EVERSOURCE

# Operations Project Authorization Form

**Approved on April 27, 2022 EPAC**

**Link to Meeting Minutes**

| | |
|---|---|
| **Project Title: [redacted] Transformer Relay Replacement** | **Project Number: CS00581** |
| **Date Prepared: 04/22/2022** | **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#: CS00581** |
| **Project Manager: [redacted]** | **Project Type: Specific** |
| **Project Sponsor: [redacted]** | **Capital Investment part of original Op Plan: Yes** |
| **Estimated in service date: 05/20/2022** | **Emergency Related Request? Yes** |
| **Eng./Constr. Resources Budgeted? Yes** | **Facility Type (check all that apply):** ☐ PTF ☐ non-PTF ☒ Distribution ☐ N/A (General Plant) |
| **Total Capital Request: $416K** | **Authorization Type: Full Funding** |

## [1] Executive Summary

This full funding request of $416K is to replace obsolete transformer protection relays with new microprocessor-based relays for the [redacted] transformer at [redacted] in [redacted], CT. This project, CS00581, is required to break out the [redacted] transformer protection relays portion of project CS00516 to complete the replacement of the [redacted] transformer protection relays before the summer of 2022 due to a delay in the delivery of the [redacted] transformer.

Work to replace the obsolete transformer [redacted] protection relays began under the CS00516 [redacted] Transformer Replacements project. Project CS00516 was set up to replace the substation [redacted] transformers and associated protection relays. Initial funding of $250K was approved in PowerPlan for CS00516 on September 15, 2021, see reference 1. The initial funding has been used to develop detailed civil and P&C packages, preliminary electrical packages, conceptual level scopes for project alternatives and associated cost estimates for presentation to the Solution Design Committee (SDC), see reference 2. Relays and other materials were authorized for procurement under a Material Order Authorization Exemption in October 2021. The alternatives and complete preferred project scope for CS00516 was presented to and approved by the Solution Design Committee (SDC) on December 8, 2021.

Due to a delay in the delivery of the [redacted]-3X replacement transformer, the transformer replacement and 3X circuit switcher replacement originally planned for spring 2022 were delayed until fall 2022. As work was well underway on the 3X relay replacement, the project team was requested to continue with the 3X relay installation to reduce the work required in the fall outage window.

[redacted] relay replacement portion of the CS00516 scope will be set up as a separate project to provide funding to complete the 3X relay replacement before the summer of 2022. The ISD for this work under project CS00581 is scheduled for May 20, 2022. The ISD for the [redacted] transformer is December 2022 and the ISD for the [redacted] transformer is June 2023. See Attachment D for the substation nomenclature diagram.

As of April 20, 2022, approximately $58K has been spent to complete the detailed design and procure the [redacted] relay replacements. Relays and associated material for this project have been ordered and delivered. The remaining work includes producing the 3X relay replacement Issue for Construction (IFC) P&C packages, and the wiring, commissioning and testing of the new 3X protection sytem.

**Related Projects Summary**

| Project Number | Work Order | Description |
|---|---|---|
| CS00516 | 80121158 | 3X Transformer Replacement |
| CS00516 | 80131732 | 3X Relays, SSTs, and PTs (Replacement) |
| CS00516 | 80121160 | 2X Transformer Replacement |
| CS00516 | 80131728 | 2X Relays, SSTs, and PTs (Replacement) |
| CS00581 | TBD | 3X Transformer Relay Replacement |

The replacement of the 3X station service transformers (SSTs) and the potential transformers (PTs) will remain in the CS00516 project and charged to WO 80131732. The WO 80131732 will required a revision to remove the word relays from the WO description. The 3X relay replacement work and materials are currently being charged to CS00516 WO 80131732 ($42,080). Additional charges for this work have been charged to WOs 80121158 ($12,096) and 80121160 ($3,924) and will be transferred to WO 80131732. As of April 20, 2022, the total charges incurred for the 3X relay replacement work are $58.1K and will be transferred from CS00516 to this project CS00581 under a new work order.

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## [2] PROJECT COSTS SUMMARY

*Note: Dollar values are in thousands*

| Line item Category | Prior Authorized | Actuals to Date | 2022 to Go | 2023 | | Total |
|---|---|---|---|---|---|---|
| 1. ROW / Easements / Land Acquisition | | | | | | |
| 2. Environmental Approvals / Permits | | | | | | |
| 3. Outreach | | | $1 | | | $1 |
| 4. Siting Approvals / Permits | | | | | | |
| 5. Engineering / Design | | $23 | $7 | | | $29 |
| 6. Materials (Eversource purchased) | | $17 | $1 | | | $18 |
| 7. Construction (incl matl's by contractors) | | $0 | $78 | | | $78 |
| 8. Testing / Commissioning | | | $47 | | | $47 |
| 9. Project Mgmt. Team | | $1 | $8 | | | $9 |
| 10. Removals | | | $3 | | | $3 |
| 11. Other | | | | | | |
| 12. Risks | | | $28 | | | $28 |
| **SUBTOTAL DIRECTS W/ RISKS** | **$250** | **$42** | **$207** | | | **$249** |
| 13. Indirects/Overhead | | $16 | $133 | | | $148 |
| 14. AFUDC | | $0 | $5 | | | $5 |
| **PROJECT TOTAL – BASELINE BUDGET** | **$250** | **$58** | **$344** | | | **$402** |
| 15. Contingency | | | $14 | | | $14 |
| | | | | | | |
| **TOTAL CAPITAL REQUEST** | **$250** | **$58** | **$358** | | | **$416** |
| 16. Reimbursables/Customer Contribution | | | | | | |
| | | | | | | |
| **PROJECT TOTAL (LESS REIMBURSABLES)** | **$250** | **$58** | **$358** | | | **$416** |
| O&M | | | | | | |
| **TOTAL REQUEST** | **$250*** | **$58** | **$358** | | | **$416** |

*Note: initial funding of $250K provided under project CS00516 was used to begin the work under this project. See reference 1.

Detail other costs, project risk items and their allocations:

| Risk | Allocation |
|---|---|
| 1. Severe Weather, Delays, OT | $18K |
| 2. Design Development | $10K |
| | |
| **Total** | $28K |

**Explain unique payment provisions, if applicable:**

Materials approved for procurement under project CS00516 in October 2021 via a Material Order Authorization - Exception form ($80K) include physical material, structural steel, conduits, anchor bolts, control cables, grounding wire and protective relaying.

**Identify and detail any unique O&M impacts resulting from this project:** N/A

## [3] TECHNICAL JUSTIFICATION

### Project Need, Objective and Justification

The [redacted] transformers and the associated transformer protection relay systems are currently being replaced under project CS00516 because of a failure of the [redacted] transformer and due to obsolesence (both 49-50 years old). The [redacted] unit was placed back in service on August 16, 2021, and has been holding, but due to the age and unknown failure cause, there is a need to replace the transformer and the transformer protection system.

Due to a delay in the delivery of the [redacted] replacement transformer, the transformer replacement originally planned for spring 2022 was delayed until fall 2022. This project, CS00581, is needed to break out the [redacted] transformer protection relay replacement portion of project CS00516 and complete the replacement of the [redacted] transformer protection relays by the end of May 2022. The relay work is planned to be completed before the 2022 summer season when power demand is higher and to reduce the transformer replacement work required in the fall outage window.

### Project Scope

The scope of this project is to complete the engineering design, construction and testing to complete the [redacted] transformer [redacted] protection relay replacements.

The scope includes the following:

- Replace the transformer [redacted] protection electromechanical relays with new microprocessor-based Schweizer SEL-501 and SEL-387 relays.
- Complete the relay design and issue the IFC P&C packages.
- Commission and test the new transformer [redacted] protection system.

A constructability review was performed on 11/23/2021 for project CS00516 and includes the review of the 3X relay replacements of this project. There is adequate space in the relay

cabinets and sufficient power for the replacement relays. The comments and photos relating to this project's scope are highlighted in blue, see Attachment C.

## Background

[redacted] See Attachment D for the Nomenclature diagram. The current nameplate rating for the [redacted] (49 years old) and [redacted] (50 years old) is 47MVA, and both are recommended to be replaced with new 62.5 MVA transformers (new standard design from HICO). The main driver for the replacements is the health index of the [redacted] transformer and a transformer fail event that occurred in June 2021 on the [redacted]

[redacted]

[redacted].

The unit was placed back in service on August 16, 2021 and has been operating normally, but due to the condition and unknown failure cause, it was determined that it should be replaced. The transformer protection [redacted]. With the replacement of the transformer, the outdated transformer protection systems will be updated and replaced with with new electronic relays.

There is a need to upgrade existing electromechanical relays throughout the Eversource system to microprocessor-based relays. [redacted]

## [4] ALTERNATIVES CONSIDERED

The [redacted] Transformer Replacements Project CS00516 was presented to the SDC and the preferred alternative was approved by the SDC on December 8, 2021 (see reference 2).

The alternatives presented to the SDC included the replacement of the [redacted] transformer protection relays, of which the 3X relay replacements are part of this project.

### Alternative 1 - Replace the 22N-2X and 22N-3X (Preferred)

The preferred solution will require replacement of the existing [redacted] transformers with the Eversource 62.5MVA standard transformer. A constructability walkdown with Station Operations, Substation Engineering, P&C Engineering, Civil Engineering, and Siting, and

Environmental was held November 22, 2021. At the walkdown the overall project scope of work was prepared and a cost estimating approach was developed.

The following project scope and risks will be assessed and built into the planning grade estimate. The new transformers will only fit in the substation if the existing circuit switchers (C/S) and high side MODs are replaced with new CS/MOD combo units. A sound study has been completed and the property line sound pressure level will be reduced due to the transformers' replacement. There are no current environment concerns associated with the old foundations. The old foundations will be removed, new foundations will be installed. Removal of the old foundations and installation of new foundations will be covered in the planning grade estimate. The existing transformer relays will be replaced with new microprocessor-based relays. The existing control house can accommodate all needed upgrades. The new microprocessor-based relays are not expected to increase the DC load compared to the old relays. The existing low side bus and switchgear can handle the increased transformer capability. New current transformers (CTs) will not be required for the low side transformer switchgear breakers. A battery capacity analysis has been completed and it has been determined a large battery size is needed.

**Cost Estimate** – $12.4M – Conceptual Grade -25% / +50% ($150K risk allocation to remove contaminated soil)

**Advantages** – Increase station capacity by approximately 20-25MVA. Replacement of the 22N-3X can be completed before summer 2023. Electromechanical relays will be upgraded to microprocessor relays. [redacted]

**Disadvantages** – None

**<u>Alternative 2 - Further Testing, Load Transfer, and Replace Peaceable 12N Transformers</u>**

To further investigate the cause of the [redacted] failure it would need to be de-tanked, inspected, and the transformer rewound. [redacted]

**Cost Estimate** – $28.5M (Repair [redacted] - $3.83M + [redacted] - $22-24M + load transfer $600K)

**Advantages –** None

**Disadvantages** – The repair process would take 12-15 months and during this time the [redacted] Distribution design is exploring adding feeder positions to [redacted] If the transformer is repaired instead of replaced, the full benefit of the additional feeder positions would not be realized. The electromechanical relay upgrade to microprocessor isn't included in the estimate. The [redacted] upgrade is very costly, and the cost cannot be deferred with this option. Replacement of the [redacted] transformers will be challenging due to the lack of space and station arrangement. The [redacted]-2X is similar vintage and condition as the [redacted] and this option does not include the replacement of this transformer. The replacement of the [redacted] is a much longer solution and more cost effective than repairing. This option is also the higher cost.

**Alternative 3 - NWA (Non-wires Alternative)**

[redacted].

**Alternatives 4 - Do Nothing**

Not recommended to do nothing with the [redacted]-3X due to it having failed once. Not recommended to do nothing with the [redacted]-2X due to it having the same age, vintage, and poor health index rating. Also, [redacted] as stated above in Alternative 2.

## [5] PROJECT SCHEDULE

| Milestone | Scheduled Completion Date |
|---|---|
| Project Need by Date | 05/20/2022 |
| Date of IFR Approval (CS00516) | 10/01/2021 |
| Complete Conceptual design of Alternative(s) (CS00516) | 09/24/2021 |
| Initiator complete SSF form (CS00516) | 11/29/2021 |
| SDC Presentation Date(s) (CS00516) | 01/26/2022 |
| Conversion of Tx development costs, 183 to 107 (applicable to projects that require SSF approval but do not require ISO alternative selection) | N/A |
| Preliminary Design Complete | 03/22/2022 |
| Preliminary Design Constructability review complete | 11/23/2021 |
| Full funding estimate complete | 04/06/2022 |
| Full funding estimate review | 04/20/2022 |
| Initiator complete PAF form | 04/26/2022 |
| EPAC Funding Dates (Full) | 04/27/2022 |
| Detail Design Complete | 04/22/2022 |
| Targeted Milestone Dates: | |
| · Siting Approval (if applicable) | N/A |
| · Env. Approvals (if applicable) | N/A |
| · Outage & Energization Plan Issued | 03/07/2022 |
| · All Material on Site | 03/07/2022 |
| · Outage Permit(s) Approved | 03/24/2022 |
| IFC Design Complete | 04/29/2022 |
| Start of Construction | 05/09/2022 |
| Project ISD | 05/20/2022 |
| Relay Settings Issued (*Required for Full Funding requests) | 04/29/2022 |
| ISO Related Milestones (for applicable projects) | N/A |
| · ISO Preferred Alternative Selected | N/A |
| · Conversion of Tx development costs, 183 to 107 · (following ISO preferred alternative selection) | N/A |
| · PAC Presentation | N/A |
| · TCA Submittal | N/A |

See Attachment B for the P6 schedule.

## [6] REGULATORY APPROVALS

Regulatory approvals are not required for the replacement of the protective relays.

## [7] Risk and Risk Mitigation Plans

### Contingency:

Contingency of $14K has been included for this project for unanticipated unknowns.

### Risk Mitigation:

| Risk | Mitigation |
|---|---|
| 1. Severe Weather, Delays, OT | Outage cancelled due to unplanned events on the system resulting in schedule delays and additional potential labor costs to remobilize is a risk and risk costs have been included. This will be mitigated by:<br>• Being flexible with personnel and to determine availability.<br>• Building float time into the construction schedule. |
| 2. Design Development | Unplanned changes required to the design resulting in additional labor costs is a risk and risk costs have been included. Mitigation includes reviewing the wiring and settings prior to work as part of QA/QC. |
| 3. SCLL conditions | A mobile is in already in place at the substation as part of project CS00516. No additional risk costs have been included in the cost estimate. |
| | |

## [8] References

| References * |
|---|
| 1. CS00516-[redacted] Xfmr Replc-IFR, dated 09/01/2021 |
| 2. CS00516 -[redacted] Transformer Replacements – SSF, dated 11/24/2021 |
| 3. CS00516 -[redacted] Transformer Replacements - Partial Funding – PAF, dated 03/24/2022 |
| 4. Material Order Authorization – Exception, dated 10/18/2021 |

*Reference documents listed are documents that were part of the CS00516 project partial funding request package presented at the 2022-03-29 EPAC Meeting agenda item 12 and can be found in the 2022-03-29 EPAC meeting folder.

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

| Attachment | Included in Submittal? |
|---|---|
| A. Cost Estimate | *YES* |
| B. P6 Schedule | *YES* |
| C. Constructability Review | *YES* |
| D. Nomenclature Diagram | *YES* |

| Project Checklist - Transmission & Substation Capital Project | | | |
|---|---|---|---|
| **Project Name:** [redacted] 3X Transformer Relay Replacement | | **Project Number: CS00581** | |
| **Facility Type:** ☐BPS ☐BES ☐PTF ☐PTF non-regional ☐non-PTF ☐CIP ☒Distribution ☐General Plant | | | |
| **PLANNING** | | | |
| Is a NX-9 required? | No | | |
| 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? | No | | |
| ISO-NE Approval Date (if completed): | Enter Date | | |
| 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: | Enter ISO-NE ID | | |
| **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? | Yes | | |
| 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? | No | | |
| Are there any changes to the baseline audible noise? | No | | |
| Is there an impact to the existing ground grid? | No | | |
| Is a Transient Over Voltage (TOV) analysis required? | No | | |

| Project Checklist - Transmission & Substation Capital Project | |
|---|---|
| **Project Name:** [redacted] 3X Transformer Relay Replacement | **Project Number: CS00581** |
| **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** | |
| Is a Siting filing required? *(If yes, list in regulatory approvals section)* | No |
| **PERMITTING** | |
| Is there any permitting required? *(If yes, list in regulatory approvals section)* | No |
| **PROJECT SERVICES (OUTREACH) and ROW WORK COORDINATION** | |
| What is the level of outreach expected? | Low |
| Is any part of this project in an Environmental Justice Community? | No |
| Has ROW Coordination reviewed this project? | Yes |
| Is this project coordinating with other existing scheduled work? | No |
| **INITIATOR** | |
| Has a field constructability review been completed? | Yes |
| **INVESTMENT RECOVERY** | |
| Does the project require development of an Investment Recovery plan? | No |
| **COST ESTIMATING** | |
| What team/firm prepared the cost estimate? | Estimate was prepared by Eversource Engineering |
| Name of the person who prepared the estimate: | [redacted] |
| Was the estimate reviewed by Eversource Estimating? | Yes - Partial Review |

ESTIMATE SUMMARY

Project Title [redacted] Transf 3X Relay Replace
Project Mgr: [redacted]
Project Number: CS00581
WO & Task #:
Estimate revision #: 01
Estimate Type - Station work

Estimate #: C-22-147
Date of Estimate 04/20/2022
Estimate done by [redacted]
In Service date (ISD):05/20/2022

Template Revision # 01.70b

**All Estimate Summary for PP4 Calc ( escalation separate)**

Estimate #: C-22-147
Date of Estimate 04/20/2022

Project Number: CS00581
WO & Task #:

## ESTIMATE SUMMARY

**Estimate Type: Planning**

| WBS | Description | TOTAL | % of Directs | % of Total | Priors | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ROW / Easements / Land purchases | | | | | | | | | | | | | | |
| 2 | Environmental Approvals / Permits | | | | | | | | | | | | | | |
| 3 | Outreach | $700 | 0.3% | 0 2% | | $700 | | | | | | | | | |
| 4 | Siting Approvals / Permits | | | | | | | | | | | | | | |
| 5 | Engineering / Design | $29,300 | 11.8% | 7 0% | $22,800 | $6,500 | | | | | | | | | |
| 6 | Materials ( Eversource purchased) | $18,500 | 7.4% | 4.4% | $17,400 | $1,100 | | | | | | | | | |
| 7 | Construction ( incl matl's by contractors) | $78,200 | 31.4% | 18 8% | $200 | $78 000 | | | | | | | | | |
| 8 | Testing / Commissioning | $81,800 | 32.9% | 19.7% | | $81,800 | | | | | | | | | |
| 9 | PMT Project Mgmt Team | $9,400 | 3.8% | 2 3% | $1.500 | $7.900 | | | | | | | | | |
| 10 | Removals | $3,000 | 1.2% | 0.7% | | $3.000 | | | | | | | | | |
| 11 | Other | | | | | | | | | | | | | | |
| 12 | Risks | $28,000 | 11.2% | 6.7% | | $28,000 | | | | | | | | | |
| 125 | **Project Directs Total w/Risks** | **$248,900** | 100.0% | 59 8% | **$41,900** | **$207,000** | | | | | | | | | |
| 13 | Indirects/Overhead | $148,400 | | 35.7% | $15.900 | $132.500 | | | | | | | | | |
| 14 | AFUDC | $5,200 | | 1 2% | $300 | $4 900 | | | | | | | | | |
| 125 | **Project Total - Baseline Budget** | **$402,500** | | 96.7% | **$58,100** | **$344,400** | | | | | | | | | |
| 15 | Contingency | $13,600 | | 3 3% | | $13,600 | | | | | | | | | |
| | **Project Total - Funding Approval Level** | **$416,100** | | 100 0% | **$58,100** | **$358,000** | | | | | | | | | |
| 16 | Reimbursables/Customer Contribution | | | | | | | | | | | | | | |
| | **Project Total (less reimbursables)** | **$416,100** | | | **$58,100** | **$358,000** | | | | | | | | | |
| | **Cost per key qty (if appl)** | 208,050 | $'s / EA Transformer primary and backup relays | | | | | | | | | | | | |
| | Amount of Escalation included above | | | | | | | | | | | | | | |
| 6 | Total materials - Eversource | $18,500 | | | $17,400 | $1,100 | | | | | | | | | |
| | Total materials - Contractor | $13 | | | $13 | | | | | | | | | | |
| | Total materials | $18 513 | | | $17.413 | $1 100 | | | | | | | | | |
| | NOTE: Risk / Contingency is 11.1% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.) | | | | | | | | | | | | | | |
| | **Estimate Range** | **-25%** | | | **25%** | | | | | | | | | | |
| | | **$312,000** | | | **$520,000** | | | | | | | | | | |

