EVERSOURCE

Project Approval Form

| | |
|---|---|
| **Project Title:** [redacted] | **Project Number: CD01463** |
| **Date Prepared:** 10/11/2023 | **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:** 12/31/2023 | |
| **Total Capital Request: $706K** | **Authorization Type:** Full Funding |

# 1. Executive Summary

This project was established to replace the [redacted]

- Approved Initial Funding Authorization: $314K at the 2/14/2020 CT-PAC meeting.
- Requesting Full Funding authorization: $706K or 225% of the Initial Funding authorization.
- Project Location:
  - Division: Western
  - District: Waterbury AWC
  - Town: Waterbury

The variance is due to the following:

- Increased labor and material charges: The legacy estimating units used to produce the Initial Funding estimate are about 30% lower than the estimates used today, which were updated to reflect increased labor & material costs. This accounted for an increase in cost of about $113K.
- Switchgear Cost: The estimating unit for [redacted]. The material cost for a PMH type 5 pair is $67K, whereas the material cost for a PME type 5 pair is $156K. Factoring in the 30% material cost increase accounted for above still leaves a difference of $165K - $87K or $69K additional material cost for the PME switchgear.

- The cable required [redacted] was underestimated. An additional 455' of cable was required, for an additional cost of about $36K.
- The remainder of the variance is due to civil work which was not included in the original estimate. During the development of the original estimate, a review of the manhole plates indicated that there were spare conduits available for the cable work required. However, during the detailed engineering field review, it was determined that civil work was in fact required since the existing ducts were insufficient for the cable work required.

## 2. Project Cost Summary

Note: Dollar values are in thousands.

| Capital Costs | Year 2022 | Year 2023 | Year 2024+ | Total |
|---|---|---|---|---|
| **Direct Capital Costs** | | | | |
| Internal Labor and Construction Equipment | 13.8 | 123.1 | 0.0 | 137.0 |
| Outside Services | 5.6 | 50.3 | 0.0 | 55.9 |
| Materials | 21.0 | 187.1 | 0.0 | 208.2 |
| Removals | 1.1 | 9.7 | 0.0 | 10.8 |
| Risk and Contingency | 0.0 | 13.8 | 0.0 | 13.8 |
| Other | 0.4 | 4.0 | 0.0 | 4.4 |
| Subtotal – Direct Costs | **42.0** | **388.1** | **0.0** | **430.1** |
| **Indirect Capital Costs** | | | | |
| Indirect/Overheads (including benefits) | 34.8 | 225.2 | 0.0 | 260.0 |
| Capitalized interest or AFUDC, if any | 1.3 | 14.6 | 0.0 | 15.9 |
| Subtotal – Indirect Costs | **36.1** | **239.8** | **0.0** | **275.9** |
| **Total Gross Capital Costs** | **78.1** | **627.9** | **0.0** | **706.0** |
| Customer Contribution | **0.0** | **0.0** | **0.0** | **0.0** |
| **Total Net Capital Project Costs** | **78.1** | **627.9** | **0.0** | **706.0** |

Explain unique payment provisions, if applicable:

# 3. Technical Justification

## Background, Project Need/Justification, and Project Scope

### a. Background

[redacted] is [redacted]

The following is the [redacted] from 1/1/2015 to 12/31/2019.

[redacted]

[redacted]

[redacted] from 1/1/2015 to 12/31/2019.

[redacted]

## b. Project Need

[redacted]

## c. Project Scope

[redacted]

## 4. Alternatives Considered

[redacted]

**Project Option Comparison**

| Design Criteria | Option | | |
|---|---|---|---|
| [redacted] | | | |
| Authorization Type | | | |
| Capital Cost | $383.5K | $706.0K | $639.9K |
| Expense Cost | $8.2K | $15.1K | $13.7K |
| Total Cost | $391.7K | $721.1K | $653.6K |
| Total Cost / MVA added | N/A | N/A | N/A |
| Total Cost / CM Saved | $432.81/CM | $336.79/CM | $291.52/CM |
| Total Cost / CI Saved | $120.5K/CI | $47.3K/CI | $42.9K/CI |
| Preferred option | | X | |

Note: the cost estimates for options 1 and 3 were revised to reflect increased costs as listed in the executive summary.

## 5. Project Schedule

Add any additional milestones that are pertinent to the project.

| Milestone/Phase Name | Estimated Date |
|---|---|
| Partial Approval | 2/14/2020 |
| 100% Detailed Engineering Completion | 11/29/2021 |
| Fully Funded | 10/18/2023 |
| In Service Date | 12/31/2023 |

## 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. | 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 | Low | 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. | 2022 | Low | Plan internal resources to perform the work. Use competitive bidding to ensure lowest outside labor cost. |
| Materials Shortage or long lead times | 2023 | Medium | 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. |

## 9. References

| References |
|---|
| 1. DSEM 05.301 – Contingency Planning |

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

| Attachment | Included in Submittal? |
|---|---|
| A. Cost Estimate | *YES* |
| B. Geographic Map | *YES* |
| C. System and Station One-Lines | *YES* |
| D. Load Summary | *YES* |
| E. Initial Funding PAF | *YES* |

Attachment A – Cost Estimate (Aims Cost Estimates were adjusted to reflect the increased cost):

Design Alternative CD01463-01

**Estimate**

Preliminary Estimate Summary

| | |
|---|---|
| Revision Number: | 2 |
| Contingency: | 28.00% |
| SubTotal: | $305,978 |
| Contingency Amount: | $85,674 |
| Estimate: | $391,651 |
| Reimbursement: | $0 |
| Net Amount: | **$391,651** |
| Description: | |

| Item Description | CU | $ / Per | Qty | Amount |
|---|---|---|---|---|
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | [redacted] | | $4,000.00 |
| OTHER<br>OTHER<br>30% adder for increase labor & material costs | 23-ALL14 | | | $59,800.00 |
| OTHER<br>OTHER<br>Cost to remove old switchgear at switch pads [redacted] | 16-ALL14 | | | $5,000.00 |
| OTHER<br>OTHER<br>differencial cost PME vs PMH switchgear | 23-ALL14 | | | $69,000.00 |
| SWITCHGEAR<br>DB/UG - Switchgear up to 25kV - Auto Type 5 (pair)<br>New automatic Type 5 PME switchgear | 16-UG125 | | | $140,080.00 |
| SWITCHING<br>OH/DB/UG - SWITCHING Network<br>Switching for [redacted] | 16-ALL15 | | | $28,097.60 |

Design Alternative CD01463-02

**Estimate**

| | Preliminary Estimate Summary |
|---|---|
| Revision Number: | 2 |
| Contingency: | 24.00% |
| SubTotal: | $293,097 |
| Contingency Amount: | $70,343 |
| Estimate: | $363,441 |
| Reimbursement: | $0 |
| Net Amount: | **$363,441** |

