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Operations Project Authorization Form

Approved on February 1, 2024 EPAC

Link to Meeting Minutes

Project Title: [redacted] Transformer & Recloser Replacement and Feeder Addition	**Project Number: CS00544, CS00634**
Date Prepared: 01/26/2024	**Company: Eversource CT**
Organization: System Planning	**Class(es) of Plant: D SS**
Project Initiator: [redacted]	**Project Category: Stations – Transformer, Reclosers**
Managing Organization: Project Mgt and Construction	**Schedule ID#: 80136640**
Project Manager: [redacted]	**Project Type: Specific**
Project Sponsor: [redacted]	**Capital Investment part of original Op Plan: Yes**
Estimated in service date: May 2025	**Emergency Related Request? No**
Eng./Constr. Resources Budgeted? Yes	**Facility Type (check all that apply):** ☐ **PTF** ☐ **non- PTF** ☐ **local PTF** ☒ **Distribution** ☐ **N/A (General Plant)**
EJ Community Impact: No	**Authorization Type: Full Funding**
Total Capital Request: $18,525K - CS00544; $3,726K - CS00634	

[1] Executive Summary

This project is seeking full funding of $22,251K ($18,525K for CS00544, $3,726K for CS00634) to support material procurement, construction, and test services for distribution system upgrades at the [redacted], located in [redacted], CT. Distribution upgrades are being proposed to address system reliability and asset conditions.

[redacted] is part of a Distribution Engineering reliability effort. [redacted]

[redacted] (Reference 1). Final connections will be made once both substation projects are complete.

[redacted] These reclosers are being replaced throughout all Eversource territories to improve reliability and reduce environmental risks due to equipment failures and leaking of contaminated oil as identified in the CS00570 (CT) - Substation Oil Recloser Replacement Program (Reference 2). The [redacted] is included in the Program to complete the replacements; however, the reclosers at [redacted] are being replaced ahead of this program to take advantage of the outages needed to replace the transformer. The associated recloser switches will also be replaced. Additionally, there are (9) existing brown glass insulators that will be replaced. This work will be completed under an asset management project number and work order to separate the system planning need to replace the transformer and the asset management need to replace aging infrastructure. A summary of both project numbers is shown below in Table 1.

Table 1 – Project Number Breakdown

Project Number	Scope of Work	Total
CS00544	[redacted]	**$18,525K**
CS00634		**$3,726K**
TOTAL		**$22,251K**

Initial funding for CS00544 (Reference 3) was approved in PowerPlan on 10/21/2021 for $100K. The project received Solution Design Committee (SDC) approval (Reference 4) of the preferred solution and partial funding approval of $1,724K ($1,045K for CS00544/80136640, $352K for CS00544/80131174, and $327K for CS00634) on August 17, 2022. Partial funding was

approved (Reference 5) in PowerPlan on September 21, 2022 (CS00634) and September 22, 2022 (CS00544). As of January 2024, $1,075K ($963.3K for CS00544 and $111.4K for CS00634) has been spent for vendor on-boarding, preliminary design completion, detail engineering package, associated cost estimates, site walkdowns, and development of this Project authorization Form (PAF).

CS00544 and CS00634 will be coordinating with CD01536 to install the new feeder position and connections. The aerial cable is expected to be completed in the field by June 2024 and final connections will be completed once the feeder position is available. It will also be coordinating with CD02253 [redacted] (Reference 6) which is required to perform the outage needed to replace the bulk transformer. The costs associated with CD02253 have been included in the CS00544 cost estimate.

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[2] Project Costs Summary

CS00544 Transformer Replacement

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2024 to Go	2025	2026	2027	2028	2029	Total Request
1. ROW / Easements / Land Acquisition	$4								$0
2. Environmental Approvals / Permits			$4	$1					$5
3. Outreach	$1	$2	$25	$16					$43
4. Siting Approvals / Permits	$5	$3	$64	$42					$109
5. Engineering / Design	$372	$242	$314	$141					$698
6. Materials (Eversource purchased)	$10		$2,268	$262					$2,530
7. Construction (incl materials by contractors)	$274	$270	$2,253	$2,208					$4,731
8. Testing / Commissioning			$963	$1,011					$1,973
9. Project Mgmt. Team	$193	$68	$238	$226					$532
10. Removals			$341	$351					$692
11. Other			$0	$0					$0
12. Risks			$591	$561					$1,152
SUBTOTAL DIRECTS W/ RISKS	$859	$586	$7,060	$4,819					$12,465
13. Indirects/Overhead	$480	$188	$2,412	$2,183					$4,784
14. AFUDC	$59	$25	$387	$335					$747
PROJECT TOTAL – BASELINE BUDGET	$1,398	$799	$9,860	$7,337					$17,995
15. Contingency			$324	$205					$530
									$0
TOTAL CAPITAL REQUEST	$1,398	$799	$10,184	$7,542					$18,525
16. Reimbursables/Customer Contribution									
PROJECT TOTAL (LESS REIMBURSABLES)	$1,398	$799	$10,184	$7,542					$18,525
O&M									$0
TOTAL REQUEST	$1,398	$799	$10,184	$7,542					$18,525

Detail other costs, project risk items and their allocations:

Risk	Allocation
1. Potential UG Obstructions	$146,000
2. Severe weather, delays, OT	$158,000
3. Design development	$140,000
4. Delay in material delivery	$117,000
5. Material commodity escalation	$117,000
6. Project acceleration	$137,000
7. Outage durations	$125,000
8. Rock Removal	$90,000
9. Relocate Underground Feeder	$122,000
Total	$1,152,000

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CS00634 Recloser and Insulator Replacement Estimate

Note: Dollar values are in thousands

Line item Category	Prior Authorized	Actuals to Date	2024 to Go	2025	2026	2027	2028	2029	Total Request
1. ROW / Easements / Land Acquisition									
2. Environmental Approvals / Permits									
3. Outreach			$13	$11					$23
4. Siting Approvals / Permits	$1		$54	$45					$99
5. Engineering / Design	$87	$8	$63	$54					$125
6. Materials (Eversource purchased)			$114	$13					$128
7. Construction (incl materials by contractors)	$8		$479	$466					$945
8. Testing / Commissioning			$279	$222					$501
9. Project Mgmt. Team	$83	$4	$82	$76					$163
10. Removals			$123	$126					$249
11. Other									
12. Risks			$110	$123					$233
SUBTOTAL DIRECTS W/ RISKS	$178	$11	$1,318	$1,137					$2,466
13. Indirects/Overhead	$135	$29	$516	$477					$1,021
14. AFUDC	$14	$2	$67	$65					$134
PROJECT TOTAL – BASELINE BUDGET	$327	$42	$1,901	$1,678					$3,621
15. Contingency			$58	$46					$105
TOTAL CAPITAL REQUEST	$327	$42	$1,959	$1,724					$3,726
16. Reimbursables/Customer Contribution									
PROJECT TOTAL (LESS REIMBURSABLES)	$327	$42	$1,959	$1,724					$3,726
O&M									
TOTAL REQUEST	$327	$42	$1,959	$1,724					$3,726

Detail other costs, project risk items and their allocations:

Risk	Allocation
1. Potential UG Obstructions	$43,000
2. Severe weather, delays, OT	$38,000
3. Design development	$41,000
4. Delay in material delivery	$41,000
5. Outage durations	$37,000
6. Outage constraints which cause project delays	$33,000
Total	$233,000

Please refer to Attachments A1 through A3 for detailed cost estimates

Explain unique payment provisions, if applicable:

A Material Exemption Form was approved in August 2023 for this project for the following equipment:

Distribution Material Details					
Qty	Equipment Type	Description	Lead Time	Unit Cost	Total Cost
[redacted]	[redacted]	[redacted]	28-32 weeks	[redacted]	$301,600
			28-32 weeks		$91,200
			74 Weeks		$92,600

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

Not applicable

[3] Technical Justification

Project Need, Objective and Justification

Project Need:

The [redacted]

[redacted]

These replacements are being coordinated with Substation Engineering to have delta-wye connections. [redacted]

It is in Eversource's long term plan to eliminate these potential risks throughout the system.

Currently, [redacted]

[redacted]. Project CD01536 will install an [redacted]; however, [redacted]
The field work for CD01536 is expected to be completed by June 2024 where it will wait for the substation work to be completed before final terminations.

Additionally, [redacted]

For cost efficiency purposes, the project team is taking the opportunity to include replacement of the remaining oil-filled reclosers at the substation. The recloser scope of work is being added in advance of a Recloser Replacement Program (CS00570) that is currently under development. The preliminary work developed for the recloser replacements at [redacted] will support further development of the Recloser Replacement Program.

Additionally, there are aging disconnect switches, arresters, recloser switches, and insulators at the station.

Project Objectives:

The project objectives are described below based on the project number for each portion of the overall project.

Project Number CS00544:

- Eliminate the need to use out-of-phase field ties during contingency events. Eliminating out-of-phase field ties is part of a Distribution Engineering reliability effort. By removing out-of-phase ties the possibility of damaging customer equipment during switching events is reduced and momentary outages seen by the customer during switching events are reduced.
- Minimize momentary outages seen by the customer during restoration processes.
- Create a backup source between [redacted] in the event a transformer or transmission line experiences a permanent fault.

