PROPEL NY ENERGY

NYISO Presentation
October 24, 2022

Executive Summary

- New York Developers focused on New York with 350+ years of experience
- Built upon two intertie solutions that are viable, sufficient, and expandable
- Modular, scalable solutions with future expandability considerations
- Completeness of proposals aligned for Permitting & Execution
  - Extensive routing and engineering completed
  - Detailed siting and permitting considerations
- Article VII readiness
- Base schedule in-service date: 2028 (Sol.1–5), 2030 (Sol. 6&7)

Agenda

- The Team
- Project Benefit Highlights
- Routing, Siting, and Permitting
- Technical Design & Engineering
- Summary

The Team

Propel NY Energy Collaboration

PROPEL NY ENERGY

NEW YORK STATE OF OPPORTUNITY. | NY Power Authority

New York Transco
Building a Clean Energy Future Together

- New York-based, New York-focused transmission owners and developers
- Formidable public-private transmission development team
- Extensive history developing, siting, constructing, and operating major electric transmission facilities
- Dedicated, experienced, and proven professionals

Project Benefit Highlights

Solution Strategy

- **Modular and scalable solutions**
- **Increased controllability, flexibility, and expandability**
- **Strategically chosen POI in Zone J: Tremont**
- **Increased resilience**
  - Tremont vs. Sprain Brook route
- **Barrett constraints and opportunities:**
  - Adaptability to potential OSW interconnection
  - Synergies to OSW upgrades
  - Future expandability
- **Optimization**:
  - Optimize existing system to achieve maximum capability with minimum additions

Two Solution Architecture

Diversity and innovation amongst project solutions:

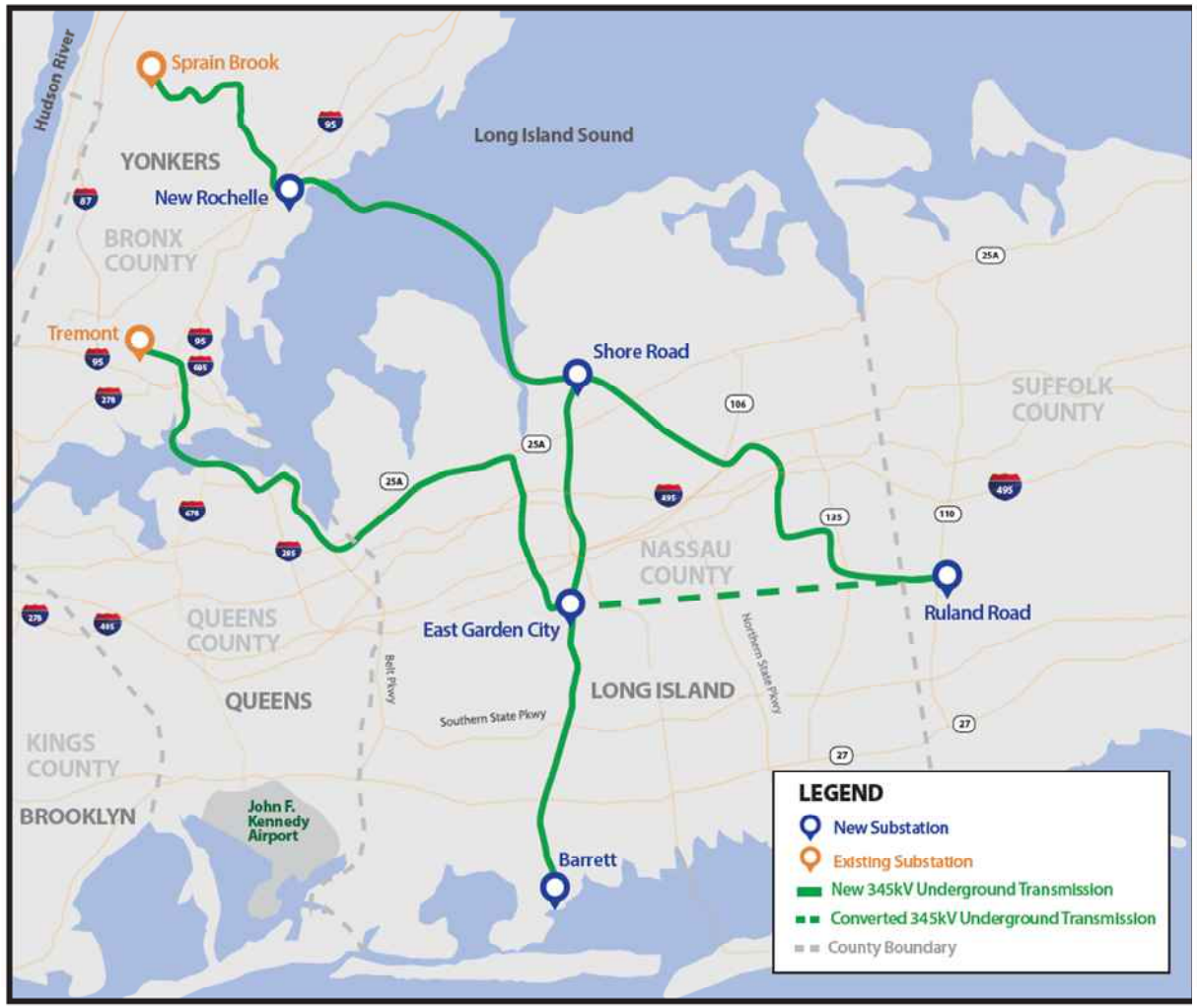
- **Solution 1 Family (#1, #3, #5, #6)**
  - Create a 345kV network with a resilient backbone
    - o Create major hubs: East Garden City, Shore Road, and Ruland Road
    - o Flexible OSW points of interconnection
  - Pursue low-cost upgrade opportunities in Long Island transmission system:
    - o e.g. EGC-Newbridge-Ruland Rd 138 kV to 345 kV conversion

- **Solution 2 Family (#2, #7)**
  - Achieve the least cost solution while providing comparable transfer limit performance and production cost savings
    - o Create new 345 kV direct ties from generation sources outward for exporting/importing
  - Reinforce 138 kV tie #903 @ Jamaica

