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Operations Program Release Form

Approved on March 2, 2022 EPAC

Link to Meeting Minutes

Project Title: DSCADA LTC Controls Upgrade [redacted]	**Project Number: CS00523**
Date Prepared: 02/22/2022	**Company: Eversource CT**
Organization: Asset Management	**Class(es) of Plant: D SS**
Project Initiator: [redacted]	**Project Category: Stations - SCADA**
Managing Organization: Engineering	**Schedule ID#: 80134769**
Project Manager: [redacted]	**Project Type: Program**
Project Sponsor: [redacted]	**Capital Investment part of original Op Plan: Yes**
Estimated in service date: 10/28/2022	**Program Level Title: DSCADA LTC**
Eng./Constr. Resources Budgeted? Yes	**Program Level Project Number: CS00407**
Total Capital Request: $896K	**Facility Type (check all that apply):** ☒ PTF ☐ non-PTF ☒ Distribution ☐ N/A (General

[1] Executive Summary

This Program Release is requesting dollar authorization in accordance with the program level criteria specified in Program Level Project Authorization Form (PAF) - DSCADA LTC Receivers Program Upgrades (CS00407) (see Attachment E) and this document for this specific location. The scope for this Program Release is defined in the Program Level PAF and in this document with modifications necessary that address this location. Location/site modification from the Program Level PAF shall be fully described herein for scope and unit cost.

This Program Release is requesting $896K to [redacted]

The new DSCADA controlled LTC Voltage Reduction System provides the capability to remotely reduce distribution voltage by 5% during system contingencies to help stabilize the transmission

system. The proposed system design also provides System Operations Control (SOC) with the ability to raise/lower the voltage at an individual LTC. Currently only a “general” alarm is sent to the SOC when a transformer problem occurs. DSCADA will notify the SOC whether the raise or lower command was correctly executed as intended with this new system.

The Program Level PAF (CS00407) had $250K of initial funding approved in PowerPlan on May 25, 2021. As of January 03, 2022, no charges ($0K) have been accrued under the old DSCADA LTC Receivers Upgrade Program (CS00090) under WO CS009062. As of February 18, 2022, minimal charges have been incurred under CS00407 program WO 80134769 for engineering and design at [redacted] substation. These prior labor charges will be journaled to this new release upon approval.

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[2] PROGRAM RELEASE COST SUMMARY

Unitized Release Cost

Note: Dollar values are in thousands

Line item Category	*Unitized Program Level PAF Cost	Release Cost	Delta
1. ROW / Easements / Land Acquisition			
2. Environmental Approvals / Permits			
3. Outreach	$ 6	$ 1	($5)
4. Siting Approvals / Permits			
5. Engineering / Design	$36	$35	($1)
6. Materials (Eversource purchased)	$52	$42	($10)
7. Construction (incl matl's by contractors)	$252	$196	($57)
8. Testing / Commissioning	$188	$152	($36)
9. Project Mgmt Team	$22	$9	($13)
10. Removals	$4	$9	$5
11. Other			
12. Risks	$142	$66	($76)
SUBTOTAL DIRECTS W/ RISKS	**$702**	**$509**	**($193)**
13. Indirects/Overhead	$376	$341	($35)
14. AFUDC	$30	$25	($5)
PROJECT TOTAL – BASELINE BUDGET	**$1,108**	**$875**	**($233)**
15. Contingency		$22	$22
TOTAL CAPITAL REQUEST	**$1,108**	**$896**	**($212)**
16. Reimbursables/Customer Contribution			
PROJECT TOTAL (LESS REIMBURSABLES)	**$1,108**	**$896**	**($212)**
O&M			
Total Request	**$1,108**	**$896**	**($212)**

*CT program unit cost (Option #3) is $554,100 per transformer (upgrade, new conduit, and new control) and has been used in the unitized release PAF cost calculations for the [redacted] transformers. New conduit will be run for the 2X transformer; the existing spare conduit will be used for the 3X transformer.

Justification for Modification

1. **ROW / Easements / Land Acquisition: $0K –** No changes from the Program Level PAF.
2. **Environmental Approvals / Permits: $0K –** No changes from the Program Level PAF.
3. **Outreach: ($5K) –** Unit price per transformer reflects outreach required at one (1) station. A savings is realized as any required outreach for two (2) transformers can be accomplished simultaneously.
4. **Siting Approvals / Permits: $0K –** No changes from the Program Level PAF.
5. **Engineering / Design: ($1K) –** No major changes from Program Level PAF. Engineering accounts for previous costs under WO 80134769 and remaining costs estimated to complete engineering to IFC.
6. **Materials (by Eversource): ($10K) –** Savings realized for Eversource purchased materials by allocating purchased materials to the construction line item.
7. **Construction (including materials supplied by contractors): ($57K) –** Savings based on contractor quotes with inclusion of necessary materials. New conduit will be run for the 2X transformer, and the existing spare conduit will be used for the 3X transformer.
8. **Testing / Commissioning: ($36K) –** Savings in costs based on contractor quotes.
9. **Project Management Team: ($13K) –** Savings in economies of scale.
10. **Removals: $5K –** Minor additional removal costs.
11. **Other: $0K –** No changes from the Program Level PAF.
12. **Risk: ($76K) –** Savings recognized in economies of scale, and lower risk from civil work reduction.
13. **Indirects/Overhead: ($35K) –** Indirects are proportional to direct costs and rates used at the time of the estimate.
14. **AFUDC: ($5K) –** No major changes from the Program Level PAF.
15. **Contingency: $22K –** Contingency was not included in the Program Level unitized cost but is included to account for project unknowns and is site specific.
16. **Reimbursables/Customer Contribution: $0K –** No changes from the Program Level PAF.

    O&M: $0K – No changes from the Program Level PAF.

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Project Costs Summary

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2022 to Go	2023	2024	Total
1. ROW / Easements / Land Acquisition						
2. Environmental Approvals / Permits						
3. Outreach			$1			$1
4. Siting Approvals / Permits						
5. Engineering / Design		$7	$20	$7		$35
6. Materials (Eversource purchased)			$42			$42
7. Construction (incl matl's by contractors)			$196			$196
8. Testing / Commissioning			$152			$152
9. Project Mgmt Team			$9			$9
10. Removals			$9			$9
11. Other						
12. Risks			$66			$66
SUBTOTAL DIRECTS W/ RISKS	**$250**	**$7**	**$495**	**$7**		**$509**
13. Indirects/Overhead			$327	$14		$341
14. AFUDC			$25			$25
PROJECT TOTAL – BASELINE BUDGET	**$250**	**$7**	**$847**	**$21**		**$875**
15. Contingency			$22			$22
TOTAL CAPITAL REQUEST	**$250**	**$7**	**$868**	**$21**		**$896**
16. Reimbursables/Customer Contribution						
PROJECT TOTAL (LESS REIMBURSABLES)	**$250**	**$7**	**$868**	**$21**		**$896**
O&M						
TOTAL REQUEST	**$250**	**$7**	**$868**	**$21**		**$896**

Detail other costs, project risk items and their allocations:

Risk	Allocation
1. Potential UG obstructions	$20K
2. Severe weather delays, OT	$30K
3. Design Development & Field Mark-up changes	$16K
4.	
5.	
Total	**$66**

Explain unique payment provisions, if applicable: N/A
Identify and detail any unique O&M impacts resulting from this project: N/A

[3] PROJECT SCOPE

In accordance with the EPAC Approved Program, CS00407 DSCADA LTC Receivers Program Upgrades, the objective of this release is to replace the existing analog radio based LTC voltage reduction system at the [redacted] with a DSCADA based system. This substation has been selected by Engineering for upgrade under the CS00407 program.

When required by Independent System Operator - New England (ISO-NE), the DSCADA upgrade to transformer [redacted] will provide the SOC with the ability to reliably raise and or lower the distribution voltage. Provisions are made in the design to enable lowering the voltage at this substation alone or as part of a group. This DSCADA upgrade will provide for transformer information and alarms to be carried back to the SOC with the DSCADA technology. The nomenclature diagram for [redacted] is included as Attachment D.

[redacted].

The existing analog based simplex radio system replacement is in support of the voltage reduction capability per reference document, OP-13 Standards for Voltage Reduction and Load Shedding ISO New England Operating Procedure.

Scope of Work Details

[redacted]

9. [redacted]

Major Material

1. Two (2) LTC DSCADA Cabinet RTUs, one (1) for each transformer
2. Two (2) LTC tap position monitors, one (1) for each transformer
3. Two (2) M-2001D Beckwith tap changer controls with M-2280B Adapter Panels

A constructability review was completed on October 29, 2021. The constructability review form is included as Attachment C.

[4] ALTERNATIVES CONSIDERED

No changes from the DSCADA Program Level PAF CS00407.

[5] PROJECT SCHEDULE

Milestone	Scheduled Completion Date
Project Need by Date	N/R
Date of Program IFR Approval	5/25/2021
Complete Conceptual Design	N/R
SDC Program Approval Date	N/R
EPAC Program Approval Date	N/R
Conversion of Tx development costs, 183 to 107 (applicable to projects that require SSF approval but do not require ISO alternative selection)	N/R
Preliminary Design Constructability review complete	October 29,2021 - Complete
Final Constructability Review Complete	January 24, 2022 - Complete
Preliminary Design Complete	February 4, 2022 - Complete
Full funding estimate review	February 8, 2022 - Complete
Full funding estimate complete	February 11, 2022 - Complete
Initiator complete PAF form	February 18, 2022 - Complete
Detail Design Complete	February 18, 2022
IFC Design Complete	February 18 2022
EPAC Full Funding Date	March 2, 2022
Relay Settings Issued (*Required for Full Funding requests)	April 11, 2022
Targeted Milestone Dates:	
· Siting Approval (if applicable)	N/R
· Env. Approvals (if applicable)	N/R
· Outage & Energization Plan Issued	August 26, 2022
· All Material on Site	July 2, 2022
· Outage Permit(s) Approved	September 2022
Start of Construction	August 1, 2022
Project ISD	October 28, 2022
ISO Related Milestones (for applicable projects)	
· ISO Preferred Alternative Selected	N/R
· Conversion of Tx development costs, 183 to 107 · (following ISO preferred alternative selection)	N/R
· PAC Presentation	N/R
· TCA Submittal	N/R

See Attachment B for the P6 schedule.

[6] Regulatory Approvals

N/R

[7] Risk and Risk Mitigation Plans

Contingency:

Contingency of $22K is included in the estimate for project unknowns.

Risk Mitigation:

Risk	Mitigation
1. Potential UG obstructions	Risk allocation is included for additional costs to reroute
2. Severe weather delays, OT	Risk allocation is included for additional labor costs
3. Design Development & Field Mark-up changes	Risk allocation is included for additional engineering and design costs
4. SCLL Conditions	SCLL conditions will be mitigated utilizing the short recall time if needed.
5.	

[8] References

References
1. OP-13 Standards for Voltage Reduction and Load Shedding ISO New England Operating Procedure 08022019

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

Attachment	Included in Submittal?
A - CS00523 [redacted] DCADA LTC Upgrade DME C-25-35	*YES*
B.- CS00523 [redacted] P6 Schedule 02142022	*YES*
C - CS00523 [redacted] Constructability Review DSCADA LTC Upgrade 02212022	*YES*
D - [redacted] Nomenclature Diagram	*YES*
E - CS00407 - DSCADA LTC Receivers Prgm Upgrades - Prgm Level Initial Funding - PAF	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: DSCADA LTC Controls Upgrade [redacted]	**Project Number: CS00523**		
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?	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?	No		
Are there any changes to the baseline audible noise?	No		
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: DSCADA LTC Controls Upgrade [redacted]	**Project Number:CS00523**

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?	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?	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 - Full Review

ESTIMATE SUMMARY

Project Title [redacted] - DSCADA LTC UPGRADES
Project Manager [redacted]

Project Number: CS00523
WO & Task #: 80134769
Estimate revision #: 00
Estimate Type - Station work

Estimate #: C-22-35
Date of Estimate:01/25/2022

Estimate done by [redacted]
In Service date (ISD):12/30/2022

Template Revision # 01.70a

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: C-22-35
Date of Estimate 01/25/2022

Project Number: CS00523
WO & Task #: 80134769

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	TOTAL w/ escal broken out
1	ROW / Easements / Land purchases															$ -
2	Environmental Approvals / Permits															$ -
3	Outreach	$800	0.2%	0.1%		$800										$ 900
4	Siting Approvals / Permits															$ 100
5	Engineering / Design	$34,500	6.8%	3.9%	$7,100	$20,300	$7,100									$ 34,300
6	Materials (Eversource purchased)	$42,200	8.3%	4.7%		$42,200										$ 42,200
7	Construction (incl matl's by contractors)	$196,100	38.5%	21.9%		$196,100										$ 196,100
8	Testing / Commissioning	$151,800	29.8%	16.9%		$151,800										$ 151,800
9	PMT Project Mgmt Team	$8 500	1.7%	0.9%		$8 500										$ 8 500
10	Removals	$8,900	1.7%	1.0%		$8,900										$ 8,900
11	Other															$ -
12	Risks	$66,000	13.0%	7.4%		$66,000										$ 66,000
125																
	Project Directs Total w/Risks	**$508,800**	100.0%	56.8%	**$7,100**	**$494,600**	**$7,100**									**$508,800**
13	Indirects/Overhead	$340,800		38.0%		$327,100	$13,700									$ 340,400
14	AFUDC	$24 900		2.8%		$24 900										$ 24 900
125																$ -
	Project Total - Baseline Budget	**$874,500**		97.6%	**$7,100**	**$846,600**	**$20,800**									**$874,100**
15	Contingency	$21,500		2.4%		$21,500										$ 21,500
	Project Total - Funding Approval Level	**$896,000**		100.0%	**$7,100**	**$868,100**	**$20,800**									**$895,600**
16	Reimbursables/Customer Contribution															$ -
																$ -
	Project Total (less reimbursables)	**$896,000**			**$7,100**	**$868,100**	**$20,800**									**$895,600**
	Cost per key qty (if appl)	448,000	$'s / EA													
	Amount of Escalation included above	$600					$600									$ 600
6	Total materials - Eversource	$42.200				$42.200										
	Total materials - Contractor															
	Total materials	$42.200				$42.200										Escal total **$896.200**
	NOTE: Risk / Contingency is 10.8% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)															Check total $200

Estimate Range

	-25%	25%
	$672,000	**$1,120,000**

COMMENTS:

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

2	EA

[redacted]

Major Materials
Two (02) CABINETS, ENCLOSURE, LTC DSCADA, AL, 24 IN X 18 IN X 14 IN .
Two (02) MONITORS, LTC TAP POS, PROGRAMMABLE, 120VAC, 4 TO 20 MA ANALOG OUTPUT, RS-232.
Two (02) M-2001D Beckwith tap changer controls only with new *Adopter Panels*.

