Transitional Cluster Study – Final Report

Transmission Services Studies

AUGUST 6, 2026

Preface/Disclaimer

ISO New England, Inc. ("ISO")[1], together with relevant Interconnecting Transmission Owners (as included in this report), and to the extent identified, Internal Affected Systems, conducted the Transitional Cluster Study ("TCS") for the projects that submitted TCS Agreements on or before October 10, 2025. This study was conducted under Schedules 22 – Large Generator Interconnection Procedures; 23 – Small Generator Interconnection Procedures; and 25 – Elective Transmission Upgrade Interconnection Procedures of the ISO's Open Access Transmission Tariff ("OATT") and the ISO's Interconnection Planning Procedure for Generation and Elective Transmission Upgrades, PP5-6. This document presents the results of the TCS as required to be issued under Section 5.1.1.2 of Schedules 22, 23, and 25 of the OATT.

Section 5.1.1.2 of each of these Schedules requires that the final TCS Report shall:

- provide all the information included in the interim TCS Report including:
    - identification of any circuit breaker short circuit capability limits exceeded as a result of the interconnection;
    - identification of any thermal overload or voltage limit violations resulting from the interconnection;
    - identification of Contingent Facilities
    - identification of any instability or inadequately damped response to system disturbances resulting from the interconnection; and
    - Interconnecting Transmission Owner's Interconnection Facilities and Network Upgrades that are expected to be required as a result of the Interconnection Request(s) and a non-binding, good faith estimate of cost responsibility and a non-binding, good faith estimated time to construct.
- provide a description of, estimated cost of, and schedule for required construction of the Interconnecting Transmission Owner's Interconnection Facilities and Network Upgrades required to interconnect the Generating Facility to the Administered Transmission System that resolve issues identified in the interim TCS Report; and
- address the short circuit, instability, and power flow issues identified in the interim TCS Report.

This final TCS Report includes the items listed above; and notes that the estimates included are planning grade estimates.

As discussed in detail in Section 10, ISO has concluded that it must evaluate if a restudy of the TCS is required due to the withdrawal of TCS Projects and other, higher queued projects. Section 10 of this report provides additional details on timing, approach, and implications of the TCS restudy determination.

[1] The ISO was assisted by the following consultants: Electranix Corporation, Mitsubishi Electric Power Products, Inc., RLC Engineering, PLLC, and Siemens Industry, Inc.

Contents

Figures

Tables

Section 1
Introduction

ISO New England Inc. ("ISO") conducted the TCS pursuant to Schedule 22 - Large Generator Interconnection Procedures ("LGIP"), Schedule 23 - Small Generator Interconnection Procedures ("SGIP") and Schedule 25 - Elective Transmission Upgrade Interconnection Procedures ("ETUIP") of Section II of the ISO New England Transmission, Markets and Services Tariff (ISO New England Open Access Transmission Tariff "OATT"), and Interconnection Planning Procedure for Generation and Elective Transmission Upgrades ("PP5-6").

This final report documents the results of the analyses performed for the TCS, along with identification of any required Interconnecting Transmission Owners' ("ITO(s)") Interconnection Facilities and Network Upgrades that are expected to be required as a result of the Interconnection Requests ("IRs") studied in the TCS and their associated non-binding, good faith cost and construction time estimates.

1.1 Eligible TCS Queue Projects

In accordance with Section 5.1.1.2 of the LGIP, SGIP and ETU IP, IRs that were TCS-eligible and for which the ICs fully executed a TCS Agreement were studied in the TCS ("TCS Projects"). There were no Elective Transmission Upgrade ("ETU") IRs that participated in the TCS.

Through the TCS Agreement, ICs specified if a TCS project was to be studied for Network Resource Interconnection Service ("NRIS"), or for Capacity Network Resource Interconnection Service ("CNRIS") (which also studies a project for NRIS). All TCS Projects requested CNRIS via their TCS Agreement. 18 TCS Projects were studied for the first time in the TCS (*i.e.*, they were studied for both NRIS and CNRIS).

In the TCS Agreement, an IC could elect for the ISO to study a TCS project for CNRIS only where the IR had already been studied for NRIS under a system impact study prior to April 4, 2025. Five (5) TCS Projects elected to be studied for CNRIS only in the TCS.

The complete list of the 23 TCS Projects participating in the TCS and related MW totals are listed below in Table 1-1.

In the TCS Agreement, an IC could elect to automatically downgrade from CNRIS to NRIS where violations were identified in the thermal analysis associated with CNRIS testing that were not identified in the thermal analysis associated with NRIS testing. Two TCS Projects elected this automatic downgrade to NRIS option.

Studies to examine NRIS were conducted according to the Network Capability Interconnection Standard ("NCIS"), and studies to examine CNRIS were conducted according to the Capacity

Capability Interconnection Standard ("CCIS"), both of these concepts are defined in the LGIP and SGIP.[2,3]

[2] Pursuant to Schedules 22 and 23, Network Capability Interconnection Standard is defined as "the minimum criteria required to permit Interconnection Customer to interconnect a Generating Facility seeking Network Resource Interconnection Service or Elective Transmission Upgrade seeking Network Import Interconnection Service in a manner that avoids any significant adverse effect on the reliability, stability, and operability of the New England Transmission System, including protecting against the degradation of transfer capability for interfaces affected by the Generating Facility seeking Network Resource Interconnection Service or Elective Transmission Upgrade seeking Network Import Interconnection Service, as detailed in the ISO New England Planning Procedures."

[3] Pursuant to Schedules 22 and 23, Capacity Capability Interconnection Standard is defined as "the criteria required to permit Interconnection Customer to interconnect a Generating Facility seeking Capacity Network Resource Interconnection Service or an Elective Transmission Upgrade seeking Capacity Network Import Interconnection Service in a manner that avoids any significant adverse effect on the reliability, stability, and operability of the New England Transmission System, including protecting against the degradation of transfer capability for interfaces affected by the Generating Facility seeking Capacity Network Resource Interconnection Service or an Elective Transmission Upgrade seeking Capacity Network Import Interconnection Service, and in a manner that ensures intra-zonal deliverability by avoidance of the redispatch of other Capacity Network Resources or Elective Transmission Upgrades with Capacity Network Import Interconnection Service, as detailed in the ISO New England Planning Procedures."

Table 1-1
List of TCS Projects

QP	Point of Interconnection ("POI")	Load Zone	Summer CNR MW	Winter CNR MW	Summer NR MW[4]
1090	West Barnstable 345 kV	SEMA	248.9	486.33	N/A
1116	Brayton Point 345 kV	SEMA	243	604	N/A
1123	Devon 115kV	CT	200	200	N/A
1148	Electric Avenue 115 kV	NEMA	300	300	N/A
1171	CMP's 34.5kV Section 137 approx. 0.3 miles from Roxbury substation	ME	2	4	N/A
1238	West Medway 345kV	SEMA	300	300	300
1365	South Agawam 115 kV	WCMA	250	250	250
1412	Pottersville 115 kV	SEMA	168	168	168
1427	Line 391 (Buxton to Scobie Pond 345 kV)	ME	180	180	180
1428	Line A184 (Scobie Pond to Pulpit Rock 115 kV)	NH	100	100	100
1495	Windsor 115 kV	VT	19.3	19.3	19.3
1502	Highgate 115 kV	VT	19.3	19.3	19.3
1513	E205E (Bear Swamp to Pratts Junction 230kV)	WCMA	300	300	300
1515	393 Line (Alps to Berkshire 345 kV)	WCMA	290	290	290
1518	Line F132-2 (Adams to Partridge Tap 115kV)	WCMA	136	136	136
1542	Blandford 115kV	WCMA	170	170	170
1543	Line 342-2 (Canal to Jordan Pond 345 kV)	SEMA	500	500	500
1546	Line F132-2 (Adams to Partridge Tap 115kV)	WCMA	170	170	170
1551	Line A127-4 (Barre to Paxton 115 kV)	WCMA	180	180	180
1553	Tewksbury 115 kV substation	NEMA	125	125	125
1555	Line Q-169 (Resco-Saugus Tap to Melrose 2 Tap 115 kV)	NEMA	200	200	200
1557	Wakefield Junction 115 kV	NEMA	225	225	225
1567	Line 326-2 (Sandy Pond to Lawrence Rd 345 kV)	WCMA	500	500	500
		Total	**4,826.5**	**5,426.93**	**3,832.6**

NOTE: Since the issuance of the interim TCS Report on June 7, 2026, QP1542 and QP1546 have withdrawn from the TCS. Section 10 of this report provides details on the next steps that the ISO will take to assess the impact of these withdrawals on the result of the TCS and the scope of any necessary restudy.

[4] NRC MW listed as "N/A" – Indicates that the TCS project requested to be studied for CNRIS only in the TCS

Figure 1-1 through to Figure 1-10 show local one-line representations of the TCS Projects on the ISO System Diagram.

