EVERSOURCE

Supplement Authorization Form

Project Title: [redacted] PILC Cable Replacement	Project Number: CD02123
Date Prepared: 02/20/2024	**Company:** Eversource CT
Organization: Electric System Operations	**Project Category:** UG CABLE & EQUIPMNT REPLACEMNT
Initiating Organization: Distribution	**Project Type:** Specific
Project DDE: [redacted]	**Capital Investment part of 5-year plan?** Yes
Project Manager: [redacted]	**Emergency Related Request?** No
Project Sponsor: [redacted]	**Facility Type** (check all that apply): ☐ PTF ☐ non-PTF ☒ Distribution ☐ N/A (General Plant)
Current Authorized Amount: $2,253.6K	**Approved In-Service Date:** 12/31/2023
Supplement Request: $872.8K	**Estimated In-Service Date: 12/31/2023**
Total Capital Request ($): $3,126.4K	**Authorization Type: Supplement Request**
	Reason: Cost Overage

1. Project Background

- Please refer to the original Full-Funded Project Authorization Form attached at the end of this document. The current authorized amount is **$2,253.6K.** A supplemental authorization of **$872.8K** is requested to meet the total capital request of **$3,126.4K.**
- Project CD02123 was established to replace the paper insulated lead covered (PILC) cable on the [redacted]. This project is part of an overall strategy to address poor performing PILC cable in the underground distribution system.
- The project was completed as specified and the initial underspend reflected in the Full-Funded PAF is due to Eversource internal crews performing the work on this project.
- Project completed on 12/31/2023.

2. Supplement Justification Overview

- This project did not undergo changes in scope but did experience an increased amount of spending for both direct and indirect expenditures.
- The most significant driver for the change cost stemmed from additional labor and material costs that were required due to unforeseen conditions in the field during construction.

3. Supplement Justification Detail

This project underwent increased spending in the following categories, requiring the need for a supplemental request:

- Internal labor: ACT Estimate was $213.4K vs Actual of $442.7K for a **$229.3K** increase.
    - During cable installs extra labor was utilized to complete necessary splicing.
    - There were two sections of cable that were damaged during installation due to the duct bank collapsing. This required the cable to be pulled out and installed in another duct.
    - During the cutover a cross phase was found requiring a splice to be done over again. This increased the overtime on the job to track this down and repair before they could energize the feeder.
    - As part of the risk mitigation overtime was needed to complete all the necessary cutovers on the feeder to restore the feeder to normal before the weekend.
- Outside Services: ACT Estimate was $118.9K vs Actual of $277.8K for a **$158.9K** increase. Additional services were required due to unforeseen conditions in the field during construction.
    - There were six locations where asbestos abatement was required to remove the PILC cable at a cost of $8k.
    - Due to blockages in the duct lines a contractor was used to power wash the ducts at a cost of $144K.
- Materials: ACT Estimate was $ 701.8K vs Actual of $965K for a **$263.2K** increase.
    - Two sections of cable were damaged during installation. This required us to scrap 870 feet of 500 CU cable at a cost of $42.6K.
    - Due to duct size limitations, approximately 2800 ft of 350 Cu was used instead of 500 CU. The cost of 350 Cu vs the 500 cu would come to a reduction of $20,817.
    - The increase of 500 CU from the ACT estimate to actuals was $11.53, totaling an increase of $178,046 to the project.
    - The increase of 1/0 CU from the ACT estimate to actuals was $2.33, totaling an increase of $4,553 to the project.
- Removals: ACT Estimate $265.1K vs actuals was $170.2K for a $94.9K decrease.
    - Removals are determined by a percentage of the work order charges, leaving insufficient information to illustrate the differential.
- The cost of associated overheads scales relative to the increase in direct costs and contributed significantly to the increased expenditure on this project.