Description:

| Item Description | CU | $ / Per | Qty | Amount |
|---|---|---|---|---|
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | [redacted] | | $10,000.00 |
| OTHER<br>OTHER<br>30% adder due to increased labor & material costs | 23-ALL14 | | | $226.00 |
| OTHER<br>OTHER<br>additional 20% for underground work in urban area | 16-ALL14 | | | $13,000.00 |
| OTHER<br>OTHER<br>At [redacted] change status of switch [redacted] to normall closed & change nomenclature t[redacted] | 16-ALL14 | | | $300.00 |
| OTHER<br>OTHER<br>At [redacted] chnage nomenclature of [redacted] | 16-ALL14 | | | $300.00 |
| OTHER<br>OTHER<br>At [redacted] remove existing fuse cabinets [redacted] Connect cables from transformers directly to switches. Tag cables [redacted] | 16-ALL14 | | | $5,000.00 |
| UG CABLE<br>UG - Transition Splice<br>At MH 144: splice new cable from pad [redacted] to cable going to existin [redacted] Tag cabl [redacted] | 16-UG120 | [redacted] | | $2,636.80 |
| UG CABLE<br>UG - Transition Splice<br>At MH 144: splice new cable from switch [redacted] to cable going to existing [redacted] | 16-UG120 | [redacted] | | $2,636.80 |
| OTHER<br>OTHER<br>civil costs for connecting [redacted] switchgear | 23-ALL14 | [redacted] | | $217,420.00 |

| Design Alternative | | | CD01463-02 |
|---|---|---|---|
| UG CABLE | 16-UG117 | [redacted] | $1,300.00 |
| UG - Cable Removal - all cables<br>Rem cable from switch [redacted] | | | |
| UG CABLE | 16-UG114 | | $5,220.00 |
| DB/UG - 350/500 - 3-1/C (3ph) Cu<br>Run 350 CU cable from pad [redacted] o MH 144. Tag cable [redacted] | | | |
| UG CABLE | 16-UG114 | | $6,960.00 |
| DB/UG - 350/500 - 3-1/C (3ph) Cu<br>Run 350 CU cable from switch # [redacted] MH 144. Tag cable [redacted] | | | |
| SWITCHING | 16-ALL15 | | $28,097.60 |
| OH/DB/UG - SWITCHING Network<br>Switching needed on [redacted] o change feeds to [redacted] from feeder cables to loop cables. | | | |