Project Number CS00634:

- Replacement of oil-filled feeder reclosers with vacuum interrupting reclosers. Eliminating oil-filled reclosers is part of a long-term plan throughout Eversource territory (Program CS00570). This objective is taking advantage of the substation outage as part of CS00544 to make the replacements.

- Replacement of aging feeder disconnect switches. This objective is taking advantage of the substation outage as part of CS00544 to make the replacements.
- Replacement of antiquated feeder arresters. This objective is taking advantage of the substation outage as part of CS00544 to make the replacements.
- Replacement of nine (9) antiquated brown glass insulators. Replacing aging brown glass insulators is part of a long-term plan throughout Eversource territory. This objective is taking advantage of the substation outage as part of CS00544 to make the replacements.

Project Scope

I. Eversource Scope of Work

This document includes the preliminary level substation engineering scope of work for replacement of the existing power transformer, [redacted] along with a number of new additions, replacements and removals as described below.

This work scope is divided among work orders as follows:

1. CS00544: Replacement of Existing [redacted]

[redacted]

[redacted]

2. CS00634 - Work Order #3 (**80328641**): [redacted]
   (Distribution Asset Management):

[redacted]

II. Assumptions:

The assumptions listed below have been used by Substation Engineering in the development of the scope items detailed within this document. If any/all of the assumptions below are deemed inaccurate and/or unfeasible, the scope of work detailed in this document shall be considered invalid and shall be revised by Engineering:

1. [redacted]
4. All engineering and design shall be performed in accordance with Eversource Standards.

III. Identification of Required Engineering Studies

The following studies have been completed as part of preliminary design: AC/DC load study, battery evaluation, structural and foundation studies.

A sound study will be completed upon completion of the project; however, it is not expected that the new equipment will exceed allowable audible noise levels.

IV. Above Grade Design Requirements – Evaluation of substation/switchyard expansion requirements

1. Impacts to existing yard design:
   a. Nomenclature Drawing – See the nomenclature removals and additions in Attachment D.
   b. Physical Impacts to substation equipment footprint – No
      i. This scope will **not** change the overall footprint of the [redacted] All work will be completed within the existing fence and control house.
   c. Impacts to design basis of existing grounding system – No, grounding system analysis is **not** required.
   d. Impacts to Direct Lightning Stroke Protection – No, a lightning protection study is **not** required.
   e. Identify Yard Lighting and or Physical Security modifications – No, yard lighting in the substation will **not** require a detailed lighting level study.
   f. No changes in fault current will occur as a result of these additions.

2. Above Grade Electrical Modifications/Additions:
   The above grade equipment modifications and/or additions are described below:

[redacted]

[redacted]

V. Below Grade Design Requirements

1. Foundation Addition/Modifications:

[redacted]

2. Ground Grid Modifications/Expansion:

a. All new equipment and structures will require ground connections to the existing ground grid in accordance with Eversource SUB 014 (Reference 10).
b. Minor ground grid repair will be required in the areas of the existing station that will be excavated for new foundations, below grade raceway and foundation removal.

3. Raceway Additions/Modifications

[redacted]

VI. Site Development Requirements & Other Considerations:

1. Real Estate/Siting & Permitting Considerations (i.e. acquisitions, offset encroachment, ROW impacts):
   a. Expansion of the existing [redacted] site is **not** required.
2. Audible Noise level Changes/Considerations: Sound level study will be conducted for replacement transformer after construction.
3. Distribution Feeder Circuit Considerations: **YES**
   a. The new feeder position at [redacted] is needed for an [redacted]

VII. Control Enclosure Evaluation

[redacted]

VIII. Construction, Outage and Energization Considerations

1. A mobile circuit switcher and mobile transformer will need to be installed for the installation of the 1X transformer and associated equipment. [redacted]

[redacted]

2. The [redacted]
3. [redacted] These will be designed by Eversource Distribution Engineering.

IX. Protection & Controls Scope of Work

The existing transformer and 13.2kV bus relays and meters will be replaced with new relays and meters on the existing panel.

Existing relays and meters to be removed include the following:

[redacted]

New Relays and Meters:

One (1)	87S1/1X	SEL-387E	Primary Transformer Differential Relay

[redacted]

A constructability review was performed on August 9, 2023 (Attachment C).

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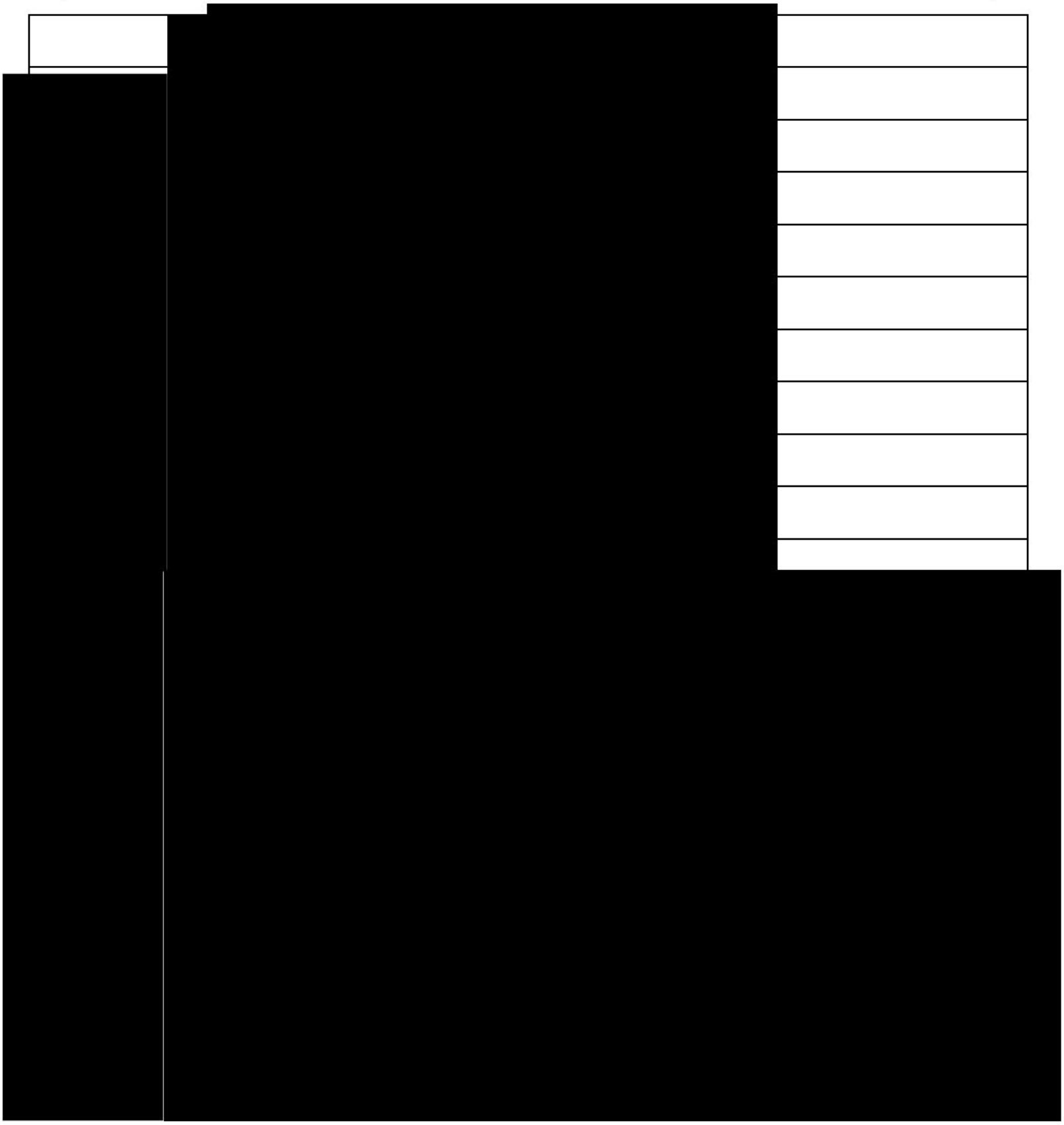
Substation Equipment

Station		Device Removals *include manufacturer*	Device Additions *include manufacturer*
[redacted]			



Background

[redacted]

[redacted]

There is antiquated equipment at [redacted] substation that will be replaced under an asset management project CS00634 and will be completed at the same time as the substation work. The equipment being replaced includes oil-filled feeder reclosers, aging disconnect switches, aging insulators, and aging relays. Performing this work under a different project helps separate the asset management needs and substation reliability needs.

[4] Alternatives Considered

The project received Solution Design Committee (SDC) approval of the preferred solution on August 17, 2022.

Alternative 1: Replace Transformer, Reclosers and Switches and Install Feeder Position (This is the preferred solution)

[redacted] Discussions have made between System Planning, Substation Engineering, and Distribution Engineering to coordinate these replacements to have the same winding configuration of delta-wye. [redacted]

[redacted]

[redacted] To make room for



Siting has determined, the current scope of Alternative 1 is within the criteria of a Notice of Exemption filing, such as the fence line is not extended, and the height of new equipment is not taller than the tallest piece of existing equipment. There will be four (4) temporary distribution wood pole structures outside the fence line on Eversource property and two (2) temporary distribution wooden pole structures inside the fence that will contain reclosers that will be used during the construction sequence when outages occur and be removed when they are no longer needed.

