EVERSOURCE

Operations Project Authorization Form

Approved on June 8, 2023 EPAC

Link to Meeting Minutes

Project Title: [redacted] **Transformer 1X Replacement**	**Project Number: CS00533**
Date Prepared: 07/14/2023	**Company: Eversource CT**
Organization: Asset Management	**Class(es) of Plant: D SS**
Project Initiator: [redacted]	**Project Category: Stations - Transformers**
Managing Organization: Transmission / Major Projects	**Schedule ID#: 9132673**
Project Manager: [redacted]	**Project Type: Specific**
Project Sponsor: [redacted]	**Capital Investment part of original Op Plan: Yes**
Estimated in service date: May 2024	**Emergency Related Request? No**
Eng./Constr. Resources Budgeted? Yes	**Facility Type (check all that apply):** ☐ **PTF** ☐ **non-PTF** ☒ **Distribution** ☐ **N/A (General Plant)**
Total Capital Request: $14.396M	**Authorization Type: Full Funding**

[1] Executive Summary

This 21J-1X transformer replacement project at the [redacted] substation in Salisbury, CT is seeking full funding of $14.396M.

The existing 21J-1X transformer at the [redacted] substation in Salisbury, CT requires replacement due to its age and configuration to improve system reliability and conform with Connecticut's standard delta-wye configuration. Such a configuration change will have a positive customer impact by increasing the number of potential field ties on the distribution system that can be utilized in the future. This will increase the reliability of the distribution system in the event of an outage at the substation or on the distribution system in northwest Connecticut.

The 21J-1X is a 13MVA 69kV-13.2kV, 70-year-old transformer that was manufactured in 1953 and is approaching the end of its useful life. The transformer has an oil leak and absorbent pads are currently in place to mitigate the leak. The unit does not have a load tap changer (LTC). Replacement of the existing unit with a new LTC equipped transformer would enable the transformer to regulate the voltage on the distribution system and would allow the external voltage regulators that are currently used (21J-1R) to be retired. This project will replace the

existing transformer with a new Eversource standard HICO 115/69kV-13.2kV 40MVA delta-wye transformer with the new secondary oil containment system.

The [redacted] substation is part of the northwest corridor of Connecticut that is supplied by five (5) bulk substations: [redacted] and [redacted]. The winding connections for transformers in this corridor are wye-wye with no phase angle shift between the high-side and low-side windings of the transformers. This is contrary to the majority of the Connecticut system which has delta-wye winding connections resulting in a 30-degree voltage phase shift between the windings. The substations in the northwest corridor of Connecticut were reviewed by System Planning and it was determined that the transformers at these five (5) substations should be replaced to conform with Connecticut's standard delta-wye configuration. This will enhance reliability by increasing the potential number of distribution system tie points. Additionally, the transformers will be ordered with dual 115kV and 69kV primary windings. This will support the conversion of the CT substations to 115kV as part of Eversource's long term plan for these sites.

Transformer protection is currently provided by obsolete electromechanical relaying. This relaying is 50 years old and is at the end of its service life. A total of (8) electromechanical relays require replacement. Additionally, the current EPAQ9100 RTU will be replaced with a SEL-3530 RTAC unit.

Currently, there are two (2) 13.2kV feeder reclosers and seven (7) 13.2kV switches requiring replacement. These units were originally included in the SS Oil Recloser Replacement Program (CS00570-CT). These existing oil filled reclosers will be replaced with new vacuum reclosers to improve the reliability of the substation and to reduce environmental risks due to equipment failures and leaking oil. The recloser and switch replacement scope will be performed under this project for engineering, outage, and construction efficiencies.

The existing transformer 69kV high side switch will be replaced with a new 115/69kV combination unit circuit switcher with associated foundations and steel. The existing switch cannot be remotely operated due to its motor contactor being at the end of its life and replacement parts are difficult to procure due to its obsolete design. The new switch will be installed and placed in the new mobile position as depicted in Attachment D1. Installing the high side mobile switch on the 690 line will improve reliability, as the substation will not need to be offloaded whenever a mobile transformer is being installed on the high side of the station.

In order to maintain service to the 21J3 and 21J4 feeders while the transformer is being replaced, the installation of a mobile transformer is required. Conduit and cables will run from the mobile transformer to a set of six (6) new poles that will temporarily be installed inside of the substation fence while the 21J-1X is being replaced. These poles will be equipped with two pole-mounted reclosers (one for each feeder) and will connect to the 21J3 and 21J4 feeders. All work besides the connection of the feeders to the pole-mounted reclosers will be performed under CS00533. This project will coordinate with CD02260 for these efforts.

Initial funding of $125K for this project was approved in PowerPlan on November 16, 2021. This project was approved by the Solution and Design Committee (SDC) on August 17, 2022 and partial funding of $1.514M was approved in PowerPlan on September 16, 2022. As of May 2023, approximately $271K has been spent on site constructability reviews, development of Conceptual Engineering by Eversource Engineering, development of Preliminary Engineering by EOC, outreach, survey, environmental and siting evaluations and preparation of CSC Petition. Detail Engineering package will be completed in July 2023.

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[2] PROJECT COSTS SUMMARY

Note: Dollar values are in thousands

			2023	2024	2025	2026	2027	2028	Total
Line item Category	**Prior Authorized**	**Actuals to Date**	**to Go**	$	$	$	$	$	$1
1. ROW / Easements / Land purchases		$1							$1
2. Environmental Approvals / Permits		$14	$5						$19
3. Outreach		$1	$13	$23					$37
4. Siting Approvals / Permits		$1	$127	$122					$249
5. Engineering / Design		$72	$279	$288					$639
6. Materials (Eversource purchased)			$1,416	$2,188					$3,604
7. Construction (incl materials by contractors)		$3	$1,054	$2,333					$3,390
8. Testing / Commissioning			$241	$506					$746
9. PMT Project Mgmt. Team		$39	$174	$168					$381
10. Removals			$178	$427					$605
11. Other (property taxes and BAR)									
12. Risks			$447	$528					$975
Project Directs Total w/Risks		**$131**	**$3,932**	**$6,583**					**$10,647**
13. Indirects/Overhead		$132	$1,077	$1,696					$2,905
14. AFUDC		$8	$194	$224					$427
Project Total - Baseline Budget		**$271**	**$5,204**	**$8,503**					**$13,978**
15. Contingency			$154	$264					$418
#N/A									
Project Total - Funding Approval Level		**$271**	**$5,358**	**$8,767**					**$14,396**
16. Reimbursables/Customer Contribution									
#N/A									
Project Total (less reimbursables)		**$271**	**$5,358**	**$8,767**					**$14,396**
Total O&M									

Detail other costs, project risk items and their allocations:

Risk	Allocation
1. Potential Underground Obstructions	$110
2. Severe Weather, Delays, OT	$109
3. Design Development	$114
4. Contaminated Soil from Existing Equipment	$91
5. Material Commodity Escalation	$114
6. Unknown Underground Utilities/Conflicts	$97
7. Delays in Material Delivery	$108
8. Overtime due to Project Acceleration	$100
9. Single Contingency Load Loss	$52
10. Logistics Cause Multiple Mob & DE-Mob Costs	$80
Total	$975

Explain unique payment provisions, if applicable:

Long lead materials were ordered in April 2023 using the Material Order Authorization – Exception Form process (in recognition of supply chain concerns) as noted in the table below.
Material Details [redacted] CS00533 – MOA-EF was approved on 3/29/2023 in the total amount of $358,094:

Material Details					
Qty	Equipment Type	Description	Lead Time	Unit Cost	Total Cost
[redacted]	CSV-DB	Combined circuit switcher and disconnect switch. 123kV, 1200A.	46 weeks	[redacted]	$138,450.00
	EV-115-1200	Mobile Transformer Disconnect Switch 21J-4X1-4 VM-1-104 125VDC, Kirk-Key Interlock Plates (2), QB Arcing Horns (whips)	30 weeks		$16,552
	KNOVA27A11 Recloser	3 Phase, 27kV, 125kV BIL, 120V auxiliary powered, 12.5kA interrupting rating,	38 weeks		$56,000.00
	EV-2-23-2000	Substation Disconnect Switches - 1X3-4,10T,11T, 12T, 13T, 14T, 15T-6	30 weeks		$64,596.00

[redacted]	EV-23-1200	Substation Disconnect Switches - 21J3-5, and 21J4-5	30 weeks	[redacted]	$15,496.00
[redacted]	OldCastle or similar	Firewall (precast concrete panels)	52 weeks		$67,000

Identify and detail any unique O&M impacts resulting from this project:

A mobile transformer 76MX (30MVA) and mobile circuit switcher 99MX will need to be installed to maintain service as this project is ongoing. A set of six (6) temporary poles and associated equipment (described below under "Project Scope") will also be installed for this purpose and will be removed upon project completion.

[3] TECHNICAL JUSTIFICATION

Project Need, Objective and Justification

The project objective is to replace the 13MVA 69kV-13.2kV transformer 21J-1X with a new Eversource standard 40MVA 115/69kV-13.2kV transformer equipped with a modern LTC. The [redacted]1X is an Eversource standard size transformer which reduces the number of spare transformers required to be available for the Connecticut distribution system.

This project will also replace outdated electromechanical protection systems on the 21J-1X transformer and 13.2kV A1 bus to update these systems to the latest Eversource standards. This relaying is 50 years old, is at the end of its service life and total of (8) electromechanical relays will be replaced as part of this project.

Concurrently, there are two (2) 13.2kV oil filled feeder reclosers and seven (7) 13.2kV switches requiring replacement that are included in the SS Oil Recloser Replacement Program (CS00570-CT). The replacement of the (2) oil filled reclosers was added to the scope of this project & removed from scope of CS00570 in 2022. CS00570 IFR was approved by EPAC on 2/28/2023. The existing oil filled reclosers will be replaced with the new vacuum reclosers to improve the reliability of the substation and to reduce the environmental risks due to equipment failures and leaking oil. This recloser and switch replacement scope will be performed under this project for engineering, outage and construction efficiencies.

Outages for this project will be coordinated with project CS00364 Falls Village 9A transformer 9A-5X replacement and CD02260 [redacted] – Feeder Relocation.

Project Scope

I. Summary

The scope of work includes replacing the existing 13MVA transformer with the new 40MVA Eversource standard transformer and associated devices at [redacted] substation. The work scope includes engineering, design, procurement and construction of a new transformer high side circuit switcher, low side circuit breaker, new high side mobile position MOD, low side bus and feeder disconnect switches and reclosers. The installation of a mobile transformer is also included.

II. Background and Description of Work

The project includes the extension of control conduits, replacement of the existing 115kV MOD i.e. 1X1-4 and 4X1-4 with a new combination circuit switcher and removal of existing ground switches i.e. 4X1-9D & 1X1-9D. Existing primary 87P electromechanical differential relay and backup 50/51P overcurrent relay will be replaced with new microprocessor SEL 387E differential primary relay and SEL 487E backup differential/overcurrent relay. The existing substation yard will be expanded to allow access to the new transformer position in the rear of the substation. The project team conducted multiple constructability walkdowns and determined that the relocation of the existing mobile position from 667 bus (4X position) to the 690 bus (3X position) would allow the station's current 1X transformer to remain in service for the duration of the construction except for relatively short cutover periods.

A mobile transformer will be required to support the installation of the new 40MVA transformer and associated relays and maintain service to the 21J3 and 21J4 feeders. Feeders 21J3 and 21J4 will be temporarily relocated via a new, temporary six (6) wooden pole arrangement containing pole-mounted risers, pole-mounted station service transformers, pole-mounted potential transformers (PTs), and pole mounted feeder reclosers will allow the existing 1X transformer and later the mobile transformer to support both feeder circuits. Conduit and cable will be installed in new shallow trenches running between the 13.2kV yard and the temporary pole arrangement (see Attachment J). Primary conductor cables will also be run between the six (6) poles. CD02260 will perform the final conductor connections from the pole-mounted reclosers to the feeders. Mobile transformer 76MX (30MVA) and mobile circuit switcher 99MX were reserved for this project.

III. Assumptions Verified by Engineering Vendor and Eversource

This document includes the preliminary level scope and design drawings for the replacement of existing 1X transformer.

1. [redacted] is not a Bulk Power System (BPS) substation. However, separation for the new equipment will be maintained in accordance with Eversource SUB013.

2. All engineering and design shall be performed in accordance with Eversource Standards (SUB099).
3. For the installation of the mobile transformer, Engineer of Choice (EOC) will be responsible for providing the mobile one-line, three-line, DC schematics, and writing prints. Vendor to also provide the settings for the mobile relays. wiring, schematics, and settings will be developed to replace the transformer. The new high-side mobile connection 21J-4X1-4 (MOD) is available, and the Low-side Mobile Links can utilize the 21J-1X3-4.
4. There is an existing Mobile transformer Junction box mounted on the MOD 4X1-4 structure; however, new mobile transformer junction box needs to be mounted on the new MOD 3X1-4 structure. It will be designed as part of the mobile package as part of this project. There are existing Selector Switches 43M/1X and Mobile Tripping relays 86/M available to enable mobile trips to their respected device.
5. The battery calculations will be performed to verify adequacy of existing battery bank as part of detail design phase per Eversource standard SUB 038.
6. The existing D-SCADA equipment SEL 3505 RTAC is adequate and is not required to be upgraded.
7. D-SCADA Cabinet has spare space for fiber patch panel installation.
8. Modification to the existing ground grid will be required.
9. Direct stroke lightning protection is not required.
10. For Eversource stations that are not BPS, the intent has always been to maintain separation when possible. So, S1 (Primary Protection) & S2 (Backup Protection) will be on different sides of the panel creating some separation. The cable trench with the separation wall will be installed between the transformer and the R&CE.
11. The new two hour rated firewall will be installed between the new transformer and the existing relay and control enclosure to comply with SUB 016.2 and IEEE 979.
12. Existing panel space in the relay and control enclosure is adequate for the installation of the new protection and control equipment.
13. Nomenclature updates for existing transformer and equipment installed during this project will be required.
14. It was determined during the constructability walkdown that the access to the new transformer position in the back of the substation was inadequate and the substation yard needs to be expanded 15 feet to the North (200 ft section of the fence will be removed and new fence installed 15 feet to the North of the existing fence).
15. The new secondary oil containment will be installed around the new transformer foundation.

The anticipated equipment **removals** include the following:

- Two (2), 115kV MODs i.e.,1X1-4 and 4X1-4 with associated Ground switches i.e., 1X1-9D & 4X1-9D and foundations.
- One (1), 69/13.2kV, 13MVA Transformer with associated foundations, conduits and existing transformer sound wall.
- Three single phase 13.2kV regulators 21J-1R.
- Seven (7), 13.2kV ring bus-isolation switches i.e. 10T-6, 11T-6, 12T-6, 13T-6, 14T-6 & 15T-6, 3X3-4
- Two (2), 13.2kV Manual feeder switches i.e., 21J3-5 & 21J4-5.

- Two (2), feeder reclosers i.e. 21J3-2 & 21J4-2.
- The existing spare transformer (Spare 21J), 75 years old, 10kVA, manufactured in 1949 by Westinghouse, stored in the back of station yard will be removed from the substation and scrapped.

The equipment **additions** include the following:

- One (1), 115/69KV Combination unit Circuit switcher with associated foundations and steel.
- One (1), 115/69KV MOD with associated foundation and steel.
- Two (2) 115/69kV three phase bus support structures supporting rigid bus connection to circuit switcher.
- One (1) 13.2kV three phase bus support structure supporting rigid/flexible bus connection to 2000A breaker (21J-4X3-2) along with a separate breaker foundation supported with necessary steel frames/C-channels and a junction box for control cable extensions.
- One (1) bus support with insulators and three (3) A-frames and bus extensions from 690 bus to new 3X1-4 mobile position MOD
- 22ft high concrete firewall to be able to maintain 42 feet between the new transformer and the existing relay and control enclosure per IEEE 979- IEEE Guide for Substation Fire Protection.
- One (1), 115/69kV-13.2kV, 40MVA HICO transformer with associated new foundation, new conduits between the transformer and R&CE and new secondary oil containment system.
- Seven (7) 13.2kV disconnect switches i.e. 4X3-4, 10T-6, 11T-6, 12T-6, 13T-6, 14T-6, 15T-6. (Note: 3X3-4 position, future low side mobile position, will receive existing 10T-6 switch)
- Two (2), 13.2kV manual feeder disconnect switches i.e., 21J3-5 & 21J4-5.
- Two (2), feeder reclosers i.e. 21J3-2 & 21J4-2.
- Replacement of the three (3) existing 1X primary transformer electromechanical relays with (1) new microprocessor based SEL 387E differential primary relay
- Replacement of the (3) existing 1X backup transformer electromechanical relays with (1) microprocessor based SEL 487E differential and overcurrent backup relay.
- One (1) low side A1 primary bus SEL 387E differential relay
- One (1) low side A1 backup bus and low side breaker SEL 351S overcurrent and breaker failure relay

The **temporary equipment additions** (to facilitate project work) include the following:

- Installation and demobilization of one (1) 30MVA mobile transformer i.e. 76MX.
- Installation and demobilization of one (1) mobile circuit switcher i.e. 99MX.
- Six (6) 45’ Eversource Poles including four (4) riser poles, one (1) station service pole, and one (1) potential transformer (PT) pole, with associated equipment.
    - Three (3) potential transformers.

    - Three (3) three-phase station service transformer banks.
- Four (4) 900A Vertical Disconnect Switches.
- Two (2) 15kV pole-mounted Nova Reclosers.
- Two (2) runs of 150’ of 6’’ Sch 40 PVC Conduit to connect from the 13.2kV yard to the riser poles.
- Two (2) runs of 25’ of 6’’ Sch 40 PVC Conduit, one run to connect each pole-mounted recloser pole to Manhole #1.
- Sixty feet (60’) of 556 AAC Bare Aluminum Primary Tree Wire to install across the six (6) poles.
- Sixty feet (60’) of 1/0 ACSR Neutral Wire to install across the six (6) poles.
- Five hundred feet (500’) of 750 MCM CU EPR 25kV UG Cable to run in the underground conduits.
- Roughly one hundred seventy five feet (175’) of steel plating to cover the underground conduits and trenches.

After the mobile transformer is installed, the following **temporary equipment additions** will be performed:

- Two (2) runs of 70’ of 6’’ Sch 40 PVC Conduit, to connect the mobile transformer to the riser poles.

The temporary equipment additions outlined above will be removed after work has been completed.

IV. Identification of Required Engineering Studies

1. Eversource will perform the Thermal Rating calculations for the detail design.
2. Engineering vendor will be responsible for Bus analysis, structural and foundation calculations during the detail design phase.
3. Eversource will perform pre and post installation sound studies.

V. Site Development:

The Project will require a 0.07-acre (approximately 3,000 square foot) permanent expansion of the fenced substation area, all on Eversource property. The proposed substation yard expansion will require the permanent removal of 0.07-acre of herbaceous and shrub vegetation, located adjacent to the northern portion of the substation. The expanded substation yard area will be graded to match the gradient of the existing substation yard and graveled. The site development is also described in the CT Siting Council (CSC) Petition, reference document 8.

VI. Above Grade Design Requirements – Evaluation of substation/switchyard expansion requirements.

1. Impacts to existing yard design:
    a. Physical Impacts to substation equipment footprint

i. The permanent expansion of the fenced substation area in section V. Site Development. Project team communicated the substation expansion with towns of Salisbury and Sharon and affected abutters as well as with CT Siting Council by filing the petition. Eversource siting, outreach and vegetation management specialists will work closely together with the project team during the planning and execution phase of the substation expansion.

ii. The new 4X transformer will be larger than the existing transformer, which requires a careful layout to ensure the new equipment will fit within the available space while meeting Eversource standard clearances. The new firewall will be installed between the new 4X transformer and existing R&CE.

b. Impacts to design basis of existing grounding system – Yes, grounding system analysis will be required. Larger mat foundation and oil containment system may have an impact on the ground grid.

c. Impacts to Direct Lightning Stroke Protection – No, a lightning protection study is not required.

d. Identify Yard Lighting and or Physical Security modifications – No, yard lighting in the substation will not require a detailed lighting level study.

e. All structural steel additions shall be designed in accordance with Eversource SUB Standard SUB 016.1 along with all codes, guidelines and references included in this Standard.

2. Above Grade Electrical Modifications/Additions:

   The above grade equipment modifications and/or additions are described below:

   a. Replace existing 13MVA 1X transformer with new 40 MVA 4X HICO transformer.
   b. Replace existing 115kV motorized disconnect switch 4X1-4 with a new 123kV combination circuit switcher which includes both a motorized air-break switch and an SF-6 interrupter.
   c. Replace existing 115kV motorized disconnect switch 1X1-4 with a new 123kV motorized disconnect switch 3X1-4
   d. Install A-frames and bus extensions from 690 bus to new 3X1-4 mobile position MOD

3. Above Grade Temporary Electrical Modifications/Additions:

   The above grade equipment modifications and/or additions described below will be temporarily employed to help execute this project:

   a. Install six (6) temporary poles including risers, pole-mounted CTs, pole-mounted reclosers, pole-mounted station service transformers, and primary conductor to facilitate the cutover of feeders while the 21J-1X service is out of service.

