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Operations Program Release Form

Approved on March 29, 2022 EPAC

Link to Meeting Minutes

Project Title: DSCADA LTC Controls Upgrade [redacted]	**Project Number: CS00527**
Date Prepared: 03/21/2022	**Company: Eversource CT**
Organization: Asset Management	**Class(es) of Plant: D SS**
Project Initiator: [redacted]	**Project Category: Stations - SCADA**
Managing Organization: Engineering	**Schedule ID#: 80134678**
Project Manager: [redacted]	**Project Type: Program**
Project Sponsor: [redacted]	**Capital Investment part of original Op Plan: Yes**
Estimated in service date: 10/20/2022	**Program Level Title: DSCADA LTC**
Eng./Constr. Resources Budgeted? Yes	**Program Level Project Number: CS00407**
Total Capital Request: $895K	**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 $895K [redacted]

[redacted]

The Program Level PAF (CS00407) had $250K of initial funding approved in Power Plan on May 25, 2021. As of March 11, 2022, minimal charges have been accrued under the old CS00090 program (see Attachment E) under WO CS009032. Additionally, minimal charges have accrued under CS00407 program under WO 80134749 for preliminary engineering and design at the [redacted] substation. These prior and current 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	$0	($6)
4. Siting Approvals / Permits			
5. Engineering / Design	$36	$48	$12
6. Materials (Eversource purchased)	$52	$43	($9)
7. Construction (incl matl's by contractors)	$252	$182	($70)
8. Testing / Commissioning	$188	$152	($36)
9. Project Mgmt Team	$22	$9	($13)
10. Removals	$4	$16	$12
11. Other			
12. Risks	$142	$66	($76)
SUBTOTAL DIRECTS W/ RISKS	**$702**	**$515**	**($187)**
13. Indirects/Overhead	$376	$335	($41)
14. AFUDC	$30	$25	($5)
PROJECT TOTAL – BASELINE BUDGET	**$1,108**	**$875**	**($223)**
15. Contingency		$21	$21
TOTAL CAPITAL REQUEST	**$1,108**	**$895**	**($213)**
16. Reimbursables/Customer Contribution			
PROJECT TOTAL (LESS REIMBURSABLES)	**$1,108**	**$895**	**($213)**
O&M			
Total Request	**$1,108**	**$895**	**($213)**

*CT program unit cost is based on Program Option #3, "Upgrade controls and new conduits". Option #3 was used in the unitized release PAF cost calculations.

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: ($6) –** 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: $12K –** No major changes from Program Level PAF. Engineering accounts for previous costs under CS009032 and remaining costs estimated to complete engineering to IFC. Additional work on 7A-3X requires a “MOD Kit” to become compatible with the newer technology.
6. **Materials (by Eversource): ($9K) –** Savings realized for Eversource purchased materials by allocating purchased materials to the construction line item.
7. **Construction (including materials supplied by contractors): ($70K) –** Savings based on contractor quotes with inclusion of necessary materials. One M-2001C Beckwith™ control will be re-used thus reducing these costs associated with installation.
8. **Testing / Commissioning: ($36K) –** Savings in costs based on contractor quotes and re-using one of the controllers.
9. **Project Management Team: ($13K) –** Savings in economies of scale.
10. **Removals: $12K –** Additional removal costs that are site specific.
11. **Other: $0K –** No changes from the Program Level PAF.
12. **Risk: ($76K) –** Savings recognized in economies of scale and LTC Controller scope reduction.
13. **Indirects/Overhead: ($41K) –** 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: $21K –** 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						
4. Siting Approvals / Permits						
5. Engineering / Design	$250	$21	$20	$7		$48
6. Materials (Eversource purchased)			$43			$43
7. Construction (incl matl's by contractors)			$182			$182
8. Testing / Commissioning			$152			$152
9. Project Mgmt Team			$9			$9
10. Removals			$16			$16
11. Other						
12. Risks			$66			$66
SUBTOTAL DIRECTS W/ RISKS	**$250**	**$21**	**$487**	**$7**		**$515**
13. Indirects/Overhead			$321	$14		$335
14. AFUDC			$25			$25
PROJECT TOTAL – BASELINE BUDGET	**$250**	**$21**	**$833**	**$21**		**$875**
15. Contingency			$21			$21
TOTAL CAPITAL REQUEST	**$250**	**$21**	**$854**	**$21**		**$895**
16. Reimbursables/Customer Contribution						
PROJECT TOTAL (LESS REIMBURSABLES)	**$250**	**$21**	**$854**	**$21**		**$895**
O&M						
TOTAL REQUEST	**$250**	**$21**	**$854**	**$21**		**$895**

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	**$66K**

Unique payment provisions, if applicable: N/A

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

[3] PROJECT SCOPE

[redacted]

[redacted]

[redacted]

[redacted]

Scope of Work Details

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[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. One (2) M-2001D Beckwith™ tap changer control with M-2280B Adapter Panel
4. 400 feet of 2" conduit (200 ft per transformer)
5. One (1) Franklin Electric™ model 1265 transmitter retrofit kit (for Westinghouse Transformer, [redacted])
6. Two (2) SEL-2533 annunciators, one per transformer

A constructability review was completed on October 19, 2021. A revised constructability review form is included as Attachment C.

[4] ALTERNATIVES CONSIDERED

No changes from the DSCADA Program Level PAF CS00407.

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[5] PROJECT SCHEDULE

Milestone	Scheduled Completion Date
Project Need by Date	N/R
Date of Program IFR Approval	May 25, 2021
Complete Conceptual Design	N/R
SDC Program Approval Date	March 17, 2021
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
Final Constructability Review Complete	October 19, 2021 - Completed
Preliminary Design Complete	January 11, 2022 - Completed
Full funding estimate review	March 8, 2022 - Completed
Full funding estimate complete	March 18, 2022 - Completed
Initiator complete PAF form	March 21, 2022 - Completed
Detail Design Complete	March 31, 2022
IFC Design Complete	May 3, 2022
EPAC Full Funding Dates	March 29, 2022
Relay Settings Issued (*Required for Full Funding requests)	May 18, 2022
Targeted Milestone Dates:	
· Siting Approval (if applicable)	N/R
· Env. Approvals (if applicable)	N/R
· All Material on Site	August 26, 2022
· Outage Permit(s) Approved	August 26, 2022
Start of Construction Civil	August 7, 2022
Start of Construction Elec, Comm, P&C	August 28, 2022
Project ISD	October 20, 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 $21K is included in the estimate for project unknowns.

Risk Mitigation:

Risk	Mitigation
1. Potential UG obstructions	$20K is allocated for additional work to re-route trenching for potential UG conflicts and unknowns. Precautions will be taken to hand dig when required.
2. Severe weather delays, OT	$30K is allocated for possible dewatering and delays in the event of severe weather. Delays from the reallocation of project resources for storm restoration work that may require overtime for schedule recovery.
3. Design Development & Field Mark-up changes	$16K is allocated for additional engineering and design resulting from unforeseen scope increase.
4. SCLL Conditions	SCLL conditions will be mitigated utilizing the short recall time if needed.

[8] REFERENCES

References
1. OP-13 Standards for Voltage Reduction and Load Shedding ISO New England Operating Procedure 08022019
2.
3.
4.
5.

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

Attachments	Included in Submittal?
Attachment A - CS00527-ES DME-[redacted]-DSCADA LTC UPGRADES rev 1.70a SLT	*YES*
Attachment B - CS00527 [redacted] 22 Mar 2022 EPAC Submittal	*YES*
Attachment C - CS00527 Constructability Review [redacted] DSCADA LTC Upgrade rev 01 SLT	*YES*
Attachment D - [redacted] Nomenclature Diagram	*YES*
Attachment E - CS00407 - DSCADA LTC Receivers Prgm Upgrades - Prgm Level Initial Funding - PAF	YES

Project Checklist - Transmission & Substation Capital Project	
Project Name: DSCADA LTC Controls Upgrade [redacted]	**Project Number: CS00527**

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: CS00527**

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?	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 - Full Review

ESTIMATE SUMMARY

Project Title: [redacted] - DSCADA LTC UPGRADES
Project Mgr/Lead: [redacted]

Project Number: CS00527
WO & Task #: 80134749
Estimate revision #: 00
Estimate Type - Station work

Estimate #: C-22-89

Date of Estimate:02/28/2022

Estimate done by: [redacted]
In Service date (ISD):12/31/2022

Template Revision # 01.70a

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: C-22-89
Date of Estimate:02/28/2022

Project Number: CS00527
WO & Task #: 80134749

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														
4	Siting Approvals / Permits														
5	Engineering / Design	$47,900	9.3%	5.4%	$20,500	$20,300	$7,100								
6	Materials (Eversource purchased)	$43,100	8.4%	4.8%		$43,100									
7	Construction (incl matl's by contractors)	$181,900	35.3%	20.3%		$181,900									
8	Testing / Commissioning	$151,800	29.5%	17.0%		$151,800									
9	PM T Project Mgmt Team	$8,500	1.7%	0.9%		$8,500									
10	Removals	$15,500	3.0%	1.7%		$15,500									
11	Other														
12	Risks	$66,000	12.8%	7.4%		$66,000									
125															
	Project Directs Total w/Risks	**$514,700**	100.0%	57.5%	**$20,500**	**$487,100**	**$7,100**								
13	Indirects/Overhead	$334,600		37.4%		$320,900	$13,700								
14	AFUDC	$25,300		2.8%		$25,300									
125															
	Project Total - Baseline Budget	**$874,600**		97.7%	**$20,500**	**$833,300**	**$20,800**								
15	Contingency	$20,700		2.3%		$20,700									
	Project Total - Funding Approval Level	**$895,300**		100.0%	**$20,500**	**$854,000**	**$20,800**								
16	Reimbursables/Customer Contribution														
--															
	Project Total (less reimbursables)	**$895,300**			**$20,500**	**$854,000**	**$20,800**								
	Cost per key qty (if appl)	447,650 $'s / EA													
	Amount of Escalation included above	$600					$600								
6	Total materials - Eversource	$43,100				$43,100									
	Total materials - Contractor														
	Total materials	$43,100				$43,100									
	NOTE: Risk / Contingency is 10.7% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)														
	Estimate Range	**-25%**			**25%**										
		$671,000			**$1,119,000**										