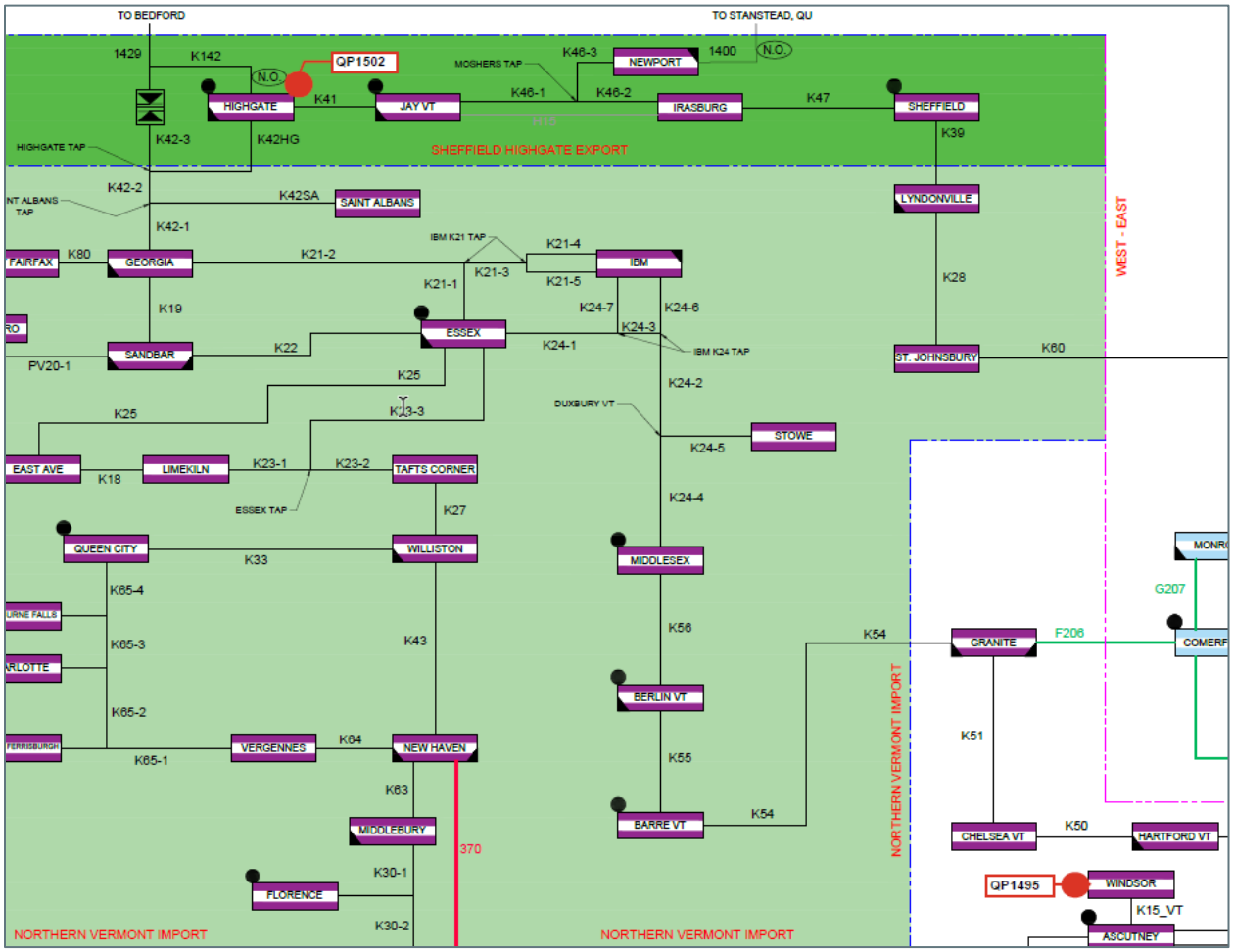

Figure 1-1: QP1502 and QP1495 System Diagram One-Line

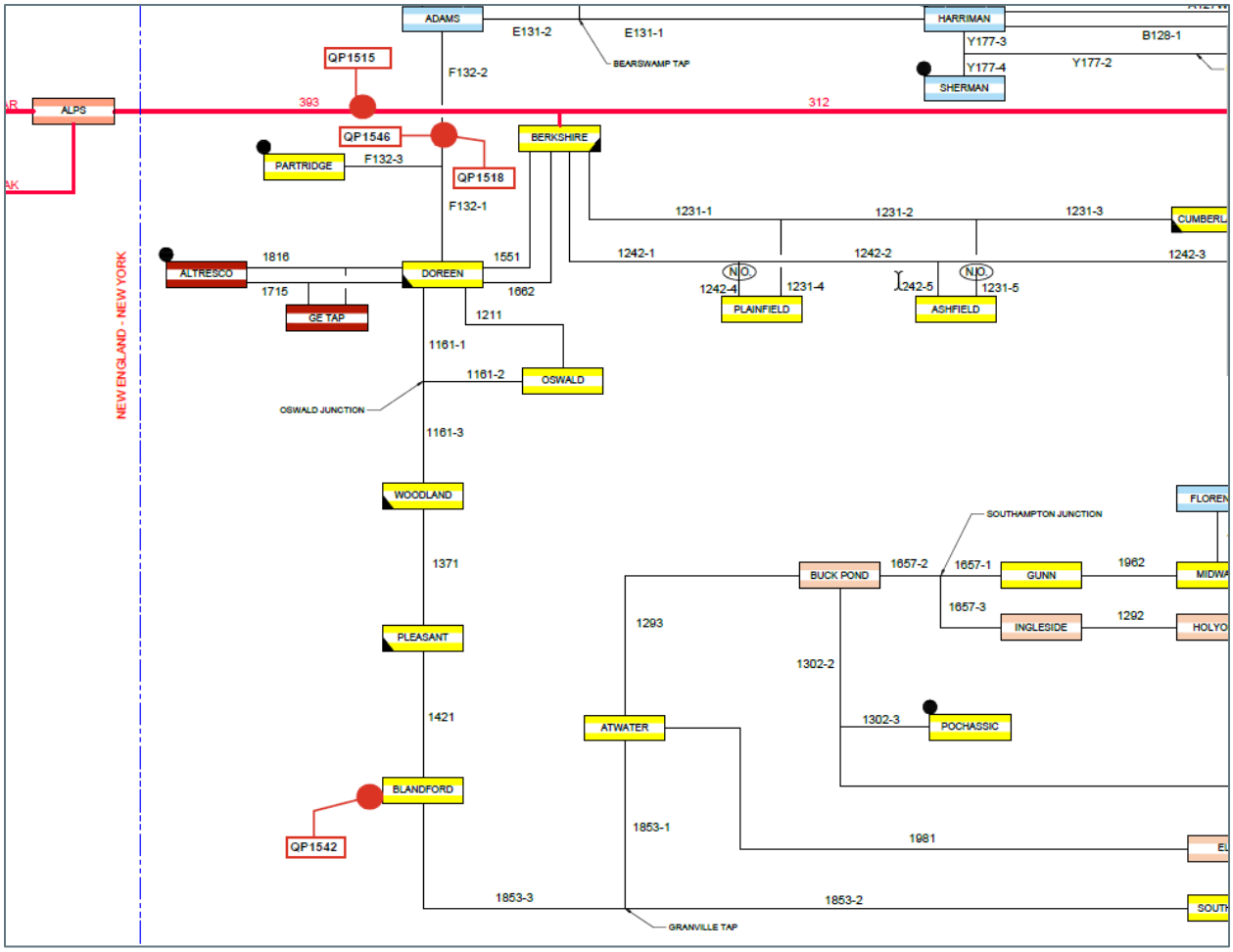

Figure 1-2: QP1515, QP1518, QP1542 and QP1546 System Diagram One-Line

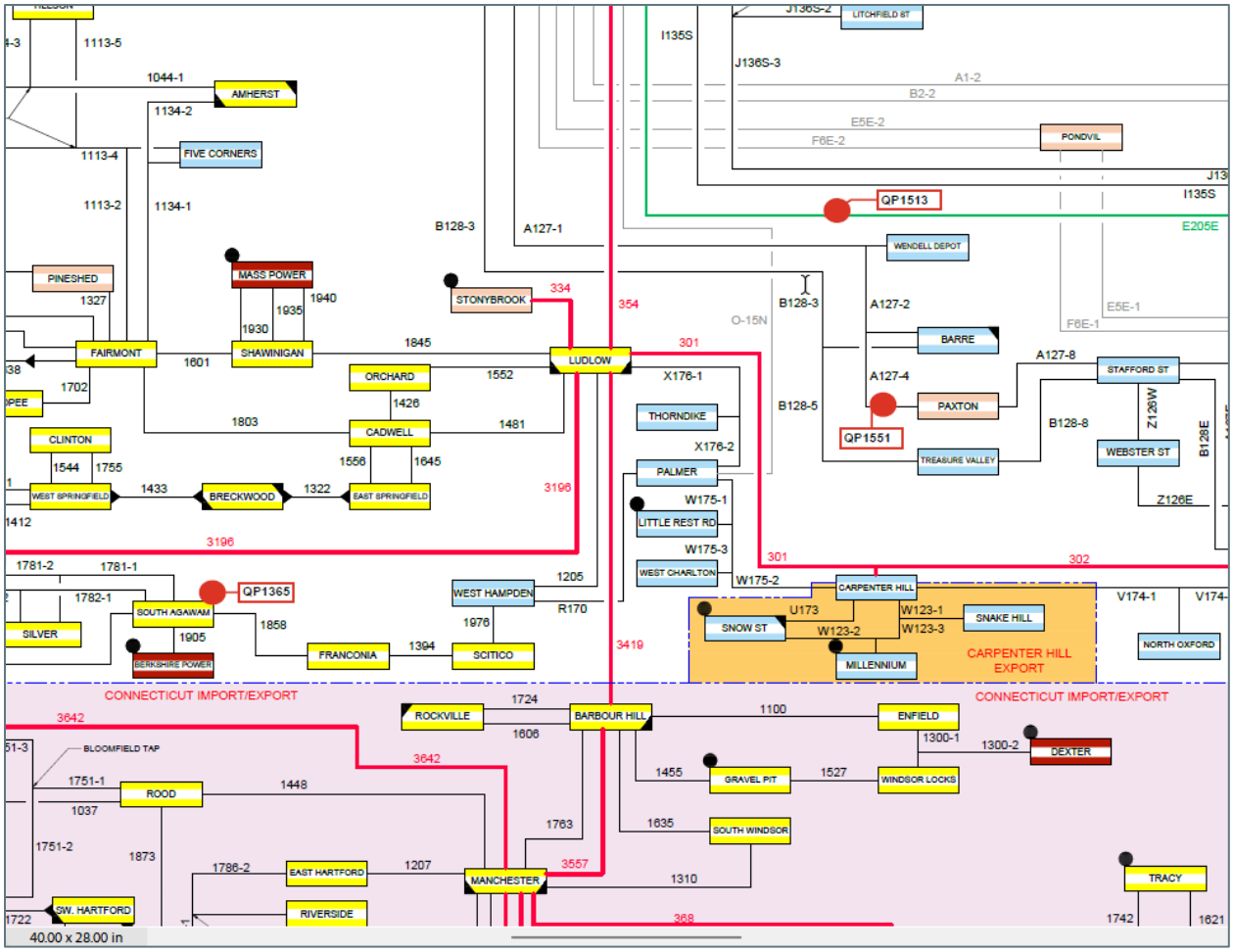

Figure 1-3: QP1365, QP1513 and QP1551 System Diagram One-Line

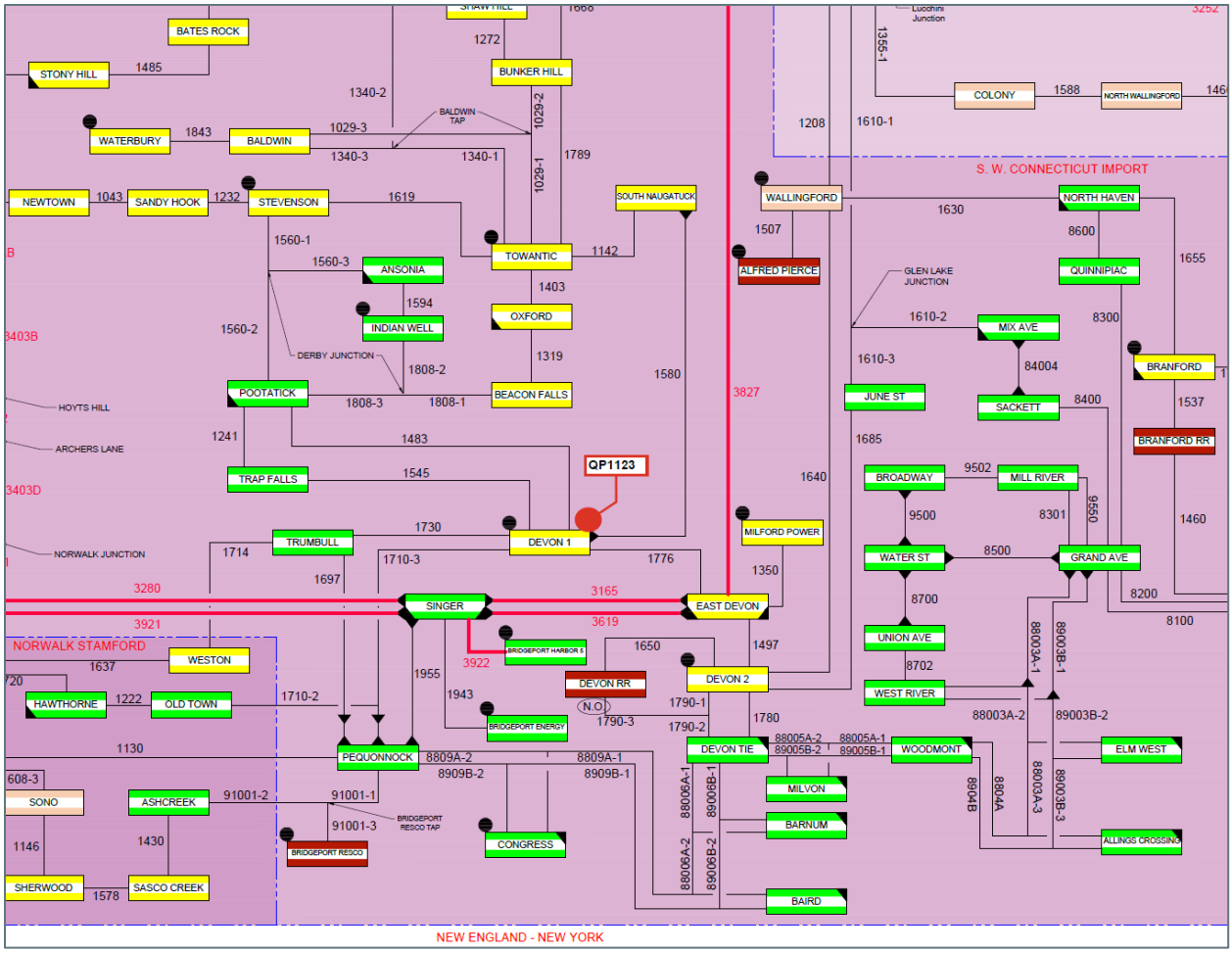

Figure 1-4: QP1123 System Diagram One-Line

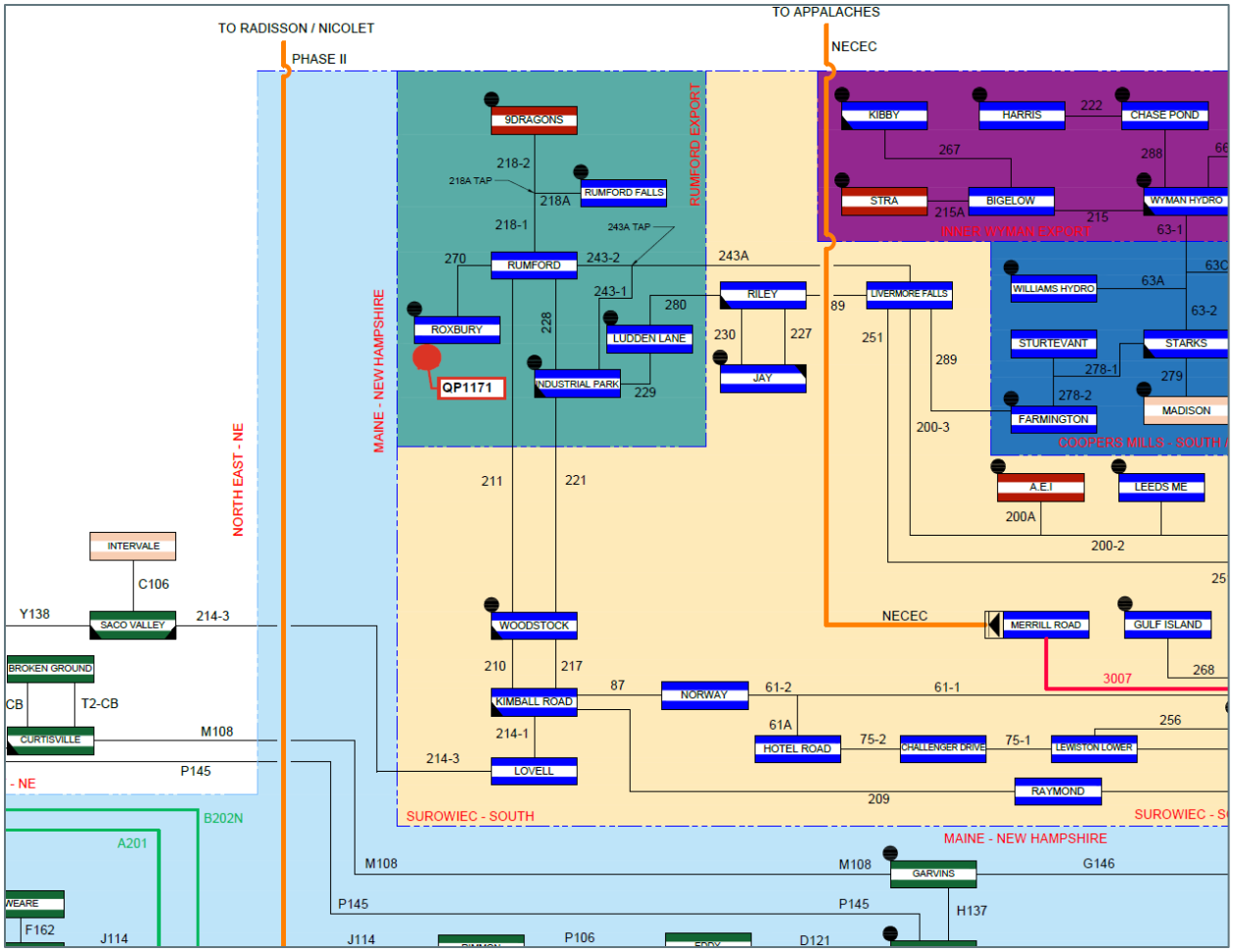

Figure 1-5: QP1171 System Diagram One-Line

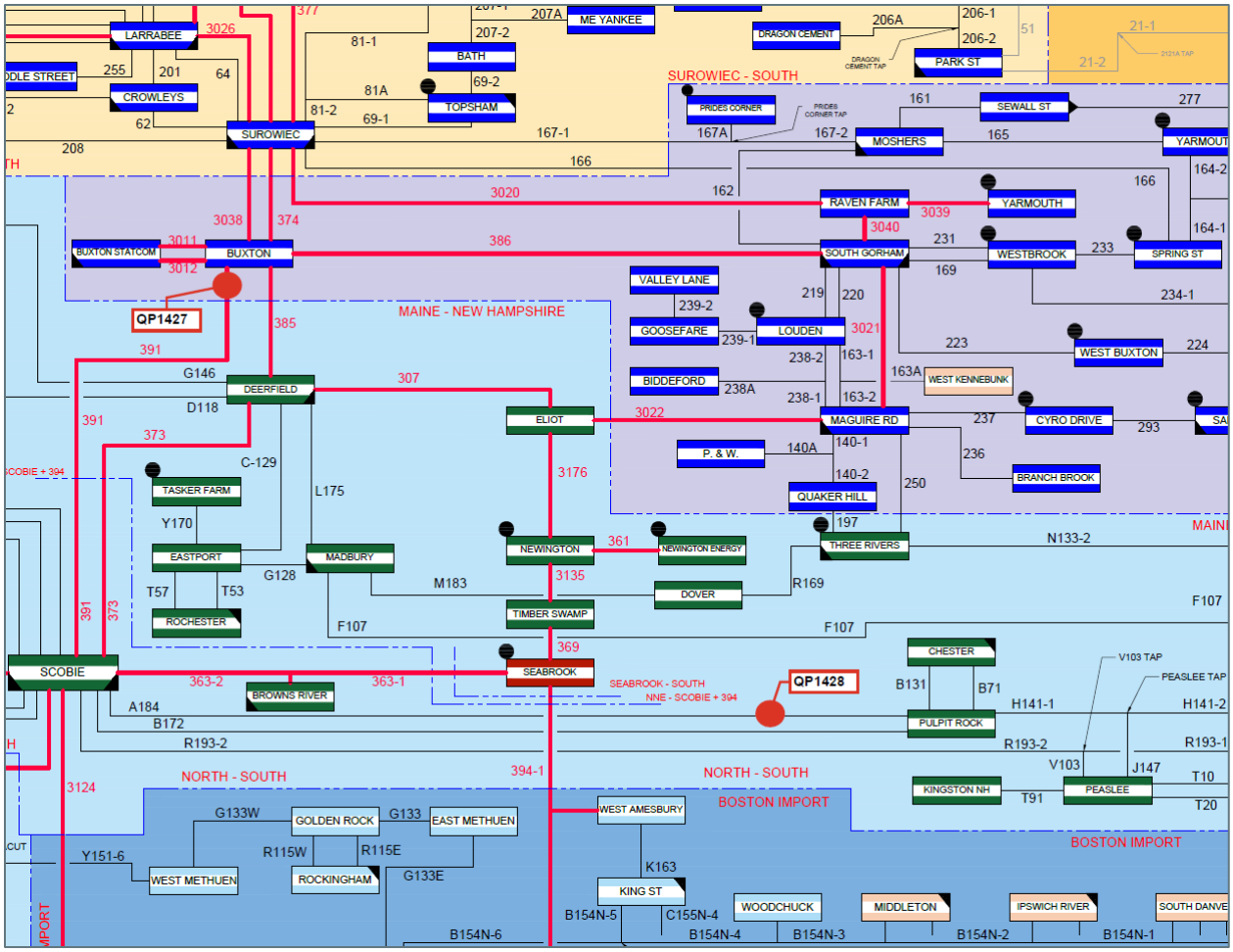

Figure 1-6: QP1427 and QP1428 System Diagram One-Line

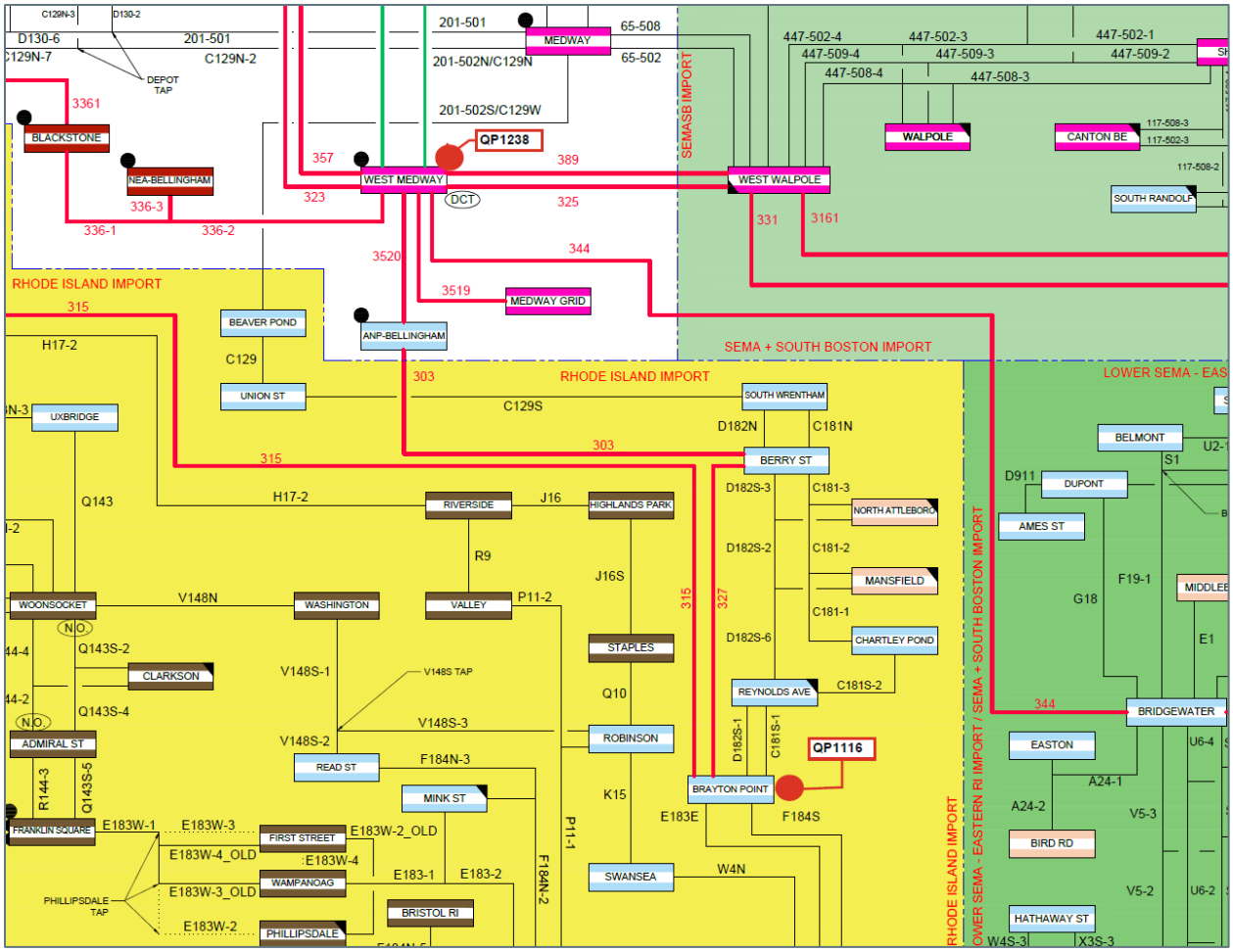

Figure 1-7: QP1116 and QP1238 System Diagram One-Line

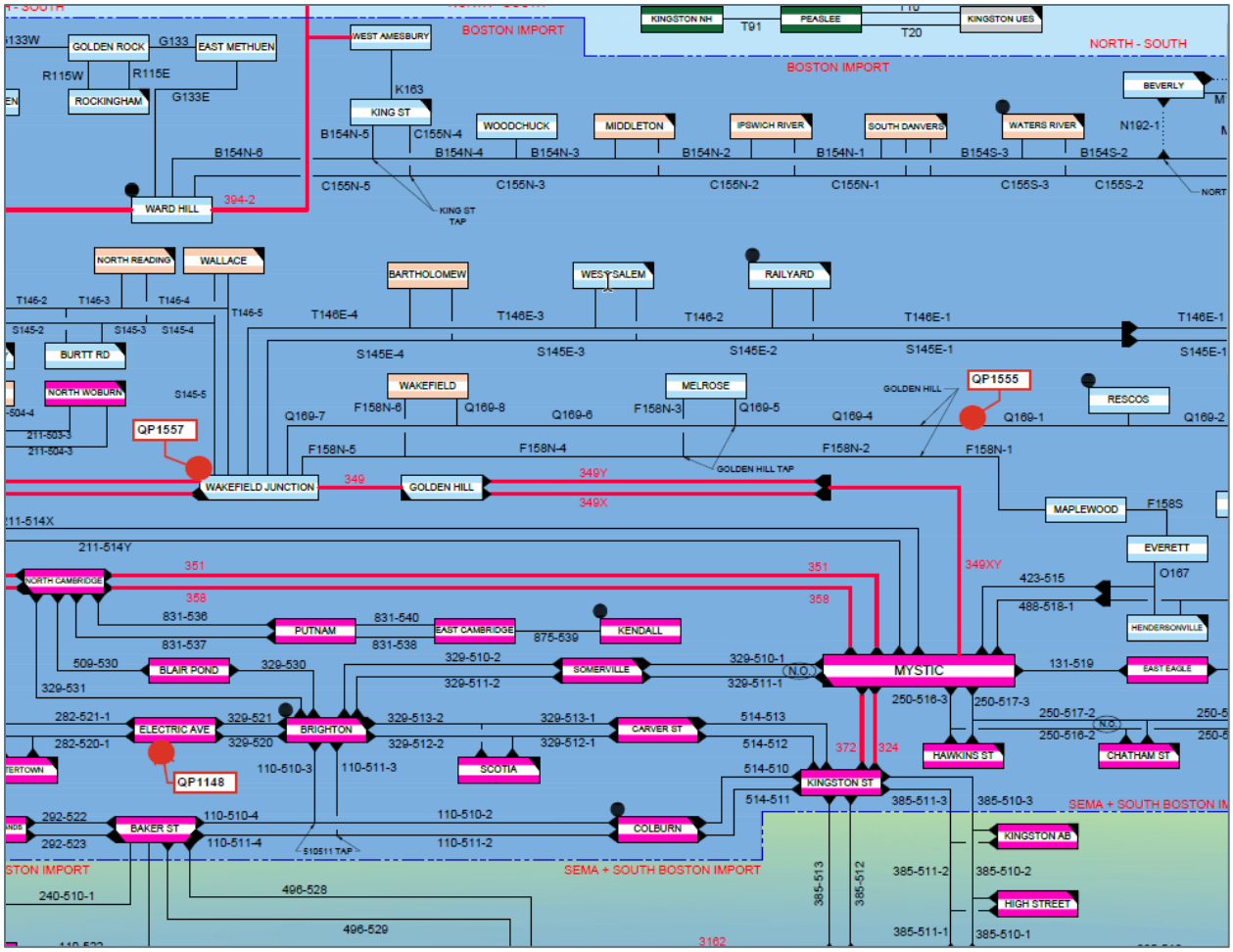

Figure 1-8: QP1148, QP1555 and QP1557 System Diagram One-Line

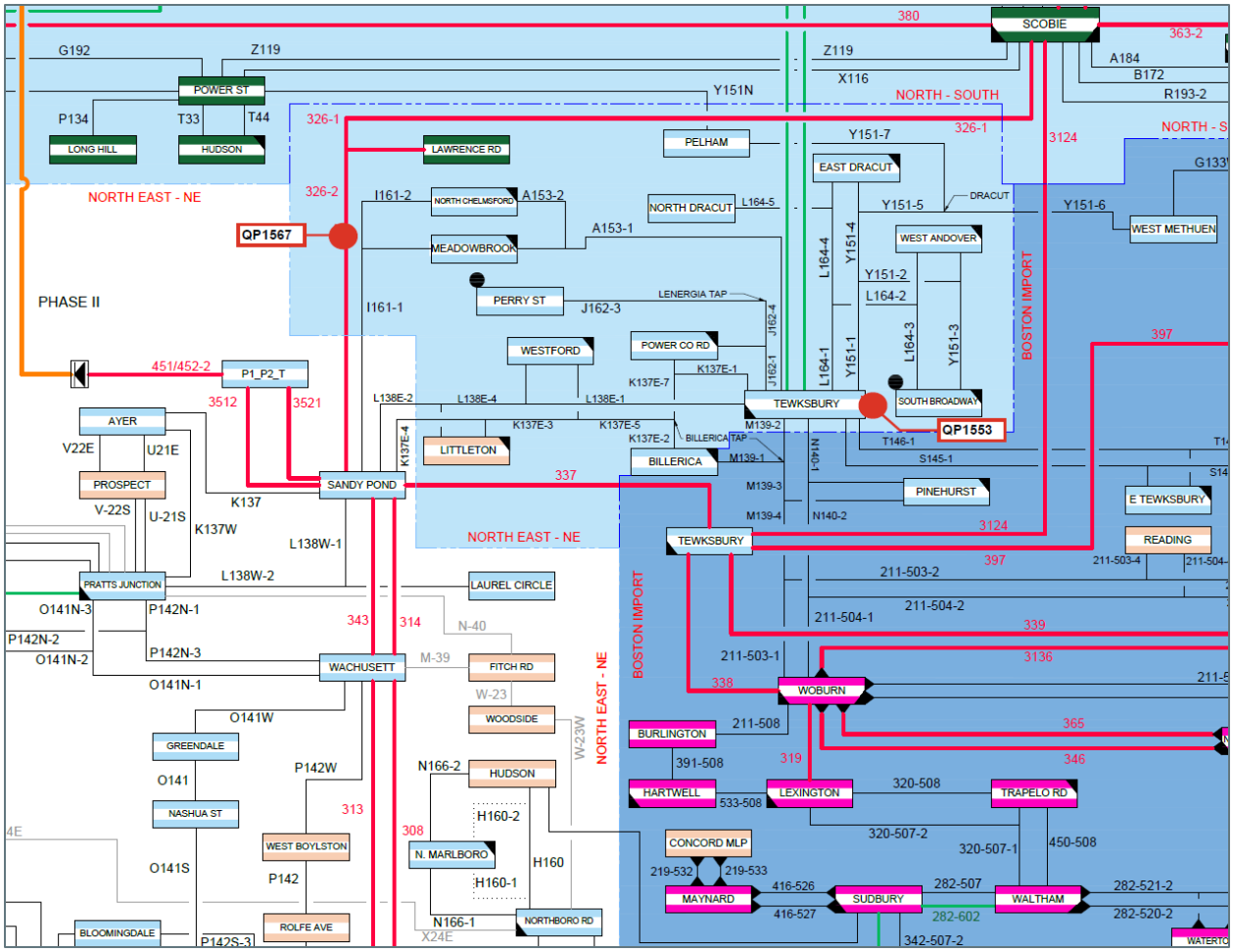

Figure 1-9: QP1553 and QP1567 System Diagram One-Line

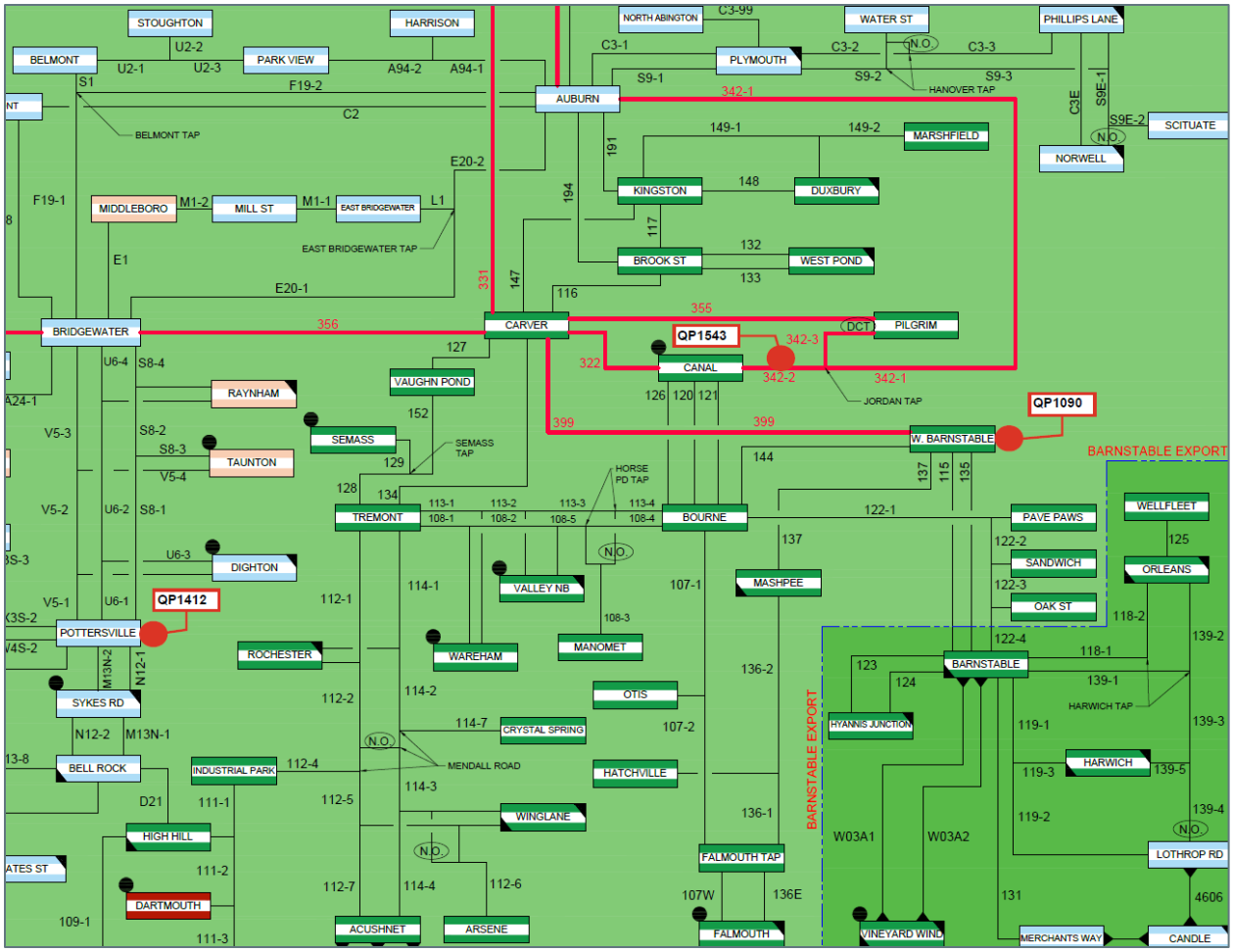

Figure 1-10: QP1090, QP1412, and QP1543 System Diagram One-Line

1.2 Base Case Topology and Load Levels

Consistent with Section 2.3 of the LGIP and SGIP, the base cases used for the TCS include all in-service, under construction, and planned transmission and generation projects expected to be in-service by 2030.