There is an abutter to the North Canaan substation. In the past, the customer has refused trimming of pine trees surrounding the substation fence. There is a chance that vegetation, on Eversource property, around the driveway will need to be removed to allow for the delivery of the transformer and mobile transformer; any major removals will be replaced upon project completion. Customer outreach has been completed; there have not been any concerns with any of the customers surrounding the substation.

Planning grade estimate for CS00544 is $18,525K
Planning grade estimate for CS00634 is $3,726K
Total cost estimate for Alternative 1 is $22,251K

Alternative 2: Install a Second Transformer (This is not the preferred solution)



[redacted]

As mentioned in Alternative 1, an [redacted]

Siting determined, the current scope of Alternative 2 is within the criteria of a Notice of [redacted]

There is a possibility that vegetation, on Eversource property, around the driveway will need to be removed to allow for the delivery of the transformer and mobile transformer; any major removals will be replaced upon project completion.

Conceptual grade estimate for CS00544 is $13,335.4K
Conceptual grade estimate for CS00634 is $2,459.8K
Combined conceptual grade estimate for Alternative 2 is $15,795.2K

Alternative 3: Replace Transformer and Install New Feeder Position (This is not the preferred solution)

This alternative will follow similar to Alternative 1; however, will not include the additional replacements of the remaining oil-filled reclosers or replacement of aging disconnect switches, arresters, and insulators. Essentially, this alternative will not include any work associated with project CS00634. The asset management work will be deferred until a Program level project is ready to be used to replace the aging infrastructure.

This solution is not the preferred solution. To complete the additional asset management work, at a later time, will require additional outages at the substation. Deferring the work could also result in an increased cost.

Conceptual grade estimate for CS00544 is $11,335.4K

Alternative 1 is the preferred alternative when weighed against each non-preferred alternative because it solves all issues described in the need statement with one (1) set of outages and provides the ideal substation configuration from an operation standpoint. Alternative 2 involves eliminating the mobile position to house a new transformer and uses the existing transformer as an energized standby. [redacted] Alternative 3 would reduce project cost and defer aging infrastructure replacement to a later time. This is not ideal either since the replacements will require additional outages at the substation. To complete Alternative 1, the station will require an outage so Alternative 1 is taking advantage of this outage to complete replacement of aging infrastructure.

[5] Project Schedule

Milestone	Scheduled Completion Date
IFR Approval	October 2021
SDC Approval (for applicable projects)	August 2022
Conversion of Tx development costs, 183 to 107 (applicable to projects that require SSF approval and/or ISO preferred alternative selection)	N/A
EPAC Partial Funding Approval (for applicable projects)	August 2022
Preliminary Design Completion (or latest pre-full funding design phase)	June 2023
EPAC Full Funding Approval	February 2024
Siting Approval (for applicable projects)	August 2024
Start of Construction	September 2024
Project In-Service Date (ISD)	May 2025
Project Need Date (for applicable projects)	May 2025
ISO Related Milestones: (for applicable projects)	
• ISO Preferred Alternative Selected	N/A
• PAC Presentation	N/A
• TCA Submittal	N/A

See Attachment B for detailed schedule.

[6] Regulatory Approvals

An Exempt Modification is required to be submitted to the Connecticut Siting Council (CSC). Submission of the Exempt Modification is expected for June 2024 and approval by August 2024.

[7] Risk and Risk Mitigation Plans

Contingency:

Contingency of $530K (CS00544) and $105K (CS00634) has been included in the project estimate to account for any unknowns.

Risk Mitigation:

Risk	Mitigation
1. Potential Underground Obstructions	UG obstructions may be observed during civil excavations and will be addressed by hand excavations at that time. Risk allocation is included in the estimate.
2. Severe weather, delays, & OT	Construction delays caused by weather and storm duty are possible. Try to be flexible with construction schedules. Risk allocation is included in the estimate.
3. Design Development	The design and review process will be done in detail as the project detail design is being completed. Risk is allocated to the project budget for any changes in the detailed design.
4. Delay in material delivery	Delays in materials could result in the need to push outages and construction times. Overtime may be needed to keep the project on schedule. Risk is allocated to the project budget for delays in material delivery.
5. Material commodity escalation	Final transformer quote from ABB will be received in March 2024. For estimating purposes, the transformer was priced based on initial quote received from ABB in April 2023. Quotes have been received from manufacturers and are locked-in for 30 days. Quotes may increase after this period. Risk is allocated to the project budget for material cost increase.
6. Project acceleration	Material delays and adverse weather could have adverse effects on the construction and outage schedule; resulting in the need for additional resources and/or overtime to keep the project in-service date. Risk is allocated to the project budget for project acceleration.
7. Outage durations	Outage coordination is on-going. Outages have not been approved at this time. Outages will be kept to a minimum to reduce SCLL concerns. Risk is allocated to the project budget for extended outages.
8. Outage constraints which cause project delays	Outage coordination is on-going. Outages have not been approved at this time. Outages may be affected due to adverse weather and will

Risk	Mitigation
	require flexibility in the construction schedule. Risk is allocated in the project budget for outage delays.
9. Relocate Underground Feeder	During construction, (2) of the (4) feeders will require temporary relocation through underground duct. This risk accounts for any unknown obstructions below the surface that may need to be addressed during excavation.
10. SCLL Considerations	This project does have SCLL concerns since this is a single transformer station. During the transformer replacement a mobile transformer will be needed to maintain customer electric supply. Additionally, while there are field ties, the first protection zone is will not be picked up for a substation contingency. Therefore, temporary, pole-top reclosers will be installed for the four (4) existing feeders to pick up the first zone customers during construction. These reclosers will be removed after completion of the project.

[8] References

References
1. CD01536 – [redacted] approved May 20201.
2. CS00570 - Substation Oil Recloser Replacement Program – Initial Funding Request; approved March 2022
3. CS00544 – [redacted] Transformer Replacement IFR; approved 10/12/2021
4. CS00544 CS00634 – [redacted] Transformer Replacement SSF; approved August 2022
5. CS00544 CS00634 – [redacted] Transformer Replacement PF PAF; approved August 2022
6. CD02253 – [redacted] Feeder Relocation; approval expected for February 2024
7. CS00533 – [redacted] Upgrade IFR; approved 11/16/2021
8. CS00286 – [redacted] Replacement IFR; approved 12/2/2021
9. 405209 - CS00364 – NWCT Distribution Reliability Project partial funding PAF; approved 11/17/2021
10. Eversource Substation 014

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

Attachment	Included in Submittal?
A1. CS00544 [redacted] Xfmr Rplcmt FF Estimate	*YES*
A2. CS00544 [redacted] Feeder Addition FF Estimate	*YES*
A3. CS00634 [redacted] Recloser_Insulator Rplcmts FF Estimate	*YES*
B. CS00544 CS00634 [redacted] Xfmr Rclsr Rplcmt Fdr Add Schedule	*YES*
C. CS00544 CS00634 [redacted] Constructability Review	*YES*
D. CS00544 CS00634 [redacted] Nomenclature Removals and Additions	*YES*

Project Checklist - Transmission & Substation Capital Project	
Project Name: [redacted] **Transformer/Recloser Replacement and Feeder Addition**	**Project Number: CS00544, CS00634**

Facility Type:

☐BPS ☐BES ☐PTF ☐local PTF ☐ non-PTF ☐CIP ☒Distribution ☐General Plant ☐CONVEX ☐SCADA

PLANNING	
Is a NX-9 required?	Yes
Is an ISO-NE PAC presentation required?	No
ISO-NE Presentation Date (if completed):	N/A
Cost in ISO-NE Presentation ($M) (if completed):	N/A
Is a PPA required?	Yes
ISO-NE Approval Date (if completed):	TBD
Is a TCA Application Required?	No
TCA Submittal Date (if submitted):	N/A
Cost in TCA Submittal ($M) (if submitted):	N/A
Enter ISO-NE RSP / Asset Condition ID, if assigned:	ES-23-LSP-112
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?	Yes
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: [redacted] Transformer/Recloser Replacement and Feeder Addition	**Project Number: CS00544, CS00634**

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	
Has Siting reviewed this project?	Yes
Name of Siting contact:	[redacted]
Is a Siting filing required? *(If yes, list in regulatory approvals section)*	Yes
PERMITTING	
Is there any permitting required? *(If yes, list in regulatory approvals section)*	No
PROJECT SERVICES (OUTREACH) and ROW WORK COORDINATION	
Has Project Services reviewed this project?	Yes (Choose an item)
Name of Project Services contact:	[redacted]
What is the level of outreach expected?	Medium
Has ROW Coordination reviewed this project?	No
Is this project coordinating with other existing scheduled work?	Yes
ENVIRONMENTAL JUSTICE COMMUNITIES	
Has the Equity and Environmental Justice team reviewed this project?	No
Name of Equity and Environmental Justice contact:	N/A
Is any part of this project in an Environmental Justice Community?	No
Was the Equity Framework Checklist completed?	No
Has enhanced outreach required per State Regulatory requirements been completed?	No
INITIATOR	
Has a field constructability review been completed?	Yes

Project Checklist - Transmission & Substation Capital Project	
Project Name: [redacted] Transformer/Recloser Replacement and Feeder Addition	**Project Number: CS00544, CS00634**
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 the Eversource Estimating Team
Name of the person who prepared the estimate:	[redacted]
Was the estimate reviewed by Eversource Estimating?	Yes - Full Review

