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Project Approval Form

Project Title: [redacted]	**Project Number: CD01593**
Date Prepared: 11/10/2023	**Company:** Eversource CT
Organization: Distribution Engineering	**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: 12/31/2024	
Total Capital Request: $4,560K	**Authorization Type:** Full Funding

1. Executive Summary

- Project CD01593 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.
- This project consists of the following:

[redacted]

- Project Location
  - Division: Central
  - District: [redacted]
  - City/Town: [redacted]

- The Partial Funding estimate for this project was $3,637K capital dollars and was approved at the 9/17/2020 CTPAC meeting. The Full Funding estimate for this project is $4,560K, an increase of $923K, or 25%.
- There is no scope change; the cost overage is due to the legacy estimating units that were used in the Partial Funding estimate. If current estimating units were used, the Partial Funding estimate would be $4,728K, making the $4,560K Full Funding estimate a 3.5% decrease.

2. Project Cost Summary

Note: Dollar values are in thousands.

Financial Evaluation ($000's)

Capital Costs	2022	2023	2024	Total
Internal Labor and Construction Equipment	187.6	166.3	126.5	480.4
Outside Services	94.5	181.7	272.3	548.5
Materials	507.0	533.9	301.0	1,341.9
Removals	175.8	203.4	182.3	561.4
Risk and Contingency	0.0	31.1	109.0	140.0
Other	0.9	1.1	10.5	12.5
Subtotal	**965.7**	**1,117.4**	**1,001.5**	**3,084.6**

Indirect Capital Costs				
Indirects/Overheads (including benefits)	427.0	440.9	560.5	1,428.4
Capitalized interest or AFUDC, if any	21.9	25.5	0.0	47.5
Subtotal	**448.9**	**466.4**	**560.5**	**1,475.8**

Total Capital Costs (Gross)	**1,414.6**	**1,583.8**	**1,562.0**	**4,560.4**
Less Total Customer Contribution	**0.0**	**0.0**	**0.0**	**0.0**
Project Costs (Net of Reimbursement)	**1,414.6**	**1,583.8**	**1,562.0**	**4,560.4**

3. Technical Justification

Background, Project Need/Justification, and Project Scope

a. Background

PILC Cable Failures:

1C07	August 1, 2017
1C04	August 23, 2017
1C05	December 27, 2017
1C04	February 8, 2018
1C07	March 26, 2019
1C05	May 6, 2019

Completion of this project is vital for maintaining reliability to this critical customer.

b. Project Need

This project 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 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.

Eversource CT established a program in 2018 to proactively replace PILC cable. Targeted cable replacement is prioritized based on outage history & reliability.

c. Project Scope

This project proposes the following cable replacement:

[redacted]

Major Material:

- 779’ of PILC cable with 1,000kcmil CU EPR 25kV cable
- 7,760’ of PILC cable with 500kcmil CU EPR 25kV cabl

4. Alternatives Considered

The Alternative considered during Partial Funding Approval was to do nothing. [redacted]

5. Project Schedule

Milestone/Phase Name	Estimated Date
Partial Approval	September 2020
100% Detailed Engineering Completion	December 2020
Fully Funded	November 2023
Construction Start	March 2022
In Service Date	December 2024

6. Regulatory Decisions

N/A

7. Codes and Standards

N/A

8. Risk and Contingencies

Risk Event	Risk Horizon	Likelihood of Occurrence	Risk Mitigation
Actual cost higher than estimated due to scope changes.	2024	Low	Included contingency costs are in the funding request. Detailed Field Analysis and walk down for project development were performed to avoid potential issues.
Internal construction resources not available to perform the work.	2024	Low	External resources are planned to perform the work. Competitive bidding will be used to ensure lowest outside labor cost.
Materials Shortage or long lead times	2024	High	A large amount of cable is required to complete this project.
Storm delays	2024	Medium	If storm activity delays work, external resources may be needed to complete the project.

9. References

References
1.