The 2025 Capacity, Energy, Loads, and Transmission ("CELT") report was used to determine the forecasted loads for the peak load levels evaluated. A fixed load level was modeled for the Intermediate (Shoulder) load, Springtime Light load, Spring Daytime Minimum load and Nighttime Minimum load.

The detailed modeling assumptions are described in the documents included in the 2025 Pre Transitional Cluster Study Stability Base Case Library - Revision 1 and 2025 Pre Transitional Cluster Study Steady-State Base Case Library - Revision 1 available on the ISO website.

1.3 Software Applications

The following software applications were used to perform the analyses documented in this report:

- PSSE, Version 35.6.4
- PowerGEM TARA Version 2503.3:
    - For CCIS analyses, the same TARA functionality that had been used to support past Forward Capacity Auction qualification cycles was used for the TCS
- Aspen OneLiner, Version 15.9
- PSCAD, Version 5.0.1

Section 2
Steady State Analysis

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2.1 CCIS Analysis Results

2.2 NCIS Thermal Analysis Results

2.3 NCIS Voltage Analysis Results

Section 3
Short Circuit Analysis

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Section 4
Transient Stability Analysis

CONFIDENTIAL/CEII INFORMATION REDACTED

4.1 DC Testing

4.2 EC Testing

4.3 BPS Classification Testing