4. Supplement Cost Summary (Project Total)

Capital Costs	To Date Spend	Prior Authorized	Supplement Request	Total
Internal Labor	442.7	213.4	229.3	442.7
Outside Services	277.8	118.9	158.9	277.8
Materials	965.0	701.8	263.2	965.0
Removals	170.2	265.1	-94.9	170.2
Risk and Contingency	61.3	157.2	-95.9	61.3
Other	5.8	0.0	5.8	5.8
SUBTOTAL Direct Cost	**1,922.8**	**1,456.4**	**466.4**	**1,922.8**
Indirects / Overheads	1,139.1	797.2	341.9	1,139.1
AFUDC	64.5	0.0	64.5	64.5
SUBTOTAL Indirect Cost	**1,203.6**	**797.2**	**406.4**	**1,203.6**
TOTAL Capital Request	**3,126.4**	**2,253.6**	**872.8**	**3,126.4**
Less Total Customer Contribution (if any)	0.0	0.0	0.0	0.0
TOTAL Project Cost	**3,126.4**	**2,253.6**	**872.8**	**3,126.4**

5. New Total Request by Year (if applicable)

Note: If multi-year project, include actuals for current and years past, and then show forecasted spend for upcoming years.

Capital Costs	2023	2024	TOTAL
Internal Labor & Equipment	441.0	1.8	442.7
Outside Services	273.2	4.5	277.8
Materials	599.2	365.8	965.0
Removals	168.7	1.6	170.2
Risk and Contingency	0.0	61.3	61.3
Other	5.8	0.0	5.8
SUBTOTAL Direct Cost	**1,487.8**	**435.0**	**1,922.8**
Indirects / Overheads	1,062.3	76.8	1,139.1
AFUDC	59.8	4.7	64.5
SUBTOTAL Indirect Cost	**1,122.1**	**81.5**	**1,203.6**
TOTAL Capital Request	**2,609.9**	**516.5**	**3,126.4**
Less Total Customer Contribution	0.0	0.0	0.0
TOTAL Project Cost	**2,609.9**	**516.5**	**3,126.4**

6. Lessons Learned

N/A

Project Title: [redacted]PILC Cable Replacement	**Project Number: CD02123**
Date Prepared: 10/04/2023	**Company:** Eversource CT
Organization: Electric System Operations	**Project Category:** UG CABLE & EQUIPMNT REPLACEMNT
Project Initiator: [redacted]	**Project Type:** Specific
Initiating Organization: Distribution	**Capital Investment part of original Op Plan:** Yes
Project Manager: [redacted]	**Emergency Related Request?** No
Project Sponsor: [redacted]	**Facility Type** (check all that apply)**:** ☐ PTF ☐ non-PTF ☒ Distribution ☐ N/A (General Plant)
Required in service date: 12/31/2023	
Total Capital Request: $2,253.6K	**Authorization Type:** Full Funding

7. Executive Summary

- Project CD02123 was established to replace the paper insulated lead covered (PILC) cable on the [redacted]circuit.
- This project is part of an overall strategy to address poor performing PILC cable in the underground distribution system.
- [redacted]
- [redacted]
    - Project Location:
        - Division: Central
        - District: Hartford AWC
        - Town: Hartford

- Approved Partial Funding Request Amount = $3,679K.
- Full Funding Request Amount = $2,253.6K or 38% decrease.
- The project was completed as specified and the underspend is due to Eversource internal crews performing the work on this project.
- Project to be completed October 30, 2023.

8. Project Cost Summary

Note: Dollar values are in thousands.

Capital Costs	Year 2023	Year 2024	Year 2025	Total
Direct Capital Costs	213.4	0.0	0.0	213.4
Internal Labor and Construction Equipment	118.9	0.0	0.0	118.9
Outside Services	701.8	0.0	0.0	701.8
Materials	265.1	0.0	0.0	265.1
Removals	157.2	0.0	0.0	157.2
Risk and Contingency	0.0	0.0	0.0	0.0
Other	**1,456.4**	**0.0**	**0.0**	**1,456.4**
Subtotal – Direct Costs	213.4	0.0	0.0	213.4
Indirect Capital Costs				
Indirect/Overheads (including benefits)	797.2	0.0	0.0	797.2
Capitalized interest or AFUDC, if any	0.0	0.0	0.0	0.0
Subtotal – Indirect Costs	**797.2**	**0.0**	**0.0**	**797.2**
Total Gross Capital Costs	**2,253.6**	**0.0**	**0.0**	**2,253.6**
Customer Contribution	**0.0**	**0.0**	**0.0**	**0.0**
Total Net Capital Project Costs	**2,253.6**	**0.0**	**0.0**	**2,253.6**

9. Technical Justification

Background, Project Need/Justification, and Project Scope

a. Background

[redacted]

[redacted]

b. Project Need

Project CD02123 is part of the initiative to eliminate PILC underground cable due to demonstrated poor performance of this type of cable on the Eversource distribution system. PILC copper cable was used extensively in the urban underground electrical systems that were built in the early/mid 1900s. This cable is now reaching the end of its useful life, and cable failures cause feeder lockouts which can impact customer reliability and satisfaction.