VII. Below Grade Design Requirements

1. Foundation Addition/Modifications:
   a. The existing 1X transformer foundation will be removed and the 1X position restored. The position 4X will receive a new foundation which will be sized to accept the new 40MVA HICO transformer, as well as a 62.5MVA HICO transformer in case of emergency/failure of the new 40MVA transformer in the future. The secondary oil containment will be installed in the 4X position to allow future replacement of new 4X transformer with similar 40MVA unit, or 62.5MVA unit having up to 12,928 gallons of oil capacity.
   b. The analysis of existing foundations of 4X1-4 MOD, 21J3-2, 21J4-2, 21J3, 21J4, 1X3-4 and 10T-6 through 15T-6 will be conducted to assess replacement or retainment. The new foundations will be designed for new mobile position MOD 3X1-4, new circuit breaker 4X3-2, new disconnect switch 4X3-4 and three (3) new bus support structures.
   c. Foundation for the “Plug and Play” interconnection box will be required.
   d. The additional structure and foundation deliverables include the following:
      - Structural design drawings
      - 115/69kV 3ph high bus extensions
      - 13.2kV low switch support
      - Foundation Detail Drawings
      - Structure & Foundation Models
      - Additions to the Structure & Foundation Calculation Package

2. Ground Grid Modifications/Expansion:
   a. All new equipment and structures will require ground connections to the existing ground grid in accordance with Eversource SUB 014.
   b. Ground grid repairs will be required in the areas where new foundations will be installed, or existing foundations, or below grade obstructions will be removed.

3. Raceway Additions/Modifications
   a. The total of 175 feet of new permanent cable trenches and 330 feet of new conduit runs will be installed as part of this project from the new transformer, new transformer low side breaker, new circuit switcher and new mobile position MOD to the Relay and Control Enclosure.
   b. Temporary below grade conduits will be installed between the 10T-6 disconnect switch, R&CE, station service/PT transformers structure and the temporary pole mounted feeder equipment. All this equipment will be removed at the end of the construction as part of the site restoration.
   c. A total of 175 feet of temporary cable trenches and 350 feet of new temporary conduit runs will be installed from the old transformer to the temporary pole-mounted

feeder equipment, prior to the installation of the mobile transformer. All this equipment will be removed at the end of the construction as part of the site restoration.

d. A total of 70 feet of temporary cable trenches and 140 feet of new temporary conduit runs will be installed from the mobile transformer to the temporary pole-mounted feeder equipment once the mobile transformer has been deployed on-site. All this equipment will be removed at the end of the construction as part of the site restoration.

VIII. Site Development Requirements & Other Considerations:

1. Real Estate/Siting & Permitting Considerations (i.e. acquisitions, offset encroachment, ROW impacts):
   a. Additional access to the back of the substation will be needed for construction purposes. 200 feet of the existing fence along the North side of the station will be relocated 15 feet to the North to add around 3,000 sq ft to existing station layout.
   b. The existing gravel access road which extends parallel to and outside of the southern substation fence will be used to access the existing graveled area to the east of the substation. This graveled area was used in the past as a staging/laydown area for the 667 and 690 69kV line rebuild work. From the graveled laydown area, another existing graveled access road extends to a second gate located in the northeastern portion of the substation's fence. These access roads and laydown area will be used as is for the material storage and parking during the project execution. Refer to the aerial map in the Attachment "I" for further information.

2. Environmental Considerations
   a. The secondary oil containment for the new transformer will be installed in the 4X position.
   b. Eversource's vendor conducted a cultural (archaeological and historical) resource review of the proposed project area. Based on this review, Heritage determined that there are no previously identified archaeological sites or National Register of Historic Places ("NRHP") or State Register of Historic Places ("SRHP") listed historic properties or districts on or within 0.5 mile of the proposed Project. Heritage also determined that all the proposed Project work areas (e.g., substation fence expansion, access road, staging/laydown areas) have been modified by the initial establishment of the substation or previous transmission line work and, as a result, no longer retain any potential to yield intact cultural deposits. Consequently, Eversource's vendor concluded that archaeological testing (Phase 1B) was not required for the proposed Project. Refer to reference document #8 for further information.
   c. Eversource's [redacted] Substation property consists predominantly of uplands and is not located within any 100- or 500-year floodplains as designated by the Federal Emergency Management Agency ("FEMA") or Aquifer Protection Areas ("APAs") as mapped by the Connecticut Department of Energy and Environmental Protection ("CT DEEP"). The property is not situated within a public water supply watershed and no public water supply wells are located nearby. Refer to reference document #8 for further information.
   d. Project's impact on wildlife and habitat as well as project's visual effects were evaluated. Refer to reference document #8 for further information.

3. Audible Noise level Changes/Considerations

a. The audible noise level calculations were performed by Eversource. The calculations confirmed that the projected noise levels will not exceed applicable CT state and town regulations. Refer to Attachment H for further information.
b. Both pre and post installation noise level measurements will be conducted. Audible noise level changes post installation will be evaluated by Eversource.

4. Identify Major Grading or drainage requirements: N/A
5. Identify Changes to Site/Substation yard access road: N/A
6. T-Line Considerations: N/A

IX. Relay and Control Enclosure Evaluation

1. Control Enclosure physical space evaluation – The new 4X transformer relaying will be installed in the existing 1R and 2R panels after the electromechanical relays are removed.
2. Raceway System modifications (including BPS requirements) – This is not a BPS station.
3. AC Station Service loading and evaluation of existing AC panel boards
   a. The Engineering vendor will verify the net change in AC loads due to transformer fans, cooling pumps and auxiliary components.
4. DC Battery/Charger Impacts and evaluation of existing DC panel boards
   a. The Engineering vendor will verify the net change in DC load due to the addition of new transformer heaters, microprocessor relays and RTAC's.
5. HVAC addition/modifications – N/A

X. Construction, Outage and Energization Considerations and Mobile XFMR Package

1. The new high and low side mobile positions will be constructed during this project. The new high side mobile position will be constructed at the beginning of the project in 3X1-4 position connected to 690 bus. The new low side position will be constructed in the location of the existing 1X3-4 disconnect switch. The nomenclature of the new low side mobile position will be 3X3-4. The existing mobile transformer junction box at the 4X1-4 position will be replaced with the new mobile transformer junction box at the 3X1-4 position as part of the mobile transformer design package. The existing mobile lockout relay 86M/1X HEA will be replaced with the new mobile lockout LOR relay in the new cabinet/panel 1R.
2. The Engineering vendor will provide all associated relay settings for the mobile transformer, depict mobile transformer position on General Arrangement drawings with breaker bushing Nomenclature, phasing, provide AC/DC schematics and wiring interconnection drawings for the mobile transformer as part of the mobile transformer design package.
3. The availability of mobile positions will be maintained during this project. Mobile capacity required is 25 MVA and 76MX mobile transformer was reserved for this project. Existing field ties can pick up Salisbury SS load, but SS Operations and Distribution Engineering prefer these periods to be limited to several hours at a time if required. There is significant risk of not being able to pick up customers, including Sharon hospital, if the field ties fail.

The existing high side mobile position 4X1-4 connected to 667 bus will be maintained until the new high side mobile position is constructed and commissioned at 3X1-4, connected to 690 bus.

4. The removal of the existing high side mobile transformer MOD 4X1-4, existing high side 1X transformer MOD 1X1-4 and installation of the new high side circuit switcher combo in 4X1-4 position will require the 667 bus to be out. Station load will be carried by the 690 line/bus and the mobile transformer during that time. The second time the 667 bus/line will be out for tying in the new circuit switcher to the 667 bus.
5. The station will be carried by the 667 bus/line and the 690 bus/line will be out for the duration of installation of new mobile position MOD 3X1-4. Line 690 is a back-up line for [redacted] station and cannot be out for long. 690 line out puts Salisbury station in the SCLL condition.
6. Construction will have to sequence the work and keep the recall times short. The construction team will need to plan for outage sequence, planned recall times to further evaluate the risks of 667/690 being out once team determines the 667/690 out outage durations. The MX mobile transformer will be connected to the 3X1-4 position connected to 690 bus while new C/S combo 4X1-4 is being installed. The existing 1X high side MOD will be removed at the same time as the new 4X1-4 circuit switcher is installed while 667 bus is out.

XI. Protection & Controls Scope of Work-Existing R&CE

Modifications to One Lines, three-lines, and Panel Drawings to reflect removal and additions.
Transformer Relay Upgrades:

1. Existing System 1 (Primary) 1X transformer relays are located in the existing relay panel/cabinet 1R. The existing cabinet 1R will be replaced with the new cabinet 1R that will accommodate new primary 4X transformer relay SEL 387E.
2. Existing System 2 (Backup) 1X transformer relays are located in the existing relay panel/cabinet 1R. The existing cabinet 1R will be replaced with the new cabinet 1R that will accommodate the new backup 4X transformer relay SEL 487E.
3. Existing transformer primary 86P and 86B lockout HEA relays are located in the existing relay panel/cabinet 1R. The existing 1R cabinet will be replaced with the new cabinet 1R which will accommodate new Primary 86P and backup 86B lockout transformer relays.

Transformer LTC Equipment Scope:

1. New transformer will be delivered with built in LTC controls (Beckwith 2001D). The transformer will also come equipped with Tap position indicator monitoring accessories to provide Tap position to Scada Security Operations Center (SOC). All the above-mentioned equipment will be connected to the station's DSCADA system.

P&C Equipment to be Removed

Three (3), 87/1X (Electromechanical Relay Type "HU") - located in Panel/cabinet 1R.

One (1), 86S1/1X (GE-HEA) Lockout Relay - located in Panel/cabinet 1R.
One (1), 86S2/1X (GE-HEA) Lockout Relay - located in Panel/cabinet 1R.
One (1), 86M/1X (GE-HEA) Lockout Relay - located in Panel/cabinet 1R

Three (3), 51/1X (Electromechanical Relay Type “HU”) - located in Panel/cabinet 1R.
One (1), MFM/1X (0-600A Neutral Amp meter) – not required on new transformer.

P&C Equipment to be Installed (Includes any associated test devices and aux relays)

One (1), 87S1/1X (SEL-387E) – located in Panel 1R.
Two (2), FT-19R Test Devices (Contains total (6) FT-1 Test Devices)
One (1), 86S1/4X (Electroswitch LOR) Lockout Relay – located in Panel 1R.
One (1), FT-1 Test Devices
One (1), 86S1/4X (Electroswitch LOR) Lockout Relay – located in Panel 1R
One (1), FT-1 Test Device One (1), 87S1/4X (SEL-387E) – located in Panel 1R
Two (2), FT-19R Test Devices (Contains total (6) FT-1 Test Devices)
One (1), 86S2/4X (Electroswitch LOR) Lockout Relay – located in Panel 1R
One (1), FT-1 Test Device
One (1), 86SF/4X1 (Electroswitch LOR) Lockout Relay – located in Panel 1R
One (1), FT-1 Test Device
One (1), 86M/1X (Electroswitch LOR) Lockout Relay – located in Panel 1R
One (1), FT-1 Test Device
Note: 86M/1X and TD/86M Test Switch need to be installed when the mobile transformer is not in service. Exact location of 86M/1X and TD/86M test switch will be determined during detail engineering phase.

One (1), 87S1/A1 BUS (SEL-387E) – located in Panel 2R.
Six (6), FT-1 Test Devices
One (1), 50/79BF/A1 BUS (SEL-351S) – located in Panel 2R.
Six (6), FT-1 Test Devices
One (1), 86S1/A1 (Electroswitch LOR) Lockout Relay – located in Panel 2R.
One (1), FT-1 Test Devices
One (1), 86S2/A1 (Electroswitch LOR) Lockout Relay – located in Panel 2R.
One (1), FT-1 Test Devices
One (1), 86BF/A1 (Electroswitch LOR) Lockout Relay – located in Panel 2R.
One (1), FT-1 Test Devices

Relay Settings

The following devices will require relay settings:

1. 87S1/4X (SEL-387E).
2. 87S2/4X (SEL-487E).

3. 90/4X (Beckwith M2001D).
4. 87S1/A1 BUS (SEL-387E).
5. 50/79BF/A1 BUS (SEL-351S).
6. Station Radial Reclosers 3F and 4F

Setting changes are required for the existing radial reclosers 3F and 4F. Mobile transformer relay settings are required to support the installation of the mobile transformer.

ASPEN One-liner model updates will be required to model the new [redacted]-4X Transformer.

METERING EQUIPMENT

The existing transformer metering is old and should be replaced with following newer meters.

One (1), RMFM/1X - ION 8500 – located in the metering cabinet 1M
One (1), MFM/1X - ION6200 – located in the metering cabinet 1M

Communication / Scada Equipment

Install new SEL-3622 and connect new transformer primary & backup relays and bus primary and backup relays serially.
Install new SEL-2725 ethernet switch which is required to communicate with transformer in built SEL2240 Axion.
Install (3) new CENTURY BFLX patch panels (two used, one spare) in the DSCADA cabinet.

A constructability review was performed on February 2, 2023, (see Attachment C).

Substation Equipment

Station	Device Position / Nomenclature	Device Removals *include manufacturer*	Device Additions *include manufacturer*
[redacted]	21J-11T-6	ITE TTR6-U	Southern States EV
	21J-12T-6	ITE TTR6-U	Southern States EV
	21J-13T-6	ITE TTR6-U	Southern States EV
	21J-14T-6	ITE TTR6-U	Southern States EV
	21J-15T-6	ITE TTR6-U	Southern States EV
	21J-1R (Green Ph)	General Electric VR-1	(None -Removal Only)
	21J-1R (Red Ph)	General Electric VR-1	(None -Removal Only)
	21J-1R (White Ph)	General Electric VR-1	(None -Removal Only)
	21J-1X	Westinghouse 13MVA 69kV-13.2kV	(None -Removal Only)
	21J-4X	(None – addition only)	HICO 115/69kV-13.2kV
	21J-1X1-4	ITE TTR6	115kV MOD
	21J-1X1-9D	ITE TTR6	(Remove only)
	21J-1X3-4	ITE TTR6-U	Southern States EV
	21J3-2	McGraw Edison WE	Cooper NOVA Recloser
	21J3-2 (control)	Cooper 4C	Cooper Form 6 Recloser Controller
	21J3-5	ITE TTR6-U	Southern States EV
	21J4-2	Kyle WVE	Cooper NOVA Recloser
	21J4-2 (control)	Cooper 4C	Cooper Form 6 Recloser Controller
	21J4-5	ITE TTR6-U	Southern States EV
	21J-4X1-4	ITE TTR6	115KV Circuit switcher MOD combo unit
	21J-4X1-9D	ITE TTR6	(Remove only)
	RTU	EPAQ9100	SEL-3530 RTAC
	87/1X	HU (3)	SEL-387E (for 87S1/1X)
	86S1/1X	GE-HEA	Electroswitch LOR
	86S2/1X	GE-HEA	Electroswitch LOR
	86M/1X	GE-HEA	(Remove only)
	51/1X	HU (3)	SEL-351S
	MFM/1X	TBD	ION6200
	RMFM/1X	TBD	ION 8500
	87S1/A1 BUS	(New)	SEL-387E
	(Spare) 21J	Westinghouse 10MVA 69kV-13/2kV	(None – Removal Only)

Background

The existing transformer was installed in 1953 (70 years old) and is approaching the end of its useful life. The transformer has an oil leak and absorbent pads have been in place since 2016 to mitigate the leak. It does not have a LTC and replacement with a modern LTC equipped transformer will allow the voltage regulators to be removed. Distribution System Planning shows a projected peak loading of 10.3MVA for the Salisbury substation in 2030. Transformer protection is currently provided by obsolete electromechanical relaying. This relaying is at the end of its service life and requires replacement. The winding connections for this transformer are wye-wye; therefore, there is no phase angle shift between the high-side and low-side windings of the transformer. This is contrary to the majority of the Connecticut system which has delta-wye winding connections which originates a 30-degree phase shift between the windings. Other northwest Connecticut transformers, [redacted] will also be replaced with Eversource standard 40MVA 115/69kV-13.2kV delta-wye transformers.

The northwest corridor of Connecticut is supplied by five (5) bulk substations: [redacted], [redacted] Currently there are two (2) other projects to replace transformers at [redacted]. The two (2) transformers at [redacted] are being replaced under project CS00286 and are being replaced due to age and condition. The single transformer [redacted] replacement is under project CS00544 and is also being replaced due to age and condition. The Franklin Drive and North Canaan transformers will be replaced with delta-wye connections; this will allow for the expansion of loop schemes to Carmel Hill, Campville, Bulls Bridge, and Canton bulk substations. [redacted] has a project to replace its single transformer under CS00364 and is being replaced to increase area reliability; the new transformer will also have delta-wye winding connections. Torrington Terminal 8A has a single transformer with wye-wye connections; Distribution System Planning is investigating the possibility of decommissioning the 8A-5X transformer. A future project will be initiated to determine if this is feasible or if the 8A-5X should be replaced to match the delta-wye connection of the above replacements.

These replacements are being coordinated by Substation Engineering to have delta-wye connections. During outage events, customers will experience a momentary outage when bringing the system back to its normal configuration. There is also risk of closing-in on a live tie that is out of phase which could cause damage to equipment. It is in Eversource's long term plan to eliminate these potential risks throughout the system.

[4] ALTERNATIVES CONSIDERED

This project was presented to and approved by the Solution Design Committee on August 17, 2022. The alternatives considered primarily addressed the installation location of the new Eversource standard 40MVA transformer, which is larger than the existing transformer. Certain details are the same for all alternatives, including:

- Required installation of a 69kV/13.8kV 25MVA mobile transformer (76MX, 30MVA) to ensure customer reliability during the 21J-1X replacement.
- A 3,000 square foot expansion of the substation fence at the north side of the station. The vegetation removal will add space for station expansion and will make it easier to move transformers and other equipment in and out of the substation. In addition, this is required to have full access to the back of the substation when the mobile transformer is deployed at the station. This required the project team to file a petition with the CT Siting Council.
- Electromechanical protection systems on the 1X transformer and 13.2kV A1 bus will be replaced with Eversource standard microprocessor relays. This equipment is located in the existing relay and control enclosure.
- The two (2) 13.2kV oil-filled feeder reclosers and seven (7) 13.2kV disconnect switches require replacement and are included in the SS Oil Recloser Replacement Program (CS00570 – CT). This equipment will be replaced as part of this project.
- All alternatives would have the positive customer impact of increasing the number of potential field ties on the distribution system in the future. This would increase the reliability of the distribution system in the event of an outage at the substation or on the distribution system.

Alternative #1: New Transformer in current Mobile position (Preferred)

Install a new 1X transformer in the existing mobile transformer position with replacement of the existing 115/69kV MOD and 13.2kV breaker. Locate the new transformer in the existing mobile transformer position. Replace the 69kV and 13.2kV bus work as required, install a 69kV circuit switcher to replace the existing transformer motor operated disconnect, install new mobile transformer motor operated disconnect switch on 690 bus, install new foundations, oil containment and firewall. This alternative locates the new transformer at the back of the substation, leaving space near the gate clear to stage equipment, as was done during a recent T-line project in the area. It also maintains a reasonable clearance from the control building with a new firewall. This alternative meets the project needs and objectives identified above. This option is the preferred alternative.

Advantages: This alternative utilizes the existing mobile position, occupying the empty space in the back of substation yard and thereby making this the most economical option. It allows a large portion of work for the new transformer to be performed while the existing one is still in service, minimizing the time the mobile transformer will be used. It also preserves the space at the front of the substation for other uses. Project team confirmed via subsequent constructability walkdowns and internal meetings that installation of new mobile high side switch in 3X1-4 (690 bus) will significantly reduce the time station load would have to be carried by field ties (high risk).

Disadvantages: A transformer firewall will be required to maintain reasonable clearance from the control house building.

Risks: This alternative has a lower risk level than the other options. The main risk is customer reliability which is addressed by the mobile transformer. There is significant risk of not being able to pick up customers, including hospital, if the field ties fail. Work will need to be sequenced to minimize outage times to 69kV 667/690 and allow for fast recall times if needed. While the five substations are being converted to delta/wye transformers there is the risk of closing a live-live tie that is out of phase.

Costs: The current planning grade estimate for this alternative is $13.947M (+/- 25%). The difference between the original SDC estimate and the current planning grade estimate is due to inclusion of SS expansion, equipment foundation and material costs and additional test and commissioning costs. The original SDC estimate for this option was $6.166M (-25%/+50%).