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

1.This estimate assumes all construction (electrical, test and civil) will be outsourced. each transformer will need to be de-energized for 5 days for installation, and testing will take place partially during the outage and upon energization.
2.The estimate include manhours for Lead Commission Engineer, Construction Representative, Electrical, Test and Civil
3.Estimated risks are assumed to be 7% of the project total cost as per the estimating group recommendations
4.DSCADA commissioning and switching will be done in house.
5.Estimate assumes existing communication are in good working condition.
6.Drawings have been issued
7.The transformer alarms will be modified and will be taken back to the SEL-2240 Axion.
8. Priors **of $7.1k** posted on Initial Funding Project/Work Order; CS00407/80013476 9 will be journaled to this Program Release Project"
9. 250ft length of *New 3 conduit* will be used for 2X transformer and 3X will use the existing spare 2" Conduit#13 upon verification which seems to be routed from 3X-> MH2-> MH1->Control house) for fiber installation from DSCADA Cabinet in Control House to LTC cabinets mounted on Tranformers. The existing conduit will need verification for any stubs prior to use.
* On the 24A-2X replace existing M-2001B (without a Comm-port) control with the new 2001D control and *new M-2280B Adopter Panel.*

RISKS

Potential UG Obstructions	$ 20,000
Severe Weather Delays OT	$ 30,000
Design development & Field mark Up Changes	$ 16,000

UNESCALATED LINE ITEM

Project Number CS00523
Date of Estimate 01/25/2022
Estimate revision # 00

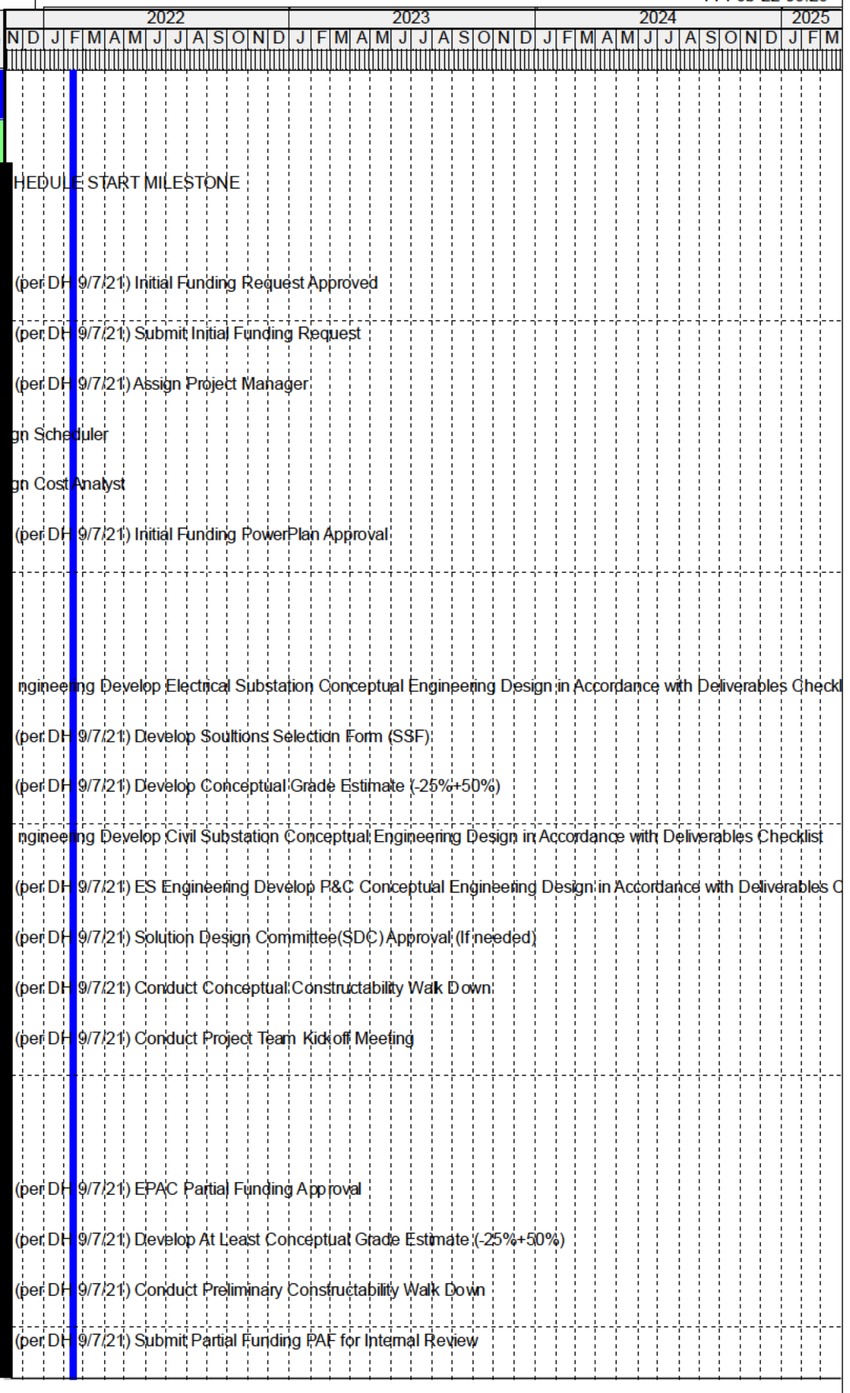
Escalation R... E Rate $ 55

	Prior Mhrs	Prior DOLLARS	2022 DOLLARS	2023 DOLLARS	TAL DOLLARS
CSTXX-CONSTRUCTION					
Electrical Construction					
General Construction					
SCADA / Automation			$4,200		$4,200
Telecom - Field					
Construction Reps (internal)			$1,890		$1,890
Support Switch/Tag			$4,404		$4,404
Other (specify)					
Other (specify)					
Other (specify)					
LT Total			$10,494		$10,494
Employee Expenses			$525		$525
Construction Purchased Material			$1,798		$1,798
Outside Construction Vendor			$179,760		$179,760
Sales tax on Constr. Vendor					
Vehicles (now in indirects section)					
Inspection services (Outside Vendor)					
Construction Rep (Outside vendor)			$5,328		$5,328
Rents and Leases					
CSTXX Subtotal			$197,905		$197,905
Escalation					
CSTXX Total			$197,905		$197,905
ENRXX-TG ENGINEERING/DESIGN					
Project Services/Drafting			$3,098	$774	$3,872
T- Line Engineering/Design					
D- Street Engineering/Design					
Civil Engineering/Design			$1,162	$387	$1,549
Substation (T) Engineering/Design					
Substation (D) Engineering/Design			$4,200	$1,260	$5,460
Protection & Controls Engineering			$3,629	$907	$4,536
Survey Engineering					
SCADA / Automation Engineering					
Telecom Engineering			$1,334	$890	$2,224
Other - PP Actuals		$7,125			$7,125
Other - Project Engineer					
LT To		$7,125	$13,423	$4,218	$24,766
Employee Expenses			$671	$211	$882
Contractor Engineering - T-Lines					
Contractor Engineering - D-Street					
Contractor Engineering - T -Station					
Contractor Engineering - D-Station					
Contractor Engineering - P&C					
Contractor Engineering - Survey					
Contractor Engineering - SCADA / Automation					
Contractor Engineering - Telecom					
Contractor Engineering - AM			$6,200	$2,480	$8,680
Contractor Engineering - Specify					
Contractor Engineering - Specify					
Vehicles (now in indirects section)					
ENRXX Subtotal		$7,125	$20,294	$6,909	$34,328
Escalation					
ENRXX Total		$7,125	$20,294	$6,909	$34,328
LNDXX-TG LAND					
Real Estate					
Employee Expenses					
Purchase Land					
Vehicles (now in indirects section)					
Fees and Payments					
LNDXX Subtotal					
Escalation					
LNDXX Total					
MATXX-TG MATERIAL					
Eversource			$38,900		$38,900
Outside Services					
Freight					
Sales Tax Eversouce/outside services			$1,500		$1,500
Other					
MATXX Subtotal			$40,400		$40,400
Escalation					
MATXX To			$40,400		$40,400
PSMXX-PROJECT MANAGER & SUPPORT					
Project Management (PM)			$4,368		$4,368
Project Planning/Cost (IP)					
Contracts/Purchasing (CIP)					
System Planning					
Environmental					
SCS - Notification			$42	$1	$43
Legal					
Estimating			$2,368		$2,368
Siting - Local Zoning			$100		$100
Asset Management			$1,361		$1,361
Other -					
Other -					
Other -					
Other -					
LT To			$8,239	$1	$8,240
Employee Expenses			$412		$412
Project Support Vendor - PM					
Project Support Vendor - IP					
Project Support Vendor - CIP					
Project Support Vendor - System Planning					
Project Support Vendor - Enviromental					
Project Support Vendor - SCS - Notification			$800	$10	$810
Project Support Vendor - Legal					
Project Support Vendor - Estimating					
Project Support Vendor - Siting - Local Zoning					
Project Support Vendor - Asset Management					
Project Support Vendor - Other					
Project Support Vendor - Other					
Project Support Vendor - Other					
Project Support Vendor - Other					
Vehicles (now in indirects section)					
Property or CWIP tax large proj. allowance					
Builder All risk insurance excluding deductables(if projec over $50m)					
Fees and Payments - Enviromental					
Fees and Payments - Siting					
Fees and Payments - Other					
PSMXX Subtotal			$9,451	$11	$9,462
Escalation					
PSMXX To			$9,451	$11	$9,462
REMXX-TG REMOVAL					
Engineering/Design					
Internal Construction					
LT To					
Employee Expenses					
Outside Services					
Contractor Labor			$8,880		$8,880
Vehicles (now in indirects section)					
Rents and Leases					
REMXX Subtotal			$8,880		$8,880
Escalation					
REMXX To			$8,880		$8,880
TSTXX-TG TEST					
Test / Field Engr. Labor (In House)					
Lead Commissioning Engr. (LCE) (internal)					
Employee Expense					
Test / Field Engr. Labor (contractor)			$96,200		$96,200
Lead Commissioning Engr. (LCE) (contactor)			$55,640		$55,640
Vehicles (now in indirects section)					
TSTXX Subtotal			$151,840		$151,840
Escalation					
TSTXX To			$151,840		$151,840
SUBTOTAL PROJECT DIRECT COST	-	**$7,125**	**$428,770**	**$6,920**	**$442,815**
Risk					
Risk			$66,000		$66,000
			$ -	$ -	
			$ -	$ -	
Risk Total			$66,000		$66,000
TOTAL PROJECT DIRECT COST (w risk)	-	**$7,125**	**$494,770**	**$6,920**	**$508,815**

INDIRECTS					
Non-Productive Time Allocation (**ZNP**)	15.1%		$4,839	$635	$5,474
Payroll Benefits Allocation (**ZPB**) incl NPT	44.0%		$5,312		$5,312
Gen SVC CO Overhead (**ZGS**) incl NPT	80.0%		$19,938	$3,883	$23,821
E&S Allocations (**ZEB,ZEL,ZES**)	60.0%		$249,032	$6,736	$255,768
AS&E Allocations (**ZAS**)	1.3%		$8,849	$227	$9,076
Stores Expense Allocation (**ZST**)	8.0%		$3,112		$3,112
Lobby Stock					
MDEC (**ZMI**)	6.0%		$26,982	$686	$27,668
Vehicles (**ZVE**)	28.0%		$9,004	$1,181	$10,185
Indirects Subtotal			$327,068	$13,348	$340,416
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)		**$7,125**	**$821,838**	**$20,268**	**$849,231**

AFUDC					
AFUDC (ZK)		6.50%	$24,908	6.50%	1 $24,908
In Service Dollars					
Cumulative ISS			-	-	
AFUDC Subtotal			$24,908		$24,908
TOTAL PROJECT COST - Baseline Budget		**$7,125**	**$846,746**	**$20,268**	**$874,139**
Contingecy					
Contingency			$21,541		$21,541
Other		$ -	$ -	$ -	
Contingency SubTotal			$21,541		$21,541
TOTAL PROJECT COST - Approved Funding		**$7,125**	**$868,287**	**$20,268**	**$895,680**
Reimbursables / Customer Contribution					
Reimbursables / Customer Contribution (enter as negative)		$ -	$ -	$ -	