| | TOTAL w/ escal broken out | |
|---|---|---|
| ROW / Easements / Land purchas | $ - | |
| Environmental Approvals / Permit | $ - | |
| Outreach | $ 700 | |
| Siting Approvals / Permits | $ - | |
| Engineering / Design | $ 29,300 | |
| Materials ( Eversource purchased) | $ 18,500 | move contractor mat'l to mat'l |
| Construction ( incl matl's by contr | $ 78,200 | $ - |
| Testing / Commissioning | $ 81,800 | |
| PMT Project Mgmt Team | $ 9.400 | |
| Removals | $ 3.000 | |
| Other | $ - | |
| Risks | $ 28,000 | |
| | **$248,900** | |
| Indirects/Overhead | $ 148.400 | |
| AFUDC | $ 5 200 | |
| | $ - | |
| | **$402,500** | |
| | $ - | |
| Contingency | $ 13,600 | |
| | **$416,100** | |
| | $ - | |
| | $ - | |
| | $ - | |
| | **$416,100** | |
| | $ - | |
| Escal total | **$416,100** | |
| Check total | | |

COMMENTS:

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

2 EA Transformer primary and backup relays

Transformer 3X Relay Replacement: [redacted]

The following equipment will be replaced & removed:
a) **Relays**: Transformer Protection Relays

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

Engineering and Design completed with in-house resources.
Construction and Testing to be outsourced and completed with contractors.
Prior costs taken from Powerplan CS00516 WO 80131732 April 20, 2022. Additional charges for this project were charged to WOs 80121158 ($12,095.81) and 80121160 ($3,923.68) and will be transferred to WO 80131732. These prior costs will be journaled to this project when set up.
Relays and associated equipment costs are included in the Prior costs.

**RISKS**

1. Severe Weather Delays OT $ 18,000
2. Design Development $ 10 000

| | | Prior | | 2022 | | 2023 | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|
| **CSTXX-CONSTRUCTION** | R | Mhrs | DOLLARS | Mhrs | DOLLARS | Mhrs | DOLLARS | Mhrs | DOLLARS |
| Electrical Construction | LT | | | | | | | | |
| General Construction | LT | | | | | | | | |
| SCADA / Automation | LT | | | | | | | | |
| Telecom - Field | LT | | | | | | | | |
| Construction Reps ( internal) | LT | | $183 | | $8,400 | | | | $8,583 |
| Support Switch/Tag | LT | | | | $2,446 | | | | $2,446 |
| Other ( specify) | LT | $ - | | | | | | | |
| Other ( specify) | LT | $ - | | | | | | | |
| Other ( specify) | LT | $ - | | | | | | | |
| LT Total | | | $183 | | $10,846 | | | | $11,029 |
| Employee Expenses | AE | | | | $542 | | | | $542 |
| Construction Purchased Material | AM | | | | $666 | | | | $666 |
| Outside Construction Vendor | AO | | | | $66,600 | | | | $66,600 |
| Sales tax on Constr. Vendor | | | | | | | | | |
| Vehicles ( now in Indirects section) | AV | | | | | | | | |
| Inspection services / Outside Vendor | AO | | | | | | | | |
| Construction Reg (Outside vendor) | AO | | | | | | | | |
| Rents and Leases | BR | | | | | | | | |
| CSTXX Subtotal | | | $183 | | $76,654 | | | | $76,837 |
| Escalation | | | | | | | | | |
| CSTXX Total | | | $183 | | $76,654 | | | | $76,837 |
| **ENRXX-TG ENGINEERING/DESIGN** | | | | | | | | | |
| Project Services/Drafting | LT | | $1,522 | | $1,355 | | | | $2,877 |
| T- Line Engineering/Design | LT | | | | | | | | |
| D- Street Engineering/Design | LT | | | | | | | | |
| Civil Engineering/Design | LT | | | | | | | | |
| Substation (T) Engineering/Design | LT | | | | | | | | |
| Substation (D) Engineering/Design | LT | | $4,339 | | $1,260 | | | | $5,599 |
| Protection & Controls Engineering | LT | | $15,461 | | $2,268 | | | | $17,729 |
| Survey Engineering | LT | | | | | | | | |
| SCADA / Automation Engineering | LT | | | | | | | | |
| Telecom Engineering | LT | | $1,490 | | $1,334 | | | | $2,824 |
| Other - specify | LT | | | | | | | | |
| Other - specify | LT | $ - | | | | | | | |
| LT Total | | | $22,802 | | $6,217 | | | | $29,019 |
| Employee Expenses | AE | | | | $311 | | | | $311 |
| Contractor Engineering - T-Lines | AO | | | | | | | | |
| Contractor Engineering - D-Street | AO | | | | | | | | |
| Contractor Engineering - T -Station | AO | | | | | | | | |
| Contractor Engineering - D-Station | AO | | | | | | | | |
| Contractor Engineering - P&C | AO | | | | | | | | |
| Contractor Engineering - Survey | AO | | | | | | | | |
| Contractor Engineering - SCADA / Automation | AO | | | | | | | | |
| Contractor Engineering - Telecom | AO | | | | | | | | |
| Contractor Engineering - Specify | AO | | | | | | | | |
| Contractor Engineering - Specify | AO | | | | | | | | |
| Contractor Engineering - Specify | AO | | | | | | | | |
| Vehicles ( now in Indirects section) | AV | | | | | | | | |
| ENRXX Subtotal | | | $22,802 | | $6,528 | | | | $29,330 |
| Escalation | | | | | | | | | |
| ENRXX Total | | | $22,802 | | $6,528 | | | | $29,330 |
| **LNDXX-TG LAND** | | | | | | | | | |
| Real Estate | LT | $ | | | | | | | |
| Employee Expenses | AE | | | | | | | | |
| Purchase Land | AM | | | | | | | | |
| Vehicles ( now in Indirects section) | AV | | | | | | | | |
| Fees and Payments | BF | | | | | | | | |
| LNDXX Subtotal | | | | | | | | | |
| Escalation | | | | | | | | | |
| LNDXX Total | | | | | | | | | |
| **MATXX-TG MATERIAL** | | | | | | | | | |
| Eversource | AM | | $17,413 | | $400 | | | | $17,813 |
| Outside Services | AM | | | | | | | | |
| | AM | | | | | | | | |
| Freight | | | | | | | | | |
| Sales Tax Eversource/outside services | 3.8% | 3.8% | | | | | | | |
| Other | | | | | | | | | |