	TOTAL w/ escal broken out
ROW / Easements / Land purchas	$ -
Environmental Approvals / Permi	$ -
Outreach	$ -
Siting Approvals / Permits	$ -
Engineering / Design	$ 47,700
Materials (Eversource purchased	$ 43,100
Construction (incl matl's by cont	$ 181,900
Testing / Commissioning	$ 151,800
PM T Project Mgmt Team	$ 8,500
Removals	$ 15,500
Other	$ -
Risks	$ 66,000
	$514,500
Indirects/Overhead	$ 334,200
AFUDC	$ 25,300
	$ -
	$874,000
	$ -
Contingency	$ 20,700
	$894,700
	$ -
	$ -
	$894,700
	$ 600
Escal total	**$895,300**
Check total	

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.
- **One** (01) M-2001D Beckwith tap changer controls only with **One** new *Adapter Panel.*

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. Major Material have been ordered.
7.The transformer alarms will be modified and will be taken back to the SEL-2240 Axion.
8. Priors of **$20.5k** posted on initial Funding Project/Work Order; CS009032/80134749 will be journaled to this Program Release Project"
9. 200 ft length of *New 2 conduit lengths* will be used for both 2X and 3X transformers for fiber installation from DSCADA Cabinet in Control House to LTC cabinets mounted on Tranformers.
* On the 7A-1X Use **existing M-2001C** (with a Comm-port) control with **existing** *M-2280B Adopter Panel.*

RISKS

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

UNESCALATED LINE ITE

Project Number CS00627
Date of Estimate 02/28/2022
Estimate revision # 00

			Prior				TOTAL
			DOLLARS		DOLLARS		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				$835			$835
Construction Purchased Material				$1,820			$1,820
Outside Construction Vendor				$161,952			$161,952
Sales tax on Constr. Vendor							
Vehicles (now in Indirects section)							
Inspection services (Outside Vendor)							
Construction Rep (Outside vendor)				$8,880			$8,880
Rents and Leases							
CSTXX Subtotal				$183,471			$183,471
Escalation							
CSTXX Total				$183,471			$183,471
ENPXX-TG ENGINEERING/DESIGN							
Project Services/Drafting				$3,098	$774		$3,872
T- Line Engineering/Design							
D- Street Engineering/Design							
Civil Engineering/Design				$1,182	$367		$1,549
Substation (T) Engineering/Design							
Substation (D) Engineering/Design				$4,200	$1,260		$5,460
Protection & Controls Engineering				$3,829	$907		$4,836
Survey Engineering							
SCADA / Automation Engineering							
Telecom Engineering				$1,334	$890		$2,224
Other - PP Actuals			$20,800				$20,800
Other - Project Explorer							
LT Tot			$20,800	$13,423	$4,218		$38,141
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)							
ENPXX Subtotal			$20,800	$20,294	$6,909		$47,703
Escalation							
ENPXX Total			$20,800	$20,294	$6,909		$47,703
LNDXX-TG LAND							
Real Estate							
Employee Expenses	AE	8%					
Purchase Land	AM						
Vehicles (now in Indirects section)	AV						
Fees and Payments	BF						
LNDXX Subtotal							
Escalation							
LNDXX Total							
MATXX-TG MATERIAL							
Eversource	AM			$39,900			$39,900
Outside Services	AM						
	AM						
Freight							
Sales Tax Eversource/outside services	3.8%	3.8%		$1,930			$1,930
Other							
MATXX Subtotal				$41,830			$41,830
Escalation							
MATXX Total				$41,830			$41,830
PSMXX-PROJECT MANAGER & SUPPORT							
Project Management (PM)	LT			$4,368			$4,368
Project Planning/Cost (IP)	LT						
Contracts/Purchasing (CIP)	LT						
System Planning	LT						
Environmental	LT						
SCS - None	LT						
Legal	LT						
Estimating	LT			$2,368			$2,368
Siting - None	LT						
Asset Management	LT			$1,361			$1,361
Other -	LT						
Other -	LT						
Other -	LT						
Other -	LT						
LT Total				$8,097			$8,097
Employee Expenses	A			$405			$405
Project Support Vendor - PM	A						
Project Support Vendor - IP	A						
Project Support Vendor - CIP	A						
Project Support Vendor - System Planning	A						
Project Support Vendor - Environental	A						
Project Support Vendor - SCS - None	A						
Project Support Vendor - Legal	A						
Project Support Vendor - Estimating	A						
Project Support Vendor - Siting - None	A						
Project Support Vendor - Asset Management	A						
Project Support Vendor - Other	A						
Project Support Vendor - Other	A						
Project Support Vendor - Other	A						
Project Support Vendor - Other	A						
Vehicles (now in Indirects section)	A						
Property or CMIP tax large proj allowance	B						
Builder All risk insurance excluding deductables(if project is over $60m)	B						
Fees and Payments - Environental	BF						
Fees and Payments - Siting	BF						
Fees and Payments - Other	BF						
PSMXX Subtotal				$8,502			$8,502
Escalation							
PSMXX Total				$8,502			$8,502
RSMXX-TG REMOVAL							
Engineering/Design	[redacted]						
Internal Construction	LT						
LT Total							
Employee Expenses	AE	15%					
Outside Services	AO						
Contractor Labor	AO			$15,840			$15,840
Vehicles (now in Indirects section)	AV						
Rents and Leases	BR						
RSMXX Subtotal				$15,840			$15,840
Escalation							
RSMXX Total				$15,840			$15,840
TSTXX-TG TEST							
Test / Field Engr. Labor (In House)	LT	$ [redacted]					
Lead Commissioning Engr. (LCE) (Internal)	LT	$ [redacted]					
Employee Expense	AE	10%					
Test / Field Engr. Labor (contractor)	AO	[redacted]		$96,200			$96,200
Lead Commissioning Engr. (LCE) (contractor)	AO	[redacted]		$55,640			$55,640
Vehicles (now in Indirects section)	AV						
TSTXX Subtotal				$151,840			$151,840
Escalation							
TSTXX Total				$151,840			$151,840
SUBTOTAL PROJECT DIRECT COST			- $20,800	$421,147	$6,909		$448,888
Risk							
Risk				$66,000			$66,000
				$ -	$ -		
				$ -	$ -		
Risk Total				$66,000			$66,000
TOTAL PROJECT DIRECT COST (w risk)			- $20,800	$487,147	$6,909		$514,888
INDIRECTS							
Non-Productive Time Allocation (SNP)	55.1%			$4,818	$835		$5,653
Payroll Benefits Allocation (ZPB) Incl NPT	44.0%			$5,312			$5,312
Gen SVC CO Overhead (ZGS) Incl NPT	80.0%			$19,807	$3,882		$23,689
E&S Allocations (ZEB,ZIE,ZEN)	60.0%			$343,818	$6,729		$350,547
AG&E Allocations (ZAG)	1.3%			$8,686	$227		$8,913
Stores Expense Allocation (ZST)	8.0%			$3,192			$3,192
Lobby Stock							
MOEC (ZMI)	6.0%			$26,308	$666		$26,984
Vehicles (ZVE)	28.0%			$8,964	$1,181		$10,145
Indirects Subtotal				$320,905	$13,340		$334,245
TOTAL PROJECT COST - Direct & Indirect (excl APUDC)			$20,800	$808,053	$20,249		$849,801
APUDC							
APUDC (DI)				6.50% $25,295	6.50%	1	$25,295
In Service Dollars				-	-		
Cumulative ISS							
APUDC Subtotal				$25,295			$25,295
TOTAL PROJECT COST - Baseline Budget			$20,800	$833,347	$20,249		$874,096
Contingency							
Contingency				$20,710			$20,710
Other			$ -	$ -	$ -		
Contingency SubTotal				$20,710			$20,710
TOTAL PROJECT COST - Approved Funding			$20,800	$854,057	$20,249		$894,806
Reimbursables / Customer Contribution							
Reimbursables / Customer Contribution (enter as negative)			$ -	$ -	$ -		
TOTAL PROJECT COST			$20,800	$854,057	$20,249		$894,806

Activity Flag	Activity ID	Activity Name	Start	Original Duration	Finish	Resources	Activity Schedule
80134749 [redacted] DSCADA LTC Automation (CS00527)			07-Sep-21 A	333	05-Jan-23		
80134749.01 INITIALIZATION AND SCOPE DEVELOPEMENT			07-Sep-21 A	245	28-Aug-22		
	START	SCHEDULE START MILESTONE	04-Oct-21 A	0			CHEDULE START MILESTONE
80134749.01.01 Initial Funding			07-Sep-21 A	20	07-Sep-21 A		
EPAC-I	PI1300	N/R (per DH 9/7/21) Initial Funding Request Approved		0	07-Sep-21 A		(per DH 9/7/21) Initial Funding Request Approved
	PI1000	N/R (per DH 9/7/21) Submit Initial Funding Request		0	07-Sep-21 A		(per DH 9/7/21) Submit Initial Funding Request
PM-AM	PI1400	N/R (per DH 9/7/21) Assign Project Manager	07-Sep-21 A	1	07-Sep-21 A		(per DH 9/7/21) Assign Project Manager
	PI1500	Assign Scheduler	07-Sep-21 A	5	07-Sep-21 A		ign Scheduler
	PI1600	Assign Cost Analyst	07-Sep-21 A	5	07-Sep-21 A		ign Cost Analyst
PPA-IF	PI1010	N/R (per DH 9/7/21) Initial Funding PowerPlan Approval	07-Sep-21 A	10	07-Sep-21 A	Eversource Project	(per DH 9/7/21) Initial Funding PowerPlan Approval
	PI1200	N/R (per DH 9/7/21) Project Initiator Develop Intitial Funding Request	07-Sep-21 A	10	07-Sep-21 A		
80134749.01.02 SDC Approval			07-Sep-21 A	47	07-Sep-21 A		
ES-CONCPT	CE1100	ES Engineering Develop Electrical Substation Conceptual Engineering Design in Accordance with Deliverables Checklist	07-Sep-21 A	15	07-Sep-21 A	SUBSTATIC ENGINEER	Engineering Develop Electrical Substation Conceptual Engineering Design in Accordance with Deliverables Che
	SSF1000	N/R (per DH 9/7/21) Develop Soultions Selection Form (SSF)	07-Sep-21 A	20	07-Sep-21 A		(per DH 9/7/21) Develop Soultions Selection Form (SSF)
EST-SDC	CGE1000	N/R (per DH 9/7/21) Develop Conceptual Grade Estimate (-25%+50%)	07-Sep-21 A	10	07-Sep-21 A	Generic Estimating	(per DH 9/7/21) Develop Conceptual Grade Estimate (-25%+50%)
ES-CONCPT	CE1000	ES Engineering Develop Civil Substation Conceptual Engineering Design in Accordance with Deliverables Checklist	07-Sep-21 A	15	07-Sep-21 A	CT-SS Civil Designer Generic	Engineering Develop Civil Substation Conceptual Engineering Design in Accordance with Deliverables Checklist
ES-CONCPT	CE1400	N/R (per DH 9/7/21) ES Engineering Develop P&C Conceptual Engineering Design in Accordance with Deliverables Checklist	07-Sep-21 A	15	07-Sep-21 A	CT- P&C Engineer Generic	(per DH 9/7/21) ES Engineering Develop P&C Conceptual Engineering Design in Accordance with Deliverables
SDC	SDC1000	N/R (per DH 9/7/21) Solution Design Committee(SDC) Approval (If needed)		0	07-Sep-21 A		(per DH 9/7/21) Solution Design Committee(SDC) Approval (If needed)
	CE1710	N/R (per DH 9/7/21) Conduct Conceptual Constructability Walk Down	07-Sep-21 A	1	07-Sep-21 A		(per DH 9/7/21) Conduct Conceptual Constructability Walk Down
	CE1600	N/R (per DH 9/7/21) Conduct Project Team Kickoff Meeting	07-Sep-21 A	1	07-Sep-21 A		(per DH 9/7/21) Conduct Project Team Kickoff Meeting
80134749.01.09 Project Initiation			07-Sep-21 A	150	28-Apr-22		
80134749.01.09.2 EPAC Partial Funding			07-Sep-21 A	47	07-Sep-21 A		
EPAC-P	PF1000	N/R (per DH 9/7/21) EPAC Partial Funding Approval	07-Sep-21 A	1	07-Sep-21 A	Eversource Project Approval	(per DH 9/7/21) EPAC Partial Funding Approval
EST-PART	ATCGE1010	N/R (per DH 9/7/21) Develop At Least Conceptual Grade Estimate (-25%+50%)	07-Sep-21 A	10	07-Sep-21 A	Generic Estimating	(per DH 9/7/21) Develop At Least Conceptual Grade Estimate (-25%+50%)
	PE1700	N/R (per DH 9/7/21) Conduct Preliminary Constructability Walk Down	07-Sep-21 A	1	07-Sep-21 A		(per DH 9/7/21) Conduct Preliminary Constructability Walk Down

