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## Long Island PPTN Project Risk Assessment Register\_DRAFT – For Discussion Purposes Only

Date: 4/20/2023

<b>Project:</b>	All
<b>Developer:</b>	All
<b>Project Name:</b>	All

Item #	Risk Title	Description	Comments
<b>Environmental and Permit Concerns</b>			
E-1	Article VII Certificate	Article VII approval process could take longer than estimated in schedule for a variety of reasons ( <i>i.e.</i> , additional special studies requested by involved agencies, lack of stakeholder consensus).	Developer needs early outreach with all stakeholders and to prepare a comprehensive application. Developer's experience with Article VII process will be essential.
E-2	Other environmental approvals	Federal agency and other approvals could take longer than the state Article VII process.	Developer needs early outreach with federal agencies and others to prepare comprehensive applications and obtain approvals in parallel with the Article VII process. Could take up to 5 months if Developer files for Evidentiary Hearing.
E-3	Public Opposition	If local groups or citizens oppose the project, it could cause significant delays especially if opposition results in litigation.	Developer needs early outreach to solicit public involvement, incorporate public concerns during planning stage before project execution, build mitigation into design, and foster community buy-in.
E-4	EM&CP Approval	EM&CP approval process could take longer than estimated by the Developer in schedule.	Developer needs to prepare a comprehensive EM&CP that will meet regulatory agency requirements. Developer's experience with DPS, DEC, Ag. & Markets, and other agency requirements will be essential.
E-5	Environmental Study Findings	Environmental studies could find critical habitat, wetlands, agricultural lands, rare, threatened or endangered species, cultural or archeological sites, etc. that could require re-routing of lines or special conditions, such as seasonal restriction on construction. The time of year when studies can be conducted could also affect project schedule.	Studies need to be scheduled and conducted early in the process to ensure design and the EM&CP adequately minimizes, mitigates, or avoids environmental impacts.
E-6	Construction Approval Restrictions- Long Island Sound Crossing	Time of year restrictions will likely be imposed. The Army Corps of Engineers will likely not allow work from Jan 1 – May 31 as a condition of their Nationwide Permit. Further, based on experience in Region 1 tidal waters, NYSDEC imposes a no-work window from Jan 1 – Sept 30. These combined restrictions would result in an allowable work window of Oct 1 – Dec 31.	
E-7	Environmental Study Findings- NYSDEC Wetland and Adjacent Areas- Barrett	The wetlands and/or the 300' Tidal Wetland Adjacent Area at Barrett Substation are likely unavoidable by any project looking to construct in this area.	Mitigation in the form of restoration is anticipated to be required.
E-8	Unknown environmental conditions discovered during construction	During construction, the Developer could encounter previously unidentified issues, such as contaminated soil, archeological remains, rare, threatened or endangered species, unidentified utilities, etc.	Environmental monitor will be on-site during construction. Such findings could require relocating and/or redesigning structures resulting in construction delays.
E-9	Violation of env. requirements during construction	Construction activities could result in violations of environmental permits/approvals due to inadequate control measures or not following plans ( <i>i.e.</i> , storm water discharges) resulting in stop work notice.	The risk can be mitigated by following Best Management Practices and ensure crews are adequately trained to implement EM&CP and other environmental permit/approval requirements.

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Item #	Risk Title	Description	Comments
<b>Property, Routes and Siting Concerns</b>			
P-1	Gas pipeline mitigation	Transmission line crossings and paralleling of natural gas pipelines may require grounding or other mitigation, and natural gas pipeline entities are increasingly aware of this issue and demanding mitigation to be installed by transmission utilities.	The cost of gas pipeline mitigation studies and mitigation requirements are relatively small compared to the overall project cost. The risk can be mitigated by a study to determine the exact location of gas pipeline(s) and recommend mitigation requirements.
P-2	Transmission line crossings	Crossing of other transmission and distribution lines:  creates additional schedule risk, to the extent an outage needs to be scheduled;  creates additional operating risk, to the extent a single event could remove both elements from services; and creates cost risk to the extent unexpected costs such as raising, lowering, or relocating an existing line is required.	This risk is mitigated by early identification of all necessary crossings. For example, this risk is best minimized during construction through frequent coordination with the existing transmission line owner and installation of protective netting and other protection prior to pulling sock line and conductor. This risk can be mitigated through the development of High Risk Evolution Plans for transmission crossings, which include, at a minimum, coordination with all involved utility owners, contractors, construction and project management planning sessions and a detailed schedule of events for crossing.
P-3	Highway, Railroad Crossings, Navigable Waterway crossings	Crossing of Highways, Railroads, and Navigable Waterways creates additional risk to the project schedule and cost, depending on the requirements imposed during construction.	The risks can be mitigated by early identification of all necessary crossings. Prior to and during construction this risk is best minimized through frequent coordination with those responsible for the operation of the facilities being crossed. Develop High Risk Evolution Plans for all major highway, RR or waterway crossings which include at a minimum coordination with RR, flaggers, contractors, Local and state police / highway patrol, US Coast Guard, construction and project management planning sessions and a detailed schedule of events for crossing.
P-4	Discovery of buried utilities and other encumbrances or poor soil conditions in planned routes of underground cables	May require relocation of existing facilities and/or rerouting of new circuit.	
P-5	Additional cable vaults	Additional cable vaults might be required due to turning angle, major crossings (e.g., roadway, aqua duct, utilities, railroad).	GPR study, test pits, and engineering review.
P-6	Routing Concern- Significant Route Changes	During the Article VII process there is a risk that the final approved route may have material differences than the proposed route.	
P-7	Property Acquisitions Concern- ROW Easements and Access	Private ROW and land acquisition or public ROW Use or Consent Agreements can result in changes to route alignment, requiring additional environmental surveys, permit amendments, and construction start delay.	The risk can be mitigated by instituting early outreach with landowners and develop route refinement tracking process so that all project SMEs review potential changes.

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Item #	Risk Title	Description	Comments
<b>Construction and Operational Concerns</b>			
C-1	Supply Chain Issues	Material and equipment shortages and delayed shipments.	The risks can be mitigated by proper quality assurance during engineering to insure adequate quantities ordered. Procurement with sufficient period of float between scheduled deliveries from suppliers and when material is needed for construction and proactive monitoring and expediting.
C-2	Operational issues	Need to maintain resources for emergency response for the life of the facility.	This risk can be mitigated by maintaining a local staff, contracting with emergency restoration provider in the project area, and entering into mutual assistance agreements with neighboring utilities.
C-3	Need for additional Network Upgrade Facilities	Detailed studies, such as fault studies and protection coordination for the project, will normally be completed during the System Impact Study, the Facilities Study, and detailed engineering.	The new facilities and Upgrades proposed by the Developers as a part of its project may require replacement of breakers, protection equipment etc to connect reliably to the existing system.
C-4	Catastrophic HSE / Safety Event	High-voltage transmission and substation work is inherently dangerous. Accidents that occur on projects of this nature frequently result in serious injury or fatality. Catastrophic safety events, such as loss of life, can result in extended work stoppages across all stages of the project.	This risk can be mitigated through a robust Project and Site Safety Program implementation. Project Orientations verify training of ALL project personnel. Extensive Health, Safety and Environmental (HSE) management presence during construction helps to ensure compliance.
C-5	Construction Quality Control	Compliance with project specifications and quality can be compromised if installations are not properly monitored. Structure misalignments, improper structure framing, use of incorrect materials, etc. can result in re-work, unnecessary delays, and project overruns. Larger and complex projects that require greater resources are more susceptible to Quality Control Issues. If the NYPSC cited a contractor as being in non-compliance, the result can be extended work stoppages.	This risk can be mitigated by detailed Quality Control/Quality Assurance Plans during early planning stages and in a detailed Project Execution Plan; ensuring inspection processes are in place for all components of construction; and considering the utilization of third-party inspectors to ensure compliance.
C-6	Change Order Management - Construction Impacts	Unresolved Change Orders may result in delays to construction and impact the schedule.	This risk can be mitigated by including detailed Change Order Management Plan and process in the Project Execution Plan in order to mitigate potential delays.
C-7	Night time work	All projects have transmission routes through heavily trafficked areas and intersections with underground/overhead utilities.	Doing work during nighttime hours will mitigate this risk.
C-8	Material, fuel price	Current material and fuel escalation rate is unpredictable and could fluctuate greatly over next few years.	Establish a contingency budget to cover the increase.
C-9	Labor shortage	Labor resource to perform the construction activities and availability of qualified supervision.	Early engagement with local unions, establish bonus incentives, retainage, hiring bonuses, etc.
C-10	Work in commercial & residential area	Work hours might be restricted in the commercial and residential areas.	Early engagement and communication with communities and local authorities by PR and permitting SMEs.  Divide project into segments and work in multiple segments concurrently to mitigate the overall project schedule impact.
C-11	Bridge/overpass clearance	Low clearance for bridges/overpasses may hinder transport of high-profile equipment.	Verify clearances of all bridges/overpasses prior to construction and confirm appropriate routes for high-profile equipment.
C-12	Submarine Cable Vessel Availability	Submarine cable installation utilizes specialized cable laying vessels. There are only a limited number of these vessels worldwide—some of the vessels are owned by individual cable manufacturers. Availability may be limited.	This can be mitigated by early coordination and contracting with vessel suppliers (e.g., target 2 years in advance).