Activity Flag	Activity ID	Activity Name	At pletion	Start	Finish	Resources	Activity Schedule
80134769 [redacted] DSCADA LTC Automation WO# (CS00523			347	07-Sep-21 A	26-Jan-23		
80134769.01 INITIALIZATION AND SCOPE DEVELOPEMENT			250	07-Sep-21 A	05-Sep-22		
	START	SCHEDULE START MILESTONE	0	20-Sep-21 A			
80134769.01.01 Initial Funding			0	07-Sep-21 A	07-Sep-21 A		
EPAC-I	PI1300	N/R (per DH 9/7/21) Initial Funding Request Approved	0		07-Sep-21 A		
	PI1000	N/R (per DH 9/7/21) Submit Initial Funding Request	0		07-Sep-21 A		
PM-AM	PI1400	N/R (per DH 9/7/21) Assign Project Manager	0	07-Sep-21 A	07-Sep-21 A		
	PI1500	Assign Scheduler	0	07-Sep-21 A	07-Sep-21 A		
	PI1600	Assign Cost Analyst	0	07-Sep-21 A	07-Sep-21 A		
PPA-IF	PI1010	N/R (per DH 9/7/21) Initial Funding PowerPlan Approval	0	07-Sep-21 A	07-Sep-21 A	Eversource Project	
	PI1200	N/R (per DH 9/7/21) Project Initiator Develop Intitial Funding Request	0	07-Sep-21 A	07-Sep-21 A		
80134769.01.02 SDC Approval			0	07-Sep-21 A	07-Sep-21 A		
ES-CONCPT	CE1100	ES Engineering Develop Electrical Substation Conceptual Engineering Design in Accordance with Deliverables Checklist	0	07-Sep-21 A	07-Sep-21 A	SUBSTATIC ENGINEER	
	SSF1000	N/R (per DH 9/7/21) Develop Soultions Selection Form (SSF)	0	07-Sep-21 A	07-Sep-21 A		
EST-SDC	CGE1000	N/R (per DH 9/7/21) Develop Conceptual Grade Estimate (-25%+50%)	0	07-Sep-21 A	07-Sep-21 A	Generic Estimating	
ES-CONCPT	CE1000	ES Engineering Develop Civil Substation Conceptual Engineering Design in Accordance with Deliverables Checklist	0	07-Sep-21 A	07-Sep-21 A	CT-SS Civil Designer	
ES-CONCPT	CE1400	N/R (per DH 9/7/21) ES Engineering Develop P&C Conceptual Engineering Design in Accordance with Deliverables Checklist	0	07-Sep-21 A	07-Sep-21 A	CT- P&C Engineer	
SDC	SDC1000	N/R (per DH 9/7/21) Solution Design Committee(SDC) Approval (If needed)	0		07-Sep-21 A		
	CE1710	N/R (per DH 9/7/21) Conduct Conceptual Constructability Walk Down	0	07-Sep-21 A	07-Sep-21 A		
	CE1600	N/R (per DH 9/7/21) Conduct Project Team Kickoff Meeting	0	07-Sep-21 A	07-Sep-21 A		
80134769.01.09 Project Initiation			134	07-Sep-21 A	22-Mar-22		
80134769.01.09.2 EPAC Partial Funding			0	07-Sep-21 A	07-Sep-21 A		
EPAC-P	PF1000	N/R (per DH 9/7/21) EPAC Partial Funding Approval	0	07-Sep-21 A	07-Sep-21 A	Eversource Project	
EST-PART	ATCGE1010	N/R (per DH 9/7/21) Develop At Least Conceptual Grade Estimate (-25%+50%)	0	07-Sep-21 A	07-Sep-21 A	Generic Estimating	
	PE1700	N/R (per DH 9/7/21) Conduct Preliminary Constructability Walk Down	0	07-Sep-21 A	07-Sep-21 A		
	PAFP1000	N/R (per DH 9/7/21) Submit Partial Funding PAF for Internal Review	0	07-Sep-21 A	07-Sep-21 A		



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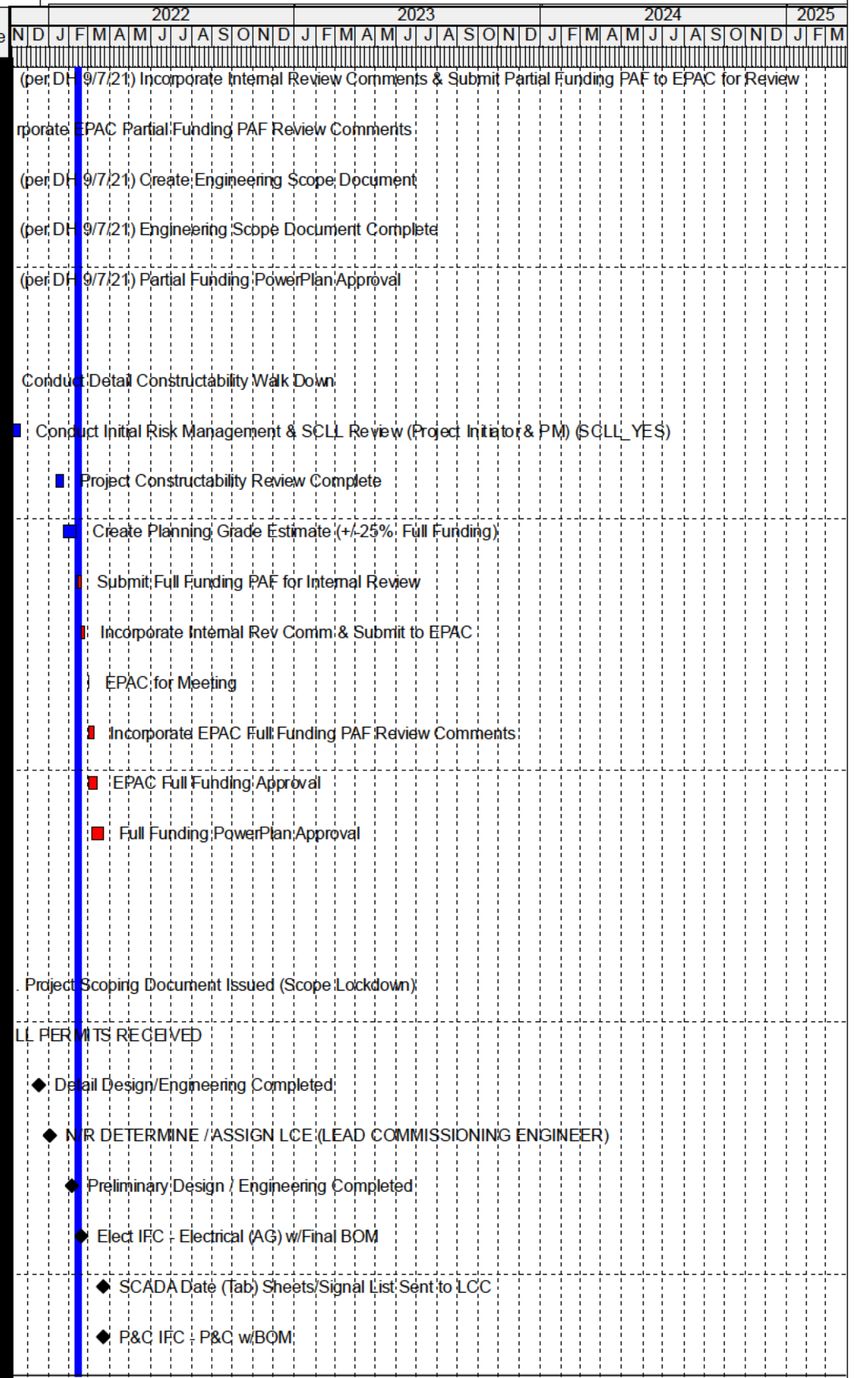
Activity Flag	Activity ID	Activity Name	At pletion	Start	Finish	Resources	Activity Schedule
	PAFP1100	N/R (per DH 9/7/21) Incorporate Internal Review Comments & Submit Partial Funding PAF to EPAC for Review	0	07-Sep-21 A	07-Sep-21 A		
	PAFP1200	Incorporate EPAC Partial Funding PAF Review Comments	0	07-Sep-21 A	07-Sep-21 A		
	PE1710	N/R (per DH 9/7/21) Create Engineering Scope Document	0	07-Sep-21 A	07-Sep-21 A	CT- Project Engineer Generic	
Scope Comp	PE1720	N/R (per DH 9/7/21) Engineering Scope Document Complete	0		07-Sep-21 A		
PPA-PF	PF1010	N/R (per DH 9/7/21) Partial Funding PowerPlan Approval	0	07-Sep-21 A	07-Sep-21 A	Eversource Project Approval	
80134769.01.09.3 EPAC Full Funding			98	28-Oct-21 A	22-Mar-22		
	DE1900	Conduct Detail Constructability Walk Down	1	28-Oct-21 A	28-Oct-21 A		
	DE1700	Conduct Initial Risk Management & SCLL Review (Project Initiator & PM) (SCLL_YES)	15	29-Oct-21 A	19-Nov-21 A		
Construct	DE2000	Project Constructability Review Complete	8	12-Jan-22 A	24-Jan-22 A		
EST-FULL	DE1600	Create Planning Grade Estimate (+/-25% Full Funding)	15	24-Jan-22 A	11-Feb-22 A	Generic Estimating	
	PAFF2000	Submit Full Funding PAF for Internal Review	6	11-Feb-22 A	18-Feb-22		
PAF Submit	PAFF2100	Incorporate Internal Rev Comm & Submit to EPAC	4	19-Feb-22	22-Feb-22*		
PAF Submit	PAFF2105	EPAC for Meeting	1	02-Mar-22*	02-Mar-22		
	PAFF2200	Incorporate EPAC Full Funding PAF Review Comments	4	03-Mar-22*	08-Mar-22		
EPAC-F	FF1000	EPAC Full Funding Approval	8	03-Mar-22*	14-Mar-22	Eversource Project Approval	
PPA-FF	FF1010	Full Funding PowerPlan Approval	11	08-Mar-22*	22-Mar-22	Eversource Project Approval	
80134769.01.12 T-Minus Milestones			250	07-Sep-21 A	05-Sep-22		
80134769.01.12.1 T-Minus Milestones "A"Electrical			250	07-Sep-21 A	05-Sep-22		
ENG-SCOPE	A1100	Eng. Project Scoping Document Issued (Scope Lockdown)	0		07-Sep-21 A		
	AT0801	ALL PERMITS RECEIVED	0		04-Oct-21 A		
ENG-DTL	A3560	Detail Design/Engineering Completed	0		17-Dec-21 A		
	AT2404	N/R DETERMINE / ASSIGN LCE (LEAD COMMISSIONING ENGINEER)	0		03-Jan-22 A		
ENG-PRELIM	A1090	Preliminary Design / Engineering Completed	0		04-Feb-22 A		
AG-IFC	AT0805E	Elect IFC - Electrical (AG) w/Final BOM	0		18-Feb-22		
	AT1201	SCADA Date (Tab) Sheets/Signal List Sent to LCC	0		23-Mar-22		
BG-IFC	AT0805P	P&C IFC - P&C w/BOM	0		23-Mar-22		



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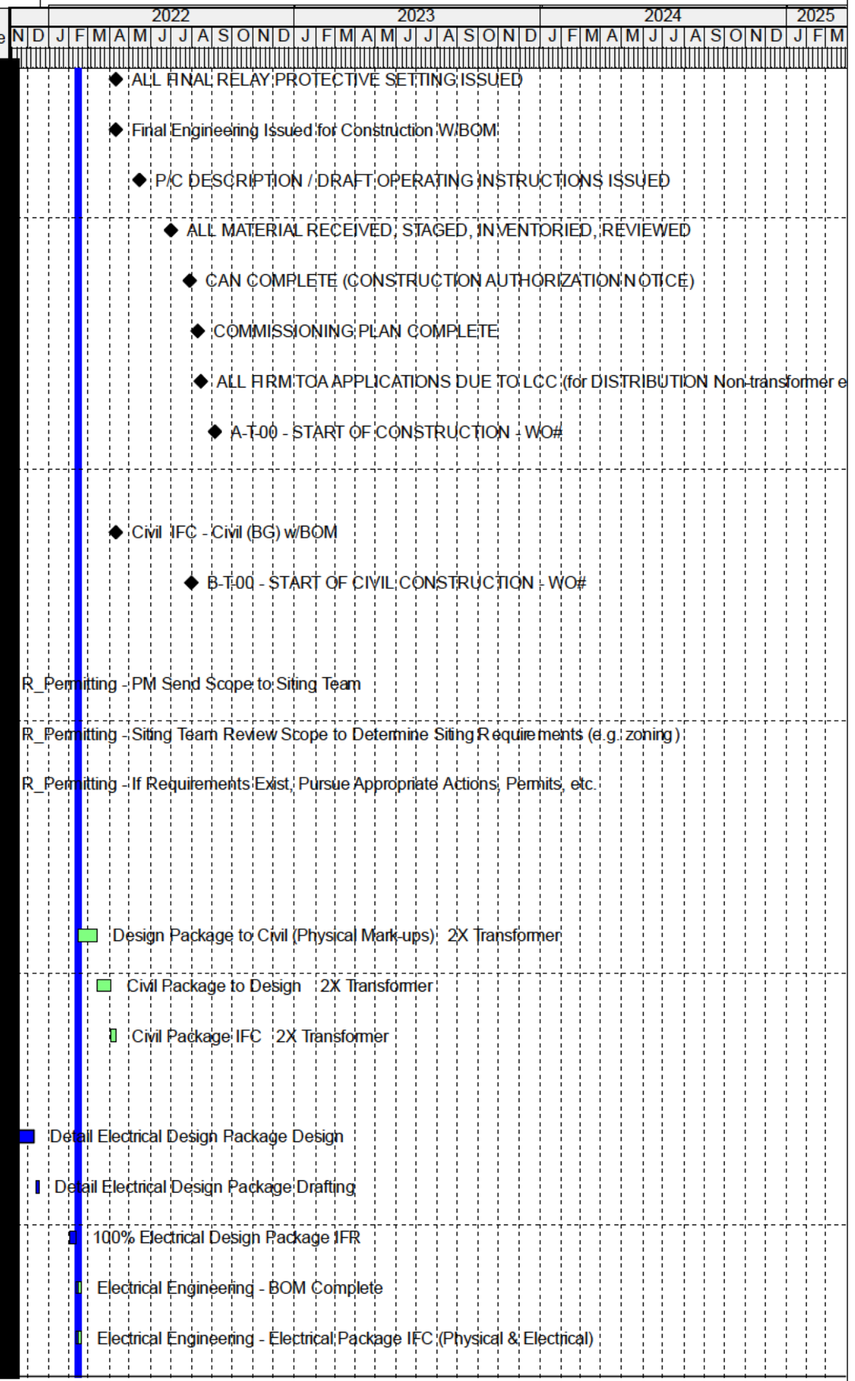
Activity Flag	Activity ID	Activity Name	At pletion	Start	Finish	Resources
	AT0404	ALL FINAL RELAY PROTECTIVE SETTING ISSUED	0		11-Apr-22	
ENG-IFC	A3570	Final Engineering Issued for Construction W/BOM	0		11-Apr-22	
	AT1202	P/C DESCRIPTION / DRAFT OPERATING INSTRUCTIONS ISSUED	0		16-May-22	
	AT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED	0		02-Jul-22	
	AT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)	0		29-Jul-22	
	AT1301	COMMISSIONING PLAN COMPLETE	0		10-Aug-22	
	AT0409	ALL FIRM TOA APPLICATIONS DUE TO LCC (for DISTRIBUTION Non-transformer equipment)	0		15-Aug-22	
SOC	AT00	A-T-00 - START OF CONSTRUCTION - WO#	0	05-Sep-22*		
80134769.01.12.2 T-Minus Milestones "B" Civil			111	11-Apr-22	01-Aug-22	
BG-IFC	BT0805C	Civil IFC - Civil (BG) w/BOM	0		11-Apr-22	
SOC	BT00	B-T-00 - START OF CIVIL CONSTRUCTION - WO#	0	01-Aug-22*		
80134769.04 SITING APPROVALS AND PERMITS			1	04-Oct-21 A	04-Oct-21 A	
	A3590	N/R_Permitting - PM Send Scope to Siting Team	1	04-Oct-21 A	04-Oct-21 A	
	A3600	N/R_Permitting - Siting Team Review Scope to Determine Siting Requirements (e.g. zoning)	1	04-Oct-21 A	04-Oct-21 A	
	A3610	N/R_Permitting - If Requirements Exist, Pursue Appropriate Actions, Permits, etc.	1	04-Oct-21 A	04-Oct-21 A	
80134769.05 ENGINEERING & DESIGN			129	09-Nov-21 A	16-May-22	
80134769.05.01 Civil Engineering			40	14-Feb-22	11-Apr-22	
	DSSE-100	Design Package to Civil (Physical Mark-ups) 2X Transformer	20	14-Feb-22	14-Mar-22	
	DSSE-110	Civil Package to Design 2X Transformer	15	15-Mar-22	04-Apr-22	
ES-IFC	DSSE-120	Civil Package IFC 2X Transformer	5	05-Apr-22	11-Apr-22	
80134769.05.02 Electrical Engineering			126	15-Nov-21 A	16-May-22	
	DSSE-200	Detail Electrical Design Package Design	19	15-Nov-21 A	10-Dec-21 A	
ES-DTL	DSSE-205	Detail Electrical Design Package Drafting	5	13-Dec-21 A	17-Dec-21 A	
ES-100%	DSSE-210	100% Electrical Design Package IFR	8	01-Feb-22 A	10-Feb-22 A	
	DSSE-230	Electrical Engineering - BOM Complete	6	11-Feb-22 A	18-Feb-22	
ES-IFC	DSSE-240	Electrical Engineering - Electrical Package IFC (Physical & Electrical)	6	11-Feb-22 A	18-Feb-22*	