2022 2023 2024 2025

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Remaining Level of Effort | Remaining Work | ◆ Mile...
Actual Work | Critical Remaining Work

TASK filter: All Activities

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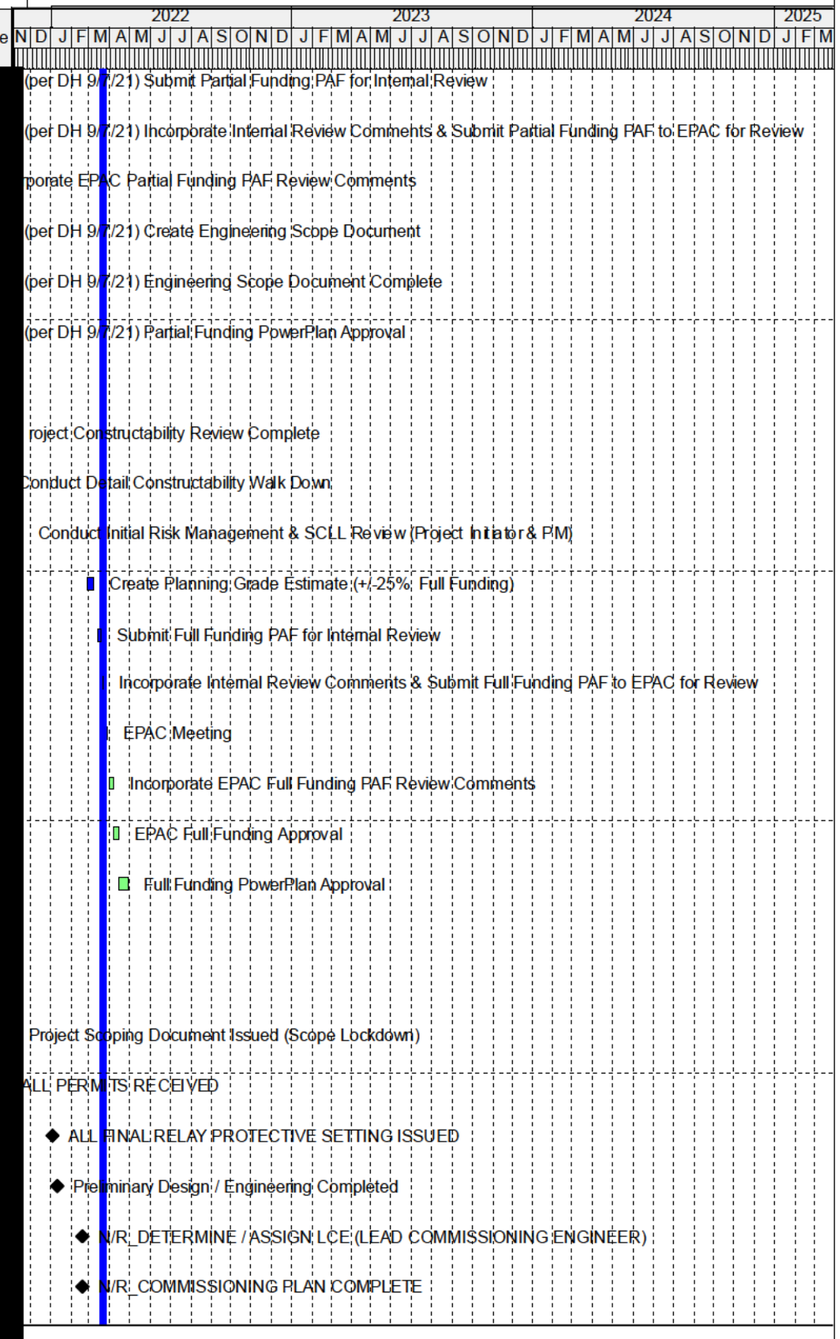
Activity Flag	Activity ID	Activity Name	Start	Original Duration	Finish	Resources	Activity Schedule
	PAFP1000	N/R (per DH 9/7/21) Submit Partial Funding PAF for Internal Review	07-Sep-21 A	10	07-Sep-21 A		
	PAFP1100	N/R (per DH 9/7/21) Incorporate Internal Review Comments & Submit Partial Funding PAF to EPAC for Review	07-Sep-21 A	5	07-Sep-21 A		
	PAFP1200	Incorporate EPAC Partial Funding PAF Review Comments	07-Sep-21 A	5	07-Sep-21 A		
	PE1710	N/R (per DH 9/7/21) Create Engineering Scope Document	07-Sep-21 A	5	07-Sep-21 A	CT- Project Engineer	
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	07-Sep-21 A	10	07-Sep-21 A	Eversource Project	
80134749.01.09.3 EPAC Full Funding			22-Sep-21 A	150	28-Apr-22		
Construct	DE2000	Project Constructability Review Complete	22-Sep-21 A	19	19-Oct-21 A		
	DE1900	Conduct Detail Constructability Walk Down	19-Oct-21 A	1	19-Oct-21 A		
	DE1700	Conduct Initial Risk Management & SCLL Review (Project Initiator & PM)	28-Oct-21 A	15	19-Nov-21 A		
EST-FULL	DE1600	Create Planning Grade Estimate (+/-25% Full Funding)	25-Feb-22 A	10	08-Mar-22 A		
	PAFF2000	Submit Full Funding PAF for Internal Review	15-Mar-22 A	4	18-Mar-22 A		
PAF Submit	PAFF2100	Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC for Review	21-Mar-22 A	1	21-Mar-22 A		
PAF Submit	PAFF2105	EPAC Meeting	29-Mar-22*	1	29-Mar-22		
	PAFF2200	Incorporate EPAC Full Funding PAF Review Comments	30-Mar-22*	7	07-Apr-22		
EPAC-F	FF1000	EPAC Full Funding Approval	08-Apr-22*	5	14-Apr-22	Eversource Project	
PPA-FF	FF1010	Full Funding PowerPlan Approval	14-Apr-22*	10	28-Apr-22	Eversource Project	
80134749.01.12 T-Minus Milestones			07-Sep-21 A	212	28-Aug-22		
80134749.01.12.1 T-Minus Milestones "A"Electrical			07-Sep-21 A	212	28-Aug-22		
ENG-SCOPE	A1100	Eng. Project Scoping Document Issued (Scope Lockdown)		0	07-Sep-21 A		
	AT0801	ALL PERMITS RECEIVED		0	25-Oct-21 A		
	AT0404	ALL FINAL RELAY PROTECTIVE SETTING ISSUED		0	04-Jan-22 A		
ENG-PRELIM	A1090	Preliminary Design / Engineering Completed		0	11-Jan-22 A		
	AT2404	N/R_DETERMINE / ASSIGN LCE (LEAD COMMISSIONING ENGINEER)		0	18-Feb-22 A		
	AT1301	N/R_COMMISSIONING PLAN COMPLETE		0	18-Feb-22 A		



