Appendix 2
Operations Project Authorization Form

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Project Title: DB Cable Replacement Annual	**Project Number: 101395**
Date Prepared: 11/18/2022	**Company:** Eversource CT
Organization: Electric Field Operations	**Class(es) of Plant:** D Line
Project Initiator: [redacted]	**Project Category:** DB CABLE REPLACE-SPECIFIC PROJ
Project Manager: [redacted]	**Project Type:** Annual
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 x Distribution
Total Gross Capital Request: $37,000K	**Authorization Type:** Full Funding

Executive Summary

This program funds the rejuvenation or replacement of direct buried (DB) distribution cables in underground residential (URD) and commercial developments that are reaching the end of their useful lives. It has been determined on an industry-wide basis that much of the original XLP and HMP-insulated primary cable installed in the DB system has not achieved its engineered life expectancy. Premature cable failures have degraded the reliability for the Company's customers served by these cables.

The distribution system encompasses a substantial component of DB cable in residential areas, which was placed in the ground in the 1970s and 1980s. At the time, the installation of the cable did not include any conduit. Utility companies simply dug a trench, put the cable into the ground, and hooked it up to the system. In the last 10 to 20 years, the DB cable has been failing at an exponentially increasing rate. Historically, the Company would repair the cable when it failed rather than replacing it because the cable could generally continue to be used and did not require elimination.

In 2019, The Company made an operational change in its strategy to replace rather than repair direct buried cables when they fail. The new replacement cable is installed in conduit and typically utilizes directional drilling technology to minimize impacts to the landscape. This change has resulted in an increased in reliability as well as capital spending; however, it eliminates subsequent failures of that section of cable, improves the reliability for the affected customers and minimizes impacts to our customers.

This project pertains to high volume work orders not to exceed $500K and covers the entire state of CT. Capital work orders initiated against this annual project **must include total costs less than or equal to $500K.** Any work order exceeding $500K will require a separate Project Authorization Form (PAF) and Delegation of Authority (DOA) approval.

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Project Costs Summary

See APS3 and APS8 requirements and consult with Plant Accounting for capital/O&M determination. Use published loaders for benefits, materials, and invoices, maintained by the Director, Budget and Internal Reporting.
Note: Dollar values are in thousands

Capital Costs	Year 2023	Total
Direct Capital Costs		
Internal Labor and Construction Equipment	$766.0	$766.0
Outside Services	$19,000.9	$19,000.9
Materials	$2,051.9	$2,051.9
Removals	$1,008.6	$1,008.6
Risk and Contingency		
Other		
Subtotal – Direct Costs	**$22,827.3**	**$22,827.3**
Indirect Capital Costs		
Indirect/Overheads (including benefits)	$13,715.8	$13,715.8
Capitalized interest or AFUDC, if any	$456.8	$456.8
Subtotal – Indirect Costs	**$14,172.7**	**$14,172.7**
Total Gross Capital Costs	**$37,000.0**	**$37,000.0**
Customer Contribution	0	0
Total Net Capital Project Costs	**$37,000.0**	**$37,000.0**

Technical Justification:

The program is needed for the replacement of direct buried (DB) distribution cables in underground residential (URD) and commercial developments that are reaching the end of their useful lives.

Project Scope

A workorder is created when a cable failure occurs to capture the cost to make repairs and/or replace the failed and obsolete equipment in the area

Equipment replaced may include the cable, transformers, riser, arresters, and/or elbows impacted by the event. Additional splice boxes or circuit reconfiguration may be required to complete the replacement of failed equipment.

The scope of work included in this program covers the smaller jobs triggered as a result of an equipment failure within a URD development / commercial DB area. If a significant amount of work is triggered as a result of the initial fault, a specific project is created.

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Background

It has been determined on an industry-wide basis that much of the original XLP and HMP-insulated primary cable installed in the DB system has not achieved its engineered life expectancy. Premature cable failures have degraded the reliability for the Company's customers served by these cables.

The distribution system encompasses a substantial component of DB cable in residential areas, which was placed in the ground in the 1970s and 1980s. At the time, the installation of the cable did not include any conduit. Utility companies simply dug a trench, put the cable into the ground, and hooked it up to the system. In the last 10 to 20 years, the DB cable has been failing at an exponentially increasing rate. Historically, the Company would repair the cable when it failed rather than replacing it because the cable could generally continue to be used and did not require elimination.

In 2019, The Company made an operational change in its strategy to replace rather than repair direct buried cables when they fail. The new replacement cable is installed in conduit and typically utilizes directional drilling technology to minimize impacts to the landscape. This change has resulted in an increased in reliability as well as capital spending; however, it eliminates subsequent failures of that section of cable, improves the reliability for the affected customers and minimizes impacts to our customers.

The Company's operating philosophy to replace DB cables with predominantly Cable in Conduit(CIC)/Horizontal Directional Drilling (HDD), rather than repair the DB cable is based on various considerations, including:

- The age of the DB cable system: By 2019, the DB Cable on the system, including those that already had been rejuvenated, were past its useful life expectancy.
- DB cable experiencing faults and requiring replacement is generally older cable installed prior to jacketed cable being installed. Unjacketed cable has an exposed concentric neutral on the outside of the cable that is in direct contact with the earth. Cable injection does not encase and therefore mitigate neutral problems on unjacketed cable.
- The condition of the cable: The DB cable found to have 50% or more of the concentric neutrals corroded or more than 2 splices found in a 150' section both require cable replacement.
- Fault Repair and Maintenance: It is easier to maintain cable when it is in conduit. In the event of a failure, the fault locating process is more difficult with DB, the fault repair requires digging up the cable, splicing the repair section and putting back in with backfill to restore the area. With conduit, fault locating is performed, the cable can be removed and replaced with new cable and terminated.

Alternatives Considered:

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

The alternative was to inject/rejuvenate the cable. Due to the failure rate, age of the cable, and condition of the neutral there has been a change in strategy to replace rather than repair.

Choose an item.

Regulatory Approvals:

Are Regulatory body approvals needed for the project?
No

This program is part of the core reliability program.

If yes, provide detailed regulatory approvals

Project Schedule

Milestone/Phase Name	Estimated Date
100% Engineering Completion	
Construction Start	
Testing/Commissioning	
In Service Date	

Risks and Risk Mitigation Plans

List top risks and mitigation plans associated with this project. Include any contingency related to each risk. (Permitting/siting; environmental; outage constraints; customer/community outreach; material delivery; constructability challenges; excavation; etc.)

Eversource experiences a high number of direct buried cable failures each year. May result in lengthy (8-12 hour) outages to small (50+/-) number of customers. Repeated failures are common when cable has deteriorated, impacting the customer experience / satisfaction.

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References

Appendices (One-Line Diagrams, Images, etc.)

Reference appendices items in the appropriate section of the PAF and list items in the same order as referenced in the PAF

If the project has future financial benefits, please use the following table to provide the yearly amounts.

Financial Benefits	Year 20__	Year 20__	Year 20__	Year 20__
Capital				
O&M				
Other				
Total Financial Benefits				

Describe the estimated future Capital, O&M and/or Other benefits noted above:

What functional area(s) will these benefits be reflected in?_____

A representative from the respective functional area is required to be included as a project approver.