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Activity Flag	Activity ID	Activity Name	At pletion	Start	Finish	Resources
	DSSE-920	Operating Instructions - SSED Review Draft Convex OI	5	10-May-22	16-May-22	
	DSSE-460	Operating Instructions - SSED Review Draft Distribution OI	5	10-May-22	16-May-22	
80134769.05.03 Distribution Thermal Ratings NX-9			1	18-Nov-21 A	18-Nov-21 A	
80134769.05.03.05 Non NX-9 Thermal Ratings			1	18-Nov-21 A	18-Nov-21 A	
	NX9A-EM74	N/R_ LRC Files Capability Sheets	1	18-Nov-21 A	18-Nov-21 A	
	NX9A-EM64	N/R_ TRC Reviews and Approves Non-NX9 Thermal Rating Data	1	18-Nov-21 A	18-Nov-21 A	
	NX9A-EM54	N/R_ LTRC Prepares and Sends Non-NX9 Thermal Rating Data for TRC Review	1	18-Nov-21 A	18-Nov-21 A	
	NX9A-EM44	N/R_ P&C Develops and Provides LTRC with P&C Checklist & Thermal Ratings Data	1	18-Nov-21 A	18-Nov-21 A	
80134769.05.04 P&C Engineering			129	09-Nov-21 A	16-May-22	
ES-CONCPT	DSSE-400	Prepare & Issue P&C Design Package to Drafting	20	09-Nov-21 A	08-Dec-21 A	
ES-PRELIM	A3380	Issue P&C Package Design	14	14-Jan-22 A	04-Feb-22 A	
	DSSE-410	Drafting Prepare & Issue Back to P&C	3	31-Jan-22 A	02-Feb-22 A	
	DSSE-480	P&C INITIATE CASCADE FORMS (Apenndix A) for Construction	20	22-Feb-22	21-Mar-22	
	DSSE-990	PE INITIATE SCADA Data Sheets	20	22-Feb-22	21-Mar-22	
	DSSE-220	SDS Complete	2	22-Mar-22	23-Mar-22	
	DSSE-450	Operating Instructions - Prepare and Issue Draft Distribution OI to Engineering	20	12-Apr-22	09-May-22	
	DSSE-470	Operating Instructions - P&C Review Draft Distribution OI	5	10-May-22	16-May-22	
	DSSE-930	Operating Instructions - P&C Review Draft Convex OI	5	10-May-22	16-May-22	
80134769.05.04.1 Relay Settings			20	15-Mar-22	11-Apr-22	
ES-RSET	DSSE-440	Relay Settings - Prepare and Issue Relay Settings IFC	20	15-Mar-22	11-Apr-22	
80134769.06 MATERIAL PROCUREMENT			159	15-Nov-21 A	02-Jul-22	
80134769.06.01 MATERIAL FOR P&C			27	15-Mar-22	20-Apr-22	
DR-RM	DSSE-510	MATERIAL - P&C - Prepare & Issue DR	5	15-Mar-22	21-Mar-22	
	DSSE-980	MATERIAL - P&C - Procurement Issue PO	5	22-Mar-22	26-Mar-22	Purchasing Departmen
	DSSE-1000	MATERIAL - P&C - Material Vendor Delivery Leadtime	24	27-Mar-22	19-Apr-22	Purchasing Departmen
M-DELIV	DSSE-1010	MATERIAL - P&C - Confirm Material Delivery to Site	1	20-Apr-22	20-Apr-22	Purchasing Departmen

Activity Schedule

2022 2023 2024 2025

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M

Operating Instructions - SSED Review Draft Convex OI
Operating Instructions - SSED Review Draft Distribution OI
N/R_ LRC Files Capability Sheets
N/R_ TRC Reviews and Approves Non-NX9 Thermal Rating Data
N/R_ LTRC Prepares and Sends Non-NX9 Thermal Rating Data for TRC Review
N/R_ P&C Develops and Provides LTRC with P&C Checklist & Thermal Ratings Data
Prepare & Issue P&C Design Package to Drafting
Issue P&C Package Design
Drafting Prepare & Issue Back to P&C
P&C INITIATE CASCADE FORMS (Apenndix A) for Construction
PE INITIATE SCADA Data Sheets
SDS Complete
Operating Instructions - Prepare and Issue Draft Distribution OI to Engineering
Operating Instructions - P&C Review Draft Distribution OI
Operating Instructions - P&C Review Draft Convex OI
Relay Settings - Prepare and Issue Relay Settings IFC
MATERIAL - P&C - Prepare & Issue DR
MATERIAL - P&C - Procurement Issue PO
MATERIAL - P&C - Material Vendor Delivery Leadtime
MATERIAL - P&C - Confirm Material Delivery to Site

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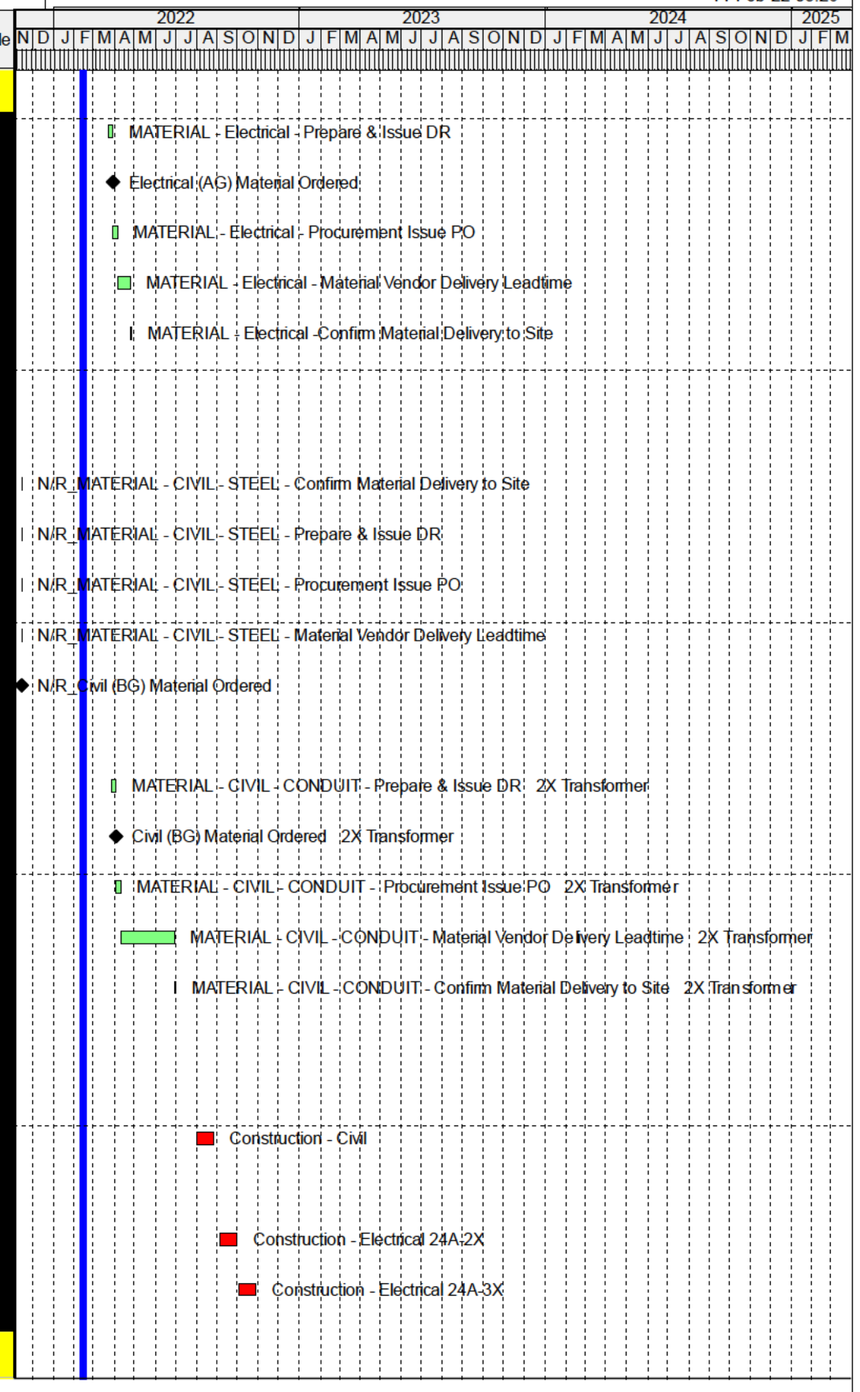
Activity Flag	Activity ID	Activity Name	At pletion	Start	Finish	Resources	Activity Schedule
80134769.06.02 MATERIAL FOR ELECTRICAL			25	23-Mar-22	26-Apr-22		
DR-RM	DSSE-520	MATERIAL - Electrical - Prepare & Issue DR	5	23-Mar-22	29-Mar-22	[redacted]	
DR-AGMAT	DSSE-530	Electrical (AG) Material Ordered	0		29-Mar-22		
	DSSE-1020	MATERIAL - Electrical - Procurement Issue PO	5	30-Mar-22	05-Apr-22	Purchasing Departmen	
	DSSE-1030	MATERIAL - Electrical - Material Vendor Delivery Leadtime	20	06-Apr-22	25-Apr-22	Purchasing Departmen	
M-DELIV	DSSE-550	MATERIAL - Electrical -Confirm Material Delivery to Site	1	26-Apr-22	26-Apr-22	Purchasing Departmen	
80134769.06.03 MATERIAL FOR CIVIL			159	15-Nov-21 A	02-Jul-22		
80134769.06.03.01 MATERIAL FOR CIVIL - STEEL			1	15-Nov-21 A	15-Nov-21 A		
M-DELIV	DSSE-560	N/R_MATERIAL - CIVIL - STEEL - Confirm Material Delivery to Site	1	15-Nov-21 A	15-Nov-21 A	Purchasing Departmen	
DR-RM	DSSE-500	N/R_MATERIAL - CIVIL - STEEL - Prepare & Issue DR	1	15-Nov-21 A	15-Nov-21 A	[redacted]	
	DSSE-1040	N/R_MATERIAL - CIVIL - STEEL - Procurement Issue PO	1	15-Nov-21 A	15-Nov-21 A	Purchasing Departmen	
	DSSE-1050	N/R_MATERIAL - CIVIL - STEEL - Material Vendor Delivery Leadtime	1	15-Nov-21 A	15-Nov-21 A	Purchasing Departmen	
DR-BGMAT	DSSE-540	N/R_Civil (BG) Material Ordered	0		15-Nov-21 A		
80134769.06.03.02 MATERIAL FOR CIVIL - CONDUIT			68	29-Mar-22	02-Jul-22		
DR-RM	DSSE-1140	MATERIAL - CIVIL - CONDUIT - Prepare & Issue DR 2X Transformer	5	29-Mar-22	04-Apr-22	[redacted]	
DR-BGMAT	DSSE-1170	Civil (BG) Material Ordered 2X Transformer	0		04-Apr-22		
	DSSE-1150	MATERIAL - CIVIL - CONDUIT - Procurement Issue PO 2X Transformer	5	05-Apr-22	11-Apr-22	Purchasing Departmen	
	DSSE-1160	MATERIAL - CIVIL - CONDUIT - Material Vendor Delivery Leadtime 2X Transformer	79	12-Apr-22	30-Jun-22	Purchasing Departmen	
M-DELIV	DSSE-1130	MATERIAL - CIVIL - CONDUIT - Confirm Material Delivery to Site 2X Transformer	2	30-Jun-22	02-Jul-22	Purchasing Departmen	
80134769.07 CONSTRUCTION			81	01-Aug-22	27-Nov-22		
80134769.07.01 CONSTRUCTION - CIVIL			26	01-Aug-22	26-Aug-22		
	A1120	Construction - Civil	26	01-Aug-22*	26-Aug-22	Const Rep Field Sup - Civil	
80134769.07.02 CONSTRUCTION - ELECTRICAL			54	05-Sep-22	28-Oct-22		
	A1135	Construction - Electrical 24A-2X	26	05-Sep-22*	30-Sep-22	Const Rep Field Sup - S/S	
	A1130	Construction - Electrical 24A-3X	26	03-Oct-22*	28-Oct-22	Const Rep Field Sup - S/S	
80134769.07.03 CONSTRUCTION - P&C			54	05-Sep-22	28-Oct-22		