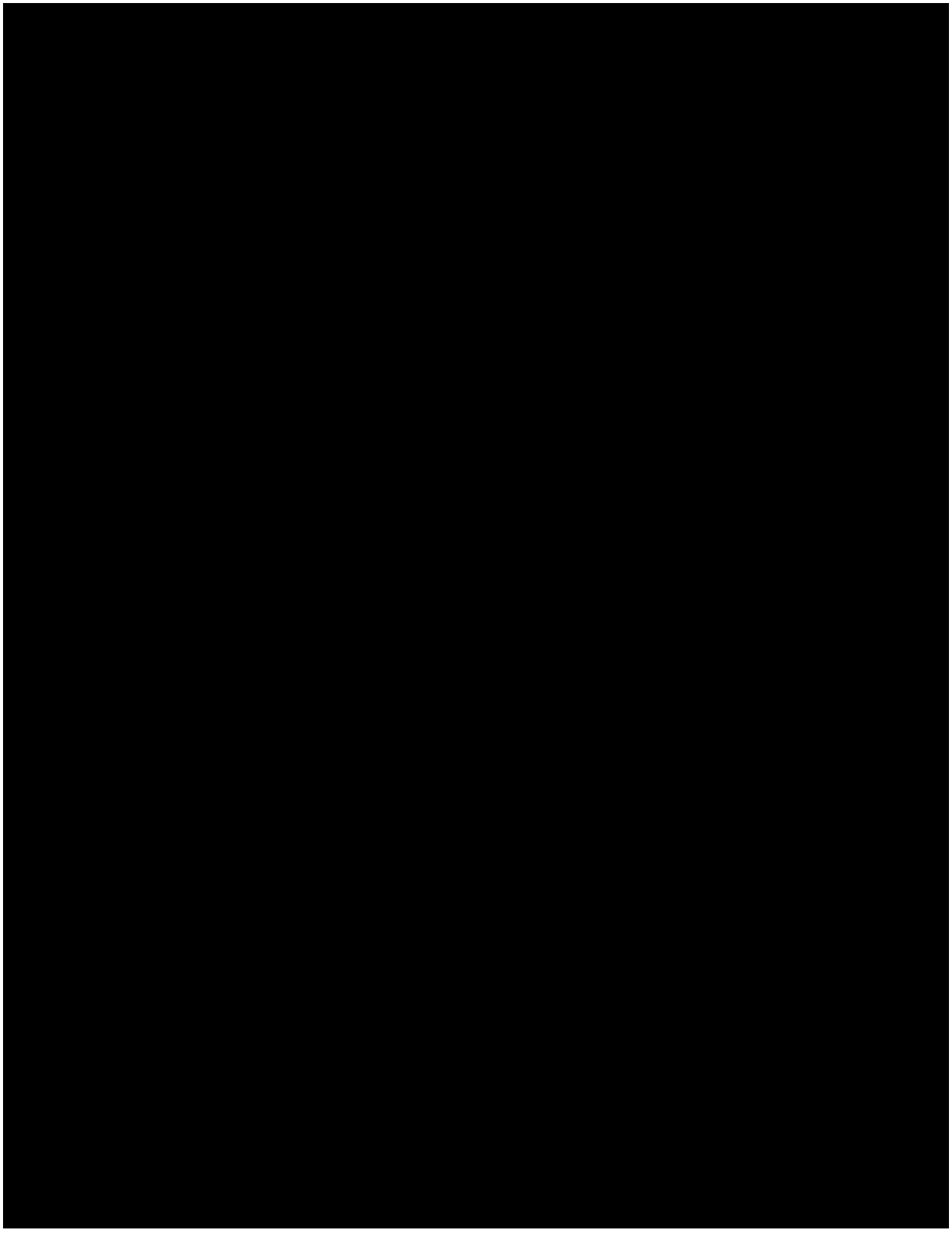
Design Alternative CD01463-03

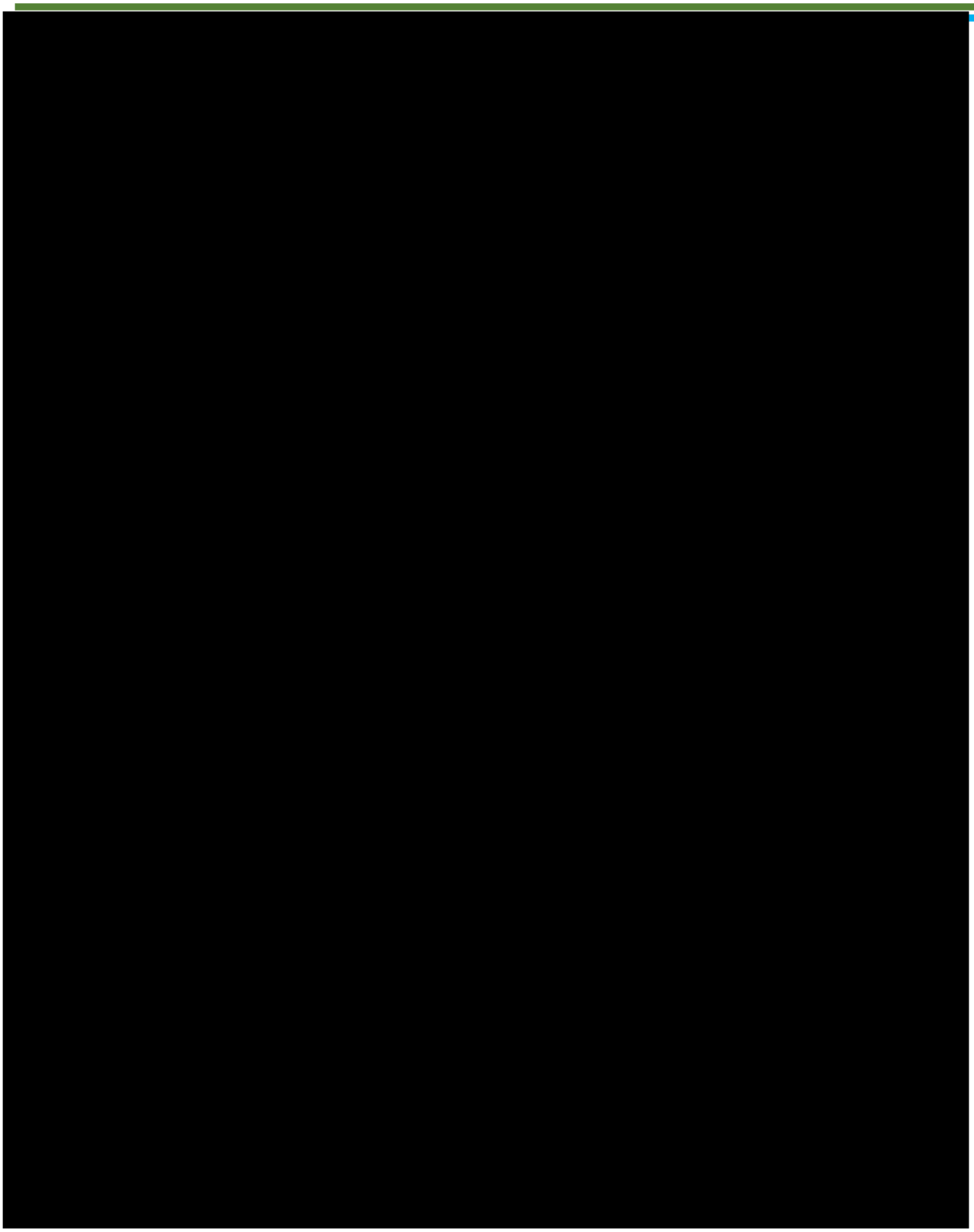
**Estimate**

| | Preliminary Estimate Summary |
|---|---|
| Revision Number: | 0 |
| Contingency: | 24.00% |
| SubTotal: | $211,219 |
| Contingency Amount: | $50,693 |
| Estimate: | $261,912 |
| Reimbursement: | $0 |
| Net Amount: | **$261,912** |
| Description: | |

| Item Description | CU | $ / Per | Qty | Amount |
|---|---|---|---|---|
| OTHER<br>OTHER<br>30% adder for increased labor & material costs | 23-ALL14 | [redacted] | | $54,200.00 |
| OTHER<br>OTHER<br>Install 2 - Elastimold Wall-Mounted Switchgear & 1-Control | 16-ALL14 | | | $150,000.00 |
| SWITCHING<br>OH/DB/UG - SWITCHING NonNetwork - Average<br>Switching to add Elasimold switchgear at [redacted] | 16-ALL17 | | | $7,019.20 |