ESTIMATE SUMMARY

Project Title: Substation Upgrade
Project Mgr: [redacted]
Project Number: CS00544
WO & Task #: 80131174
Estimate revision #: 01
Estimate Type - Station work

Estimate #: C-23-595AF
Date of Estimate 01/25/2024
Estimate done by:
In Service date (ISD):05/31/2025

Template Revision # 02.00

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: C-23-595AF
Date of Estimate:01/25/2024

Project Number: CS00544
WO & Task #: 80131174

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
1	ROW / Easements / Land purchases														
2	Environmental Approvals / Permits														
3	Outreach	$31 800	0.3%	0 2%	$900	$19 400	$11 500								
4	Siting Approvals / Permits	$84,000	0.9%	0 6%	$2,900	$50,900	$30,200								
5	Engineering / Design	$508 100	5.4%	3 6%	$179 800	$224 500	$103 800								
6	Materials (Eversource purchased)	$2,345,200	24.7%	16.7%		$2,101,700	$243,500								
7	Construction (incl materials by contractors)	$3,548,600	37.4%	25 2%	$269,600	$1,663,100	$1,615,900								
8	Testing / Commissioning	$1,145,700	12.1%	8 2%		$558,900	$586,800								
9	PMT Project Mgmt Team	$326,500	3.4%	2 3%	$44,000	$144,800	$137,700								
10	Removals	$627,100	6.6%	4 5%		$308,900	$318,200								
11	Other (property taxes and BAR)														
12	Risks	$872 000	9.2%	6 2%		$455 000	$417 000								
125	**Project Directs Total w/Risks**	**$9,489,000**	100.0%	67 5%	**$497,200**	**$5,527,200**	**$3,464,600**								
13	Indirects/Overhead	$3,581,700		25 5%	$142,100	$1,813,700	$1,625,900								
14	AFUDC	$579,400		4.1%	$19,700	$303,100	$256,600								
125	**Project Total - Baseline Budget**	**$13,650,100**		97.1%	**$659,000**	**$7,644,000**	**$5,347,100**								
15	Contingency	$403,900		2 9%		$255,700	$148,200								
	Project Total - Funding Approval Level	**$14,054,000**		100 0%	**$659,000**	**$7,899,700**	**$5,495,300**								
16	Reimbursables/Customer Contribution														
---	**Project Total (less reimbursables)**	**$14,054,000**			**$659,000**	**$7,899,700**	**$5,495,300**								
	Cost per key qty (if appl)	14,054,000	$'s / EA Substation Upgrade												
	Amount of Escalation included above	$211 900					$211 900								
6	Total materials - Eversource	$2 345 200				$2 101 700	$243 500								
	Total materials - Contractor	$429,409			$267,009	$141,600	$20,800								
	Total materials	$2 774 609			$267 009	$2 243 300	$264 300								

NOTE: Risk / Contingency is 10% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)

Estimate Range	**-25%**		**25%**
	$10,541,000		**$17,568,000**

	TOTAL w/ escal broken out
ROW / Easements / Land purchas	$ -
Environmental Approvals / Permi	$ -
Outreach	$ 31 300
Siting Approvals / Permits	$ 82,600
Engineering / Design	$ 503 200
Materials (Eversource purchased	$ 2,484,246
Construction (incl materials by c	$ 3,325,654
Testing / Commissioning	$ 1,117,800
PMT Project Mgmt Team	$ 320,000
Removals	$ 617,900
Other (property taxes and BAR)	$ -
Risks	$ 872 000
	$9,354,700
Indirects/Overhead	$ 3,504,300
AFUDC	$ 579,300
	$ -
	$13,438,300
	$ -
Contingency	$ 403,900
	$13,842,200
	$ -
	$ -
	$ -
	$13,842,200
	$ 211 900
Escal total	**$14,054,100**
Check total	$100

COMMENTS:

Project Scope:

Key qty's and UOM (tie to inputs on est sheets): 1 EA Substation Upgrade — 5.99 Factor (total $/Eversource Mat'l $'s)

[redacted]

Assumptions/Clarifications:

Indirect rates based on: 11 - CT - Station work

Engineering is External with Internal review
Construction is External.
P-6 Schedule provided is dated 12/15/2023
Engineering by RLC per email quote dated 8/17/23 from CM for $250,153.62 + Contingency of $25,200.00 = $275,353.62
Studies to be performed - AC load study, DC load study, Battery Capacity Evaluation, bus analysis, structural and foundation calculations, cable & conduit fill, sound study.
Prior Costs are dated 10/19/2023
rev.01
Add Proposal cost to Install Temporary Feeder ES Project #CD02253 for $1,246,371.00 Date Received 1/25/2024

RISKS

Potential UG Obstructions	$ 102 000	Rock Removal	$ 90 000
Severe Wea her. Delays. OT	$ 122 000	Relocate Underground Feeder	$ 122 000
Design development	$ 97 000		
Delay in material delivery	$ 79 000		
Material commodity escalation	$ 77 000		
Project Acceleration	$ 96 000		
Outage Durations	$ 87 000		

UNESCALATED LINE ITEM DOLLARS

Project Number CS00544
Date of Estimate 01/25/2024
Estimate revision # 01

CSTXX-CONSTRUCTION	R	Prior Mhrs	Prior DOLLARS	2024 Mhrs	2024 DOLLARS	2025 Mhrs	2025 DOLLARS	TOTAL Mhrs	TOTAL DOLLARS
Electrical Construction	LT				$311,580		$311,580		$623,160
General Construction	LT		$2,558						$2,558
SCADA / Automation	LT				$6,664		$4,456		$11,140
Other (specify)	LT								
Construction Regs (Internal)	LT								
Support Switch/Tag	LT				$12,980		$12,980		$25,960
Other (specify)	LT								
Other (specify)	LT								
Other (specify)	LT								
LT Total			$2,558		$331,227		$329,039		$662,843
Employee Expenses	AE				$16,580		$16,451		$33,014
Constr. Purchased Matl (Eversource)	AM				$3,116		$3,116		$6,232
Constr. Purchased Matl (contracted)	AM				$4,926		$4,926		$9,852
Outside Construction Vendor	AQ				$665,219		$665,219		$1,270,438
Sales tax on Constr. Vendor									
Vehicles (now in Indirects section)	AV								
Inspection services (Outside Vendor)	AQ								
Construction Rep (Outside vendor)	AQ				$188,400		$188,400		$376,800
Rents and Leases	SR								
CSTXX Subtotal			$2,558		$1,529,461		$1,527,141		$3,059,179
Escalation									
CSTXX Total			$2,558		$1,529,461		$1,527,141		$3,059,179
ENRXX-TG ENGINEERING/DESIGN									
Project Services/Drafting	LT				$2,570		$2,056		$4,626
T- Line Engineering/Design	LT								
D- Street Engineering/Design	LT								
Civil Engineering/Design	LT								
Substation (T) Engineering/Design	LT								
Substation (D) Engineering/Design	LT		$26,951		$7,796		$5,570		$13,366
Protection & Controls Engineering	LT				$10,836		$8,428		$19,264
Survey Engineering	LT								
SCADA / Automation Engineering	LT				$4,720		$2,360		$7,080
Telecom Engineering	LT				$944		$472		$1,416
Other - specify	LT								
Other - specify	LT								
LT Total			$26,951		$26,566		$18,886		$45,754
Employee Expenses	AE				$1,343		$944		$2,287
Contractor Engineering - T-Lines	AQ								
Contractor Engineering - D-Street	AQ								
Contractor Engineering - T -Station	AQ								
Contractor Engineering - D-Station	AQ		$152,845		$66,640		$30,080		$116,900
Contractor Engineering - P&C	AQ				$65,680		$30,240		$115,920
Contractor Engineering - Survey	AQ								
Contractor Engineering - SCADA / Automation	AQ				$19,800		$17,453		$37,253
Contractor Engineering - Telecom	AQ				$3,960		$1,320		$5,280
Contractor Engineering - Specify	AQ								
Contractor Engineering - Specify	AQ								
Contractor Engineering - Specify	AQ								
Vehicles (now in Indirects section)	AV								
ENRXX Subtotal			$179,796		$224,491		$98,903		$323,394
Escalation									
ENRXX Total			$179,796		$224,491		$98,903		$323,394
LNDXX-TG LAND									
Real Estate	LT								
Employee Expenses	AE								
Purchase Land	AM								
Easements	AM								
Vehicles (now in Indirects section)	AV								
Fees and Payments	SF								
LNDXX Subtotal									
Escalation									
LNDXX Total									
MATXX-TG MATERIAL									
Eversource	AM				$2,019,778		$224,430		$2,244,198
Outside Services	AM		$267,009		$131,821		$14,625		$146,446
Freight	AM								
Sales Tax (Eversource)	3.9%				$78,800		$8,800		$87,600
Sales Tax (outside services)	3.9%				$5,100		$600		$5,700
Other									
MATXX Subtotal			$267,009		$2,235,300		$248,444		$2,483,744
Escalation									
MATXX Total			$267,009		$2,235,300		$248,444		$2,483,744
PSMXX-PROJECT MANAGER & SUPPORT									
Project Management (PM)	LT		$6,833		$14,822		$14,822		$29,644
Project Planning/Cost (IP)	LT				$1,358		$838		$2,096
Contracts/Purchasing (C/P)	LT				$1,366		$910		$2,276
System Planning	LT				$1,810		$1,206		$3,016
Environmental	LT								
SCS - Traditional	LT		$885		$7,771		$4,388		$13,044
Legal	LT								
Estimating	LT								
Siting - Exempt Modification	LT		$2,876		$2,500		$1,400		$6,776
Asset Management	LT								
Veg. Mgmt	LT								
Other -	LT								
Other -	LT								
Other -	LT								
LT Total			$10,594		$29,527		$23,564		$58,853
Employee Expenses	AE				$1,478		$1,178		$2,656
Project Support Vendor - PM	AQ		$37,213		$105,600		$105,600		$211,200
Project Support Vendor - IP	AQ				$2,640		$1,320		$3,960
Project Support Vendor - C/P	AQ				$2,640		$1,320		$3,960
Project Support Vendor - System Planning	AQ				$2,640		$1,320		$3,960
Project Support Vendor - Environmental	AQ								
Project Support Vendor - SCS - Traditional	AQ				$11,880		$6,360		$18,240
Project Support Vendor - Legal	AQ								
Project Support Vendor - Estimating	AQ				$8,800				$8,800
Project Support Vendor - Siting - Exempt Modification	AQ				$49,400		$27,400		$76,800
Project Support Vendor - Asset Management	AQ				$3,960		$3,640		$7,600
Project Support Vendor - Veg. Mgmt.	AQ								
Project Support Vendor - Other	AQ								
Project Support Vendor - Other	AQ								
Project Support Vendor - Other	AQ								
Vehicles (now in Indirects section)	AV								
Property or CWIP tax (large proj. a tolerance	SR								
Builder All risk insurance excluding deductibles(if project is over $50m)	SR								
Fees and Payments - Environmental	SF								
Fees and Payments - Siting	SF								
Fees and Payments - Other	SF								
PSMXX Subtotal			$47,807		$215,143		$170,922		$389,926
Escalation									
PSMXX Total			$47,807		$215,143		$170,922		$389,926
REMXX-TG REMOVAL									
Engineering/Design	LT								
Internal Construction	LT								
LT Total									
Employee Expenses	AE								
Outside Services	AQ								
Contractor Labor	AQ				$308,932		$308,932		$617,863
Vehicles (now in Indirects section)	AV								
Rents and Leases	SR								
REMXX Subtotal					$308,932		$308,932		$617,863
Escalation									
REMXX Total					$308,932		$308,932		$617,863
TSTXX-TG TEST									
Test / Field Engr. Labor (In House)	LT								
Test / Comm. Engr. Labor (In House)	LT								
Lead Commissioning Engr. (LCE) (Internal)	LT								
Employee Expense	AE								
Test / Field Engr. Labor (contractor)	AQ				$354,600		$354,600		$709,200
Test / Comm. Engr. Labor (contractor)	AQ								
Lead Commissioning Engr. (LCE) (contactor)	AQ				$204,300		$204,300		$408,600
Vehicles (now in Indirects section)	AV								
TSTXX Subtotal					$558,900		$558,900		$1,117,800
Escalation									
TSTXX Total					$558,900		$558,900		$1,117,800
SUBTOTAL PROJECT DIRECT COST		-	$497,170		$5,972,346		$2,913,341		$7,991,006
Risk									
Risk					$455,000		$417,000		$872,000
					$ -		$ -		
					$ -		$ -		
Risk Total					$455,000		$417,000		$872,000
TOTAL PROJECT DIRECT COST (w risk)		-	$497,170		$6,427,346		$3,330,341		$8,863,006
INDIRECTS									
Non-Productive Time Allocation (ZNP)	17.0%		$6,503		$65,901		$63,151		$135,555
Payroll Benefits Allocation (ZPB) Incl NPT	30.0%				$125,703		$122,119		$247,822
Gen SVC CO Overhead (ZGA) Incl NPT	70.0%		$29,620		$24,183		$19,398		$73,102
E&S Allocations (ZEB,ZEL,ZES)	35.0%		$82,796		$1,058,858		$994,983		$2,136,637
AG&E Allocations (ZAS)	1.4%		$7,955		$80,956		$67,079		$154,390
Stores Expense Allocation (ZST)	5.0%				$101,582		$77,954		$179,536
Lobby Stock									
MOEC (ZM)	6.0%		$14,783		$180,068		$169,407		$364,258
Vehicles (ZVE)	38.0%		$482		$108,540		$104,014		$213,036
Indirects Subtotal			$142,139		$1,813,992		$1,548,495		$3,504,316
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)			$639,309		$7,340,838		$4,878,728		$12,366,122
AFUDC									
AFUDC (ZX)			$19,655	7.00%	$303,080	7.00%	$256,821		$579,356
In Service Dollars / Land costs									
Cumulative ISS & Land Costs					-		-		
AFUDC Subtotal			$19,655		$303,080		$256,821		$579,356
TOTAL PROJECT COST - Baseline Budget			$660,964		$7,643,918		$5,135,547		$12,947,480
Contingency		-							
Contingency		-			$255,730		$148,203		$403,933
Other		-	$ -		$ -		$ -		
Contingency SubTotal					$255,730		$148,203		$403,933
TOTAL PROJECT COST - Approved Funding			$660,964		$7,899,728		$5,283,550		$13,351,391

ESTIMATE SUMMARY

Project Title: Substation Upgrade [redacted]
Project Mgr/Lead [redacted]
Project Number: CS00544
WO & Task #: 80131174
Estimate revision #: 00
Estimate Type - Station work

Estimate #: C-23-595AE
Date of Estimate:01/10/2024
Estimate done by:
In Service date (ISD):05/31/2025

Template Revision # 02.00

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: C-23-595AE
Date of Estimate 01/10/2024

Project Number: CS00544
WO & Task #: 80131174

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	TOTAL w/ escal broken out
1	ROW / Easements / Land purchases															ROW / Easements / Land purchas $ -
2	Environmental Approvals / Permits	$5,100	0.2%	0.1%		$3,800	$1,300									Environmental Approvals / Permi $ 5,000
3	Outreach	$10 800	0.4%	0.2%	$1 300	$5 100	$4 400									Outreach $ 10 600
4	Siting Approvals / Permits	$25,300	0.9%	0.6%	$100	$13,500	$11,700									Siting Approvals / Permits $ 24,700
5	Engineering / Design	$189 500	6.4%	4.2%	$62 600	$90 000	$36 900									Engineering / Design $ 187 700
6	Materials (Eversource purchased)	$184,900	6.2%	4.1%		$165,900	$19,000									Materials (Eversource purchased $ 215,591
7	Construction (incl materials by contractors)	$1,182,200	39.7%	26.4%	$900	$589,600	$591,700									Construction (incl materials by c $ 1,122,709
8	Testing / Commissioning	$827,500	27.8%	18.5%		$403,700	$423,800									Testing / Commissioning $ 807,300
9	PMT Project Mgmt Team	$205,600	6.9%	4.6%	$23,600	$93,700	$88,300									PMT Project Mgmt Team $ 201,300
10	Removals	$64,900	2.2%	1.5%		$32,000	$32,900									Removals $ 63,900
11	Other (property taxes and BAR)															Other (property taxes and BAR) $ -
12	Risks	$280 000	9.4%	6.3%		$136 000	$144 000									Risks $ 280 000
125																
	Project Directs Total w/Risks	**$2,975,800**	100.0%	66.6%	**$88,500**	**$1,533,300**	**$1,354,000**									**$2,918,800**
13	Indirects/Overhead	$1,202,300		26.9%	$46,200	$598,600	$557,500									Indirects/Overhead $ 1,175,700
14	AFUDC	$167,500		3.7%	$5,200	$84,400	$77,900									AFUDC $ 167,500
125																$ -
	Project Total - Baseline Budget	**$4,345,600**		97.2%	**$139,900**	**$2,216,300**	**$1,989,400**									**$4,262,000**
																$ -
15	Contingency	$125,500		2.8%		$68,700	$56,800									Contingency $ 125,600
	Project Total - Funding Approval Level	**$4,471,100**		100.0%	**$139,900**	**$2,285,000**	**$2,046,200**									**$4,387,600**
16	Reimbursables/Customer Contribution															$ -
---																$ -
	Project Total (less reimbursables)	**$4,471,100**			**$139,900**	**$2,285,000**	**$2,046,200**									**$4,387,600**
	Cost per key qty (if appl)	4,471,100	$'s / EA 115kV Substation Upgrade													
	Amount of Escalation included above	$83 100					$83 100									$ 83 100
6	Total materials - Eversource	$184 900				$165 900	$19 000									
	Total materials - Contractor	$37,300				$31,500	$5,800									Escal total **$4,470,700**
	Total materials	$222 200				$197 400	$24 800									Check total -$400

NOTE: Risk / Contingency is 10% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)

Estimate Range	**-25%**	**25%**
	$3,353,000	**$5,589,000**

COMMENTS:

Project Scope:
Key qty's and UOM (tie to inputs on est sheets) 1 EA 115kV Substation Upgrade 24.18 Factor (total $/Eversource Mat'l $'s)

[redacted]

Indirect rates based on: 11 - CT - Station work

Engineering is External with Internal review
Construction is External.
Testing is External
P-6 Schedule provided is dated 12/15/2023
WBS Prior Costs are as of 10/19/2023
Engineering by RLC per email quote dated 8/17/23 from CM for $83,384.54 + Contingency of $16,677.00 = $100,062.00

RISKS

Potential UG Obstructions	$ 44 000
Severe Weather Delays OT	$ 36 000
Design development	$ 43 000
Delay in material delivery	$ 38 000
Material commodity escalation	$ 40 000
Project Acceleration	$ 41 000
Outage Durations	$ 38 000

UNESCALATED LINE ITEM DOLLARS

Project Number C800544

Date of Estimate 04/19/2024

Estimate revision # 00

Escalation Rate		E Rate $ 59		2024		2025		TOTAL	
		Prior							
CSTXX-CONSTRUCTION	R	Mhrs	DOLLARS	Mhrs	DOLLARS	Mhrs	DOLLARS	Mhrs	DOLLARS
Electrical Construction	LT								
General Construction	LT $		$650						$650
SCADA / Automation	LT $				$2,228		$2,228		$4,456
Other (specify)	LT $ -								
Construction Reps (Internal)	LT $				$15,576		$15,576		$31,152
Support Switch/Tag	LT $								
Other (specify)	LT $ -								
Other (specify)	LT $ -								
Other (specify)	LT $ -								
LT Total			$650		$17,804		$17,804		$36,458
Employee Expenses	AE				$890		$890		$1,780
Constr. Purchased Matl (Eversource)	AM								
Constr. Purchased Matl (contracted)	AM				$2,324		$2,324		$4,648
Outside Construction Vendor	AO				$464,723		$464,723		$929,446
Sales tax on Constr. Vendor									
Vehicles (now in Indirects section)	AV								
Inspection services (Outside Vendor)	AO $								
Construction fee (Outside vendor)	AO $				$74,575		$74,575		$149,150
Rents and Leases	SR								
CSTXX Subtotal			$650		$560,316		$560,316		$1,121,482
Escalation									
CSTXX Total			$650		$560,316		$560,316		$1,121,482
ENRXX-TG ENGINEERING/DESIGN									
Project Services/Drafting	LT $								
T- Line Engineering/Design	LT $								
D- Street Engineering/Design	LT $								
Civil Engineering/Design	LT $								
Substation (T) Engineering/Design	LT $								
Substation (D) Engineering/Design	LT $		$9,407		$8,912		$1,114		$10,026
Protection & Controls Engineering	LT $				$8,428		$1,204		$9,632
Survey Engineering	LT								
SCADA / Automation Engineering	LT $				$2,360		$944		$3,304
Telecom Engineering	LT $				$472		$472		$944
Other - specify	LT $								
Other - specify	LT $								
LT Total			$9,407		$20,172		$3,734		$23,906
Employee Expenses	AE				$1,009		$187		$1,196
Contractor Engineering - T-Line	AO $								
Contractor Engineering - D-Street	AO $								
Contractor Engineering - T -Station	AO $								
Contractor Engineering - D-Station	AO $		$53,164		$28,392		$15,091		$43,481
Contractor Engineering - P&C	AO $				$27,668		$10,147		$38,035
Contractor Engineering - Survey	AO								
Contractor Engineering - SCADA / Automation	AO $				$9,900		$4,666		$14,566
Contractor Engineering - Telecom	AO $				$2,640		$1,320		$3,960
Contractor Engineering - Specify	AO $								
Contractor Engineering - Specify	AO $								
Contractor Engineering - Specify	AO $								
Vehicles (now in Indirects section)	AV								
ENRXX Subtotal			$62,571		$89,999		$35,165		$125,164
Escalation									
ENRXX Total			$62,571		$89,999		$35,165		$125,164
LNDXX-TG LAND									
Real Estate	LT $								
Employee Expenses	AE								
Purchase Land	AM								
Easements	AM								
Vehicles (now in Indirects section)	AV								
Fees and Payments	SF								
LNDXX Subtotal									
Escalation									
LNDXX Total									
MATXX-TG MATERIAL									
Eversource	AM				$159,652		$17,739		$177,391
Outside Services	AM				$28,162		$3,129		$31,291
Freight	AM								
Sales Tax (Eversource)	3.9%				$6,200		$700		$6,900
Sales Tax (outside services)	3.9%				$1,100		$100		$1,200
Other									
MATXX Subtotal					$195,114		$21,668		$216,782
Escalation									
MATXX Total					$195,114		$21,668		$216,782
PSMXX-PROJECT MANAGER & SUPPORT									
Project Management (PM)	LT $		$3,184		$9,264		$9,264		$21,712
Project Planning/Cost (IP)	LT $				$838		$419		$1,257
Contracts/Purchasing (C/P)	LT $				$910		$455		$1,365
System Planning	LT $				$1,206		$603		$1,809
Environmental	LT				$3,750		$1,250		$5,000
SCS - Traditional	LT		$1,301		$2,050		$1,684		$5,035
Legal	LT $								
Estimating	LT $								
Siting - Exempt Modification	LT		$53		$700		$600		$1,353
Asset Management	LT $								
Veg. Mgmt	LT $								
Other -	LT $								
Other -	LT $								
Other -	LT $								
LT Total			$4,538		$18,718		$14,375		$37,631
Employee Expenses	AE				$836		$714		$1,550
Project Support Vendor - PM	AO $		$20,430		$66,000		$66,000		$152,430
Project Support Vendor - IP	AO $				$1,320		$1,320		$2,640
Project Support Vendor - C/P	AO $				$1,320		$1,320		$2,640
Project Support Vendor - System Planning	AO $				$1,320		$1,320		$2,640
Project Support Vendor - Environmental	AO								
Project Support Vendor - SCS - Traditional	AO				$3,070		$2,530		$5,600
Project Support Vendor - Legal	AO $								
Project Support Vendor - Estimating	AO $				$6,600				$6,600
Project Support Vendor - Siting - Exempt Modification	AO				$12,800		$10,500		$23,300
Project Support Vendor - Asset Management	AO $				$3,960		$2,640		$6,600
Project Support Vendor - Veg. Mgmt.	AO $								
Project Support Vendor - Other	AO $								
Project Support Vendor - Other	AO $								
Project Support Vendor - Other	AO $								
Vehicles (now in Indirects section)	AV								
Property or CWIP tax (prop incl. allowance	SR								
Subtier All-risk insurance excluding deductables(if project is over $5m	SR								
Fees and Payments - Environmental	SF								
Fees and Payments - Siting	SF								
Fees and Payments - Other	SF								
PSMXX Subtotal			$24,968		$116,044		$100,619		$241,631
Escalation									
PSMXX Total			$24,968		$116,044		$100,619		$241,631
REMXX-TG REMOVAL									
Engineering/Design	LT $								
Internal Construction	LT								
LT Total									
Employee Expenses	AE								
Outside Services	AO								
Contractor Labor	AO				$31,951		$31,951		$63,902
Vehicles (now in Indirects section)	AV								
Rents and Leases	SR								
REMXX Subtotal					$31,951		$31,951		$63,902
Escalation									
REMXX Total					$31,951		$31,951		$63,902
TSTXX-TG TEST									
Test / Field Engr. Labor (In House)	LT $								
Test / Comm. Engr. Labor (In House)	LT $								
Lead Commissioning Engr. (LCE) (Internal)	LT $								
Employee Expenses	AE								
Test / Field Engr. Labor (contractor)	AO $				$256,100		$256,100		$512,200
Test / Comm. Engr. Labor (contractor)	AO $								
Lead Commissioning Engr. (LCE) (contactor)	AO $				$147,550		$147,550		$295,100
Vehicles (now in Indirects section)	AV								
TSTXX Subtotal					$403,650		$403,650		$807,300
Escalation									
TSTXX Total					$403,650		$403,650		$807,300
SUBTOTAL PROJECT DIRECT COST		-	$88,389		$1,397,074		$1,165,369		$2,576,361
Risk									
Risk					$136,000		$144,000		$280,000
					$ -		$ -		
					$ -		$ -		
Risk Total					$136,000		$144,000		$280,000
TOTAL PROJECT DIRECT COST (w risk)		-	$88,389		$1,533,074		$1,297,369		$2,856,361
INDIRECTS									
Non-Productive Time Allocation (ZNP)	17.0%		$2,467		$9,638		$6,068		$18,213
Payroll Benefits Allocation (ZPB) incl NPT	30.0%				$13,330		$7,560		$20,890
Gen SVC OD Overhead (ZGS) incl NPT	70.0%		$10,553		$15,330		$11,691		$37,574
E&S Allocations (ZES,ZEL,ZES)	35.0%		$26,773		$432,295		$403,524		$862,592
A&GE Allocations (ZAG)	1.4%		$1,448		$26,147		$22,151		$49,746
Stores Expense Allocation (ZST)	8.0%				$12,772		$1,419		$14,191
Lobby Stock									
MOEC (ZM)	6.0%		$4,644		$73,186		$68,474		$146,304
Vehicles (ZVE)	26.0%		$172		$15,874		$10,028		$26,074
Indirects Subtotal			$45,178		$598,562		$530,935		$1,175,675
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)			$134,567		$2,131,636		$1,828,304		$4,091,956
AFUDC									
AFUDC (ZK)			$5,205	7.00%	$84,391	7.00%	$77,903		$167,499
In Service Dollars / Land costs									
Cumulative ISS & Land Costs					-		-		
AFUDC Subtotal			$5,205		$84,391		$77,903		$167,499
TOTAL PROJECT COST - Baseline Budget			$139,772		$2,216,027		$1,906,207		$4,199,456
Contingency									
Contingency					$60,735		$56,840		$125,575
Other			$ -		$ -		$ -		
Contingency SubTotal					$60,735		$56,840		$125,575
TOTAL PROJECT COST - Approved Funding			$139,772		$2,394,762		$1,963,047		$4,325,010

ESTIMATE SUMMARY

Project Title: Substation Upgrade
Project Mgr/Lead [redacted]
Project Number: CS00634
WO & Task #: 80328641
Estimate revision #: 00
Estimate Type - Station work

Estimate #: C-23-396
Date of Estimate:01/10/2024
Estimate done by [redacted]
In Service date ISD/USA 1/2025

Template Revision # 02.00

ESTIMATE SUMMARY

Estimate Type: Planning

WBS	Description	TOTAL	% of Directs	% of Total	Priors	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
1	ROW / Easements / Land purchases														
2	Environmental Approvals / Permits														
3	Outreach	$23 300	0.9%	0.6%		$12 700	$10 600								
4	Siting Approvals / Permits	$99 200	4.0%	2.7%		$54,000	$45,200								
5	Engineering / Design	$124 800	5.1%	3.3%	$7 700	$63 200	$53 900								
6	Materials (Eversource purchased)	$127.500	5.2%	3.4%		$114.400	$13.100								
7	Construction (incl materials by contractors)	$944,700	38.3%	25.4%		$478,700	$466,000								
8	Testing / Commissioning	$501,400	20.3%	13.5%		$279,500	$221,900								
9	PMT Project Mgmt Team	$162,700	6.6%	4.4%	$3,800	$82,400	$76,500								
10	Removals	$249,100	10.1%	6.7%		$122,700	$126,400								
11	Other (property taxes and BAR)														
12	Risks	$233 000	9.4%	6.3%		$110 000	$123 000								
125															
	Project Directs Total w/Risks	**$2,465,700**	100.0%	66.2%	**$11,500**	**$1,317,600**	**$1,136,600**								
13	Indirects/Overhead	$1,021,300		27.4%	$28,600	$516,100	$476,600								
14	AFUDC	$134,000		3.6%	$2,200	$67,100	$64,700								
125															
	Project Total - Baseline Budget	**$3,621,000**		97.2%	**$42,300**	**$1,900,800**	**$1,677,900**								
15	Contingency	$104,700		2.8%		$58,500	$46,200								
	Project Total - Funding Approval Level	**$3,725,700**		100.0%	**$42,300**	**$1,959,300**	**$1,724,100**								
16	Reimbursables/Customer Contribution														

	Project Total (less reimbursables)	**$3,725,700**			**$42,300**	**$1,959,300**	**$1,724,100**								
	Cost per key qty (if appl)	3,725,700	$'s / EA 115kV Substation Upgrades												
	Amount of Escalation included above	$68 300					$68 300								
6	Total materials - Eversource	$127 500				$114 400	$13 100								
	Total materials - Contractor	$47,400				$41,000	$6,400								
	Total materials	$174 900				$155 400	$19 500								

NOTE: Risk / Contingency is 10% of Project Total Costs (incl escal/indirects/AFUDC but excl reimb.)

Estimate Range	**-25%**	**25%**
	$2,794,000	**$4,657,000**

COMMENTS:

Project Scope:

Key qty's and UOM (tie to inputs on est sheets): 1 EA 115kV Substation Upgrades 29.22 Factor (total $/Eversource Mat'l $'s)

ource mat'l $'s)

[redacted]

Assumptions/Clarifications:

Indirect rates based on: 11 - CT Station work

Engineering is External with Internal review
Construction is External.
P-6 Schedule provided is dated 08/11/2023
Engineering by RLC per email quote dated 8/17/23 from CM for $83,384.54 + Contingency of $16,677.00 = $100,061.00
Actual costs dated 10/20/2023

RISKS

Potential UG Obstructions	$ 43 000
Severe Weather, Delays, OT	$ 38 000
Design development	$ 41 000
Delay in material delivery	$ 41 000
Outage Durations	$ 37 000
Outage Constraints which cause project delays	$ 33 000

Alt Estimate Summary for PP4 Calc (escalation separate)

Estimate #: C-23-396
Date of Estimate 01/10/2024

Project Number: CS00634
WO & Task #: 80328641

		TOTAL w/ escal broken out
ROW / Easements / Land purchas	$	-
Environmental Approvals / Permi	$	-
Outreach	$	22 800
Siting Approvals / Permits	$	97,000
Engineering / Design	$	122 200
Materials (Eversource purchased	$	169,114
Construction (incl materials by c	$	880,686
Testing / Commissioning	$	490,800
PMT Project Mgmt Team	$	159,000
Removals	$	245,500
Other (property taxes and BAR)	$	-
Risks	$	233 000
		$2,420,100
Indirects/Overhead	$	998,600
AFUDC	$	134,100
	$	-
		$3,552,800
	$	-
Contingency	$	104,700
		$3,657,500
	$	-
	$	-
	$	-
		$3,657,500
	$	68 300
Escal total		**$3,725,800**
Check total		$100