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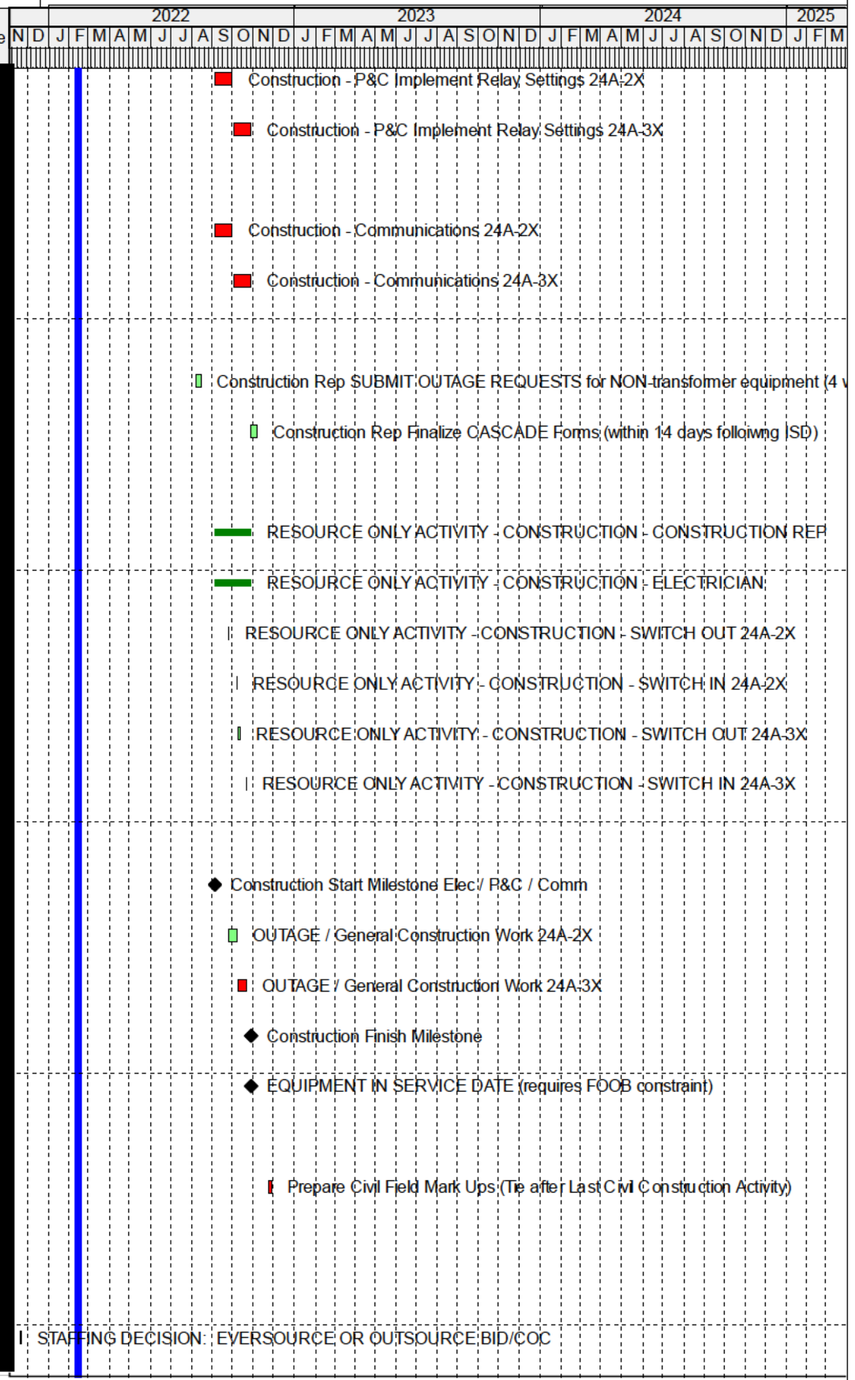
Activity Flag	Activity ID	Activity Name	At pletion	Start	Finish	Resources	Activity Schedule
	A1145	Construction - P&C Implement Relay Settings 24A-2X	26	05-Sep-22*	30-Sep-22	Constructio Rep	
	A1140	Construction - P&C Implement Relay Settings 24A-3X	26	03-Oct-22*	28-Oct-22	Constructio Rep	
80134769.07.04 CONSTRUCTION - COMMUNICATIONS			54	05-Sep-22	28-Oct-22		
	A1155	Construction - Communications 24A-2X	26	05-Sep-22*	30-Sep-22	Constructio Rep	
	A1150	Construction - Communications 24A-3X	26	03-Oct-22*	28-Oct-22	Constructio Rep	
80134769.07.92 CONSTRUCTION - CONST.REP TASKS			92	08-Aug-22	07-Nov-22		
	A1250	Construction Rep SUBMIT OUTAGE REQUESTS for NON-transformer equipment (4 weeks before outage)	8	08-Aug-22*	15-Aug-22	Constructio Rep	
	A1260	Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD)	10	29-Oct-22	07-Nov-22	Constructio Rep	
80134769.07.94 CONSTRUCTION RESOURCE TRACKING			54	05-Sep-22	28-Oct-22		
	ConRep-S	RESOURCE ONLY ACTIVITY - CONSTRUCTION - CONSTRUCTION REP	54	05-Sep-22	28-Oct-22	Constructio Rep	
	CONSTelec	RESOURCE ONLY ACTIVITY - CONSTRUCTION - ELECTRICIAN	54	05-Sep-22	28-Oct-22	Distribution - S/S	
	A1075	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH OUT 24A-2X	1	26-Sep-22*	26-Sep-22	Distribution Switching	
	A1085	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH IN 24A-2X	1	07-Oct-22*	07-Oct-22	Distribution Switching	
	A1070	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH OUT 24A-3X	1	11-Oct-22*	11-Oct-22	Distribution Switching	
	A1080	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH IN 24A-3X	1	21-Oct-22*	21-Oct-22	Distribution Switching	
80134769.07.96 CONSTRUCTION OUTAGES			47	05-Sep-22	28-Oct-22		
CRH	CSM	Construction Start Milestone Elec / P&C / Comm	0	05-Sep-22			
OUT	TOA-Const 24A-2X	OUTAGE / General Construction Work 24A-2X	11	26-Sep-22*	07-Oct-22	Constructio Resources	
OUT	TOA-Const 24A-3X	OUTAGE / General Construction Work 24A-3X	10	11-Oct-22*	21-Oct-22	Constructio Resources	
	CFM	Construction Finish Milestone	0		28-Oct-22		
ISD	ISD	EQUIPMENT IN SERVICE DATE (requires FOOB constraint)	0		28-Oct-22*		
80134769.07.98 CONSTRUCTION CLOSEOUT			5	23-Nov-22	27-Nov-22		
	DSSE-900	Prepare Civil Field Mark Ups (Tie after Last Civil Construction Activity)	5	23-Nov-22	27-Nov-22	Constructio Resources	
80134769.09 TEST AND COMMISSION			257	15-Nov-21 A	22-Nov-22		
80134769.09.01 TEST - SERVICES STAFFING DECISION			1	19-Nov-21 A	22-Nov-21 A		
	A1010	STAFFING DECISION: EVERSOURCE OR OUTSOURCE BID/COC	1	19-Nov-21 A	22-Nov-21 A		



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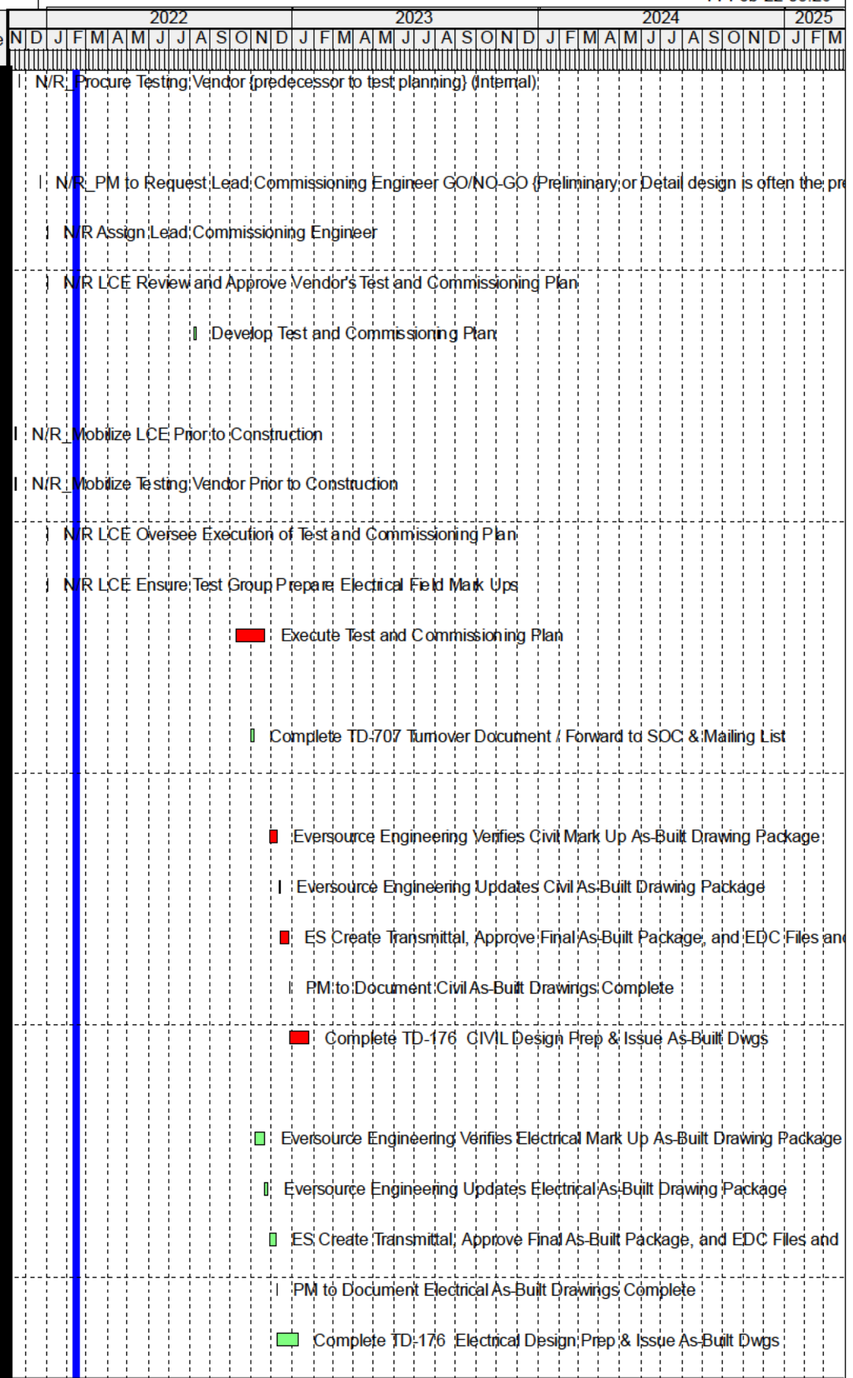
Activity Flag	Activity ID	Activity Name	At pletion	Start	Finish	Resources	Activity Schedule
	A3250	N/R_Procure Testing Vendor {predecessor to test planning} (Internal)	0	22-Nov-21 A	22-Nov-21 A		
80134769.09.02 LCE PLANNING			160	22-Dec-21 A	10-Aug-22		
	LCE100	N/R_PM to Request Lead Commissioning Engineer GO/NO-GO {Preliminary or Detail design is often the predecessor}	1	22-Dec-21 A	22-Dec-21 A		
	LCE200	N/R Assign Lead Commissioning Engineer	0	03-Jan-22 A	03-Jan-22 A		
	LCE500	N/R LCE Review and Approve Vendor's Test and Commissioning Plan	0	03-Jan-22 A	03-Jan-22 A	CT - Lead Commissior	
	LCE400	Develop Test and Commissioning Plan	3	08-Aug-22*	10-Aug-22	CT/WMA Test	
80134769.09.04 TEST ACTIVITIES			257	15-Nov-21 A	22-Nov-22		
	LCE310	N/R_Mobilize LCE Prior to Construction	2	15-Nov-21 A	16-Nov-21 A	CT - Lead Commissior	
	LCE320	N/R_Mobilize Testing Vendor Prior to Construction	2	15-Nov-21 A	16-Nov-21 A	CT/WMA Test	
	LCE610	N/R LCE Oversee Execution of Test and Commissioning Plan	0	03-Jan-22 A	03-Jan-22 A	CT - Lead Commissior	
	LCE700	N/R LCE Ensure Test Group Prepare Electrical Field Mark Ups	0	03-Jan-22 A	03-Jan-22 A	CT - Lead Commissior	
	LCE620	Execute Test and Commissioning Plan	30	11-Oct-22	22-Nov-22	Engineering Contractor	
80134769.10 PROJECT CLOSE OUT			268	03-Jan-22 A	26-Jan-23		
	DSSE-1100	Complete TD-707 Turnover Document / Forward to SOC & Mailing List	5	31-Oct-22	04-Nov-22	Constructio Rep	
80134769.10.01 Civil As-Builts			41	28-Nov-22	26-Jan-23		
	DSSE-860	Eversource Engineering Verifies Civil Mark Up As-Built Drawing Package	10	28-Nov-22	09-Dec-22		
	DSSE-970	Eversource Engineering Updates Civil As-Built Drawing Package	3	12-Dec-22	14-Dec-22		
ES-ASB	DSSE-870	ES Create Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	8	15-Dec-22	27-Dec-22		
	DSSE-880	PM to Document Civil As-Built Drawings Complete	1	28-Dec-22	28-Dec-22		
	DSSE-1120	Complete TD-176 CIVIL Design Prep & Issue As-Built Dwgs	20	28-Dec-22	26-Jan-23		
80134769.10.02 Electrical As-Builts			42	07-Nov-22	09-Jan-23		
	DSSE-820	Eversource Engineering Verifies Electrical Mark Up As-Built Drawing Package	10	07-Nov-22	21-Nov-22		
	DSSE-940	Eversource Engineering Updates Electrical As-Built Drawing Package	3	22-Nov-22	25-Nov-22		
ES-ASB	DSSE-830	ES Create Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	9	28-Nov-22	08-Dec-22		
	DSSE-840	PM to Document Electrical As-Built Drawings Complete	1	09-Dec-22	09-Dec-22		
	DSSE-1110	Complete TD-176 Electrical Design Prep & Issue As-Built Dwgs	20	09-Dec-22	09-Jan-23		