| MATXX Subtotal | | | $17,413 | | $400 | | | | $17,813 |
| Escalation | | | | | | | | | |
| MATXX Total | | | $17,413 | | $400 | | | | $17,813 |
| **PSMXX-PROJECT MANAGER & SUPPORT** | | | | | | | | | |
| Project Management (PM) | LT | | | | | | | | |
| Project Planning/Cost (IP) | LT | | | | $195 | | | | $195 |
| Contracts/Purchasing (CIP) | LT | | | | $322 | | | | $322 |
| System Planning | LT | | | | $264 | | | | $264 |
| Environmental | LT | | | | | | | | |
| SCS - Traditional | LT | | $30 | | $272 | | | | $302 |
| Legal | LT | | | | | | | | |
| Estimating | LT | | | | $237 | | | | $237 |
| Siting - None | LT | | | | | | | | |
| Asset Management | LT | | | | | | | | |
| Asset Management | LT | | | | | | | | |
| Other - | LT | $ - | | | | | | | |
| Other - | LT | $ - | | | | | | | |
| Other - | LT | $ - | | | | | | | |
| LT Total | | | $30 | | $1,313 | | | | $1,343 |
| Employee Expenses | AE | | | | $66 | | | | $66 |
| Project Support Vendor - PM | AO | | $1,474 | | $6,200 | | | | $7,674 |
| Project Support Vendor - IP | AO | | | | | | | | |
| Project Support Vendor - CIP | AO | | | | | | | | |
| Project Support Vendor - System Planning | AO | | | | | | | | |
| Project Support Vendor - Environmental | AO | | | | | | | | |
| Project Support Vendor - SCS - Traditional | AO | | | | $410 | | | | $410 |
| Project Support Vendor - Legal | AO | | | | | | | | |
| Project Support Vendor - Estimating | AO | | | | | | | | |
| Project Support Vendor - Siting - None | AO | | | | | | | | |
| Project Support Vendor - Asset Management | AO | | | | $620 | | | | $620 |
| Project Support Vendor - Other | AO | | | | | | | | |
| Project Support Vendor - Other | AO | | | | | | | | |
| Project Support Vendor - Other | AO | | | | | | | | |
| Project Support Vendor - Other | AO | | | | | | | | |
| Vehicles ( now in Indirects section) | AV | | | | | | | | |
| Property or CWIP tax large proj. a inverse | BR | | | | | | | | |
| Builder All risk insurance excluding deductibles( if project is over $50m) | BR | | | | | | | | |
| Fees and Payments - Environental | BF | | | | | | | | |
| Fees and Payments - Siting | BF | | | | | | | | |
| Fees and Payments - Other | BF | | | | | | | | |
| PSMXX Subtotal | | | $1,504 | | $8,609 | | | | $10,113 |
| Escalation | | | | | | | | | |
| PSMXX Total | | | $1,504 | | $8,609 | | | | $10,113 |
| **REMXX-TG REMOVAL** | | | | | | | | | |
| Engineering/Design | LT | $ | | | | | | | |
| Internal Construction | LT | | | | | | | | |
| LT Total | | | | | | | | | |
| Employee Expenses | AE | | | | | | | | |
| Outside Services | AO | | | | | | | | |
| Contractor Labor | AO | | | | $2,960 | | | | $2,960 |
| Vehicles ( now in Indirects section) | AV | | | | | | | | |
| Rents and Leases | BR | | | | | | | | |
| REMXX Subtotal | | | | | $2,960 | | | | $2,960 |
| Escalation | | | | | | | | | |
| REMXX Total | | | | | $2,960 | | | | $2,960 |
| **TSTXX-TG TEST** | | | | | | | | | |
| Test / Field Engr. Labor (In House) | LT | | | | | | | | |
| Lead Commissioning Engr. (LCE) ( internal) | LT | | | | | | | | |
| Employee Expense | AE | | | | | | | | |
| Test / Field Engr. Labor (contractor) | AO | | | | $51,800 | | | | $51,800 |
| Lead Commissioning Engr. (LCE) (contractor) | AO | | | | $29,960 | | | | $29,960 |
| Vehicles ( now in Indirects section) | AV | | | | | | | | |
| TSTXX Subtotal | | | | | $81,760 | | | | $81,760 |
| Escalation | | | | | | | | | |
| TSTXX Total | | | | | $81,760 | | | | $81,760 |
| **SUBTOTAL PROJECT DIRECT COST** | | - | $41,903 | | $178,911 | | | | $220,814 |
| **Risk** | | | | | | | | | |
| Risk | | | | | $28,000 | | | | $28,000 |
| | | | | $ - | | $ - | | | |
| | | | | $ - | | $ - | | | |
| Risk Total | | | | | $28,000 | | | | $28,000 |
| **TOTAL PROJECT DIRECT COST (w risk)** | | - | $41,903 | | $206,911 | | | | $248,814 |
| **INDIRECTS** | | | | | | | | | |
| Non-Productive Time Allocation (ZNP) | 17.0% | | $1,051 | | $3,124 | | | | $4,175 |
| Payroll Benefits Allocation (ZPB) Incl NPT | 44.0% | | $13 | | $5,504 | | | | $5,527 |
| Gen SVC CO Overhead (ZGS) Incl NPT | 80.0% | | $4,177 | | $7,048 | | | | $11,225 |
| E&S Allocations (ZES,ZEL,ZES) | 50.0% | | $7,761 | | $96,341 | | | | $104,102 |
| AS&E Allocations (ZAS) | 1.3% | | $483 | | $3,638 | | | | $4,121 |
| Stores Expense Allocation (ZST) | 6.0% | | $1,333 | | $32 | | | | $1,365 |
| Lobby Stock | | | $0 | | | | | | $0 |
| MDEC (ZM) | 6.0% | | $990 | | $11,608 | | | | $12,598 |
| Vehicles (ZVE) | 28.0% | | $106 | | $5,145 | | | | $5,251 |
| Indirects Subtotal | | | $15,913 | | $132,520 | | | | $148,433 |
| **TOTAL PROJECT COST - Direct & Indirect ( excl AFUDC )** | | | $57,817 | | $339,431 | | | | $397,248 |
| **AFUDC** | | | | | | | | | |
| AFUDC (ZX) | | | $294 | 6.50% | $4,936 | 6.50% | | | $5,230 |
| In Service Dollars | | | | | | | | | |
| Cumulative ISS | | | | - | | - | | | |
| AFUDC Subtotal | | | $294 | | $4,936 | | | | $5,230 |
| **TOTAL PROJECT COST - Baseline Budget** | | | $58,111 | | $344,367 | | | | $402,478 |
| **Contingency** | | | | | | | | | |
| Contingency | | | | | $13,634 | | | | $13,634 |
| Other | | | $ - | | $ - | | $ - | | |
| Contingency SubTotal | | | | | $13,634 | | | | $13,634 |
| **TOTAL PROJECT COST - Approved Funding** | | | $58,111 | | $358,001 | | | | $416,112 |
| **Reimbursables / Customer Contribution** | | | | | | | | | |
| Reimbursable / Customer Contribution ( enter as negative) | | | $ - | | $ - | | $ - | | |

| # | Project ID | T-Milestone | Activity Flag | Activity ID | Activity Name | Activity Status | Total Float | Start | Finish | Activity % Complete | Remaining Duration | Resources | Predecessors | Successors | RESP - Responsibility | DEPT - DEPARTMI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | [redacted] 3X Relay Construction | | | | | | 0 | 03-Aug-21 A | 30-Dec-22 | | 173 | | | | | |
| 2 | INITIALIZATION AND SCOPE DEVELOPEMENT | | | | | | 153 | 03-Aug-21 A | 20-May-22 | | 20 | | | | | |
| 3 | CS00581 | | | START | SCHEDULE START MILESTONE | Completed | | 03-Aug-21 A | | 100% | 0 | | | A3550, P | | PM |
| 4 | Initial Funding | | | | | | | 10-Aug-21 A | 01-Oct-21 A | | 0 | | | | | |
| 5 | CS00581 | | | PI1000 | Submit Initial Funding Request | Completed | | | 24-Aug-21 A | 100% | 0 | | PI1200 | PI1300 | | AM.ENG |
| 6 | CS00581 | | | PI1200 | Project Initiator Develop Intitial Funding Request | Completed | | 10-Aug-21 A | 23-Aug-21 A | 100% | 0 | [redacted] | START | PI1000 | | AM.ENG |
| 7 | CS00581 | | EPAC-I | PI1300 | Initial Funding Request Approved @ EPAC | Completed | | 30-Aug-21 A | 13-Sep-21 A | 100% | 0 | Eversource Project Approval Committee | PI1000 | PI1610 | | IP |
| 8 | CS00581 | | | PI1400 | Assign Project Manager Request Resources for Project Team | Completed | | 18-Aug-21 A | 31-Aug-21 A | 100% | 0 | [redacted] | PI1610 | CE1400, | | PM |
| 9 | CS00581 | | | PI1500 | Assign Scheduler | Completed | | 20-Sep-21 A | 24-Sep-21 A | 100% | 0 | [redacted] | PI1400 | CE1710, | | TEPS |
| 10 | CS00581 | | | PI1600 | Assign Cost Analyst | Completed | | 20-Sep-21 A | 27-Sep-21 A | 100% | 0 | [redacted] | PI1400 | CE1600, | | PM |
| 11 | CS00581 | | PPA-IF | PI1610 | Initial Funding PowerPlan Approval Create WO# | Completed | | 20-Sep-21 A | 01-Oct-21 A | 100% | 0 | Eversource Project Approval Committee | PI1300 | PI1400 | | IP |
| 12 | SDC Approval | | | | | | | 20-Sep-21 A | 26-Jan-22 A | | 0 | | | | | |
| 13 | CS00581 | | ES-CONCP | CE1000 | ES Engineering Develop Civil Substation Conceptual Engineering Design in A | Completed | | 20-Sep-21 A | 24-Sep-21 A | 100% | 0 | [redacted] | PI1400 | CE1710, | | SS.CIVL |
| 14 | CS00581 | | ES-CONCP | CE1100 | ES Develop Electrical Substation Conceptual Engineering Design in Accordan | Completed | | 20-Sep-21 A | 24-Sep-21 A | 100% | 0 | | PI1400 | CE1710, | | SS.ELEC |
| 15 | CS00581 | | ES-CONCP | CE1400 | ES Engineering Develop P&C Conceptual Engineering Design in Accordance | Completed | | 20-Sep-21 A | 24-Sep-21 A | 100% | 0 | | PI1400 | CE1710, | | P&C.P&C |
| 16 | CS00581 | | | CE1600 | Conduct Project Team Kickoff Meeting Verify SDC Need | Completed | | 30-Sep-21 A | 30-Sep-21 A | 100% | 0 | | PI1600, PI1400, PI1500 | CE1710 | | PM |
| 17 | CS00581 | | | CE1700 | Review Conceptual Siting, Real Estate,SCS, & Permitting (If Required) | Completed | | 25-Oct-21 A | 25-Oct-21 A | 100% | 0 | | CE1400, CE1100, CE1000, C | CGE1000 | | PM |
| 18 | CS00581 | | | CE1710 | Conduct Conceptual Constructability Walk Down | Completed | | 04-Oct-21 A | 04-Oct-21 A | 100% | 0 | | CE1400, CE1100, CE1000, F | CGE1000 | | PM |
| 19 | CS00581 | | | CGE1000 | Develop Conceptual Grade Estimate (-25%+50%) | Completed | | 25-Oct-21 A | 18-Nov-21 A | 100% | 0 | | CE1710, CE1700 | SSF1000 | | BQA.EST |
| 20 | CS00581 | | SDC | SDC1000 | Solution Design Committee(SDC) Approval | Completed | | 03-Jan-22 A | 26-Jan-22 A | 100% | 0 | Solution Design Committee | SSF1000 | PE1600 | | |
| 21 | CS00581 | | | SSF1000 | Develop Soultions Selection Form (SSF) | Completed | | 08-Oct-21 A | 29-Nov-21 A | 100% | 0 | [redacted] | CGE1000 | SDC1000 | | AM.ENG |
| 22 | Project Initiation | | | | | | 168 | 11-Oct-21 A | 02-May-22 | | 5 | | | | | |
| 23 | EPAC Full Funding | | | | | | 168 | 11-Oct-21 A | 02-May-22 | | 5 | | | | | |
| 24 | CS00581 | | EST-FULL | DE1600 | Create Planning Grade Estimate (+/-25% Full Funding) | Completed | | 27-Jan-22 A | 06-Apr-22 A | 100% | 0 | [redacted] | DE2000 | PAFF200 | | AM.ENG |
| 25 | CS00581 | | | DE1610 | Review Planning Grade Estimate (+/-25% Full Funding) | Completed | | 08-Apr-22 A | 20-Apr-22 A | 100% | 0 | | DE1600 | PAFF2200 | | AM.ENG |
| 26 | CS00581 | | | DE1700 | Conduct Initial Risk Management & SCLL Review (Project Initiator & PM) | Completed | | 14-Dec-21 A | 17-Dec-21 A | 100% | 0 | | DE1800 | DE2000 | | PM |
| 27 | CS00581 | | | DE1800 | Review Detail Siting & Permitting (If Required) | Completed | | 10-Dec-21 A | 10-Dec-21 A | 100% | 0 | | PF1010 | DE1700 | | SS.ELEC |
| 28 | CS00581 | | | DE1900 | Conduct Preliminary Constructability Walk Down | Completed | | 23-Nov-21 A | 23-Nov-21 A | 100% | 0 | | DSSE-400, DSSE-260 | DE2000 | | PM |
| 29 | CS00581 | | Construct | DE2000 | Project Preliminary Constructability Review Complete | Completed | | 23-Nov-21 A | 23-Nov-21 A | 100% | 0 | TRANSMISSION ASSET MGMT, [redacted] | DE1700, DE1900 | DE1600 | | PROJ |
| 30 | CS00581 | | EPAC-F | FF1000 | EPAC Full Funding Approval | Not Started | 5 | 28-Apr-22 | 29-Apr-22 | 0% | 1 | Eversource Project Approval Committee | PAFF2200 | FF1010, / | | IP |
| 31 | CS00581 | | PPA-FF | FF1010 | Full Funding PowerPlan Approval | Not Started | 5 | 29-Apr-22 | 02-May-22 | 0% | 1 | Eversource Project Approval Committee | FF1000 | TOA 22-0 | | IP |
| 32 | CS00581 | | | PAFF2000 | Submit Full Funding PAF for Internal Review | In Progress | 5 | 21-Apr-22 A | 25-Apr-22 | 0% | 1 | TRANSMISSION ASSET MGMT | DE1600 | PAFF2100 | | AM.ENG |
| 33 | CS00581 | | PAF Submit | PAFF2100 | Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC f | Not Started | 5 | 26-Apr-22 | 26-Apr-22 | 0% | 0 | [redacted] | PAFF2000 | PAFF220 | | AM.ENG |
| 34 | CS00581 | | | PAFF2110 | Present Full funding PAF at EPAC meeting | Not Started | 171 | 26-Apr-22 | 27-Apr-22 | 0% | 1 | | PAFF2100 | | | AM.ENG |
| 35 | CS00581 | | | PAFF2200 | Incorporate EPAC Full Funding PAF Review Comments | Not Started | 5 | 26-Apr-22 | 28-Apr-22 | 0% | 2 | [redacted] | PAFF2100, DE1610 | FF1000 | | AM.ENG |
| 36 | CS00581 | | | PF1020 | File Material Exemption Mod to order prior to Partial Funding | Completed | | 11-Oct-21 A | 18-Oct-21 A | 100% | 0 | | | RELAYP- | | PM |
| 37 | T-Minus Milestones | | | | | | -10 | 24-Jan-22 A | 20-May-22 | | 20 | | | | | |
| 38 | Relay Panel T-Minus Milestones | | | | | | -10 | 24-Jan-22 A | 20-May-22 | | 20 | | | | | |
| 39 | CS00581 | T-00 | | BT00 | BT-00 - Electrical (Relay Panel) START OF CONSTRUCTION - WO#80121160 | Not Started | 0 | 09-May-22* | | 0% | 0 | | BT0401, BT0409, BT0203, B | TOA 22-0 | TBD-TPM.F | CONS |
| 40 | CS00581 | T-02.03 | | BT0203 | CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE) | Not Started | -12 | | 20-May-22 | 0% | 0 | | A1170 | BT00 | | PM |
| 41 | CS00581 | T-04.01 | | BT0401 | ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED | Completed | | | 28-Feb-22 A | 100% | 0 | | RELAYP-1010 | BT00 | | CONS |
| 42 | CS00581 | T-04.04 | | BT0404 | ALL FINAL RELAY PROTECTIVE SETTING ISSUED | Not Started | 9 | | 29-Apr-22 | 0% | 0 | | DSSE-440 | BT00 | TBD-TPM.F | P&C.P&C |
| 43 | CS00581 | T-04.09 | | BT0409 | BT-04.09 ALL FIRM TOA APPLICATIONS DUE TO LCC (for DISTRIBUTION N | Completed | | | 25-Mar-22 A | 100% | 0 | | A1280 | BT00 | TBD-TPM.F | CONS |
| 44 | CS00581 | T-08.05.P | P&C-IFC | BT0805P | P&C IFC - P&C w/BOM | Completed | | | 13-Apr-22 A | 100% | 0 | | DSSE-220 | BT00 | TBD-TPM.( | P&C.P&C |
| 45 | CS00581 | T-08.13 | | BT0813 | SITING PETITION AND APPLICATION FILED | Completed | | | 24-Jan-22 A | 100% | 0 | | A1240 | BT00 | | PM |
| 46 | CS00581 | T-12.02 | | BT1202 | P/C DESCRIPTION / DRAFT OPERATING INSTRUCTIONS ISSUED | Not Started | 14 | | 25-Apr-22 | 0% | 0 | | DSSE-930, DSSE-470 | BT00 | | P&C.P&C |
| 47 | CS00581 | T-13.01 | | BT1301 | COMMISSIONING PLAN COMPLETE | Completed | | | 31-Jan-22 A | 100% | 0 | | LCE500 | BT00 | | PM |
| 48 | CS00581 | T-24.04 | | BT2404 | DETERMINE / ASSIGN LCE (LEAD COMMISSIONING ENGINEER) | Completed | | | 07-Feb-22 A | 100% | 0 | | LCE200 | BT00 | TBD-TPM.F | SUBTEC |
| 49 | CS00581 | T-26.05 | ENG-PRELI | BT2605 | P&C Preliminary Design / Engineering Completed | Completed | | | 30-Mar-22 A | 100% | 0 | | A3380 | BT00 | | P&C.P&C |



TASK filter: No N/R Activities .

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| # | Project ID | T-Milestone | Activity Flag | Activity ID | Activity Name | Activity Status | Total Float | Start | Finish | Activity % Complete | Remaining Duration | Resources | Predecessors | Successors | RESP - Responsibility | DEPT - DEPARTM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | **ENVIRONMENTAL APPROVALS AND PERMITS** | | | | | | | 24-Jan-22 A | 24-Jan-22 A | | 0 | | | | | |
| 51 | **PREPARE COMPLIANCE MATRICES - REGULATORY & COMMITMENTS** | | | | | | | 24-Jan-22 A | 24-Jan-22 A | | 0 | | | | | |
| 52 | CS00581 | | | A1240 | Determine Requirment for CSC (CT Siting Council submissions/approvals) | Completed | | 24-Jan-22 A | 24-Jan-22 A | 100% | 0 | Siting Manager, CT Siting Council, [redacted]\ | PE1600, DSSE-260, DSSE-1 | BT0813 | | PM |
| 53 | **ENGINEERING & DESIGN** | | | | | | 0 | 01-Oct-21 A | 06-May-22 | | 10 | | | | | |
| 54 | **Civil Engineering** | | | | | | | 01-Oct-21 A | 16-Dec-21 A | | 0 | | | | | |
| 55 | CS00581 | | | DSSE-100 | Design Package to Civil | Completed | | 01-Oct-21 A | 13-Oct-21 A | 100% | 0 | [redacted] | | DSSE-11( | V | SS.ELEC |
| 56 | CS00581 | | ES-DTL | DSSE-110 | Civil Package to Design | Completed | | 25-Oct-21 A | 16-Dec-21 A | 100% | 0 | | DSSE-100 | DSSE-120 | V | SS.CIVL |
| 57 | **P&C Engineering** | | | | | | 0 | 22-Oct-21 A | 06-May-22 | | 10 | | | | | |
| 58 | CS00581 | | ES-DTL | A3380 | Issue P&C Package Detail Design | Completed | | 01-Apr-22 A | 08-Apr-22 A | 100% | 0 | | DSSE-410 | BT2605, | V | P&C.P&C |
| 59 | CS00581 | | | DSSE-220 | SDS Complete | Not Started | -10 | 25-Apr-22 | 06-May-22 | 0% | 10 | | A3380 | BT0805P | V | P&C.P&C |
| 60 | CS00581 | | ES-PRELIM | DSSE-400 | Prepare & Issue P&C Preliminary Design Package to Drafting | Completed | | 22-Oct-21 A | 09-Dec-21 A | 100% | 0 | | | DE1900, | V | P&C.P&C |
| 61 | CS00581 | | | DSSE-410 | Drafting Prepare & Issue Preliminary Back to P&C | Completed | | 13-Dec-21 A | 01-Apr-22 A | 100% | 0 | CT- Substation Design Drafter Generic | DSSE-400 | A3380, R | V | SS.ELEC |
| 62 | CS00581 | | | DSSE-450 | Operating Instructions - Prepare and Issue Draft Distribution OI to Engineering | Completed | | 01-Apr-22 A | 04-Apr-22 A | 100% | 0 | Procedure Writing Group | DSSE-440 | DSSE-93 | | P&C.P&C |
| 63 | CS00581 | | | DSSE-470 | Operating Instructions - P&C Review Draft Distribution OI | Completed | | 01-Apr-22 A | 04-Apr-22 A | 100% | 0 | | DSSE-440, DSSE-450 | BT1202 | V | P&C.P&C |
| 64 | CS00581 | | CASCADE | DSSE-480 | P&C INITIATE CASCADE FORMS (appendix A) for Construction | Completed | | 28-Mar-22 A | 31-Mar-22 A | 100% | 0 | | | CFM | | P&C.P&C |
| 65 | CS00581 | | | DSSE-930 | Operating Instructions - P&C Review Draft Convex OI | Completed | | 01-Apr-22 A | 04-Apr-22 A | 100% | 0 | | DSSE-440, DSSE-450 | BT1202 | V | P&C.P&C |
| 66 | **Relay Settings** | | | | | | 5 | 29-Mar-22 A | 29-Apr-22 | | 5 | | | | | |
| 67 | CS00581 | | ES-RSET | DSSE-440 | Relay Settings - Prepare and Issue Relay Settings IFC | In Progress | 5 | 29-Mar-22 A | 29-Apr-22 | 75% | 5 | [redacted] | DSSE-220 | DSSE-93 | V | P&C.P&C |
| 68 | **MATERIAL PROCUREMENT** | | | | | | | 10-Dec-21 A | 07-Mar-22 A | | 0 | | | | | |
| 69 | **MATERIAL FOR Relay Panels-BID** | | | | | | | 10-Dec-21 A | 07-Mar-22 A | | 0 | | | | | |
| 70 | CS00581 | | | LAYP-1000 | MATERIAL - P&C - Relay Panels Material Vendor Delivery Leadtime | Completed | | 31-Jan-22 A | 07-Mar-22 A | 100% | 0 | Purchasing Department | RELAYP-980, RELAYP-1070 | RELAYP- | | PURC |
| 71 | CS00581 | | M-DELIV | LAYP-1010 | MATERIAL - P&C - Relay Panels Confirm Material Delivery to Site | Completed | | 07-Mar-22 A | 07-Mar-22 A | 100% | 0 | Purchasing Department | RELAYP-1000 | BT0401 | | PURC |
| 72 | CS00581 | | DR-RM | LAYP-1020 | MATERIAL - P&C - Relay Panels Prepare & Issue DR | Completed | | 04-Jan-22 A | 10-Jan-22 A | 100% | 0 | [redacted] | RELAYP-1040 | RELAYP- | V | P&C.P&C |
| 73 | CS00581 | | | LAYP-1030 | MATERIAL - P&C - Relay Panels Bids Received | Completed | | 20-Dec-21 A | 03-Jan-22 A | 100% | 0 | | RELAYP-510 | RELAYP- | V | PURC |
| 74 | CS00581 | | | LAYP-1040 | MATERIAL - P&C - Relay Panels Bids Evaluated and Recommendation Com | Completed | | 10-Jan-22 A | 14-Jan-22 A | 100% | 0 | | RELAYP-1030 | RELAYP- | V | PURC |
| 75 | CS00581 | | | ELAYP-510 | MATERIAL - P&C - Relay Panels RFP Issued to vendors including Tech Specs | Completed | | 10-Dec-21 A | 17-Dec-21 A | 100% | 0 | | PF1020, DSSE-410 | RELAYP- | V | P&C.P&C |
| 76 | CS00581 | | | ELAYP-980 | MATERIAL - P&C - Relay Panels Procurement Issue PO | Completed | | 14-Jan-22 A | 28-Jan-22 A | 100% | 0 | Purchasing Department | RELAYP-1020 | RELAYP- | | PURC |
| 77 | **CONSTRUCTION** | | | | | | 133 | 08-Oct-21 A | 06-Jun-22 | | 20 | | | | | |
| 78 | **CONSTRUCTION SERVICES SELECTION-CIVIL** | | | | | | | 08-Oct-21 A | 22-Oct-21 A | | 0 | | | | | |
| 79 | CS00581 | | | A3550 | STAFFING DECISION -CONSTRUCTION: EVERSOURCE OR OUTSOURCE I | Completed | | 08-Oct-21 A | 22-Oct-21 A | 100% | 0 | [redacted] | START | | | PM |
| 80 | **Construction - Electrical** | | | | | | 0 | 09-May-22 | 20-May-22 | | 10 | | | | | |
| 81 | CS00581 | | | TOA [redacted] | Construction - Electrical - Relay | Not Started | 0 | 09-May-22* | 20-May-22 | 0% | 10 | Construction Rep Generic, [redacted] | BT00, FF1010 | CFM, A1( | | CONS |
| 82 | **Construction - P&C** | | | | | | 0 | 09-May-22 | 20-May-22 | | 10 | | | | | |
| 83 | CS00581 | | | A1140 | Construction - P&C Implement Relay Settings | Not Started | 0 | 09-May-22 | 20-May-22 | 0% | 10 | Construction Rep Generic, [redacted] | BT00, FF1010 | CFM | | CONS |
| 84 | **Construction - Communication** | | | | | | 0 | 09-May-22 | 20-May-22 | | 10 | | | | | |
| 85 | CS00581 | | | A1150 | Construction - Field Communications | Not Started | 0 | 09-May-22 | 20-May-22 | 0% | 10 | Construction Rep Generic, [redacted] | BT00, FF1010 | CFM | | CONS |
| 86 | **Construction - CONST.REP TASKS** | | | | | | 113 | 07-Mar-22 A | 06-Jun-22 | | 10 | | | | | |
| 87 | CS00581 | | | A1260 | Construction Rep Finalize CASCADE Forms (within 14 days following ISD) | Not Started | 113 | 23-May-22 | 06-Jun-22 | 0% | 10 | Construction Rep Generic, [redacted] | CFM | A1030 | | CONS |
| 88 | CS00581 | | | A1275 | Outage and Energization plan Issued | Completed | | 07-Mar-22 A | 07-Mar-22 A | 100% | 0 | | | | | |
| 89 | CS00581 | | | A1277 | Outage Permits Approved | Completed | | 18-Mar-22 A | 24-Mar-22 A | 100% | 0 | | | | | |
| 90 | CS00581 | | | A1280 | Construction Rep SUBMIT OUTAGE REQUESTS for RELAY WORK | Completed | | 21-Mar-22 A | 25-Mar-22 A | 100% | 0 | Construction Rep Generic | DSSE-120 | BT0409 | | CONS |
| 91 | **CONSTRUCTION RESOURCE TRACKING** | | | | | | 0 | 09-May-22 | 20-May-22 | | 10 | | | | | |
| 92 | CS00581 | | | A1070 | RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH OUT | Not Started | 9 | 09-May-22 | 09-May-22 | 0% | 1 | Distribution Switching Crew | TOA 22-01354 | CFM | | CONS |
| 93 | CS00581 | | | A1080 | RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH IN | Not Started | 0 | 20-May-22 | 20-May-22 | 0% | 1 | Distribution Switching Crew | TOA 22-01354 | CFM | | CONS |
| 94 | CS00581 | | | ConRep-S | RESOURCE ONLY ACTIVITY - CONSTRUCTION - CONSTRUCTION REP | Not Started | 0 | 09-May-22 | 20-May-22 | 0% | 10 | Construction Rep Generic, [redacted] | CSM | CFM | | CONS |
| 95 | CS00581 | | | CONSTelec | RESOURCE ONLY ACTIVITY - CONSTRUCTION - ELECTRICIAN | Not Started | 0 | 09-May-22 | 20-May-22 | 0% | 10 | Distribution - S/S Electrician | CSM | CFM | | CONS |
| 96 | **CONSTRUCTION MILESTONES** | | | | | | 179 | 09-May-22 | 20-May-22 | | 11 | | | | | |
| 97 | CS00581 | | | CFM | Construction Finish Milestone | Not Started | 0 | | 20-May-22 | 0% | 0 | | A1140, CONSTelec, DSSE-4[ | A1020, A | | CONS |
| 98 | CS00581 | | CRH | CSM | Construction Start Milestone | Not Started | 190 | 09-May-22 | | 0% | 0 | | BT00, FF1010 | ConRep-S | | CONS |



TASK filter: No N/R Activities .