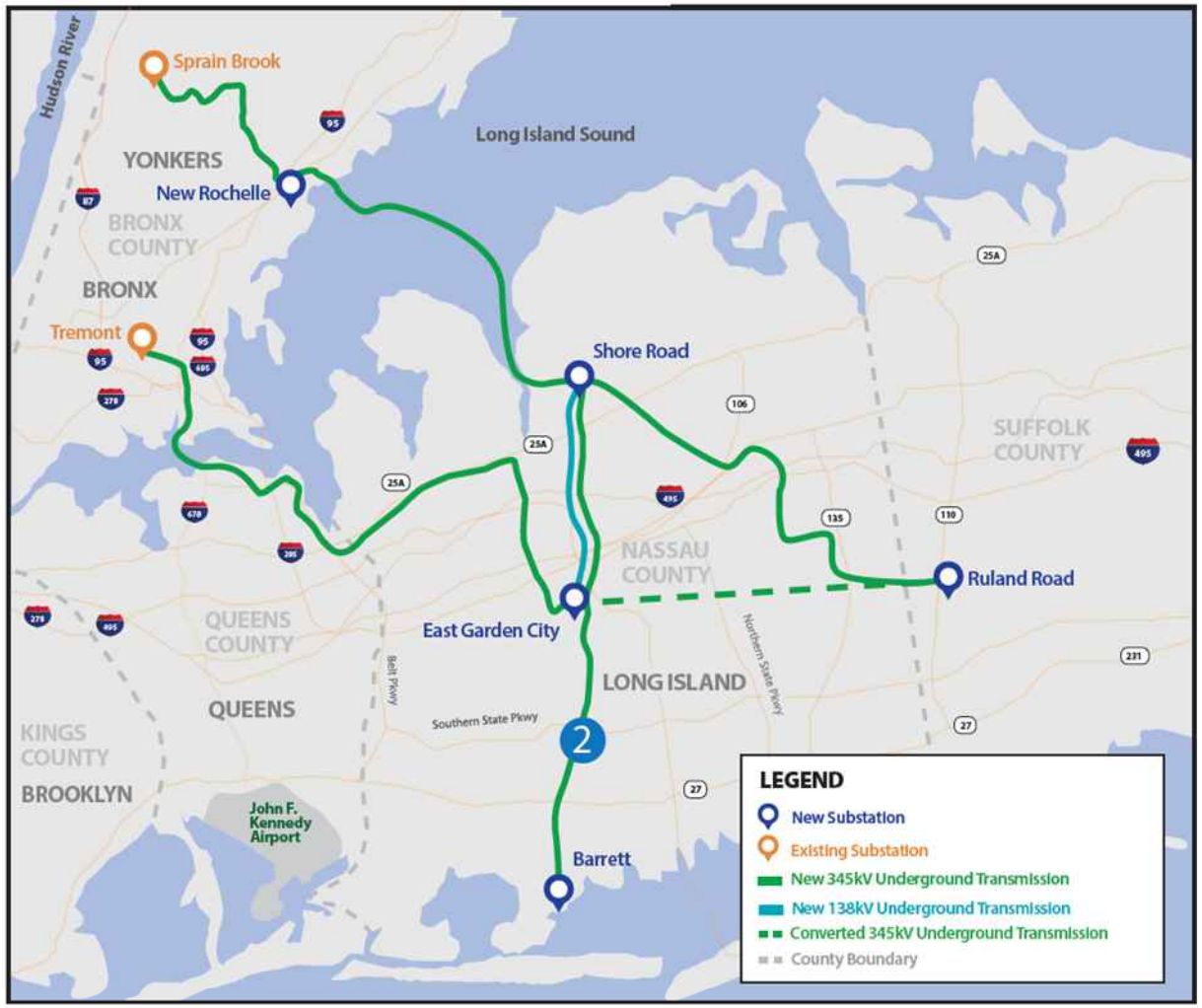
- **Solutions #6 and #7:** Create 345/138 kV hub at Eastern Queens

- **Solution #7:** Create additional sourcing points for export via Northport HVDC