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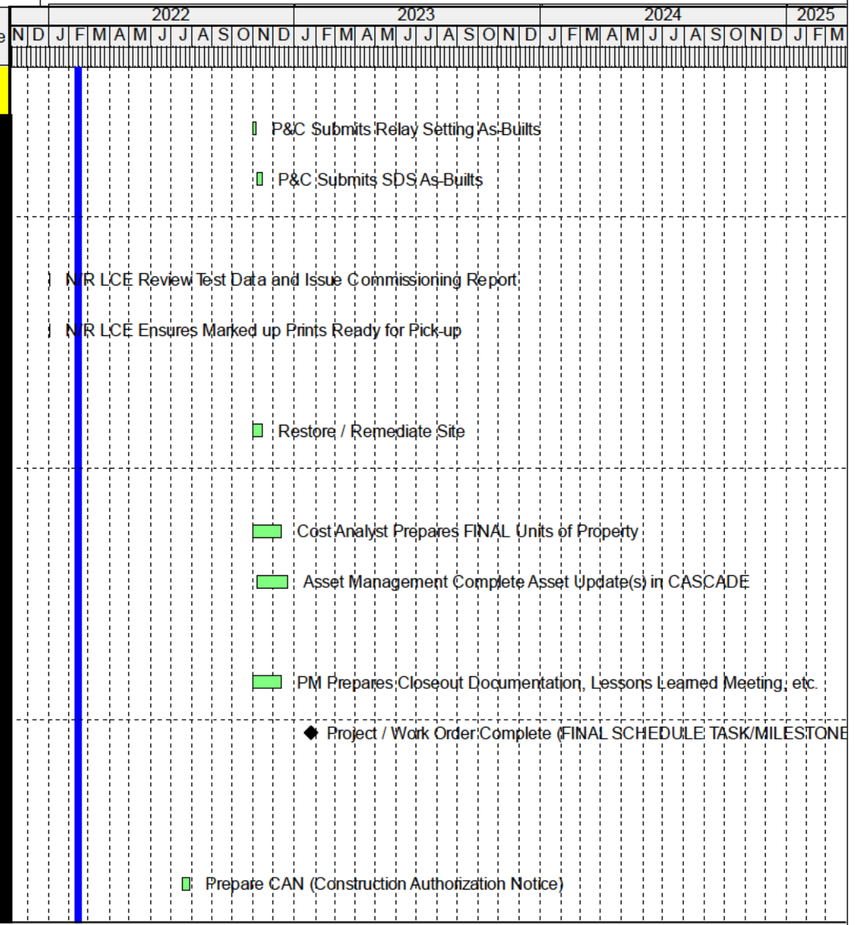
Activity Flag	Activity ID	Activity Name	At pletion	Start	Finish	Resources	Activity Schedule
80134769.10.03 P&C As-Builts			10	31-Oct-22	14-Nov-22		
	DSSE-960	P&C Submits Relay Setting As-Builts	5	31-Oct-22	04-Nov-22		
	DSSE-950	P&C Submits SDS As-Builts	5	07-Nov-22	14-Nov-22		
80134769.10.04 Test Closout			0	03-Jan-22 A	03-Jan-22 A		
	LCE900	N/R LCE Review Test Data and Issue Commissioning Report	0	03-Jan-22 A	03-Jan-22 A	CT - Lead Commissior	
	LCE800	N/R LCE Ensures Marked up Prints Ready for Pick-up	0	03-Jan-22 A	03-Jan-22 A	CT - Lead Commissior	
80134769.10.05 SITE RESTORATION CLOSEOUT			10	31-Oct-22	14-Nov-22		
	A1110	Restore / Remediate Site	10	31-Oct-22	14-Nov-22	CT/WMA C Contractor-	
80134769.10.06 MATERIAL, EQUIPMENT, COST, AND ASSET MANAGEMENT CLOSEOUT			36	31-Oct-22	21-Dec-22		
	A1020	Cost Analyst Prepares FINAL Units of Property	30	31-Oct-22	13-Dec-22	CT- Cost Analyst	
	A1030	Asset Management Complete Asset Update(s) in CASCADE	30	08-Nov-22	21-Dec-22		
80134769.10.07 PROJECT MANAGEMENT CLOSEOUT			59	31-Oct-22	26-Jan-23		
	A1040	PM Prepares Closeout Documentation, Lessons Learned Meeting, etc.	30	31-Oct-22	13-Dec-22		
	FINISH	Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE)	0		26-Jan-23		
80134769.13 OVERHEAD / INDIRECTS			10	18-Jul-22	29-Jul-22		
80134769.13.01 PROJECT MANAGEMENT			10	18-Jul-22	29-Jul-22		
	A1170	Prepare CAN (Construction Authorization Notice)	10	18-Jul-22*	29-Jul-22		



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Constructability Review Form: **Substation**

Project Title: [redacted] Dscada LTC	☐	Prior Constructability Review Performed?
	☒	Program Related Site Specific Review?
Project Numbers(s): CS00523 (Program CS00407)	**Project Constructability Phase:**	
Date(s) of Constructability Review: **10/29/2021**	☒ Conceptual Engineering Design	
Click to enter a date	☐ Preliminary Engineering Design	
	☐ Detailed Engineering Design	
Project Scope Statement: [redacted]		

Department Review/Walkdown Attendees*:

Required [X]	Attended [X]	Department	Name	Required [X]	Attended [X]	Department	
☐	☒	Project Management	[redacted]	☐	☒	S/S Engineering	[redacted]
☐	☐	Asset Management		☐	☐	P&C Engineering	
☐	☒	Constr. Management	[redacted]	☐	☐	Civil Engineering	
☐	☐	S/S Technical / LCE		☐	☐	Telecom	
☐	☒	S/S Operations**	[redacted]	☐	☐	Environmental	
☐	☐	Field Engineering		☐	☐	Real Estate	
☐	☐	Line Engineering		☐	☐	T&D ROW	
☐	☐	Vegetation Management		☐	☐	Survey Engineering	
☐	☐	Siting		☐	☐	Cost Estimating	
☐	☐	Safety		☐	☐	Outreach (SCS)	
☐	☒	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] _____ *10/29/21* _____ *Name / Signature*

Date

EVERSOURCE

Constructability Review Form: **Substation**

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	[redacted]	Engineering to order appropriate controls for both Transformers
2	~~Both transformers need new conduit to install DSCADA fiber~~ [redacted]	Engineering to issue civil drawings for new conduit
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** - 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 adequate

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
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?	☐	N/A [2022-2-21]
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..		Adequate space for Dscada addition
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	
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?	☐	N/A
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?	N/A	

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
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.)		Engineering to issue conduit drawings
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	☐	N/A
9	Nomenclature / Switching One-Line Diagram -Any obvious deviations from diagrams provided?	☐	N/A
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?	☐	N/A
B	**Construction**		
1	**Any safety hazards specific to the facility? i.e. Low Bus, Deterioration, etc.**	☐	N/A
2	**Prior known Site Specific Conditions** -Common or Obvious station Issues -Missing scope items that could impact costs?	☐	
3	**Identify/Consider Required Depts for Construction?** -Who is constructor: Internal vs External Resources -S/S Ops, GO, Test, Field Engineering, etc	☐	N/A

EVERSOURCE

Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
	-Specialty Contractors Required? -Required Oversite Needed - Estimated level of CR and LCE support 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?	☐	No issues
5	Unique Equipment Considerations: Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser		N/A

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Constructability Review Form: **Substation**

	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	☐	Outages determined by construction
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)	☐	N/A
9	Need for mobile battery and where connected (if needed)	☐	N/A
10	OT work required or Notable Permit Conditions (special hours)?	☐	N/A
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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Constructability Review Form: **Substation**

	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	☐	N/R
2	**Desktop investigation and EAD Review** -Required Permits -Stormwater Considerations -Dewatering requirements -Wetland and buffer review	☐	N/A
3	Risk or presence of PCB's/Asbestos/Lead/SF6	☐	N/A
4	Transformer Spill Containment Recommended?	☐	N/A
5	Expanding Footprint / New Buildings or future Expansion Plans? (Enviro Impact)	☐	N/A
6	Environmental oversight considerations? (Inspection type/Interval)	☐	N/A
7	Environmental mitigations - Any matting or seasonal needs? Review D&M Plan with CR.	☐	N/A
D	**Siting, S&CS, and T&D Real Estate**		
1	**Any regulatory concerns or approvals needed?** - Consider scope/design alterations to mitigate concerns - Consider Visual screening considerations (feasibility or location) -Zoning Relief and Permits required	☐	N/A
2	**Neighbor/Abutter impacts:** - Any noise, visual impacts, or sensitive abutters - Any changes to lighting or additional lighting needed?	☐	N/A
3	Review for roadway, gate access, trailers, equip height, noise, weekend/night work, or any potential public disturbance related to work	☐	N/A
4	Installation within Eversource Rights - Is Rights and Restrictions Review required?	☐	N/A
5	Expanding Footprint / New Buildings or future Expansion Plans?	☐	N/A
6	Proposed Equipment on same property? - Any Encroachments	☐	N/A

EVERSOURCE

Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
F	**Protection & Controls**		
1	Panel Graphic additions and/or Modifications	☐	N/A
2	Space on existing panels for new equipment? (front & rear of panel fronts)	☐	N/A
3	Panel fronts conform to drawings	☐	N/A
4	Access to bring new panels into control enclosure	☐	N/A
5	Nameplate list and location of nameplates	☐	N/A
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?	☐	N/A
8	Will relay setting changes be needed? Any additional outage requirements for changes?		N/A
G	**Telecom Engineering**		
1	Review telecom equipment in existing control enclosure	☐	N/A
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.	☐	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.	☐	N/A
4	Review current Telecom fiber diversity and validate with P&C any fiber diversity requirements.	☐	N/A
5	Review and list any remote station impacts/updates	☐	N/A
6	Confirm whether correct interface equipment is available (i.e.) for fiber termination or multiplexor termination	☐	N/A
7	Confirm whether existing communications cabinets are enough to support additional telecommunications equipment installed	☐	N/A

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Constructability Review Form: **Substation**

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
8	Review space for any required additional communications cabinets which may be required to support additional telecommunications equipment installed	☐	Space for additional cabinet
9	Review third party Telecommunications at substation and confirm whether additional capacity or Ground Potential Rise protection is required	☐	N/A

Photos

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

[redacted]

EVERSOURCE

Operations Program Level Project Authorization Form

Approved at March 17, 2021 SDC

Link to Meeting Minutes

Date Prepared: 05/11/2021	**Program Title**: DSCADA LTC Receivers Program Upgrades
Company: Eversource CT	**Program Number:** CS00407
Organization: Asset Management	**Class(es) of Plant:** D SS
Project Initiator: [redacted]	**Project Category:** Stations - SCADA
Project Manager: [redacted]	**Project Type:** Program
Project Sponsor: [redacted]	**Project Purpose:** Replace Obsolete Radio System
Estimated in service date: Q4 2030	**If Transmission Project: PTF/Non-PTF? N/A**
Eng. / Constr. Resources Budgeted? Yes	**Capital Investment Part of Original Operating Plan?** Yes
Authorization Type: Program Approval with Initial Funding	**O&M Expenses Part of the Original Operating Plan?** N/A
Initial Funding Request: $250K	**Estimated Program value (CT):** $45M

Financial Requirements:

Project Authorization

ERM: _____

FP&A: _____

Executive Summary

This Initial Funding Request of $250K is to establish a program to [redacted]

[redacted]

[redacted] The list of substations and associated LTC transformers is provided in Attachment 1. [redacted] Accordingly, the "old" CS00090 will coordinate with the new CS00407 program going forward.

Background details:

$8.5M in total prior costs were charged under the original 2015 CS00090 general one-time approval program through 2020. Sixty-six (66) workorders remain open or in service in Power Plan™. Eighteen (18) of the original work orders were completed for a total direct cost of $4.5M. The total direct cost budget approved for CS00090 was $5.808M, so total direct costs had not exceeded the +/- 10% limit of the APS-1 procedure. As construction, system operations control, and regulatory scope requirements grew, costs per unit increased substantially. Therefore, it was determined that the remainder of the work would be completed as a new program with release documentation to better provide comparable data for each remaining station's scope for improved control and tracking. Accordingly, units / stations with completed construction on the previous CS00090 will remain on that project.

The original program's scope creep was primarily the result of SOC requirements and expectations for voltage tap changer control and position indication. As originally proposed, the scope for the program was primarily for relay and DSCADA connectivity to abandon the obsolete and failing radio control system. The estimate did not account for these additional SOC requirements. CS00090 program documentation is attached for reference.

Transitioning to a DSCADA LTC Automation program with subsequently funded project releases mitigates the need for a high dollar supplemental request to the original CS00090 program. The transitioning moved remaining work to new Program CS00407 for the primary purpose of tracking specific station costs of a release based on redefined detailed scope from an Engineering Checklist. The checklist that follows in the "Project Scope" section defines all possible scope (worst case) that could be required for a station LTC transformer. Release estimates going forward will be established against what most remaining transformers will require based on a revised/updated unitized cost. Extra scope (e.g. conduit, and/or controllers) will follow a pre-established tiered cost range/benchmark developed from current CS00407 Program Substation Engineering and Design's Decision-Making Estimates that follow.

Planned Releases

Upon approval of this Initial Funding, three releases are planned for three substations with a total of nine transformers, [redacted] CS00433, [redacted] CS00432 and [redacted] CS00430. Additionally, all planned releases will be coordinated with other programs and work conflicts (where possible) that might arise in the selected substations. Coordination with other station activities not currently identified entailing switching, repairs etc. will be considered when identifying and planning subsequent releases.