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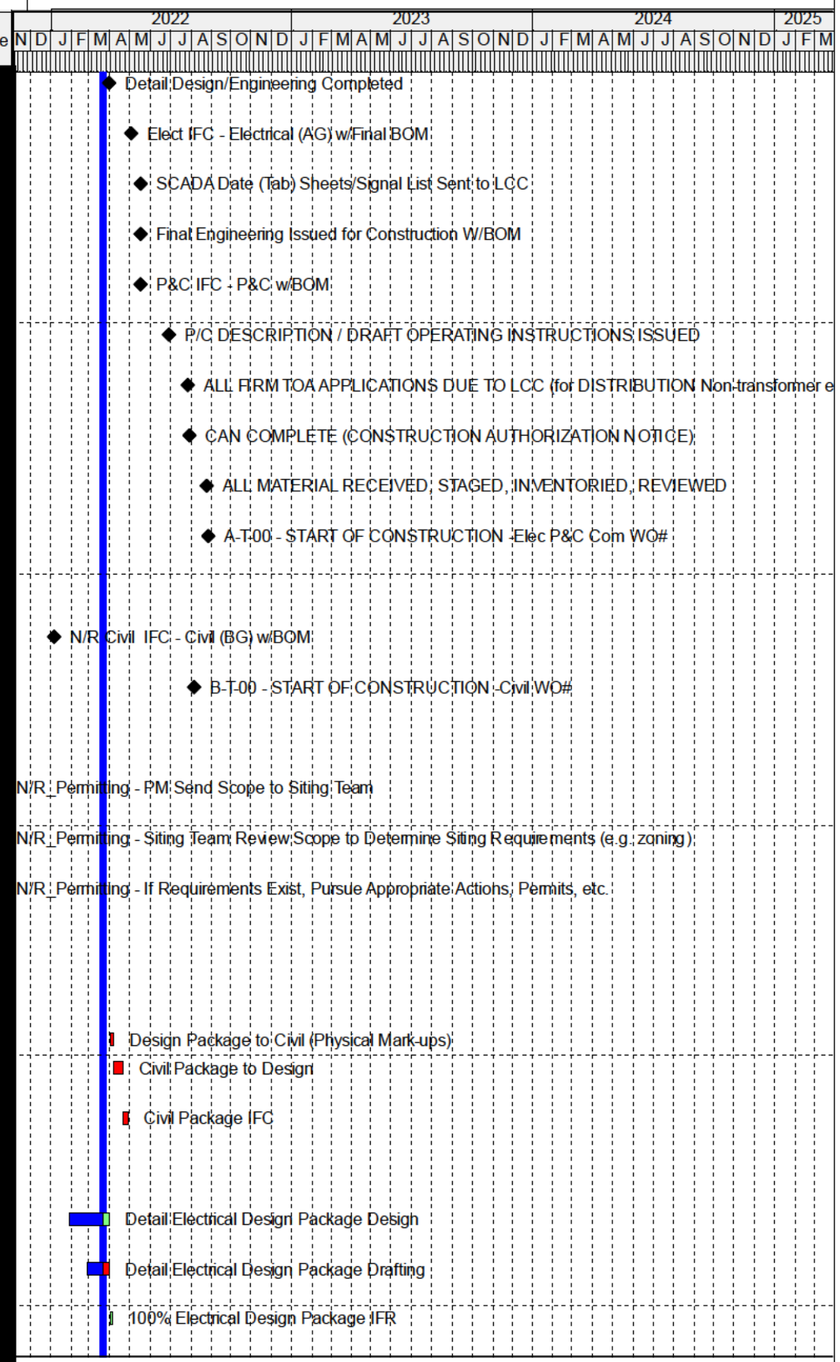
Activity Flag	Activity ID	Activity Name	Start	Original Duration	Finish	Resources
ENG-DTL	A3560	Detail Design/Engineering Completed		0	31-Mar-22	
AG-IFC	AT0805E	Elect IFC - Electrical (AG) w/Final BOM		0	03-May-22	
	AT1201	SCADA Date (Tab) Sheets/Signal List Sent to LCC		0	18-May-22	
ENG-IFC	A3570	Final Engineering Issued for Construction W/BOM		0	18-May-22	
BG-IFC	AT0805P	P&C IFC - P&C w/BOM		0	18-May-22	
	AT1202	P/C DESCRIPTION / DRAFT OPERATING INSTRUCTIONS ISSUED		0	30-Jun-22	
	AT0409	ALL FIRM TOA APPLICATIONS DUE TO LCC (for DISTRIBUTION Non-transformer equipment)		0	28-Jul-22	
	AT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		0	29-Jul-22	
	AT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		0	26-Aug-22	
SOC	AT00	A-T-00 - START OF CONSTRUCTION -Elec P&C Com WO#	28-Aug-22*	0		
80134749.01.12.2 T-Minus Milestones "B" Civil			06-Jan-22 A	191	07-Aug-22	
BG-IFC	BT0805C	N/R Civil IFC - Civil (BG) w/BOM		0	06-Jan-22 A	
SOC	BT00	B-T-00 - START OF CONSTRUCTION -Civil WO#	07-Aug-22*	0		
80134749.04 SITING APPROVALS AND PERMITS			18-Oct-21 A	1	18-Oct-21 A	
	A3590	N/R_Permitting - PM Send Scope to Siting Team	18-Oct-21 A	1	18-Oct-21 A	
	A3600	N/R_Permitting - Siting Team Review Scope to Determine Siting Requirements (e.g. zoning)	18-Oct-21 A	1	18-Oct-21 A	Siting Lead Generic
	A3610	N/R_Permitting - If Requirements Exist, Pursue Appropriate Actions, Permits, etc.	18-Oct-21 A	1	18-Oct-21 A	Siting Lead Generic
80134749.05 ENGINEERING & DESIGN			18-Nov-21 A	155	30-Jun-22	
80134749.05.01 Civil Engineering			01-Apr-22	20	28-Apr-22	
	DSSE-100	Design Package to Civil (Physical Mark-ups)	01-Apr-22	5	07-Apr-22	
	DSSE-110	Civil Package to Design	08-Apr-22	10	21-Apr-22	
ES-IFC	DSSE-120	Civil Package IFC	22-Apr-22	5	28-Apr-22	
80134749.05.02 Electrical Engineering			31-Jan-22 A	104	27-Jun-22	
	DSSE-200	Detail Electrical Design Package Design	31-Jan-22 A	5	31-Mar-22	
ES-DTL	DSSE-205	Detail Electrical Design Package Drafting	25-Feb-22 A	5	31-Mar-22	
ES-100%	DSSE-210	100% Electrical Design Package IFR	01-Apr-22	3	05-Apr-22	



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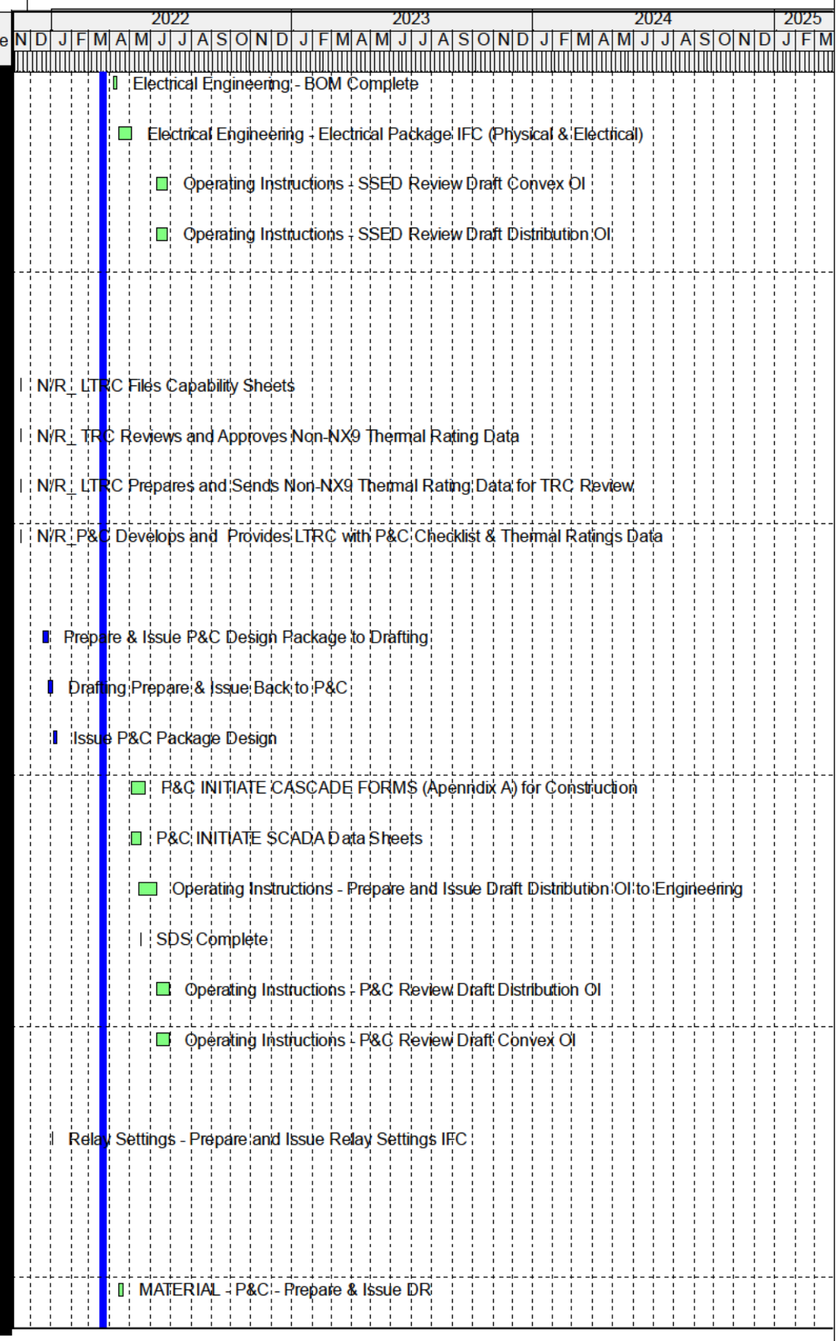
Activity Flag	Activity ID	Activity Name	Start	Original Duration	Finish	Resources	Activity Schedule
	DSSE-230	Electrical Engineering - BOM Complete	06-Apr-22	5	12-Apr-22		
ES-IFC	DSSE-240	Electrical Engineering - Electrical Package IFC (Physical & Electrical)	13-Apr-22	15	03-May-22		
	DSSE-920	Operating Instructions - SSED Review Draft Convex OI	10-Jun-22*	12	27-Jun-22		
	DSSE-460	Operating Instructions - SSED Review Draft Distribution OI	10-Jun-22*	12	27-Jun-22		
80134749.05.03 Distribution Thermal Ratings NX-9			18-Nov-21 A	1	18-Nov-21 A		
80134749.05.03.05 Non NX-9 Thermal Ratings			18-Nov-21 A	1	18-Nov-21 A		
	NX9A-EM74	N/R_ LTRC Files Capability Sheets	18-Nov-21 A	1	18-Nov-21 A		
	NX9A-EM64	N/R_ TRC Reviews and Approves Non-NX9 Thermal Rating Data	18-Nov-21 A	1	18-Nov-21 A		
	NX9A-EM54	N/R_ LTRC Prepares and Sends Non-NX9 Thermal Rating Data for TRC Review	18-Nov-21 A	1	18-Nov-21 A		
	NX9A-EM44	N/R_P&C Develops and Provides LTRC with P&C Checklist & Thermal Ratings Data	18-Nov-21 A	1	18-Nov-21 A		
80134749.05.04 P&C Engineering			20-Dec-21 A	139	30-Jun-22		
ES-CONCPT	DSSE-400	Prepare & Issue P&C Design Package to Drafting	20-Dec-21 A	10	27-Dec-21 A		
	DSSE-410	Drafting Prepare & Issue Back to P&C	27-Dec-21 A	7	05-Jan-22 A		
ES-PRELIM	A3380	Issue P&C Package Design	06-Jan-22 A	9	11-Jan-22 A		
	DSSE-480	P&C INITIATE CASCADE FORMS (Apenndix A) for Construction	04-May-22	15	24-May-22		
	DSSE-990	P&C INITIATE SCADA Data Sheets	04-May-22	10	17-May-22		
	DSSE-450	Operating Instructions - Prepare and Issue Draft Distribution OI to Engineering	16-May-22*	18	09-Jun-22		
ES-IFC	DSSE-220	SDS Complete	18-May-22	1	18-May-22		
	DSSE-470	Operating Instructions - P&C Review Draft Distribution OI	10-Jun-22	15	30-Jun-22		
	DSSE-930	Operating Instructions - P&C Review Draft Convex OI	10-Jun-22	15	30-Jun-22		
80134749.05.04.1 Relay Settings			03-Jan-22 A	20	04-Jan-22 A		
ES-RSET	DSSE-440	Relay Settings - Prepare and Issue Relay Settings IFC	03-Jan-22 A	20	04-Jan-22 A		
80134749.06 MATERIAL PROCUREMENT			06-Oct-21 A	224	26-Aug-22		
80134749.06.01 MATERIAL FOR P&C			14-Apr-22	80	06-Aug-22		
DR-RM	DSSE-510	MATERIAL - P&C - Prepare & Issue DR	14-Apr-22	5	21-Apr-22		



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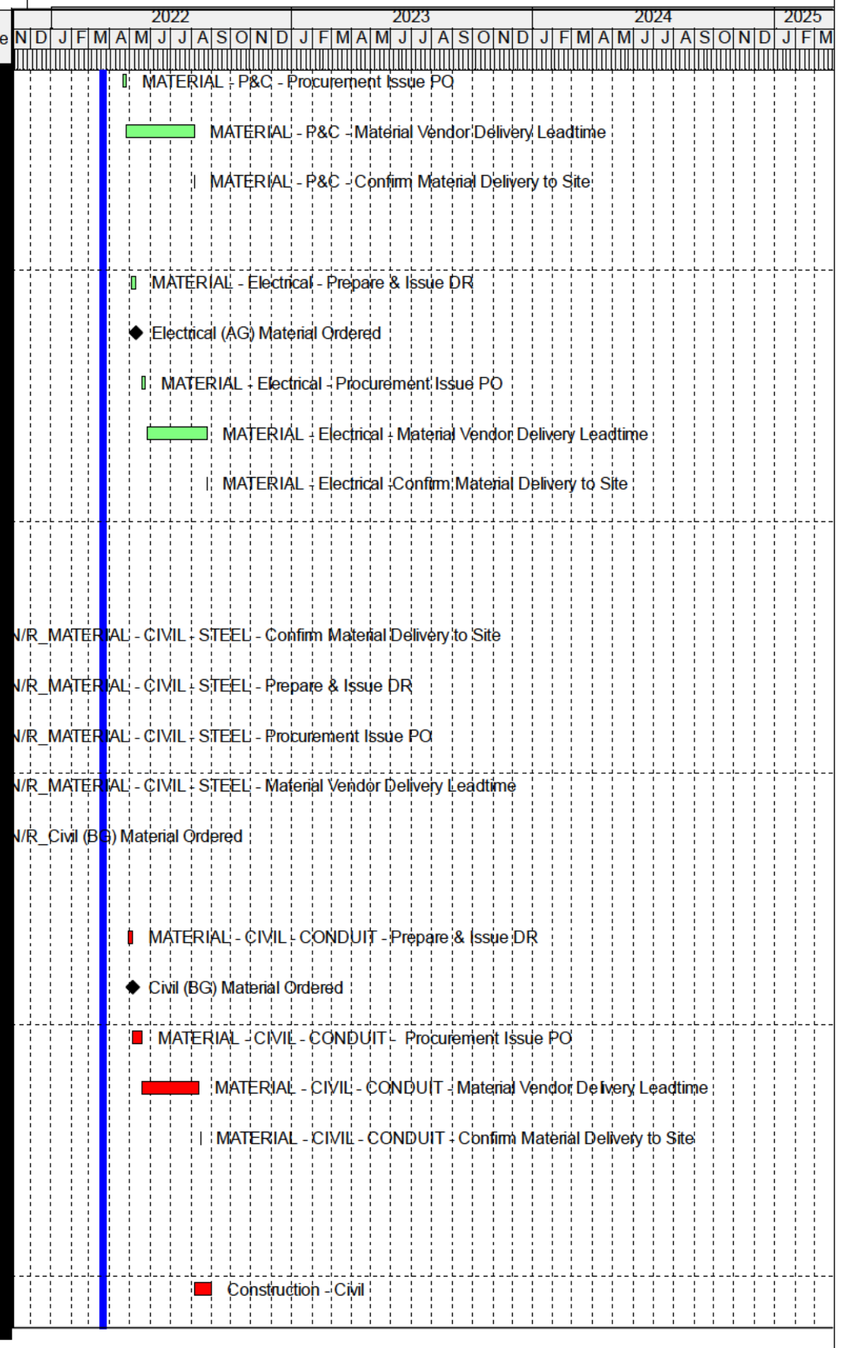
Activity Flag	Activity ID	Activity Name	Start	Original Duration	Finish	Resources
	DSSE-980	MATERIAL - P&C - Procurement Issue PO	21-Apr-22	5	26-Apr-22	Purchasing Department
	DSSE-1000	MATERIAL - P&C - Material Vendor Delivery Leadtime	26-Apr-22	101	05-Aug-22	Purchasing Department
M-DELIV	DSSE-1010	MATERIAL - P&C - Confirm Material Delivery to Site	05-Aug-22	1	06-Aug-22	Purchasing Department
80134749.06.02 MATERIAL FOR ELECTRICAL			04-May-22	81	26-Aug-22	
DR-RM	DSSE-520	MATERIAL - Electrical - Prepare & Issue DR	04-May-22	5	10-May-22	
DR-AGMAT	DSSE-530	Electrical (AG) Material Ordered		0	10-May-22	
	DSSE-1020	MATERIAL - Electrical - Procurement Issue PO	19-May-22	5	25-May-22	Purchasing Department
	DSSE-1030	MATERIAL - Electrical - Material Vendor Delivery Leadtime	26-May-22	92	25-Aug-22	Purchasing Department
M-DELIV	DSSE-550	MATERIAL - Electrical -Confirm Material Delivery to Site	26-Aug-22	1	26-Aug-22	Purchasing Department
80134749.06.03 MATERIAL FOR CIVIL			06-Oct-21 A	214	15-Aug-22	
80134749.06.03.01 MATERIAL FOR CIVIL - STEEL			06-Oct-21 A	1	06-Oct-21 A	
M-DELIV	DSSE-560	N/R_MATERIAL - CIVIL - STEEL - Confirm Material Delivery to Site	06-Oct-21 A	1	06-Oct-21 A	Purchasing Department
DR-ENG	DSSE-500	N/R_MATERIAL - CIVIL - STEEL - Prepare & Issue DR	06-Oct-21 A	1	06-Oct-21 A	
	DSSE-1040	N/R_MATERIAL - CIVIL - STEEL - Procurement Issue PO	06-Oct-21 A	1	06-Oct-21 A	Purchasing Department
	DSSE-1050	N/R_MATERIAL - CIVIL - STEEL - Material Vendor Delivery Leadtime	06-Oct-21 A	1	06-Oct-21 A	Purchasing Department
DR-BGMAT	DSSE-540	N/R_Civil (BG) Material Ordered		0	06-Oct-21 A	
80134749.06.03.02 MATERIAL FOR CIVIL - CONDUIT			29-Apr-22	74	15-Aug-22	
DR-RM	DSSE-1140	MATERIAL - CIVIL - CONDUIT - Prepare & Issue DR	29-Apr-22	5	05-May-22	
DR-BGMAT	DSSE-1170	Civil (BG) Material Ordered		0	05-May-22	
	DSSE-1150	MATERIAL - CIVIL - CONDUIT - Procurement Issue PO	06-May-22	10	19-May-22	Purchasing Department
	DSSE-1160	MATERIAL - CIVIL - CONDUIT - Material Vendor Delivery Leadtime	20-May-22	87	14-Aug-22	Purchasing Department
M-DELIV	DSSE-1130	MATERIAL - CIVIL - CONDUIT - Confirm Material Delivery to Site	15-Aug-22	0	15-Aug-22	Purchasing Department
80134749.07 CONSTRUCTION			24-Jul-22	72	03-Nov-22	
80134749.07.01 CONSTRUCTION - CIVIL			07-Aug-22	26	01-Sep-22	
	A1120	Construction - Civil	07-Aug-22*	26	01-Sep-22	Const Rep Field Sup - Civil



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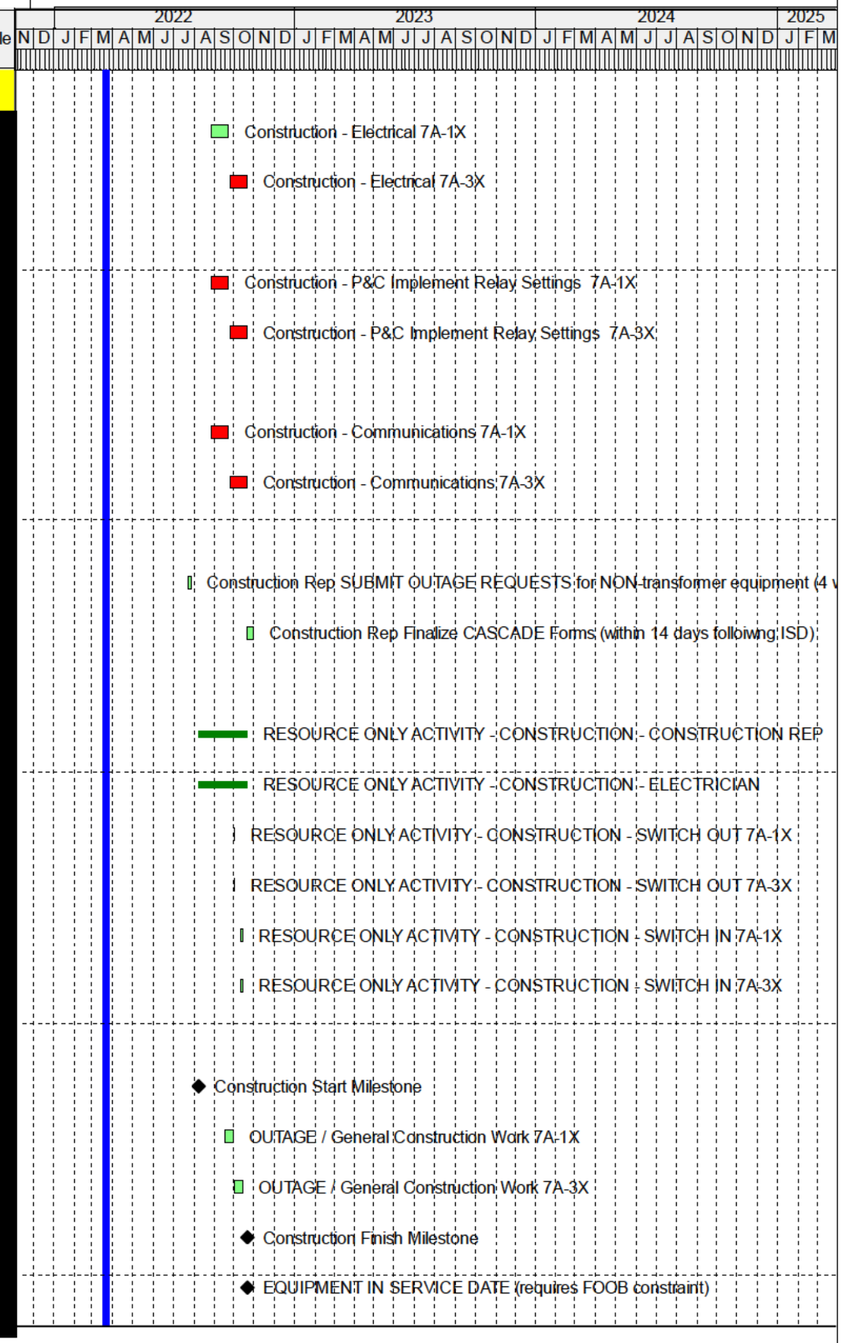
Activity Flag	Activity ID	Activity Name	Start	Original Duration	Finish	Resources	Activity Schedule
80134749.07.02 CONSTRUCTION - ELECTRICAL			28-Aug-22	54	20-Oct-22		
	A1130	Construction - Electrical 7A-1X	28-Aug-22*	26	22-Sep-22	Const Rep Field Sup - S/S	
	A1135	Construction - Electrical 7A-3X	25-Sep-22*	26	20-Oct-22	Const Rep Field Sup - S/S	
80134749.07.03 CONSTRUCTION - P&C			28-Aug-22	54	20-Oct-22		
	A1140	Construction - P&C Implement Relay Settings 7A-1X	28-Aug-22*	26	22-Sep-22	Constructio Rep	
	A1145	Construction - P&C Implement Relay Settings 7A-3X	25-Sep-22*	26	20-Oct-22	Constructio Rep	
80134749.07.04 CONSTRUCTION - COMMUNICATIONS			28-Aug-22	54	20-Oct-22		
	A1150	Construction - Communications 7A-1X	28-Aug-22*	26	22-Sep-22	Constructio Rep	
	A1155	Construction - Communications 7A-3X	25-Sep-22*	26	20-Oct-22	Constructio Rep	
80134749.07.92 CONSTRUCTION - CONST.REP TASKS			24-Jul-22	99	30-Oct-22		
	A1250	Construction Rep SUBMIT OUTAGE REQUESTS for NON-transformer equipment (4 weeks before outage)	24-Jul-22*	5	28-Jul-22	Constructio Rep	
	A1260	Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD)	21-Oct-22	10	30-Oct-22	Constructio Rep	
80134749.07.94 CONSTRUCTION RESOURCE TRACKING			08-Aug-22	74	20-Oct-22		
	ConRep-S	RESOURCE ONLY ACTIVITY - CONSTRUCTION - CONSTRUCTION REP	08-Aug-22	74	20-Oct-22	Constructio Rep	
	CONSTelec	RESOURCE ONLY ACTIVITY - CONSTRUCTION - ELECTRICIAN	08-Aug-22	74	20-Oct-22	Distribution - S/S Electrician	
	A1070	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH OUT 7A-1X	03-Oct-22*	1	03-Oct-22	Distribution Switching Crew	
	A3615	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH OUT 7A-3X	03-Oct-22*	1	03-Oct-22	Distribution Switching Crew	
	A1080	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH IN 7A-1X	13-Oct-22*	1	13-Oct-22	Distribution Switching Crew	
	A3620	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH IN 7A-3X	13-Oct-22*	1	13-Oct-22	Distribution Switching Crew	
80134749.07.96 CONSTRUCTION OUTAGES			08-Aug-22	52	20-Oct-22		
CRH	CSM	Construction Start Milestone	08-Aug-22*	0			
OUT	TOA-Const 7A-1X	OUTAGE / General Construction Work 7A-1X	19-Sep-22*	10	29-Sep-22	Constructio Resources	
OUT	TOA-Const 7A-3X	OUTAGE / General Construction Work 7A-3X	03-Oct-22*	10	13-Oct-22	Constructio Resources	
	CFM	Construction Finish Milestone		0	20-Oct-22		
ISD	ISD	EQUIPMENT IN SERVICE DATE (requires FOOB constraint)		0	20-Oct-22*		



Remaining Level of Effort | Remaining Work | Mile...
Actual Work | Critical Remaining Work

TASK filter: All Activities

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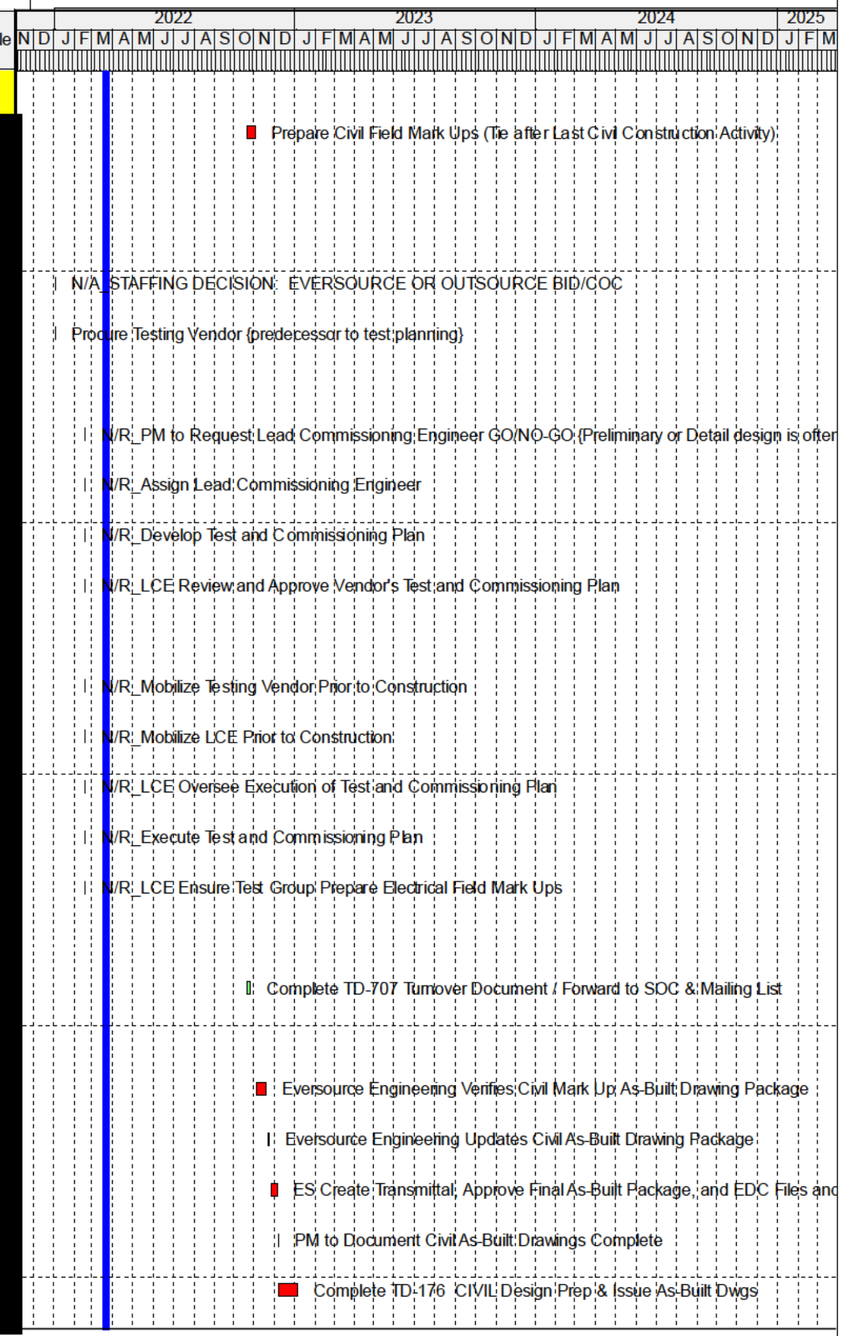
Activity Flag	Activity ID	Activity Name	Start	Original Duration	Finish	Resources	Activity Schedule
80134749.07.98 CONSTRUCTION CLOSEOUT			21-Oct-22	10	03-Nov-22		
	DSSE-900	Prepare Civil Field Mark Ups (Tie after Last Civil Construction Activity)	21-Oct-22	10	03-Nov-22	Construction Resources	
80134749.09 TEST AND COMMISSION			03-Jan-22 A	34	18-Feb-22 A		
80134749.09.01 TEST - SERVICES STAFFING DECISION			03-Jan-22 A	1	03-Jan-22 A		
	A1010	N/A_STAFFING DECISION: EVERSOURCE OR OUTSOURCE BID/COC	03-Jan-22 A	1	03-Jan-22 A		
	A3250	Procure Testing Vendor {predecessor to test planning}	03-Jan-22 A	1	03-Jan-22 A		
80134749.09.02 LCE PLANNING			18-Feb-22 A	0	18-Feb-22 A		
	LCE100	N/R_PM to Request Lead Commissioning Engineer GO/NO-GO {Preliminary or Detail design is often the predecessor}	18-Feb-22 A	0	18-Feb-22 A		
	LCE200	N/R_Assign Lead Commissioning Engineer	18-Feb-22 A	0	18-Feb-22 A		
	LCE400	N/R_Develop Test and Commissioning Plan	18-Feb-22 A	0	18-Feb-22 A	CT/WMA Test	
	LCE500	N/R_LCE Review and Approve Vendor's Test and Commissioning Plan	18-Feb-22 A	0	18-Feb-22 A		
80134749.09.04 TEST ACTIVITIES			18-Feb-22 A	1	18-Feb-22 A		
	LCE320	N/R_Mobilize Testing Vendor Prior to Construction	18-Feb-22 A	1	18-Feb-22 A	CT/WMA Test	
	LCE310	N/R_Mobilize LCE Prior to Construction	18-Feb-22 A	0	18-Feb-22 A		
	LCE610	N/R_LCE Oversee Execution of Test and Commissioning Plan	18-Feb-22 A	0	18-Feb-22 A		
	LCE620	N/R_Execute Test and Commissioning Plan	18-Feb-22 A	0	18-Feb-22 A	Engineering Contractor	
	LCE700	N/R_LCE Ensure Test Group Prepare Electrical Field Mark Ups	18-Feb-22 A	0	18-Feb-22 A		
80134749.10 PROJECT CLOSE OUT			18-Feb-22 A	221	05-Jan-23		
	DSSE-1100	Complete TD-707 Turnover Document / Forward to SOC & Mailing List	21-Oct-22	5	27-Oct-22	Construction Rep	
80134749.10.01 Civil As-Builts			04-Nov-22	41	05-Jan-23		
	DSSE-860	Eversource Engineering Verifies Civil Mark Up As-Built Drawing Package	04-Nov-22	10	18-Nov-22		
	DSSE-970	Eversource Engineering Updates Civil As-Built Drawing Package	21-Nov-22	3	23-Nov-22		
ES-ASB	DSSE-870	ES Create Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	25-Nov-22	8	06-Dec-22		
	DSSE-880	PM to Document Civil As-Built Drawings Complete	07-Dec-22	1	07-Dec-22		
	DSSE-1120	Complete TD-176 CIVIL Design Prep & Issue As-Built Dwgs	07-Dec-22	20	05-Jan-23		