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<b>Project Name:</b>	All

Item #	Risk Title	Description	Comments
C-13	Construction Concern- Space for Trenchless Equipment	There are several crossings for all projects that require Jack and Bore or Horizontal Directional Drilling. Implementing these crossing can be challenging due to the amount of construction space required and being in close proximity to other utilities. Modifications to proposed routes may be necessary to accommodate the construction equipment.	

**Long Island PPTN Project Risk Assessment Register  
Heat Map\_DRAFT – For Discussion Purposes Only**

<b>Probability Risk Will Occur</b>	<b>Very High (VH)</b>				T043, T044
	<b>High (H)</b>			T037, T038, T041	T039, T042
	<b>Medium (M)</b>		T053	T036, T040	
	<b>Low (L)</b>		T035, T047, T048, T049, T051, T052		
		<b>Low (L)</b>	<b>Medium (M)</b>	<b>High (H)</b>	<b>Very High (VH)</b>
<b>Cost and Schedule Risk</b>					

**Long Island PPTN Project Risk Assessment Register\_DRAFT – For Discussion Purposes Only**

Date: 04/20/2023

<b>Project:</b>	T035
<b>Developer:</b>	LS Power
<b>Project Name:</b>	Atlantic Gateway

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 month	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	Comments
<b>Environmental and Permit Concerns</b>						
E-1	Cable and Pipeline Crossing	The waters surrounding Long Island and New York City contain a large number of existing submarine linear infrastructure, including electric/telecommunication cables and pipelines. Crossing of linear infrastructure will likely require approvals from the asset owner. Failure to receive permission to cross existing linear infrastructure could result in a specific submarine route not being feasible.	L	L	L	This project has 1 cable and 1 pipeline crossing.  Existing infrastructure, including pipelines, communications, and electric cables, would require authorization from the owners to cross. Most approvals would likely be part of the Article VII process, but any Connecticut or Federal approvals would be separate. LS Power's proposed alternate route avoids crossing into Connecticut's jurisdiction.
E-2	Navigation Channels and Anchorages- Lower Risk	The waters surrounding Long Island and New York City contain a large number designated channels and anchorage. Therefore, routing through this area is very complex and will cross multiple navigation features. ▪ Implications: This work will need to be completed in a manner that does not impact navigation in the busy New York port. This is likely to include HDD across high traffic areas. A USACE Section 408 permit will be required and if numerous and/or large lengths of channels/anchorages are crossed this could be a lengthy process. Additionally, crossing anchorages and channels requires increased burial depth. Current guidance from USACE is 15 feet below authorized depth or the actual maintained depth, whatever is deeper. Furthermore, if areas of high contamination are crossed, regulatory agencies could require alternate cable burial methods which could be more time consuming and costly (i.e., mechanical dredging with an environmental bucket and backfilling with clean fill).	L	L	L	This project crosses 1 navigation area and 1 anchorage area.  Crossing of Navigation Channels and Anchorage Areas would require authorization from the USACE under Section 408. The USACE may require low-impact crossing methods, such as HDD, or may deny the authorization outright.
E-3	Connecticut Permitting	A portion of the transmission route across the Long Island Sound is in close proximity to the Connecticut state boundary near the landing at Port Chester. It is recommended that the project be designed to stay within the boundaries of New York to avoid additional permitting and authorizations from Connecticut.	L	L	L	LS Power's proposed alternate route avoids crossing into Connecticut's jurisdiction.

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	Very High (VH)	High (H)	Medium (M)	Low (L)
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<b>Property, Routes and Siting Concerns</b>						
P-1	Routing Concern- Bridge Crossing	Southgate – Northgate Line: May not be able to install cable on King St. at the bridge crossing noted as D7 and D8 (see Attachment C.2A.1 Page 63) due to low clearance (approximately 3') to waterway running between two ponds.	L	M	L	LS Power's proposed Alternate B route avoids this crossing.
P-2	Property Site Concerns- Northgate substation- subsurface condition	Approximately 50% of the site could encounter rock during excavation and the site might require extensive slope protection. Site conditions will require further investigation to quantify. This could have high cost and schedule impact depending on volume of rock excavation and methods used (i.e., blasting likely not allowed in this area)	H	M	L	Independent estimate has assumed that rock excavation is required.
P-3	Property Acquisition Concern- Ruland Road	LIPA is planning to utilize available property at the site. LS Power will need to coordinate with the utility and potentially modify its layout to accommodate the LIPA-planned facility, if needed.	M	M	L	
<b>Design Concerns</b>						
D-1	Design Concern - No spare power cable conduit	Replacement of a failed cable would be more difficult without a spare conduit.	L	L	L	
D-2	Design Concern- Multiple Circuits in Same Duct Bank- Higher Risk More Than 50 miles	All three circuits are installed in the same duct for the Longshore – Southgate and Southgate – Northgate lines. This has the potential risk of two or more circuits being damaged if the duct bank was compromised.	M	M	L	Longshore – Southgate - 3 ckts, 21 miles Southgate – Northgate - 3 ckts, 29 miles
D-3	Design Concern- Barrett	The proposal identifies Barrett as a potential Network Upgrade Facility. The proposal assumed that Barrett will be rebuilt to support Empire Wind II and accommodate three 345kV lines from the proposed Longshore substation. Empire Wind II is connecting into Liotta substation.	M	H	H	
D-4	Design Concern- Potential Flooding or Inundation by Storm Surge	Some proposed substations are located in or near a 100-year or 500-year flood zone and/or have the potential for being inundated by a Category 1 storm. The proposal does not address how the substations will be designed to reduce the potential impact of flooding.	L	L	L	The project has 1 substation potentially impacted with a risk score of 7.5.