Project Costs Summary

Estimates include man-days for outsourced Lead Commissioning Engineer (LCE), and Construction Representative. Material estimates, labor estimates, and vendor quotes are based on recently completed work in 2020. All new equipment shall be installed within the confines of the existing fenced stations. Estimate for an individual substation will be developed during initial funding based on existing infrastructure at a substation. For example : the type of tap changer control, ability to reuse existing conduits to pull fiber, and the capability to use existing communication device to communicate with new device will all be identified to improve the accuracy of the estimate and control costs going forward.

The LTC DSCADA upgrade for each substation / transformer location is expected to follow one of three possible cost scenarios. Accordingly, the cost for each scenario will vary depending on the actual infrastructure and equipment condition. The funding provided by this Initial PAF will facilitate work scope definition at each substation. Some may need conduit installation; some may simply only need wiring and some a new tap changer control and / or combination of this items. All will require testing and commissioning. As a result of these scenarios, there are three (DME) estimates that reflect the different costs in cost ascending value:

1. LTC control upgrade only, existing control & conduit (least cost)
2. LTC control upgrade, new conduit, existing control
3. LTC Control upgrade, new control & conduit (most cost)

Table -1

Cost of D-SCADA LTC Project Scenarios

Description	1. Upgrade Only – existing Control & Conduit	2. Upgrade & Conduit – existing Control	3. Upgrade, New Control & Conduit
ROW / Easements / Land purchases			
Environmental Approvals / Permits			
Outreach	$1,900	$2,200	$3,200
Siting Approvals / Permits			
Engineering / Design	$10,400	$12,600	$17,600
Materials (Eversource purchased)	$18,400	$18,600	$26,200
Construction (incl. matl's by contractors)	$69,800	$90,900	$126,100
Testing / Commissioning	$61,300	$61,300	$94,200
PMT Project Mgmt Team	$10,500	$10,500	$10,500
Removals	$2,300	$2,300	$2,300
Other			
Risks	$63,200	$63,200	$71,000
Project Directs Total w/Risks	**$237,800**	**$261,600**	**$351,100**
Indirects/Overhead	$117,200	$134,000	$188,400
AFUDC	$9,600	$10,700	$14,600
Project Total - Baseline Budget	**$364,600**	**$406,300**	**$554,100**
Contingency			
Project Total - Funding Approval Level	**$364,600**	**$406,300**	**$554,100**
Reimbursables/Customer Contribution	**Not applicable**	**Not applicable**	**Not applicable**
Project Total (less reimbursables)	**$364,600**	**$406,300**	**$554,100**

Technical Justification:

Project Need Statement

[redacted]. A simplified one-line of the radio system (CONVEX LMS system) can be found in Figure 1. Pictures of the obsolete radio receivers can be found in Attachment 2.

Project Objectives

[redacted]

Project Scope

[redacted]

The work at each proposed station requires further evaluation to finalize scope, project details, and cost estimates. The $250K will be used for Substation Engineering, P&C Engineering, Asset Management, Estimating, Project Management, and Field Engineering at a cost on average of $50K per station. Individual release PAF's for each substation will be written and proposed for EPAC review and approval.

[redacted]



- Development of Engineering Project Approval Committee (EPAC) documents
- Constructability Walkdowns including qualified representatives from Engineering (Field/SCADA/Telecom), Project Management, Operations, and Construction departments
- Outage planning and the development of single contingency load loss (SCLL) mitigation plans as needed

Background / Justification



Comverge™, the company that provides Eversource with replacement software and hardware for the radio system, has limited availability of system components used by Eversource. They cannot guarantee future logistic and technical support. Hubbell™ that supplies hardware to organize the handshake mechanism for our phone lines is discontinuing availability and support for the system currently in use.

Business Process and / or Technical Improvements:

As the future of the grid evolves, remote voltage control will become critical to meet the requirements for Distributed Generation systems and provide energy savings. In addition to the ability to remotely control voltage at the LTCs, it is anticipated that remote control of the distribution capacitors and regulators will become necessary in the future (not part of this project). Adding this functionality to the LTCs as part of this DSCADA project is the most cost-effective manner for this work to be done.

Alternatives Considered

Eversource evaluated the following three alternatives:

[redacted]

Cost estimate $554,100 (planning grade)

[redacted]

[redacted]

Project Schedule

All project releases in the program will have station specific P6 schedules. The following program schedule lists milestones leading to the start of construction.

Milestone/Phase Name	Estimated Date
SDC Meeting – Operations Program Level Approval with Initial Funding	3/17/2021
Revised with Comments – Operations Program Level Approval with Initial Funding	5/11/2021
SDC / EPAC Meeting Program Approval (email)	5/11/2021
Program Construction Start	Q3 2021
Program Construction Completion	Q4 2030

Due to potential financial and man-hour restrictions, this project will spread 99 LTC transformers over ten years for construction from 2021 – 2030. Engineering and material purchase will be done annually. Each transformer LTC upgrade on average may cost approximately $450K per unit. Justification for the length of this proposed 10-year program is cost. The program's duration can be adjusted if it is determined that the cost per unit is acceptable, and an increased investment in the program over other system needs is justified.

Planned LTC Upgrade Releases for 2021

Substation Name	Project Number	LTC Control	Equip Position
[redacted]			
TOTAL UNITS		9	

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Planned LTC Releases for 2022

Substation Name	Project Number	LTC Control	Equip Position
[redacted]			
TOTAL UNITS		13	

Planned LTC Releases for 2023

Substation Name	Project Number	LTC Control	Equip Position
[redacted]			
TOTAL UNITS		8	

Planned Number of LTC Releases (Unspecified Stations) for Years 2024 – 2030

Engineer and Upgrade LTC	Estimated In Service Date
10 Transformers	12/31/2024
10 Transformers	12/31/2025
10 Transformers	12/31/2026
10 Transformers	12/31/2027
10 Transformers	12/31/2028
10 Transformers	12/31/2029
9 Transformers	12/31/2030
69 Transformers	TOTAL UNITS

Regulatory Approvals

No advance regulatory approval is required for this project.

Risks and Risk Mitigation Plans

[redacted]

Contingency

None at the Program level.

References

ISO-NE Operating Procedure No. 13 – Standards for Voltage Reduction and Load Shedding Capability.

Attachments

Figure1
CONVEX LMS System



ESTIMATE SUMARY

Project Title: EVERSOURCE CT - DSCADA LTC CONTROLS UPGRADE
Project Mgr/Lead:
Project Number:CS00407
WO & Task #:
Est. Revision #
Estimate Type - Station work

Estimate By: [redacted]
Date of Estimate: 02/09/2021
ISD:12/31/2021
Estimate #

Template Revision # 01.53

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2021	2022	2023	2024	2025	2026
1	ROW / Easements / Land purchases										
2	Environmental Approvals / Permits										
3	Outreach	$1,900	0.8%	0.5%		$1,900					
4	Siting Approvals / Permits										
5	Engineering / Design	$10,400	4.4%	2.9%		$10,400					
6	Materials (Eversource purchased)	$18,400	7.7%	5.0%		$18,400					
7	Construction (incl matl's by	$69,800	29.4%	19.1%		$69,800					
8	Testing / Commissioning	$61,300	25.8%	16.8%		$61,300					
9	PMT Project Mgmt Team	$10,500	4.4%	2.9%		$10,500					
10	Removals	$2,300	1.0%	0.6%		$2,300					
11	Other										
12	Risks	$63,200	26.6%	17.3%		$63,200					
	Project Directs Total w/Risks	**$237,800**	100.0%	65.2%		**$237,800**					
13	Indirects/Overhead	$117,200		32.1%		$117,200					
14	AFUDC	$9,600		2.6%		$9,600					
	Project Total - Baseline Budget	**$364,600**		100.0%		**$364,600**					
15	Contingency										
	Project Total - Funding Approval Level	**$364,600**	100.0%			**$364,600**					
16	Reimbursables/Customer Contribution										
	Project Total (less reimbursables)	**$364,600**				**$364,600**					

	Amount of Escalation included above		
6	Total materials - Eversource	$18,400	$18,400
	Total materials - Contractor	$5,600	$5,600
	Total materials	$24,000	$24,000
	NOTE: Risk / Contingency is 21% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)		

Estimate Range	**-25%**	-	**25%**
	$273,000	-	**$456,000**

COMMENTS:

Project Scope:

[redacted]

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

Major material

1. One (1) CABINET, ENCLOSURE, LTC DSCADA, AL,24 IN X 18 IN X 14 IN, ANNUNCIATOR
2. One (1) MONITOR, LTC Tap position indicator device
3. 43AMR 3 position switch ("AUTO/MAN/REMOTE")

Notes:

1. Test manhours based on test contractor quote per LTC/transformer
2. Electrical construction manhours based on electrical contractor quote per LTC/transformer
3. Estimate assumes existing conduits can be used to install crush proof fiber between the transformer and the control house or switchgear. An estimated cost of $1,322 per ft to install conduit between transformer and control house or switchgear should be added to the estimate if required
4. Material quote based on previous projects

RISKS

Severe Weather, Delays, OT	$	13,200
Communication System Upgrade	$	50,000

ESTIMATE SUMARY

Project Title: EVERSOURCE CT - DSCADA LTC CONTROLS UPGRADE
Proiect Mar/Lead:
Project Number:CS00407
WO & Task #:
Est. Revision #
Estimate Type - Station work

Estimate By: [redacted]
Date of Estimate: 02/09/2021
ISD:12/31/2021
Estimate #

Template Revision # 01.53

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2021	2022	2023	2024	2025	2026
1	ROW / Easements / Land purchases										
2	Environmental Approvals / Permits										
3	Outreach	$2,200	0.8%	0.5%		$2,200					
4	Siting Approvals / Permits										
5	Engineering / Design	$12,600	4.8%	3.1%		$12,600					
6	Materials (Eversource purchased)	$18,600	7.1%	4.6%		$18,600					
7	Construction (incl matl's by	$90,900	34.7%	22.4%		$90,900					
8	Testing / Commissioning	$61,300	23.4%	15.1%		$61,300					
9	PMT Project Mgmt Team	$10,500	4.0%	2.6%		$10,500					
10	Removals	$2,300	0.9%	0.6%		$2,300					
11	Other										
12	Risks	$63,200	24.2%	15.6%		$63,200					
	Project Directs Total w/Risks	**$261,600**	100.0%	64.4%		**$261,600**					
13	Indirects/Overhead	$134,000		33.0%		$134,000					
14	AFUDC	$10,700		2.6%		$10,700					
	Project Total - Baseline Budget	**$406,300**		100.0%		**$406,300**					
15	Contingency										
	Project Total - Funding Approval Level	**$406,300**		100.0%		**$406,300**					
16	Reimbursables/Customer Contribution										
	Project Total (less reimbursables)	**$406,300**				**$406,300**					
	Amount of Escalation included above										
6	Total materials - Eversource	$18,600				$18,600					
	Total materials - Contractor	$7,800				$7,800					
	Total materials	$26,400				$26,400					
	NOTE: Risk / Contingency is 18.4% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)										

Estimate Range	**-25%**	-	**25%**	
	$305,000	-	**$508,000**	

COMMENTS:

Project Scope:

[redacted]

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

Major material
1. One (1) CABINET, ENCLOSURE, LTC DSCADA, AL,24 IN X 18 IN X 14 IN, ANNUNCIATOR
2. One (1) MONITOR, LTC Tap position indicator device
3. 43AMR 3 position switch ("AUTO/MAN/REMOTE")

Notes:
1. Test manhours based on test contractor quote per LTC/transformer
2. Electrical construction manhours based on electrical contractor quote per LTC/transformer
3. Estimate assumes existing conduits can be used to install crush proof fiber between the transformer and the control house or switchgear. An estimated cost of $1,322 per ft to install conduit between transformer and control house or switchgear should be added to the estimate if required
4. Material quote based on previous projects

RISKS

Severe Weather, Delays, OT	$	13.200
Communication System Upgrade	$	50.000

ESTIMATE SUMMARY

Project Title: EVERSOURCE CT - DSCADA LTC CONTROLS UPGRADE
Project Mgr/Lead:
Project Number:CS00407
WO & Task #:
Est. Revision #
Estimate Type - Station work

Estimate By: [redacted]
Date of Estimate: 02/09/2021
ISD:12/31/2021
Estimate #

Template Revision # 01.53

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2021	2022	2023	2024	2025	2026
1	ROW / Easements / Land purchases										
2	Environmental Approvals / Permits										
3	Outreach	$3,200	0.9%	0.6%		$3,200					
4	Siting Approvals / Permits										
5	Engineering / Design	$17,600	5.0%	3.2%		$17,600					
6	Materials (Eversource purchased)	$26,200	7.5%	4.7%		$26,200					
7	Construction (incl matl's by	$126,100	35.9%	22.8%		$126,100					
8	Testing / Commissioning	$94,200	26.8%	17.0%		$94,200					
9	PMT Project Mgmt Team	$10,500	3.0%	1.9%		$10,500					
10	Removals	$2,300	0.7%	0.4%		$2,300					
11	Other										
12	Risks	$71,000	20.2%	12.8%		$71,000					
	Project Directs Total w/Risks	**$351,100**	100.0%	63.4%		**$351,100**					
13	Indirects/Overhead	$188,400		34.0%		$188,400					
14	AFUDC	$14,600		2.6%		$14,600					
	Project Total - Baseline Budget	**$554,100**		100.0%		**$554,100**					
15	Contingency										
	Project Total - Funding Approval Level	**$554,100**		100.0%		**$554,100**					
16	Reimbursables/Customer Contribution										
	Project Total (less reimbursables)	**$554,100**				**$554,100**					

	Amount of Escalation included above		
6	Total materials - Eversource	$26,200	$26,200
	Total materials - Contractor	$9,500	$9,500
	Total materials	$35,700	$35,700
	NOTE: Risk / Contingency is 14.7% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)		

Estimate Range	**-25%**	-	**25%**
	$416,000	-	**$693,000**

COMMENTS:

Project Scope:

[redacted]

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

Major material

1. One (1) CABINET, ENCLOSURE, LTC DSCADA, AL,24 IN X 18 IN X 14 IN, ANNUNCIATOR
2. One (1) MONITOR, LTC Tap position indicator device
3. One (1) Beckwith M-2001D Digital Tapchanger Control and adapter panel
4. 43AMR 3 position switch ("AUTO/MAN/REMOTE")

Notes:

1. Test manhours based on test contractor quote per LTC/transformer
2. Electrical construction manhours based on electrical contractor quote per LTC/transformer
3. Civil manhours based on civil contractor quote to excavate 100 ft between transformer and control house or switchgear
4. Material quote based on previous projects

RISKS

Severe Weather, Delays, OT	$	21,000
Communication System Upgrade	$	50,000

Estimate Review Checklist

Type Project to be reviewed: Replace obsolete Radio Controlled sytem on the Transformer. Substation work no conduit, no controls alternative 1

Job Order: CS00407

Requestor: [redacted]

Work Order:

Date of Est: 2/9/21

Est#: Review Number C-21-136

Revsion of Est: 0

Job Description: Replace obsolete Radio controlled equipment.