Family 1 Solutions #1 and #3

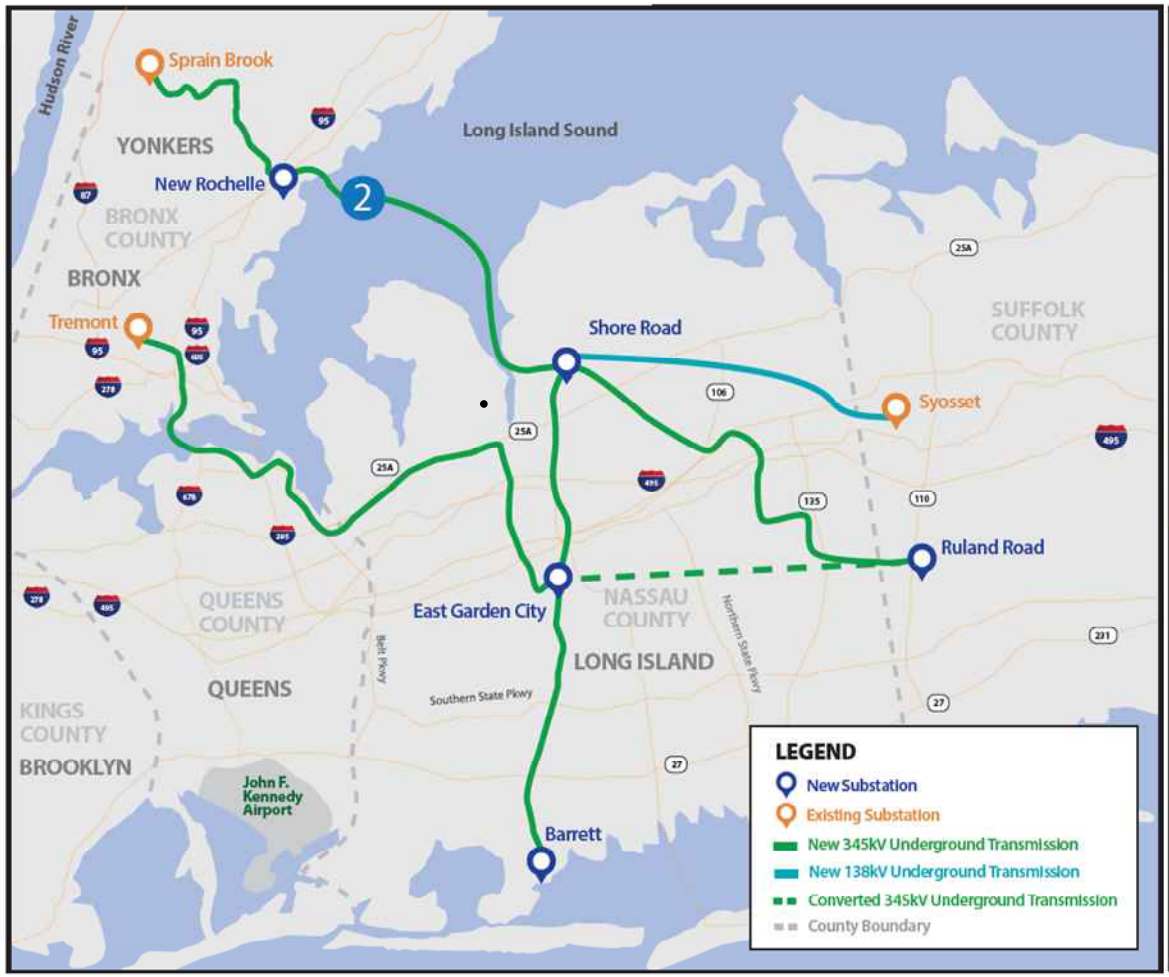


Base Solution #1

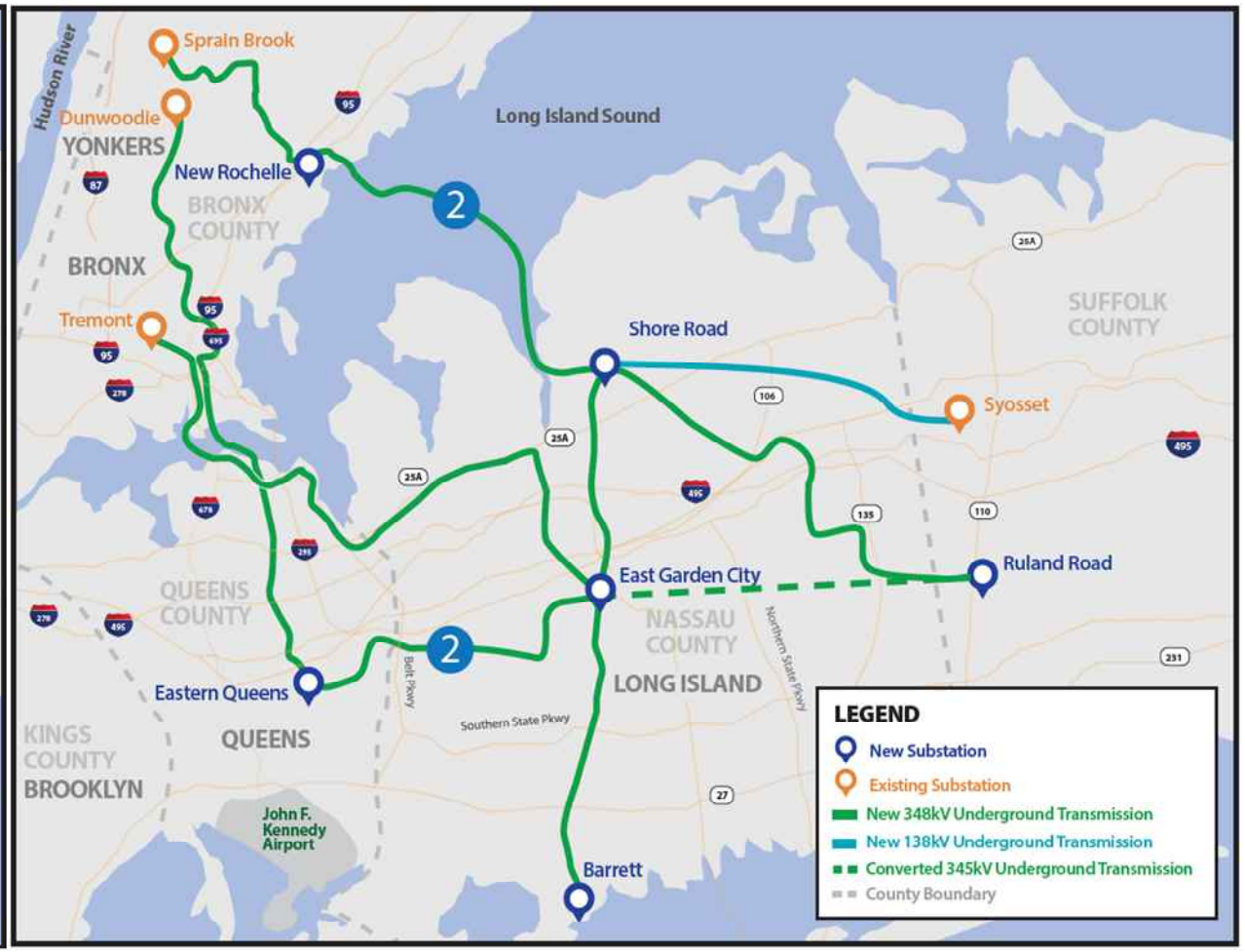


Base Solution #3

Family 1 Solutions #5 and #6

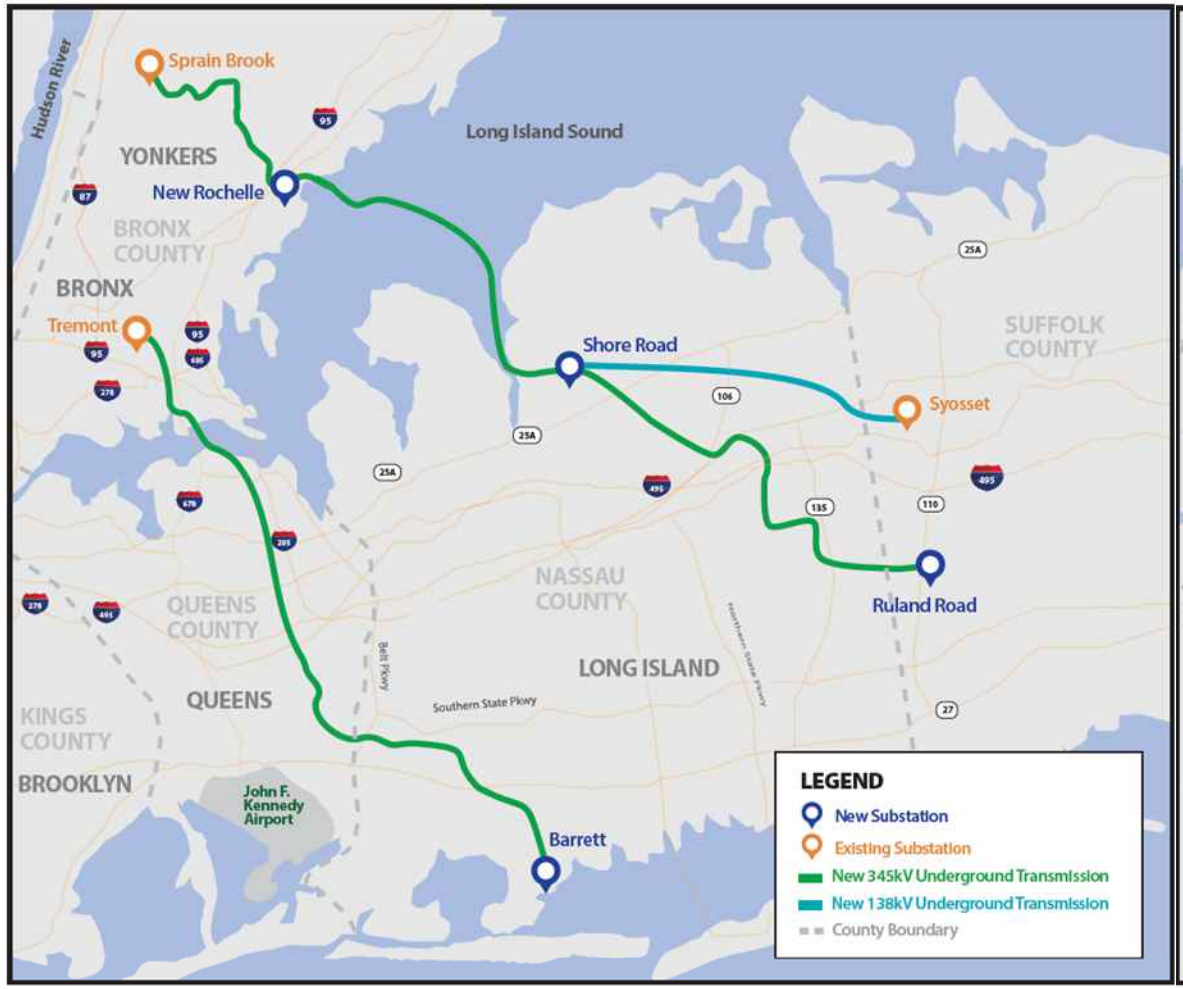


Alternate Solution #5

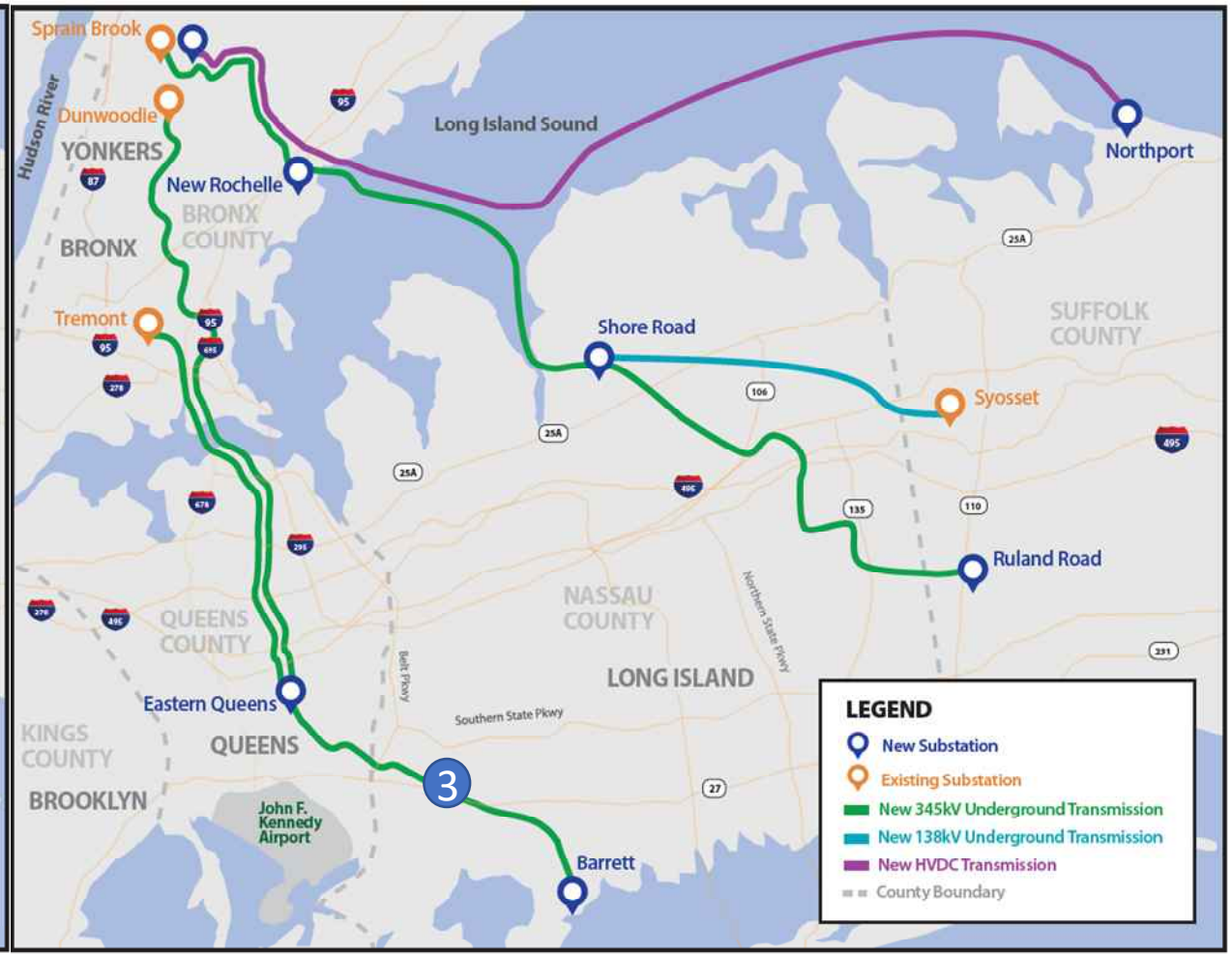


Alternate Solution #6

Family 2 Solutions #2 and #7



Base Solution #2



Alternate Solution #7

Increase in Transfer Limits

- Significant increases in transfer limits:
  - o LIPA-Con Ed and Con Ed-LIPA Interfaces

Solutions	Base Solution 1	Base Solution 2	Base Solution 3	Alternate Solution 5	Alternate Solution 6	Alternate Solution 7
LIPA-Con Ed Transfer Limit (MW)	+1,627	+1,584	+1,624	+1,906	+3,315	+3,934
Con Ed-LIPA Transfer Limit (MW)	+1,067	+1,090	+1,103	+1,518	+1,573	+2,417

  - o Other interface benefits, e.g. Newbridge Interface

Economic Benefits

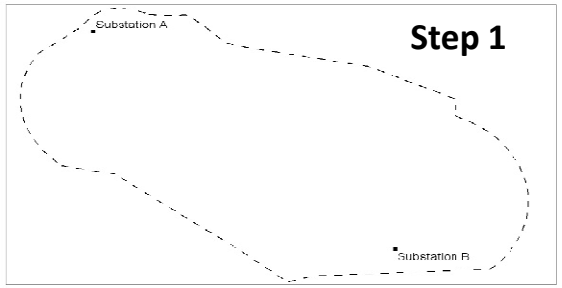
- Significant reduction in offshore wind curtailment in the Alternate Scenario
- Depending on solutions, the Carbon reduction was observed to be between 700,000 – 1M+ tons in the Alternate Scenario
- Significant production cost, ICAP savings, and load payment reductions:

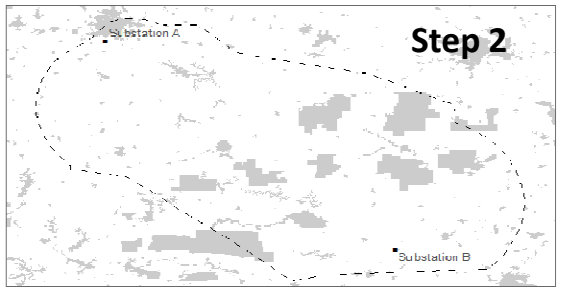
Solution #	Production Cost Tool	NYCA Production Cost Savings ($M)	ICAP Savings ($M)	Load Payment Reductions ($M)
Base Solution 1	GE-MAPS	$ 1,773	$ 1,418	$ 3,681
Base Solution 2		$ 1,621	$ 1,395	$ 3,452
Base Solution 3		$ 1,773	$ 1,418	$ 3,773
Alt. Solution 5		$ 1,903	$ 1,564	$ 4,618
Alt. Solution 6	ABB Gridview	$ 2,338	$ 1,168	$ 3,649
Alt. Solution 7		$ 2,371	$ 1,230	$ 4,410

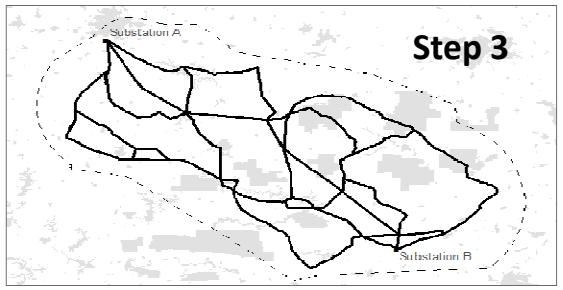
Economic benefits presented over a 20-year NPV

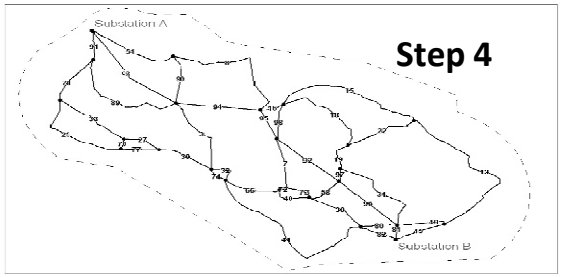
Routing, Siting & Permitting

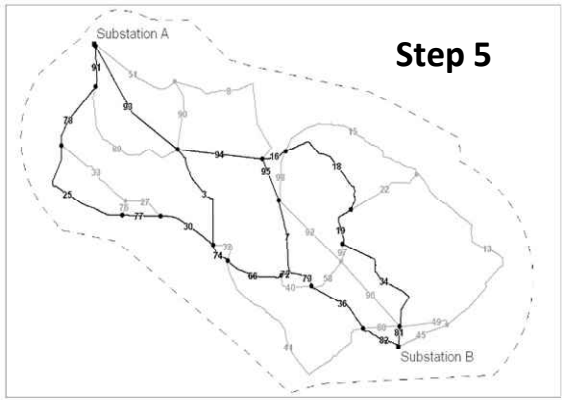
Our Approach

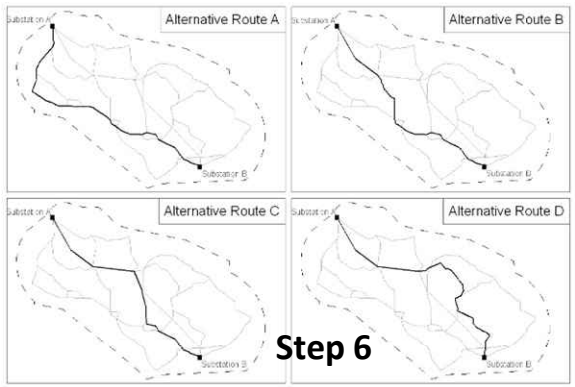


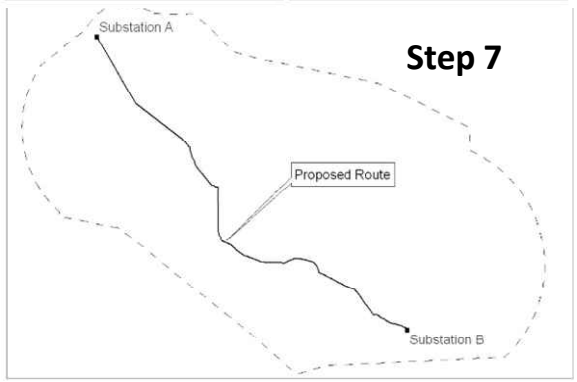












Objective:

Identify routes that limit impacts on natural & human environment while balancing cost

- Step 1: Study area
- Step 2: Study area with constraints and opportunities
- Step 3: Potential routes based on 1st level factors
- Step 4: Potential route network
- Step 5: Refined route network on 2nd level factors
- Step 6: Alternate routes rated on reviews for critical flaws
- Step 7: Preferred route

Routing Limiting Factors

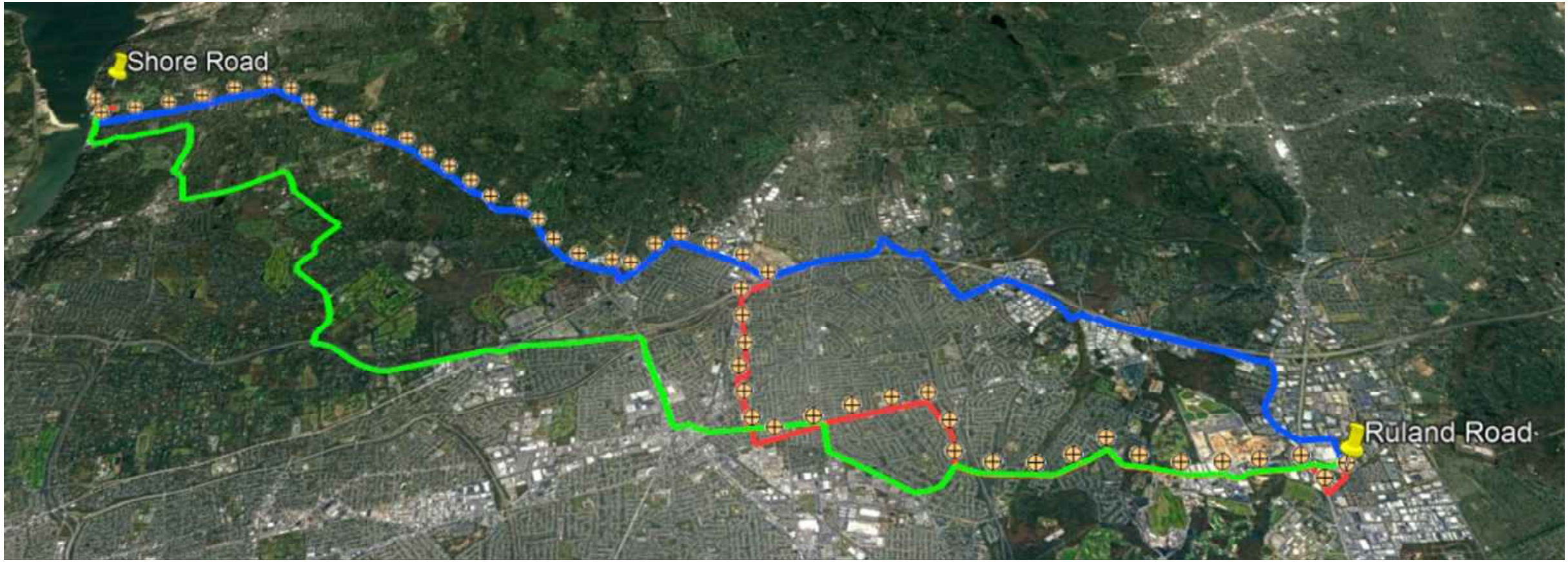
First level:

- Overhead versus underground electric transmission construction
- Use of new rights-of-way (“ROW”)
- Use of federal and state highways
- Use of trenchless construction techniques, such as HDDs, jack and bore, and bridge attachments

Second level:

- Infrastructure: highways, railways, subways, associated stations, and shipping channels
- Land features: parks, natural and cultural resources, wetlands, and waterbodies
- Public facilities: schools, hospitals/fire department/emergency services, museums, cemeteries, places of worship, and water treatment plants
- Existing infrastructure and utilities

Route Review – Ruland Rd to Shore Rd



Permitting

Propel NY Energy team adept at navigating the NYS Article VII Process

- Teams have recent success on active projects and maintain stakeholder/ regulator relationships

Proposal development included:

- Initial permitting matrix: federal, state, county and local requirements. (Attachment. B.05.1)
- 30% engineering design
- Alternative analysis for routing/siting/substations
- Initial community outreach

Technical Design & Engineering

U/G Transmission Design Overview

- Design criteria included Civil and Electrical requirements/calculations
- Thorough investigation of existing site conditions
- Strategic placement of underground vaults including trenchless entry/exit pits
- Substantial efforts lead to proposed solutions that are Article VII ready

Existing Site Conditions

- **Long Island**: Sandy soils; high water table
- **Queens County**: Sandy; till; potential bedrock; heavy utility congestion and penetration
- **Bronx/Westchester**: known shallow and exposed hard bedrock
- **Geotechnical conditions verified through public sources**

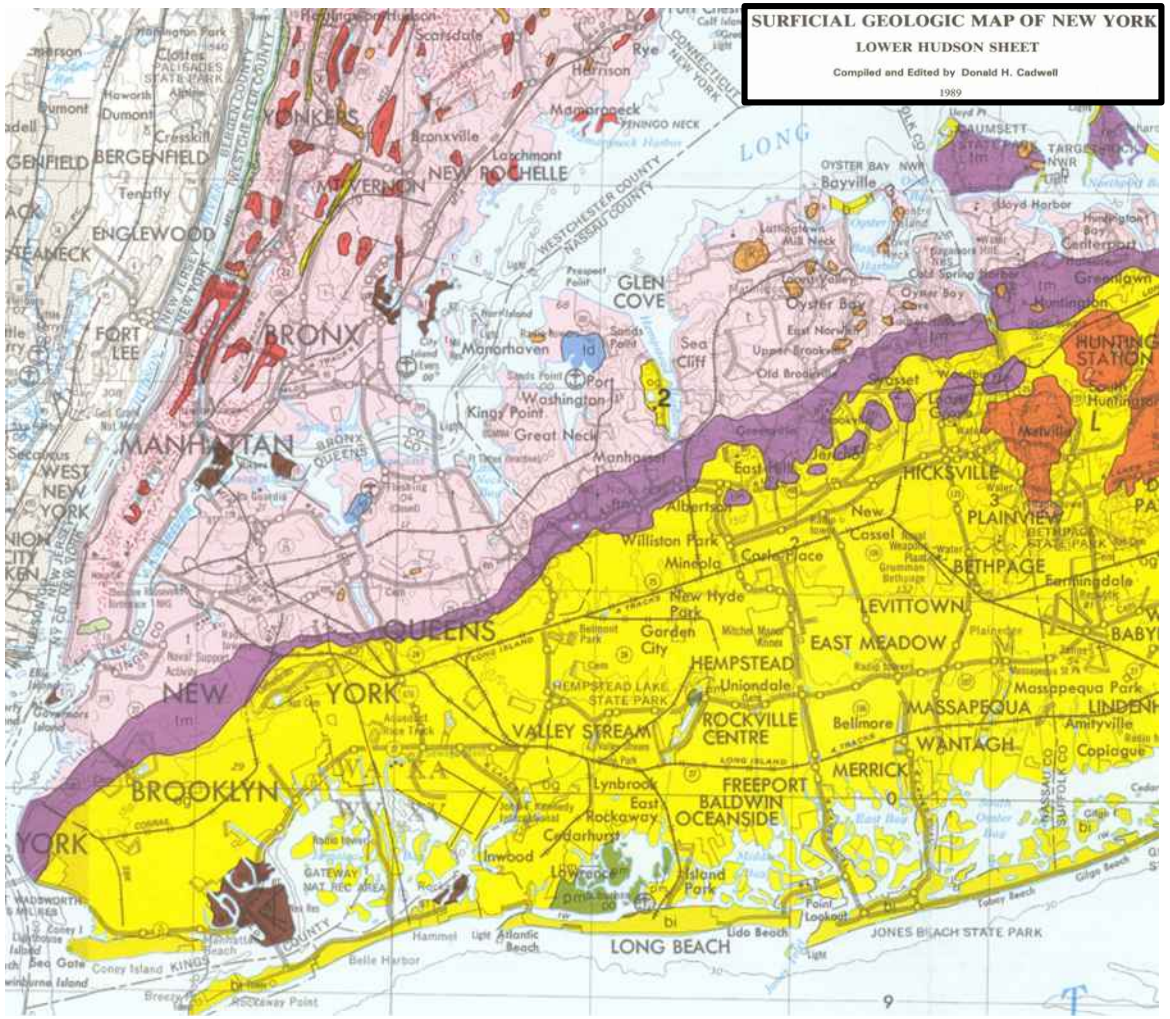
tm — **Till moraine**
More variably sorted than till,
generally more permeable than till,
deposition adjacent to ice,
more variably drained,
may include ablation till,
thickness variable (10-30 meters).