Beginning in 2018, Eversource - CT has established a program to proactively replace PILC cable. Targeted cable replacement is prioritized based on outage history and reliability.

c. Project Scope

- [redacted]

10. Alternatives Considered

Project Option Comparison

	Option	[redacted]
Authorization Type	Full	Partial
Capital Cost	$2,253.6K	$0
Expense Cost	$37.3K	$0
Total Cost	$2,290.9K	$0
Preferred option	X	

Do nothing was not selected as the aging infrastructure would continue to fail which would interrupt customers and place the system abnormal.

11. Project Schedule

Milestone/Phase Name	Estimated Date
Partial Approval	November 2022
100% Detailed Engineering Completion	May 2023
Fully Funded	October 2023

Milestone/Phase Name	Estimated Date
Construction Start	June 2023
In Service Date	September 2023

12. Attachments (One Line Diagrams, Images, etc.)

Attachment	Included in Submittal?
A. Partial (originally called Initial) Funding Cost Estimate	*YES*
B. Geographic Map	*YES*
C. Circuit conductor size & length worksheet	*YES*
D. Partial (originally called Initial) Funding PAF	*YES*

Attachment A – Partial Cost Estimate

Estimate

Preliminary Estimate Summary

Revision Number:	0
Contingency:	24.00%
SubTotal:	$3,107,046
Contingency Amount:	$745,691
Estimate:	$3,852,737
Reimbursement:	$0
Net Amount:	$3,852,737

Description: [redacted] PILC Replacement

Item Description	CU	Amount
SWITCHING OH/DB/UG - SWITCHING Network 1 Street network and 6 spot networks	16-ALL15	$14,048.80
UG CABLE DB/UG - 350/500 - 3-1/C (3ph) Cu 18170 +10%	16-UG114	391,095.20
TRAFFIC OH/DB/UG - Traffic Control - Police Officer 2 Officers / Day for 30 weeks	16-ALL18	300,000.00
OTHER OTHER 20% contractor adder (excludes switching)	16-ALL14	473,927.00
UG CABLE DB/UG - 1/0 - 3-1/C (3ph) Cu 2534 +10%	16-UG113A	104,791.20
OTHER OTHER Manhole cleaning (110 MH X $1K/MH)	16-ALL14	110,000.00
OTHER OTHER Mechanical Y Splices (8 Locations X $5K/Loc)	16-ALL14	$40,000.00
UG CABLE UG - Transition Splice Mulitple netowrk units and swithcgear locations formerly fed by PILC	16-UG120	$13,184.00
OTHER OTHER Power wash Ducts (20 days X $2K/day)	16-ALL14	$40,000.00

Attachment B – Geographic Map



[redacted]

D. Partial (originally called Initial) Funding PAF

Operations Project Authorization Form

Project Title: [redacted]PILC Cable Replacement	**Project Number: CD02123**
Date Prepared: 10/27/2022	**Company:** Eversource CT
Organization: Electric Field Operations	**Class(es) of Plant:** D Line
Project Initiator: [redacted]	**Project Category:** UG CABLE & EQUIPMNT REPLACEMNT
Project Manager: [redacted]	**Project Type:** Specific
Project Sponsor: [redacted]	**Capital Investment part of original Operating Plan:** Yes
Estimated in service date: 12/31/2023	**Emergency Related Request?** No
Eng./Constr. Resources Budgeted? Yes	**Facility Type** (check all that apply)**:** ☐ PTF ☐ non-PTF ☒ Distribution
Total Gross Capital Request: $3,679K	**Authorization Type:** Initial Funding

Executive Summary

Project CD02123 has been established to replace the paper insulated lead covered (PILC) cable on the [redacted] This project is part of an overall strategy to address poor performing PILC cable in the underground distribution system.