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| # | Project ID | T-Milestone | Activity Flag | Activity ID | Activity Name | Activity Status | Total Float | Start | Finish | Activity % Complete | Remaining Duration | Resources | Predecessors | Successors | RESP - Responsibility | DEPT - DEPARTMI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99 | CS00581 | | ISD | ISD | EQUIPMENT IN SERVICE DATE (requires FOOB constraint) | Not Started | 0 | | 20-May-22* | 0% | 0 | | CFM | | | PM |
| 100 | **TEST AND COMMISSION** | | | | | | 142 | 14-Jan-22 A | 07-Jun-22 | | 21 | | | | | |
| 101 | **TEST - SERVICES STAFFING DECISION** | | | | | | | 14-Jan-22 A | 14-Jan-22 A | | 0 | | | | | |
| 102 | CS00581 | | | A1010 | STAFFING DECISION: EVERSOURCE OR OUTSOURCE BID/COC | Completed | | 14-Jan-22 A | 14-Jan-22 A | 100% | 0 | Construction Rep Generic, [redacted] | | A3470 | | PM |
| 103 | **LCE PLANNING** | | | | | | 142 | 09-May-22 | 07-Jun-22 | | 21 | | | | | |
| 104 | CS00581 | | ES-COMPL | LCE400 | Develop Test and Commissioning Plan | Not Started | 142 | 09-May-22 | 07-Jun-22 | 0% | 21 | [redacted] | DSSE-220 | LCE500 | | TEST |
| 105 | **TEST ACTMITIES** | | | | | | 153 | 09-May-22 | 20-May-22 | | 10 | | | | | |
| 106 | CS00581 | | | LCE620 | Execute Test and Commissioning Plan | Not Started | 153 | 09-May-22 | 20-May-22 | 0% | 10 | Engineering Contractor | CSM, CFM | | | SUBTEC |
| 107 | **PROJECT CLOSE OUT** | | | | | | 0 | 25-Apr-22 | 30-Dec-22 | | 173 | | | | | |
| 108 | CS00581 | | ES-FLDASB | A3650 | Prepare & Submit P&C Field Mark Ups | Not Started | 30 | 25-Apr-22 | 23-May-22 | 0% | 21 | FIELD ENGINEERING-GENERIC | | A3770 | | ENGR.FI |
| 109 | CS00581 | | PM | A3680 | PM to Document P&C As-Built Drawings Complete | Not Started | 30 | 18-Aug-22 | 18-Aug-22 | 0% | 1 | [redacted] | A3780 | A3710, A | | PM |
| 110 | CS00581 | | ES-FLSASB | A3690 | FE Files Substation Design Drawings at Station | Not Started | 30 | 19-Aug-22 | 30-Sep-22 | 0% | 30 | FIELD ENGINEERING-GENERIC | A3680 | A1040 | | ENGR.FI |
| 111 | CS00581 | | ES-FLSASB | A3710 | FE Files P&C Design Drawings at Station | Not Started | 30 | 19-Aug-22 | 30-Sep-22 | 0% | 30 | FIELD ENGINEERING-GENERIC | A3680 | A1040 | | ENGR.FI |
| 112 | CS00581 | | | DSSE-1100 | Complete TD-707 Turnover Document / Forward to SOC & Mailing List | Not Started | 117 | 23-May-22 | 27-May-22 | 0% | 5 | [redacted] | CFM | A1040 | | CONS |
| 113 | **P&C As-Builts** | | | | | | 30 | 24-May-22 | 17-Aug-22 | | 60 | | | | | |
| 114 | CS00581 | | ES-ASB | A3770 | Eversource Engineering Verifies P&C Mark Ups and Updates As-Built Drawing | Not Started | 30 | 24-May-22 | 10-Aug-22 | 0% | 55 | [redacted] | A3650 | A3780 | | P&C.P&C |
| 115 | CS00581 | | ES-ASB | A3780 | P&C Transmittal, Approve Final As-Built Package, and EDC Files and Issue Di | Not Started | 30 | 11-Aug-22 | 17-Aug-22 | 0% | 5 | [redacted] | A3770 | A3680 | | P&C.P&C |
| 116 | **MATERIAL, EQUIPMENT, COST, AND ASSET MANAGEMENT CLOSEOUT** | | | | | | 113 | 23-May-22 | 19-Jul-22 | | 40 | | | | | |
| 117 | CS00581 | | | A1020 | Cost Analyst Prepares FINAL Units of Property | Not Started | 123 | 23-May-22 | 05-Jul-22 | 0% | 30 | CT- Cost Analyst Generic, [redacted] | CFM | FINISH | | COST |
| 118 | CS00581 | | | A1030 | Asset Management Complete Asset Update(s) in CASCADE | Not Started | 113 | 07-Jun-22 | 19-Jul-22 | 0% | 30 | [redacted] | A1260, CFM | FINISH | | AM.COM |
| 119 | **PROJECT MANAGEMENT CLOSEOUT** | | | | | | 0 | 23-May-22 | 30-Dec-22 | | 153 | | | | | |
| 120 | CS00581 | | | A1040 | PM Prepares Closeout Documentation, Lessons Learned Meeting, etc. | Not Started | 30 | 03-Oct-22 | 15-Nov-22 | 0% | 30 | [redacted] | CFM, A3690, A3710, DSSE-1 | FINISH | | PM |
| 121 | CS00581 | | | A1270 | Prepare TD-707 Document | Not Started | 122 | 23-May-22 | 05-Jul-22 | 0% | 30 | [redacted] | CFM | FINISH | | PM |
| 122 | CS00581 | | | FINISH | Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE) | Not Started | 0 | | 30-Dec-22* | 0% | 0 | | A1020, A1040, A1110, A127( | | | PM |
| 123 | **OVERHEAD / INDIRECTS** | | | | | | -10 | 09-May-22 | 20-May-22 | | 10 | | | | | |
| 124 | **PROJECT MANAGEMENT** | | | | | | -10 | 09-May-22 | 20-May-22 | | 10 | | | | | |
| 125 | CS00581 | | | A1170 | Prepare CAN (Construction Authorization Notice) | Not Started | -10 | 09-May-22 | 20-May-22 | 0% | 10 | [redacted] | A1220, DSSE-120, A1230, D | BT0203 | | PM |



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EVERSOURCE

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

**Substation Constructability Review**

| | | |
|---|---|---|
| **Project Title:** [redacted] Transformer Replacement | ☐ | Prior Constructability Review Performed? |
| | ☐ | Program Related Site Specific Review? |
| **Project Numbers(s):** CS00516 | **Project Constructability Phase:** | |
| **Date(s) of Constructability Review:** 11/23/2021 | ☐ | Conceptual Engineering Design |
| | ☒ | Preliminary Engineering Design |
| Click to enter a date | ☐ | Detailed Engineering Design |
| **Project Scope Statement:** Replace the 3X and 2X transformers and relays in [redacted] | | |

Note: Items pertaining to CS00581 [redacted] Relay Replacements are hilighted in blue.

**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 | [redacted] |
| ☒ | ☒ | Constr. Management | [redacted] | ☒ | ☒ | Civil Engineering | [redacted] |
| ☐ | ☐ | S/S Technical / LCE | | ☒ | ☐ | Telecom | |
| ☒ | ☐ | S/S Operations** | [redacted] | ☒ | ☐ | Environmental | |
| ☐ | ☐ | Field Engineering | | ☐ | ☐ | Real Estate | |
| ☐ | ☐ | Line Engineering | | ☐ | ☐ | ROW T&D Rights & Survey | |
| ☐ | ☐ | Vegetation Management | | ☐ | ☐ | Survey Engineering | |
| ☒ | ☐ | Siting | | ☐ | ☐ | Cost Estimating | |
| ☐ | ☐ | Safety | | ☒ | ☒ | Project Services (Outreach) | [redacted] |
| ☐ | ☐ | 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:

[redacted] _____ *11/23/21*_____

*Name / Signature* *Date*

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<br>-Birdseye site plan<br>-General Arrangement | ☒ | Preliminary Drawings<br>-Civil Site Drawing<br>-Electrical Drawing<br>-Section Drawings | ☐ | Prints in hand for marking up<br>-Panel Front/Read View<br>-Control Enclosure Layout<br>-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 | Construction / Barnhart to review path for X2 transformer to determine if fence bump out required | May effect siting if fence bumpout needed |
| 2 | Construction to determine if resources are available to install new relays once transformer out of service. | If resources not available, defer relay replacement to Fall |
| 3 | | |
| 4 | | |
| 5 | | |

| | Key Review Item Description | N/A or No Concern | Review Notes, Concerns, or Additional Info Needed |
|---|---|---|---|
| A | **Engineering & Asset Management** | | |
| 1 | **Scope of Work**<br>- Is scope adequately developed and sufficiently detailed for intended deliverable?<br>- Any complimentary projects or other adjacent obsolete equipment for inclusion?<br>- Any overlapping projects that could impact work/outages?<br>- Consider Physical Installation, P&C Scope, Civil Scope, Engineering studies, Design standard adherence<br>- Any remote station impacts?<br>- Engineering Estimates for Design and Technical Support? (EE and EOC) Total Project | X | 1. Scope is well defined. There is room in cabinets for new relays. New transformer is larger, but will fit in conjunction with new switch combo. Need to get outages submitted to determine if any conflicts with proposed work. |

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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 |
|---|---|---|---|
| 2 | **Materials Identified/Ordered**<br>-Any concerns with BOM/Major Materials? Review BOM lead times and project need dates<br>-Specialty Major Materials: Identify Specialty Equipment & Materials potentials - temporary/replacement - long lead items?<br>-Any Materials needed to facilitate construction access? | ☐ | 1. New transformer due to arrive last week of Feb<br>2. Switch combo due in early May<br>3. Material exemption approved for reactor and switch combo, need to submit another material exemption for all other material (relays, conduits, cables, etc). |
| 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.. | X | No interference identified. There is room in cabinets for new relays. |
| 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 | X | New transformer is larger, but will fit in conjunction with new switch combo. |
| 5 | **Wall, Fence, Gate, and Foundation Considerations**<br>-Any permanent / temporary alterations or relocations required?<br>-Pre-Project Sound Measurements Needed? Sound Walls?<br>-Take measurements for Foundation quantities, dimensions and concrete volumes<br>-CIP Review/Ballistic needs. Any Physical Security Requirement Consideration?<br>-Assess condition of existing yard equipment foundations and viability for reuse (if proposed)<br>-Review station expansion areas (if needed) for structures, old foundations, etc.<br>-Any Steel Structural Plan Considerations?<br>-Any impacts to construction plan? | ☐ | Need to review path for X2 transformer with Barnhart to determine if fence bump out required |
| 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? | X | Environmental has already identified that soil borings should be done for potential PCB contamination. |

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 |
|---|---|---|---|
| 7 | **Underground Obstructions**<br>-Drawing review concerns?<br>-Is preconstruction or test excavation needed?<br>-Is reuse of underground control cables / Conduits /replace Non-Shielded Cable feasible (if applicable)<br>-Are spare conduits available? Are they useable?<br>-Review if any areas will need to be plated for increased load bearing for equipment access (i.e., large Xfmr, etc.) | X | Cables to be re-used, but UG conduits need to be relocated to accommodate new equipment layout and foundations. |
| 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 | X | Design accounts for low ground resistivity – SS already has ground nets, not just rods. |
| 9 | Nomenclature / Switching One-Line Diagram<br>-Any obvious deviations from diagrams provided? | X | |
| 10 | BPS Separation Requirements<br>- Is this BPS Substation? Y/N (part of PAF)<br>- Changes to pre-existing BPS standards? | X | N/A |
| 11 | IEC 61850 Substation Automation and Communication Requirements - Any Impacts/Retrofit needed? | X | N/A |
| 12 | Any Upgrades to ES Standards - Is retrofit needed to bring up to ES standards? Can that be done? | X | N/A |
| B | **Construction** | | |
| 1 | **Any safety hazards specific to the facility? i.e., Low Bus, Deterioration, etc.** | | Need to determine if fence bump out will be required when bringing in X2 unit to maintain clearance distance on bus. |
| 2 | **Prior known Site Specific Conditions**<br>-Common or Obvious station Issues<br>-Missing scope items that could impact costs? | X | |
| 3 | **Identify/Consider Required Depts for Construction?**<br>-Who is constructor: Internal vs External Resources<br>-S/S Ops, GO, Test, Field Engineering, etc. | ☐ | Below ground work/civil will be performed by external contractor. All other work (electrical, testing) by internal crews. |