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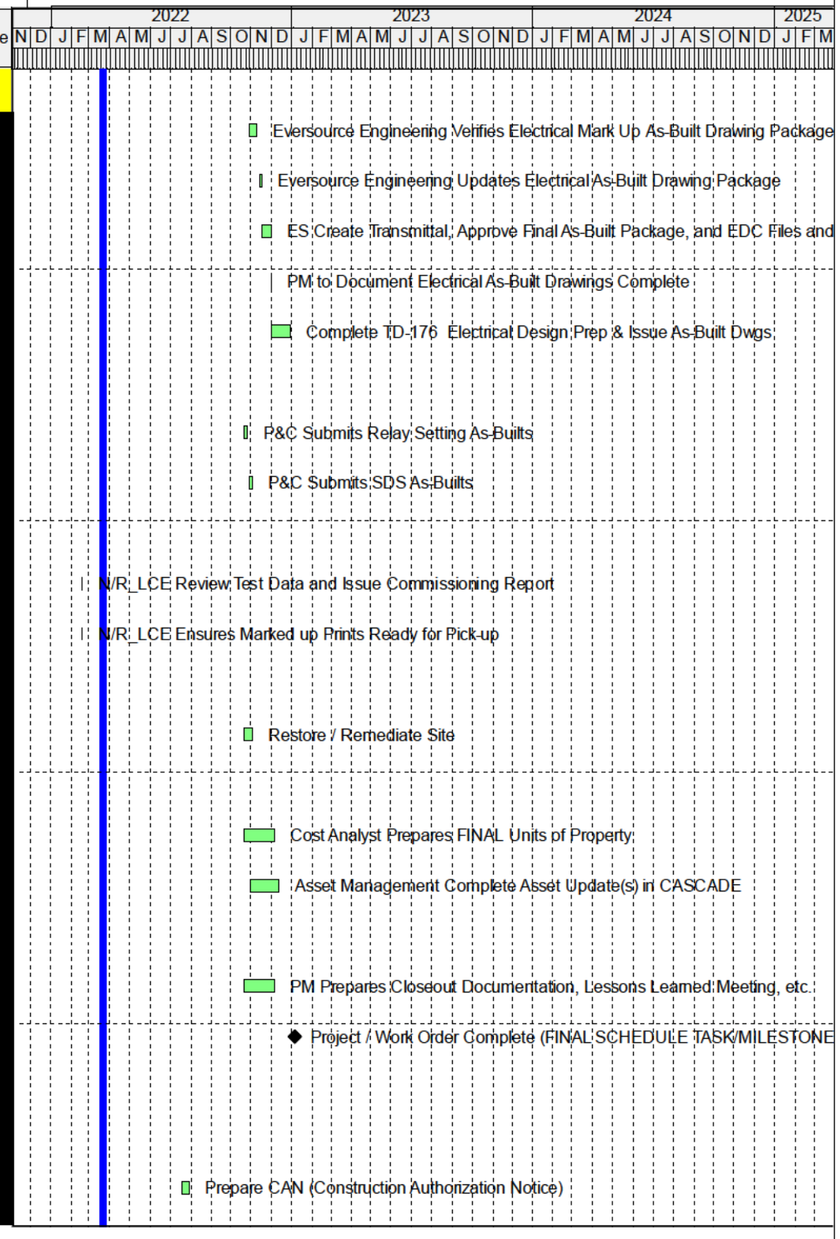
Activity Flag	Activity ID	Activity Name	Start	Original Duration	Finish	Resources	Activity Schedule
80134749.10.02 Electrical As-Builts			28-Oct-22	42	29-Dec-22		
	DSSE-820	Eversource Engineering Verifies Electrical Mark Up As-Built Drawing Package	28-Oct-22	10	10-Nov-22		
	DSSE-940	Eversource Engineering Updates Electrical As-Built Drawing Package	14-Nov-22	3	16-Nov-22		
ES-ASB	DSSE-830	ES Create Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	17-Nov-22	9	30-Nov-22		
	DSSE-840	PM to Document Electrical As-Built Drawings Complete	01-Dec-22	1	01-Dec-22		
	DSSE-1110	Complete TD-176 Electrical Design Prep & Issue As-Built Dwgs	01-Dec-22	20	29-Dec-22		
80134749.10.03 P&C As-Builts			21-Oct-22	10	03-Nov-22		
	DSSE-960	P&C Submits Relay Setting As-Builts	21-Oct-22	5	27-Oct-22		
	DSSE-950	P&C Submits SDS As-Builts	28-Oct-22	5	03-Nov-22		
80134749.10.04 Test Closout			18-Feb-22 A	1	18-Feb-22 A		
	LCE900	N/R_LCE Review Test Data and Issue Commissioning Report	18-Feb-22 A	1	18-Feb-22 A		
	LCE800	N/R_LCE Ensures Marked up Prints Ready for Pick-up	18-Feb-22 A	1	18-Feb-22 A		
80134749.10.05 SITE RESTORATION CLOSEOUT			21-Oct-22	10	03-Nov-22		
	A1110	Restore / Remediate Site	21-Oct-22	10	03-Nov-22	CT/WMA.C Contractor-	
80134749.10.06 MATERIAL, EQUIPMENT, COST, AND ASSET MANAGEMENT CLOSEOUT			21-Oct-22	36	13-Dec-22		
	A1020	Cost Analyst Prepares FINAL Units of Property	21-Oct-22	30	05-Dec-22	CT- Cost Analyst	
	A1030	Asset Management Complete Asset Update(s) in CASCADE	31-Oct-22	30	13-Dec-22		
80134749.10.07 PROJECT MANAGEMENT CLOSEOUT			21-Oct-22	51	05-Jan-23		
	A1040	PM Prepares Closeout Documentation, Lessons Learned Meeting, etc.	21-Oct-22	30	05-Dec-22		
	FINISH	Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE)		0	05-Jan-23		
80134749.13 OVERHEAD / INDIRECTS			18-Jul-22	10	29-Jul-22		
80134749.13.01 PROJECT MANAGEMENT			18-Jul-22	10	29-Jul-22		
	A1170	Prepare CAN (Construction Authorization Notice)	18-Jul-22*	10	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): CS00527 (Program CS00407)	**Project Constructability Phase:**	
Date(s) of Constructability Review: **10/19/2021**	☒ 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	[redacted]
☐	☒	Constr. Management	[redacted]	☐	☐	Civil Engineering	
☐	☐	S/S Technical / LCE		☐	☐	Telecom	
☐	☒	S/S Operations**	[redacted]	☐	☐	Environmental	
☐	☐	Field Engineering	[redacted]	☐	☐	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] _____*10/19/21*_____*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]	[redacted]
2	[redacted]	[redacted]
3	[redacted]	[redacted]
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
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.)		None
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?	☐	No Issues
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

EVERSOURCE

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

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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 [redacted]

[redacted]

[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:

1. [redacted]

   Cost estimate $554,100 (planning grade)

2. [redacted]

3. [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 Count	Equip Position
[redacted]			

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Planned LTC Releases for 2022

Substation Name	Project Number	LTC Control	Equip Position
[redacted]			

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
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	$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