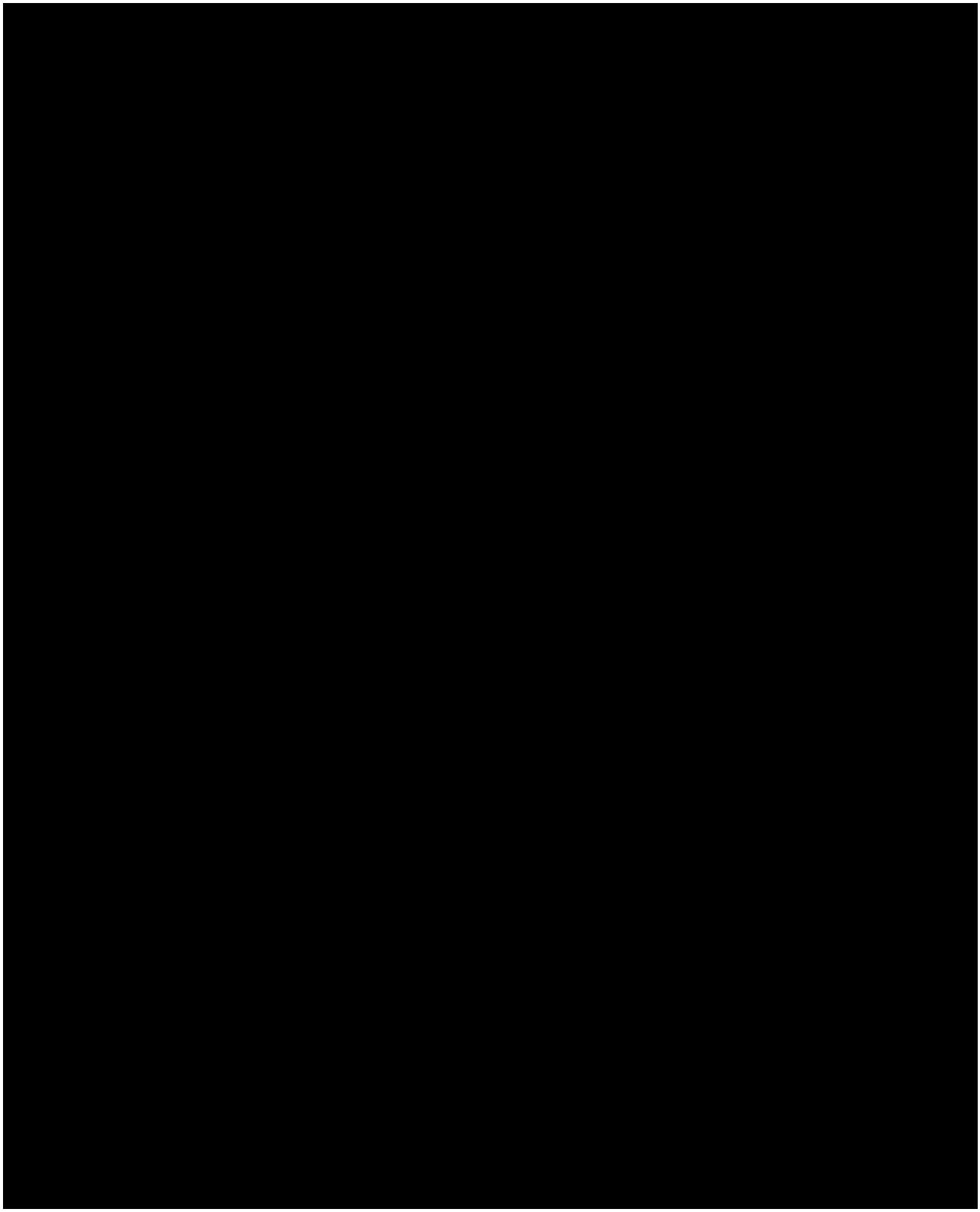
Attachment B – Maps

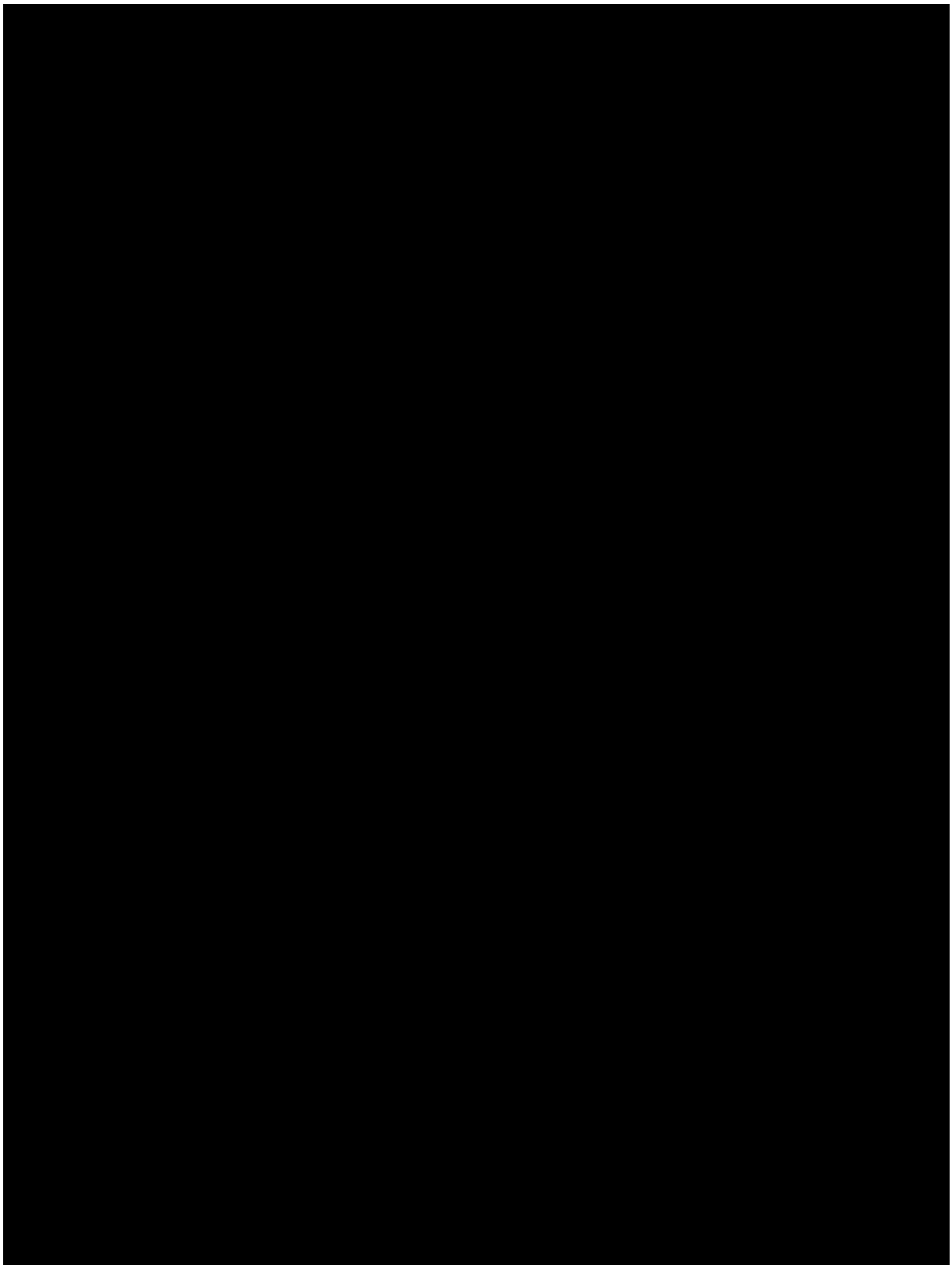


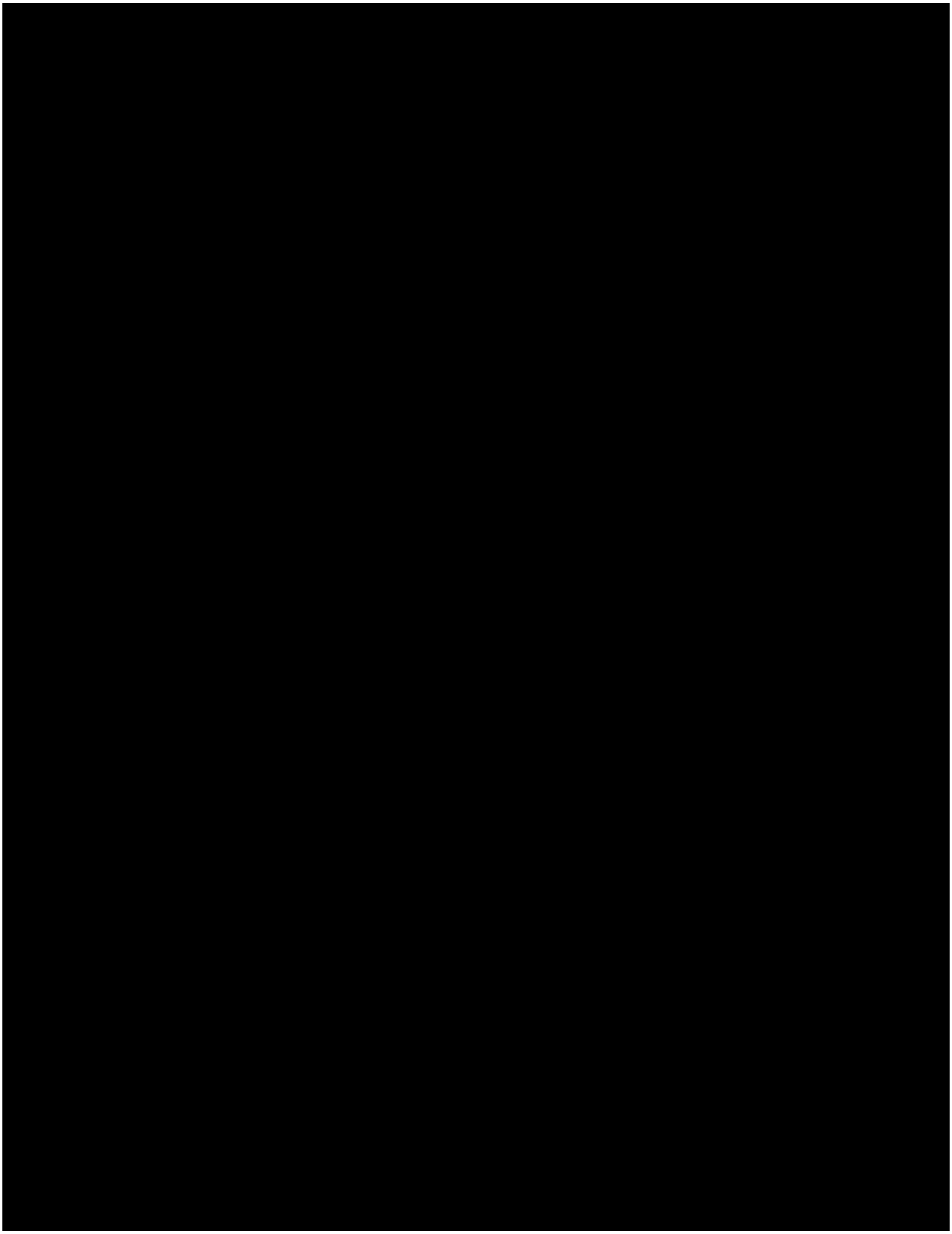


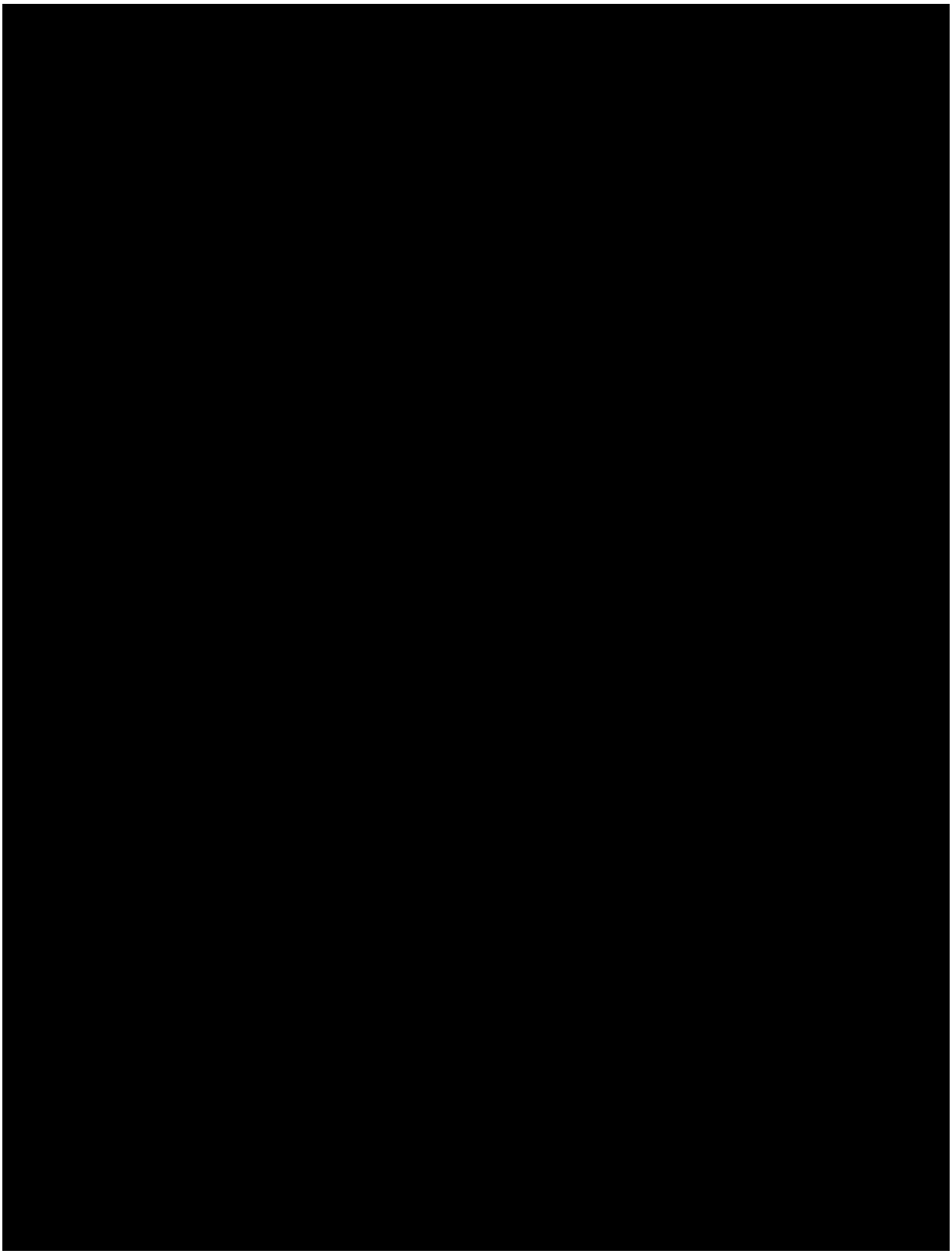


Attachment C – One-Lines









Attachment D – Load Summary

**Project Load Summary**

Project Number: CD01463

Project Name: [redacted]

[redacted]

## Project Load Summary

Project Number: CD01463

Project Name: [redacted]



EVERSOURCE
Project Authorization Form

## Operations Project Authorization Form

| | |
|---|---|
| **Date Prepared: February 14, 2020** | **Project Title:** [redacted] |
| **Company/ies: Eversource CT** | **Project ID Number: CD01463** |
| **Organization: Distribution Electric** | **Class(es) of Plant: Distribution** |
| **Project Initiator:** [redacted] | **Project Category: Line** |
| **Project Manager** [redacted] | **Project Type: UG Cable & Equipment Replacement** |
| **Project Sponsor** [redacted] | **Project Purpose: Eliminate Manual Switchgear** |
| **Estimated in service date: 12/31/2021** | **If Transmission Project: PTF? N/A** |
| **Eng. /Constr. Resources Budgeted? N** | **Capital Investment Part of Original Operating Plan? N** |
| **Authorization Type: Preliminary Funding** | **O&M Expenses Part of the Original Operating Plan? N** |
| **Total Request: $320k** | |

**Financial Requirements:**

**Project Authorization**

ERM: _____

FP&A: _____

**Executive Summary**

[redacted]

This project is part of an overall program to eliminate manual switchgear to eliminate the need to manually transfer customers to their alternate source for loss of the preferred source. This project will also improve operational flexibility with the addition of DSCADA capability.