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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 |
|---|---|---|---|
| | -Specialty Contractors Required?<br>-Required Oversite Needed - Estimated level of CR and LCE support needed | | |
| 4 | **Site Plan, Access, and Temporary Construction Facilities:**<br>-Confirm maintenance access for proposed new or replaced equipment<br>-Verify clear footprint for yard equipment / Property Plan<br>-General access to site, can areas outside substation be utilized?<br>-Substation Entry Plan (driveway and drive path modifications)<br>- Identification of Unique Requirements, i.e. (access bridges, station service, etc.)<br>-Site Development Plan (grading and drainage) with Cut/Fill<br>-Existing Rock Conditions? Potential Impacts (rock quantity)?<br>-Any police details needed for deliveries, restricted hours, and/or need for extended hour approvals<br>-Any Sanitary Civil Requirements? (Septic tanks, etc.)<br>-Review turning radius for delivery trucks (if critical)<br>-Any Substation Access and site/yard access Limitations?<br>-Office Trailer Needs: Facilities, Utilities, Restroom, Container, Dumpster Space<br>-Weather impacts to Site (Snow Placement)<br>-Identify Material Laydown and Security<br>-Where will new vs removed equipment go?<br>-Construction permit for trailers outside substation fence? | ☐ | Eversource has access from [redacted] (ROW along rail trail). Walkdown of road indicates it is in good condition for equipment deliveries.<br>Police most likely required for permitted loads (Transformer, potentially switch combo).<br>There is a laydown area outside of SS that can be utilized. |
| 5 | Unique Equipment Considerations:<br>Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser | | Need to check for potential PCB contamination from existing transformers. |

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 |
|---|---|---|---|
| 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:***<br>-Approach Distances – Outage Requirements to maintain electrical clearances throughout proposed installation<br>-Distribution Clearances<br>-Clearance Holder Assignments<br>-Drawings vs Field Conditions<br>-Outage boundaries and interconnections<br>-Phased approach needs for additional mobilizations<br>-Verify outage sequence supports the planned construction sequence and timeline. (Lead Commissioning Engineer "LCE", Substation Operations, and Outage Planner input)<br>-Any design alterations or considerations to Eliminate SCLL Conditions, Reduce Recall Time, Reduce Outage durations, Special Conditions<br>-Additional outage requirements: Railroad Catenaries, Fiber outage, SCADA outage, Relay permissions<br>-Seasonal or weather conditions impacts | | Will need outages to disconnect the transformer / reconnect to new transformer. Mobile transformer will be used entire time transformer is out of service for replacement (approximately 5 months). |
| 7 | **Equipment Testing & Acceptance**<br>-Grounding plans / Resources? Will we need grounds hung?<br>-Hi-pot testing and where will the equipment be set up? | X | |
| 8 | Need for mobile generator and where connected (if needed) | X | |
| 9 | Need for mobile battery and where connected (if needed) | X | |
| 10 | OT work required or Notable Permit Conditions (special hours)? | ☐ | |
| 11 | Coordination of boundaries/seams (Identification of point of demarcation for connection to existing equipment and/or for coordination with other municipalities) | X | |

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 |
|---|---|---|---|
| C | **Environmental** | | |
| 1 | Soil Pre-Characterization or Grab Sampling Completed/Planned | ☐ | Environmental planning on soil borings for potential contamination. |
| 2 | **Desktop investigation and EAD Review**<br>-Required Permits<br>-Stormwater Considerations<br>-Dewatering requirements<br>-Wetland and buffer review | X | |
| 3 | Risk or presence of PCB's/Asbestos/Lead/SF6 | ☐ | Potential PCB leak from existing transformer |
| 4 | Transformer Spill Containment Recommended? | ☐ | Review by Environmental indicated oil containment not required. |
| 5 | Expanding Footprint / New Buildings or future Expansion Plans? (Enviro Impact) | x | |
| 6 | Environmental oversight considerations? (Inspection type/Interval) | ☐ | |
| 7 | Environmental mitigations - Any matting or seasonal needs? Review D&M Plan with CR. | x | N/A |
| D | **Siting, Project Services, and ROW T&D Rights & Survey** | | |
| 1 | **Any regulatory concerns or approvals needed?**<br>- Any concerns noted that could be mitigated by scope/design alterations?<br>- Likely to require visual screening? What considerations (feasibility or location)?<br>-Zoning Relief and Permits required? | X | No sub-petition or modification expected as long as fence bumpout not required. |
| 2 | Other siting considerations? | X | |
| 3 | **Neighbor/Abutter impacts:**<br>- Any noise, visual impacts, or sensitive abutters<br>- Any changes to lighting or additional lighting needed? | X | New transformer is expected to be quieter than existing units. |
| 4 | Review for roadway, gate access, trailers, equip height, noise, weekend/night work, or any potential public disturbance related to work | X | SS is along rail trail and next to condo complex. Work during winter, with no leaves on trees, will fully expose work to neighbors. Project Service planning numerous notifications. |
| 5 | Installation within Eversource Rights - Is Rights and Restrictions Review required? | X | Eversource has access from [redacted] (ROW along rail trail). |

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 |
|---|---|---|---|
| 6 | Expanding Footprint / New Buildings / Fence line or future Expansion Plans? | X | |
| 7 | Proposed Equipment on same property? - Any Encroachments | X | |
| F | **Protection & Controls** | | |
| 1 | Panel Graphic additions and/or Modifications | X | |
| 2 | Space on existing panels for new equipment? (front & rear of panel fronts) | X | |
| 3 | Panel fronts conform to drawings | X | |
| 4 | Access to bring new panels into control enclosure | X | |
| 5 | Nameplate list and location of nameplates | X | |
| 6 | Verifies that relays and meters that will be an interconnected project work are as shown on the drawings. | X | |
| 7 | Temporary protection, relays, control cable needed? How long will they be required? | X | |
| 8 | Will relay setting changes be needed? Any additional outage requirements for changes? | | New relays to be installed |
| G | **Telecom Engineering** | | |
| 1 | Review telecom equipment in existing control enclosure | X | |
| 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. | X | |
| 3 | Review current or proposed Telecom equipment power connections and validate with P&C any need for system 1 and system 2 separation. | X | |
| 4 | Review current Telecom fiber diversity and validate with P&C any fiber diversity requirements. | X | |
| 5 | Review and list any remote station impacts/updates | X | |
| 6 | Confirm whether correct interface equipment is available (i.e.) for fiber termination or multiplexor termination | X | |

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 |
|---|---|---|---|
| 7 | Confirm whether existing communications cabinets are enough to support additional telecommunications equipment installed | X | |
| 8 | Review space for any required additional communications cabinets which may be required to support additional telecommunications equipment installed | X | |
| 9 | Review third party Telecommunications at substation and confirm whether additional capacity or Ground Potential Rise protection is required | X | |

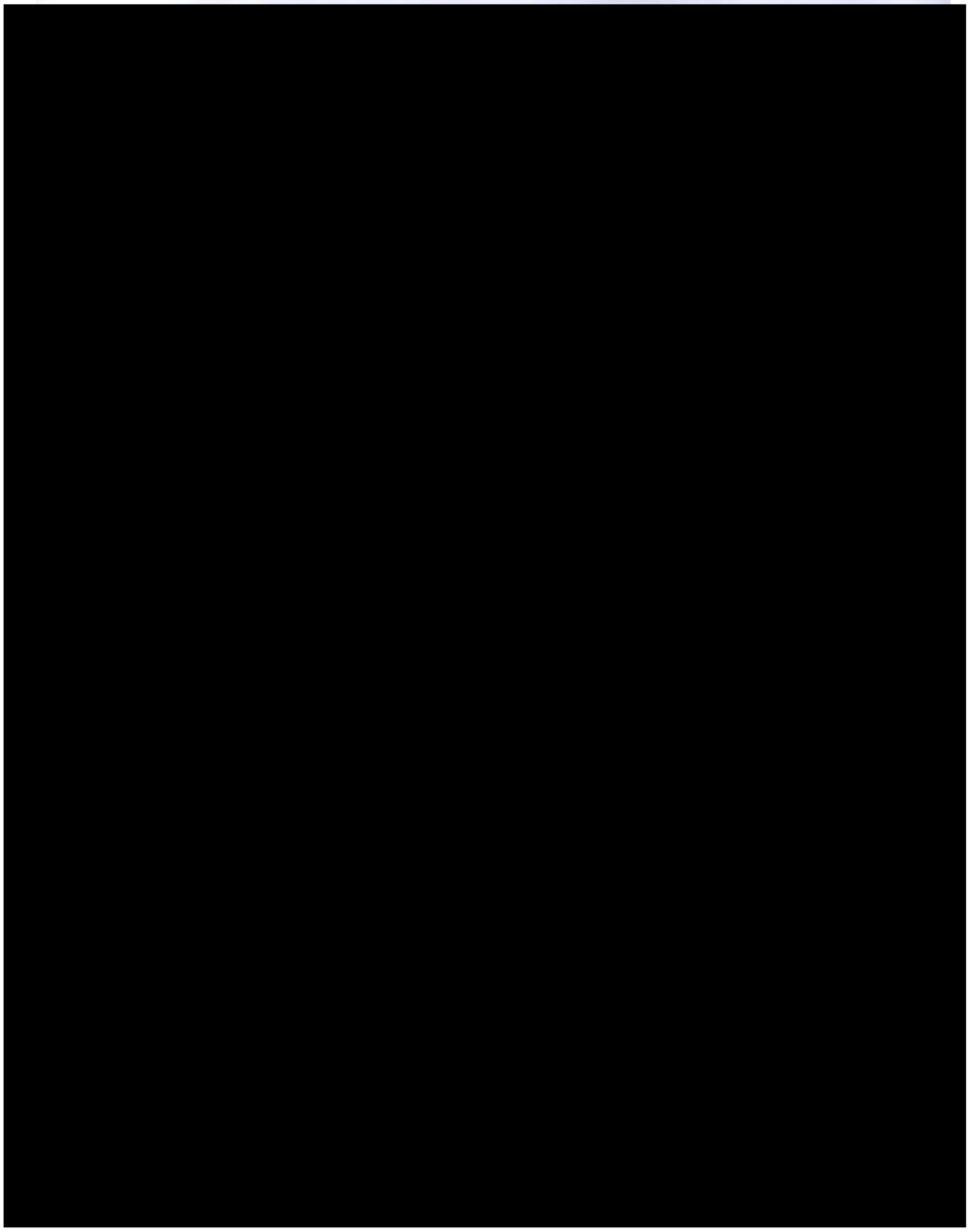
**Photos**



3X – Transformer



3X Transformer



Travel path behind switchgear for 2X transformer



Control House – 2X and 3X relays

[redacted]