Section 5
Additional Analyses

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5.1 Stability DC Testing for East-West Transfer Limit Increase

5.2 VELCO Sub-Transmission Thermal and Voltage Screening

5.3 Electromagnetic Transient ("EMT") Analysis

5.4 Sub-synchronous Torsional Interaction ("SSTI") Screening

Section 6
Network Upgrades, Cost and Construction Time Estimates

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In accordance with Section 10.3.2 of PP5-6, ISO New England and applicable Transmission Owners have identified Network Upgrades to address the worst violations identified in Sections 3 to 5 of this report. Details on each listed Network Upgrades can be found in Appendix G. The cost and construction time estimates noted in this section of the report are non-binding and good faith estimates.

6.1 Eversource's Upgrades

Table below lists the Network Upgrades proposed in Eversource's service territory:

Table 6-1
Eversource's Network Upgrades – Estimated Cost and Construction Time

Upgrade Element Name or Location	Cost Estimates ($)	Construction Time Estimates (Months)
H141-1	12,471,100	25
389	24,616,600	33
325	66,859,900	48
211-514X	361,115,900	46
349XY	384,207,800	63
1771	672,500	11
381-ES	24,527,200[5]	31
A152-2A	16,878,100	25
A152-2B	Combined with A152-2A	Combined with A152-2A
N186-2	4,629,900	22
338-ES	53,292,000	35

[5] Highlighted values within this final TCS Report identify changes to the upgrade information relative to the interim TCS Report.

Upgrade Element Name or Location	Cost Estimates ($)	Construction Time Estimates (Months)
301-ES	7,555,500	28
A127W-4-ES	687,500	10
1781-1	615,000	17
1782-1	699,400	12
1211-A	7,474,600	28
1211-B	Combined with 1211-A	Combined with 1211-A
1371	15,590,800	32
1421	47,370,500	63
1853-3	18,327,400	36
1853-1	17,464,800	36
1853-2	16,200,100	36
1768-2	4,500,000	36
1768-3	Combined with 1768-2	Combined with 1768-2
347-ES	3,260,400	21
393-1	385,200	11
342-2-1	5,224,800	28
342-2-2	514,800	28
322E	9,555,500	22
400 MVAR STATCOM at Ludlow 345kV	125,098,000	69
250 MVAR STATCOM at Scobie Pond 345kV	22,931,700	69
West Medway 345 kV Breaker 105	1,796,500	31
Total Cost	**1,254,523,500**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

6.2 National Grid's Upgrades

Table below lists the Network Upgrades proposed in National Grid's service territory:

Table 6-2
National Grid's Network Upgrades – Estimated Cost and Construction Time

Upgrade Element Name or Location	Cost Estimates ($)	Construction Time Estimates (Months)
E131-1	13,000,000	40
Deerfield #4 T3	40,000,000	60