## Project Costs Summary

*Note: Dollar values are in thousands*

| | Prior Authorized | 2020 | 2021 | 2022+ | Totals |
|---|---|---|---|---|---|
| Capital Additions - Direct | $0 | $0 | $167 | $0 | $167 |
| Less Customer Contribution | $0 | $0 | $0 | $0 | $0 |
| Removals net of Salvage ____% | $0 | $0 | $19 | $0 | $19 |
| Total - Direct Spending | $0 | $0 | $185 | $0 | $185 |
| Capital Additions - Indirect | $0 | $0 | $126 | $0 | $126 |
| Subtotal Request | $0 | $0 | $312 | $0 | $312 |
| AFUDC | $0 | $0 | $3 | $0 | $3 |
| Total Capital Request | $0 | $0 | $314 | $0 | $314 |
| O&M | $0 | $0 | $6 | $0 | $6 |
| **Total Request** | **$0** | **$0** | **$320** | **$0** | **$320** |

## Financial Evaluation

*Note: Dollar values are in thousands*

| Direct Capital Costs | 2020 | 2021 | 2022+ | Total |
|---|---|---|---|---|
| Straight Time Labor | $0 | $28 | $0 | $28 |
| Overtime Labor | $0 | $15 | $0 | $15 |
| Outside Services | $0 | $63 | $0 | $63 |
| Materials | $0 | $76 | $0 | $76 |
| Other, including contingency amounts (describe) | $0 | $3 | $0 | $3 |
| **Total Direct Costs** | **$0** | **$185** | **$0** | **$185** |

| Indirect Capital Costs | 2020 | 2021 | 2022+ | Total |
|---|---|---|---|---|
| Indirects/Overheads (including benefits) | $0 | $126 | $0 | $126 |
| Capitalized interest or AFUDC, if any | $0 | $3 | $0 | $3 |
| **Total Indirect Costs** | **$0** | **$129** | **$0** | **$129** |
| | | | | |
| **Total Capital Costs** | **$0** | **$314** | **$0** | **$314** |
| | | | | |
| Less Total Customer Contribution | **$0** | **$0** | **$0** | **$0** |
| | | | | |
| **Total Capital Project Costs** | **$0** | **$314** | **$0** | **$314** |
| | | | | |
| **Total O&M Project Costs** | **$0** | **$6** | **$0** | **$6** |
| | | | | |
| **Total Project Cost** | **$0** | **$320** | **$0** | **$320** |

*Note: Explain unique payment provisions, if applicable*

**Technical Justification:**

**Project Need Statement**

[redacted]

**Project Objectives**

The purpose of this project is to eliminate the need to manually switch customers to their alternate source for the loss of the preferred source via replacement of the existing manual switchgear with automatic switchgear, as well as to provide for DSCADA operating and load monitoring capability at this location.

**Project Scope**

The scope of this project is as follows:

[redacted]

**Major Material:**

1 - Type 5 automatic PME Master switchgear unit.
1 - Type 5 automatic PME Companion switchgear unit.
175' of 350kcmil CU 3-1/C EPR 15kV cable.

**Background / Justification**

[redacted]

**Business Process and / or Technical Improvements:**

[redacted]

**Alternatives Considered with Cost Estimates**

[redacted]

**Project Option Comparison**

| Design Criteria | [redacted] | | |
|---|---|---|---|
| Cost | $227k | $320k | $421k |
| Cost / CM Saved | $5,671/CM | $206/CM | $271/CM |
| Cost / CI Saved | $1,135k/CI | $26k/CI | $34k/CI |
| Preferred option | | X | |

## Project Schedule

| Milestone/Phase Name | Estimated Completion Date |
|---|---|
| Preliminary Approval | February 2020 |
| Detailed Design & Full Funding Authorization | June 2020 |
| Settings Requested | July 2020 |
| Construction Start Date | January 2021 |
| Construction End Date | December 2021 |

## Regulatory Approvals

None required

## Risks and Risk Mitigation Plans

| Risk Event | Risk Horizon | Likelihood of Occurrence | Risk Mitigation |
|---|---|---|---|
| Actual cost higher than estimated due to scope changes. | 2021 | 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 | 2021 | Low | Design to minimize customer impact. Project Preplanning and customer/community outreach |
| Internal construction resources not available to perform the work. | 2021 | Low | 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. |
| Storm delays | 2021 | Low | If storm activity delays work, we may be forced to use external resources. |
| System abnormal configuration | 2021 | Low | Schedule work to minimize system abnormal time. Most of this work will require system to be abnormal for any extended period of time. |