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

Attachment	Included in Submittal?
A. Cost Estimate	*YES*
B. P6 Schedule	*NO*
C. Geographic Map	*YES*
D. Load Sheet (Before and After)	*YES*
E. Initial Funding PAF	*YES*

Attachment A: Cost Estimate

Design Alternative CD01593-01

Estimate

Preliminary Estimate Summary

Revision Number:	0
Contingency:	24.00%
SubTotal:	$931,851
Contingency Amount:	$223,644
Estimate:	$1,155,495
Reimbursement:	$0
Net Amount:	**$1,155,495**
Description:	

Item Description	CU	$ / Per	Qty	Amount
UG CABLE DB/UG - 350/500 - 3-1/C (3ph) Cu	16-UG114	[redacted]	[redacted]	$626,678.40
UG CABLE UG - Cable Removal - all cables	16-UG117			$180,080.00
SWITCHING OH/DB/UG - SWITCHING Network Cutover Network Transformers and Switchgear locations onto new cable	16-ALL15			$84,292.80
UG CABLE DB/UG - 4/0 - 3-1/C (3ph) Cu Install 4/0 CU jacket cable on UG tap to network units	16-UG113B	[redacted]		$28,800.00
UG CABLE UG - Cable Removal - all cables Remove 1/0 CU paper & lead cable to network units	16-UG117			$12,000.00

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Design Alternative CD01593-02

Estimate

	Preliminary Estimate Summary
Revision Number:	0
Contingency:	24.00%
SubTotal:	$985,145
Contingency Amount:	$236,435
Estimate:	$1,221,580
Reimbursement:	$0
Net Amount:	**$1,221,580**

Description:

Item Description	CU	$ / Per	Qty	Amount
UG CABLE DB/UG - 350/500 - 3-1/C (3ph) Cu	16-UG114	[redacted]	[redacted]	$657,163.20
UG CABLE UG - Cable Removal - all cables	16-UG117			$188,840.00
SWITCHING OH/DB/UG - SWITCHING Network Cutover Network and Switchgear onto new cable	16-ALL15			$98,341.60
UG CABLE DB/UG - 4/0 - 3-1/C (3ph) Cu Install 4/0 CU jacket cable on UG tap to network Units	16-UG113B			$28,800.00
UG CABLE UG - Cable Removal - all cables Remove 1/0 CU P&L cable to network units	16-UG117			$12,000.00

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Design Alternative

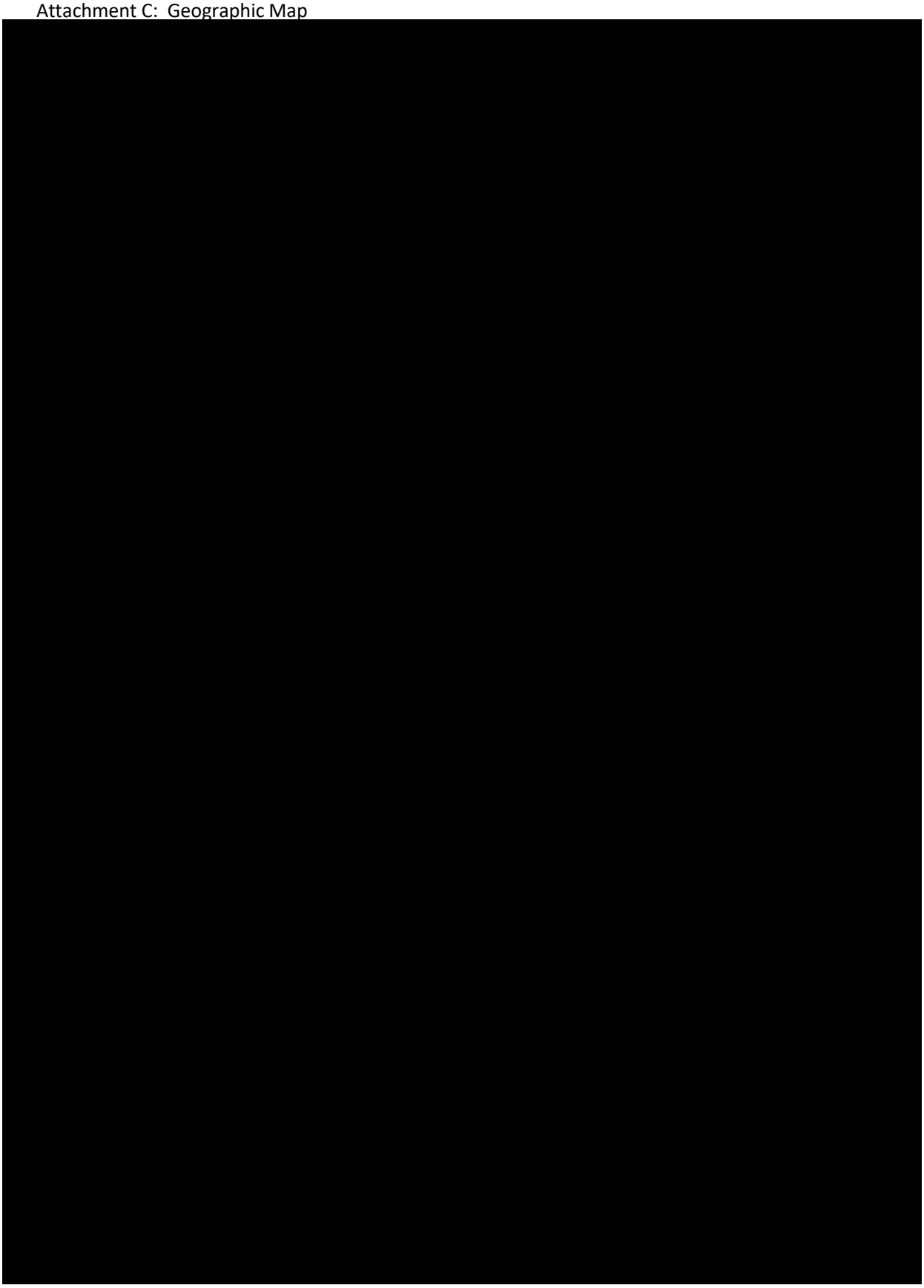
CD01593-03

Estimate

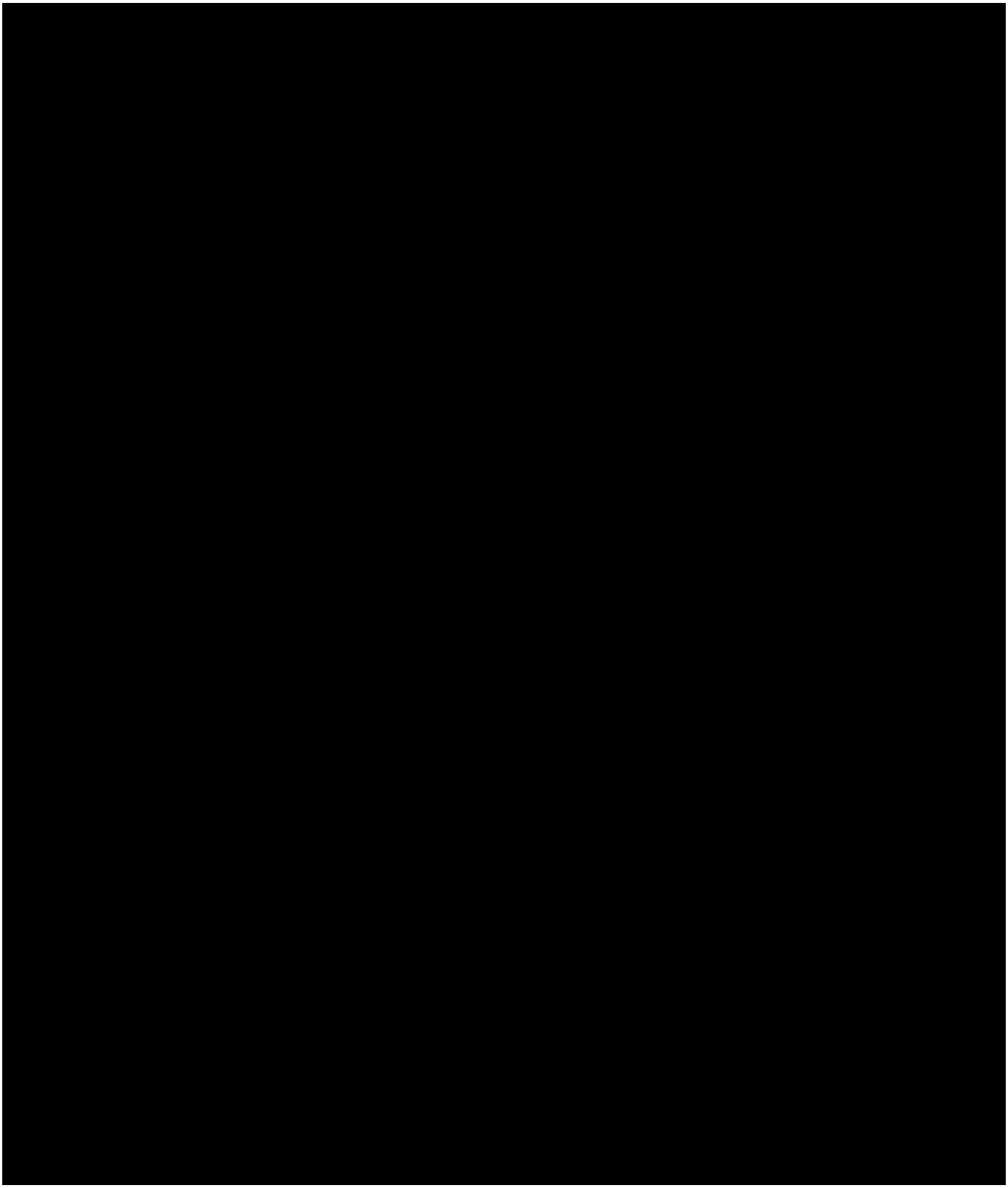
	Preliminary Estimate Summary
Revision Number:	0
Contingency:	24.00%
SubTotal:	$1,016,199
Contingency Amount:	$243,888
Estimate:	$1,260,087
Reimbursement:	$0
Net Amount:	**$1,260,087**
Description:	

Item Description	CU	$ / Per	Qty	Amount
UG CABLE DB/UG - 350/500 - 3-1/C (3ph) Cu	16-UG114	[redacted]	[redacted]	$659,460.00
UG CABLE UG - Cable Removal - all cables	16-UG117			$189,500.00
SWITCHING OH/DB/UG - SWITCHING Network Cutover Network Transformers and Switchgear onto to cable	16-ALL15			$126,439.20
UG CABLE DB/UG - 4/0 - 3-1/C (3ph) Cu Install 4/0 CU jacket cable on UG tag to network units	16-UG113B			$28,800.00
UG CABLE UG - Cable Removal - all cables Remove 1/0 CU P&L cable to network units	16-UG117			$12,000.00

Attachment C: Geographic Map



Attachment D: Load Sheet - Before



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[redacted]

Attachment E: Initial Funding PAF

Date Prepared: August 26, 2020	**Project Title:** [redacted]
Company/ies: Eversource CT	**Project ID Number:** CD01593
Organization: Distribution Engineering	**Class(es) of Plant:** Distribution
Project Initiator: [redacted]	**Project Category:** Line
Project Manager: [redacted]	**Project Type:** UG Cable
Project Sponsor: [redacted]	**Project Purpose:** Replace P&L Cable to [redacted]
Estimated in service date: 12/31/2023	**If Transmission Project:** N/A
Eng. / Constr. Resources Budgeted? Yes	**Capital Investment Part of Original Operating Plan?** Yes
Authorization Type: Preliminary Funding Request	**O&M Expenses Part of the Original Operating Plan?** Yes
Total Request: $3,637,162	

Financial Requirements:

Project Authorization
ERM: _____

FP&A: _____

Executive Summary:

[redacted] [redacted] was designed, built and became operational in the late 1960s and early 1970's. During that time, paper & lead cable was still widely used across the industry.

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Project CD01593 is required to [redacted]

[redacted]

The total amount of paper & lead cable from all three underground circuits is roughly 28,000 feet.

[redacted]

Most recent paper & lead primary cable failures:

[redacted]
- 1/0 MCM CU August 1, 2017
- 350 MCM CU August 23, 2017
- 350 MCM CU December 27, 2017
- 350 MCM CU February 8, 2018
- 350 MCM CU March 26, 2019
- 350 MCM CU May 6, 2019

Project Costs Summary

	Prior Authorized	2021	2022	2023	Totals
Capital Additions - Direct	$0	$741,455	$718,797	$679,911	$2,140,163
Less Customer Contribution	$0	$0	$0	$0	$0
Removals net of Salvage ___%	$0	$81,652	$79,156	$74,874	$235,682
Total - Direct Spending	$0	$823,107	$797,953	$754,786	$2,375,845
Capital Additions - Indirect	$0	$427,439	$414,377	$391,960	$1,233,775
Subtotal Request	$0	$1,250,545	$1,212,330	$1,146,745	$3,609,621
AFUDC	$0	$8,767	$8,499	$8,039	$25,305
Total Capital Request	$0	$1,259,312	$1,220,829	$1,154,784	$3,634,925
O&M	$0	$775	$751	$711	$2,237
Total Request	$0	$1,260,087	$1,221,580	$1,155,495	$3,637,162

Financial Evaluation

Direct Capital Costs	2021	2022	2023+	Total
Straight Time Labor	$105,033	$101,824	$96,315	$303,172
Overtime Labor	$38,144	$36,978	$34,978	$110,100

Outside Services	$242,222	$234,820	$222,116	$699,158
Materials	$422,999	$410,073	$387,889	$1,220,961
Other, including contingency amounts (describe)	$14,708	$14,259	$13,487	$42,454
Total Direct Costs	**$823,107**	**$797,953**	**$754,786**	**$2,375,845**

Indirect Capital Costs	2021	2022	2023+	Total
Indirects/Overheads (including benefits)	$427,439	$414,377	$391,960	$1,233,775
Capitalized interest or AFUDC, if any	$8,761	$8,494	$8,034	$25,289
Total Indirect Costs	**$436,200**	**$422,870**	**$399,994**	**$1,259,064**
Total Capital Costs	**$1,259,307**	**$1,220,823**	**$1,154,779**	**$3,634,910**
Less Total Customer Contribution	**$0**	**$0**	**$0**	**$0**
Total Capital Project Costs	**$1,259,307**	**$1,220,823**	**$1,154,779**	**$3,634,910**
Total O&M Project Costs	**$780**	**$757**	**$716**	**$2,252**
Total Project Cost	**$1,260,087**	**$ 1,221,580**	**$1,155,495**	**$3,637,162**

Connecticut Light & Power
A Northeast Utilities Company

Specific Project Proposal - Project #: CD01593
[redacted] Replace P&L Cable

Project Option Summary

ID	Description	Segments	Preliminary Estimate	Construction Estimate	Variance	IEEE $/CMS	All (w/Storm)	Prfrd
O1	Replace all PILC on Feeders to [redacted]	1,2,3	$3,637,162	$0	100%	$0.00	$0.00	☑

Segments

ID	Title	Preliminary Estimate	Construction Estimate	Variance	IEEE $/CMS	All (w/Storm)
1	[redacted] Replace Lead Cable	$1,155,495			$0.00	$0.00
2	[redacted] Replace lead Cable	$1,221,580			$0.00	$0.00
3	[redacted] Replace Lead Cable	$1,260,087			$0.00	$0.00
4	Create N-2 Reliability	$0			$0.00	$0.00

Technical Justification:

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Project Objective:

Replace paper and lead cable on circuits [redacted].

Project Scope:

[redacted]

Major Material:

UG Primary 500 MCM Copper Cable	28000 feet
UG Primary 4/0 Copper Cable	2000 feet

Background / Justification:

PILC Cable Failures:

[redacted]

- 1/0 MCM CU August 1, 2017
- 350 MCM CU August 23, 2017
- 350 MCM CU December 27, 2017
- 350 MCM CU February 8, 2018
- 350 MCM CU March 26, 2019
- 350 MCM CU May 6, 2019

Completion of this project is vital for maintaining excellent reliability to this very critical customer.

Business Process and / or Technical Improvements:

Replace all paper and lead primary cables feeding the [redacted]. Because diameter of the duct bank conduits is 4-inches, all new 23 kV backbone cables will be 500 MCM copper. [redacted]

This project increases ratings on [redacted] respectively.

Completion of project CD01593, is the first step necessary to reach a long-term N-2 goal to improve restoration efforts and enhance reliability on these underground circuits. (In the future, to achieve a full N-2 design, will require [redacted]

Alternatives Considered with Cost Estimates:

Do nothing, leave 50-year-old paper and lead cable in operation.
This is not a good option. [redacted]

[redacted]

Project Schedule

Milestone/Phase Name	Estimated Completion Date
Preliminary Funding Authorization	August 2020
Detail Design	November 2020
Full Funding Authorization	December 2020
Begin Construction	March 2021
Complete Construction	December 2021

Regulatory Approvals:
None

Risks and Risk Mitigation Plans

Risk Event	Risk Horizon	Likelihood of Occurrence	Risk Mitigation
Actual cost higher than estimated due to scope changes.	2020	Medium	Estimated project cost is based on actual work orders. Contingency dollars included within this funding request. Perform detailed Field Analysis and walk down in project development to avoid potential issues.
Customer Permission / Siting Council / Municipal approvals	2020	Low	Design to minimize customer impact. Project Preplanning and customer/community outreach.
Internal construction resources not available to perform the work.	2021	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.	2020	Medium	Plan internal resources to perform the work. Use competitive bidding to ensure lowest outside labor cost.
Materials Shortage or long lead times	2021	Low	Pre-order long lead time material; minimize the use of non-standard and non-stocked material.
Storm delays	2021	Medium	If storm activity delays work, we may be forced to use external resources.
System abnormal configuration	2021	Medium	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	2021	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	2021	Low	Use of mats and specialty equipment, only work during certain times of the year.