Date of Review: 3/4/21

Estimator: [redacted]

Level of Estimate: Planning

Substation type project	Recommended Risk
Bus, Switch, Insulator, Misc Eqt Upgrades	Planning 7-12%

OH Project	Underground Project

Level Of Review	Purpose of Estimate
Full Review	Planning Study

Items Checked

Indirect Rates Correct? ☐ Yes ☑ No
Minor increases in some rates in new template.

Manpower/Mandays sufficient for project? ☑ Yes ☐ No
If No, explain:

AFUDC rates are current and correctly applied? ☐ Yes ☑ No
Minor changes in AFUDC rate on new template.

Scope deliverables match expectations for est. class? ☑ Yes ☐ No
If No, explain:

PM Support sufficient for proj? ☑ Yes ☐ No
If No System planning or scheduling required.

Milestones and schedule ISD match scope? ☐ Yes ☑ No
Milestones not completed.

Prior spending accounted for? ☐ Yes ☑ No
No priors reported to date.

Escalation allocated correctly across project time frame? ☐ Yes ☑ No
No escalation included project program will be for next ten years and estimate is for work done this year only.

Contingency and Risk in line with est. type? ☐ Yes ☑ No
No contingrency applied.

Construction Rep and LCE sufficient for project? ☑ Yes ☐ No
If No, explain:

Recommendations

Check AFUDC rate minor drop in CT D rate.

Check indirect rates to see if adjustment would increase accuracy.

Add Project management planning and system scheduling.

Adjust risk and contingency. Risk is at 17.3% of total change by moving 5.3% to Contingency and adjusting risk to 12%

Estimate Review Checklist

Type Project to be reviewed: Replace obsolete Radio Controlled sytem on the Transformer. Substation work new conduit, no controls alternative 2

Job Order: CS00407

Requestor: [redacted]

Work Order:

Date of Est: 2/9/21

Est#: Review Number C-21-136

Revsion of Est: 0

Job Description: Replace obsolete Radio controlled equipment.

Date of Review: 3/4/21

Estimator: [redacted]

Level of Estimate: Planning

Substation type project	Recommended Risk
Bus, Switch, Insulator, Misc Eqt Upgrades	Planning 7-12%

OH Project	Underground Project

Level Of Review	Purpose of Estimate
Full Review	Planning Study

Items Checked

Indirect Rates Correct? ☐ Yes ☑ No
Minor increases in some rates in new template.

Manpower/Mandays sufficient for project? ☑ Yes ☐ No
If No, explain:

AFUDC rates are current and correctly applied? ☐ Yes ☑ No
Minor changes in AFUDC rate on new template.

Scope deliverables match expectations for est. class? ☑ Yes ☐ No
If No, explain:

PM Support sufficient for proj? ☑ Yes ☐ No
If No System planning or scheduling required.

Milestones and schedule ISD match scope? ☐ Yes ☑ No
Milestones not completed.

Prior spending accounted for? ☐ Yes ☑ No
No priors reported to date.

Escalation allocated correctly across project time frame? ☐ Yes ☑ No
No escalation included project program will be for next ten years and estimate is for work done this year only.

Contingency and Risk in line with est. type? ☐ Yes ☑ No
No contingrency applied.

Construction Rep and LCE sufficient for project? ☑ Yes ☐ No
If No, explain:

Recommendations

Check AFUDC rate minor drop in CT D rate.

Check indirect rates to see if adjustment would increase accuracy.

Add Project management planning and system scheduling.

Adjust risk and contingency. Risk presently at 15.6% adjust risk to 11% and adjust contingency to 4.6% of total project.

Estimate Review Checklist

Type Project to be reviewed: Replace obsolete Radio Controlled sytem on the Transformer. Substation work new conduit and controls alternative 3

Job Order: CS00407

Requestor: [redacted]

Work Order:

Date of Est: 2/9/21

Est#: Review Number C-21-136

Revsion of Est: 0

Job Description: Replace obsolete Radio controlled equipment.

Date of Review: 3/4/21

Estimator: [redacted]

Level of Estimate: Planning

Substation type project	Recommended Risk
Bus, Switch, Insulator, Misc Eqt Upgrades	Planning 7-12%

OH Project	Underground Project

Level Of Review	Purpose of Estimate
Full Review	Planning Study

Items Checked

Indirect Rates Correct? ☐ Yes ☑ No
Minor increases in some rates in new template.

AFUDC rates are current and correctly applied? ☐ Yes ☑ No
Minor changes in AFUDC rate on new template.

PM Support sufficient for proj? ☑ Yes ☐ No
If No System planning or scheduling required.

Prior spending accounted for? ☐ Yes ☑ No
No priors reported to date.

Contingency and Risk in line with est. type? ☐ Yes ☑ No
No contingrency applied.

Manpower/Mandays sufficient for project? ☑ Yes ☐ No
If No, explain:

Scope deliverables match expectations for est. class? ☑ Yes ☐ No
If No, explain:

Milestones and schedule ISD match scope? ☐ Yes ☑ No
Milestones not completed.

Escalation allocated correctly across project time frame? ☐ Yes ☑ No
No escalation included project program will be for next ten years and estimate is for work done this year only.

Construction Rep and LCE sufficient for project? ☑ Yes ☐ No
If No, explain:

Recommendations

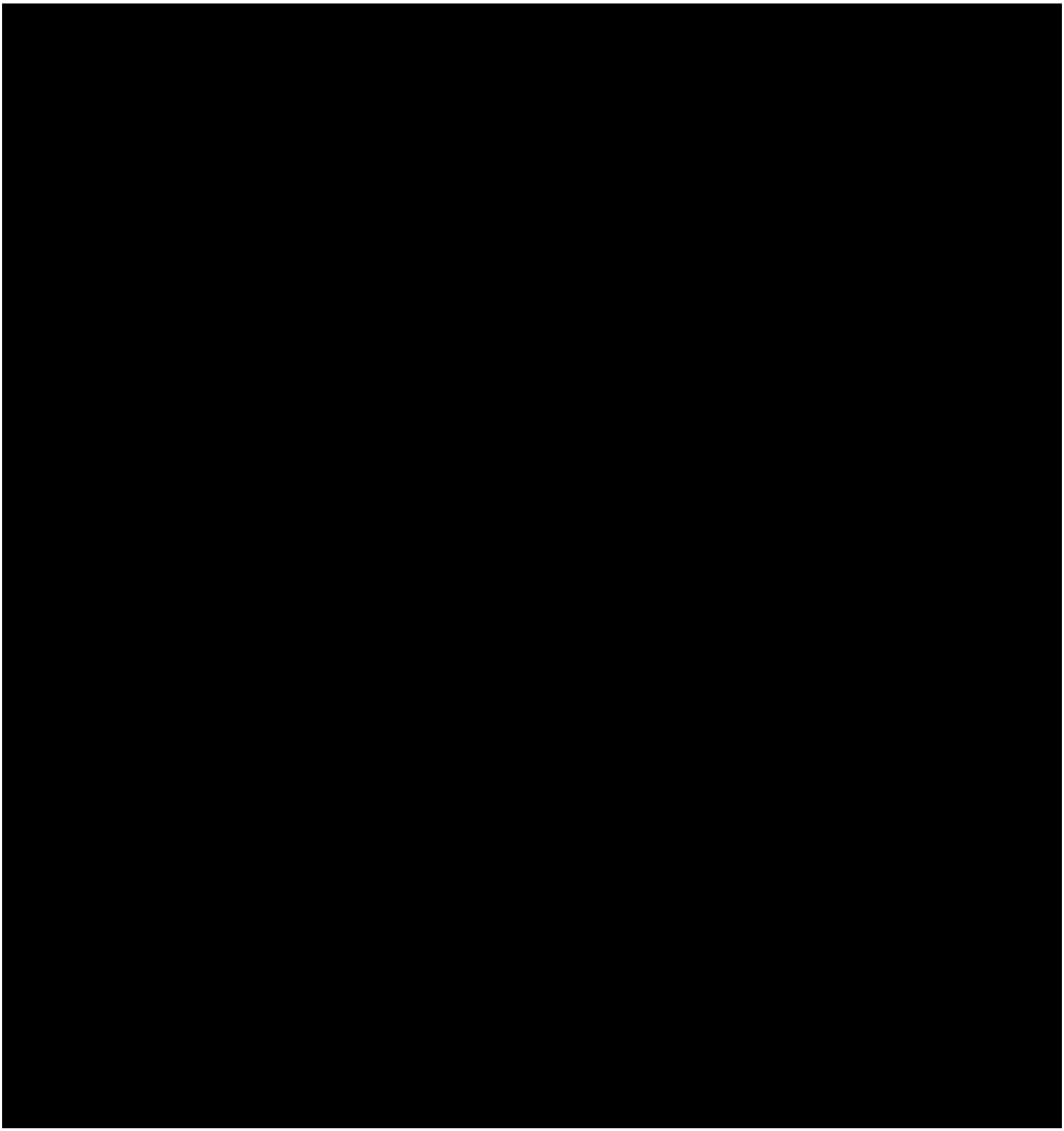
Check AFUDC rate minor drop in CT D rate.

Check indirect rates to see if adjustment would increase accuracy.

Add Project management planning and system scheduling.

Adjust risk and contingency. Risk currently at 12.8% adjust risk to 10% of total and add contingency to 4% of total.

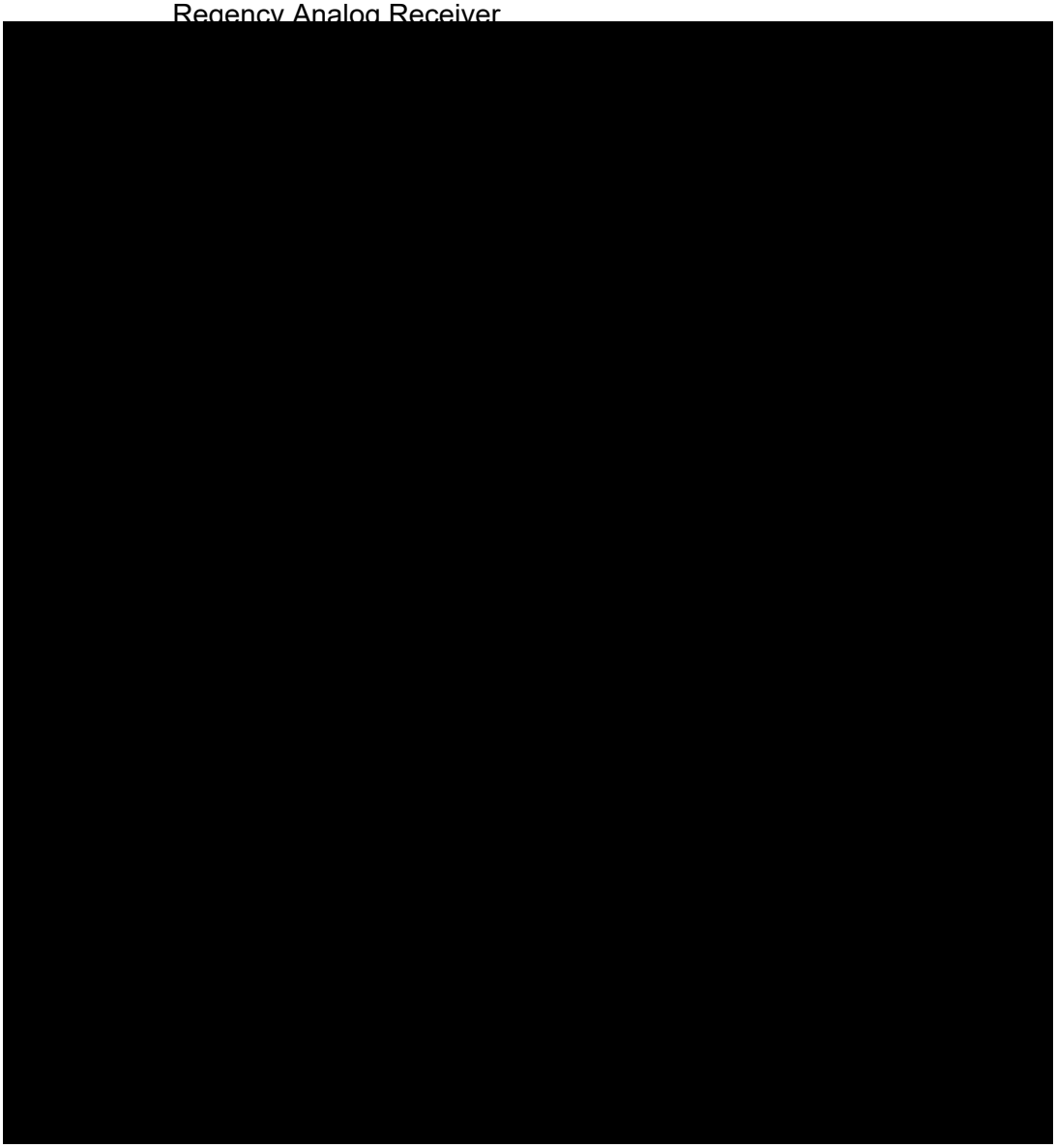
Attachment 2 – Substation – Transformer List



ATTACHMENT 3 - Photos



Regency Analog Receiver



New D-DSCADA LTC (RTU) Cabinet that is mounted on the Transformer:

