

# Appendix E: Proposed Solutions

## Long Island Offshore Wind Export Public Policy Transmission Planning Report

**A Report from the New York  
Independent System Operator**

DRAFT for May 24, 2023, BIC

**DRAFT – FOR DISCUSSION PURPOSES ONLY**

## Appendix E: Proposed Solutions

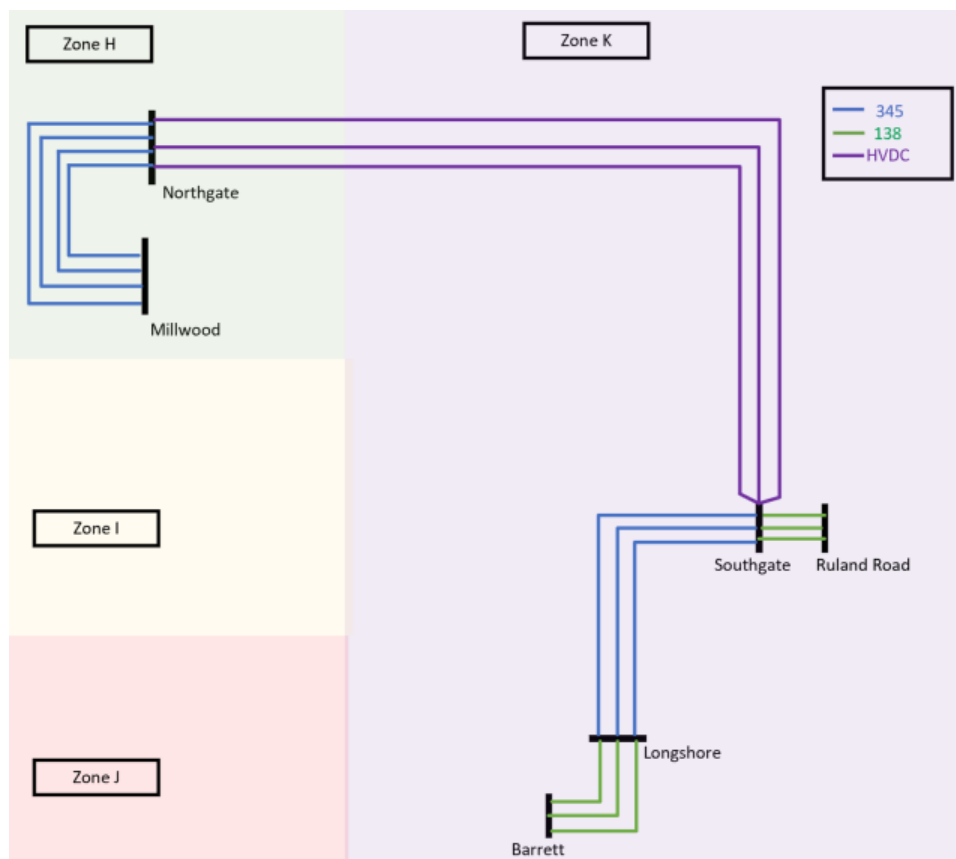
### T035 LS Power Atlantic Gateway

LS Power Atlantic Gateway project proposal consists of the following components:

- Build a proposed Longshore 345/138 kV GIS substation interconnecting to the Barrett 138 kV substation with three phase angle regulators (PARs) on the proposed 345/138 kV transformers and two 150 MVAR shunt reactors
- Build a proposed Southgate 345/138 kV GIS substation interconnecting to Ruland Rd 138 kV substation with three  $\pm 400$  kV monopole DC converter stations each rated at 1200 MW and three 150 MVAR shunt reactors
- Build a proposed Northgate 345 kV GIS substation intercepting W80/W81/W97/W98 lines with three  $\pm 400$  kV monopole DC converter stations each rated at 1200 MW
- Build three proposed underground Longshore – Southgate 345 kV AC lines
- Build three proposed underground/submarine Southgate – Northgate  $\pm 400$  kV bi-directional DC transmission lines rated at 1200 MW each
- Reconductor East Garden City – Carle Place (138-361) and East Garden City – Roslyn (138-362)
- Replace terminal equipment on Holbrook – Ronkonkoma (138-875), Ronkonkoma – Central Islip (138-883), Holbrook – West Bus (138-888), and West Bus – Kings – Pilgrim (138-881)
- Reconductor a segment of and replace terminal equipment on Pilgrim PAR – Hauppauge (138-871)
- Replace terminal equipment Central Islip – Hauppauge (138-889)
- Glenwood South – Shore Road (138-365) upgrades (anticipated to be replacement of buswork and connections) to achieve a higher rating
- Reconductor of the 138 kV East Garden City – Carle Place line
- Reconductor the East Garden City – Roslyn 138 kV line
- Terminal upgrades at the Holbrook, Ronkonkoma, Central Islip, West Bus, Kings, Pilgrim, Glenwood South, and Shore Road (i.e., replacement of CTs or buswork) 138 kV substations
- Partial reconductor of the Pilgrim – Hauppauge 138 kV line with installation of a PAR

- Modify relay systems to eliminate P5 contingencies at the Barrett and Valley Stream substations

**Figure 1: T035 LS Power Atlantic Gateway Major Project Components (Refer to the description above for complete list of project components)**



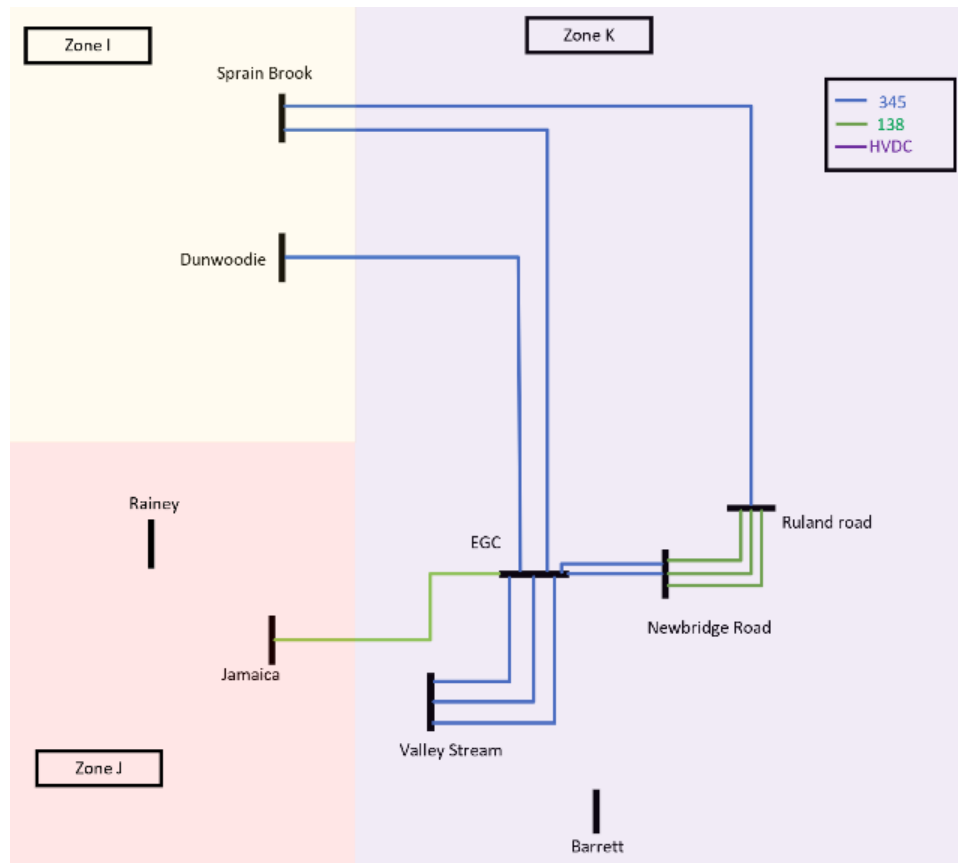
### **T036 NextEra Core 1**

NextEra Core 1 proposal consists of the following components:

- Build a proposed East Garden City 345 kV GIS substation with two 1050 MVA PARs regulating flow on the existing East Garden City – Sprain Brook and the existing East Garden City – Dunwoodie 345 kV lines
- Build a proposed Ruland Road 345/138 kV GIS substation with two 345/138 kV transformers
- Build a proposed Valley Stream 345 kV GIS substation with three 345/138 kV transformers
- Build a proposed Barrett 138 kV GIS substation with one PAR regulating flow on proposed East Garden City – Jamaica 138 kV transmission line
- Build a proposed Rainey 345 kV GIS substation
- Build a proposed Dunwoodie 345 kV GIS substation
- Modify the existing Newbridge Road 345 kV substation to add two breaker-and-a-half GIS bays
- Build a proposed East Garden City – Dunwoodie 345 kV transmission line
- Build a proposed East Garden City – Sprain Brook 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build a proposed PAR-controlled East Garden City – Jamaica 138 kV transmission line
- Build three proposed East Garden City – proposed Valley Stream 345 kV transmission lines
- Partially reconductor the Newbridge Road – Ruland Road 138 kV line 561, 562, and 567
- Partially reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV line 462 and 463 as two 345 kV transmission lines from the proposed East Garden City substation to proposed Newbridge Road substation
- Partially rebuild the Syosset – Oakwood 138 kV transmission line
- Partially rebuild the Syosset – Greenlawn 138 kV transmission line
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (*i.e.*, loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections
- Build two Dunwoodie – proposed Dunwoodie 345 kV connections

- Build two Barrett – proposed Barrett 138 kV connections
- Build a proposed Newbridge Road 138 kV – Newbridge Road 345 kV connection
- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install shunt reactors for the proposed East Garden City – Dunwoodie 345 kV, proposed East Garden City – Sprain Brook 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Upgrade terminal equipment at the West Bus 138 kV and Kings 138 kV substations
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install a reactor at the Shore Road 138 kV substation to be five blocks of 50 MVAR
- Re-terminate Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate Mott Haven – Rainey East 345 kV transmission line to the proposed Rainey 345 kV substation
- Re-terminate Barrett – Freeport 138 kV line 459 to the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 to the Valley Stream 138 kV substation
- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation
- Add two breaker-and-a-half bays at the existing Sprain Brook 345 kV substation
- Retire the Valley Stream 138 kV lines 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV lines 465 and 467
- Modify the Newbridge Road 138 kV substation

**Figure 2: T036 NextEra Core 1 Major Project Components (Refer to the description above for complete list of project components)**



## **T037 NextEra Core 2**

NextEra Core 2 proposal consists of the following components:

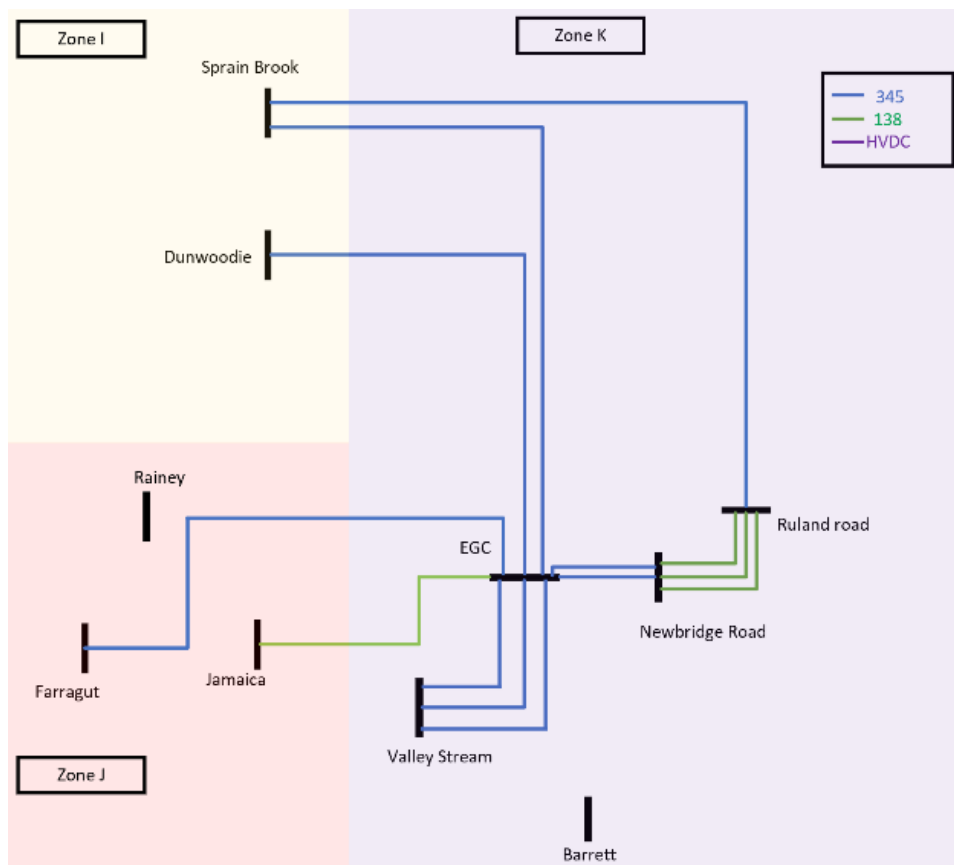
- Build a proposed East Garden City – proposed Farragut 345 kV transmission line
- Build a proposed East Garden City – Dunwoodie 345 kV transmission line
- Build a proposed East Garden City – Sprain Brook 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build a PAR-controlled East Garden City – Jamaica 138 kV transmission line
- Build three proposed East Garden City – proposed Valley Stream 345 kV transmission lines
- Partial reconductor the Newbridge Road – Ruland Road 138 kV lines 561, 562, and 567
- Partial reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV lines 462 and 463 as two 345 kV transmission lines from the proposed East Garden City substation to proposed Newbridge Road substation
- Partial rebuild of the Syosset – Oakwood 138 kV transmission line
- Partial rebuild of the Syosset – Greenlawn 138 kV transmission line
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (i.e., loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections
- Build two Dunwoodie – proposed Dunwoodie 345 kV connections
- Build two Barrett – proposed Barrett 138 kV connections
- Build two Farragut – proposed Farragut 345 kV connections
- Build a Newbridge Road 138 kV – Newbridge Road 345 kV connection
- Build an East Garden City 345 kV GIS substation with one 1050 MVA PAR regulating flow on the proposed East Garden City to proposed Farragut transmission line
- Build a Ruland Road 345/138 kV GIS substation with two 345/138 kV transformers and one 1050 MVA PAR regulating flow on the proposed Ruland Rd to Sprain Brook transmission line
- Build a Valley Stream 345 kV GIS substation with three 345/138 kV transformers

- Build a proposed Barrett 138 kV GIS substation with one PAR regulating flow on proposed East Garden City – Jamaica 138 kV transmission line
- Build a Rainey 345 kV GIS substation
- Build a Dunwoodie 345 kV GIS substation
- Build a Farragut 345 kV GIS substation
- Modify the existing Newbridge Road 345 kV substation to add two breaker-and-a-half GIS bays
- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install shunt reactors at the proposed East Garden City – Dunwoodie 345 kV, proposed East Garden City – Sprain Brook 345 kV, proposed East Garden City – proposed Farragut 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Terminal upgrades at the West Bus 138 kV and Kings 138 kV substations
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install reactor at the Shore Road 138 kV substation to be five blocks of 50 MVAR
- Re-terminate the Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate the Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate the Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Mott Haven – Rainey East 345 kV transmission line at the proposed Rainey 345 kV substation
- Re-terminate the Barrett – Freeport 138 kV line 459 at the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 at the Valley Stream 138 kV substation
- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation



- Install two breaker-and-a-half bays at the existing Sprain Brook 345 kV substation
- Retire Valley Stream 138 kV lines 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV lines 465 and 467
- Modify the Newbridge Road 138 kV substation

**Figure 3: T037 NextEra Core 2 Major Project Components (Refer to the description above for complete list of project components)**



### **T038 NextEra Core 3**

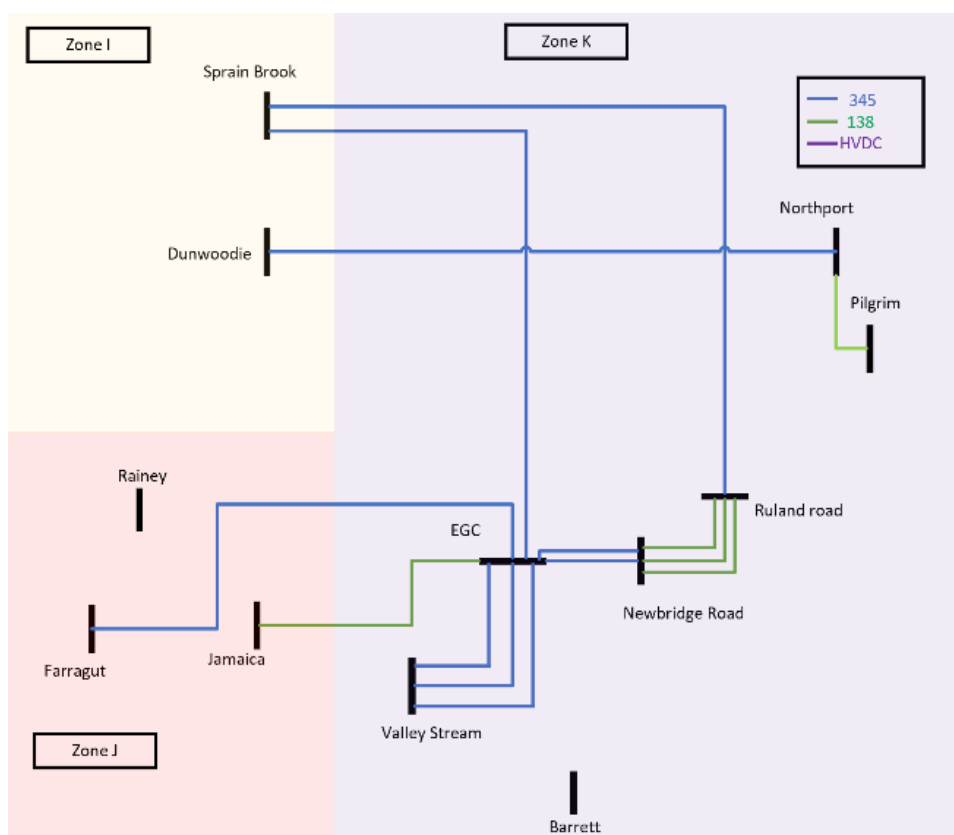
NextEra Core 3 proposal consists of the following components:

- Build a proposed East Garden City 345 kV substation with two 1050 MVA PARs regulating flow on the East Garden City – Sprain Brook and East Garden City – Farragut transmission lines
- Build a proposed Ruland Road 345/138 kV substation with two 345/138 kV transformers and one 1050 MVA PAR regulating flow on the Ruland Road – Sprain Brook transmission line
- Build a proposed Valley Stream 345 kV substation with three 345/138 kV transformers
- Build a proposed Northport 345/138 kV substation with two 345/138 kV transformers
- Build a proposed Barrett 138 kV substation with one PAR regulating flow on proposed East Garden City – Jamaica 138 kV transmission line
- Build a proposed Rainey 345 kV substation
- Build a proposed Dunwoodie 345 kV substation
- Build a proposed Farragut 345 kV substation
- Modify the existing Newbridge Road 345 kV to add two breaker-and-a-half GIS bays
- Build a proposed East Garden City – proposed Farragut 345 kV transmission line
- Build a proposed Northport – Dunwoodie 345 kV transmission line
- Build a proposed East Garden City – Sprain Brook 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build a proposed PAR controlled East Garden City – Jamaica 138 kV transmission line
- Build three East Garden City – proposed Valley Stream 345 kV transmission lines
- Partially reconductor the Newbridge Road – Ruland Road 138 kV lines 561, 562, and 567
- Partially reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV lines 462 and 463 as two 345 kV transmission lines from the proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (i.e., loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections

- Build two Dunwoodie – proposed Dunwoodie 345 kV connections
- Build two Barrett – proposed Barrett 138 kV connections
- Build two Farragut – proposed Farragut 345 kV connections
- Build two proposed Northport 138 kV – proposed Northport 345 kV connections
- Build two Northport – proposed Northport 138 kV connections
- Build a proposed Newbridge Road 138 kV – Newbridge Road 345 kV connection
- Build a proposed Pilgrim – proposed Northport 138 kV transmission line
- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install one breaker at the Pilgrim 138 kV substation
- Install shunt reactors for the proposed Northport – Dunwoodie 345 kV, proposed East Garden City – Sprain Brook 345 kV, proposed East Garden City – proposed Farragut 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Terminal upgrades at the West Bus 138 kV and Kings 138 kV substations
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install a reactor at the Shore Road 138 kV substation, consisting of five blocks of 50 MVAR
- Re-terminate the Northport – Pilgrim 138 kV lines 672, 677, and 679 at the proposed Northport 138 kV substation
- Re-terminate the Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate the Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate the Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Mott Haven – Rainey East 345 kV transmission line at the proposed Rainey 345 kV substation
- Re-terminate the Barrett – Freeport 138 kV line 459 at the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 at Valley Stream 138 kV substation

- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation
- Add two breaker-and-a-half bays at the existing Sprain Brook 345 kV substation
- Retire the Valley Stream 138 kV lines 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV lines 465 and 467
- Modify the Newbridge Road 138 kV substation

**Figure 4: T038 NextEra Core 3 Major Project Components (Refer to the description above for complete list of project components)**



### **T039 NextEra Core 4**

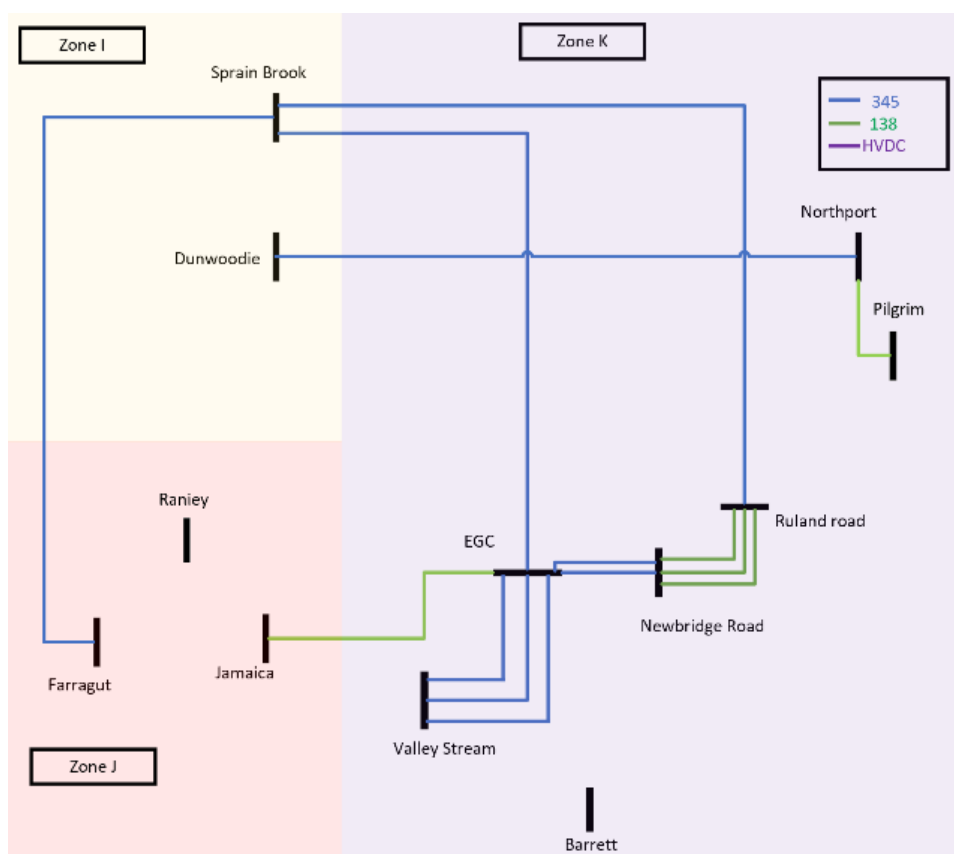
NextEra Core 4 proposal consists of the following components:

- Build a proposed Farragut – Sprain Brook 345 kV transmission line
- Build a proposed Northport – Dunwoodie 345 kV transmission line
- Build a proposed East Garden City – Sprain Brook 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build a PAR-controlled East Garden City – Jamaica 138 kV transmission line
- Build three proposed East Garden City – proposed Valley Stream 345 kV transmission lines
- Partial reconductor the Newbridge Road – Ruland Road 138 kV line 561, 562, and 567
- Partial reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV line 462 and 463 as two 345 kV transmission lines from the proposed East Garden City substation to proposed Newbridge Road substation
- Partial rebuild of the Syosset – Oakwood 138 kV transmission line
- Partial rebuild of the Syosset – Greenlawn 138 kV transmission line
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (i.e., loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections
- Build two Dunwoodie – proposed Dunwoodie 345 kV connections
- Build two Barrett – proposed Barrett 138 kV connections
- Build two Farragut – proposed Farragut 345 kV connections
- Build two proposed Northport 138 kV – proposed Northport 345 kV connections
- Build two Northport – proposed Northport 138 kV connections
- Build a Newbridge Road 138 kV – Newbridge Road 345 kV connection
- Build a Pilgrim – proposed Northport 138 kV transmission line
- Build an East Garden City 345 kV GIS substation with one 1050 MVA PAR at regulating flows on the proposed East Greenbush to Sprain Brook transmission line
- Build a Ruland Road 345/138 kV GIS substation with two 345/138 kV transformers

- Build a Valley Stream 345 kV GIS substation with three 345/138 kV transformers
- Build a Northport 345/138 kV GIS substation with two 345/138 kV transformers
- Build a proposed Barrett 138 kV GIS substation with one PAR regulating flow on the proposed East Garden City – Jamaica 138 kV transmission line
- Build a Rainey 345 kV GIS substation
- Build a Dunwoodie 345 kV GIS substation
- Build a Farragut 345 kV GIS substation
- Modify the existing Newbridge Road 345 kV substation to add two breaker-and-a-half GIS bays
- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install one breaker at the Pilgrim 138 kV substation
- Install shunt reactors at the proposed Northport – Dunwoodie 345 kV, proposed East Garden City – Sprain Brook 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed Farragut – Sprain Brook 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Terminal upgrades at the West Bus 138 kV and Kings 138 kV substations
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install reactor at the Shore Road 138 kV substation to be five blocks of 50 MVAR
- Re-terminate the Northport – Pilgrim 138 kV line 672, 677, and 679 to the proposed Northport 138 kV substation
- Re-terminate the Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate the Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate the Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Mott Haven – Rainey East 345 kV transmission line to the proposed Rainey 345 kV substation
- Re-terminate the Barrett – Freeport 138 kV line 459 to the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 at the Valley Stream 138 kV substation

- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation
- Add two breaker-and-a-half bays to the existing Sprain Brook 345 kV substation
- Retire the Valley Stream 138 kV lines 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV lines 465 and 467
- Modify the Newbridge Road 138 kV substation

**Figure 5: T039 NextEra Core 4 Major Project Components (Refer to the description above for complete list of project components)**



## **T040 NextEra Core 5**

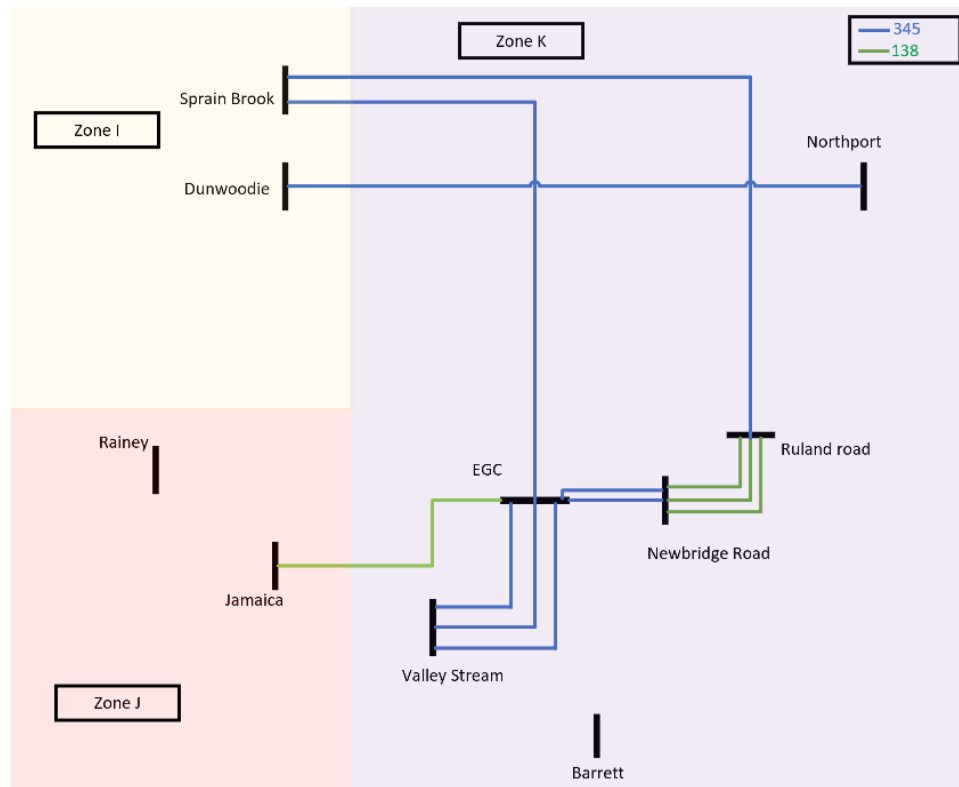
NextEra Core 5 proposal consists of the following components:

- Build a proposed East Garden City 345 kV substation with one 1050 MVA PAR regulating flow on the East Garden City – Sprain Brook transmission line
- Build a proposed Ruland Road 345/138 kV substation with two 345/138 kV transformers
- Build a proposed Valley Stream 345 kV substation with three 345/138 kV transformers
- Build a proposed Northport 345/138 kV substation with two 345/138 kV transformers
- Build a proposed Barrett 138 kV substation with one PAR regulating flow on proposed East Garden City – Jamaica 138 kV transmission line
- Build a proposed Rainey 345 kV substation
- Build a proposed Dunwoodie 345 kV substation
- Add two breaker-and-a-half GIS bays to the existing Newbridge Road 345 kV substation
- Build a proposed Northport – Dunwoodie 345 kV transmission line
- Build a proposed East Garden City – Sprain Brook 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build a proposed PAR-controlled East Garden City – Jamaica 138 kV transmission line
- Partially reconductor the Newbridge Road – Ruland Road 138 kV lines 561, 562, and 567
- Partially reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV lines 462 and 463 as proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (i.e., loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections
- Build two Dunwoodie – proposed Dunwoodie 345 kV connections
- Build two Barrett – proposed Barrett 138 kV connections
- Build two proposed Northport 138 kV – proposed Northport 345 kV connections
- Build two Northport – proposed Northport 138 kV connections
- Build a proposed Newbridge Road 138 kV – Newbridge Road 345 kV connection



- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install shunt reactors at the proposed Northport – Dunwoodie 345 kV, proposed East Garden City – Sprain Brook 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Terminal upgrades at the West Bus 138 kV and Kings 138 kV substations
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install a reactor at the Shore Road 138 kV substation to be five blocks of 50 MVAR
- Re-terminate the Northport – Pilgrim 138 kV line 672, 677, and 679 to the proposed Northport 138 kV substation
- Re-terminate the Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate the Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate the Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Mott Haven – Rainey East 345 kV transmission line at the proposed Rainey 345 kV substation
- Re-terminate the Barrett – Freeport 138 kV line 459 at the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 at the Valley Stream 138 kV substation
- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation
- Add two breaker-and-a-half bays to the existing Sprain Brook 345 kV substation
- Retire Valley Stream 138 kV lines 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV lines 465 and 467
- Modify the Newbridge Road 138 kV substation

**Figure 6: T040 NextEra Core 5 Major Project Components (Refer to the description above for complete list of project components)**



## **T041 NextEra Core 6**

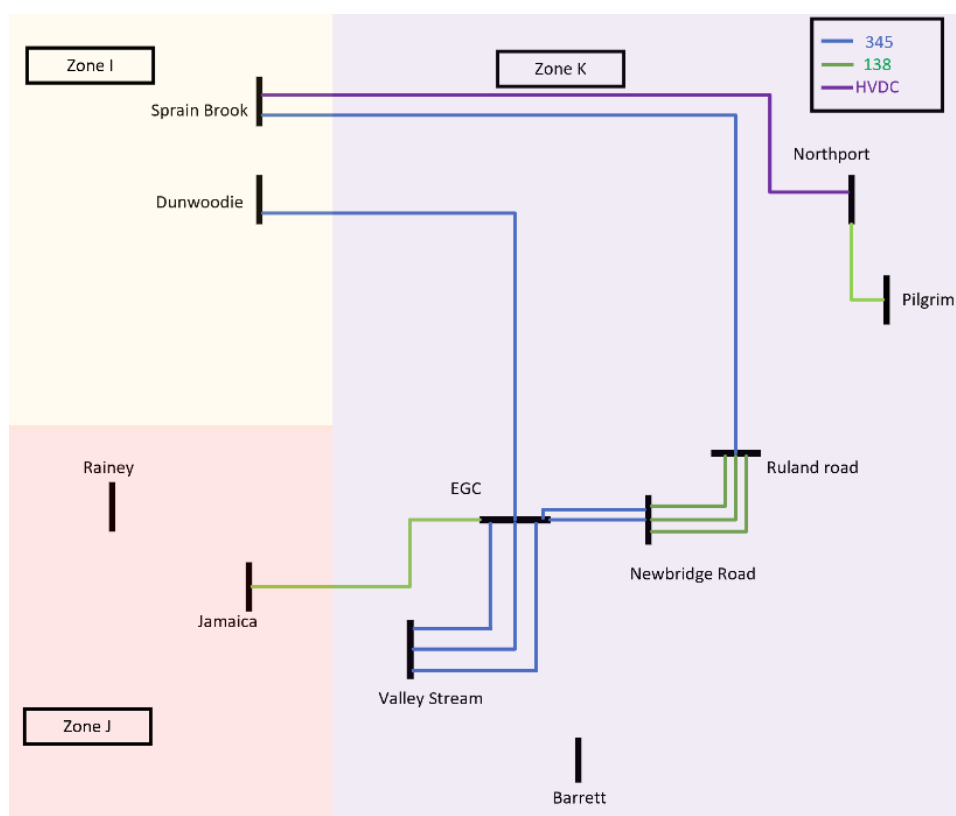
NextEra Core 6 proposal consists of the following components:

- Build a Northport Converter Station – Sprain Brook Converter Station 320 kV DC line
- Build a proposed East Garden City – Dunwoodie 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build a PAR-controlled East Garden City – Jamaica 138 kV transmission line
- Build three proposed East Garden City – proposed Valley Stream 345 kV transmission lines
- Partially reconductor the Newbridge Road – Ruland Road 138 kV lines 561, 562, and 567
- Partially reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV lines 462 and 463 as two 345 kV transmission lines from the proposed East Garden City substation to proposed Newbridge Road substation
- Partially rebuild the Syosset – Oakwood 138 kV transmission line
- Partially rebuild the Syosset – Greenlawn 138 kV transmission line
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (i.e., loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections
- Build two Dunwoodie – proposed Dunwoodie 345 kV connections
- Build two Barrett – proposed Barrett 138 kV connections
- Build three Northport Converter Station – proposed Northport 138 kV transmission lines
- Build a Sprain Brook Converter Station – Sprain Brook 345 kV transmission line
- Build two Northport – proposed Northport 138 kV connections
- Build a Newbridge Road 138 kV – Newbridge Road 345 kV connection
- Build a Pilgrim – proposed Northport 138 kV transmission line
- Build an East Garden City 345 kV GIS substation with one 1050 MVA PAR regulating flow on the proposed East Garden City to Dunwoodie transmission line
- Build a Ruland Road 345/138 kV GIS substation with two 345/138 kV transformers
- Build a Valley Stream 345 kV GIS substation with three 345/138 kV transformers

- Build a Northport Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Sprain Brook Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a proposed Barrett 138 kV GIS substation with one PAR regulating flow on the proposed East Garden City – Jamaica 138 kV transmission line
- Build a Rainey 345 kV GIS substation
- Build a Dunwoodie 345 kV GIS substation
- Build a Northport 138 kV GIS substation
- Add two breaker-and-a-half GIS bays to the existing Newbridge Road 345 kV substation
- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install one breaker at the Pilgrim 138 kV substation
- Install shunt reactors at the proposed East Garden City – Dunwoodie 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Terminal upgrades at the West Bus 138 kV and Kings 138 kV substations
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install reactor at the Shore Road 138 kV substation to be five blocks of 50 MVAR
- Re-terminate the Northport – Pilgrim 138 kV lines 672, 677, and 679 at the proposed Northport 138 kV substation
- Re-terminate the Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate the Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate the Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Mott Haven – Rainey East 345 kV transmission line at the proposed Rainey 345 kV substation
- Re-terminate the “901” PAR transmission line at the East Garden City 138 kV substation
- Re-terminate the Barrett – Freeport 138 kV line 459 at the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 at the Valley Stream 138 kV substation

- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation
- Add two breaker-and-a-half bays at the existing Sprain Brook 345 kV substation
- Retire the Valley Stream 138 kV lines 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV lines 465 and 467
- Modify the Newbridge Road 138 kV substation

**Figure 7: T041 NextEra Core 6 Major Project Components (Refer to the description above for complete list of project components)**



## **T042 NextEra Core 7**

NextEra Core 7 proposal consists of the following components:

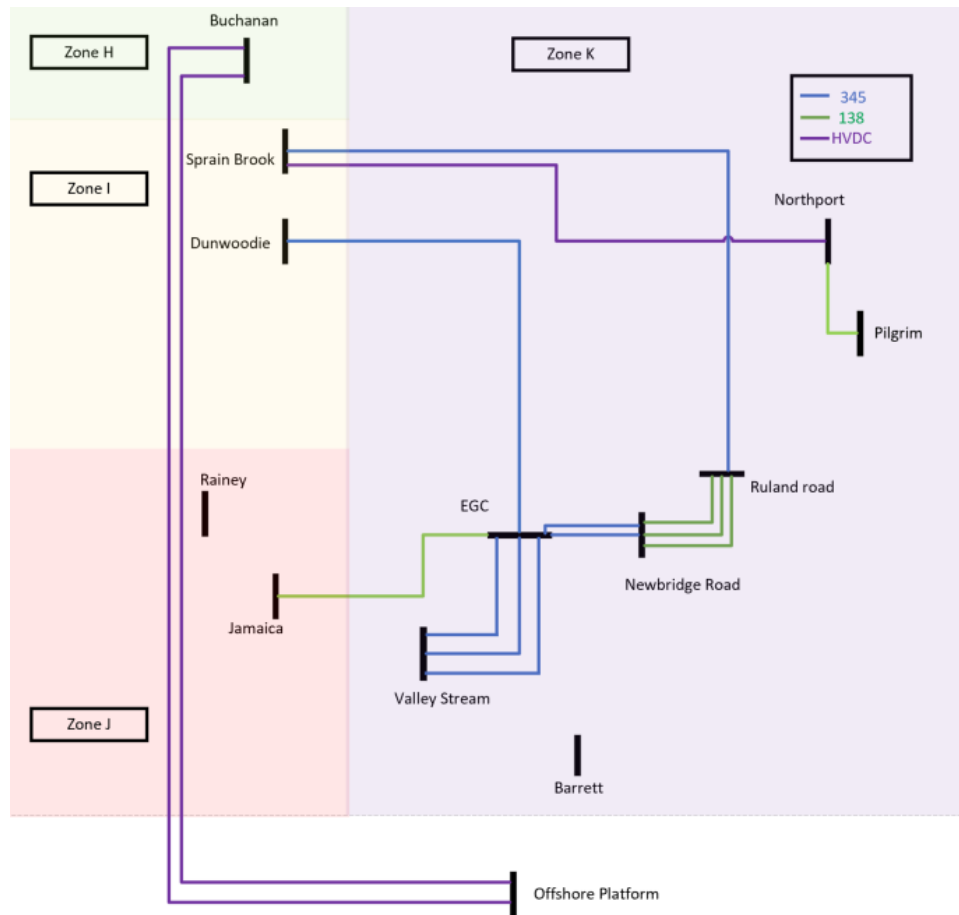
- Build a proposed East Garden City – Dunwoodie 345 kV transmission line
- Build a proposed East Garden City – Sprain Brook 345 kV transmission line
- Build a proposed East Garden City – proposed Farragut 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build an East Garden City – Jamaica 138 kV transmission line (includes a “905” PAR)
- Build a proposed Farragut – Sprain Brook 345 kV transmission line
- Build a Barrett Converter Station – Buchanan Converter Station 320 kV DC line
- Build a Northport Converter Station – Sprain Brook Converter Station 320 kV DC line
- Build three proposed East Garden City – proposed Valley Stream 345 kV transmission lines
- Partially reconductor the Newbridge Road – Ruland Road 138 kV lines 561, 562, and 567
- Partially reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV lines 462 and 463 as two 345 kV transmission lines from the proposed East Garden City substation to the proposed Newbridge Road substation
- Partially rebuild the Syosset – Oakwood 138 kV transmission line
- Partially rebuild the Syosset – Greenlawn 138 kV transmission line
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (i.e., loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections
- Build two Dunwoodie – proposed Dunwoodie 345 kV connections
- Build two Barrett – proposed Barrett 138 kV connections
- Build two Farragut – proposed Farragut 345 kV connections
- Build three Northport Converter Station – proposed Northport 138 kV transmission lines
- Build a Sprain Brook Converter Station – Sprain Brook 345 kV transmission line
- Build two Northport – proposed Northport 138 kV connections
- Build a Newbridge Road 138 kV – Newbridge Road 345 kV connection

- Build a Pilgrim – proposed Northport 138 kV transmission line
- Build a Holbrook – Pilgrim 138 kV transmission line
- Build three Barrett Converter Station – proposed Barrett 138 kV transmission lines
- Build a Buchanan Converter Station – Buchanan 345 kV transmission line
- Build an East Garden City 345 kV GIS substation with two 1050 MVA PARs regulating flows on the East Garden City to Farragut and East Garden City to Sprain Brook transmission lines
- Build a Ruland Road 345/138 kV GIS substation with two 345/138 kV transformers and one 1050 MVA PAR regulating flows on the Ruland Rd to Sprain Brook transmission line
- Build a Valley Stream 345 kV GIS substation with three 345/138 kV transformers
- Build a Northport Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Sprain Brook Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Barrett Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Buchanan Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Barrett 138 kV GIS substation with one PAR regulating flow on the proposed East Garden City – Jamaica 138 kV transmission line
- Build a Rainey 345 kV GIS substation
- Build a Farragut 345 kV GIS substation
- Build a Dunwoodie 345 kV GIS substation
- Build a Northport 138 kV GIS substation
- Add two breaker-and-a-half GIS bays at the existing Newbridge Road 345 kV substation
- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install two breakers at the Pilgrim 138 kV substation
- Install shunt reactors at the proposed East Garden City – Sprain Brook 345 kV, proposed East Garden City – Dunwoodie 345 kV, proposed East Garden City – proposed Farragut 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed Farragut – Sprain Brook 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install a reactor at the Shore Road 138 kV substation to be five blocks of 50 MVAR
- Re-terminate the Northport – Pilgrim 138 kV lines 672, 677, and 679 at the proposed Northport 138 kV substation

- Re-terminate the Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate the Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate the Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Mott Haven – Rainey East 345 kV transmission line at the proposed Rainey 345 kV substation
- Re-terminate the Barrett – Freeport 138 kV line 459 at the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 at the Valley Stream 138 kV substation
- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation
- Add two breaker-and-a-half bays at the existing Sprain Brook 345 kV substation
- Retire the Valley Stream 138 kV lines 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV lines 465 and 467
- Modify the Newbridge Road 138 kV substation



**Figure 8: T042 NextEra Core 7 Major Project Components (Refer to the description above for complete list of project components)**



### **T043 NextEra Enhanced 1**

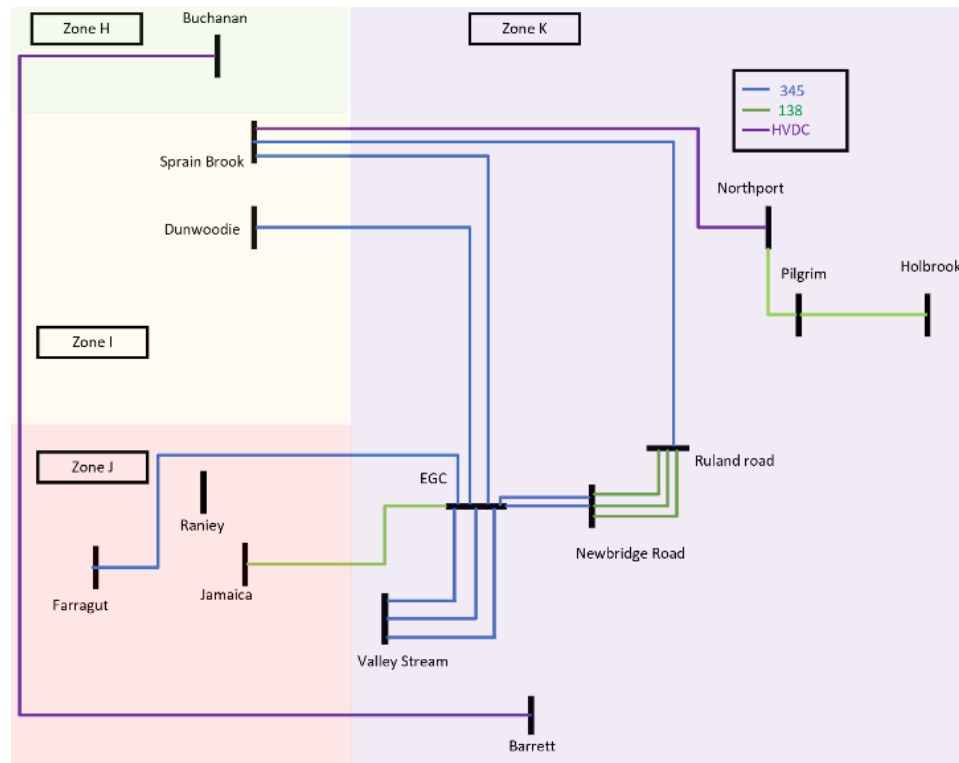
NextEra Enhanced 1 proposal consists of the following components:

- Build a proposed East Garden City – Dunwoodie 345 kV transmission line
- Build a proposed East Garden City – Sprain Brook 345 kV transmission line
- Build a proposed East Garden City – proposed Farragut 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build a PAR-controlled East Garden City – Jamaica 138 kV transmission line
- Build a proposed Farragut – Sprain Brook 345 kV transmission line
- Build a Barrett Converter Station – Buchanan Converter Station 320 kV DC line
- Build a Northport Converter Station – Sprain Brook Converter Station 320 kV DC line
- Build three proposed East Garden City – proposed Valley Stream 345 kV transmission lines
- Partially reconductor the Newbridge Road – Ruland Road 138 kV lines 561, 562, and 567
- Partially reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV lines 462 and 463 as two 345 kV transmission lines from the proposed East Garden City substation to proposed Newbridge Road substation
- Partially rebuild the Syosset – Oakwood 138 kV transmission line
- Partially rebuild the Syosset – Greenlawn 138 kV transmission line
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (i.e., loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections
- Build two Dunwoodie – proposed Dunwoodie 345 kV connections
- Build two Barrett – proposed Barrett 138 kV connections
- Build two Farragut – proposed Farragut 345 kV connections
- Build three Northport Converter Station – proposed Northport 138 kV transmission lines
- Build a Sprain Brook Converter Station – Sprain Brook 345 kV transmission line
- Build two Northport – proposed Northport 138 kV connections
- Build a Newbridge Road 138 kV – Newbridge Road 345 kV connection

- Build a Pilgrim – proposed Northport 138 kV transmission line
- Build a Holbrook – Pilgrim 138 kV transmission line
- Build three Barrett Converter Station – proposed Barrett 138 kV transmission lines
- Build a Buchanan Converter Station – Buchanan 345 kV transmission line
- Build an East Garden City 345 kV GIS substation with two 1050 MVA PARs regulating flows on the East Garden City to Farragut and East Garden City to Sprain Brook transmission lines
- Build a Ruland Road 345/138 kV GIS substation with two 345/138 kV transformers and one 1050 MVA PAR regulating flows on the Ruland Rd to Sprain Brook transmission line
- Build a Valley Stream 345 kV GIS substation with three 345/138 kV transformers
- Build a Northport Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Sprain Brook Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Barrett Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Buchanan Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a proposed Barrett 138 kV GIS substation with one PAR regulating flow on the proposed East Garden City – Jamaica 138 kV transmission line
- Build a Rainey 345 kV GIS substation
- Build a Farragut 345 kV GIS substation
- Build a Dunwoodie 345 kV GIS substation
- Build a Northport 138 kV GIS substation
- Add two breaker-and-a-half GIS bays at the existing Newbridge Road 345 kV substation
- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install two breakers at the Pilgrim 138 kV substation
- Install shunt reactors at the proposed East Garden City – Sprain Brook 345 kV, proposed East Garden City – Dunwoodie 345 kV, proposed East Garden City – proposed Farragut 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed Farragut – Sprain Brook 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV transmission lines
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install reactor at the Shore Road 138 kV substation to be five blocks of 50 MVAR
- Re-terminate the Northport – Pilgrim 138 kV lines 672, 677, and 679 at the proposed Northport 138 kV substation

- Re-terminate the Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate the Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate the Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Mott Haven – Rainey East 345 kV transmission line at the proposed Rainey 345 kV substation
- Re-terminate the Barrett – Freeport 138 kV line 459 at the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 at the Valley Stream 138 kV substation
- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation
- Expand the existing Sprain Brook 345 kV substation by adding two breaker-and-a-half bays
- Retire the Valley Stream 138 kV lines 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV lines 465 and 467
- Modify the Newbridge Road 138 kV substation

**Figure 9: T043 NextEra Enhanced 1 Major Project Components (Refer to the description above for complete list of project components)**



## **T044 NextEra Enhanced 2**

NextEra Enhanced 2 proposal consists of the following components:

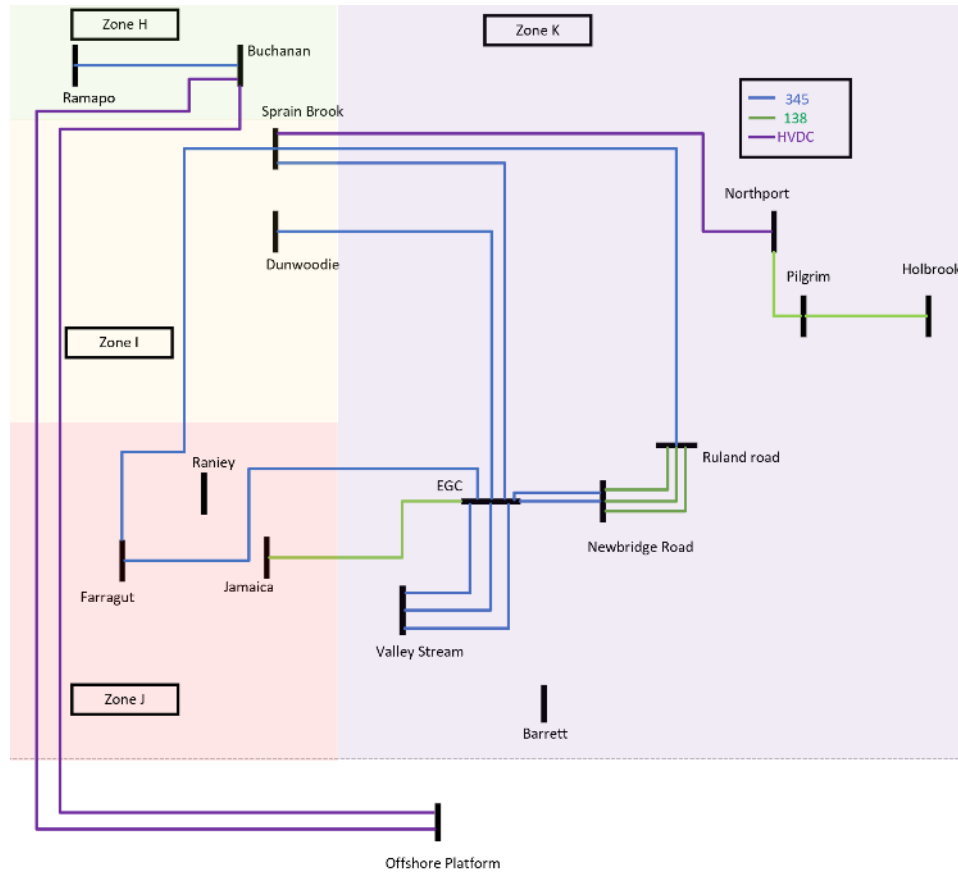
- Build a proposed East Garden City – Dunwoodie 345 kV transmission line
- Build a proposed East Garden City – Sprain Brook 345 kV transmission line
- Build a proposed East Garden City – proposed Farragut 345 kV transmission line
- Build a proposed Ruland Road – Sprain Brook 345 kV transmission line
- Build a PAR-controlled East Garden City – Jamaica 138 kV transmission line
- Build a proposed Farragut – Sprain Brook 345 kV transmission line
- Build a Northport Converter Station – Sprain Brook Converter Station 320 kV DC line
- Build three proposed East Garden City – proposed Valley Stream 345 kV transmission lines
- Partially reconductor the Newbridge Road – Ruland Road 138 kV lines 561, 562, and 567
- Partially reconductor the Central Islip – Hauppauge 138 kV transmission line
- Rebuild the existing East Garden City – Newbridge Road 138 kV lines 462 and 463 as two 345 kV transmission lines from the proposed East Garden City substation to the proposed Newbridge Road substation
- Partially rebuild the Syosset – Oakwood 138 kV transmission line
- Partially rebuild the Syosset – Greenlawn 138 kV transmission line
- Partially rebuild the Newbridge – Locust Grove 138 kV transmission line
- Loop the Newbridge Road – Bagatelle 138 kV line 563 into the proposed Ruland Road 138 kV substation
- Modify the East Garden City – Sprain Brook 345 kV transmission line (i.e., loop Y49 to proposed EGC 345 kV substation by building four East Garden City – proposed East Garden City 345 kV connections)
- Build three Valley Stream 138 kV – proposed Valley Stream 345 kV connections
- Build two Ruland Road – proposed Ruland Road 138 kV connections
- Build three Rainey – proposed Rainey 345 kV connections
- Build two Dunwoodie – proposed Dunwoodie 345 kV connections
- Build two Barrett – proposed Barrett 138 kV connections
- Build two Farragut – proposed Farragut 345 kV connections
- Build three Northport Converter Station – proposed Northport 138 kV transmission lines
- Build a Sprain Brook Converter Station – Sprain Brook 345 kV transmission line
- Build two Northport – proposed Northport 138 kV connections
- Build a Newbridge Road 138 kV – Newbridge Road 345 kV connection

- Build a Pilgrim – proposed Northport 138 kV transmission line
- Build a Holbrook – Pilgrim 138 kV transmission line
- Build two Offshore Platform – Buchanan Converter Station (1,200 MW HVDC Symmetrical Monopole) transmission lines
- Build two Buchanan Converter Station – Buchanan 345 kV transmission lines
- Build two proposed Buchanan – Buchanan 345 kV connections
- Build a proposed Buchanan – Ramapo 345 kV transmission line
- Build a Corona – Jamaica 138 kV transmission line with one 283 MVA PAR
- Build an East Garden City 345 kV GIS substation with two 1050 MVA PARs regulating flows on the East Garden City to Farragut and East Garden City to Sprain Brook transmission lines
- Build a Ruland Road 345/138 kV GIS substation with two 345/138 kV transformers and one 1050 MVA PAR regulating flows on the Ruland Rd to Sprain Brook transmission line
- Build a Valley Stream 345 kV GIS substation with three 345/138 kV transformers
- Build a Northport Converter Station (1,200 MW HVDC VSC Converter Station)
- Build a Sprain Brook Converter Station (1,200 MW HVDC VSC Converter Station)
- Build two Buchanan Converter Stations (1,200 MW HVDC VSC Converter Station x 2)
- Build two Offshore Converter Stations to deliver energy from future offshore wind generators to the proposed Buchanan 345 kV substation
- Build a Buchanan 345 kV GIS substation with two PARs
- Build a proposed Barrett 138 kV GIS substation with one PAR regulating flow on the proposed East Garden City – Jamaica 138 kV transmission line
- Build a Rainey 345 kV GIS substation
- Build a Farragut 345 kV GIS substation
- Build a Dunwoodie 345 kV GIS substation
- Build a Northport 138 kV GIS substation
- Add two breaker-and-a-half GIS bays at the existing Newbridge Road 345 kV substation
- Install two 1050 MVA PARs at the Buchanan 345 kV substation on the line to Eastview
- Install one PAR with summer rating of 283 MVA at the Corona 138 kV substation
- Install one 345/138 kV transformer at the Newbridge Road 345/138 kV substation
- Install one 324 MVA PAR at the East Garden City 138 kV substation
- Install one breaker at the Ruland Road 138 kV substation
- Install two breakers at the Pilgrim 138 kV substation

- Install shunt reactors at the proposed East Garden City – Sprain Brook 345 kV, proposed East Garden City – Dunwoodie 345 kV, proposed East Garden City – proposed Farragut 345 kV, proposed Ruland Road – Sprain Brook 345 kV, proposed Farragut – Sprain Brook 345 kV, proposed Buchanan substation – Ramapo 345 kV, proposed East Garden City – proposed Valley Stream 345 kV, and proposed East Garden City – proposed Newbridge Road 345 kV
- Modify the reactor at the Elwood 138 kV substation to be two blocks of 40 MVAR
- Install a reactor at the Shore Road 138 kV substation to be five blocks of 50 MVAR
- Re-terminate the Northport – Pilgrim 138 kV lines 672, 677, and 679 at the proposed Northport 138 kV substation
- Re-terminate the Ruland Road 138 kV lines 562 and 662 at the proposed Ruland Road 138 kV substation
- Re-terminate the Barrett – Valley Stream 138 kV lines 291 and 292 at the proposed Barrett 138 kV substation
- Re-terminate the Mott Haven – Rainey East 345 kV transmission line at the proposed Rainey 345 kV substation
- Re-terminate the Dunwoodie – Pleasantville 345 kV lines W89 and W90 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Dunwoodie – Sprain Brook 345 kV line W75 at the proposed Dunwoodie 345 kV substation
- Re-terminate the Eastview – Buchanan (North) “W93” transmission line at the proposed Buchanan 345 kV substation
- Re-terminate the Millwood West – Buchanan (South) “W97” transmission line at the proposed Buchanan 345 kV substation
- Re-terminate the Barrett – Freeport 138 kV line 459 at the proposed Barrett 138 kV substation
- Re-terminate the Barrett – Valley Stream line 292 at the Valley Stream 138 kV substation
- Re-terminate the Newbridge Road – Ruland Road 138 kV line 561 at the Newbridge Road 138 kV substation
- Re-terminate the Newbridge Road – Bethpage 138 kV line 563 at the Newbridge Road 138 kV substation
- Add two breaker-and-a-half bays at the existing Sprain Brook 345 kV substation
- Retire the Valley Stream 138 kV line 261 and 262
- Retire the East Garden City – Newbridge Road 138 kV line 465 and 467
- Modify the Newbridge Road 138 kV substation



**Figure 10: T044 NextEra Enhanced 2 Major Project Components (Refer to the description above for complete list of project components)**



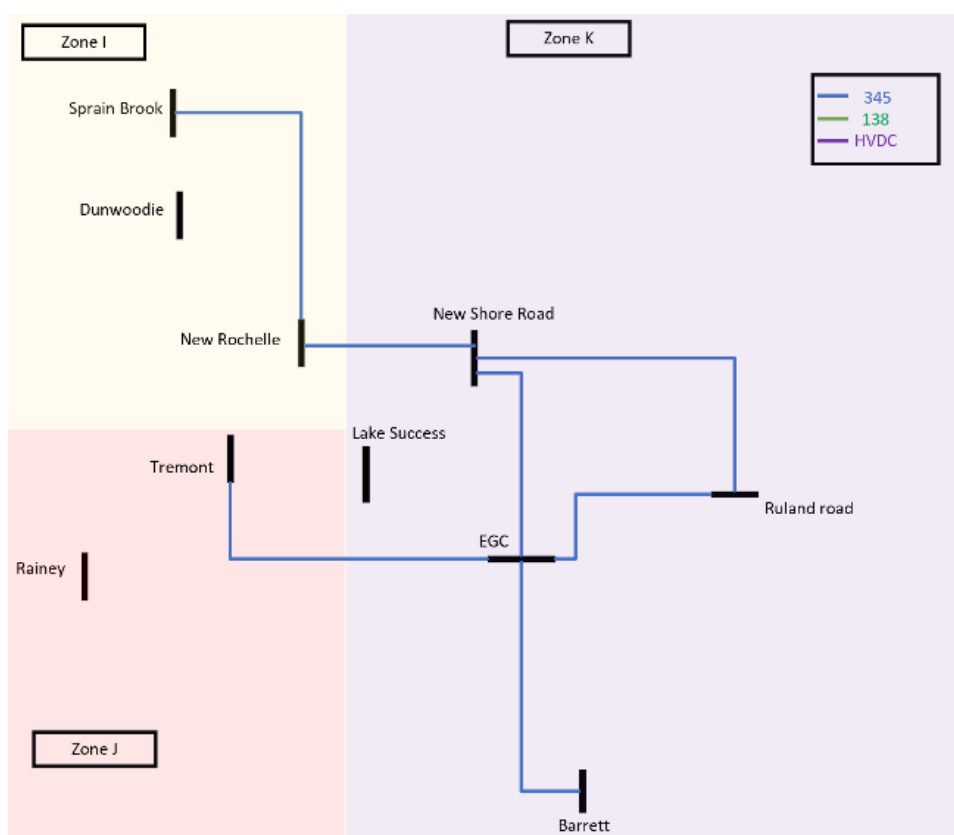
### **T047 Propel Base Solution 1**

Propel Base Solution 1 proposal consists of the following components:

- Build a proposed Barrett 345 kV substation with two 345/138 kV transformers in series with 138 kV 540 MVA PARs controlling flow towards Barrett and one 100 MVAR shunt reactor
- Build a proposed New Shore Road 345 kV station with one 345 kV 900 MVA PAR controlling flow towards the New Rochelle 345 kV station, one 345/138 kV transformer in series with a 138 kV 540 MVA PAR controlling flow towards the existing Shore Road 345/138 kV substation, and two 150 MVAR shunt reactors
- Build a proposed Ruland Road 345 kV substation in a ring configuration with three 345/138 kV transformers to connect to the existing Ruland Road 138 kV substation, one 345 kV 650 MVA PAR controlling flow towards the East Garden City 345 kV substation; and two 150 MVAR shunt reactors
- Build a proposed New Rochelle 345 kV transition station
- Build a proposed underground Barrett – East Garden City 345 kV AC line
- Build a proposed PAR-controlled 345 kV tie line from East Garden City 345 kV substation interconnected to the existing Tremont 345 kV substation
- Build a proposed underground/submarine Ruland Road – New Shore Road – New Rochelle-Sprain Brook 345 kV AC line
- Convert and reconfigure the existing Ruland Road – New Bridge 138 kV circuit 3 and New Bridge – East Garden City 138 kV circuit 4 to a Ruland Road – East Garden City 345 kV line, bypassing the existing New Bridge 138 kV substation
- Install PASS Breakers in place of breakers 1E and 6E at the existing Rainey 345 kV substation
- Modify the East Garden City 345 kV substation to a breaker-and-a-half configuration with a PAR-controlled connection of the existing Y-49 345 kV line (i.e., the two existing Y49 345/138 kV transformers will be used to connect the East Garden City 345 kV substation to the existing East Garden City 138 kV substation)
- Install one 120 MVAR shunt reactor and one 300 MVAR shunt reactor at the East Garden City 345 kV substation.
- Install one 100 MVAR switch shunt reactor at the Sprain Brook 345 kV substation
- Install two series reactors on the Ruland Road – New Bridge 138 kV circuit 1 & circuit 2 at the Ruland Road substation
- Install two series reactors on the East Garden City – New Bridge 138 kV circuit 1 & circuit 2 at the East Garden City substation

- Install PASS breakers (i.e., two breakers in series) in place of breaker CB-1460 at the existing New Bridge 138 kV substation to address the stuck breaker fault
- Install a new circuit breaker between the Holbrook 138/69 kV transformers 2 & 2A and the Holbrook – Ruland Road 138 kV line (Line 138-882) at the existing Holbrook 138 kV substation
- Upgrade Central Islip-Hauppauge 138 kV line (Line 138-889)
- Modify relay systems to eliminate P5 contingencies at multiple substations, including Valley Stream 138 kV substation, Lake Success 138 kV substation, East Garden City 138 kV substation, and Barrett 138 kV substation

**Figure 11: T047 Propel Base Solution 1 Major Project Components (Refer to the description above for complete list of project components)**



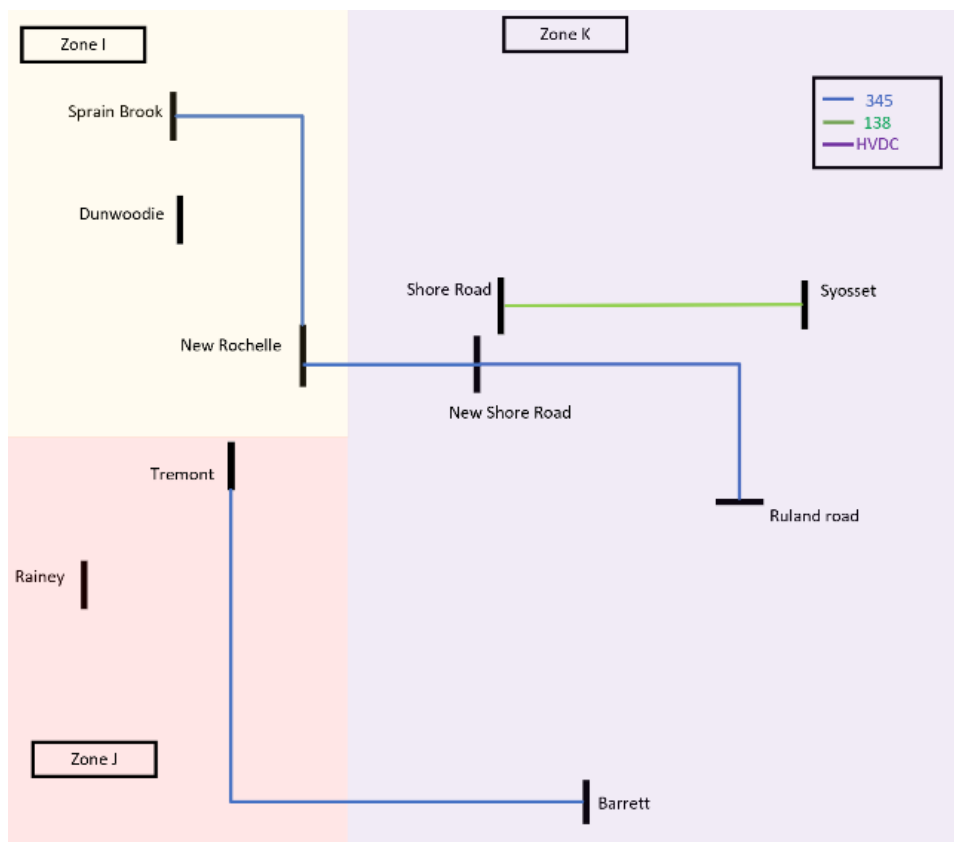
## **T048 Propel Base Solution 2**

Propel Base Solution 2 proposal consists of the following components:

- Build a proposed Barrett 345/138 kV substation in a ring configuration connecting to the proposed 138 kV Barrett substation to accommodate offshore wind projects with three 345/138 transformers, one 345 kV 900 MVA PAR controlling flow to Tremont, and one 300 MVAR shunt reactor
- Build a proposed New Shore Road 345 kV transition station together with one 200 MVAR shunt reactor
- Build a proposed Ruland Road 345/138 kV substation in ring configuration interconnecting to existing Ruland Road 138 kV substation with three 345/138 kV transformers, one 345 kV 900 MVA PAR controlling flow towards the proposed New Shore Road 345 kV substation, and one 200 MVAR shunt reactor
- Build a proposed New Rochelle 345 kV transition station
- Build a proposed underground Barrett – Tremont 345 kV AC line
- Build a proposed underground/submarine Ruland Road – New Shore Road – New Rochelle – Sprain Brook 345 kV AC line
- Build a Syosset – Shore Rd 138 kV land cable with one 138 kV 517 MVA PAR at the Syosset 138 kV substation
- Install a PASS breaker in place of breaker 1E at the existing Rainey 345 kV substation
- Install one 150 MVAR switch shunt reactor at the existing Sprain Brook 345 kV substation
- Install one 150 MVAR switch shunt reactor at the existing East Garden City 345 kV substation
- Install one 50 MVAR switch shunt reactor at the existing Shore Road 138 kV substation
- Install three series reactors on the Ruland Road – New Bridge 138 kV circuits 1, 2 & 3 at the Ruland Road substation
- Install three series reactors on the East Garden City – New Bridge 138 kV circuits 1, 2 & 3 at the East Garden City substation
- Reinforce existing 903 PAR to 420 MVA at the Lake Success substation
- Reinforce the Jamaica-Lake Success 138 kV cable
- Install a circuit breaker between the Holbrook 138/69 kV transformers 2 & 2A and the Holbrook – Ruland Road 138 kV line (Line 138-882) at the existing Holbrook 138 kV substation
- Install a PASS breaker in place of breaker 1330 at the existing Barrett 138 kV substation
- Upgrade Central Islip-Hauppauge 138 kV line (Line 138-889)

- Modify relay systems to eliminate P5 contingencies at multiple substations, including Valley Stream 138 kV substation, East Garden City 138 kV substation, and Barrett 138 kV substation

**Figure 12: T048 Propel Base Solution 2 Major Project Components (Refer to the description above for complete list of project components)**



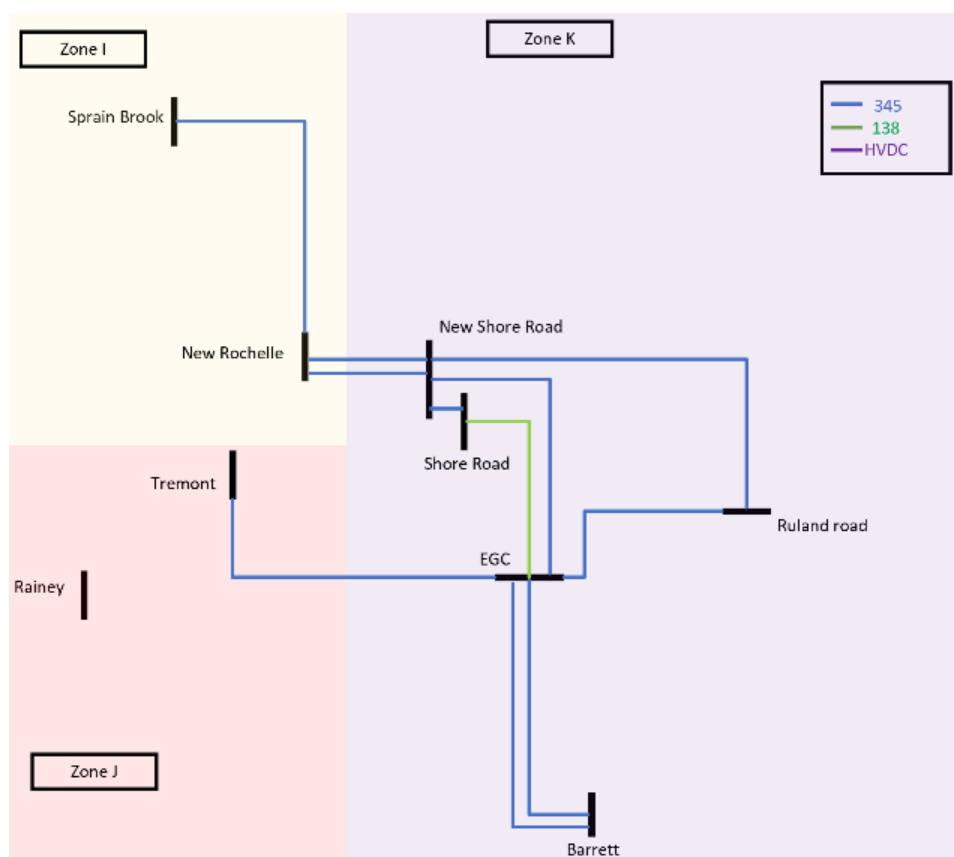
### **T049 Propel Base Solution 3**

Propel Base Solution 3 proposal consists of the following components:

- Build a proposed Barrett 345 kV substation in a ring configuration with three 345/138 kV transformers in series with 138 kV 540 MVA PARs controlling flow towards Barrett and two 100 MVAR shunt reactors
- Build a proposed New Shore Road 345 kV station with one 345 kV 900 MVA PAR controlling flow towards the New Rochelle 345 kV station, one 345/138 kV transformer in series with a 138 kV 540 MVA PAR controlling flow towards the existing Shore Road 345/138 kV substation, and two 150 MVAR shunt reactors
- Build a proposed Ruland Road 345 kV substation in ring configuration connecting to existing Ruland Rd 138 kV substation with three 345/138 kV transformers, one 345 kV 650 MVA PAR controlling flow towards the East Garden City 345 kV substation, and two 150 MVAR shunt reactors
- Build a proposed New Rochelle 345 kV transition substation
- Build two proposed underground Barrett – East Garden City 345 kV AC lines
- Build a 345 kV tie line with a 900 MVA PAR from the East Garden City 345 kV substation interconnected to the existing Tremont 345 kV substation
- Build one proposed underground East Garden City – New Shore Road 345 kV AC line
- Build one proposed underground East Garden City – New Shore Road 138 kV AC line
- Build one proposed underground Ruland Road – Shore Road 345 kV AC line
- Build one proposed underground/submarine Shore Road – New Rochelle – Sprain Brook 345 kV AC line
- Convert and reconfigure the existing Ruland Road – New Bridge 138 kV circuit 3 and New Bridge – East Garden City 138 kV circuit 4 to a Ruland Road – East Garden City 345 kV line, bypassing the existing New Bridge 138 kV substation
- Install PASS breakers in place of breakers 1E and 6E at the existing Rainey 345 kV substation
- Modify the East Garden City 345 kV substation to a breaker-and-a-half configuration with a PAR-controlled connection of the existing Y-49 345 kV line (i.e., the two existing Y49 345/138 kV transformers will be used to connect the East Garden City 345 kV substation to the existing East Garden City 138 kV substation)
- Install one 100 MVAR switch shunt reactor at Sprain Brook 345 kV substation

- Install two series reactors on the Ruland Road – New Bridge 138 kV circuit 1 & circuit 2 at the Ruland Road substation
- Install two series reactors on East Garden City – New Bridge 138 kV circuit 1 & circuit 2 at the East Garden City substation
- Install a PASS breaker (i.e., two breakers in series) in place of breaker CB-1460 at the existing New Bridge 138 kV substation to address the stuck breaker fault
- Install a circuit breaker between the Holbrook 138/69 kV transformers 2 & 2A and the Holbrook-Ruland Road 138 kV line (Line 138-882) at the existing Holbrook 138 kV substation.
- Upgrade the Central Islip – Hauppauge 138 kV line (Line 138-889)
- Modify relay systems to eliminate P5 contingencies at multiple substations, including Valley Stream 138 kV substation, Lake Success 138 kV substation, East Garden City 138 kV substation, and Barrett 138 kV substation.

**Figure 13: T049 Propel Base Solution 3 Major Project Components (Refer to the description above for complete list of project components)**



### **T051 Propel Alternate Solution 5**

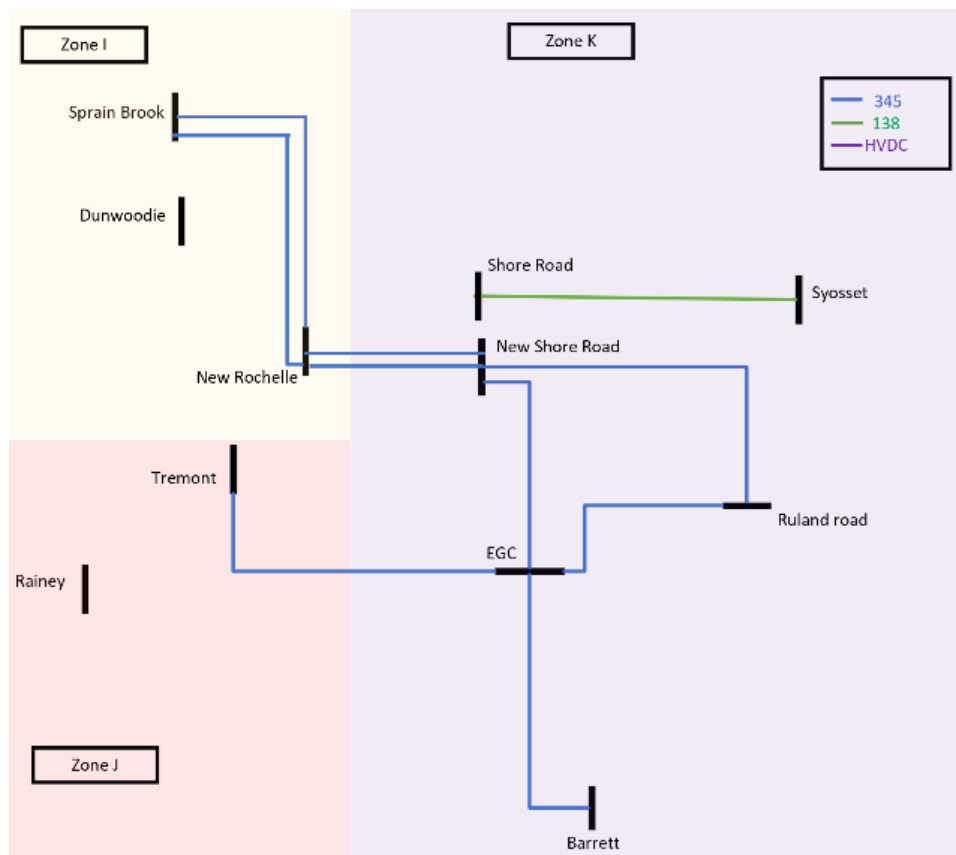
Propel Alternate Solution 5 proposal consists of the following components:

- Build a proposed Barrett 345 kV substation with two 345/138 transformers in series with 138 kV 540 MVA PARs controlling flow towards proposed OSW Developer 138 kV Barrett substation, and one 100 MVAR shunt reactor
- Build a proposed New Shore Road 345 kV substation with a 345/138 kV transformer in series with a 138 kV PAR to connect to the existing Shore Road 345/138 kV substation, two 345 kV 900 MVA PARs controlling flow towards the New Rochelle 345 kV station, two 150 MVAR shunt reactors, and one 100 MVAR shunt reactor
- Build a proposed Ruland Road 345 kV substation in ring configuration with three 345/138 kV transformers connecting to the existing Ruland Road 138 kV substation, one 345 kV 650 MVA PAR controlling flow towards the East Garden City 345 kV substation, and two 150 MVAR shunt reactors
- Build a proposed New Rochelle 345 kV transition substation
- Build one proposed underground Barrett – East Garden City 345 kV AC line
- Build a 345 kV tie line with a 900 MVA PAR from the East Garden City 345 kV substation interconnected to the existing Tremont 345 kV substation
- Build a proposed underground East Garden City – New Shore Road 345 kV AC line
- Build a proposed underground Ruland Road – New Shore Road 345 kV AC line
- Build two proposed underground/submarine New Shore Road – New Rochelle – Sprain Brook 345 kV AC lines
- Build a 138 kV line with a 400 MVA PAR from the existing Syosset 138 kV substation to the Shore Road 345/138 kV substation
- Convert and reconfigure the existing Ruland Road – New Bridge 138 kV circuit 3 and New Bridge – East Garden City 138 kV circuit 4 to a proposed Ruland Road – East Garden City 345 kV line, bypassing the existing New Bridge 138 kV substation
- Install PASS breakers (i.e., two breakers in series) in place of breakers 1E and 6E at the existing Rainey 345 kV substation
- Modify the East Garden City 345 kV substation to a breaker-and-a-half configuration with a PAR-controlled connection of the existing Y-49 345 kV line (i.e., the two existing Y49 345/138 kV transformers will be used to connect the East Garden City 345 kV substation to the existing East Garden City 138 kV substation)
- Install two 100 MVAR switch shunt reactors at the Sprain Brook 345 kV substation



- Install series reactors on the following five existing 138 kV lines: Ruland Road – New Bridge circuit 1 & circuit 2, East Garden City – New Bridge circuit 1 & circuit 2, and East Garden City – Valley Stream circuit 1.
- Upgrade the 2.5-mile segment to each of the existing Syosset – Greenlawn 138 kV and the Syosset – Oakwood 138 kV lines.
- Install a second PAR at the existing 138 kV Northport substation.
- Install a PASS breaker (i.e., two breakers in series) in place of breaker CB-1460 at the existing New Bridge 138 kV substation to address the stuck breaker fault
- Install a circuit breaker between the Holbrook 138/69 kV transformers 2 & 2A and the Holbrook – Ruland Road 138 kV line (Line 138-882) at the existing Holbrook 138 kV substation
- Upgrade the Central Islip – Hauppauge 138 kV line (Line 138-889)
- Modify relay systems to eliminate P5 contingencies at multiple substations, including Valley Stream 138 kV substation, Lake Success 138 kV substation, East Garden City 138 kV substation, and Barrett 138 kV substation

**Figure 14: T051 Propel Alternate Solution 5 Major Project Components (Refer to the description above for complete list of project components)**



## **T052 Propel Alternate Solution 6**

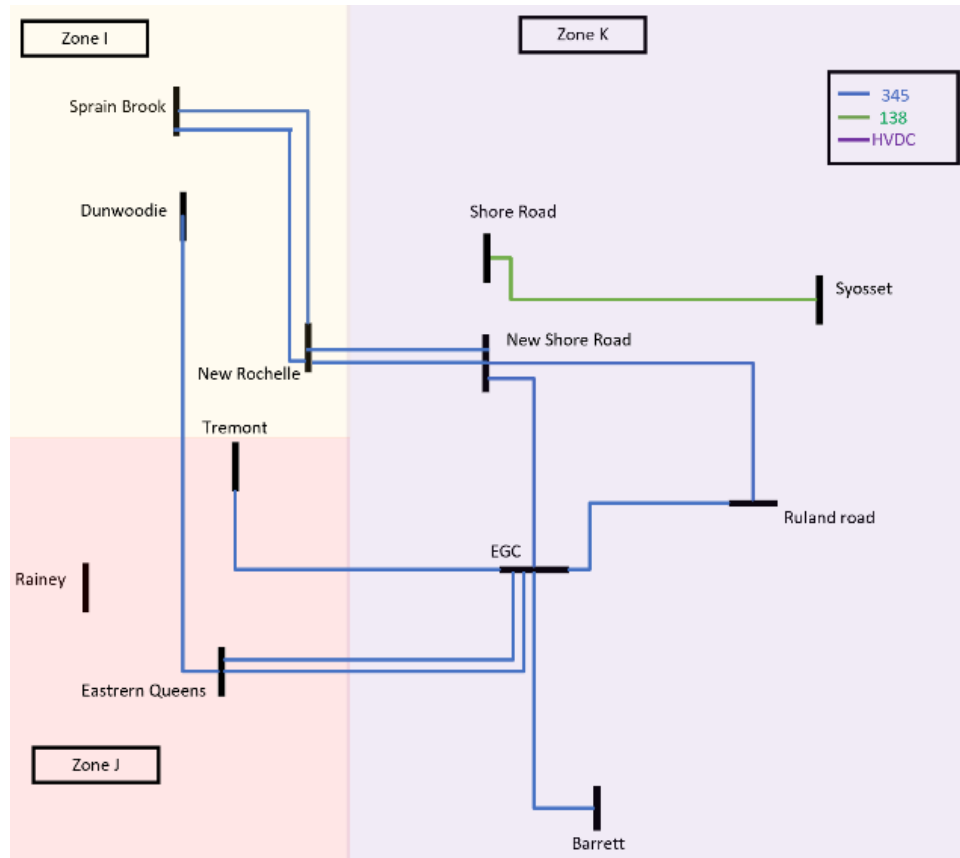
Propel Alternate Solution 6 proposal consists of the following components:

- Build a proposed Barrett 345 kV substation with two 345/138 kV transformers in series with 138 kV 540 MVA PARs controlling flow towards Barrett, and one 100 MVAR shunt reactor
- Build a proposed New Shore Road 345 kV substation with one 345/138 kV transformer in series with a 138 kV 540 MVA PAR controlling flow towards the Shore Road 345/138 kV substation, two 345 kV 900 MVA PARs controlling flow towards the New Rochelle 345 kV substation, two 75 MVAR shunt reactors, and 150 MVAR shunt reactor
- Build a proposed Ruland Road 345 kV substation in a ring configuration with three 345/138 kV transformers to connect to the existing Ruland Road 138 kV substation, one 345 kV 650 MVA PAR controlling flow towards the East Garden City 345 kV substation, and two 150 MVAR shunt reactor
- Build a proposed Eastern Queens 345/138 kV GIS substation in three-ring configurations by tapping the Valley Stream – Jamaica 138 kV line and Lake Success – Jamaica 138 kV line with three 345/138 kV transformers, three 138 kV PARs controlling the flow to the 138 kV transmission system, and one 345 kV 897 MVA PAR controlling flow towards the Dunwoodie 345 kV substation
- Build a proposed underground Barrett – East Garden City 345 kV AC line
- Build two proposed underground East Garden City – Eastern Queens 345 kV AC lines
- Build a proposed underground Eastern Queens – Dunwoodie 345 kV AC line
- Build a proposed underground East Garden City – New Shore Road 345 kV AC line
- Build a proposed underground Ruland Road – New Shore Road 345 kV AC line
- Build two proposed underground/submarine New Shore Road – New Rochelle – Sprain Brook 345 kV AC lines
- Build a Syosset – Shore Rd 138 kV line with one 138 kV PAR at the Syosset substation
- Covert and reconfigure the existing Ruland Road – New Bridge 138 kV circuit 3 and New Bridge – East Garden City 138 kV circuit 4 to a proposed Ruland Road – East Garden City 345 kV line, bypassing the existing New Bridge 138 kV substation
- Upgrade existing Lake Success – Jamaica 138 kV line and Valley Stream – Jamaica 138 kV line and loop them into the proposed Eastern Queens 138 kV substation
- Install PASS breakers (i.e., two breakers in series) in place of breaker 1E and 6E at the existing Rainey 345 kV substation
- Modify the East Garden City 345 kV substation to a breaker-and-a-half configuration with a PAR-controlled connection of the existing Y-49 345 kV line (i.e., the two existing Y49 345/138 kV

transformers will be used to connect the East Garden City 345 kV substation to the existing East Garden City 138 kV substation)

- Install one 120 MVAR shunt reactor and one 300 MVAR shunt reactor
- Install two 75 MVAR switch shunt reactors at the Sprain Brook 345 kV substation
- Install series reactors on the following four existing 138 kV lines: Ruland Road – New Bridge circuit 1 & circuit 2 and New Bride – East Garden City circuit 1 & circuit 2
- Install a PASS breaker (i.e., two breakers in series) in place of breaker CB-1460 at the existing New Bridge 138 kV substation to address the stuck breaker fault
- Install a circuit breaker between the Holbrook 138/69 kV transformers 2 & 2A and the Holbrook – Ruland Road 138 kV line (Line 138-882) at the existing Holbrook 138 kV substation
- Upgrade Central Islip – Hauppauge 138 kV line (Line 138-889)
- Modify relay systems to eliminate P5 contingencies at multiple substations, including Valley Stream 138 kV substation, East Garden City 138 kV substation, and Barrett 138 kV substation

**Figure 15: T052 Propel Alternate Solution 6 Major Project Components (Refer to the description above for complete list of project components)**



### **T053 Propel Alternate Solution 7**

Propel Alternate Solution 7 proposal consists of the following components:

- Build a proposed Barrett 345 kV substation in a ring configuration connecting to the proposed 138 kV Barrett substation to accommodate offshore wind projects with three 345/138 kV transformers, one 345 kV 897 MVA PAR controlling flow towards the Eastern Queens 138 kV substation, and one 250 MVAR shunt reactor
- Build a proposed New Shore Road 345 kV substation with one 200 MVAR shunt reactor
- Build a proposed Ruland Road 345 kV substation in a ring configuration with three 345/138 kV transformers connecting to existing Ruland Rd 138 kV substation, one 345 kV 897 MVA PAR controlling flow towards the New Shore Road 345 kV substation, and one 200 MVAR shunt reactor
- Build a proposed New Rochelle 345 kV substation
- Build a proposed Eastern Queens 345 kV GIS substation in a three-ring configuration tapping Valley Stream – Jamaica 138 kV line and Lake Success – Jamaica 138 kV line, three 345/138 kV transformers and three 138 kV PARs controlling the flow to the 138 kV transmission system, and one 150 MVAR Shunt reactor
- Build a proposed Northport 345 kV substation in a ring configuration connecting to existing Northport 138 kV substation with  $\pm 320$  kV 1250 MVA HVDC converter station, four 345/138 kV transformers, one 200 MVAR shunt capacitor, and two 150 MVAR shunt capacitors
- Build a proposed Sprain Brook HVDC Converter Station connecting to existing Sprain Brook 345 kV substation
- Build three proposed underground Barrett – Eastern Queens 345 kV AC lines
- Build one proposed underground Eastern Queens – Tremont 345 kV AC line
- Build one proposed underground Eastern Queens – Dunwoodie 345 kV AC line
- Build one proposed underground/submarine Ruland Road – New Shore Road – New Rochelle-Sprain Brook 345 kV AC line
- Build one proposed underground Northport – Sprain Brook bi-direction  $\pm 320$  kV DC line rated at 1250 MVA
- Build a Syosset – Shore Rd 138 kV AC line with one 138 kV 517 MVA PAR at the Syosset substation
- Install a PASS breaker (i.e., two breakers in series) in place of breakers 1E at the existing Rainey 345 kV substation
- Loop-in the existing 901 & 903 lines into the proposed Eastern Queens 138 kV substations along with reinforcing the 903 cable and PAR.

- Update the existing 138 kV land cable between Valley Stream – Eastern Queens (replacing one section of 901) with one PAR at the Eastern Queens 138 kV substation
- Install one 200 MVAR shunt reactor at the Lake Success 138 kV substation
- Install one 50 MVAR switch shunt reactor at the Shore Road 138 kV substation
- Install one 150 MVAR switch shunt reactor at the Sprain Brook 345 kV substation
- Install three series reactors on the Ruland Road – New Bridge 138 kV circuits 1, 2 & 3 at the Ruland Road substation
- Install three series reactors on Eastern Garden City – New Bridge 138 kV circuits 1, 2 & 3 at the East Garden City substation
- Install a PASS breaker in place of breaker 1330 at the existing Barrett 138 kV substation
- Install a circuit breaker between the Holbrook 138/69 kV transformers 2 & 2A and the Holbrook – Ruland Road 138 kV line (Line 138-882) at the existing Holbrook 138 kV substation
- Upgrade the Central Islip – Hauppauge 138 kV line (Line 138-889)
- Modify relay systems to eliminate P5 contingencies at multiple substations, including Valley Stream 138 kV substation, East Garden City 138 kV substation, and Barrett 138 kV substation

**Figure 16: T053 Propel Alternate Solution 7 Major Project Components (Refer to the description above for complete list of project components)**