Deerfield #4 T4	Combined with Deerfield #4 T3	Combined with Deerfield #4 T3
D-4A	860,000	12
302	130,000,000	61
343	115,000,000	73
Pratts Jct T8A	18,000,000	72
E157W-1	Covered by ACL #529	N/A
E157W-2	Covered by ACL #529	N/A
E157	Partially covered by ACL #529, incremental cost is 71,000	6
E157E	Partially covered by ACL #529, incremental cost is145,000	6
A127-4-1	48,000,000	93
A127-8	42,000,000	Combined with A127-4-1
Z126W	3,000,000	42
337	Covered by ACL #462	N/A
338-NGRID	Covered by ACL #461	N/A
301-NGRID	Partially covered by ACL #528; incremental cost is 55,000,000	42
326-2-NGRID	105,000,000	70
E205E-1	350,000,000	93
E205E-2	110,000,000	Combined with E205E-1
W4S-1	48,000,000	51
W4S-2	Combined with W4S-1	Combined with W4S-1

Upgrade Element Name or Location	Cost Estimates ($)	Construction Time Estimates (Months)
X3S-1	1,000,000	30
E205W-NE	61,000,000	67
O141N-1	30,000,000	51
O141N-3	Combined with O141N-1	Combined with O141N-1
P142N-1	Combined with O141N-1	Combined with O141N-1
P142N-3	Combined with O141N-1	Combined with O141N-1
M-39	100,000	6
66 MVAR STATCOM at QP1513 POI	45,000,000	48
Total Cost	**1,215,176,000**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

6.3 Rhode Island Energy's Upgrades

Table below lists the Network Upgrade proposed in Rhode Island Energy ("RIE")'s service territory:

Table 6-3
RIE's Network Upgrade – Estimated Cost and Construction Time

Upgrade Element Name or Location	Cost Estimates ($)	Construction Time Estimates (Months)
347-RIE	35,000,000	48
Total Cost	**35,000,000**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

6.4 VELCO's Upgrades

Table below lists the Network Upgrades proposed in VELCO's service territory:

Table 6-4
VELCO's Network Upgrades – Estimated Cost and Construction Time

Upgrade Element Name or Location	Cost Estimates ($)	Construction Time Estimates (Months)
381-VELCO	4,265,434	12
Total Cost	**4,265,434**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

6.5 Eversource's Distribution System Upgrade

Table below lists the Distribution Upgrade proposed in Eversource's service territory:

Table 6-5
Eversource's Distribution Upgrade – Estimated Cost and Construction Time

Upgrade Element Name and Location	Cost Estimates ($)	Construction Time Estimates (Months)
8 MVAR STATCOM at Partridge 23 kV 15E4 feeder	6,825,500	57
Total Cost	**6,825,500**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

6.6 Required Auxiliary Devices Behind TCS Projects' POIs

6.7 Alternative Transmission Technologies ("ATT") Review

In accordance with Section 10.3.2.1 of PP5-6, ISO New England and Transmission Owners evaluated the use of ATT when determining the Network Upgrades to address the violations identified in Sections 3 to 5 of this report. The general guidance provided in Section 10.3.2.1 of PP5-6, as summarized in the table below, was followed.

Table 6-6
PP5-6 Section 10.3.2.1. - ATT Guidelines

ATT	Violation Types that the ATT May Address
Static Synchronous Compensators	• Voltage • Stability • Voltage Control/Reactive Power Requirements
Static VAR Compensators	• Voltage • Stability • Voltage Control/Reactive Power Requirements
Advanced Power Flow Controllers	• Thermal • Voltage • Stability
Transmission Switching	• Thermal • Voltage • Stability
Synchronous Condensers	• Voltage • Stability • Voltage Control/Reactive Power Requirements • Weak Grid Issues
Voltage Source Converters	• Voltage • Stability • Voltage Control/Reactive Power Requirements
Advanced Conductors	• Thermal
Tower Lifting	• Thermal

The following sub-sections explain the individual Transmission Owner's approach for assessing ATT.

6.7.1 VELCO

VELCO identified an upgrade for one thermal violation. VELCO considered the use of ATTs in their analysis when compared to the final identified upgrade (*i.e.*, reconductor with double bundled 954 Aluminum Conductor Steel Supported ("ACSS")). Specifically, advanced power flow controllers like a Smartvalve device could solve the thermal overload, however they would be significantly more expensive than the final identified upgrade. Transmission switching could be done to alleviate the overload, however opening the transmission system could have negative reliability impacts. Advanced conductors could have been used for this solution, however they would be significantly more expensive than the final identified upgrade. Lastly, tower lifting was not utilized because the

height of the towers (and therefore ground clearance under high loading conditions) was not limiting the line's capability to achieve a higher rating.

6.7.2 National Grid

National Grid considers and implements the use of ATTs when they serve a particular identified need that more traditional technologies cannot, or when those technologies can provide additional benefits. Such additional benefits could include greater performance, lower cost, or schedule benefits. Inputs considered when determining whether ATTs provide a benefit in addressing a given need can include performance characteristics, third-party testing results, experience of peer utilities, and impact on other components of the transmission system. Compliance with Good Utility Practice, applicable reliability standards, laws, and regulations would all be required. One alternative transmission technology National Grid has found to be applicable and useful in widespread applications is high-temperature, low-sag ("HTLS") conductors, such as ACSS which is proposed for various identified upgrades.

6.7.3 Eversource

To address thermal violations, Eversource's best practice is to specify ACSS, an advanced conductor technology with decades of installed and proven performance, as the preferred replacement for traditional Aluminum Conductor Steel Reinforced ("ACSR") conductor. ACSS improves electrical performance in comparison to traditional ACSR conductor. ACSS is categorized as a HTLS conductor technology that optimizes current-carrying capacity and thermal performance by operating safely and effectively at higher temperatures while maintaining near identical weight and diameter to ACSR. When considering typical short New England spans, rolling terrain, Right of Way widths, and all design (thermal, ice and wind, *etc*.) load cases, ACSS strikes the right balance between performance and cost for most Eversource Transmission line applications. Eversource considered other advanced conductors, including conductor utilizing composite core technologies or other HTLS conductor designs on a project specific basis. Circumstances in which alternatives to ACSS may be appropriate include long conductor span conditions, river crossings, or applications on existing lattice towers where adequate structure strength, structure height, and conductor clearances already exist to permit increased ampacity without the need for structure replacement.

Addressing network violations through substation advanced technology equipment was also actively scoped into proposed solutions, particularly in the use of STATCOMs. Novel to Eversource, the use of containerized distribution voltage STATCOMs was adopted to address the needs of two TCS Projects where Transmission voltage STATCOMs were substantially oversized and were physically constrained from being used in the existing substation. The use of these modular STATCOMs allowed these projects to remain viable and provide a reduced cost to the IC. Additionally, Eversource is also including two STATCOMs to compensate for other areas of the network where violations were seen with the addition of TCS Projects.

6.7.4 Rhode Island Energy

During the TCS, ISO-NE notified RIE of one thermal violation: a 111.64% thermal overload on the RIE portion of the 345 kV 347 Line from Sherman Road Station to the Rhode Island / Connecticut border. RIE previously identified the 347 Line as having poor asset health and concluded that the

existing aged wood H Frame structures cannot support reconductoring. Therefore, a full or nearly full line rebuild is required to resolve this violation. The most cost-efficient solution is to use standard steel structures and 345 kV standard conductor of double bundle 1590 kcmil ACSS, which will increase the summer LTE rating to 2,557 MVA.

As an alternative, RIE evaluated the possibility of increasing the maximum operating temperature of the existing conductor and increasing electrical clearances to compensate for additional sag, however it was concluded that the existing conductor would need to have its operating temperature increased above the safe and reliable operating temperature limit of ACAR to achieve the required rating. Clearance violations would also be significant and impractical to resolve. This option was deemed not viable.

RIE also considered use of other ATTs as described in ISO-NE PP5-6, however the nature of a thermal overload on the critical East-West interface transmission line limits the practicality of less robust options compared to increasing the capacity of the line itself. Introducing similarly costly flow control power electronics with added complexity and failure points or introducing complex switching and transmission reconfigurations would add risk to this critical interface line without adequately addressing the overload. RIE's standard conductor type of choice is ACSS, which is an advanced HTLS that cost efficiently optimizes the capacity of the transmission system.

Section 7
Network Upgrades Cost Allocation

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Section 8
Contingent Facilities

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Section 9
TCS Project – Summary of Interconnection Requirements

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This section provides a summary of interconnection requirements for each TCS project, including each ITO's Interconnection Facilities and Network Upgrades that are required, and a non-binding, good faith estimate of cost responsibility and a non-binding, good faith estimated of time to construct. The costs summarized in this section reflect allocation as described in Section 7 of this report.

It is expected that each project's Generating Facility and Interconnection Customer Interconnection Facilities will be rated to withstand the maximum duties they could experience based on the output capabilities of the Generating Facility, range of system voltages, and system short circuit contribution that were assumed or determined in the TCS. The IC is responsible for verifying this throughout the development of its project for any changes to these facilities such as requests for modifications to them and submittal of its as-purchased and as-built updates that will be required under the project's Interconnection Agreement ("IA").

9.1 QP1090

9.1.1 Project Description

9.1.2 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-1
QP1090 Upgrade(s), Cost and Construction Estimates

Upgrade Classification	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	Not Applicable - Review IA	
Substation Network Upgrades	Not Applicable - Review IA	
System Network Upgrades	None identified in the TCS	
Total Cost	**N/A**	

9.2 QP1123

9.2.1 Project Description

9.2.2 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-2
QP1123 Upgrade(s), Cost and Construction Estimates

Upgrade Classification	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	Not Applicable - Review IA	
Substation Network Upgrades	Not Applicable - Review IA	
System Network Upgrades	672,500	11
Total Cost	**672,500**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.3 QP1148

9.3.1 Project Description

9.3.2 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-3
QP1148 Upgrade(s), Cost and Construction Estimates

Upgrade Classification	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	Not Applicable - Review IA	
Substation Network Upgrades	Not Applicable - Review IA	
System Network Upgrades	None identified in the TCS	
Total Cost	**N/A**	

9.4 QP1171

9.4.1 Project Description

9.4.2 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-4
QP1171 Upgrade(s), Cost and Construction Estimates

Upgrade Classification	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	Not Applicable - Review IA	
Substation Network Upgrades	Not Applicable - Review IA	
System Network Upgrades	None identified in the TCS	
Total Cost	**N/A**	