t — **Till**
Variable texture (e.g. clay, silt-clay, boulder clay),
usually poorly sorted diamict,
deposition beneath glacier ice,
relatively impermeable (loamy matrix),
variable clast content — ranging from abundant well-rounded diverse lithologies in valley tills to relatively angular, more limited lithologies in upland tills,
tends to be sandy in areas underlain by gneiss or sandstone,
potential land instability on steep slopes,
thickness variable (1-50 meters).

og — **Outwash sand and gravel**
Coarse to fine gravel with sand,
proglacial fluvial deposition,
well rounded and stratified,
generally finer texture away from ice border,
thickness variable (2-20 meters).

r — **Bedrock**
Exposed or generally within 1 meter of surface.

Bedrock stipple overprint
Bedrock may be within 1-3 meters of surface,
may sporadically crop out,
variable mantle of rock debris and glacial till.



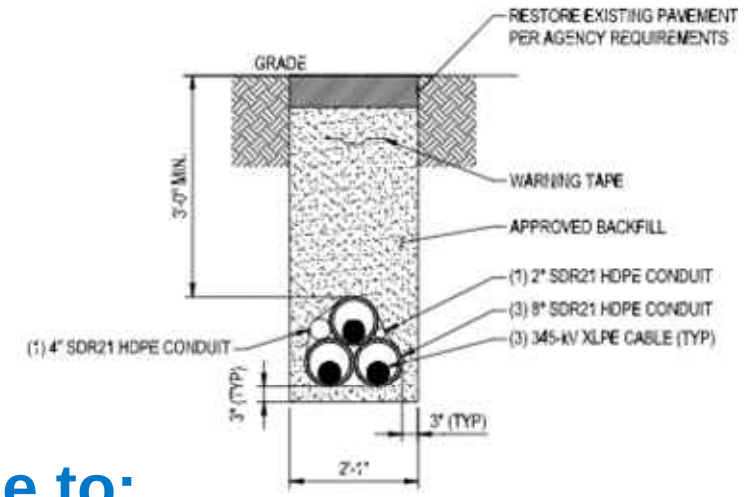
U/G Transmission Design Highlights

Engineering performed:

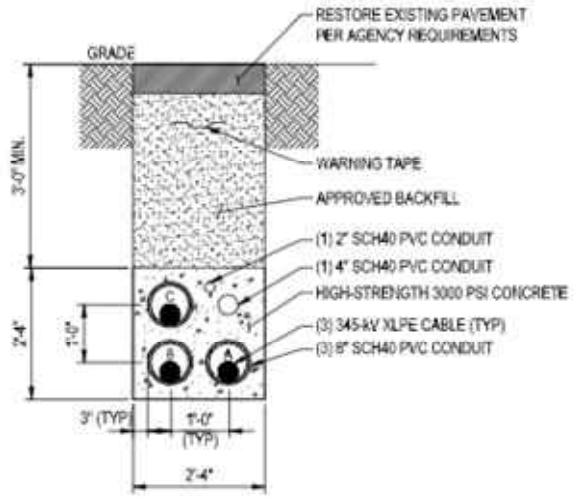
- Design Basis Document
- Ampacity calculations
- Pull calculations

Optimized 4,000 kcmil cable due to:

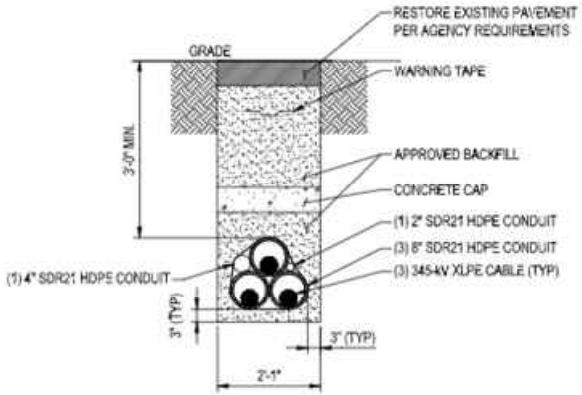
- Performance characteristics
- Supplier diversity and availability
- Consistency throughout all Solutions
- Flexibility in construction
- Opportunity to leverage communal spare equipment



Direct Bury (Long Island)
Backfill: Re-use existing sandy fill



Concrete Encased (NYC)
Backfill: New fluidized thermal backfill (FTB)



Direct Bury with Concrete Cap (Westchester)
Backfill: New fluidized thermal backfill (FTB)

***3' min requirement shown is code-driven; average depth of cover is ~5' historically**

Submarine Transmission Design

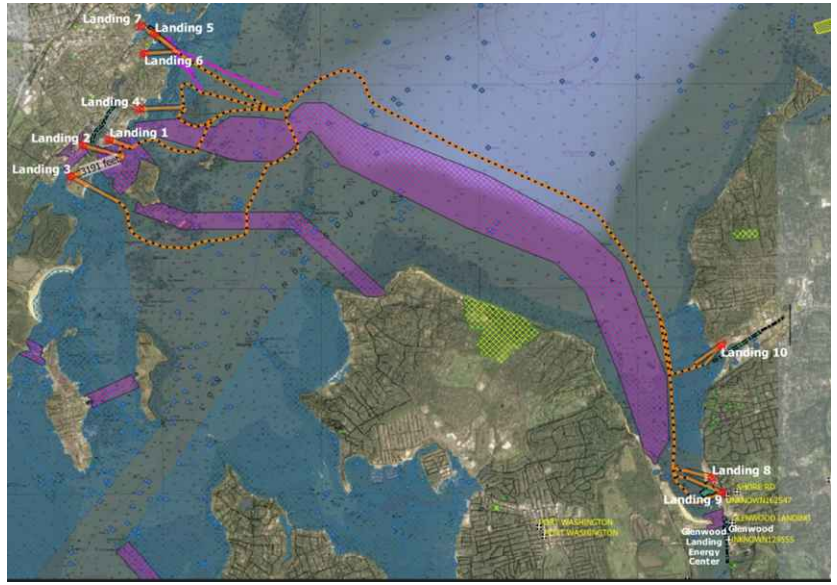
Routing Approach

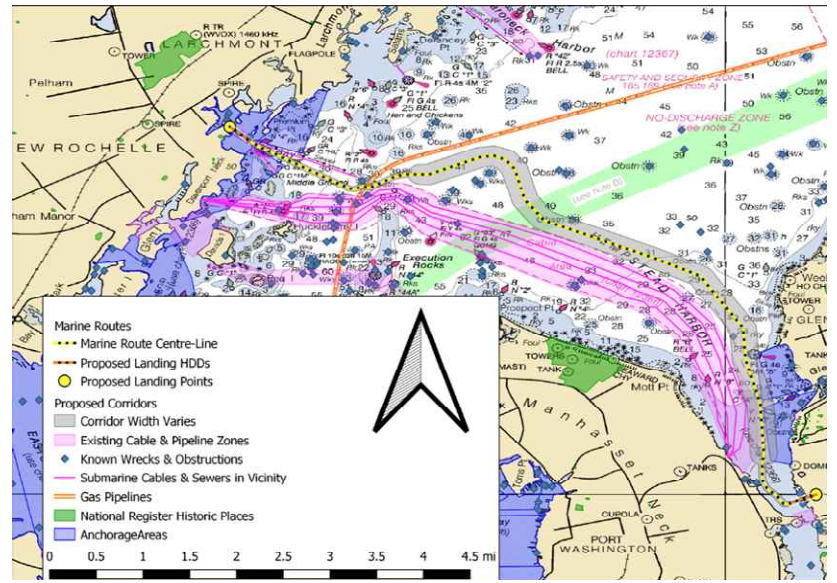
- Multi-stage approach focusing on cable landing opportunities, existing maritime/geotechnical constraints, and best management practices/lessons learned

- Submarine cable system will be entirely buried

- Burial depths will vary depending on the cable location but will at minimum provide 5 feet of cover

- Installation method a function of benthic characteristics, presence of existing cables, pipelines, and other marine infrastructure, and regulatory requirements to maintain federal navigation channels





Substation Design Highlights

Cost-efficient design

- Site preparation costs evaluated and optimized
- Hybrid AIS/GIS utilized to limit deep pile foundations

Substation footprint – minimized for community benefit

Substation type – AIS with PASS breaker or GIS

Substation Design – Ring Bus or Breaker-and-a-Half

Substation conceptual design include:

- Electrical one line and layout
- Civil
- Structural
- Bill of Materials (BOMs)
- Detailed cost estimates

Hybrid AIS Substation with PASS System

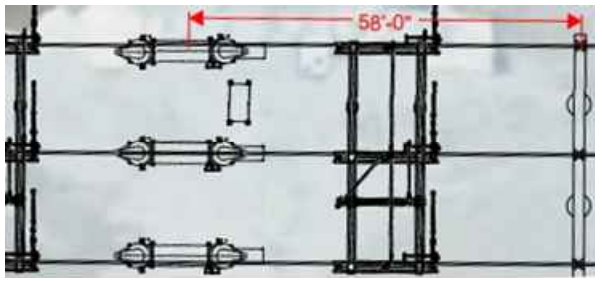
PASS (Plug & Switch System)

Hybrid AIS/GIS flexible, customizable system
Close to GIS compactness at AIS value

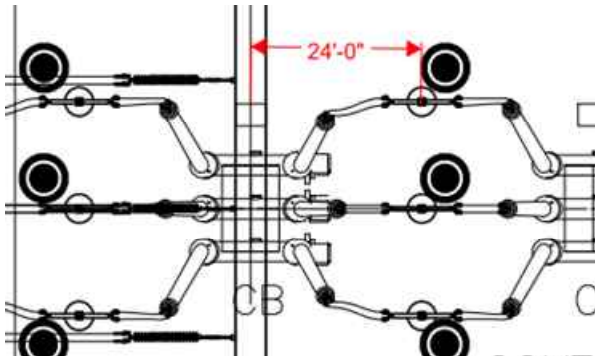
Why PASS?

- PASS is the most widely installed hybrid switchgear worldwide, protecting networks in many different climates and applications
- Utilized in NYS transmission system as a problem-solving technology
- Delivered fully assembled & tested, energizes in 24 hours on-site
- Modular design enables highly customizable solutions
- When compared to AIS layouts:
  - Compact station via shorter bay lengths
  - Reduces foundation quantity significantly

Sample PASS Breaker



345 kV AIS



345 kV PASS

PROPEL NY ENERGY

Propel NY Energy benefits:

Innovative, flexible, and cost-effective solutions
Demonstrated track record
Depth of local knowledge
Unmatched routing and technical design

New Yorkers investing in New York:

Alignment with CLCPA targets through reinforced grid
Emission reduction benefits
Production Cost & ICAP savings, and load payment reductions
Economic Development opportunities

PROPEL NY ENERGY

New Yorkers invested in New York
350+ years of New York experience