**Design General**
**Section 05.30**

## Contingency Planning

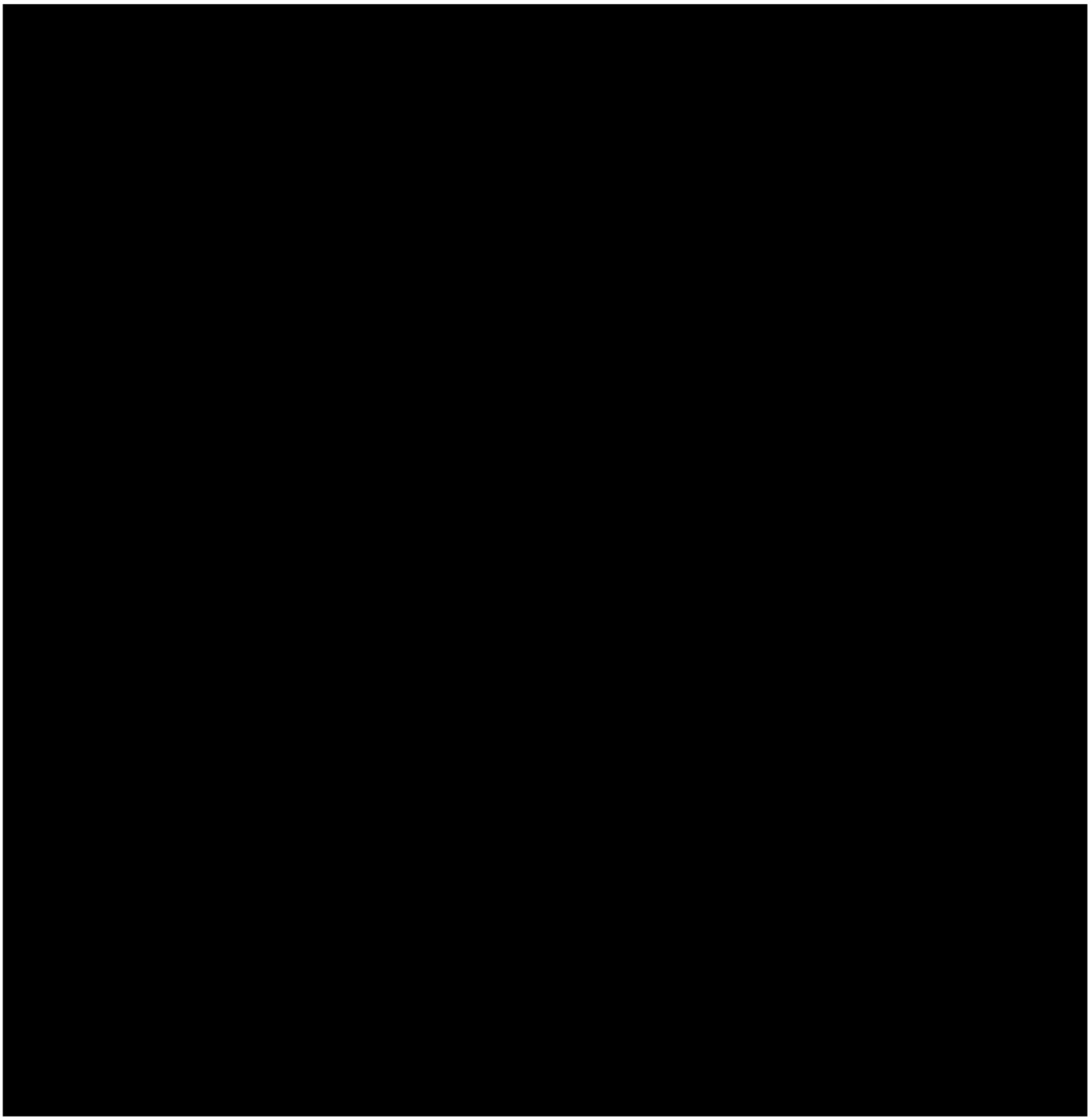
CT/MA

**05.301**

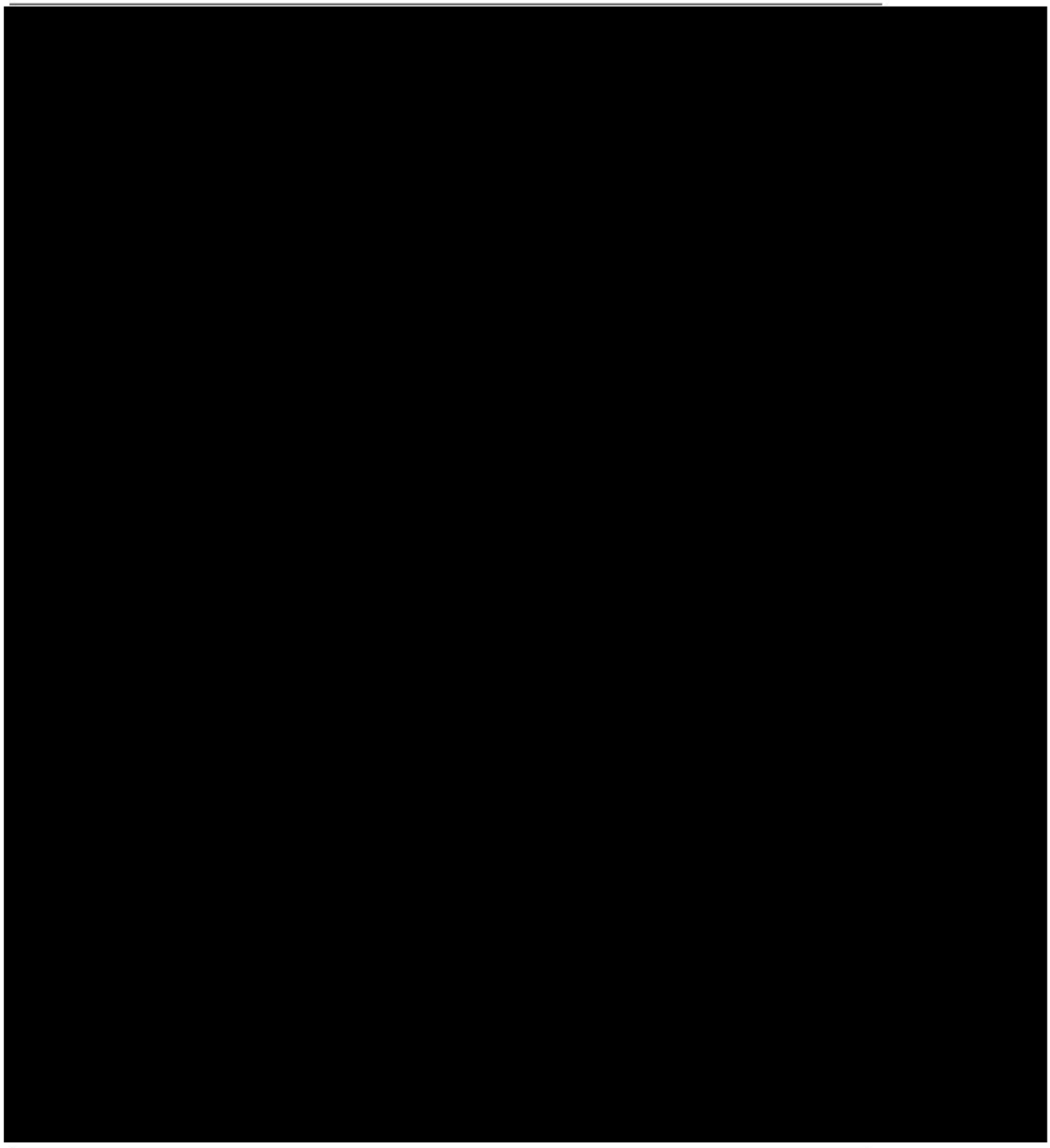
**GENERAL** – A contingency occurs when an operating line or piece of equipment has been removed from service. Contingencies may be *planned* or *unplanned*.

[redacted]

| Design General<br>Section 05.30 | Contingency Planning | CT/MA | 05.302 |
|---|---|---|---|



| Design General<br>Section 05.30 | Contingency Planning | CT/MA | 05.303 |
|---|---|---|---|