9.5 QP1238

9.5.1 Project Description

9.5.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.5.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-5
QP1238 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	3,422,500	38
Substation Network Upgrades	27,219,500	64
System Network Upgrades	79,588,927	48
Total Cost	**110,230,927**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.6 QP1365

9.6.1 Project Description

9.6.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.6.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-6
QP1365 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months)
ITO's Interconnection Facilities	N/A - All of the facilities equipment already exists at the substation.	
Substation Network Upgrades	2,173,600	36
System Network Upgrades	133,620,932	73
Total Cost	**135,794,532**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.7 QP1412

9.7.1 Project Description

9.7.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.7.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-7
QP1412 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months)
ITO's Interconnection Facilities	8,000,000	36
Substation Network Upgrades	2,000,000	36
System Network Upgrades	49,090,518	51
Total Cost	**59,090,518**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.8 QP1427

9.8.1 Project Description

9.8.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.8.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-8
QP1427 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	2,200,000	54
Substation Network Upgrades	73,800,000	54
System Network Upgrades	6,334	31
Total	**76,006,334**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.9 QP1428

9.9.1 Project Description

9.9.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.9.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-9
QP1428 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	2,771,900	38
Substation Network Upgrades	28,593,800	57
System Network Upgrades	22,701,740	69
Total Cost	**54,067,440**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.10 QP1495

9.10.1 Project Description

9.10.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.10.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-10
QP1495 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	3,489,279	24
Substation Network Upgrades	2,469,797	24
System Network Upgrades	6,466	31
Total Cost	**5,965,542**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.11 QP1502

9.11.1 Project Description

9.11.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.11.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-11
QP1502 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	1,300,981	24
Substation Network Upgrades	787,733	24
System Network Upgrades	5,938	31
Total Cost	**2,094,652**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.12 QP1513

9.12.1 Project Description

9.12.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.12.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-12
QP1513 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	10,000,000	59
Substation Network Upgrades	49,730,000	59
System Network Upgrades	241,349,371	93
Total Cost	**301,079,371**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.13 QP1515

9.13.1 Project Description

9.13.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.13.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-13
QP1515 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	3,469,400	38
Substation Network Upgrades	57,078,500	74
System Network Upgrades	244,385,964	93
Total Cost	**304,933,864**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.14 QP1518

9.14.1 Project Description

9.14.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.14.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-14
QP1518 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	1,776,000	36
Substation Network Upgrades	18,983,500	60
System Network Upgrades	176,237,665	93
Distribution Network Upgrade	3,033,556	57
Total Cost	**200,030,720**	

9.15 QP1542

9.15.1 Project Description

9.15.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.15.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-15
QP1542 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	1,120,400	38
Substation Network Upgrades	11,029,100	69
System Network Upgrades	207,297,593	93
Total Cost	**219,447,093**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.16 QP1543

9.16.1 Project Description

9.16.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.16.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-16
QP1543 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	3,932,500	38
Substation Network Upgrades	84,321,900	75
System Network Upgrades	15,527,068	28
Total Cost	**103,781,468**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.17 QP1546

9.17.1 Project Description

9.17.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.17.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-17
QP1546 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	1,776,000	36
Substation Network Upgrades	18,983,500	60
System Network Upgrades	217,640,501	93
Distribution Network Upgrade	3,791,944	57
Total Cost	**242,191,945**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.18 QP1551

9.18.1 Project Description

9.18.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.18.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-18
QP1551 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	8,000,000	64
Substation Network Upgrades	46,700,000	64
System Network Upgrades	102,263,718	93
Total Cost	**156,963,718**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.19 QP1553

9.19.1 Project Description

9.19.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.19.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-19
QP1553 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	9,000,000	36
Substation Network Upgrades	1,000,000	36
System Network Upgrades	55,331,093	69
Total Cost	**65,331,093**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.20 QP1555

9.20.1 Project Description

9.20.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.20.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-20
QP1555 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	8,000,000	68
Substation Network Upgrades	76,000,000	68
System Network Upgrades	456,639,979	69
Total Cost	**540,639,979**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.21 QP1557

9.21.1 Project Description

9.21.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.21.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-21
QP1557 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	10,000,000	48
Substation Network Upgrades	5,000,000	48
System Network Upgrades	155,252,109	69
Total Cost	**170,252,109**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

9.22 QP1567

9.22.1 Project Description

9.22.2 ITO's Interconnection Facilities and Substation Network Upgrades Description

9.22.3 Summary of Project Upgrade(s), Cost and Construction Estimates

Table 9-22
QP1567 Upgrade(s), Cost and Construction Estimates

Upgrade Element Name	Cost Estimates ($)	Construction Time Estimates (Months, Longest)
ITO's Interconnection Facilities	12,000,000	64
Substation Network Upgrades	62,290,217	64
System Network Upgrades	351,323,824	70
Total Cost	**425,614,041**	

NOTE: The construction time estimates are from Notice to Proceed (NTP)

Section 10
Additional TCS Administration

The ISO issued this final TCS Report by August 6, 2026, which is within three hundred and sixty Calendar Days of August 11, 2025, the date on which the ISO issued TCS Agreements. Within 15 Calendar Days after the ISO issues the final TCS Report, which is August 21, 2026, the ISO will tender ICs IAs and ICs shall proceed to IA negotiations and provide all required deposits at IA execution, as described in Sections 5.1.1.2 and 11 of the LGIP and the SGIP. Pursuant to Section 11 of Schedules 22/23, these negotiations are to be completed within 60 Calendar Days. At the conclusion of this period, ICs will need to: 1) execute the IA; 2) ask that the IA be filed unexecuted with the Commission; or 3) enter dispute resolution as to unagreed upon agreement terms. ICs will also need to provide an IA deposit to the applicable ITO (*i.e.*, 20% of identified Network Upgrade costs) at the date of IA execution or within ten (10) Business Days after the IC requests that the IA be filed unexecuted at the Commission.

The ISO will notify TCS Projects and the relevant Affected System Operator of the potential need for an Affected System Study within 10 Business Days of the issuance of this final TCS Report (*i.e.* no later than August 20, 2026) as described in Section 3.6A.1 of the LGIP and SGIP. An IC that requires an Affected System Study may seek to extend its IA negotiation period pursuant to Section 11.2.1 of the LGIP and the SGIP.

The final TCS Report represents a complete Interconnection Study pursuant to Section 5 of the LGIP, SGIP, and ETUIP. Projects participating in the TCS do not have the option to elect a Facilities Study. Further, Section 5 of the LGIP, SGIP, and ETUIP does not specify a restudy window for the TCS, only that a final TCS Report is to be issued 360 Calendar Days after the issuance of TCS Agreements.

The TCS Agreement states, however, that the TCS "*combines the Cluster Study and Interconnection Facilities Study, in a single cluster study, followed by any needed restudies, to specify and estimate the cost of the equipment, engineering, procurement, and construction work needed to physically and electrically connect the Large Generating Facility to the Administered Transmission System.*" (emphasis added)

Therefore, while there is no formal restudy window for the TCS, such restudies may occur.

ISO has concluded that it must evaluate if a restudy of the TCS is required due to the withdrawal of QP501, QP1542, and QP1546. These are the only withdrawals that are relevant to the TCS Projects as of the date of the posting of this final TCS Report. The full extent of any necessary restudy of the TCS will depend on the ISO's consideration of the impact of these, and any other future withdrawals, on the previously completed analyses; this consideration will be done in coordination with the relevant ITO(s).

Following the dates when IA deposits are due (as detailed above), the ISO will undertake a restudy determination to establish whether restudy is needed and the scope of any necessary restudy. Determining the need for, and scope of, any necessary restudy at this stage reduces the risk of

prolonged multiple rounds of restudy, allowing the ISO to open the first Cluster Study window on time to allow other committed projects to enter and move through the interconnection process. If a restudy is required, the ISO will conduct the TCS restudy in parallel with the formation of the base case for the first regular Cluster Study and the early parts of that study.

The ISO will inform the affected IC(s) that participated in the TCS of the need and timing for restudy of the TCS and issue a new TCS Agreement to such customers. The cost of the restudy will be allocated to affected ICs in the same manner as TCS costs were allocated with those projects subject to restudy, where the allocation is calculated on a 50% per MW and 50% per capita basis.

For any needed restudy, ICs will not be invoiced for the restudy unless the ISO is unable to cover such costs under Section 3.4.2 of the LGIP, SGIP, or ETUIP, which states in relevant part that previously forfeited deposits (which include Interconnection Request Deposits) will be "*applied on a pro-rata basis to offset costs incurred by ICs that are subject to re-study, as determined by the System Operator in accordance with the provisions of this LGIP, as a result of the withdrawal of an Interconnection Request within the same Cluster*."

The ISO intends to conduct a lessons-learned session with ITOs, ICs, and other stakeholders with the intent to identify areas for improvement for future Clusters. The ISO anticipates holding this session in Q4 2026. Details regarding the specific timing, scope, and format of this session will be provided to all stakeholders in advance of the meeting.