Refer to Attachment F for Plan of Equipment Installation for Alternative #1. Refer to attachments E1 and E2 for intermediate construction steps.

Alternative #2: New transformer located at the position of existing transformer

Replace the 1X transformer in its existing location. Replace/update the associated equipment on the existing transformer and MX positions. This alternative meets the project needs and objectives identified above, however it requires additional high and low side bus work to install and leaves minimal clearance from the existing control building. This option is not the preferred alternative.

Advantages: This option has few advantages. It does preserve the space at the front of the substation but at the expense of requiring the mobile transformer to be in service for the entire replacement.

Disadvantages: Requires extensive modifications to the high and low side bus. There would be less clearance between the new transformer and the control house building than other alternatives making maintenance access difficult. This option requires the mobile transformer to be in service during the entire transformer replacement project.

Risks: Leaves minimal space between the new transformer and the control building, this will make maintenance difficult in the future. This alternative requires the mobile transformer to be in

service carrying the substation load for the entire duration of the transformer replacement, much longer than the other two options. There is significant risk of not being able to pick up customers, including hospital, if the field ties fail.

Costs: The current estimate for this alternative was not created. This option was not selected to proceed with as preferred. The original SDC estimate for this option was $6.514M (-25%/+50%), higher than the SDC estimate for the preferred alternative 1 by $0.348M.

Alternative #3: New transformer located in "2X" position, to the West of the control house

Replacement of 1X transformer at north-western position near the entry gate of the station. Replace/update the associated equipment on the existing transformer and mobile positions. This option requires additional high and low side bus work and leaves less clearance to the control building than the preferred alternative. This alternative also restricts future substation expansion as it limits the ability to bring a crane into the yard if a second transformer were ever needed and congests the mobile transformer installation path. It also utilizes space in the yard currently used for material and equipment staging during projects. This option is not the preferred alternative.

Advantages: New transformer can be installed while existing transformer is still in service, minimizing mobile transformer requirements.

Disadvantages: Requires additional high/low side bus work involved, less clearance from the control house building and further congesting the removal path in case of equipment failure.

Risks: Creates congestion at the front of the substation, limiting options for substation expansion in the future.

Costs: The current estimate for this alternative was not created. This option was not selected to proceed with as preferred. The original SDC estimate for this option was $6.915M (-25%/+50%), higher than the SDC estimate for the preferred alternative 1 by $0.749M.

[5] PROJECT SCHEDULE

Milestone	Scheduled Completion Date
IFR Approval	November 2021
SDC Approval (for applicable projects)	August 2022
Conversion of Tx development costs, 183 to 107 (applicable to projects that require SSF approval and/or ISO preferred alternative selection)	N/A
EPAC Partial Funding Approval (for applicable projects)	September 2022
Preliminary Design Completion (or latest pre-full funding design phase)	April 2023
EPAC Full Funding Approval	June 2023
Siting Approval (for applicable projects)	October 2023
Start of Construction	October 2023
Project In-Service Date (ISD)	May 2024
Project Need Date (for applicable projects)	May 2024
ISO Related Milestones: (for applicable projects)	
• ISO-NE PPA Approval Date	TBD
• PAC Presentation	N/A
• TCA Submittal	N/A

See Attachment B for the P6 schedule.

[6] Regulatory Approvals

The following approvals are required:
- Connecticut Siting Council (CSC) Petition

[7] Risk and Risk Mitigation Plans

Contingency:

The project cost estimate allocates $418K of continency for any risks that are not yet known and do not yet have mitigation plans.

Risk Mitigation:

Risk	Mitigation
1. Potential Underground Obstructions	Conduct ground penetrating radar (GPR). Will require review during construction if obstructions observed by civil contractor. Test pits and adjust routing to equipment if possible. Risk allocation is also included.
2. Severe Weather, Delays, OT	Review scheduling and forecasts. May require additional labor and overtime. Risk allocation is also included.
3. Design Development	Engage internal and vendor resources. Risk allocation is also included.
4. Contaminated Soil from Existing Equipment	Engage environmental subject matter expert (SME). Risk allocation is also included.
5. Material Commodity Escalation	Place material POs asap. Risk allocation is also included.
6. Unknown Underground Utilities/Conflicts	Conduct GPR. Will require review during construction if obstructions observed by civil contractor. Test pits and adjust routing to equipment if possible. Risk allocation is also included.
7. Delays in Material Delivery	Engage internal and vendor resources. Risk allocation is also included.
8. Overtime due to Project Acceleration	Review milestones and progress. May require additional labor and overtime. Risk allocation is also included.
9. Single Contingency Load Loss	Plan the construction activities such that 4-6 hour recall times are possible during both 690 bus outage and later during 667 bus outage. Risk allocation is also included.
10. Mobile Transformer Availability	The full completion of the project is dependent on the availability of the mobile transformer. If MX is not available to support planned 5/31/24 ISD, the project's ISD will have to be adjusted. Risk allocation to cover electrical and test contractors' re-mobilization, addt't CR and LCE costs when MX is available was included.

[8] REFERENCES

References
1. Distribution System Planning Guide
2. CS00533 [redacted] Transformer Replacement IFR; approved on 11/16/2021
3. CS00533 [redacted] Transformer Replacement SSF; approved on 08/17/2022
4. CS00533 [redacted] Transformer Replacement Partial Funding PAF; approved on 08/17/2022
5. Eversource SUB013
6. Eversource SUB016.2
7. [redacted] aterial Authorization Form
8. [redacted] T Siting Council Petition
9. 405209-CS00364 NWCT Distribution Reliability Project Partial Funding PAF, approved on 11/17/2021
10. CS00544-CS00634 [redacted] Transformer & Recloser Replacements and Feeder Addition Partial Funding PAF, approved on 8/17/2022
11. CS00286 [redacted] Transformers 4X & 5X Replacement Partial Funding PAF, approved on 11/22/2022
12. CS00570 SS Oil Recloser Replacement Program Initial Funding IFR, approved on 2/28/2022
13. CD02260 [redacted] – Feeder Relocation PAF Rev. 1, dated 6/29/2023

[9] ATTACHMENTS (One-Line Diagrams, Images, etc.)

Attachment	Included in Submittal?
A. Cost Estimate	YES
B. P6 Schedule	YES
C. Constructability Review Form – Preliminary Walkdown	YES
D1 & D2. [redacted] Nomenclature Diagram Additions and Deletions	YES
E [redacted] Temporary Feeder Routing w Existing 1X XFMR in Service	YES
E [redacted] Temporary Feeder Routing w Mobile XFMR in Service	YES
F. [redacted] tation on Mobile XFMR Preliminary Drawing (after ISD)	YES
G1 & G2. [redacted] CT Siting Council Dwgs Additions and Removals	YES
H [redacted] Eversource Sound Evaluation Report	YES
I. [redacted] Station Aerial Map	YES
J. [redacted] Temp Feeders Scope of Work v2	YES

INSTRUCTIONS:
It is the responsibility of the initiator to contact the subject matter experts in the listed area disciplines to determine if the project considerations contained in this list are applicable to their project. They should fill out the checklist and determine a transition plan for the purpose of project execution. See the PAF Guide for additional instruction.

Project Checklist - Transmission & Substation Capital Project			
Project Name: [redacted] **Transformer Replacement**		**Project Number: CS00533**	
Facility Type: ☐BPS ☐BES ☐PTF ☐PTF non-regional ☐non-PTF ☐CIP ☒Distribution ☐General Plant			
PLANNING			
Is a NX-9 required?		Yes	
Is an ISO-NE PAC presentation required?		No	
ISO-NE Presentation Date (if completed):		Enter Date	
Cost in ISO-NE Presentation ($M) (if completed):		Enter Cost ($M)	
Is a PPA required?		Yes	
ISO-NE Approval Date (if completed):		TBD	
Is a TCA Application Required?		No	
TCA Submittal Date (if submitted):		Enter Date	
Cost in TCA Submittal ($M) (if submitted):		Enter Cost ($M)	
Enter ISO-NE RSP / Asset Condition ID, if assigned:		LSP	
PLANNING/PROTECTION & CONTROLS			
Are RAS/SPS/UVLs affected?		No	
OPERATIONS			
Outage Required?	☒ Primary Equipment (Power Transfer)	☐ Secondary Equipment (P&C only)	☐ Outage Not Required
Do SCLL Conditions Exist?		Yes	
Has an outage schedule been approved?		No	
Are Operations & Maintenance procedures/training required?		No	
STANDARDS			
Does the project include standard equipment and designs?		Yes	
SUBSTATION ENGINEERING			
Does this impact Revenue Metering		No	
Is preliminary short circuit/ breaker duty analysis required?		Yes	
Are there any changes to the baseline audible noise?		Yes	
Is there an impact to the existing ground grid?		Yes	
Is a Transient Over Voltage (TOV) analysis required?		No	

Project Checklist - Transmission & Substation Capital Project	
Project Name: [redacted] **Transformer Replacement**	**Project Number: CS00533**
P&C ENGINEERING	
OP-22 - Are PMUs and DDR required?	No
If BPS, is an NPCC Directory #4 presentation required?	No
Are ISO-NE OP-24 Appendix B updates necessary?	No
TRANSMISSION LINE ENGINEERING	
Are there any changes that affect the baseline EMF?	No
Are there any changes that affect the baseline EMI?	No
SITING	
Has Siting reviewed this project?	Yes
Name of Siting contact:	[redacted]
Is a Siting filing required? *(If yes, list in regulatory approvals section)*	Yes
PERMITTING	
Is there any permitting required? *(If yes, list in regulatory approvals section)*	Yes
PROJECT SERVICES (OUTREACH) and ROW WORK COORDINATION	
Has Project Services reviewed this project?	Yes
Name of Project Services contact:	[redacted]
What is the level of outreach expected?	Medium
Is any part of this project in an Environmental Justice Community?	No
Has ROW Coordination reviewed this project?	No
Is this project coordinating with other existing scheduled work?	Yes
INITIATOR	
Has a field constructability review been completed?	Yes
INVESTMENT RECOVERY	
Does the project require development of an Investment Recovery plan?	Yes
COST ESTIMATING	
What team/firm prepared the cost estimate?	Estimate was prepared by the Eversource Estimating Team
Name of the person who prepared the estimate:	[redacted]
Was the estimate reviewed by Eversource Estimating?	Yes - Full Review

ESTIMATE SUMMARY

Project Title: Transformer Replacement [redacted]
Project Mgr/Lead [redacted]
Project Number: CS00533
WO & Task #: 80162555
Estimate revision #: 01
Estimate Type - Station work

Estimate #: C-23-337
Date of Estimate: 07/20/2023
Estimate done by [redacted]
In Service date (ISD): [redacted]

Template Revision # 01.XIa

All Estimate Summary for PP4 Calc / escalation excerpts

Estimate #: C-23-337
Date of Estimate: 07/20/2023

Project Number: CS00533
WO & Task #: 80162555

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
1	ROW / Easements / Land purchases	$800	0.0%	0.0%	$800										
2	Environmental Approvals / Permits	$19,100	0.2%	0.1%	$14,100	$5,000									
3	Outreach	$37,300	0.4%	0.3%	$1,400	$12,700	$23,200								
4	Siting Approvals / Permits	$249 100	2.3%	1.7%	$800	$126 600	$121 700								
5	Engineering / Design	$636,800	6.0%	4.4%	$71,800	$278,700	$288,300								
6	Materials (Eversource purchased)	$3,604,100	33.9%	25.0%		$1,416,200	$2,187,900								
7	Construction (Incl materials by contractors)	$3,390,300	31.8%	23.6%	$3,100	$1,053,800	$2,333,400								
8	Testing / Commissioning	$746 500	7.0%	5.2%		$240 800	$505 700								
9	PMT Project Mgmt Team	$380,800	3.6%	2.6%	$39,100	$173,700	$168,000								
10	Removals	$804,800	5.7%	4.2%		$177,700	$427,100								
11	Other (property taxes and SAR)														
12	Risks	$975,000	9.2%	6.8%		$447,000	$528,000								
125	**Project Directs Total w/Risks**	**$10,646,800**	100.0%	74.0%	**$131,100**	**$3,932,200**	**$8,683,300**								
13	Indirects/Overhead	$2,905,000		20.2%	$131,800	$1,077,500	$1,695,700								
14	AFUDC	$426,700		3.0%	$8,200	$194,300	$224,200								
135	**Project Total - Baseline Budget**	**$13,978,300**		97.1%	**$271,100**	**$5,204,000**	**$8,603,200**								
15	Contingency	$417 700		2.9%		$153 900	$263 800								
	Project Total - Funding Approval Level	**$14,396,000**		100.0%	**$271,100**	**$5,357,900**	**$8,767,000**								
16	Reimbursables/Customer Contribution														
145	**Project Total (less reimbursables)**	**$14,396,000**			**$271,100**	**$5,357,900**	**$8,767,000**								
	Cost per key qty (if appl)	14,396,000	$'s / EA Replace 115kV 13MVA Transformer with 40MVA Transformer												
	Amount of Escalation included above	$320 000					$320 000								
8	Total materials - Eversource	$3 604 100				$1 416 200	$2 187 900								
	Total materials - Contractor	$80,132			$832	$29,700	$49,600								
	Total materials	$3 684 232			$832	$1 445 900	$2 237 500								

NOTE: Risk / Contingency is 10.7% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)

Estimate Range	**-25%**	**25%**
	$10,797,000	**$17,995,000**

All Estimate Summary for PP4 Calc / escalation excerpts		TOTAL w/ escal broken out
ROW / Easements / Land purchas	$	800
Environmental Approvals / Permi	$	19,100
Outreach	$	36,100
Siting Approvals / Permits	$	243 300
Engineering / Design	$	625,100
Materials (Eversource purchased	$	3,601,254
Construction (Incl materials by c	$	3,218,946
Testing / Commissioning	$	722,400
PMT Project Mgmt Team	$	372,900
Removals	$	502,400
Other (property taxes and SAR)	$	-
Risks	$	975,000
		$10,407,300
Indirects/Overhead	$	2,824,200
AFUDC	$	426,700
	$	-
		$13,658,200
	$	-
Continuency	$	417 800
		$14,076,000
	$	-
	$	-
		$14,076,000
	$	320,000
Excel total		**$14,396,000**
Check total		

COMMENTS:

Project Scope:
Key qty's and UOM (tie to inputs on est sheets)

[redacted] EA Replace 115kV 13MVA Transfor

[redacted] Factor (total $/Eversource Matl $'s)

Factor (Total directs $/Total Eversource matl $'s)

Replace 13MVA Transformer with 40MVA Transformer

See Cover (2) For Detailed Scope of Work

Assumptions/Clarifications:
Indirect rates based on: 11 - CT - Station work

Engineering is Internal
Civil Construction is External
Electrical Construction is External
Engineering cost per the PM from email dated 5/8/23 is $498,699.00 No quote provided.
Siting estimated at $60,000 per PM including All Points Purchase Order per email dated 5/12/23 No quote provided.
Prior costs are as of 5/2023
P&C Conduit and Cable lengths per emil dated 5/16/23
Existing cabinets are adequate for replacement relays.
Fence quotes from Eagle Fence & Guardrail for $71,254.51 dated 5/17/23
Conduit & Control Cabling quantities cover Main Project, Interim Transformer & Mobile Transformer
Add $15,000 to project cost for noise testing per email from PM dated 6/2/2023
Reversed material escalation per PM email dated 6/2/2023
Added additional Mobilizations to Risk per PM email estimate dated 6/2/2023
Add 15kV cable UG and OH.
Changed quantity of Utility Poles
Include work from CD02260 Scope of Work
Add Mobile Circuit Switcher per email dated 7/14/23
ISD Date is per PS Schedule
rev.01

RISKS

Potential UG Obstructions	$ 110 000	Delay in material delivery	$ 100 000
Reverse Wire bar Delays OT	$ 100 000	Over Time due to Project Acceleration	$ 62 000
Design development	$ 114 000	Single Con Inspector Load Loss	$ 80 000
Contaminated Soils from Existing Equipment	$ 91 000	Logistics Course Mid Job Mob & Off-Mob Costs	$ -
Material commodity escalation	$ 114 000		
Unknown UG utilities/conflicts	$ 97 000		
Delay in material delivery	$ 108 000		

UNESCALATED LINE ITEM DOLLARS

Project Number CS00533
Date of Estimate 07/20/2023
Estimate revision # 01

Escalation Rate | E Rate $ | 1

CSTXX-CONSTRUCTION	R	Prior Mhrs	Prior DOLLARS	2023 Mhrs	2023 DOLLARS	2024 Mhrs	2024 DOLLARS	TOTAL Mhrs	TOTAL DOLLARS
Electrical Construction	LT								
General Construction	LT								
SCADA / Automation	LT								
Other (specify)	LT								
Construction Reps (Internal)	LT								
Support Switch/Tag	LT								
Other (specify)	LT								
Other (specify)	LT								
Other (specify)	LT								
LT Total									
Employee Expenses	AE								
Constr. Purchased Matl (Eversource)	AM								
Constr. Purchased Matl (contracted)	AM								
Outside Construction Vendor	AQ								
Sales tax on Constr. Vendor									
Vehicles (now in indirects section)	AV								
Inspection services (Outside Vendor)	AQ								
Construction Reps (Outside vendor)	AQ								
Rents and Leases	BR								
CSTXX Subtotal									
Escalation									
CSTXX Total									
ENRXX-TG ENGINEERING/DESIGN									
Project Services/Drafting	LT								
T- Line Engineering/Design	LT								
D- Street Engineering/Design	LT								
Civil Engineering/Design	LT								
Substation (T) Engineering/Design	LT								
Substation (D) Engineering/Design	LT								
Protection & Controls Engineering	LT								
Survey Engineering	LT								
SCADA / Automation Engineering	LT								
Telecom Engineering	LT								
Other - specify	LT								
Other - specify	LT								
LT Total									
Employee Expenses	AE								
Contractor Engineering - T-Lines	AQ								
Contractor Engineering - D-Street	AQ								
Contractor Engineering - T -Station	AQ								
Contractor Engineering - D-Station	AQ								
Contractor Engineering - P&C	AQ								
Contractor Engineering - Survey	AQ								
Contractor Engineering - SCADA / Automation	AQ								
Contractor Engineering - Telecom	AQ								
Contractor Engineering - Specify	AQ								
Contractor Engineering - Specify	AQ								
Contractor Engineering - Specify	AQ								
Vehicles (now in indirects section)	AV								
ENRXX Subtotal									
Escalation									
ENRXX Total									
LNDXX-TG LAND									
Real Estate	LT								
Employee Expenses	AE								
Purchase Land	AM								
Easements	AM								
Vehicles (now in indirects section)	AV								
Fees and Payments	BF								
LNDXX Subtotal									
Escalation									
LNDXX Total									
MATXX-TG MATERIAL									
Eversource	AM								
Outside Services	AM								
	AM								
Freight									
Sales Tax (Eversouce)									
Sales Tax (outside services)									
Other									
MATXX Subtotal									
Escalation									
MATXX Total									
PSMXX-PROJECT MANAGER & SUPPORT									
Project Management (PM)	LT								
Project Planning/Cost (IP)	LT								
Contracts/Purchasing (C/P)	LT								
System Planning	LT								
Environmental	LT								
SCS - Traditional	LT								
Legal	LT								
Estimating	LT								
Siting - Petition	LT								
Asset Management	LT								
Veg. Mgmt	LT								
Siting - Petition Costs	LT								
Other -	LT								
Other -	LT								
LT Total									
Employee Expenses	AE								
Project Support Vendor - PM	AQ								
Project Support Vendor - IP	AQ								
Project Support Vendor - C/P	AQ								
Project Support Vendor - System Planning	AQ								
Project Support Vendor - Enviromental	AQ								
Project Support Vendor - SCS - Traditional	AQ								
Project Support Vendor - Legal	AQ								
Project Support Vendor - Estimating	AQ								
Project Support Vendor - Siting - Petition	AQ								
Project Support Vendor - Asset Management	AQ								
Project Support Vendor - Veg. Mgmt	AQ								
Project Support Vendor - Other	AQ								
Project Support Vendor - Other	AQ								
Project Support Vendor - Other	AQ								
Vehicles (now in indirects section)	AV								
Property or CWIP tax large proj. a lowance	BR								
Builder All risk insurance excluding deductables(if project is over $50mil)	BR								
Fees and Payments - Enviromental	BF								
Fees and Payments - Siting	BF								
Fees and Payments - Other	BF								
PSMXX Subtotal									
Escalation									
PSMXX Total									
REMXX-TG REMOVAL									
Engineering/Design	LT								
Internal Construction	LT								
LT Total									
Employee Expenses	AE								
Outside Services	AQ								
Contractor Labor	AQ								
Vehicles (now in indirects section)	AV								
Rents and Leases	BR								
REMXX Subtotal									
Escalation									
REMXX Total									
TSTXX-TG TEST									
Test / Field Engr. Labor (In House)	LT								
Test / Comm. Engr. Labor (In House)	LT								
Lead Commissioning Engr. (LCE) (internal)	LT								
Employee Expense	AE								
Test / Field Engr. Labor (contractor)	AQ								
Test / Comm. Engr. Labor (contractor)	AQ								
Lead Commissioning Engr. (LCE) (contactor)	AQ								
Vehicles (now in indirects section)	AV								
TSTXX Subtotal									
Escalation									
TSTXX Total									
SUBTOTAL PROJECT DIRECT COST									
Risk									
Risk									
Risk Total									
TOTAL PROJECT DIRECT COST (w risk)									
INDIRECTS									
Non-Productive Time Allocation (**ZNP**)									
Payroll Benefits Allocation (**ZPB**) incl NPT									
Gen SVC CO Overhead (**ZGS**) incl NPT									
E&S Allocations (**ZEB,ZEL ,ZES**)									
AS&E Allocations (**ZAS**)									
Stores Expense Allocation (**ZST**)									
Lobby Stock									
MDEC (**ZMI**)									
Vehicles (**ZVE**)									
Indirects Subtotal									
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)									
AFUDC									
AFUDC (ZK)									
In Service Dollars / Land costs									
Cumulative ISS & Land Costs									
AFUDC Subtotal									
TOTAL PROJECT COST - Baseline Budget									
Contingecy									
Contingency									
Other									
Contingency SubTotal									
TOTAL PROJECT COST - Approved Funding									

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
1	**Salisbury 21J -1X Transformer Replacement**		30-Nov-22 A	26-Nov-24		0	447		
2	**PROJECT PLANNING & FUNDING**		22-May-23 A	11-Aug-24		-115	309		
3	**T-Minus Milestones**		22-May-23	11-Aug-24		-165	448		
4	**Civil T-Minus Milestones**		22-May-23	30-Dec-23		-91	223		
5	AT0813	SITING PETITION AND APPLICATION FILED		22-May-23		132	0	PM	
6	AT1811	Detail Design/Engineering Completed		30-Jun-23		92	0	PM	
7	AT0805C	Civil IFC - Civil (BG) w/BOM		28-Jul-23		64	0	PM	
8	AT00	T-00 START OF CONSTRUCTION - Non-Outage	01-Oct-23*			0	0	PM	
9	AT0801	ALL PERMITS RECEIVED		22-Nov-23		-53	0	PM	
10	AT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		06-Dec-23	9	-67	0	PM	
11	AT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		20-Dec-23	7	-81	0	PM	
12	AT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		30-Dec-23	6	-91	0	PM	
13	**Electrical T-Milestones - Non-outage**		21-Jul-23	20-Dec-23		-81	152		
14	FT1811	Detail Design/Engineering Completed		21-Jul-23		71	0	PM	
15	FT2404	ASSIGN LCE (LEAD COMMISSIONING ENGINEER)		27-Jul-23		65	0	PM	
16	FT0805E	Elect IFC - Electrical (AG) w/Final BOM		11-Sep-23		19	0	PM	
17	FT1301	COMMISSIONING PLAN COMPLETE		26-Sep-23		4	0	PM	
18	FT00	T-00 START OF CONSTRUCTION - Non-Outage	01-Oct-23*			0	0	PM	
19	FT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		23-Oct-23		-23	0	PM	
20	FT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		06-Dec-23	10	-67	0	PM	
21	FT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		20-Dec-23	8	-81	0	PM	
22	**Electrical T-Milestones - Outage**		21-Jul-23	11-Aug-24		-285	387		
23	BT1811	Detail Design/Engineering Completed		21-Jul-23		102	0	PM	
24	BT2404	ASSIGN LCE (LEAD COMMISSIONING ENGINEER)		27-Jul-23		96	0	ENG.S	
25	BT1801	T18.01 ALL FIRM TOAAPPLICATIONS DUE TO LCC (for DISTRIBUTION Non-transformer equipment)		16-Aug-23*		-50	0	PM	
26	BT0805E	Elect IFC - Electrical (AG) w/Final BOM		11-Sep-23		50	0	PM	
27	BT1301	COMMISSIONING PLAN COMPLETE		26-Sep-23		35	0	PM	
28	BT00	T-00 START OF CONSTRUCTION - Outage 1	01-Nov-23*			0	0	PM	
29	BT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		06-Dec-23		-36	0	PM	
30	BT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		20-Dec-23		-50	0	PM	
31	BT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		11-Aug-24	1	-285	0	PM	
32	**P&C T-Minus Milestones**		11-Aug-23	15-Jan-24		0	156		
33	CT1811	Detail Design/Engineering Completed		11-Aug-23		156	0	PM	
34	CT0805P	P&C IFC - P&C w/BOM		01-Sep-23		135	0	PM	
35	CT1202	P/C DESCRIPTION / DRAFT OPERATING INSTRUCTIONS ISSUED		18-Sep-23		118	0	PM	
36	CT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		02-Oct-23		104	0	PM	
37	CT0404	ALL FINAL RELAY PROTECTIVE SETTING ISSUED		21-Nov-23		54	0	PM	
38	CT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		06-Dec-23		39	0	PM	
39	CT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		20-Dec-23		25	0	PM	
40	CT00	T-00 - START OF CONSTRUCTION - Mobile XFMR P&C	15-Jan-24*			0	0	PM	
41	**76MX Mobile Transformer & 99MX CS Installation T-Milestones**		21-Jul-23	15-Jan-24		0	177		
42	DT1811	Detail Design/Engineering Completed		21-Jul-23		177	0	PM	
43	DT1801	T-1801 -All Firm TOA's submitted to LCC		16-Aug-23*		25	0	PM	
44	DT0805E	Elect IFC - Electrical (AG) w/Final BOM		11-Sep-23		125	0	PM	
45	DT1805	B-T-18 NX9 Preliminary Ratings to LCC for New Equipment (transformers are considered 'NEW EQUIPMENT')		21-Sep-23*		-11	0	PM	
46	DT1301	COMMISSIONING PLAN COMPLETE		26-Sep-23		110	0	PM	
47	DT0301	B-T-03 NX9 THERMAL RATINGS TO LCC AND CONVEX		29-Nov-23*		25	0	PM	

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
48	DT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		06-Dec-23		39	0	PM	
49	DT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		20-Dec-23		25	0	PM	
50	DT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		21-Dec-23		24	0	PM	
51	DT00	T-00 START OF CONSTRUCTION - Mobile Transformer Energization	15-Jan-24*			0	0	PM	
52	**Transformer Installation Milestones**		21-Jul-23	29-Feb-24		-1	223		
53	ET1811	Detail Design/Engineering Completed		21-Jul-23		222	0	PM	
54	ET1801	T-1801 -All Firm TOA's submitted to LCC		16-Aug-23*		70	0	PM	
55	ET0805E	Elect IFC - Electrical (AG) w/Final BOM		11-Sep-23		170	0	PM	
56	ET1805	B-T-18 NX9 Preliminary Ratings to LCC for New Equipment (transformers are considered 'NEW EQUIPMENT')		21-Sep-23*		34	0	PM	
57	ET1301	COMMISSIONING PLAN COMPLETE		26-Sep-23		155	0	PM	
58	ET0301	B-T-03 NX9 THERMAL RATINGS TO LCC AND CONVEX		29-Nov-23*		70	0	PM	
59	ET0814	ALL CONSTRUCTION CONTRACTS IN PLACE		06-Dec-23		84	0	PM	
60	ET0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		20-Dec-23		70	0	PM	
61	ET00	T-00 START OF CONSTRUCTION - 1X	29-Feb-24*			0	0	PM	
62	ET0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		29-Feb-24		-1	0	PM	
63	**Project Funding**		22-May-23 A	06-Jul-23		13	32		
64	**Full Funding**		22-May-23 A	06-Jul-23		13	32		
65	**PAF - FF**		22-May-23 A	25-May-23		13	3		
66	DE2000	Project Constructability Review Complete	22-May-23	23-May-23		15	2	PM	
67	DE1700	Conduct Initial Risk Management & SCLL Review (Project Initiator & PM)	22-May-23 A	25-May-23		13	2	ENG.AI	
68	**EPAC - FF**		26-May-23	21-Jun-23		13	18		
69	PAFF2000	Submit Full Funding PAF for Internal Review	26-May-23	26-May-23		13	1	ENG.AI	
70	PAFF2100	Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC for Review	30-May-23	05-Jun-23		13	5	ENG.AI	
71	PAFF2120	Review time of PAF before meeting	06-Jun-23	12-Jun-23		15	5	PM	
72	PAFF2110	EPAC Full Funding Meeting		14-Jun-23		13	0	IP	
73	PAFF2200	Incorporate EPAC Full Funding PAF Review Comments	15-Jun-23	21-Jun-23		13	5	PM	
74	FF1000	EPAC Full Funding Approval		21-Jun-23		13	0	PM	
75	**Power Plan - FF**		22-Jun-23	06-Jul-23		13	10		
76	FF1010	Full Funding PowerPlan Approval	22-Jun-23	06-Jul-23		13	10	IP	
77	**Project Management**		12-Aug-23	20-Dec-23		-39	90		
78	**Compliance Authorization Notification**		07-Dec-23	20-Dec-23		-56	10		
79	1170	Prepare CAN (Construction Authorization Notice) - Civil	07-Dec-23	20-Dec-23	7	-56	10	PM	
80	3640	Prepare CAN (Construction Authorization Notice) - Mobile	07-Dec-23	20-Dec-23	8	-56	10	PM	
81	3650	Prepare CAN (Construction Authorization Notice) - 1X	07-Dec-23	20-Dec-23		-56	10	PM	
82	**Outage Permits / TOAs Request**		12-Aug-23	16-Aug-23		70	5		
83	1250	Construction Rep SUBMIT OUTAGE REQUESTS for Mobile Transformer	12-Aug-23	16-Aug-23		25	5	CONS	
84	3620	Construction Rep SUBMIT OUTAGE REQUESTS for NON-Swithgear equipment (4 weeks before outage)	12-Aug-23	16-Aug-23		-50	5	CONS	
85	3630	Construction Rep SUBMIT OUTAGE REQUESTS for New 1X Transformer	12-Aug-23	16-Aug-23		70	5	CONS	
86	**ENVIRONMENTAL APPROVALS & PERMITS**		17-Apr-23 A	09-Nov-23		-28	120		
87	**Federal Approvals & Permits**		17-Apr-23 A	09-Nov-23		-28	120		
88	1180	Determine Requirement for and Prepare Permitting Docments - FEDERAL (X-MA,CT)	17-Apr-23 A	09-Nov-23		-28	120	PM	
89	**Regional Approvals**		17-Apr-23 A	09-Nov-23		-28	120		
90	1200	Determine Requirement for and Prepare Permitting Docments - REGIONAL (X-MA CT)	17-Apr-23 A	09-Nov-23		-28	120	PM	
91	**State Approvals & Permits**		17-Apr-23 A	09-Nov-23		-28	120		
92	1190	Determine Requirement for and Prepare Permitting Docments - STATE	17-Apr-23 A	09-Nov-23		-28	120	PM	
93	**Local Approvals & Permits**		17-Apr-23 A	09-Nov-23		-28	120		
94	1210	Determine Requirement for and Prepare Permitting Docments - LOCAL	17-Apr-23 A	09-Nov-23		-28	120	PM	

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
95		**SITING APPROVALS / PERMITS / PROJECT SERVICES**	17-Apr-23 A	22-Nov-23		-37	158		
96		**State Approvals and Permits**	19-May-23 A	22-Nov-23		-37	128		
97		**Siting Council / Board**	19-May-23 A	22-Nov-23		-37	128		
98	CTSITE200	Filing of CT Siting Council Petition date	19-May-23 A	21-Nov-23		-37	128	SITE	
99	CTSITE300	CT Siting Council Petition Approval Received	22-Nov-23	22-Nov-23		-37	1	SITE	
100		**Compliance Matrices - Regulatory Commitments**	17-Apr-23 A	12-Oct-23		-18	100		
101	1230	Prepared Compliance Matrices - Regulatory	17-Apr-23 A	12-Oct-23		-18	100	PM	
102		**Compliance Matrices - Non Regulatory Commitments**	17-Apr-23 A	12-Oct-23		-18	100		
103	1220	Prepared Compliance Matrices - Non-Regulatory (Commitments)	17-Apr-23 A	12-Oct-23		-18	100	PM	
104		**ENGINEERING DETAILED / IFC DESIGN**	23-Feb-23 A	12-Jun-24		115	332		
105		**Civil Engineering**	24-Apr-23 A	28-Jul-23		-26	73		
106		**Civil Engineering Detailed Design**	24-Apr-23 A	30-Jun-23		-26	54		
107	CE1200	Vendor Engineer Develop Civil Substation Detail Design	24-Apr-23 A	16-Jun-23		-26	31	ENG.S	
108	CE1210	ES Engineering Review Civil Substation Detail Design	19-Jun-23	30-Jun-23		-26	10	ENG.S	
109		**Civil Engineering IFC Design**	03-Jul-23	28-Jul-23		-26	19		
110	CE1300	Vendor Engineer Develop Civil Substation IFC	03-Jul-23	14-Jul-23		-26	9	ENG.S	
111	CE1310	ES Engineering Review Civil Substation IFC	17-Jul-23	28-Jul-23		-26	10	ENG.S	
112		**Electrical Engineering**	23-Feb-23 A	12-Jun-24		115	332		
113		**Electrical Engineering Detailed Design**	24-Apr-23 A	21-Jul-23		340	68		
114	DE1900	Conduct Detail Constructability Walk Down	19-Jun-23	23-Jun-23		359	5	PM	
115	EE1200	Vendor Engineer Develop Electrical Substation Detail Design	24-Apr-23 A	30-Jun-23	7	-56	27	ENG.S	
116	EE1210	ES Engineering Review Electrical Substation Detail Design	03-Jul-23	21-Jul-23	7	-56	14	ENG.S	
117		**Electrical Engineering Pre-IFC Design**	12-Sep-23	18-Sep-23		177	5		
118	EE920	Operating Instructions - SSED Review Draft Convex OI	12-Sep-23	18-Sep-23		80	5	ENG.S	
119	EE460	Operating Instructions - SSED Review Draft Distribution OI	12-Sep-23	18-Sep-23		80	5	ENG.S	
120	CSD1000	PE Initiate CASCADE Forms (Appendix A) for Construction Package	12-Sep-23	18-Sep-23		177	5	ENG.S	
121		**Electrical Engineering NX-9**	24-Apr-23 A	12-Jun-24		115	251		
122		**Thermal Ratings - Non NX-9 Thermal Ratings**	24-Jul-23	18-Aug-23		203	20		
123	NX9A-EM44	Thermal Rating- Non NX9 - P&C Develops and Provides LTRC with P&C Checklist & Thermal Ratings Data	24-Jul-23	28-Jul-23		203	5	ENG.S	
124	NX9A-EM54	Thermal Rating- Non NX9 -LTRC Prepares and Sends Thermal Rating Data for TRC Review	31-Jul-23	04-Aug-23		203	5	ENG.S	
125	NX9A-EM64	Thermal Rating- Non NX9 -TRC Reviews and Approves Thermal Rating Data	07-Aug-23	11-Aug-23		203	5	ENG.S	
126	NX9A-EM74	Thermal Rating- Non NX9 -LTRC Files Capability Sheets	14-Aug-23	18-Aug-23		203	5	ENG.S	
127		**Substation Thermal Rating NX-9**	24-Apr-23 A	12-Jun-24		115	251		
128		**Substation NX9 for New Construction(New Equipment CS or Xfmr) - TEMPORARY HS CIRCUIT SWITCHER**	24-Apr-23 A	12-Jun-24		115	251		
129		**Substation - Preliminary Thermal Data - New Construction**	24-Apr-23 A	06-Sep-23		-9	58		
130	NX9A-NC09	LTRC Requests P&C Checklist	24-Apr-23 A	02-Jun-23		25	5	ENG.S	
131	NX9A-NC11	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	24-Jul-23	28-Jul-23		-9	5	ENG.S	
132	NX9A-NC13	LTRC Reviews and Sends Thermal Rating Data for TRC Review	31-Jul-23	04-Aug-23		-9	5	ENG.S	
133	NX9A-NC15	TRC Reviews and Approves Thermal Rating Data	07-Aug-23	11-Aug-23		-9	5	ENG.Al	
134	NX9A-NC17	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	14-Aug-23	18-Aug-23		-9	5	ENG.S	
135	NX9A-NC18	TRC Confirms Engineering Management Approvals of NX-9	21-Aug-23	25-Aug-23		-9	5	ENG.S	
136	NX9A-NC19	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	28-Aug-23	28-Aug-23		-9	1	TEPS	
137	NX9A-NC21	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	29-Aug-23	05-Sep-23		-9	5	ENG.Al	
138	NX9A-NC23	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-18, EquipDOE, Revs DOE per M7-EN-3006	06-Sep-23	06-Sep-23		-9	1	TEPS	
139		**Substation - Verify Thermal Data - New Construction**	12-Sep-23	16-Nov-23		-12	47		
140	NX9A-NC31	PE to Verify Thermal Data Review PE Chectlist (M7-EN-3006.2)	12-Sep-23	18-Sep-23		-12	5	ENG.S	
141	NX9A-NC33	LTRC Reviews and Makes "GO / NO-GO" Decision	19-Sep-23	25-Sep-23		-12	5	ENG.S	

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
142	NX9A-NC35	LTRC Requests P&C Checklist	26-Sep-23	02-Oct-23		-12	5	ENG.S	[redacted]
143	NX9A-NC37	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	03-Oct-23	10-Oct-23		-12	5	ENG.S	
144	NX9A-NC39	LTRC Reviews and Sends Thermal Rating Data for TRC Review	11-Oct-23	17-Oct-23		-12	5	ENG.S	
145	NX9A-NC41	TRC Reviews and Approves Thermal Rating Data	18-Oct-23	24-Oct-23		-12	5	ENG.A	
146	NX9A-NC43	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	25-Oct-23	31-Oct-23		-12	5	ENG.S	
147	NX9A-NC44	TRC Confirms Engineering Management Approvals of NX-9	01-Nov-23	07-Nov-23		-12	5	ENG.S	
148	NX9A-NC45	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	08-Nov-23	08-Nov-23		-12	1	TEPS	
149	NX9A-NC47	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	09-Nov-23	15-Nov-23		-12	5	ENG.A	
150	NX9A-NC49	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, EquipDOE, Revs DOE per M7-EN-3006	16-Nov-23	16-Nov-23		-12	1	TEPS	
151	**Substation - NX-9 Pre NX9-DOE**		30-May-24	30-May-24		6	1		
152	NX9500	Scheduler - Send Email for 48Hrs Notification before DOE. (Tie SS to Beginning of NX9 Outage)	30-May-24	30-May-24		6	1	TEPS	
153	**Substation - NX-9 Post NX9-DOE/ISD**		03-Jun-24	12-Jun-24		115	8		
154	NX9FINAL50	Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or ISD)	03-Jun-24	05-Jun-24		115	3	PM	
155	NX9A600	Scheduler - Has 72 Hrs to Put in Service the NX-9 and Send to TOP Director in NURS after DOE/PM Note of Completion.	05-Jun-24	05-Jun-24		115	1	TEPS	
156	NX9FINAL60	[If Required] Receive + Issue Final Affirmed NX-9 Data to NURS	06-Jun-24	12-Jun-24		115	5	ENG.A	
157	**Substation NX9 for New Construction(New Equipment CS or Xfmr) - NEW MOBILE CIRCUIT SWITCHER**		03-Jul-23	12-Jun-24		115	239		
158	**Substation - Preliminary Thermal Data - New Construction**		03-Jul-23	21-Sep-23		-20	57		
159	NX9B-NC01	PE Updates 1-Line Nomenclature Dwgs & Complete PE Checklist M7-EN-3006.2 - e-mail link to project team & CONVEX	03-Jul-23	10-Jul-23		-20	5	ENG.S	
160	NX9B-NC03	LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line Nomenclature	11-Jul-23	17-Jul-23		-20	5	ENG.S	
161	NX9B-NC05	LTRC Submits 1-Line Nomenclature to TRC	18-Jul-23	24-Jul-23		-20	5	ENG.S	
162	NX9B-NC07	LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal Ratings	25-Jul-23	31-Jul-23		-20	5	ENG.S	
163	NX9B-NC09	LTRC Requests P&C Checklist	01-Aug-23	07-Aug-23		-20	5	ENG.S	
164	NX9B-NC11	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	08-Aug-23	14-Aug-23		-20	5	ENG.S	
165	NX9B-NC13	LTRC Reviews and Sends Thermal Rating Data for TRC Review	15-Aug-23	21-Aug-23		-20	5	ENG.S	
166	NX9B-NC15	TRC Reviews and Approves Thermal Rating Data	22-Aug-23	28-Aug-23		-20	5	ENG.A	
167	NX9B-NC17	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	29-Aug-23	05-Sep-23		-20	5	ENG.S	
168	NX9B-NC18	TRC Confirms Engineering Management Approvals of NX-9	06-Sep-23	12-Sep-23		-20	5	ENG.S	
169	NX9B-NC19	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	13-Sep-23	13-Sep-23		-20	1	TEPS	
170	NX9B-NC21	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	14-Sep-23	20-Sep-23		-20	5	ENG.A	
171	NX9B-NC23	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-18, EquipDOE, Revs DOE per M7-EN-3006	21-Sep-23	21-Sep-23		-20	1	TEPS	
172	**Substation - Verify Thermal Data - New Construction**		22-Sep-23	29-Nov-23		-20	47		
173	NX9B-NC31	PE to Verify Thermal Data Review PE Chectlist (M7-EN-3006.2)	22-Sep-23	28-Sep-23		-20	5	ENG.S	
174	NX9B-NC33	LTRC Reviews and Makes "GO / NO-GO" Decision	29-Sep-23	05-Oct-23		-20	5	ENG.S	
175	NX9B-NC35	LTRC Requests P&C Checklist	06-Oct-23	13-Oct-23		-20	5	ENG.S	
176	NX9B-NC37	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	16-Oct-23	20-Oct-23		-20	5	ENG.S	
177	NX9B-NC39	LTRC Reviews and Sends Thermal Rating Data for TRC Review	23-Oct-23	27-Oct-23		-20	5	ENG.S	
178	NX9B-NC41	TRC Reviews and Approves Thermal Rating Data	30-Oct-23	03-Nov-23		-20	5	ENG.A	
179	NX9B-NC43	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	06-Nov-23	10-Nov-23		-20	5	ENG.S	
180	NX9B-NC44	TRC Confirms Engineering Management Approvals of NX-9	13-Nov-23	17-Nov-23		-20	5	ENG.S	
181	NX9B-NC45	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	20-Nov-23	20-Nov-23		-20	1	TEPS	
182	NX9B-NC47	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	21-Nov-23	28-Nov-23		-20	5	ENG.A	
183	NX9B-NC49	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, EquipDOE, Revs DOE per M7-EN-3006	29-Nov-23	29-Nov-23		-20	1	TEPS	
184	**Substation - NX-9 Pre NX9-DOE**		29-May-24	29-May-24		7	1		
185	NX9502	Scheduler - Send Email for 48Hrs Notification before DOE. (Tie SS to Beginning of NX9 Outage)	29-May-24	29-May-24		7	1	TEPS	
186	**Substation - NX-9 Post NX9-DOE/ISD**		03-Jun-24	12-Jun-24		115	8		
187	NX9FINAL51	Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or ISD)	03-Jun-24	05-Jun-24		115	3	PM	
188	NX9B600	Scheduler - Has 72 Hrs to Put in Service the NX-9 and Send to TOP Director in NURS after DOE/PM Note of Completion.	05-Jun-24	05-Jun-24		115	1	TEPS	

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
189	NX9FINAL61	[If Required] Receive + Issue Final Affirmed NX-9 Data to NURS	06-Jun-24	12-Jun-24		115	5	ENG.Al	[redacted]
190	**Substation NX-9 for Equipment Modification -TEMPORARY MOBILE TRANSFORMER**		19-Jun-23	12-Jun-24		115	249		
191	**Substation NX-9 - Equipment Modification**		19-Jun-23	07-Sep-23		37	57		
192	NX9A-EM01	PE Updates 1-Line Nomenclature Dwgs & Complete PE Checklist M7-EN-3006.2 - e-mail link to project team & CONVEX	19-Jun-23	23-Jun-23		37	5	ENG.S	
193	NX9A-EM04	LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line Nomenclature	26-Jun-23	30-Jun-23		37	5	ENG.S	
194	NX9A-EM07	LTRC Submits1-Line Nomenclature to TRC	03-Jul-23	10-Jul-23		37	5	ENG.S	
195	NX9A-EM10	LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal Ratings	11-Jul-23	17-Jul-23		37	5	ENG.S	
196	NX9A-EM13	LTRC Requests P&C Checklist	18-Jul-23	24-Jul-23		37	5	ENG.S	
197	NX9A-EM16	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	25-Jul-23	31-Jul-23		37	5	ENG.S	
198	NX9A-EM19	LTRC Reviews and Sends Thermal Rating Data for TRC Review	01-Aug-23	07-Aug-23		37	5	ENG.S	
199	NX9A-EM22	TRC Reviews and Approves Thermal Rating Data	08-Aug-23	14-Aug-23		37	5	ENG.Al	
200	NX9A-EM25	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	15-Aug-23	21-Aug-23		37	5	ENG.S	
201	NX9A-EM26	TRC Confirms Engineering Management Approvals of NX-9	22-Aug-23	28-Aug-23		37	5	ENG.S	
202	NX9A-EM28	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	29-Aug-23	29-Aug-23		37	1	TEPS	
203	NX9A-EM31	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	30-Aug-23	06-Sep-23		37	5	ENG.Al	
204	NX9A-EM34	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, EquipDOE, Revs DOE per M7-EN-3006	07-Sep-23	07-Sep-23		37	1	TEPS	
205	**Substation - NX-9 Pre NX9-DOE**		30-May-24	30-May-24		6	1		
206	NX9A100	Scheduler - Send Email for 48Hrs Notification before DOE. (Tie SS to Beginning of NX9 Outage)	30-May-24	30-May-24		6	1	TEPS	
207	**Substation - NX-9 Post NX9-DOE/ISD**		03-Jun-24	12-Jun-24		115	8		
208	NX9FINAL10	Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or ISD)	03-Jun-24	05-Jun-24		115	3	PM	
209	NX9A200	Scheduler - Has 72 Hrs to Put in Service the NX-9 and Send to TOP Director in NURS after DOE/PM Note of Completion	05-Jun-24	05-Jun-24		115	1	TEPS	
210	NX9FINAL20	[If Required] Receive + Issue Final Affirmed NX-9 Data to NURS	06-Jun-24	12-Jun-24		115	5	ENG.Al	
211	**Substation NX-9 for Equipment Modification -REPLACEMENT 1X TRANSFORMER**		19-Jun-23	12-Jun-24		115	249		
212	**Substation NX-9 - Equipment Modification**		19-Jun-23	07-Sep-23		37	57		
213	NX9B-EM01	PE Updates 1-Line Nomenclature Dwgs & Complete PE Checklist M7-EN-3006.2 - e-mail link to project team & CONVEX	19-Jun-23	23-Jun-23		37	5	ENG.S	
214	NX9B-EM04	LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line Nomenclature	26-Jun-23	30-Jun-23		37	5	ENG.S	
215	NX9B-EM07	LTRC Submits1-Line Nomenclature to TRC	03-Jul-23	10-Jul-23		37	5	ENG.S	
216	NX9B-EM10	LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal Ratings	11-Jul-23	17-Jul-23		37	5	ENG.S	
217	NX9B-EM13	LTRC Requests P&C Checklist	18-Jul-23	24-Jul-23		37	5	ENG.S	
218	NX9B-EM16	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	25-Jul-23	31-Jul-23		37	5	ENG.S	
219	NX9B-EM19	LTRC Reviews and Sends Thermal Rating Data for TRC Review	01-Aug-23	07-Aug-23		37	5	ENG.S	
220	NX9B-EM22	TRC Reviews and Approves Thermal Rating Data	08-Aug-23	14-Aug-23		37	5	ENG.Al	
221	NX9B-EM25	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	15-Aug-23	21-Aug-23		37	5	ENG.S	
222	NX9B-EM26	TRC Confirms Engineering Management Approvals of NX-9	22-Aug-23	28-Aug-23		37	5	ENG.S	
223	NX9B-EM28	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	29-Aug-23	29-Aug-23		37	1	TEPS	
224	NX9B-EM31	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	30-Aug-23	06-Sep-23		37	5	ENG.Al	
225	NX9B-EM34	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, EquipDOE, Revs DOE per M7-EN-3006	07-Sep-23	07-Sep-23		37	1	TEPS	
226	**Substation - NX-9 Pre NX9-DOE**		30-May-24	30-May-24		6	1		
227	NX9501	Scheduler - Send Email for 48Hrs Notification before DOE. (Tie SS to Beginning of NX9 Outage)	30-May-24	30-May-24		6	1	TEPS	
228	**Substation - NX-9 Post NX9-DOE/ISD**		03-Jun-24	12-Jun-24		115	8		
229	NX9FINAL11	Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or ISD)	03-Jun-24	05-Jun-24		115	3	PM	
230	NX9B200	Scheduler - Has 72 Hrs to Put in Service the NX-9 and Send to TOP Director in NURS after DOE/PM Note of Completion	05-Jun-24	05-Jun-24		115	1	TEPS	
231	NX9FINAL21	[If Required] Receive + Issue Final Affirmed NX-9 Data to NURS	06-Jun-24	12-Jun-24		115	5	ENG.Al	
232	**Electrical Engineering IFC Design**		24-Jul-23	11-Sep-23		-56	35		
233	EE1300	Vendor Engineer Develop Electrical/P&C Substation IFC	24-Jul-23	25-Aug-23	7	-56	25	ENG.S	
234	EE1310	ES Engineering Review Electrical/P&C Substation IFC	28-Aug-23	11-Sep-23	7	-56	10	ENG.S	
235	**Transformer- Vendor Drawings with Schematics**		23-Feb-23 A	01-Sep-23		305	36		
236	TRANS-1160	TRANS-Vendor Submits Firm Transformer Drawings & Schematics	23-Feb-23 A	01-Sep-23		305	36	ENG.S	

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
237	**P&C Engineering**		24-Apr-23 A	21-Nov-23		35	153		
238	**P&C Engineering Detailed Design**		24-Apr-23 A	01-Sep-23		35	98		
239	PC1100	Vendor Engineer Develop P&C Detail Design	24-Apr-23 A	28-Jul-23		-35	27	ENG.S	
240	PC1110	ES Engineering Review P&C Detail Design	31-Jul-23	11-Aug-23		-35	10	ENG.S	
241	PC1320	Vendor Engineer Creates SDS	14-Aug-23	25-Aug-23		35	10	ENG.S	
242	PC1330	ES Engineering Reviews and Issues SDS	28-Aug-23	01-Sep-23		35	5	ENG.S	
243	**P&C Engineering Pre-IFC Design**		28-Aug-23	01-Sep-23		61	5		
244	CSD1030	PE Initiate CASCADE Forms (Appendix A) for Construction Package	28-Aug-23	01-Sep-23		61	5	ENG.S	
245	**P&C Relay Settings Development**		05-Sep-23	02-Oct-23		70	20		
246	PC1400	Complete P&C Relay Settings	05-Sep-23	02-Oct-23		70	20	ENG.S	
247	**P&C DFR Design**		24-Jul-23	21-Nov-23		35	85		
248	DFR1060	DFR Pts Identified		24-Jul-23		65	0	ENG.S	
249	DFR1040	Verify CASCADE Forms Exists for S/S DFR, if not then Initiate Form	05-Sep-23	05-Sep-23		35	0	ENG.S	
250	DFR1000	Verify DFR Calibration is Required	05-Sep-23	05-Sep-23		35	1	ENG.S	
251	DFR1010	P&C Prepare Configuration for DFRs	02-Nov-23	08-Nov-23		35	5	ENG.S	
252	DFR1020	Peer Review and Comment DFR Configuration	09-Nov-23	15-Nov-23		35	5	ENG.S	
253	DFR1030	P&C Issue Configuration For DFR	16-Nov-23	20-Nov-23		35	3	ENG.S	
254	DFR1050	DFR Config Complete	21-Nov-23	21-Nov-23		35	1	ENG.S	
255	**Lead Commissioning Engineer**		24-Jul-23	26-Sep-23		0	46		
256	LCE100	PM to Request Lead Commissioning Engineer GO/NO-GO {Preliminary or Detail design is often the predecessor}	24-Jul-23	25-Jul-23		0	2	PM	
257	LCE200	Assign Lead Commissioning Engineer	26-Jul-23	27-Jul-23		0	2	ENG.S	
258	**LCE Commissioning Plan**		28-Jul-23	26-Sep-23		0	42		
259	LCE400	Develop Test and Commissioning Plan	28-Jul-23	25-Aug-23		0	21	TEST	
260	LCE500	LCE Review and Approve Vendor's Test and Commissioning Plan	28-Aug-23	26-Sep-23		0	21	ENG.S	
261	**PROCUREMENT LONG LEAD MATERIAL**		30-Nov-22 A	11-Aug-24		74	364		
262	MatExcep10	Material Exemption Form assembled and submitted - Form 2	01-May-23 A	03-Jul-23	1	-194	30	ENG.S	
263	**Civil Long Lead Material**		05-Jul-23	30-Dec-23		-62	124		
264	**Conduit**		07-Jul-23	11-Sep-23		14	46		
265	MTRL08	CONDUIT - Prepare & Issue DR	07-Jul-23	20-Jul-23		13	10	ENG.S	
266	MTRL09	CONDUIT - Procurement Issue PO	21-Jul-23	04-Aug-23		19	15	PURC	
267	MTRL10	CONDUIT - Material Vendor Delivery Leadtime	05-Aug-23	01-Sep-23		19	28	MTRLH	
268	MTRL20	CONDUIT - Confirm Material Delivery to Site	02-Sep-23	11-Sep-23		19	10	MTRLH	
269	**Anchor Bolts**		05-Jul-23	21-Oct-23		-14	76		
270	MTRL38	ANCHOR BOLTS - Prepare & Issue DR	05-Jul-23	18-Jul-23		-14	10	ENG.S	
271	MTRL39	ANCHOR BOLTS - Procurement Issue PO	19-Jul-23	02-Aug-23		-21	15	PURC	
272	MTRL40	ANCHOR BOLTS - Material Vendor Delivery Leadtime	03-Aug-23	11-Oct-23		-21	70	MTRLH	
273	MTRL50	ANCHOR BOLTS- Confirm Material Delivery to Site	12-Oct-23	21-Oct-23		-21	10	MTRLH	
274	**Cable Trench**		05-Jul-23	30-Dec-23		-62	124		
275	MTRL58	CABLE TRENCH - Prepare & Issue DR	05-Jul-23	18-Jul-23	6	-63	10	ENG.S	
276	MTRL59	CABLE TRENCH - Procurement Issue PO	19-Jul-23	02-Aug-23	6	-91	15	PURC	
277	MTRL60	CABLE TRENCH - Material Vendor Delivery Leadtime	03-Aug-23	20-Dec-23	6	-91	140	MTRLH	
278	MTRL70	CABLE TRENCH - Confirm Material Delivery to Site	21-Dec-23	30-Dec-23	6	-91	10	MTRLH	
279	**Electrical Long Lead Material**		30-Nov-22 A	11-Aug-24		74	364		
280	**TRANSFORMER**		30-Nov-22 A	29-Feb-24		188	276		
281	TRANS-550	TRANS - Prepare & Issue LNTP for Vendor Dwgs. & Schematics (if Needed Check with SME)	05-Sep-23	11-Sep-23		305	5	ENG.S	
282	TRANS-560	TRANS - Transformer - Material Vendor Delivery Leadtime	30-Nov-22 A	28-Feb-24		-1	401	MTRLH	
283	TRANS-570	TRANS - Transformer - Confirm Material Delivery to Site	29-Feb-24	29-Feb-24		-1	1	MTRLH	
284	**Control Cable**		05-Jul-23	13-Apr-24		-113	196		

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
285	MTRL350	CONTROL CABLE - Prepare & Issue DR	05-Jul-23	18-Jul-23	4	-114	10	ENG.S	[redacted]
286	MTRL360	CONTROL CABLE - Procurement Issue PO	19-Jul-23	02-Aug-23	4	-165	15	PURC	
287	MTRL380	CONTROL CABLE - Material Vendor Delivery Leadtime	03-Aug-23	03-Apr-24	4	-165	245	MTRLH	
288	MTRL385	CONTROL CABLE - Confirm Material Delivery to Site	04-Apr-24	13-Apr-24	4	-165	10	MTRLH	
289	**SSVT**		05-Jul-23	06-Jul-24		-171	254		
290	MTRL100	SSVT - Prepare & Issue DR	05-Jul-23	18-Jul-23	2	-170	10	ENG.S	
291	MTRL110	SSVT - Procurement Issue PO	19-Jul-23	02-Aug-23	2	-249	15	PURC	
292	MTRL130	SSVT - Material Vendor Delivery Leadtime	03-Aug-23	26-Jun-24	2	-249	329	MTRLH	
293	MTRL135	SSVT - Confirm Material Delivery to Site	27-Jun-24	06-Jul-24	2	-249	10	MTRLH	
294	**High Side MOD**		11-Apr-23 A	23-Oct-23		-23	184		
295	MTRL945	HIGH SIDE MOD - Material Vendor Delivery Leadtime	11-Apr-23 A	22-Oct-23		-23	154	MTRLH	
296	MTRL950	HIGH SIDE MOD - Confirm Material Delivery to Site	23-Oct-23	23-Oct-23		-23	1	MTRLH	
297	**High Side Circuit Switches**		07-Apr-23 A	17-Apr-24		-169	361		
298	MTRL165	HIGH SIDE CIRCUIT SWITCHES - Material Vendor Delivery Leadtime	07-Apr-23 A	07-Apr-24	3	-169	322	MTRLH	
299	MTRL170	HIGH SIDE CIRCUIT SWITCHES - Confirm Material Delivery to Site	08-Apr-24	17-Apr-24	3	-169	10	MTRLH	
300	**Low Side Switches**		07-Apr-23 A	20-Sep-23		10	154		
301	MTRL230	LOW SIDE DISCONNECT SWITCHES - Material Vendor Delivery Leadtime	07-Apr-23 A	10-Sep-23		10	154	MTRLH	
302	MTRL231	LOW SIDE DISCONNECT SWITCHES - Confirm Material Delivery to Site	11-Sep-23	20-Sep-23		10	10	MTRLH	
303	**Circuit Breakers**		06-Feb-23 A	20-Dec-23		-35	203		
304	MTRL250	CIRCUIT BREAKERS - Prepare & Issue DR to BCS	07-Jul-23	20-Jul-23		64	10	ENG.S	
305	MTRL280	CIRCUIT BREAKERS - Material Vendor Delivery Leadtime	06-Feb-23 A	10-Dec-23		-50	280	MTRLH	
306	MTRL281	CIRCUIT BREAKERS - Confirm Material Delivery to Site	11-Dec-23	20-Dec-23		-50	10	MTRLH	
307	**Bus**		05-Jul-23	24-Feb-24		-78	161		
308	MTRL298	BUS - Prepare & Issue DR	05-Jul-23	18-Jul-23	5	-80	10	ENG.S	
309	MTRL299	BUS - Procurement Issue PO	19-Jul-23	02-Aug-23	5	-116	15	PURC	
310	MTRL300	BUS - Material Vendor Delivery Leadtime	03-Aug-23	14-Feb-24	5	-116	196	MTRLH	
311	MTRL310	BUS - Confirm Material Delivery to Site	15-Feb-24	24-Feb-24	5	-116	10	MTRLH	
312	**Insulators**		05-Jul-23	30-Dec-23		-41	124		
313	MTRL398	INSULATORS - Prepare & Issue DR	05-Jul-23	18-Jul-23		-40	10	ENG.S	
314	MTRL399	INSULATORS - Procurement Issue PO	19-Jul-23	02-Aug-23		-60	15	PURC	
315	MTRL400	INSULATORS - Material Vendor Delivery Leadtime	03-Aug-23	20-Dec-23		-60	140	MTRLH	
316	MTRL410	INSULATORS - Confirm Material Delivery to Site	21-Dec-23	30-Dec-23		-60	10	MTRLH	
317	**Firewall**		05-Jul-23	11-Aug-24		-196	279		
318	MTRL498	FIREWALL - Prepare & Issue DR	05-Jul-23	18-Jul-23	1	-194	10	ENG.S	
319	MTRL499	FIREWALL - Procurement Issue PO	19-Jul-23	02-Aug-23	1	-285	15	PURC	
320	MTRL500	FIREWALL - Material Vendor Delivery Leadtime	03-Aug-23	01-Aug-24	1	-285	365	MTRLH	
321	MTRL510	FIREWALL - Confirm Material Delivery to Site	02-Aug-24	11-Aug-24	1	-285	10	MTRLH	
322	**Form 6 Reclosers**		05-Apr-23 A	30-Sep-23		31	266		
323	MTRL600	(2) FORM 6 RECLOSERS - Material Vendor Delivery Leadtime - DR 646607	05-Apr-23 A	29-Sep-23		31	266	MTRLH	
324	MTRL610	FORM 6 RECLOSERS - Confirm Material Delivery to Site	30-Sep-23	30-Sep-23		31	1	MTRLH	
325	**Disconnect Switches**		07-Apr-23 A	11-Sep-23		19	154		
326	MTRL710	DISCONNECT SWITCHES - Material Vendor Delivery Leadtime	07-Apr-23 A	10-Sep-23		19	154	MTRLH	
327	MTRL720	DISCONNECT SWITCHES - Confirm Material Delivery to Site	11-Sep-23	11-Sep-23		19	1	MTRLH	
328	**SEL Relays**		05-Jul-23	07-Dec-23		-26	109		
329	MTRL808	SEL RELAYS - Prepare & Issue DR	05-Jul-23	18-Jul-23		-26	10	ENG.S	
330	MTRL809	SEL RELAYS - Procurement Issue PO	19-Jul-23	02-Aug-23		-37	15	PURC	
331	MTRL810	SEL RELAYS - Material Vendor Delivery Leadtime	03-Aug-23	06-Dec-23		-37	126	MTRLH	
332	MTRL880	SEL RELAYS - Confirm Material Delivery to Site	07-Dec-23	07-Dec-23		-37	1	MTRLH	

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
333	**Plug N Play**		05-Jul-23	21-Dec-23		-36	119		
334	MTRL908	PLUG N PLAY - Prepare & Issue DR	05-Jul-23	18-Jul-23		-35	10	ENG.S	
335	MTRL909	PLUG N PLAY - Procurement Issue PO	19-Jul-23	02-Aug-23		-51	15	PURC	
336	MTRL910	PLUG N PLAY - Material Vendor Delivery Leadtime	03-Aug-23	20-Dec-23		-51	140	MTRLH	
337	MTRL911	PLUG N PLAY - Confirm Material Delivery to Site	21-Dec-23	21-Dec-23		-51	1	MTRLH	
338	**Cable for TEMP TRANSFORMER**		05-Jul-23	21-Dec-23		14	119		
339	MTRL918	TMP XRMR CABLE - Prepare & Issue DR	05-Jul-23	18-Jul-23		18	10	ENG.S	
340	MTRL919	TMP XRMR CABLE - Procurement Issue PO	19-Jul-23	02-Aug-23		24	15	PURC	
341	MTRL920	TMP XRMR CABLE - Material Vendor Delivery Leadtime	03-Aug-23	20-Dec-23		24	140	MTRLH	
342	MTRL930	TMP XRMR CABLE - Confirm Material Delivery to Site	21-Dec-23	21-Dec-23		24	1	MTRLH	
343	**PROCUREMENT MATERIAL - BALANCE OF MATERIAL**		14-Aug-23	06-Oct-23		66	39		
344	**Civil Balance of Material**		14-Aug-23	28-Sep-23		1	33		
345	CE500	MATERIAL - CIVIL - Prepare & Issue DR	14-Aug-23	18-Aug-23		0	5	ENG.S	
346	CE600	Civil (BG) Material Ordered	14-Aug-23	18-Aug-23		8	5	ENG.S	
347	CE1040	MATERIAL - CIVIL - Procurement Issue PO	19-Aug-23	28-Aug-23		2	10	PURC	
348	CE1050	MATERIAL - CIVIL - Material Vendor Delivery Leadtime	29-Aug-23	27-Sep-23		2	30	MTRLH	
349	CE560	MATERIAL - CIVIL - Confirm Material Delivery to Site	28-Sep-23	28-Sep-23		2	1	MTRLH	
350	**Electrical Balance of Material**		14-Aug-23	06-Oct-23		-5	39		
351	EE520	MATERIAL - Electrical - Prepare & Issue DR	14-Aug-23	18-Aug-23		-5	5	ENG.S	
352	EE1020	MATERIAL - Electrical - Procurement Issue PO	19-Aug-23	28-Aug-23		-5	10	PURC	
353	EE590	Electrical (AG) Material Ordered	29-Aug-23	05-Sep-23		-3	5	ENG.S	
354	EE1030	MATERIAL - Electrical - Material Vendor Delivery Leadtime	06-Sep-23	05-Oct-23		-6	30	MTRLH	
355	EE550	MATERIAL - Electrical - Confirm Material Delivery to Site	06-Oct-23	06-Oct-23		-6	1	MTRLH	
356	**P&C Balance of Material**		14-Aug-23	02-Oct-23		70	35		
357	PC510	MATERIAL - P&C - Prepare & Issue DR	14-Aug-23	18-Aug-23		71	5	ENG.S	
358	PC980	MATERIAL - P&C - Procurement Issue PO	21-Aug-23	01-Sep-23		71	10	PURC	
359	PC1000	MATERIAL - P&C - Material Vendor Delivery Leadtime	02-Sep-23	01-Oct-23		104	30	MTRLH	
360	PC1010	MATERIAL - P&C - Confirm Material Delivery to Site	02-Oct-23	02-Oct-23		104	1	MTRLH	
361	**PROCUREMENT OF SERVICE CONTRACTS**		19-Jun-23	06-Dec-23		-49	119		
362	**Constructor of Choice - Direct Award or Bid**		12-Sep-23	06-Dec-23		-56	60		
363	**CONSTRUCTION SERVICES - CONTRACTOR OF CHOICE - CIVIL**		12-Sep-23	31-Oct-23		-31	35		
364	3390	CONST.SERVICES - COC - Eversource Provides Spec / RFQ to COC	12-Sep-23	18-Sep-23		-31	5	PURC	
365	3400	CONST.SERVICES - COC - COC Evaluates Spec and Provides Quote	19-Sep-23	02-Oct-23		-31	10	CONTR	
366	3410	CONST.SERVICES - COC - Eversource Reviews Quote from COC	03-Oct-23	17-Oct-23		-31	10	ENG.E	
367	3420	CONST.SERVICES - COC - Eversource Awards Contract - PO Issued	18-Oct-23	31-Oct-23		-31	10	PURC	
368	**CONSTRUCTION SERVICES - BID PROCESS - CIVIL**		12-Sep-23	06-Dec-23		-56	60		
369	3430	CONST.SERVICES - BID - Eversource provide Spec / RFP	12-Sep-23	02-Oct-23	7	-56	15	PURC	
370	3440	CONST.SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	03-Oct-23	24-Oct-23	7	-56	15	CONS	
371	3450	CONST.SERVICES - BID - Eversource reviews contractor proposals	25-Oct-23	14-Nov-23	7	-56	15	ENG.E	
372	3460	CONST.SERVICES - BID - Contract is Awarded - PO Issued	15-Nov-23	06-Dec-23	7	-56	15	PURC	
373	**Testing Service - Direct Award or Bid**		19-Jun-23	06-Sep-23		14	56		
374	1010	STAFFING DECISION:TEST:EVERSOURCE OR OUTSOURCE BID/COC	19-Jun-23	19-Jun-23		14	1	PM	
375	**TEST SERVICES - CONTRACTOR OF CHOICE**		20-Jun-23	08-Aug-23		27	35		
376	TSCOC100	TEST SERVICES - COC - Eversource Provides Spec / RFQ to COC	20-Jun-23	26-Jun-23		27	5	PURC	
377	TSCOC200	TEST SERVICES - COC - COC Evaluates Spec and Provides Quote	27-Jun-23	11-Jul-23		27	10	PURC	
378	TSCOC300	TEST SERVICES - COC - Eversource Reviews Quote from COC	12-Jul-23	25-Jul-23		27	10	PURC	
379	TSCOC400	TEST SERVICES - COC - Eversource Awards Contract - PO Issued	26-Jul-23	08-Aug-23		27	10	PURC	

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
380	**TEST SERVICES - BID PROCESS**		20-Jun-23	06-Sep-23		14	55		[redacted]
381	TSBID100	TEST SERVICES - BID - Eversource provide Spec / RFP	20-Jun-23	11-Jul-23		14	15	PURC	
382	TSBID200	TEST SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	12-Jul-23	01-Aug-23		14	15	PURC	
383	TSBID300	TEST SERVICES - BID - Eversource reviews contractor proposals	02-Aug-23	15-Aug-23		14	10	PURC	
384	TSBID400	TEST SERVICES - BID - Eversource awards contract - PO Issued	16-Aug-23	06-Sep-23		14	15	PURC	
385	**CONSTRUCTION**		01-Oct-23	31-Jul-24		0	210		
386	**Outages**		01-Nov-23	31-May-24		10	213		
387	CSM	Construction Start Milestone	01-Nov-23			30	0	CONS	
388	TOA-Const	OUTAGE 1 Install Cables	01-Nov-23	04-Nov-23		219	4	CONS	
389	TOA-Const10	OUTAGE 2 Remove Bus from service/690 from NY	01-Nov-23	10-Nov-23		213	10	CONS	
390	TOA-Const20	OUTAGE 3 Energize Mobile	15-Jan-24	19-Jan-24		143	5	CONS	
391	TOA-Test	OUTAGE / Test Swithgear	29-Feb-24	03-Mar-24		99	4	TEST	
392	TOA-Const30	OUTAGE 4 Energize 1X	29-Feb-24	04-Mar-24		98	5	CONS	
393	CFM	Construction Finish Milestone		31-May-24		10	0	CONS	
394	ISD	EQUIPMENT IN SERVICE DATE (requires FOOB constraint)		31-May-24*		0	0	PM	
395	**Construction Support LOEs**		01-Nov-23	31-May-24		10	213		
396	1070	RESOURCE ONLY ACTIVITY - CONSTRUCTION - CIVIL	01-Nov-23	01-Nov-23		222	1	CONS	
397	ConRep-S	RESOURCE ONLY ACTIVITY - CONSTRUCTION - CONSTRUCTION REP	01-Nov-23	31-May-24		10	213	CONS	
398	CONSTelec	RESOURCE ONLY ACTIVITY - CONSTRUCTION - ELECTRICIAN	01-Nov-23	31-May-24		10	213	CONS	
399	**Site Development**		01-Oct-23	17-Apr-24		54	200		
400	1120	Construction - Civil	01-Oct-23	17-Apr-24		54	200	CONS	
401	**Substation Construction**		01-Oct-23	31-Jul-24		0	210		
402	1130	Construction - Electrical	01-Oct-23	31-May-24		10	244	CONS	
403	**Temporary Transformer**		01-Dec-23	31-Jul-24		0	168		
404	A3620	Prep Mobile XFMR and mobile circuit switcher - 66MX 25MVA mobile XFMR	02-Jan-24*	13-Feb-24		0	30	CONS	
405	A3630	21J - 1X out of service and pour new foundation	14-Feb-24	21-Feb-24		42	5	CONS	
406	A3650	New 21J -1X on Site	22-Feb-24	10-Apr-24		42	35	CONS	
407	A3625	Mobile XFMR and mobile circuit switcher on site	01-Dec-23*	31-Jul-24		0	168	CONS	
408	**P&C Construction**		02-Jan-24	24-Jan-24		0	23		
409	3660	Construction - P&C Implement Relay Settings 1X	02-Jan-24*	11-Jan-24		0	10	CONS	
410	1140	Construction - P&C Implement Relay Settings Mobile	15-Jan-24*	24-Jan-24		0	10	CONS	
411	**Telecomm Construction**		02-Jan-24	31-May-24		0	151		
412	1150	Construction - Field Communications 1-X	02-Jan-24*	31-May-24		0	151	CONS	
413	**TEST & COMMISSIONING**		27-Sep-23	31-May-24		0	171		
414	**Testing Activities**		27-Sep-23	31-May-24		0	171		
415	LCE310	Mobilize LCE Prior to Construction	27-Sep-23*	01-Oct-23		0	5	ENG.S	
416	LCE320	Mobilize Testing Vendor Prior to Construction	27-Sep-23*	01-Oct-23		0	5	TEST	
417	LCE610	LCE Oversee Execution of Test and Commissioning Plan	02-Oct-23	31-May-24		0	168	ENG.S	
418	LCE620	Execute Test and Commissioning Plan	02-Oct-23	31-May-24		0	168	TEST	
419	**PROJECT CLOSE OUT**		01-Jun-24	26-Nov-24		0	123		
420	**Civil Close Out**		10-Jun-24	18-Nov-24		6	112		
421	CV1000	Prepare Civil Field Mark Ups (Tie after Last Civil Construction Activity)	10-Jun-24	09-Jul-24		6	21	ENG.E	
422	CV1100	Eversource Engineering Prepares & Sends Civil Field Mark Up Packge to Vendor	10-Jul-24	16-Jul-24		6	5	ENG.S	
423	1110	Restore / Remediate Site	01-Aug-24	14-Aug-24		71	10	CONS	
424	CV1200	Vendor Engineering Verifies Civil Mark Ups and Updates As-Built Drawing Package. Submits Final Package to ES	17-Jul-24	27-Aug-24		6	30	ENG.S	
425	CV1300	Eversource Engineering Verifies Quality of Submitted Civil Drawings	28-Aug-24	25-Sep-24		6	20	ENG.S	

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#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
426	CV1400	ES Create Civil Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	26-Sep-24	02-Oct-24		6	5	ENG.S	[redacted]
427	PM1000	PM to Document Civil As-Built Drawings Complete	03-Oct-24	03-Oct-24		6	1	PM	
428	CV1500	FE Files Civil Design Drawings at Station	04-Oct-24	18-Nov-24		6	30	ENG.E	
429	**Electrical Close Out**		18-Jun-24	26-Nov-24		0	112		
430	EV1000	Prepare Electrical Field Mark Ups	18-Jun-24	17-Jul-24		0	21	ENG.E	
431	EV1100	Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor	18-Jul-24	24-Jul-24		0	5	ENG.S	
432	EV1200	Vendor Engineering Verifies Electrical Mark Ups and Updates As-Built Drawing Package. Submits Final Package to ES	25-Jul-24	05-Sep-24		0	30	ENG.S	
433	EV1300	Eversource Engineering Verifies Quality of Submitted Electrical Drawings	06-Sep-24	03-Oct-24		0	20	ENG.S	
434	EV1400	Electrical Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	04-Oct-24	10-Oct-24		0	5	ENG.S	
435	PM1100	PM to Document Electrical As-Built Drawings Complete (Electrical & P&C)	11-Oct-24	11-Oct-24		0	1	PM	
436	EV1500	FE Files Substation Design Drawings at Station	15-Oct-24	26-Nov-24		0	30	ENG.E	
437	**P&C Close Out**		18-Jun-24	26-Nov-24		0	112		
438	PC8000	Prepare P&C Field Mark Ups	18-Jun-24	17-Jul-24		0	21	ENG.E	
439	PC1111	Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor	18-Jul-24	24-Jul-24		0	5	ENG.S	
440	PC1200	Vendor Engineering Verifies P&C Mark Ups and Updates As-Built Drawing Package. Submits Final Package to ES	25-Jul-24	05-Sep-24		0	30	ENG.S	
441	PC1300	Eversource Engineering Verifies Quality of Submitted P&C Drawings	06-Sep-24	03-Oct-24		0	20	ENG.S	
442	PC1411	P&C Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	04-Oct-24	10-Oct-24		0	5	ENG.S	
443	PC8500	FE Files P&C Design Drawings at Station	15-Oct-24	26-Nov-24		0	30	ENG.E	
444	**LCE Closeout**		01-Jun-24	17-Jun-24		0	11		
445	LCE700	LCE Ensure Test Group Prepare Electrical Field Mark Ups	01-Jun-24	01-Jun-24		1	1	ENG.S	
446	LCE800	LCE Ensures Marked up Prints Ready for Pick-up	03-Jun-24	03-Jun-24		0	1	ENG.S	
447	LCE900	LCE Review Test Data and Issue Commissioning Report	04-Jun-24	17-Jun-24		0	10	ENG.S	
448	**Work Order / Financial Close Out**		03-Jun-24	23-Jul-24		87	36		
449	1020	Cost Analyst Prepares FINAL Units of Property	03-Jun-24	15-Jul-24		93	30	COST	
450	1030	Asset Management Complete Asset Update(s) in CASCADE	11-Jun-24	23-Jul-24		87	30	ENG.A	
451	**Project Management Close Out**		01-Jun-24	26-Nov-24		0	123		
452	TD1100	Complete TD-707 Turnover Document / Forward to SOC & Mailing List	03-Jun-24	07-Jun-24		6	5	CONS	
453	1260	Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD)	01-Jun-24	10-Jun-24		126	10	CONS	
454	1040	PM Prepares Closeout Documentation, Lessons Learned Meeting, etc.	03-Jun-24	15-Jul-24		92	30	PM	
455	1270	Prepare TD-707 Document	03-Jun-24	15-Jul-24		93	30	PM	
456	FINISH	Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE)		26-Nov-24		0	0	PM	

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EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

Project Title: [redacted] – 1X Transformer Replacement	☐	Prior Constructability Review Performed?
	☐	Program Related Site Specific Review?
Project Numbers(s): CS00533	**Project Constructability Phase:**	
Date(s) of Constructability Review: **02/02/2023** Click to enter a date	☐ Conceptual Engineering Design ☒ Preliminary Engineering Design ☐ Detailed Engineering Design	

Project Scope Statement:
Replace the existing 13MVA 69kV-13.2kV transformer 21J-1X at the [redacted] substation at [redacted]. in Salisbury, CT with a new Eversource standard 40MVA 115/69kV-13.2kV transformer.

Department Review/Walkdown Attendees*:

Required [X]	Attended [X]	Department	Name	Required [X]	Attended [X]	Department	Name
☐	☒	Project Management	[redacted]	☐	☒	S/S Engineering	[redacted]
☐	☐	Asset Management		☐	☒	P&C Engineering	
☐	☒	Constr. Management		☐	☐	Civil Engineering	
☐	☐	S/S Technical / LCE		☐	☐	Telecom	
☐	☒	S/S Operations**		☐	☐	Environmental	
☐	☒	Field Engineering		☐	☐	Real Estate	
☐	☐	Line Engineering		☐	☐	ROW T&D Rights & Survey	
☐	☐	Vegetation Management		☐	☐	Survey Engineering	
☐	☐	Siting		☐	☐	Cost Estimating	
☐	☐	Safety		☐	☐	Project Services (Outreach)	
☐	☐	SCADA		☐	☐	Material Procurement	

*** Sign-off in the table above for the Detailed Engineering Design Constructability Review indicates that all Action Items/Concerns from prior Constructability Reviews have been mitigated/resolved as documented in this form. Not every department is required to attend walkdowns for every project but should be consulted for project impact considerations**

** Internal Eversource Substation Operations must be included in the review even if external construction resources are planned

[Project Manager] certifies that this review was performed to completeness, that all applicable departments were informed of the project and have had opportunity to provide input to this review:

Name/Signature [redacted] Date 2/2/2023 and 5/5/2023

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

Documents available for use prior to Constructability Review					
[X]	Document	[X]	Document	[X]	Document
☐	Initial Scope -Birdseye site plan -General Arrangement	☐	Preliminary Drawings -Civil Site Drawing -Electrical Drawing -Section Drawings	☐	Prints in hand for marking up -Panel Front/Read View -Control Enclosure Layout -Floor / Wall Plans
☐	Detailed Scope Document	☒	Proposed Schedule	☐	Construction Sequence/Timeline
☐	Previous Notes / Comments / Observations	☒	Major Material / Equipment List	☐	Replace / Reuse of equipment

Action Items and Resolutions:

Item No.	Const. Review Action Item/Concern	Design Resolution/Mitigation:
1	MAD cannot be maintained when installing new XFMR high side circuit switcher combo as previously planned.	Duration of 667 line outage needs to be requested such that it supports installation of new bus pipes support structure and new CS combo and supporting structure.
2	MAD cannot be maintained when installing new mobile position MOD. MAD cannot be maintained when installing mobile circuit switcher under existing high side XFMR conductors as previously planned.	Mobile position MOD needs to be constructed in front of 690 line. New bus support structures, bus A-frames and pipes will be required. Both mobile circuit switcher and mobile XFMR will be in "2X" position.
3	Temporary 4-pole arrangement which will allow to de-energize the low side/replacement of low side disconnect switches and reclosers needs to be relocated to allow access to the back of the SS.	Change the design to 5-poles carrying (2) reclosers, (3) PT's, (3) SSVT's and relocate this pole arrangement parallel to the West fence and route the low side cables directly to MH1.
4	CMU block (acoustic?) walls near the feeder disconnect switches are deteriorating. Walls should be either repaired, or removed.	Engineering will determine whether these walls can be removed. It appears they were constructed near the the equipment foundations which no longer contain any equipment (formerly occupied by 3-phase voltage controllers per feeder circuit, SS Eng to confirm).
5		

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
A	**Engineering & Asset Management**		

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
1	**Scope of Work** - Is scope adequately developed and sufficiently detailed for intended deliverable? - Any complimentary projects or other adjacent obsolete equipment for inclusion? - Any overlapping projects that could impact work/outages? - Consider Physical Installation, P&C Scope, Civil Scope, Engineering studies, Design standard adherence - Any remote station impacts? - Engineering Estimates for Design and Technical Support? (EE and EOC) Total Project	☐	Scope of work was substantially revised. Engineering vendor will submit final Preliminary Des Package. Submittal of Detail Engineering package will have to be adjusted.
2	**Materials Identified/Ordered** -Any concerns with BOM/Major Materials? Review BOM lead times and project need dates -Specialty Major Materials: Identify Specialty Equipment & Materials potentials - temporary/replacement - long lead items? -Any Materials needed to facilitate construction access?	☐	Major materials were identified, Material Exception Form approved and Pos for the major material were placed. The remaining SS and P&C material lead times remain to be a concern.
3	**Control House** - Review Unmapped equipment interferences, Control/Battery Enclosure Layout, HVAC System (if equipment added), space for new or modified equipment, AC / DC station breaker availability and service loading, Panel Space, Expansion, one-line and/or riser type panelboard drawings, other..	☐	No concerns at this time.
4	**Ratings & Dimensions** for Major Equipment. Any concerns upon field review? Equipment Rating One Line (and/or equipment thermal ratings tables) - Review for any errors in field	☐	N/A

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
5	**Wall, Fence, Gate, and Foundation Considerations** -Any permanent / temporary alterations or relocations required? -Pre-Project Sound Measurements Needed? Sound Walls? -Take measurements for Foundation quantities, dimensions and concrete volumes -CIP Review/Ballistic needs. Any Physical Security Requirement Consideration? -Assess condition of existing yard equipment foundations and viability for reuse (if proposed) -Review station expansion areas (if needed) for structures, old foundations, etc. -Any Steel Structural Plan Considerations? -Any impacts to construction plan?	☐	Permanent relocation of the SS fence on the North side is required. Project team met with the abutter on 5/5/23. Abutter requested the addition of solid panels instead of the traditional chain link fence along the North side of the SS. Project team will follow up on the abutter's request.
6	**Below Grade / Enclosure Raceway** - If possible, evaluate existing raceway and review spacing requirements. Review for any subsurface investigation needs or potential below grade obstructions. GPR/test pits needed? Geotechnical Investigation - is soil boring or resistivity investigation needed?	☐	Exploratory excavations will be conducted during Detail Design Engineering Phase.
7	**Underground Obstructions** -Drawing review concerns? -Is preconstruction or test excavation needed? -Is reuse of underground control cables / Conduits /replace Non-Shielded Cable feasible (if applicable) -Are spare conduits available? Are they useable? -Review if any areas will need to be plated for increased load bearing for equipment access (i.e., large Xfmr, etc.)	☐	Exploratory excavations will be conducted during Detail Design Engineering Phase.
8	**Grounding Plan (Ground Grid)** - Will footprint impact layout or other equipment? Identify locations to improve grounding. Impacts to foundations and ground grid plans. Observations on wetlands or ability to perform tests	☐	Grounding will have to be extended along the North side of the SS, in the 15ft expandedsection.

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Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
9	Nomenclature / Switching One-Line Diagram -Any obvious deviations from diagrams provided?	☐	Nomenclature dwgs were substantially revised to show the new XFMR in 3X position and mobile MOD connected to/in front of 690 bus.
10	BPS Separation Requirements - Is this BPS Substation? Y/N (part of PAF) - Changes to pre-existing BPS standards?	☐	N/A
11	IEC 61850 Substation Automation and Communication Requirements - Any Impacts/Retrofit needed?	☐	N/A
12	Any Upgrades to ES Standards - Is retrofit needed to bring up to ES standards? Can that be done?	☐	Oil filled reclosers and disconnect switches will be replaced.
B	**Construction**		
1	**Any safety hazards specific to the facility? i.e., Low Bus, Deterioration, etc.**	☐	Dead trees to the North of the Substation. The dead trees having potential to reach the SS security fence should be removed. Acoustic walls near the feeder disconnect switches are deteriorating and should be either repaired, or removed.
2	**Prior known Site Specific Conditions** -Common or Obvious station Issues -Missing scope items that could impact costs?	☐	None identified.
3	**Identify/Consider Required Depts for Construction?** -Who is constructor: Internal vs External Resources -S/S Ops, GO, Test, Field Engineering, etc. -Specialty Contractors Required? -Required Oversite Needed - Estimated level of CR and LCE support needed	☐	Civil Construction – Contractor Electrical Construction – Contractor Test – Contractor LCE - Contractor

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Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
4	**Site Plan, Access, and Temporary Construction Facilities:** -Confirm maintenance access for proposed new or replaced equipment -Verify clear footprint for yard equipment / Property Plan -General access to site, can areas outside substation be utilized? -Substation Entry Plan (driveway and drive path modifications) - Identification of Unique Requirements, i.e. (access bridges, station service, etc.) -Site Development Plan (grading and drainage) with Cut/Fill -Existing Rock Conditions? Potential Impacts (rock quantity)? -Any police details needed for deliveries, restricted hours, and/or need for extended hour approvals -Any Sanitary Civil Requirements? (Septic tanks, etc.) -Review turning radius for delivery trucks (if critical) -Any Substation Access and site/yard access Limitations? -Office Trailer Needs: Facilities, Utilities, Restroom, Container, Dumpster Space -Weather impacts to Site (Snow Placement) -Identify Material Laydown and Security -Where will new vs removed equipment go? -Construction permit for trailers outside substation fence?	☐	Permanent relocation of the SS fence on the North side is required. Sensitive abutter to the North. Work hours need to be adhered to. Limit early AM, late PM and weekend work to the extent possible. No parking along the SS access road (sensitive abutter). Site office trailers and portable restrooms will be required. Parking and dumpster space behind the SS (to the East) is sufficient.
5	Unique Equipment Considerations: Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser		N/A

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Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
6	**Outage & Energization Plan and Construction Sequence:** *Review electrical working clearances for equipment during construction, Detailed look at protection zone changes, Locked sequence or random outages, Outage durations minimized.* ***Considerations:*** -Approach Distances – Outage Requirements to maintain electrical clearances throughout proposed installation -Distribution Clearances -Clearance Holder Assignments -Drawings vs Field Conditions -Outage boundaries and interconnections -Phased approach needs for additional mobilizations -Verify outage sequence supports the planned construction sequence and timeline. (Lead Commissioning Engineer "LCE", Substation Operations, and Outage Planner input) -Any design alterations or considerations to Eliminate SCLL Conditions, Reduce Recall Time, Reduce Outage durations, Special Conditions -Additional outage requirements: Railroad Catenaries, Fiber outage, SCADA outage, Relay permissions -Seasonal or weather conditions impacts	☐	Mobile position MOD, XFMR high side combo replacement, station cut over from 21J-1X to MX and back outages will be determined and requested by construction. Mobile transformer will have to be installed during the construction. Planned mobile C/S and mobile XFMR on site is January 2024 – May 2024.
7	**Equipment Testing & Acceptance** -Grounding plans / Resources? Will we need grounds hung? -Hi-pot testing and where will the equipment be set up?	☐	N/A
8	Need for mobile generator and where connected (if needed)	☐	Mobile generation not required. Station can be supplied by either 667, or 690 lines.
9	Need for mobile battery and where connected (if needed)	☐	N/A
10	OT work required or Notable Permit Conditions (special hours)?	☐	To be determined later, driven by (late) equipment deliveries.
11	Coordination of boundaries/seams (Identification of point of demarcation for connection to existing equipment and/or for coordination with other municipalities)	☐	N/A

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Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
C	**Environmental**		
1	Soil Pre-Characterization or Grab Sampling Completed/Planned	☐	Planned
2	**Desktop investigation and EAD Review** -Required Permits -Stormwater Considerations -Dewatering requirements -Wetland and buffer review	☐	CT Siting Petition and Environmental Assessment is required (fence expansion).
3	Risk or presence of PCB's/Asbestos/Lead/SF6	☐	None identified to date.
4	Transformer Spill Containment Recommended?	☐	Yes
5	Expanding Footprint / New Buildings or future Expansion Plans? (Enviro Impact)	☐	Permanent relocation of the SS fence on the North side is required.
6	Environmental oversight considerations? (Inspection type/Interval)	☐	TBD
7	Environmental mitigations - Any matting or seasonal needs? Review D&M Plan with CR.	☐	N/R
D	**Siting, Project Services, and ROW T&D Rights & Survey**		
1	**Any regulatory concerns or approvals needed?** - Any concerns noted that could be mitigated by scope/design alterations? - Likely to require visual screening? What considerations (feasibility or location)? -Zoning Relief and Permits required?	☐	CT Siting Petition will be required.
2	Other siting considerations?	☐	Additional fencing requested by the abutter to the North on 5/5/23.
3	**Neighbor/Abutter impacts:** - Any noise, visual impacts, or sensitive abutters - Any changes to lighting or additional lighting needed?	☐	Noise loading calculated within/under CT limits. Abutter to the North requested CH to be painted green & solid fence, also painted green so he doesn't see the SS equipment from his property. No additional lighting needed.
4	Review for roadway, gate access, trailers, equip height, noise, weekend/night work, or any potential public disturbance related to work	☐	Abutter to the North requested additional gate to close the access road to the back of the SS to reduce the dirt bike traffic under the transmission lines.
5	Installation within Eversource Rights - Is Rights and Restrictions Review required?	☐	Within ES rights.

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Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
6	Expanding Footprint / New Buildings / Fence line or future Expansion Plans?	☐	Permanent relocation of the SS fence on the North side is required.
7	Proposed Equipment on same property? - Any Encroachments	☐	Same property.
F	**Protection & Controls**		
1	Panel Graphic additions and/or Modifications	☐	An existing 1X transformer relay. cabinet will be replaced with new 3X transformer relay cabinet. Primary and back up bus relays will be installed in the existing cabinet space 2R
2	Space on existing panels for new equipment? (front & rear of panel fronts)	☐	There is an existing panel space Panel 2R for new primary and backup bus relays installation.
3	Panel fronts conform to drawings	☐	Existing panels match the panel layout drawings.
4	Access to bring new panels into control enclosure	☐	There is sufficient access and available space to install a new cabinet in the place of the existing transformer relay cabinet.
5	Nameplate list and location of nameplates	☐	Will be included in scope.
6	Verifies that relays and meters that will be an interconnected project work are as shown on the drawings.	☒	N/A
7	Temporary protection, relays, control cable needed? How long will they be required?	☐	Temporary protection settings will be needed for the mobile XFMR and will be determined during the execution of project.
8	Will relay setting changes be needed? Any additional outage requirements for changes?	☐	(2) Transformer Primary & Backup relays and (2) Bus Primary & Backup relays settings will be created. Existing station reclosers settings will be revised for new station two reclosers installation.
G	**Telecom Engineering**		
1	Review telecom equipment in existing control enclosure	☐	SEL-3622 and SEL-2725 will be added in the existing DSCADA cabinet to support this project work.
2	Review path to get telecom circuits into the station and paths within the control house. Determine whether new underground duct or overhead tray work is needed.	☒	Reviewed. N/A
3	Review current or proposed Telecom equipment power connections and validate with P&C any need for system 1 and system 2 separation.	☒	Reviewed. N/A
4	Review current Telecom fiber diversity and validate with P&C any fiber diversity requirements.	☒	Reviewed. N/A
5	Review and list any remote station impacts/updates	☒	Reviewed. N/A

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Substation Constructability Review

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
6	Confirm whether correct interface equipment is available (i.e.) for fiber termination or multiplexor termination	☒	Reviewed. N/A
7	Confirm whether existing communications cabinets are enough to support additional telecommunications equipment installed	☒	Reviewed. N/A
8	Review space for any required additional communications cabinets which may be required to support additional telecommunications equipment installed	☒	Reviewed. N/A
9	Review third party Telecommunications at substation and confirm whether additional capacity or Ground Potential Rise protection is required	☒	Reviewed. N/A

Photos

(Ex. Equipment control cabinet, Breakers, MODs, CCVTs, PTs, Transformers)

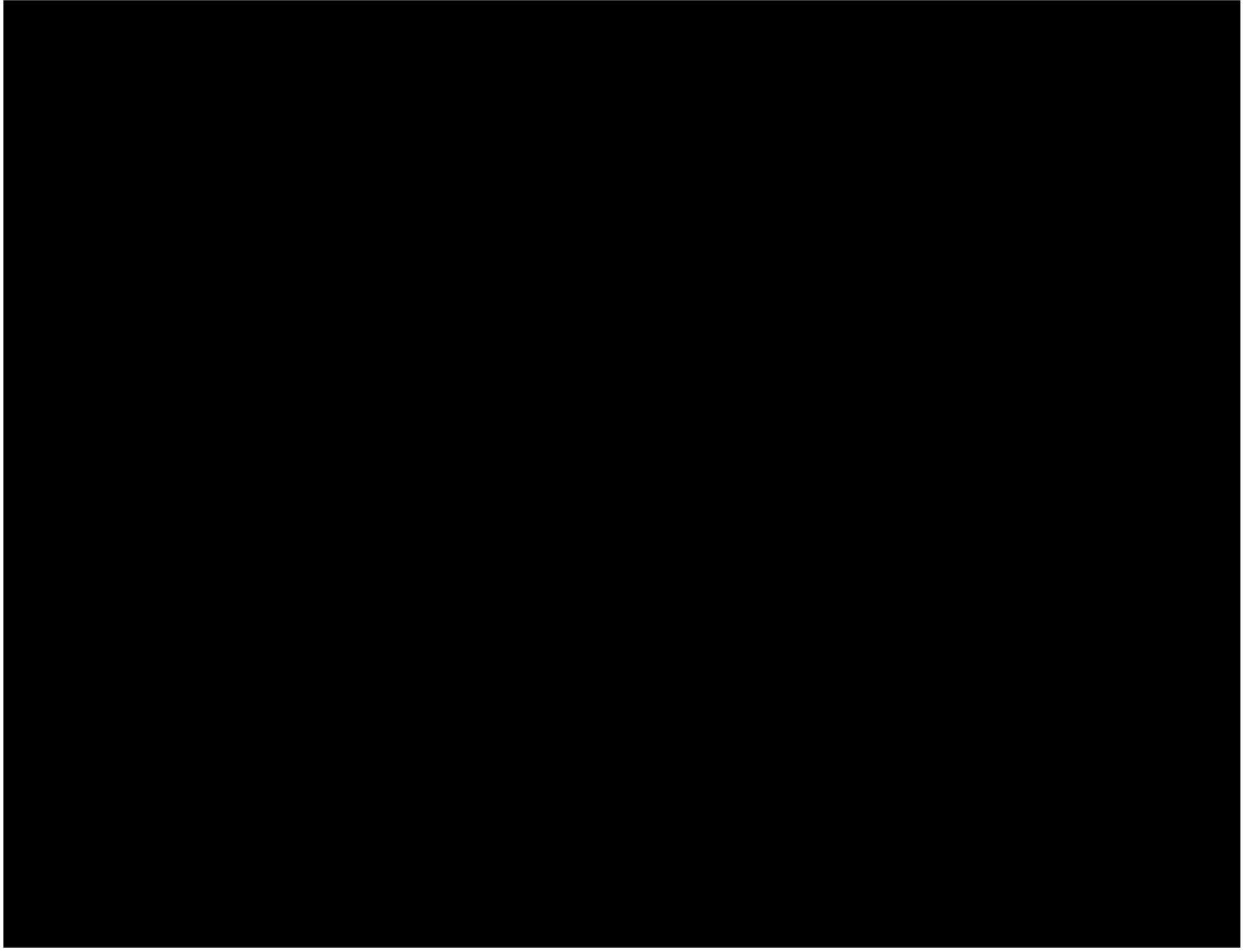
Site photos are located in the below SharePoint folder:

[redacted]

[redacted]



[redacted]



[redacted]
Eversource Substation Engineering and Design
Tel: [redacted]
Email: [redacted]

April 26, 2023

Mr. [redacted]
Eversource Energy
56 Prospect St
Hartford CT
Tel: [redacted]

SUBJECT: Environmental Sound Evaluation
[redacted] Substation – Installation of 40MVA HICO Transformer
[redacted] Salisbury CT 06039

Dear Mr. Stonawski Lubor

Engineering has evaluated environmental sound impacts associated with proposed modifications at [redacted] substation in Salisbury, Connecticut. The objectives of this evaluation were based on (1) the define acoustic design goals based on applicable noise regulations, (2) to estimate the acoustic impact of the proposed project in the surrounding community.

The results of the evaluation are summarized herein. Multiple appendixes are attached on this report for supporting information purposes.

As the table below shows, the Substation would be considered an industrial noise emitter. At the Eversource property boundaries (industrial use), which abut residential land uses (receptors), the noise must be 61 dBA during the daytime and 51 dBA at night.

Noise Ordinances: State and Local
The State noise regulations (RCSA §§ 22a-69-1 to 22a-69-7.4, 2015) prescribe the A-weighted maximum sound pressure levels, based on land use at the noise emitter and receptor. These regulations define daytime vs. nighttime noise periods, classify noise zones based on land uses, and identify noise standards for each zone, specifying that noise emitters must not cause the emission of excessive noise beyond the boundaries of their noise zone to exceed the allowable noise levels on a receptor's land.

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The following table lists the Connecticut noise zone standards, by emitter (source) and receptor (receiver) noise classification.

State of Connecticut: Maximum Sound Pressure Level Noise-Control Levels (By Emitter and Receptor Land Use)

TABLE 1
Connecticut Regulations for the Control of Noise Sound Level Limits (dBA)

	Receptor Class			
Emitter Class	C	B	A/Day	A/Night
C	70	66	61	51
B	62	62	55	45
A	62	55	55	45

Definitions
In the above table, day is defined as the time interval 7:00 a.m. to 10:00 p.m. Night is defined as the time interval 10:00 p.m. to 7:00 a.m. Noise Zone Classifications are based on the actual use of the land. Where multiple land uses exist on the same property, the least restrictive limits apply.

In accordance with Conn. Gen. Stat. Section 22a-73, municipalities also may adopt noise control ordinances, which must be at least as stringent as any State noise control plan. Currently, Salisbury does not have a noise ordinance separate; the State noise requirements therefore apply (Salisbury was previously covered by a noise ordinance promulgated by the Torrington Area Health District; however, the health district repealed this ordinance as of 1/21/2016.

A Class A noise zone is land generally designated for residential use or areas where serenity and tranquility are essential to the intended use.

A Class B noise zone includes land uses generally of a commercial nature but also include undeveloped land, and parks.

A Class C noise zone includes uses generally of an industrial nature but also includes utilities such as the substation.

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Exceptions and Other Limit Provisions

Section 22a-69-3.3 Prominent Discrete Tones

To offset the undesirable nature of tonal sound in the environment, the regulation penalizes sources of prominent, audible discrete tones. If a facility produces such sounds, the applicable limits in Table 1 are reduced by 5 dBA. In its definitions (Section 22a-69-1.2), the regulation defines a method for identifying prominent discrete tones based on measuring one-third octave band sound levels.

Section 22a-69-3.7. Existing noise sources
Existing noise sources constructed between the effective date of these Regulations and January 1, 1960 shall be provided a permanent five (5) dBA maximum noise level allowance over levels otherwise herein required regardless of subsequent changes in ownership or facility utilization processes at the location of the existing noise source. Existing noise sources constructed prior to 1960 shall be provided a permanent ten (10) dBA maximum noise level allowance over levels otherwise herein required regardless of subsequent changes in ownership or facility utilization processes at the location of the existing noise source. Additionally, all existing noise sources shall be provided twenty-four (24) months in order to achieve compliance with these Regulations if a notice of violation has been, or may be, issued to the source. This time period begins with the effective date of these Regulations, not with the date of the notice of violation.

Facility Acoustic Requirements

Our interpretation of the above referenced regulation follows:

· The substation is classified as a Class C emitter (Utility).

· The north, east, and west property boundaries of the substation abut undeveloped conservation land (Class B receptor).

· The south property boundary of the substation abuts Residential land uses along South Direction where there is a resident housing (Class A receptors).

· The substation produces sound continuously during daytime and nighttime hours. As such, where the regulations provide more stringent limits for nighttime operation, these will apply.

· We assumed that the sound produced by the substation can characterized as producing a prominent discrete
tone, thus the limits in Table 1 should be reduced by 5 dBA.

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Based on our interpretation of the regulations, and our understanding of the various land uses surrounding the site, we have determined that the following limits apply to sound produced by the substation.

I. At the nearest residential property boundary south of the substation, the most stringent nighttime limit for a Class C emitter is 46 dBA. This is determined based on the following adjustments:
   - Limit reduced by 5 dBA for containing a prominent discrete tone. Therefore, the new requirement for nighttime is 51 dBA – 5dBA = 46 dBA

II. At the nearest residential property boundary south of the substation, the daytime limit for a Class C emitter is 56 dBA. This is determined based on the following adjustments:
   - Limit reduced by 5 dBA for containing a prominent discrete tone. Therefore, the new requirement for nighttime is 61 dBA – 5dBA = 56 dBA

Table 2: Adjusted state regulation

Emitter Class	Receptor Class B (Residential)	
C (Utility)	A/ Day @ 56 dBA	A/Night @ 46 dBA

Facility Sound Analysis

Facility related sound impacts that are associated with equipment at the substation have been calculated using the Eversource internal excel spreadsheet. The spreadsheet was developed based on the algorithms and procedures described in International Standard

- ISO 9613-2:1996 "Acoustics- Attenuation of sound during propagation outdoors – Part 2: General method of calculation". This standard and its associated methodology are the most universally accepted approach for environmental sound modeling of industrial and transit sound sources. The methodology described in this standard provides estimates of A-weighted sound levels for meteorological conditions that are favorable for the propagation of sound (downwind with a wind speed of 1-5 meters/sec). This methodology is also valid for sound propagation under well-developed moderate ground-based temperature profile inversions, which commonly occur on clear calm nights.

Project Design Requirement:

HICO Transformer (21J-1X) sound pressure levels:

Sound pressure level (no-load condition with all fans)	*58 / 60 /61 dBA*

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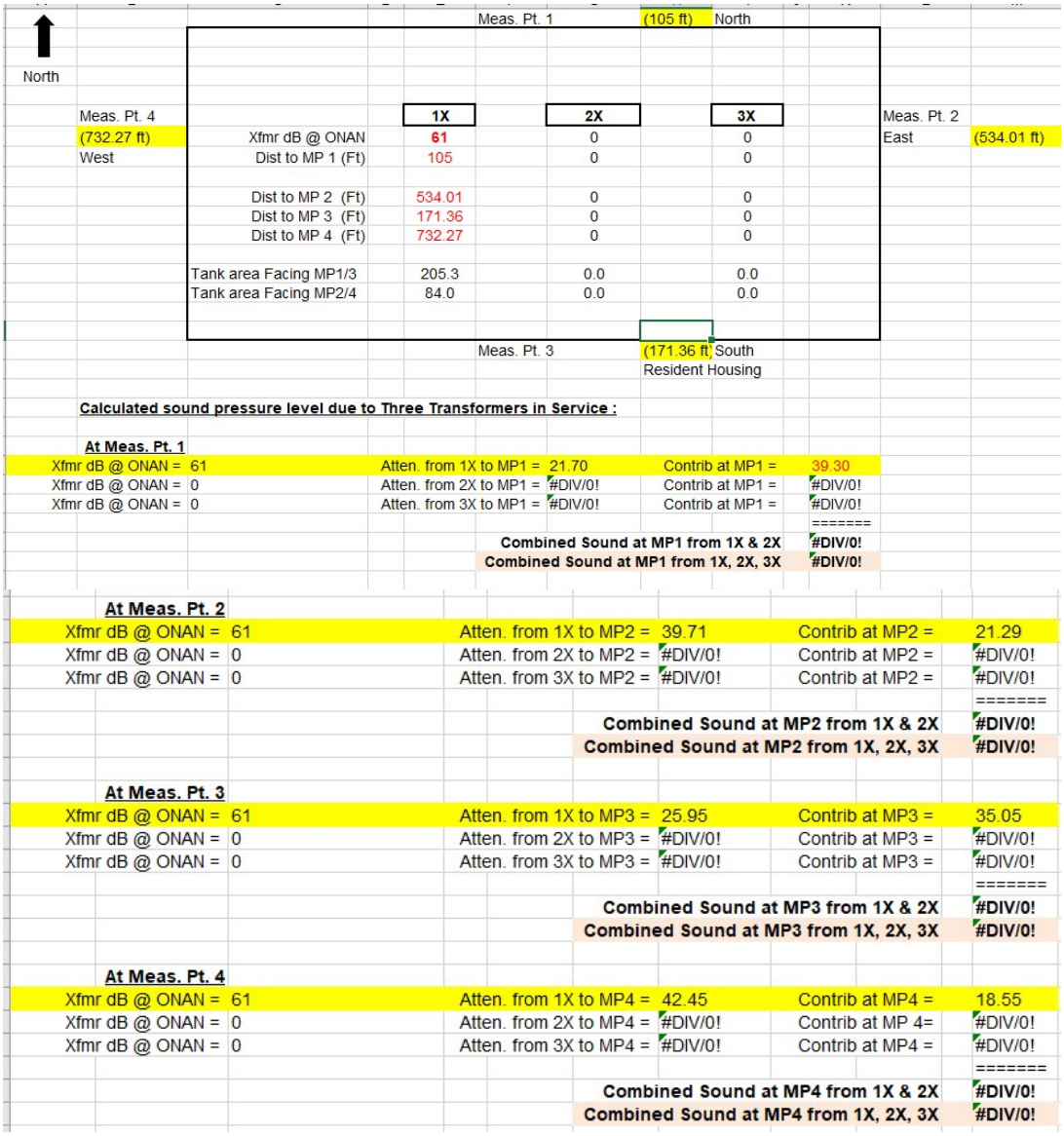
Calculated Data: Daytime

Transformer rated at 61 dBA



				Meas. Pt. 1	(105 ft)	North		
North								
Meas. Pt. 4			1X	2X	3X		Meas. Pt. 2	
(732.27 ft)		Xfmr dB @ ONAN	61	0	0		East	(534.01 ft)
West		Dist to MP 1 (Ft)	105	0	0			
		Dist to MP 2 (Ft)	534.01	0	0			
		Dist to MP 3 (Ft)	171.36	0	0			
		Dist to MP 4 (Ft)	732.27	0	0			
		Tank area Facing MP1/3	205.3	0.0	0.0			
		Tank area Facing MP2/4	84.0	0.0	0.0			
				Meas. Pt. 3	(171.36 ft)	South		
					Resident Housing			

Calculated sound pressure level due to Three Transformers in Service :

At Meas. Pt. 1

Xfmr dB @ ONAN =	61	Atten. from 1X to MP1 =	21.70	Contrib at MP1 =	39.30
Xfmr dB @ ONAN =	0	Atten. from 2X to MP1 =	#DIV/0!	Contrib at MP1 =	#DIV/0!
Xfmr dB @ ONAN =	0	Atten. from 3X to MP1 =	#DIV/0!	Contrib at MP1 =	#DIV/0!
					=======
				Combined Sound at MP1 from 1X & 2X	**#DIV/0!**
				Combined Sound at MP1 from 1X, 2X, 3X	**#DIV/0!**

At Meas. Pt. 2

Xfmr dB @ ONAN =	61	Atten. from 1X to MP2 =	39.71	Contrib at MP2 =	21.29
Xfmr dB @ ONAN =	0	Atten. from 2X to MP2 =	#DIV/0!	Contrib at MP2 =	#DIV/0!
Xfmr dB @ ONAN =	0	Atten. from 3X to MP2 =	#DIV/0!	Contrib at MP2 =	#DIV/0!
					=======
				Combined Sound at MP2 from 1X & 2X	**#DIV/0!**
				Combined Sound at MP2 from 1X, 2X, 3X	**#DIV/0!**

At Meas. Pt. 3

Xfmr dB @ ONAN =	61	Atten. from 1X to MP3 =	25.95	Contrib at MP3 =	35.05
Xfmr dB @ ONAN =	0	Atten. from 2X to MP3 =	#DIV/0!	Contrib at MP3 =	#DIV/0!
Xfmr dB @ ONAN =	0	Atten. from 3X to MP3 =	#DIV/0!	Contrib at MP3 =	#DIV/0!
					=======
				Combined Sound at MP3 from 1X & 2X	**#DIV/0!**
				Combined Sound at MP3 from 1X, 2X, 3X	**#DIV/0!**

At Meas. Pt. 4

Xfmr dB @ ONAN =	61	Atten. from 1X to MP4 =	42.45	Contrib at MP4 =	18.55
Xfmr dB @ ONAN =	0	Atten. from 2X to MP4 =	#DIV/0!	Contrib at MP 4=	#DIV/0!
Xfmr dB @ ONAN =	0	Atten. from 3X to MP4 =	#DIV/0!	Contrib at MP4 =	#DIV/0!
					=======
				Combined Sound at MP4 from 1X & 2X	**#DIV/0!**
				Combined Sound at MP4 from 1X, 2X, 3X	**#DIV/0!**

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Calculated Data: Night-time

Transformer rated at 58 dBA

North			Meas. Pt. 1	(105 ft)	North		
	Meas. Pt. 4		1X	2X	3X		Meas. Pt. 2
	(732.27 ft)	Xfmr dB @ ONAN	58	0	0		East
	West	Dist to MP 1 (Ft)	105	0	0		
		Dist to MP 2 (Ft)	534.01	0	0		
		Dist to MP 3 (Ft)	171.36	0	0		
		Dist to MP 4 (Ft)	732.27	0	0		
		Tank area Facing MP1/3	205.3	0.0	0.0		
		Tank area Facing MP2/4	84.0	0.0	0.0		
			Meas. Pt. 3	(171.36 ft)	South		
					Resident Housing		

Calculated sound pressure level due to Three Transformers in Service :

At Meas. Pt. 1					
Xfmr dB @ ONAN =	58	Atten. from 1X to MP1 =	21.70	Contrib at MP1 =	36.30
Xfmr dB @ ONAN =	0	Atten. from 2X to MP1 =	#DIV/0!	Contrib at MP1 =	#DIV/0!
Xfmr dB @ ONAN =	0	Atten. from 3X to MP1 =	#DIV/0!	Contrib at MP1 =	#DIV/0!
					=======
				Combined Sound at MP1 from 1X & 2X	**#DIV/0!**
				Combined Sound at MP1 from 1X, 2X, 3X	**#DIV/0!**
At Meas. Pt. 2					
Xfmr dB @ ONAN =	58	Atten. from 1X to MP2 =	39.71	Contrib at MP2 =	18.29
Xfmr dB @ ONAN =	0	Atten. from 2X to MP2 =	#DIV/0!	Contrib at MP2 =	#DIV/0!
Xfmr dB @ ONAN =	0	Atten. from 3X to MP2 =	#DIV/0!	Contrib at MP2 =	#DIV/0!
					=======
				Combined Sound at MP2 from 1X & 2X	**#DIV/0!**
				Combined Sound at MP2 from 1X, 2X, 3X	**#DIV/0!**
At Meas. Pt. 3					
Xfmr dB @ ONAN =	58	Atten. from 1X to MP3 =	25.95	Contrib at MP3 =	32.05
Xfmr dB @ ONAN =	0	Atten. from 2X to MP3 =	#DIV/0!	Contrib at MP3 =	#DIV/0!
Xfmr dB @ ONAN =	0	Atten. from 3X to MP3 =	#DIV/0!	Contrib at MP3 =	#DIV/0!
					=======
				Combined Sound at MP3 from 1X & 2X	**#DIV/0!**
				Combined Sound at MP3 from 1X, 2X, 3X	**#DIV/0!**
At Meas. Pt. 4					
Xfmr dB @ ONAN =	58	Atten. from 1X to MP4 =	42.45	Contrib at MP4 =	15.55
Xfmr dB @ ONAN =	0	Atten. from 2X to MP4 =	#DIV/0!	Contrib at MP 4=	#DIV/0!
Xfmr dB @ ONAN =	0	Atten. from 3X to MP4 =	#DIV/0!	Contrib at MP4 =	#DIV/0!
					=======
				Combined Sound at MP4 from 1X & 2X	**#DIV/0!**
				Combined Sound at MP4 from 1X, 2X, 3X	**#DIV/0!**

[redacted]
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Summary:

i. The following results are based on transformers with 58 dBA (nighttime) and 61 dBA (daytime) sound levels at base ratings with no fans running at nighttime condition.

ii. These results are the contribution from the transformers only and do not include any ambient noises (from the street, etc)

iii. Town sound level regulations can be more restrictive; however, the town regulations are the same as the state regulations at this site.

iv. Adjusted State Regulation Table.

Daytime	The adjusted state regulation limit is 56 dBA
Nighttime	The adjusted state regulation limit is 46 dBA

v. Calculated Sound Table:

Cardinal Direction	Calculated Daytime(dBA)	Adjusted State Regulation: Daytime (dBA)	Margin between calculated and State Adj. Reg. for Daytime (dBA)		Calculated Nighttime(dBA)	Adjusted State Regulation: Nighttime (dBA)	Margin between calculated and State Adj. Reg. for Nighttime (dBA)
North (pt#1)	39.30	56	16.7		36.30	46	9.7
East (pt#2)	21.29	56	34.71		18.29	46	27.71
South (nearest housing) (pt#3)	35.05	56	20.95		32.05	46	13.95
West (pt#4)	18.55	56	37.45		15.55	46	30.45

vi. The nearest housing is situated on the South direction of the substation. The calculated data for the South Direction were observed to be 32.05 dBA for daytime (margin is 20.95 dBA) and 32.05 dBA for nighttime (margin is 13.95 dBA). The rest of the cardinal directions do not have nearest housing/resident.

vii. The calculated sound levels for daytime and nighttime are below the adjusted state regulation limits.

Conclusion:

Based on our review of the data presented on this report, it is our opinion that sound produced by the new [redacted] is currently in compliance with the state noise regulation.

[redacted]
Eversource Substation Engineering and Design
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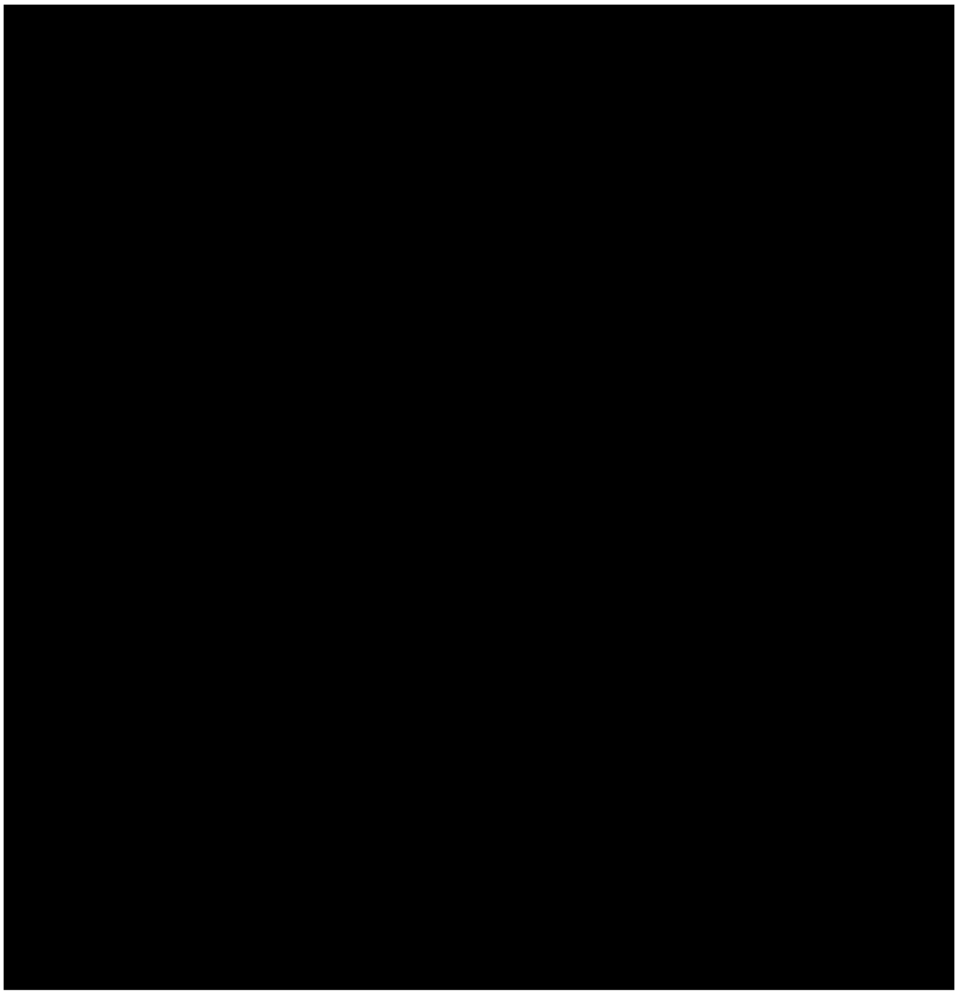
Email: [redacted]

Measurement surrounding the 21J-1X Transformer.



Measurement of Nearest Resident

The distance from Transformer to the Property line in the South Direction where the nearest resident is about 171.36 ft.

[redacted]
Eversource Substation Engineering and Design
Tel: [redacted]
Email: [redacted]

[redacted]

Detail measurement of all angles to the transformer

North: From transformer to property line is 105 ft

East: From transformer to property line is 534.01 ft

South: From transformer to property line is 171.36 ft

West: From transformer to property line is 732.27 ft

[redacted]
Eversource Substation Engineering and Design
Tel: [redacted]
Email: [redacted]



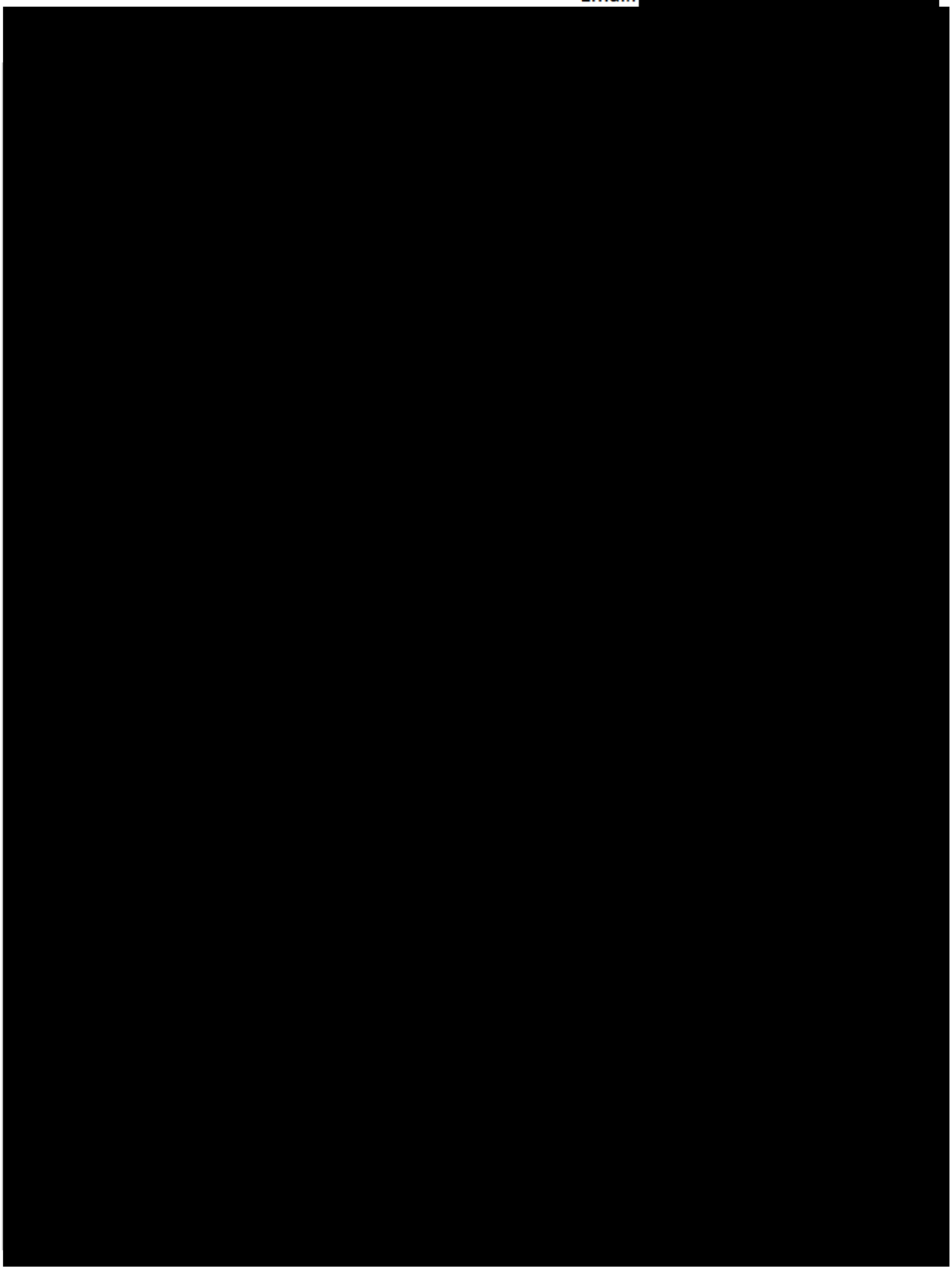
Satellite View Of Salisbury Substation

Physical Address:

[redacted]

Salisbury, CT 06039

[redacted]
Eversource Substation Engineering and Design
Tel: [redacted]
Email: [redacted]



Plot Plan of [redacted] Substation

[redacted]
Eversource Substation Engineering and Design
Tel: [redacted]
Email: [redacted]



Nomenclature Diagram of [redacted] Substation