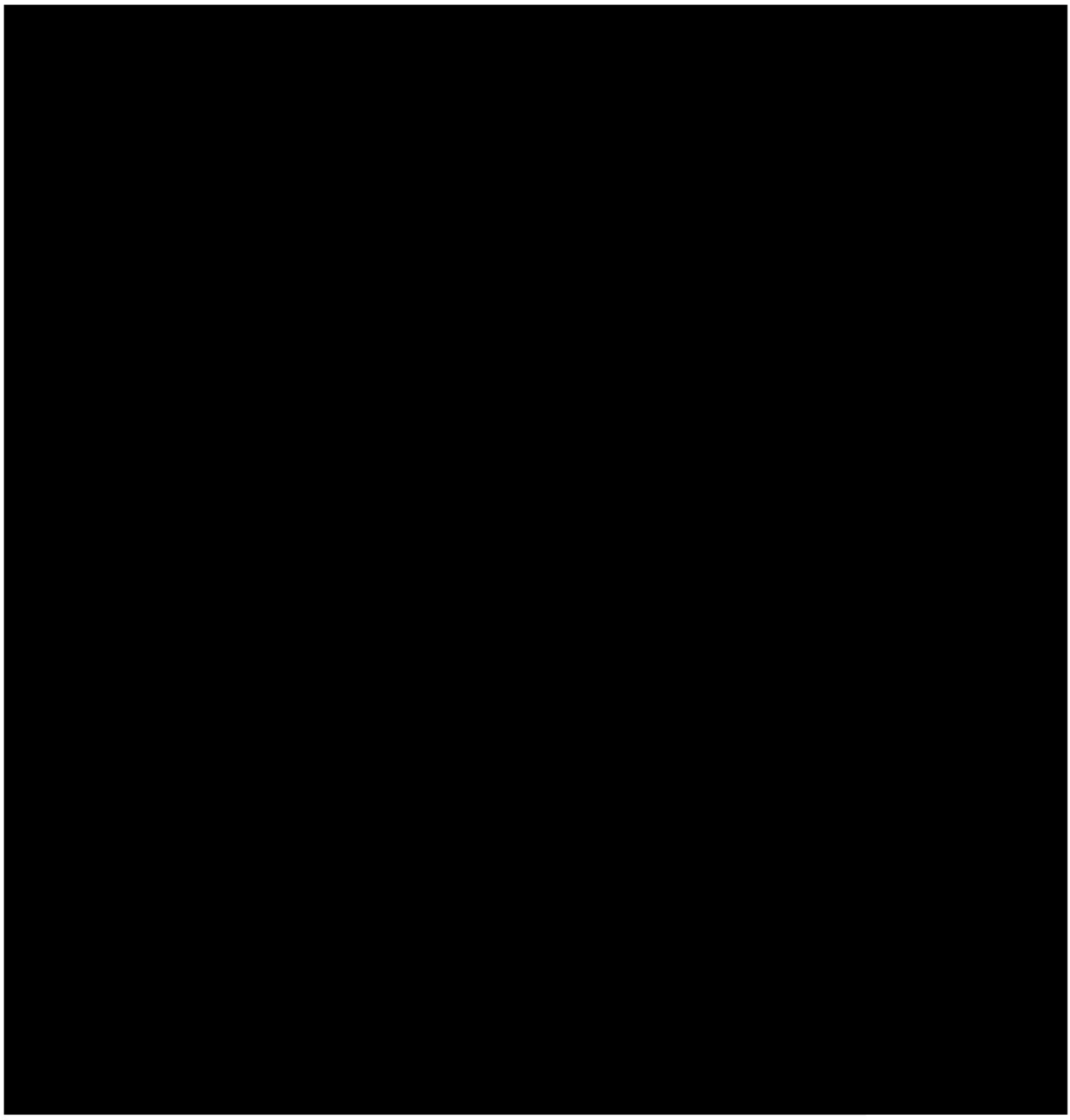


Design General
Section 05.30

**Contingency Planning**

CT/MA

05.304



| Design General<br>Section 05.30 | Contingency Planning | CT/MA | 05.305 |
|---|---|---|---|

[redacted]

Original Aims cost estimates:

Segment CD01463-01

**Estimate**

Preliminary Estimate Summary

| | |
|---|---|
| Revision Number: | 1 |
| Contingency: | 28.00% |
| SubTotal: | $177,178 |
| Contingency Amount: | $49,610 |
| Estimate: | $226,787 |
| Reimbursement: | $0 |
| Net Amount: | $226,787 |
| Description: | |

| Item Description | CU | $ / Per | Qty | Amount |
|---|---|---|---|---|
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | [redacted] | | $4,000.00 |
| OTHER<br>OTHER<br>Cost to remove old switchgear at switch pads [redacted] | 16-ALL14 | | | $5,000.00 |
| SWITCHGEAR<br>DB/UG - Switchgear up to 25kV - Auto Type 5 (pair)<br>New automatic Type 5 PME switchgear | 16-UG125 | | | $140,080.00 |
| SWITCHING<br>OH/DB/UG - SWITCHING Network<br>Switching for [redacted] | 16-ALL15 | | | $28,097.60 |

Segment CD01463-02

**Estimate**

Preliminary Estimate Summary

| | |
|---|---|
| Revision Number: | 1 |
| Contingency: | 24.00% |
| SubTotal: | $75,451 |
| Contingency Amount: | $18,108 |
| Estimate: | $93,559 |
| Reimbursement: | $0 |
| Net Amount: | $93,559 |
| Description: | |

| Item Description | CU | $ / Per | Qty | Amount |
|---|---|---|---|---|
| TRAFFIC<br>OH/DB/UG - Traffic Control - Police Officer | 16-ALL18 | [redacted] | | $10,000.00 |
| OTHER<br>OTHER<br>additional 20% for underground work in urban area | 16-ALL14 | | | $13,000.00 |
| OTHER<br>OTHER<br>A[redacted] change status of switch[redacted] to normall closed & change nomenclature to[redacted] | 16-ALL14 | | | $300.00 |
| OTHER<br>OTHER<br>At[redacted] chnage nomenclature c[redacted] | 16-ALL14 | | | $300.00 |
| OTHER<br>OTHER<br>A[redacted] remove existing fuse cabinets [redacted] Connect cables from transformers directly to switches. Tag cable[redacted] | 16-ALL14 | | | $5,000.00 |
| UG CABLE<br>UG - Transition Splice<br>At MH 144: splice new cable from pad [redacted] to cable going to existing[redacted] Tag cabl[redacted] | 16-UG120 | [redacted] | | $2,636.80 |
| UG CABLE<br>UG - Transition Splice<br>At MH 144: splice new cable from switch #[redacted] to cable going to existing[redacted] | 16-UG120 | [redacted] | | $2,636.80 |
| UG CABLE<br>UG - Cable Removal - all cables<br>Rem cable from switch [redacted] | 16-UG117 | [redacted] | | $1,300.00 |
| UG CABLE<br>DB/UG - 350/500 - 3-1/C (3ph) Cu<br>Run 350 CU cable from pad #[redacted] o MH 144. Tag cable [redacted] | 16-UG114 | [redacted] | | $5,220.00 |

Segment CD01463-02

| | | | |
|---|---|---|---|
| UG CABLE | 16-UG114 | [redacted] | $6,960.00 |
| DB/UG - 350/500 - 3-1/C (3ph) Cu<br>Run 350 CU cable from switch [redacted] o MH 144. Tag cable 328C1 | | | |
| SWITCHING | 16-ALL15 | | $28,097.60 |
| OH/DB/UG - SWITCHING Network<br>Switching needed on [redacted] to change feeds to [redacted] rom feeder cables to loop cables. | | | |

Design Alternative CD01463-03

**Estimate**

| Preliminary Estimate Summary | |
|---|---|
| Revision Number: | 0 |
| Contingency: | 24.00% |
| SubTotal: | $157,019 |
| Contingency Amount: | $37,685 |
| Estimate: | $194,704 |
| Reimbursement: | $0 |
| Net Amount: | **$194,704** |

Description:

| Item Description | CU | $ / Per | Qty | Amount |
|---|---|---|---|---|
| OTHER | 16-ALL14 | [redacted] | | $150,000.00 |
| OTHER<br>Install 2 - Elastimold Wall-Mounted Switchgear & 1-Control | | | | |
| SWITCHING | 16-ALL17 | | | $7,019.20 |
| OH/DB/UG - SWITCHING NonNetwork - Average<br>Switching to add Elasimold switchgear at [redacted] | | | | |