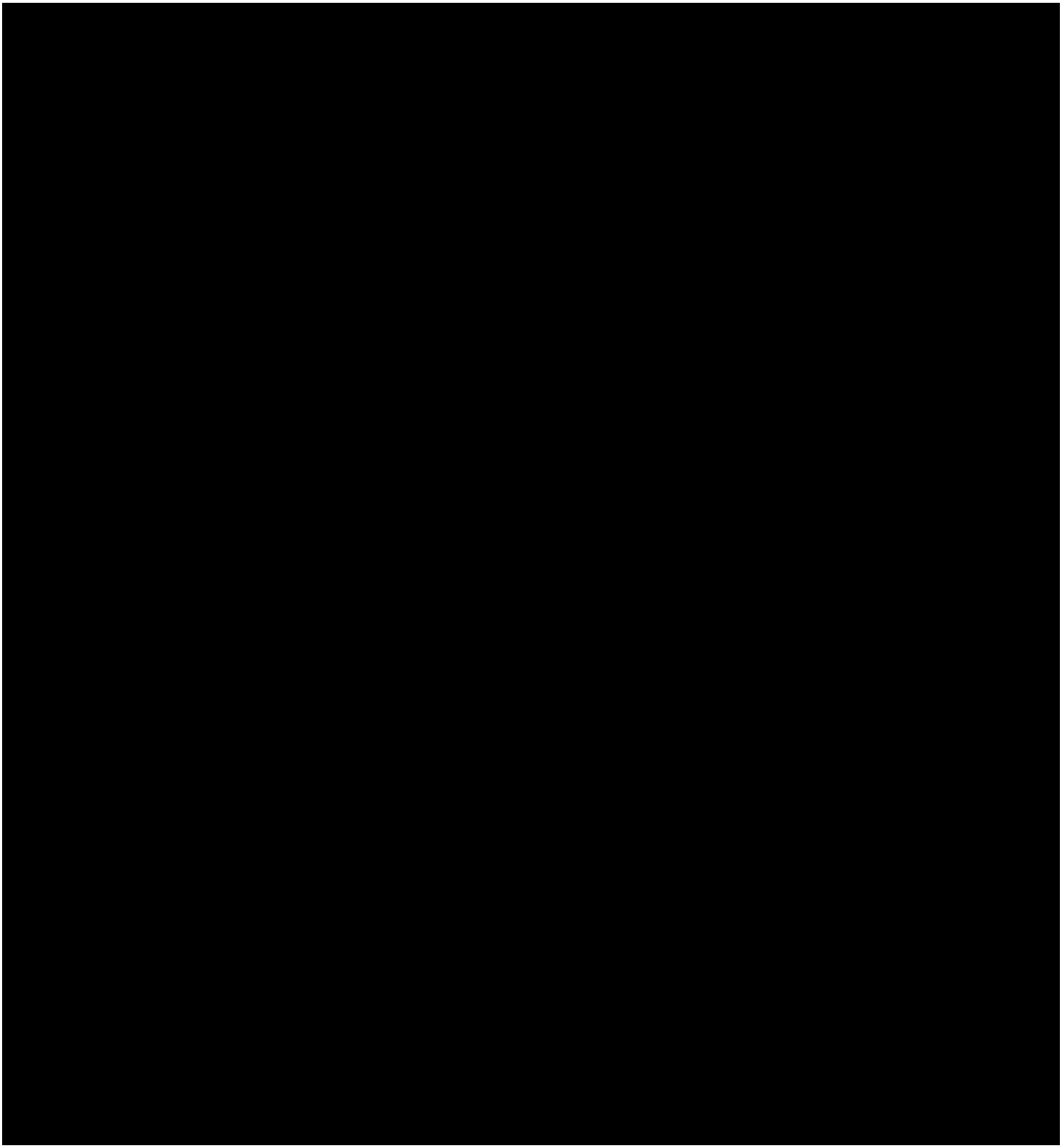
Check AFUDC rate minor drop in CT D rate.

Check indirect rates to see if adjustment would increase accuracy.

Add Project management planning and system scheduling.

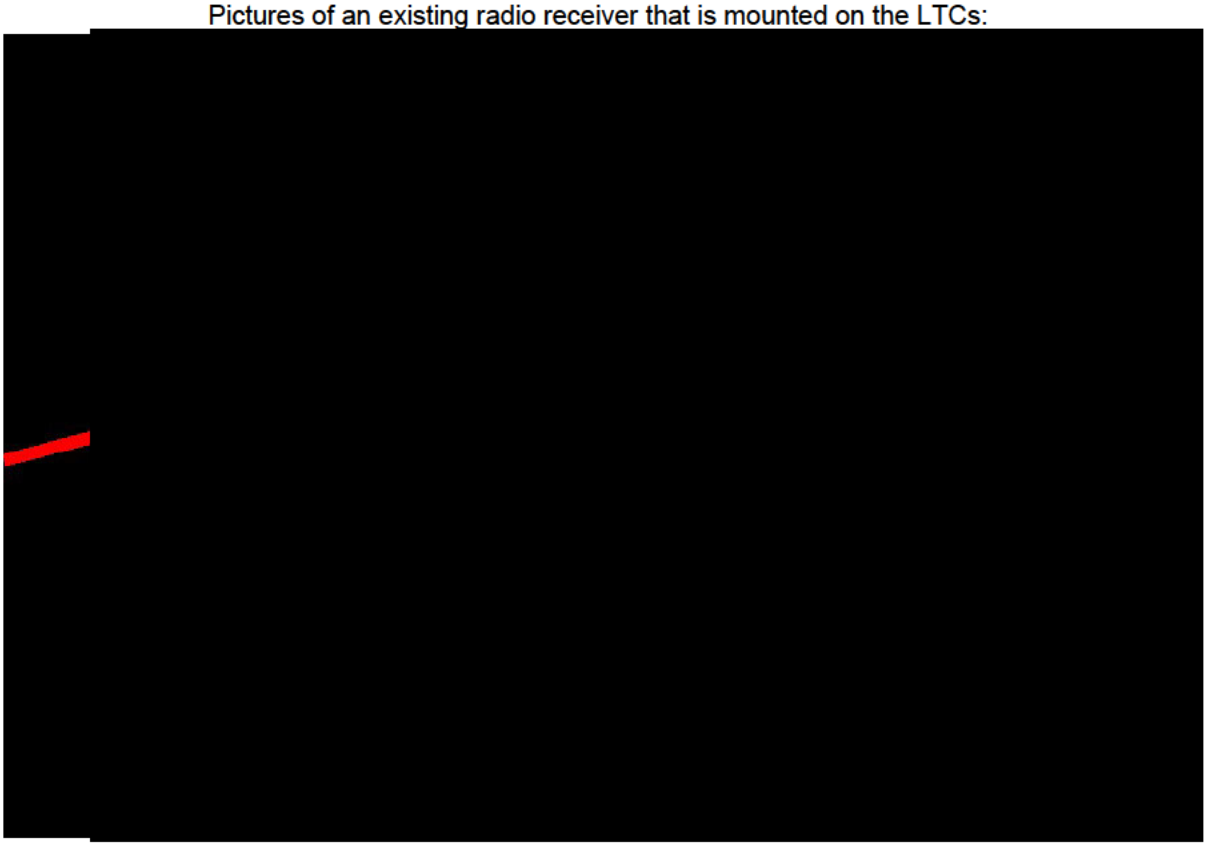
Adjust risk and contingency. Risk currently at 12.8% adjust risk to 10% of total and add contingency to 4% of total.

Attachment 2 – Substation – Transformer List

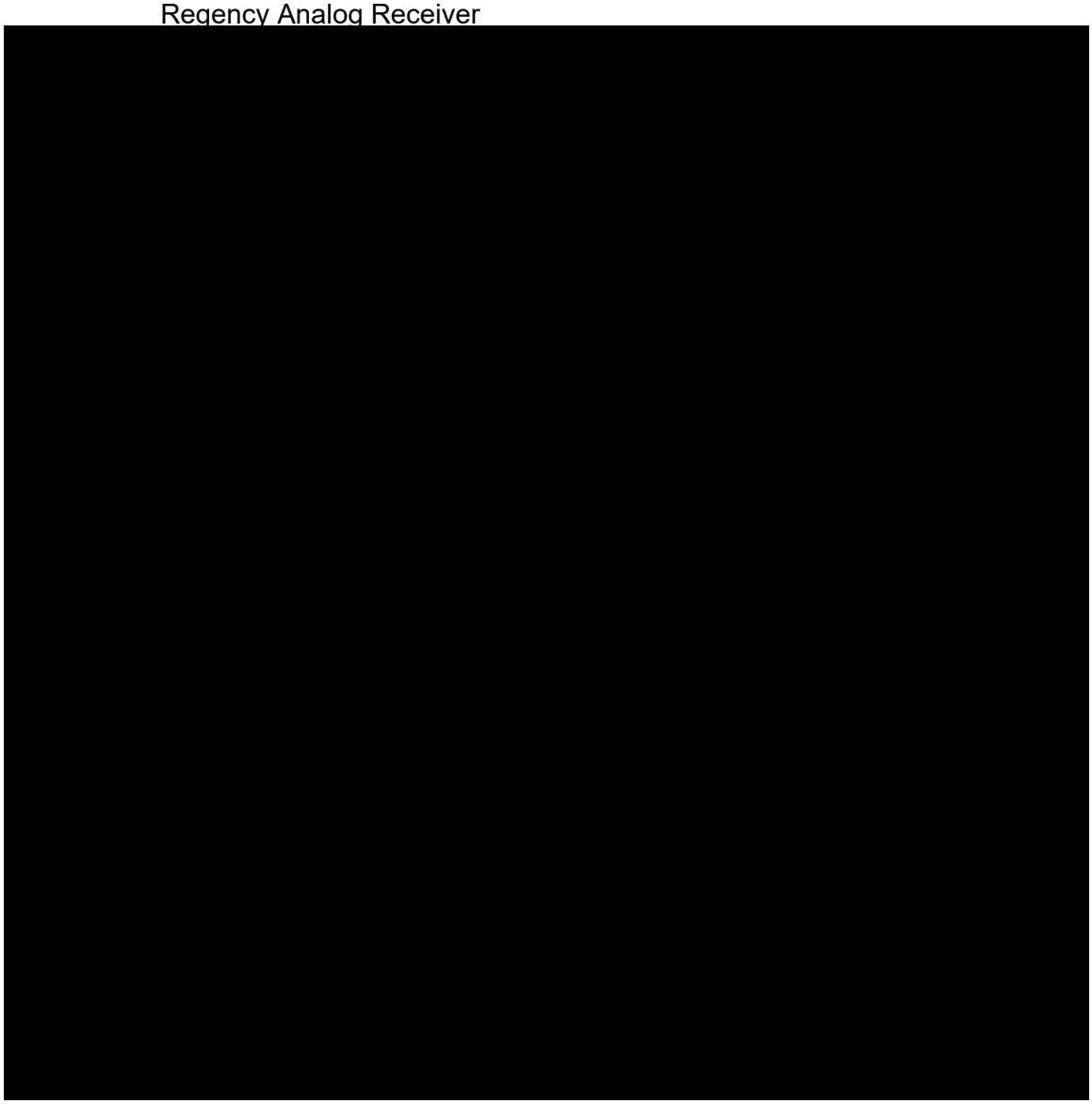


ATTACHMENT 3 - Photos

Pictures of an existing radio receiver that is mounted on the LTCs:



Regency Analog Receiver



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