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Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	Comments
D-5	Design Concern - PARs are not equipped with Bypass Switch	A failure of one of the three 345kV PARs would result in a long-term outage of the impacted 138kV line between Longshore and Barrett. Also, an outage of the line will be required to perform maintenance on the PAR.	M	L	L	
D-6	Design Concern - Shunt Reactors are not equipped with breakers or disconnect switches	Three 345kV Lines between Longshore and Southgate have shunt reactors at each end of the lines. Failure of a shunt reactor will trip the line out of service. Also, an outage of the line will be required to perform maintenance on the shunt reactor.	M	L	L	
D-7	Design Concern- Millwood Cap Bank Yard and ROW Access Drive	The proposed GIS bus for the two Buchanan lines will be crossing the access drive to the capacitor bank yard and the transmission ROW.	M	L	L	The proposed GIS will need to be either elevated to allow vehicles to cross under or placed below ground.
D-8	Design Concern- Millwood Underground Line to Northgate	The proposed underground cable from Millwood to Northgate is being routed around the eastern side of the existing capacitor bank yard. Due to an elevation change and rocky conditions, there is an existing retaining wall along the eastern side of the capacitor bank yard.	M	L	L	The underground cable will need to be routed around the existing retaining wall.
D-9	Design Concern- Ruland Rd.	The two proposed 138kV bay additions at Ruland Rd will interfere with an overhead 138kV strain bus to Banks #2 and #4, an overhead 69kV line running from the 69kV yard to air core reactors located in the 138kV yard and an underground 138kV cable (Line 567).	H	M	L	Modifications to the existing infrastructure is required to allow the construction of the two bay additions.
D-10	Design Concern- Ruland Rd.	The one-line diagram shows that one of the 138kV ties from Southgate to Ruland Rd is going to terminate in the existing line terminal position for the 661 line to Pilgrim and the Pilgrim 661 line is to be relocated to the new bay addition. However, the Plot Plan is showing the underground connection between Southgate to Ruland Rd terminating in the incorrect line terminal position. The existing 661 line exits overhead, not underground. Also, the proposed design does not provide a method for tying the existing OH 661 line into the new bay addition.	H	M	L	The 138kV ties between Ruland Rd and Southgate and the relocation of Line 661 needs to be redesigned.
D-11	Design Concern- Southgate	The west side of the proposed Southgate substation borders a U.S. Post Office. There is a large discharge area of the property that is owned by the U.S. Post Office. The layout will need to be designed around this area.	H	L	L	

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<b>Construction and Operational Concerns</b>						
C-1	Construction Concerns- HVDC Lead-times	Due to high demand and equipment complexities, manufacturer's are quoting lead times up to 4 years. With three units being installed, it would take an additional 6 months for the second unit and another six months for the third unit to be installed, tested, and commissioned.	H	L	H	
C-2	Construction Concern- Millwood - Lines to Buchanan and Pleasant Valley Outage	Pleasant Valley (W80, W81) and Buchanan (W97, W98) lines exit the Millwood substation to a double circuit pole. The proposed design is showing two deadend structures being installed at this location to make the transition from overhead to GIS. This installation will require the outages for both lines for an extended period of time. However, this is not accounted for in the Outage Plan.	H	H	H	
C-3	Construction Concern- Millwood Access Road	Due to the terrain and rock conditions, access to the site will be difficult and the Developer's proposal did not include a design for an access road. The Transmission Owner has stated that they cannot obtain access through their facility.	M	M	L	Based on the property outline shown on the Developer's Plot Plan it appears that they could obtain access from Shingle House Rd. The view from the road shows this to have a steep slope and rocky terrain and it is adjacent to a residential home.
C-4	Construction Concern- Submarine Cable Landing Sites	Construction of the underground cables within a roadway requires approximately 30'-35' width for vehicles and equipment. Fox Island Rd near the submarine cable landing at Port Chester and Shore Rd near the submarine cable landing at Cold Springs Harbor are only 25' wide. Therefore, the entire roadways would be closed down during construction eliminating the only access to homes and businesses.	VH	VH	M	Utilizing the proposed alternate landing locations would mitigate this concern. However, utilizing the alternate route will result in longer transmission lines (4 miles additional terrestrial cables).

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Date: 04/20/2023

<b>Project:</b>	T036-T044
<b>Developer:</b>	NextEra
<b>Project Name:</b>	Core 1, 2, 3, 4, 5, 6, 7, Enhanced 1, Enhanced 2

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
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Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T036 Core 1	T037 Core 2	T038 Core 3	T039 Core 4	T040 Core 5	T041 Core 6	T042 Core 7	T043 En 1	T044 En 2	Comments
<b>Environmental and Permit Concerns</b>															
E-1A	Cable and Pipeline Crossing	The waters surrounding Long Island and New York City contains a large number of existing submarine linear infrastructure, including electric/telecommunication cables and pipelines. Crossing of linear infrastructure will likely require approvals from the asset owner. Failure to receive permission to cross existing linear infrastructure could result in a specific submarine route not being feasible.	L	L	L	X	X	X		X	X				These projects have 1 or 2 cable crossings.  Existing infrastructure, including pipelines, communications and electric cables, would require authorization from the owners to cross. Most approvals would likely be part of the Article VII process, but any Federal approvals would be separate.
E-1B	Cable and Pipeline Crossing	See E-1A	M	L	L				X						This project has 4 cable crossings and 3 pipe crossings.  Existing infrastructure, including pipelines, communications, and electric cables, would require authorization from the owners to cross. Most approvals would likely be part of the Article VII process, but any Federal approvals would be separate.
E-1C	Hudson River Routing- Cable and Pipeline Crossings: To Buchanan	There are a large number of existing pipelines/cables (i.e., Lower New York Bay Lateral Pipeline, multiple Narrows Cables/Pipeline Areas, Neptune Transmission, Bayonne Energy Center, 3 Cross Hudson Pipelines, and a large number of telecom cables) that must be crossed. • Implications: Owner approval to cross these is likely required. Failure to get owner approval could be a potential no/go for a proposed route. Proper setbacks must be maintained to ensure no impacts to existing infrastructure.	VH	H	VH							X	X	X	These projects have as many as 33 cables and 8 pipeline crossings.  Existing infrastructure, including pipelines, communications, and electric cables, would require authorization from the owners to cross. Most approvals would likely be part of the Article VII process, but any New Jersey or Federal approvals would be separate.  The lines to Buchanan (T042 and T044) and the lines from Farragut to Sprain brook Landing (T042, T043 and T044) have the potential to cross into New Jersey territory.

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E-2A	Navigation Channels and Anchorages- Higher Risk	Upper NY Harbor is almost entirely covered in designated channels and anchorage. Therefore, routing through this area is very complex and will cross multiple navigation features. • Implications: This work will need to be completed in a manner that does not impact navigation in the busy NY port. This is likely to include HDD across high traffic areas. However, within some areas of Upper NY Bay, HDD can be difficult given limited viable locations for entry/exit pits and laydown areas given these navigation features. A USACE Section 408 permit will be required and if numerous and/or large lengths of channels/anchorages are crossed this could be a lengthy process. <u>Given the large number/length of crossings and potential to impact navigation, permit issuance is not a guarantee.</u> Additionally, crossing anchorages and channels requires increased burial depth. Current guidance from USACE is 15 feet below authorized depth or the actual maintained depth, whatever is deeper. USACE also recently authorized a new NY/NJ Harbor Deepening Study to investigate increasing dredge depths within NY Harbor. Furthermore, if areas of high contamination are crossed, regulatory agencies could require alternate cable burial methods which could be more time consuming and costly (i.e., mechanical dredging with an environmental bucket and backfilling with clean fill).	M	M	M				X			X	X	X	These projects cross as many as 6 navigation channels and 8 anchorage areas. Crossing of Navigation Channels and Anchorage Areas would require authorization from the USACE under Section 408. The USACE may require low-impact crossing methods such as HDD or may deny the authorization outright. Has a potential need for re-routing.
E-2B	Navigation Channels and Anchorages- Lower Risk	See E-2A	L	L	L	X	X	X		X	X				These projects cross 1 anchorage area.
E-3A	Contaminated Sediment- Hudson River from Battery to 200 Miles North.	The seafloor sediments in the areas surrounding Long Island and New York City contain known areas of contamination, as well as areas that are likely to contain contaminated sediments as a result of historic industrial activities and discharges. The bottom disturbance necessary to install a submarine cable into the seafloor has the potential to resuspend these contaminated sediments. Agencies are likely to require avoidance and rerouting around areas of high contamination. This area is considered Federal and NY State Superfund Site as a result of PCB contamination. - Implication: Sediment sampling will be required and if impacts found, mitigation measures or rerouting could be required.	H	M	H				X			X	X	X	Approximate length of Hudson River PCB Superfund crossed: T039 - 19 miles T042 - 41 miles T043 - 59.5 miles T044 - 60 miles  Potential risk of not getting approval.

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Date: 04/20/2023

Project:	T036-T044
Developer:	NextEra
Project Name:	Core 1, 2, 3, 4, 5, 6, 7, Enhanced 1, Enhanced 2

	Very High (VH)	High (H)	Medium (M)	Low (L)
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E-3B	Contaminated Sediment- Lower New York Bay, Upper New York Bay, and the East River	See E-3A.This area has either known contamination or suspected contamination.	M	M	H				X			X	X	X	

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E-4	Expansion into East River- New Farragut Substation	NYC Department of Small Business Services is the agency that issues permits for improvement and maintenance to waterfront structures and NYC owned waterfront buildings. The proposed expansion into the East River appears to be in a mapped V-Zone based on the NYC Preliminary Flood Insurance Rate Maps. Pursuant to G304.2 V-Zone Construction Standards Section 6, (NYC, 2022) Development, including land-disturbing activities, seaward of the reach of mean high tide are prohibited. Therefore, to develop a pier in this area which appears to be prohibited under the above code, a variance from the Board of Standards and Appeals would likely be needed.	H	M	H		X	X	X				X	X	If permit is not granted, a different site or redesign would be required.
E-5	Farragut SPCC/SPDES	Utilizing oil-filled shunt reactors for the new Farragut 345kV substation being built on a platform in the East River may have difficulty with SPCC and SPDES permitting. High risk that an equipment failure would result in oil reaching navigable waterway.	L	L	L		X	X	X				X	X	
E-6	East River Tunnel Crossings- Farragut-Sprain Brook 345kV	Routes cross five Subway tunnels and the Battery Tunnel. MTA, Port Authority of NY/NJ, and potential other owners are likely to require permission to cross these pieces of infrastructure. There does not appear to be much of a precedent for crossing these tunnels with linear infrastructure. Has the potential of being a "no/go" condition if owners do not allow permission to cross. Moreover, the East River has potential shallow bedrock and the tunnels in the East River are in some cases very old and shallow. This could add further complications to crossing these tunnels. If proper burial depths could not be reached while crossing, armoring of the lines could be logistically challenging given some tunnels' ages.	M	M	H				X				X	X	5 tunnels will need to be crossed.
E-7	Hudson River Routing- Tunnel Crossing: To Buchanan and Farragut- Sprain Brook 345kV	Hudson Tunnels including the Lincoln, Holland, NJ Transit and multiple PATH tunnels will need to be crossed. MTA, Port Authority of NY/NJ, and potential other owners are likely to require permission to cross these pieces of infrastructure. There does not appear to be much of a precedent for crossing these tunnels with linear infrastructure.	H	H	H				X			X	X	X	5-10 tunnels will need to be crossed.  Has the potential of being a "no go" condition if owners do not allow permission to cross.

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E-8	Hudson River Routing- The Narrows: To Buchanan	The Narrows themselves and the areas immediately north pose a physical constraint in the number of cables coming into Upper NY Harbor. An offshore wind project is proposing to come in on the east side of Ambrose Channel going to Gowanus substation and other offshore wind projects are likely considering to directly interconnect from offshore wind sites to onshore substations in New York City. Additionally, NYSDERDA was investigating meshed vs. radial interconnection to bring cables into NYC area given these constraints. • Implications: Given the limited amount of space that physically exists in the Narrows and setbacks between cables necessary for installation and maintenance, only a finite number of cables can be routed here. Ambrose Channel is the only deep draft channel to Upper New York Bay and is highly important to commerce; routing within the channel and limiting its navigability is likely to be an issue. Depending on the timing of the transmission project and the offshore wind generationTherefore, cables will likely need to be routed outside the Ambrose Channel. The abutments of the Verrazano Bridge further reduce the size of this area.	H	H	H							X	X	X	The density of existing infrastructure and regulated areas, and large number of users in this area add complexity to any routes passing through The Narrows.
E-9	Permitting Concern- Sprain brook Bay Addition	345kV AIS Bay addition will require a very large and complex retaining wall to accommodate the 60'-90' drop-off. It will be difficult to obtain permits due to its impact on the residential neighborhood.	VH	M	VH	X	X	X	X	X	X	X	X	X	
E-10	Permitting Concern- Cable Landing and Transition Substation at Davenport Park	Transition stations are required to interconnect the proposed 2-submarine cables per phase with the single terrestrial cable per phase. The proposed location where the submarine cables are coming ashore in the New Rochelle area at Davenport Park is in sensitive areas due to the park, beach, and adjacent country club. Construction of a transition station in these areas would have significant visual impact and may be subject to public opposition that may require relocation away from those sensitive areas. A similar project constructed in the 1990s in this area (near Davenport Park in New Rochelle) required securing property and the construction of a sizeable indoor substation building with a "residential" façade to hide the station.	H	M	H	X	X	X	X	X	X	X	X	X	

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E-11	Permitting Concern-Cable Landing and Transition Substations for Sprain Brook - Farragut	A transition station is required to interconnect the proposed 2-submarine cables per phase with the single terrestrial cable per phase. The proposed location where the submarine cables are coming ashore at Sprain Brook landing is for a marina with limited space. Construction of a transition station in this area would have significant visual impact and may be subject to public opposition that may require relocation away from those sensitive areas.	VH	H	H				X				X	X	
E-12	Permitting Concern-Cable Landing at Buchanan	The proposed landing for the cable going to Buchanan is at a commercial boat docking area. It may be difficult to obtain permits or construction may be limited to specific time of year due potential impact to commercial operations parking.	H	M	M								X	X	
E-13	Permitting Concern-Cable Landing and Transition Substations for Buchanan - Barrett	A transition station is required to interconnect the proposed 2-submarine cables per phase with the single terrestrial cable per phase. The proposed location at Long Beach where the submarine cables are coming ashore is a sensitive area. Construction of transition stations in this area would have significant visual impact and may be subject to public opposition that may require relocation away from those sensitive areas.	VH	H	H								X		



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<b>Property, Routes and Siting Concerns</b>															
P-1	Property Acquisition Concern - Proposed 345kV East Garden City Substation	The fenced area shown on the plot plan appears to impact the rear access for two adjacent commercial buildings.	H	M	L	X	X	X	X	X	X	X	X	X	Potential impact to adjacent buildings may require their purchase or other arrangement.
P-2	Route Concern- East Garden City Line Exits	All of the underground lines exiting East Garden City as shown in the map books are being routed in Stewart Ave, which is a busy road and congested with other existing underground utilities. This will make it difficult to construct. Obtaining sufficient available space within the public easement may be difficult such that there may not be sufficient space to install all of the lines.	H	H	H	X	X	X	X	X	X	X	X	X	Lines being routed in Stewart Ave include: 1 - 345kV to Dunwoodie (or 1 - 345kV to Farragut), 2 - 345kV to Sprain brook, 3 - 138kV to Newbridge 3 - 138kV to Valley Stream.  Modifications to routes may be required.
P-3	Property Acquisition Concern - Sprain Brook	The addition of the three 345kV reactors are not entirely located within the utility's property. An adjacent property will need to be obtained.	H	L	L	X	X	X	X	X	X	X	X	X	
P-4	Property Acquisition Concern- Transition Station at Hempstead Harbor	A transition station is required to interconnect the proposed 2- submarine cables per phase with the single terrestrial cable per phase. The proposed location for the submarine cables coming ashore at Tappen Beach for the New Rochelle-Hempstead Harbor line is an existing gas regulator station.	VH	VH	M	X	X	X	X	X	X	X	X	X	The transition station will need to be built on a different site. May increase length of transmission lines.

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<b>Design Concerns</b>															
D-1	Design Concern - Jamaica	The proposed design does not meet Con Edison's design principle. The proposed location for the breaker addition as shown on the Plot Plan is electrically in the wrong location. There is not sufficient space to install the breaker at the location proposed by the Developer. The location for the line exit down the side of the building would interfere with the building's door entrance and other equipment already mounted on the side of the building. Routing the underground cable through the parking lot will be difficult due to two water lines that are installed for the fire deluge system. Installing additional equipment on the roof of an existing building may result in the need for significant structural reinforcement. Spacing is extremely congested. The installation of GIS bus and equipment would require the existing, open air 138kV bus to be de-energized to safely conduct the work. Any future maintenance on the GIS bus, or replacement thereof due to electrical failure, would require other station components, such as open-air bus, to be de-energized.	VH	VH	M	X	X	X	X	X	X	X	X	X	Per Con Edison's specification (CE-ES-2002-I), equipment needs to be arranged such that a failure does not jeopardize the continued operation of the facility. The most likely means for mitigation would be to build a new facility on an adjacent property.
D-2	Design Concern- Northport HVDC	Design shows three 138kV lines tied to the HVDC converter. However, there is no means shown or space provided for tying these lines together and connecting to the HVDC interface transformers. Interconnecting the HVDC to 138kV results in high current (5000A), which increases the complexity of the design. The space allocated is the same as Sprain brook which ties to one 345kV line.	H	M	L						X	X	X	X	Assumed a 3-breaker ring will be required. Costs are included in Independent cost estimate.
D-3	Design Concern- Northport	The underground cables running the length of the existing substation from the proposed transformers to the proposed GIS will be crossing several 12'-16' deep tunnels that run from the plant to the discharge area across the substation. Some are only 5'-6' below grade. These may cause interference with installing the proposed cables.	H	M	M			X	X	X	X	X	X	X	
D-4	Design Concern- Northport	The location for the proposed transformer and 345kV line and the proposed HVDC facilities may interfere with an existing 8" oil pipe that runs from off the coast to the oil tank farm.	M	M	L			X	X	X	X	X	X	X	

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D-5	Design Concern-Barrett HVDC	Design shows three 138kV lines tied to the HVDC converter. However, there is no means shown nor space provided for tying these lines together and connecting to the HVDC Interface transformers. Interconnecting the HVDC to 138kV results in high current (5000A) which increases the complexity of the design. The space allocated is the same as Sprain Brook which ties to one 345kV line.	H	M	L								X		Assumed a 3 breaker ring will be required. Costs are included in Independent cost estimate.
D-6	Design Concern-Buchanan HVDC	Design calls for two HVDC stacked converters. However, the space shown is the same as for one converter. Additional property may be required for additional equipment for two converters.	H	H	L									X	
D-7	Design Concern-Buchanan HVDC	The planned location for the HVDC station impacts an existing 345kV transmission line. The proposed design does not address the relocation of the line.	H	M	L							X		X	
D-8	Design Concern-HVDC Cable Size	Estimate documents state that the size for the HVDC cable is to be 2000mm <sup>2</sup> . This size cable is the minimum required to meet the ampacity requirements. It may be determined to be undersized during detailed engineering once specific Geotech information, cable crossings and duct bank configuration are determined.	M	M	L						X	X	X	X	Independent estimate utilized a larger size cable.
D-9	Design Concern-345kV PAR East Garden City	Manufacturer, who responded to SECO's budgetary quotation request, indicated that PAR of the proposed size (1050 MVA) cannot be built. Two 3-phase or three 1-phase parallel PARs are required. Design modification is required. There may not be sufficient space to accommodate additional equipment.	H	H	L	X	X	X	X	X	X	X	X	X	Additional property may need to be acquired. Independent estimate included cost for two 3-phase PARs.
D-10	Design Concern-345kV PAR Ruland Road	Manufacturer, who responded to SECO's budgetary quotation request, indicated that PAR of the proposed size (1050 MVA) cannot be built. Two 3-phase or three 1-phase parallel PARs are required. Design modification is required. There may not be sufficient space to accommodate additional equipment.	H	H	L		X	X					X	X	Additional property may need to be acquired.
D-11	Design Concern-345kV PAR Buchanan	Manufacturer, who responded to SECO's budgetary quotation request, indicated that PAR of the proposed size (1050 MVA) cannot be built. Two 3-phase or three 1-phase parallel PARs are required. Design modification is required. There may not be sufficient space to accommodate additional equipment.	H	H	L									X	Additional property may need to be acquired.
D-12	Design Concern-Newbridge Road Underground Cable Crossings	138kV underground cables will be crossing each other and crossing 345kV underground cables within the substation. This will require deeper duct banks and will impact the cables' ampacity ratings.	H	L	L	X	X	X	X	X	X	X	X	X	Final cable sizing will need to take into account the cable depths and the crossings in the substation.

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D-13	Design Concern-Newbridge	The proposed location for the new GIS is currently occupied by a 138kV bay that ties to the low side of Bank #2 and the high side of Bank #9. The bay area is elevated approximately 10' above the rest of the station. The proposed GIS building extends beyond this elevated area requiring additional grading and a retaining wall. Also the GIS building will interfere with an existing oil pump building and an underground oil tank.	H	M	L	X	X	X	X	X	X	X	X	X	The existing oil pump building and associated oil lines along with the oil tank will need to be relocated.
D-14	Design Concern-Dunwoodie 345kV Existing Lines	The proposed location for the 345kV GIS is in the ROW of three 345kV transmission lines. The design does not provide a means to relocate the existing three 345kV lines to allow the GIS building to be constructed nor a means to interconnect them into the proposed substation. Due to the low-grade clearances and two of the existing lines being on double circuit poles in a vertical orientation, it will be very difficult to transition the lines to underground cables or GIS while meeting the system outage and restoration requirements.	VH	VH	VH	X	X	X	X	X	X	X	X	X	Will require long outages of the 3-345kV lines.
D-15	Design Concern-Dunwoodie New 345kV Line Exits	Due to a rock outcropping and a significant drop in elevation along the eastern side of the substation and ROW, it will be difficult to route a new underground line out of the proposed GIS towards the east, as proposed.	H	H	L	X	X	X	X	X	X	X	X	X	
D-16	Design Concern-Sprain Brook Bay	Proposed 345kV AIS bay on the east side of the substation will be very difficult to construct due to the 90' drop off in this area. A very large and complex retaining wall would be necessary which is not included in NextEra's design. It will be difficult to construct due to the limited access available and the impact on the residential neighborhood.	VH	VH	H	X	X	X	X	X	X	X	X	X	
D-17	Design Concern-Sprain Brook Proposed 345kV Line Exits	Due to a rock outcropping and a significant drop in elevation along the eastern and western side of the substation, it will be difficult to route an underground line, as proposed.	H	H	L	X	X	X	X	X	X	X	X	X	
D-18	Design Concern-Potential Flooding or Inundation by Storm Surge	Some proposed substations are located in or near a 100-year or 500-year flood zone and/or have the potential for being inundated by a Category 1 storm. The proposals do not address how the substations will be designed to reduce the potential impact of flooding.	H	M	L	X	X	X	X	X	X	X	X	X	Projects have five to ten substations potentially impacted with a Risk score ranging from 19 to 45. With 45 being the highest risk score of all proposals evaluated.

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D-19	Design Concern - PARs are Not Equipped with Bypass Switch- Corona and Buchanan	A failure of the PAR at Corona will result in a long-term outage of the 138kV line from Corona to Jamaica and failure of PAR at Buchanan will result in a long-term outage of the 345kv line from Buchanan to Eastview. Also, an outage of the lines will be required to perform maintenance on the PAR.	M	L	L									X	
D-20	Design Concern- Farragut Substation	The proposed design does not meet Con Edison's design principle. The proposed design requires the use of 345kV Gas Insulated Bus Work (GIB) and 345kV cables to connect the proposed substation to the existing facility. The installation of GIB would impede the replacement of existing Con Edison assets and the operations of the facility. Due to the below grade congestion around the Farragut substation, it is not feasible to install underground cables.	VH	H	H		X	X	X				X	X	
D-21	Design Concern - Reactors Not Equipped With Breakers- Buchanan, Ramapo and Sprain brook.	A failure of a shunt reactor will result in a long-term outage of the associated 345kV lines. Also an outage of the line will be required to perform maintenance.	M	L	L	X	X	X	X	X	X	X	X	X	One 345kV Reactor at Buchanan One 345kV Reactor at Ramapo Up to three 345kV Reactors at Sprain Brook
D-22	Design Concern- Multiple Circuits in Same Duct Bank- Lower Risk 50 miles or less	All projects included transmission sections where multiple circuits are installed in the same duct bank. This has the potential for all circuits being damaged if a strike occurred.	L	L	L	X		X	X	X	X				Five or less segments totaling less than 50 miles.
D-23	Design Concern- Multiple Circuits in Same Duct Bank- Higher Risk More Than 50 miles	All projects included transmission sections where multiple circuits are installed in the same duct bank. This has the potential for all circuits being damaged if a strike occurred.	M	L	L		X					X	X	X	Six or more segments totaling more than 50 miles.
D-24	Design Concern- Rainey	The proposed design does not meet Con Edison's design principle. Due to the location of the existing access road, surrounding equipment and a below grade oil tank, there is insufficient space between breakers 1E and 2E for the installation of a line terminal. Also it will be very difficult to install the underground cable through the substation, as proposed, due to interference with existing tunnels that run between Rainey and the Ravenswood plant, transformer oil containment pits and a security brick wall.	VH	VH	H	X	X	X	X	X	X	X	X	X	Major modifications to the existing infrastructure would be required to accommodate this installation.

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D-25	Design Concern-Rainey	Due to the location of the existing access road and surrounding equipment, there is insufficient space between breakers 1W and 2W for the installation of a line terminal. Also, it will be very difficult to install the underground cable through the substation, as proposed, due to interference with existing cable trench and crossing through the area of a newly installed transformer and PAR located on the north side of the substation.	VH	VH	H	X	X	X	X	X	X	X	X	X	Major modifications to the existing infrastructure would be required to accommodate this installation.
D-26	Design Concern-Ruland Rd.	The location for Line 562's new transition pole from overhead to underground is located in the center of the main access driveway.	L	L	L	X	X	X	X	X	X	X	X	X	New transition pole will need to be relocated. Modification to existing transmission tower will probably be required.
D-27	Design Concern-Ruland Rd.	There is insufficient space to add a breaker and line terminal position between breaker 1420 and the main bus.	H	M	M	X	X	X	X	X	X	X	X	X	Major modifications to the existing infrastructure would be required to accommodate this installation.
D-28	Design Concern-Valley Stream	There is insufficient space to add a breaker and line terminal position between breakers 1430 and 1450.	H	M	M	X	X	X	X	X	X	X	X	X	Major modifications to the existing infrastructure would be required to accommodate this installation. Also an existing oil pump building would need to be relocated.
D-29	Design Concern-Pilgrim	There is insufficient space to add a breaker(s) and line terminal position(s) between breakers 1350, 1390, and 1310.	H	M	M			X			X	X	X	X	Major modifications to the existing infrastructure would be required to accommodate this installation.

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<b>Construction and Operational Concerns</b>															
C-1	Construction Concern Installing Underground Cables in Existing Substations.	Installing proposed underground cables in the existing substations will be difficult without impacting existing foundations, conduit/trench systems, grounding, and buswork. Such installation could require additional or concurrent outages, complex construction sequences and/or more expensive construction methods.	H	M	M	X	X	X	X	X	X	X	X	X	Number of underground cables being routed through the existing substations include: Barrett - five 138kV cables EGC - three 138kV cables (2 cables cross each other) and two 345kV cables Newbridge - six 138kV cables with 13 crossings and four 345kV cables Rainey - three 345kV cables Ruland Rd. - three 138kV cables Valley Stream -three 138kV cables Corona - one 138kV cable Farragut - one or two 345kV cables Northport - five 138kV cables
C-2	Construction Concerns- HVDC Lead Times	Due to high demand and equipment complexities, manufacturers are quoting lead times up to 4 years for onshore HVDC converter stations and 5 years for onshore/offshore HVDC converter stations. It will take an additional six months to install, test, and commission a second unit.	H	L	H						X	X	X	X	
C-3	Construction Concerns- Sprain Brook HVDC Substation - Subsurface Condition	Approximately 90% of the site could encounter rock during excavation and the site might require extensive slope protection. Site conditions will require further investigation to quantify. This could have high cost and schedule impact depending on volume of rock excavation and methods used (i.e., blasting likely not allowed in this area)	H	M	L						X	X	X	X	Independent estimate has assumed that rock excavation is required.
C-4	Construction Concerns- New Rochelle-Dunwoodie, New Rochelle-Sprain Brook	Construction of the underground cables within a roadway requires approximately 30'-35' width for vehicles and equipment. Davenport Ave and Church St. near the Davenport Park transition station are only 25' wide. Therefore, the entire road way would be closed down during construction eliminating the only access to homes on the peninsula.	VH	VH	M	X	X	X	X	X	X	X	X	X	An alternate route will be required which may increase the length of the circuits.

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Date: 04/20/2023

<b>Project:</b>	T036-T044
<b>Developer:</b>	NextEra
<b>Project Name:</b>	Core 1, 2, 3, 4, 5, 6, 7, Enhanced 1, Enhanced 2

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 months	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T036 Core 1	T037 Core 2	T038 Core 3	T039 Core 4	T040 Core 5	T041 Core 6	T042 Core 7	T043 En 1	T044 En 2	Comments
C-5	Construction Concern- Pipe Type Cables	One 345kV line and several 138kV transmission lines that are to be intercepted and tied into a proposed substation are oil-filled, pipe type cables. Tying into these type of cables requires managing the oil pressure and transitioning to EPR which adds an additional level of complexity to the construction. The extent of work required will be dependent on the cable's condition and age.	H	L	L	X	X	X	X	X	X	X	X	X	Barrett-Valley Stream 291 and 292 transition from EPR to oil pipe type cables in a vault outside of the Barrett substation. The pipe cables are tied together and the oil pressure is managed at Valley Stream. Barrett-Freeport 459 line Northport-Pilgrim 672, 677, 679 transition from EPR to oil pipe type cables in a vault outside of the Northport substation. Rainey-Mott Haven
C-6	Construction Concern- East Garden City 345kV Underground Cables to PARs	The proposed route for the underground cables to tie the existing 345kV PARs to the proposed GIS substation is along the west side of the substation heading north. Along the west side of the substation is a double-circuit overhead 138kV Lines 361 and 362 along with an overhead distribution circuit and communication circuit. There is a large double-circuit lattice structure for Lines 361 and 362 located in the north west corner of the substation adjacent to a building. Due to these interferences it will be very difficult to install the 345kV cables through this area.	H	L	L	X	X	X	X	X	X	X	X	X	An alternate route for the 345kV PARs will be required.
C-7	Construction Concern- East Garden City 345kV Cables to Transformers and 138kV Cable to Proposed PAR	The proposed route for the underground cables to tie the existing 345kV transformers to the proposed GIS substation and the 138kV cable to the proposed PAR are exiting towards the east and then turning north. It will be difficult to exit the substation to the east since there are three gas lines (30", 20", 8"), one 138kV pipe-type cable (Line 463), and 8" water lines that run North-South along the east side of the station that will need to be crossed.	H	L	L	X	X	X	X	X	X	X	X	X	An alternate route for the 345kV transformers would be required.
C-8	Construction Concern- Outages of Existing Facilities	In order to construct the project several existing elements (transformers, PARs, transmission lines, main busses) will need to be removed from service. Being able to schedule outages can impact the project schedule. Having a single element or multiple concurrent elements out of service can impact the reliability of the system.	VH	M	H	X	X	X	X	X	X	X	X	X	Number of elements out of service for 7 days or more: 51-58 Maximum # of concurrent elements: 5 # of elements out for more than 90 days: 7



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Date: 04/20/2023

<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 months	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
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Environmental and Permit Concerns												
E-1	Cable and Pipeline Crossing	The waters surrounding Long Island and New York City contains a large number of exiting submarine linear infrastructure, including electric/telecommunication cables and pipelines. Crossing of linear infrastructure will likely require approvals from the asset owner. Failure to receive permission to cross exiting linear infrastructure could result in a specific submarine route not being feasible.	L	L	L	X	X	X	X	X	X	These projects have 1 cable crossing.  Existing infrastructure, including pipelines, communications and electric cables, would require authorization from the owners to cross. Most approvals would likely be part of the Article VII process, but any federal approvals would be separate.
E-2	Navigation Channels and Anchorages- Lower Risk	The waters surrounding Long Island and New York City contain a large number designated channels and anchorage. Therefore, routing through this area is very complex and will cross multiple navigation features. • Implications: This work will need to be completed in a manner that does not impact navigation in the busy New York port. This is likely to include HDD across high traffic areas. A USACE Section 408 permit will be required and if numerous and/or large lengths of channels/anchorages are crossed this could be a lengthy process. Additionally, crossing anchorages and channels requires increased burial depth. Current guidance from USACE is 15 feet below authorized depth or the actual maintained depth, whatever is deeper. Furthermore, if areas of high contamination are crossed, regulatory agencies could require alternate cable burial methods, which could be more time consuming and costly (i.e., mechanical dredging with an environmental bucket and backfilling with clean fill).	L	L	L	X	X	X	X	X	X	These projects cross 2 navigation areas and 3 anchorage areas.  Crossing of Navigation Channels and Anchorage Areas would require authorization from the USACE under Section 408. The USACE may require low-impact crossing methods such as HDD, or may deny the authorization outright.

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Date: 04/20/2023

<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 months	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
E-3	Contaminated Sediment- East River	The seafloor sediments in the areas surrounding Long Island and New York City contain known areas of contamination, as well as areas that are likely to contain contaminated sediments, as a result of historic industrial activities and discharges. The bottom disturbance necessary to install a submarine cable into the seafloor has the potential to resuspend these contaminated sediments. Agencies are likely to require avoidance and rerouting around areas of high contamination. This area has either known contamination or suspected contamination.	L	L	L	X	X	X	X	X	X	This impacts 1 Circuit to Tremont- 1.2 Miles  Propel NY plans to cross the river using Horizontal Directional Drilling (HDD). Based on this plan, there is minimal chance that contaminated sediment will be impacted.
E-4	Contaminated Site- Northport	The proposed location for the HVDC converter station at Northport is at a large above-ground storage oil tank farm. Subsurface contamination could be found here. The need to address the contamination could impact cost and schedule. A full environmental survey prior to construction may be required to ensure there is no soil contamination.	M	M	M						X	

Property, Routes and Siting Concerns												
P-1	Property Acquisition Concern- Eastern Queens	Utility may be utilizing available property at the site. If Propel NY is unable to secure property, current plan may not contain sufficient property to build the proposed substation.	H	M	L					X	X	
P-2	Property Acquisition Concern- East Garden City	Utility may be utilizing available property at the site. If Propel NY is unable to secure property, current plan may not contain sufficient property to build the proposed substation.	M	M	L	X		X	X	X		
P-3	Route Concern- East Garden City Line Exits	Some of the underground lines exiting East Garden City, as shown in the map books, are being routed in Stewart Ave, which is a busy road and congested with other existing underground utilities. This will make it difficult to construct. Obtaining sufficient available space within the public easement may be difficult such that there may not be sufficient space to install all of the lines.	M	M	M	X		X	X	X		Lines being routed in Stewart Ave include: 1-345kV EGC-Tremont (Base 1, 3, Alt 5 and Alt 6) 1-345kV EGC- Shore Rd. (Base 1, 3, Alt 5 and Alt 6) 1-345kV EGC- Eastern Queens (Alt 6 Only) 1-138kV EGC-Shore Rd. (Base 3 Only)

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Date: 04/20/2023

<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 month	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
P-4	Property Acquisition Concern- Northport	The proposed location for the HVDC converter station at Northport is at a large above-ground oil storage tank farm. This site is currently in use as back up source for the power plant.	H	M	L						X	A new site would need to be identified.

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<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 month	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
<b>Design Concerns</b>												
D-1	Design Concern- Use of 5900kcmil DC Submarine Cable	A conductor size above 5000kcmil will likely limit the number of manufacturers that are able to offer this size cable. 345kV cables sized 5900kcmil are at the limit of manufacturing capability. There is a risk that the 5900kcmil does not meet the capacity requirement once specific Geotech information, cable crossings, and duct bank configuration are determined during detailed engineering. Since a larger size cable is unavailable, the only option would be to use multiple cables per phase to satisfy ratings, which would require a larger cable trench to accommodate more conduits.	L	M	M						X	
D-2	Design Concern- Multiple Circuits in Same Duct Bank- Lower Risk 50 Miles or Less	There is one line segment that has two circuits in the same duct bank. This has the potential risk of two or more circuits being damaged if the duct bank was compromised.	L	L	L			X	X	X	X	Base 3: Barrett-EGC- 2 ckts, 8.8 Miles Alt 5: Shore Rd-New Rochelle-Sprain Brook- 2 ckts, 8.1 miles Alt 6: EGC to Eastern Queens- 2 ckts, 11.7 miles Alt 7: Barrett-Eastern Queens 2 ckts, 11 miles
D-3	Design Concern - No Spare Power Cable Conduit	Replacement of a failed cable could be more difficult without a spare conduit.	L	L	L	X	X	X	X	X	X	
D-4	Design Concern- Barrett Offshore Wind Interconnection	The proposal assumes that a new offshore wind substation that connects into Barrett will be designed to accommodate two 345kV lines from Propel NY's proposed Barrett substation.	M	H	H	X	X	X	X	X	X	
D-5	Design Concern- Potential Flooding or Inundation by Storm Surge	Some new substations are located in or near a 100-year or 500-year flood zone and/or have the potential for being inundated by a Category 1 storm.	M	M	L	X	X	X	X	X	X	Projects have 3 to 5 substations potentially impacted with a risk score ranging from 16 to 24.
D-6	Design Concern - PARs are Not Equipped with Bypass Switch	Without a means to bypass a PAR, its failure will result in a long-term outage of the associated line. Also, an outage of the line will be required to perform maintenance on the PAR.	M	M	L	X	X	X	X	X	X	There are a total of four to nine PARs in a project.

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<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 months	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
D-7	Design Concern- Dunwoodie- Insufficient Space for Line Terminal	Per the one-line diagram, the project plans to add a 345kV line terminal to Eastern Queens between the breakers 6 and 8. However, the plot plan shows the connection to the existing GIS equipment between breakers 3 and 4. There is not sufficient space between breakers 6 and 8 to add the line terminal.	VH	H	H					X	X	A significant rebuild of the existing GIS would be required to add this line terminal leading to long outages of the facilities.
D-8	Design Concern- Dunwoodie Proposed 345kV Line Exit	Due to a rock outcropping and a significant drop in elevation along the eastern side of the substation and ROW, it will be difficult to route an underground line out of the proposed GIS towards the east, as proposed.	H	H	L					X	X	
D-9	Design Concern- Sprain Brook Proposed 345kV Line Exits	Due to a rock outcropping and a significant drop in elevation along the eastern and western side of the substation, it will be difficult to route an underground line, as proposed.	H	H	L	X	X	X	X	X	X	
D-10	Design Concern- Tremont	The proposed GIS equipment, which Propel NY preliminary identified as a potential NUF, is to be installed at the location of the existing bus connections between Banks 1 and 2 and the tie to the 345kV X28 line to Sprain Brook. The construction of the proposed NUF would require an extensive outage of the transformers and the line. Also, the proposed location of the control house will cut off access to the northern side of the substation.	H	M	M	X	X	X	X	X	X	In order to mitigate the outage, the potential GIS equipment may need to be installed on an adjacent property.
D-11	Design Concern- Barrett 138kV	There is insufficient space to replace the existing breaker 1330 with a double PASS breaker due to a large lattice deadend structure that would interfere with this	H	L	L		X				X	To mitigate this concern, the deadend structure would need to be relocated.
D-12	Design Concern- East Garden City Proposed 345kV Reactor	The location for the proposed 345kV reactor will interfere with a main cable trench and access road. In addition, the Plot Plan provided incorrectly shows the location of the existing Y49 line exit. Therefore, the proposed 345kV reactor will extend further to the west than shown. It may not fit within the fenced area of the substation. Also, the reactor would be installed under the double ckt overhead Lines 361 and 362, a distribution, and communication circuits.	H	H	M		X				X	Additional property may be required. Outages of Lines 361 and 362 may be required during construction, which is not identified in the Outage Plan. Also relocation of the distribution and communication circuits would be required.