[redacted]

1A151 was ranked 10th on the PILC replacement list. The 9 circuits ranked above it have projects created to address their respective PILC replacement.

[redacted]

Project Costs Summary

Note: Dollar values are in thousands

Capital Costs	Year 2023	Year 2024	Year 2025+	Total
Direct Capital Costs				
Internal Labor and Construction Equipment	$234	$0	$0	$234
Outside Services	$1,565	$0	$0	$1,565
Materials	$514	$0	$0	$514
Removals	$261	$0	$0	$261
Risk and Contingency	($631)	$0	$0	($631)
Other	$0	$0	$0	$0
Subtotal – Direct Costs	**$1,942**	**$0**	**$0**	**$1,942**
Indirect Capital Costs				
Indirect/Overheads (including benefits)	$1,659	$0	$0	$1,659
Capitalized interest or AFUDC, if any	$78	$0	$0	$78
Subtotal – Indirect Costs	**$1,737**	**$0**	**$0**	**$1,737**
Total Gross Capital Costs	**$3,679**	**$0**	**$0**	**$3,679**
Customer Contribution	**$0**	**$0**	**$0**	**$0**
Total Net Capital Project Costs	**$3,679**	**$0**	**$0**	**$3,679**

Technical Justification:

Project Need, Objective and Justification:

Project CD02123 has been established to replace the paper insulated lead covered (PILC) cable on the [redacted] with 500 CU ethylene propylene rubber (EPR) insulated cable. 500 CU 3-1/C 25kV cable is proposed due to the 4" conduit in the duct bank, which prohibits the installation of cable larger than 500 CU EPR at 25kV.

Project Scope:

Project CD02123 is part of the initiative to eliminate PILC underground cable due to demonstrated poor performance of this type of cable on our distribution system.

PILC copper cable was used extensively in the urban underground electrical systems that were built in the early/mid 1900s. This cable is now reaching the end of its useful life, and cable failures cause feeder lockouts which can impact customer reliability and satisfaction.

Beginning in 2018, Eversource - CT has established a program to proactively replace PILC cable. Targeted cable replacement is prioritized based on outage history / reliability.

Major Material:

18,170' of 500 CU EPR 3-1/C 25kV cable

5,019' of 1/0 CU EPR 3-1/C 25kV cable

Background:

[redacted]

[redacted]



Alternatives Considered:

Were alternative solutions considered/applicable? Include any cost/benefit analysis.

Alternatives were considered (please describe below)

Project Option Comparison

	Option	
[redacted]		
Cost	$3679K	$0
Preferred option	X	

Regulatory Approvals:

Are Regulatory body approvals needed for the project?

No

Project Schedule

Milestone/Phase Name	Estimated Date
100% Engineering Completion	May 2023
Construction Start	July 2023
Testing/Commissioning	October 2023
In Service Date	December 2023

Risks and Risk Mitigation Plans

Risk Event	Risk Horizon	Likelihood of Occurrence	Risk Mitigation
Actual cost higher than estimated due to scope changes.	2023	Medium	Included contingency costs in the funding request. Perform detailed Field Analysis and walk down in project development to avoid potential issues.
Customer Permission / Siting Council / Municipal approvals	2023	Low	Design to minimize customer impact. Project Preplanning and customer/community outreach.
Internal construction resources not available to perform the work.	2023	Medium	Plan internal resources to perform the work. Use competitive bidding to ensure lowest outside labor cost.
Internal engineering resources not available to perform the work.	2023	Medium	Plan internal resources to perform the work. Use competitive bidding to ensure lowest outside labor cost.
Materials Shortage or long lead times	2023	High	Pre-order long lead time material; minimize the use of non-standard and non-stocked material.
Storm delays	2023	Low	If storm activity delays work, we may be forced to use external resources.
System abnormal configuration	2023	Low	Schedule work to minimize system abnormal time. Install temporary bypasses/equipment if system will be abnormal for extended periods.

Technological risks involving integration of new technology	2023	Low	Before use of new technology ensure support of standards and manufacturer. Schedule project to accommodate for extra time or ensure new technology is not on the critical path.
Wetlands / Environmentally sensitive area	2023	Low	Use of mats and specialty equipment, only work during certain times of the year.