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Date: 04/20/2023

<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 month	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
D-13	Design Concern- East Garden City 345kV Cables to Existing PARs	The proposed route of the 345kV cables from the existing PARs to the proposed substation is shown being routed through the 69kV yard. This will need to be routed around this existing equipment, including two new switchgear buildings, which do not show up the aerial view of the substation.	M	L	L	X		X	X	X		
D-14	Design Concern- Newbridge	Circuit breaker 1460 is to be replaced with a double PASS breaker. However, there are two underground cables (Lines 463 and 465) crossing this area, which may cause interference with the breaker's foundation.	L	L	L	X		X	X	X		
D-15	Design Concern- Northport	The new 138kV underground cables running to the proposed PAR will cross several 12'-16' deep tunnels that run from the plant to the discharge area. Some are only 5'-6' below grade. Also, the underground termination being installed next to breaker 1450 is the location of one of the tunnels. These may cause interference with installing the proposed cables.	H	M	M				X			
D-16	Design Concern- Jamaica- Lake Success 903 Line Cooling	The project requires forced cooling to be added to the lines to increase their capability. However, the required cooling equipment is not shown on the substation plans. There may not be adequate space at Jamaica station to add the required equipment.	H	M	M		X			X		

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Date: 04/20/2023

<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
Cost to Mitigate Risk	Greater than \$20M	\$11M-20M	\$6-\$10M	Below \$5M
Schedule Impact	More than 6 months	3-6 months	1-3 months	Less than 1 month

Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
<b>Construction and Operational Concerns</b>												
C-1	Construction Concern - Installing Underground Cables in Existing Substations	Installing underground cables in the existing substations will be difficult without impacting existing foundations, conduit/trench systems, grounding, and buswork. This could require additional or concurrent outages, complex construction sequences, and/or more expensive construction methods.	M	L	L	X	X	X	X	X	X	Number of underground cables being routed through the existing substations include: Barrett - two 138kV cables EGC - two 138kV cables Ruland Rd. - two 138kV cables Shore Rd- one 138kV cable Sprainbrook - one 345kV cable Northport- two 138kV cables
C-2	Construction Concern- Sharp Right Turn	Shore Rd.- New Rochelle- Sharp right-hand turn from Hudson Park Rd. onto Pelham Rd. Also, high traffic area.	M	L	L	X	X	X	X	X	X	Recommend identifying an alternate route for this portion of the line due to this sharp right-hand turn. Possible consideration for routing through Leif Ericsson Park.
C-3	Construction Concern- Railroad Tracks in Use	East Garden City-Tremont: Railroad tracks appear to be in use. If tracks are in service this would potentially require limited amount of working time adjacent to the RR Tracks while the train is moving. This could impact the construction schedule.	M	M	M	X		X	X	X		Recommend confirming whether railroad tracks are in use
C-4	Construction Concern- HDD for Small Retention Pond	East Garden City to New Bridge to Ruland Rd. - Developer proposed trenching across a pond located between Stewart Ave and Broadway.	L	L	L	X		X	X	X		HDD would be more feasible and logical solution. Recommend HDD for small retention pond
C-5	Construction Concern- Length of HDD	The use of HDD across the East River to Tremont is about a mile long. This is approaching the limit of the HDD capability. Being able to use this technique will be dependent on the geological conditions and being able to obtain the necessary cable reels. This impacts lines from East Garden City to Tremont, Barrett to Tremont, and Eastern Queens to Tremont.	M	M	M	X	X	X	X	X	X	
C-6	Construction Concern- Space for Transition Joints from Submarine to Terrestrial Cables.	The below grade transition vaults are to be located in Hudson Park. This is a very active summer recreational area. Therefore, the construction window will be limited.	H	L	L	X	X	X	X	X	X	

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Date: 04/20/2023

<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
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Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
C-7	Construction Concern- Sprain Brook HVDC Substation - Subsurface Condition	Approximately 90% of the site could encounter rock during excavation and the site might require extensive slope protection. Site conditions will require further investigation to quantify. This could have high cost and schedule impact depending on volume of rock excavation and methods used (i.e., blasting likely not allowed in this area)	H	M	L						X	Independent estimate has assumed that rock excavation is required.
C-8	Construction Concerns- HVDC Lead Times	Due to high demand and equipment complexities, manufacturer's are quoting lead times up to 4 years.	H	L	H						X	
C-9	Construction Concerns-East Garden City- 345kV Cables to existing PARs and Transformers	Construction of the underground 345kV cables from the existing PARs and transformers to the proposed substation will be difficult due to having to cross and run parallel with the main cable trench. Also, there will be interference with the existing overhead 138kV 361 and 362 lines, a 69kV line distribution circuit, and communication circuits and their associated poles located along the west side of the substation.	M	L	L	X		X	X	X		
C-10	Construction Concern- Pipe Type Cables	Several 138kV transmission lines that are to be intercepted and tied into a proposed substation are oil-filled, pipe type cables. Tying into these type of cables requires managing the oil pressure and transitioning to EPR (Ethylene Propylene Rubber), which adds an additional level of complexity to the construction. The extent of work required will be dependent on the cable's condition and age.	H	L	L	X	X	X	X	X	X	EGC- Line 462 (Base 1, 2, 3, Alt 5, Alt 6, Alt 7), EGC- Line 463 (Base 1, 2, 3, Alt 5, Alt 6, Alt 7) EGC- Line 465 (Base 2, Alt 7) , EGC- Line 262 (Alt 5)
C-11	Construction Concern- Outages of Existing Facilities	In order to construct the project several existing elements (e.g., transformers, PARs, transmission lines, main busses) will need to be removed from service. Being able to schedule outages can impact the project schedule. Having a single element or multiple concurrent elements out of service can impact the reliability of the system.	M	L	M	X	X	X	X	X	X	Number of elements out of service for 7 days or more: <b>11</b> Maximum # of concurrent elements: <b>2</b> # of elements out for more than 90 days: <b>5</b>



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Date: 04/20/2023

<b>Project:</b>	T047-T059, T051-T053
<b>Developer:</b>	Propel NY
<b>Project Name:</b>	Base 1-3 and Alt 5- Alt 7

	Very High (VH)	High (H)	Medium (M)	Low (L)
Probability Risk Will Occur	90-100%	50-89%	10-49%	Below 10%
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Item #	Risk Title	Description	Probability	Cost Impact	Schedule Impact	T047 Base 1	T048 Base 2	T049 Base 3	T051 Alt 5	T052 Alt 6	T053 Alt 7	Comments
C-12	Construction Concern- East Garden City 138kV Cable Installation	Proposal did not include proposed routes for intercepting the 138kV lines (462, 463, 465 and 262) to the proposed substation. However, due to the extensive underground facilities throughout the yard, along the east side (two 345kV cables, three gas lines (30", 20" 8") and one 138kV pipe-type cable (Line 463) and along the south side (one gas line 30", two 138kV cables 465 and 467, one 69kV cable, and the railroad track) it will be difficult to install the cables. Also along the west and north sides there are overhead 138kV lines, 69kV lines, distribution circuits and communication circuits.)	H	M	M	X	X	X	X	X	X	