UNESCALATED LINE ITEM DOLLARS

Project Number CS00634
Date of Estimate 01/10/2024
Estimate revision # 00

Escalation Rate — E Rate $ — Str

CSTXX-CONSTRUCTION	R	Prior Mhrs	Prior DOLLARS	2024 Mhrs	2024 DOLLARS	2025 Mhrs	2025 DOLLARS	TOTAL Mhrs	TOTAL DOLLARS
Electrical Construction	LT								
General Construction	LT $								
SCADA / Automation	LT $				$1,782		$1,782		$3,564
Other (specify)	LT $								
Construction Reps (Internal)	LT $								
Support Switch/Tag	LT $				$12,960		$12,960		$25,920
Other (specify)	LT $								
Other (specify)	LT $ -								
Other (specify)	LT $ -								
LT Total					$14,742		$14,742		$29,524
Employee Expenses	AE				$738		$738		$1,476
Constr. Purchased Matl (Eversource)	AM								
Constr. Purchased Matl (contracted)	AM				$1,777		$1,777		$3,554
Outside Construction Vendor	AO				$355,481		$355,481		$710,962
Sales tax on Constr. Vendor									
Vehicles (now in Indirects section)	AV								
Inspection services (Outside Vendor)	AO $								
Construction Reps (Outside vendor)	AO $				$66,725		$66,725		$133,450
Rents and Leases	BR								
CSTXX Subtotal					$439,483		$439,483		$878,966
Escalation									
CSTXX Total					$439,483		$439,483		$878,966
ENRXX-TG ENGINEERING/DESIGN									
Project Services/Drafting	LT $				$822		$411		$1,233
T- Line Engineering/Design	LT $								
D- Street Engineering/Design	LT $								
Civil Engineering/Design	LT $								
Substation (T) Engineering/Design	LT $								
Substation (D) Engineering/Design	LT $		$7,857		$2,359		$1,671		$11,887
Protection & Controls Engineering	LT $				$2,526		$1,808		$4,334
Survey Engineering	LT								
SCADA / Automation Engineering	LT $				$1,888		$944		$2,832
Telecom Engineering	LT $				$944		$472		$1,416
Other - specify	LT $ -								
Other - specify	LT $ -								
LT Total			$7,857		$8,521		$5,304		$21,482
Employee Expenses	AE				$438		$265		$691
Contractor Engineering - T-Lines	AO $								
Contractor Engineering - D-Street	AO $								
Contractor Engineering - T -Station	AO $								
Contractor Engineering - D-Station	AO $				$23,212		$21,710		$44,922
Contractor Engineering - P&C	AO $				$21,840		$16,800		$38,640
Contractor Engineering - Survey	AO								
Contractor Engineering - SCADA / Automation	AO $				$7,920		$7,980		$15,180
Contractor Engineering - Telecom	AO $				$1,320				$1,320
Contractor Engineering - Specify	AO $								
Contractor Engineering - Specify	AO $								
Contractor Engineering - Specify	AO $								
Vehicles (now in Indirects section)	AV								
ENRXX Subtotal			$7,857		$63,259		$51,339		$122,235
Escalation									
ENRXX Total			$7,857		$63,259		$51,339		$122,235
LNDXX-TG LAND									
Real Estate	LT $								
Employee Expenses	AE								
Purchase Land	AM								
Easements	AM								
Vehicles (now in Indirects section)	AV								
Fees and Payments	BF								
LNDXX Subtotal									
Escalation									
LNDXX Total									
MATXX-TG MATERIAL									
Eversource	AM				$110,148		$12,239		$122,387
Outside Services	AM				$37,723		$4,191		$41,914
	AM								
Freight									
Sales Tax (Eversource)	3.5%				$4,300		$500		$4,800
Sales Tax (outside services)	3.5%				$1,500		$200		$1,700
Other									
MATXX Subtotal					$153,671		$17,130		$170,801
Escalation									
MATXX Total					$153,671		$17,130		$170,801
PSMXX-PROJECT MANAGER & SUPPORT									
Project Management (PM)	LT $		$1,085		$7,874		$7,874		$15,748
Project Planning/Cost (IP)	LT $				$838		$419		$1,257
Contracts/Purchasing (CIP)	LT $				$910		$455		$1,365
System Planning	LT $				$1,206		$603		$1,809
Environmental	LT								
SCS - Campaign	LT				$2,541		$2,021		$4,562
Legal	LT $								
Estimating	LT $								
Siting - Application	LT				$5,400		$4,300		$9,700
Asset Management	LT $								
Veg. Mgmt	LT $								
Other -	LT $								
Other -	LT $								
Other -	LT $								
LT Total			$1,085		$18,769		$15,672		$34,441
Employee Expenses	AE				$938		$784		$1,722
Project Support Vendor - PM	AO $		$2,713		$58,100		$56,190		$112,290
Project Support Vendor - IP	AO $				$1,320		$1,320		$2,640
Project Support Vendor - CIP	AO $				$1,320		$1,320		$2,640
Project Support Vendor - System Planning	AO $				$1,320		$1,320		$2,640
Project Support Vendor - Environmental	AO								
Project Support Vendor - SCS - Campaign	AO				$10,160		$8,080		$18,240
Project Support Vendor - Legal	AO $								
Project Support Vendor - Estimating	AO $				$6,600				$6,600
Project Support Vendor - Siting - Application	AO				$40,800		$36,700		$87,300
Project Support Vendor - Asset Management	AO $				$3,960		$2,640		$6,600
Project Support Vendor - Veg. Mgmt.	AO $								
Project Support Vendor - Other	AO $								
Project Support Vendor - Other	AO $								
Project Support Vendor - Other	AO $								
Vehicles (now in Indirects section)	AV								
Property or CWIP tax large proj. a/owance	BR								
Builder All risk Insurance excluding deductables(if project is over $50m)	BR								
Fees and Payments - Environmental	BF								
Fees and Payments - Siting	BF								
Fees and Payments - Other	BF								
PSMXX Subtotal			$3,798		$149,067		$135,938		$275,023
Escalation									
PSMXX Total			$3,798		$149,067		$135,938		$275,023
REMXX-TG REMOVAL									
Engineering/Design	LT $								
Internal Construction	LT								
LT Total									
Employee Expenses	AE								
Outside Services	AO								
Contractor Labor	AO				$122,746		$122,746		$245,492
Vehicles (now in Indirects section)	AV								
Rents and Leases	BR								
REMXX Subtotal					$122,746		$122,746		$245,492
Escalation									
REMXX Total					$122,746		$122,746		$245,492
TSTXX-TG TEST									
Test / Field Engr. Labor (In House)	LT $								
Test / Comm. Engr. Labor (In House)	LT $								
Lead Commissioning Engr. (LCE) (Internal)	LT $								
Employee Expense	AE								
Test / Field Engr. Labor (contractor)	AO $				$177,300		$177,300		$354,600
Test / Comm. Engr. Labor (contractor)	AO $								
Lead Commissioning Engr. (LCE) (contactor)	AO $				$102,150		$34,050		$136,200
Vehicles (now in Indirects section)	AV								
TSTXX Subtotal					$279,450		$211,350		$490,800
Escalation					-				
TSTXX Total					$279,450		$211,350		$490,800
SUBTOTAL PROJECT DIRECT COST		-	$11,455		$1,307,676		$947,984		$2,183,317
Risk									
Risk					$110,000		$123,000		$233,000
					$ -		$ -		
					$ -		$ -		
Risk Total					$110,000		$123,000		$233,000
TOTAL PROJECT DIRECT COST (w risk)		-	$11,455		$1,317,676		$1,070,984		$2,416,317
INDIRECTS									
Non-Productive Time Allocation (ZNP)	17.0%		$1,495		$7,149		$6,075		$14,719
Payroll Benefits Allocation (ZPB) Incl NPT	30.0%				$8,172		$7,043		$15,215
Gen SVC CO Overhead (ZGS) Incl NPT	70.0%		$6,426		$15,372		$12,835		$34,633
E&S Allocations (ZES,ZEL,ZES)	35.0%		$15,562		$378,287		$340,835		$735,314
AG&E Allocations (ZAS)	1.4%		$1,018		$22,833		$18,684		$42,535
Stores Expense Allocation (ZST)	8.0%				$6,812		$979		$8,791
Lobby Stock									
MOEC (ZMI)	6.0%		$3,200		$63,927		$57,624		$124,751
Vehicles (ZME)	26.0%		$109		$11,775		$10,007		$21,891
Indirects Subtotal			$28,841		$516,127		$453,882		$996,850
TOTAL PROJECT COST - Direct & Indirect (excl AFUDC)			$40,096		$1,833,803		$1,544,866		$3,414,967
AFUDC									
AFUDC (ZII)			$2,222	7.00%	$67,145	7.00%	$64,731		$134,096
In Service Dollars / Land costs									
Cumulative ISS & Land Costs					-		-		
AFUDC Subtotal			$2,222		$67,145		$64,731		$134,096
TOTAL PROJECT COST - Baseline Budget			$42,318		$1,900,948		$1,609,597		$3,549,066
Contingency		-							
Contingency		-			$58,493		$46,159		$104,652
Other		-	$ -		$ -		$ -		
Contingency SubTotal					$58,493		$46,159		$104,652
TOTAL PROJECT COST - Approved Funding			$42,318		$1,959,441		$1,655,756		$3,653,717

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
1	[redacted]	Transformer Replacement (80136640)	05-Jul-22 A	25-Nov-25		0	854		
2		PROJECT PLANNING & FUNDING	01-Jun-23 A	03-Mar-25		-57	389		
3		T-Minus Milestones	16-Feb-24	03-Mar-25		-57	260		
4		Civil T-Minus Milestone	16-Feb-24	03-Sep-24		0	199		
5	AT1811	Detail Design/Engineering Completed		16-Feb-24		199	0	PM	
6	AT0805C	Civil IFC - Civil (BG) w/BOM		18-Apr-24		137	0	PM	
7	AT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		24-Apr-24		131	0	PM	
8	AT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		22-Jul-24		42	0	PM	
9	AT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		12-Aug-24		21	0	PM	
10	AT0801	ALL PERMITS RECEIVED		30-Aug-24		3	0	PM	
11	AT00	T-00 START OF CONSTRUCTION - Civil - Non Outage	03-Sep-24*			0	0	PM	
12		Electrical T-Milestones - Non- Outage	16-Feb-24	03-Sep-24		0	199		
13	BT1811	Detail Design/Engineering Completed		16-Feb-24		199	0	PM	
14	BT2404	ASSIGN LCE (LEAD COMMISSIONING ENGINEER)		23-Feb-24		192	0	ENG.S	
15	BT0805E	Elect IFC - Electrical (AG) w/Final BOM		18-Apr-24		137	0	PM	
16	BT1301	COMMISSIONING PLAN COMPLETE		18-Jun-24		76	0	PM	
17	BT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		22-Jul-24		42	0	PM	
18	BT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		12-Aug-24		21	0	PM	
19	BT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		02-Sep-24		0	0	PM	
20	BT00	T-00 START OF CONSTRUCTION - Elec Non-Outage 80131174	03-Sep-24*			0	0	PM	
21		Electrical T-Milestones - Outage	16-Feb-24	14-Nov-24		-73	272		
22	ET1811	Detail Design/Engineering Completed		16-Feb-24		199	0	PM	
23	ET2404	ASSIGN LCE (LEAD COMMISSIONING ENGINEER)		23-Feb-24		192	0	PM	
24	ET0805E	Elect IFC - Electrical (AG) w/Final BOM		18-Apr-24		137	0	PM	
25	ET1801	T-1801 ALL FIRM TOA APPLICATIONS DUE TO LCC - Elec		21-May-24*		-22	0	PM	
26	ET1301	COMMISSIONING PLAN COMPLETE		18-Jun-24		76	0	PM	
27	ET0814	ALL CONSTRUCTION CONTRACTS IN PLACE		29-Jul-24		35	0	PM	
28	ET0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		12-Aug-24		21	0	PM	
29	ET0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		02-Sep-24		0	0	PM	
30	ET00	T-00 START OF CONSTRUCTION - Elec Outage	03-Sep-24*			0	0	PM	
31	ET1805	T-18 NX9 Preliminary Ratings to LCC for New Equipment (transformers are considered 'NEW EQUIPMENT')		06-Sep-24*	4	-130	0	PM	
32	ET0301	T-03 NX9 THERMAL RATINGS TO LCC AND CONVEX		14-Nov-24*	7	-94	0	PM	
33		P&C T-Minus Milestones	16-Feb-24	03-Sep-24		0	199		
34	CT1811	Detail Design/Engineering Completed		16-Feb-24		199	0	PM	
35	CT0805PC	P&C IFC - P&C w/BOM		18-Apr-24		137	0	PM	
36	CT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		24-Apr-24		131	0	PM	
37	CT1202	P/C DESCRIPTION / DRAFT OPERATING INSTRUCTIONS ISSUED		02-May-24		123	0	PM	
38	CT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		29-Jul-24		35	0	PM	
39	CT0404	ALL FINAL RELAY PROTECTIVE SETTING ISSUED		02-Aug-24		31	0	PM	
40	CT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		12-Aug-24		21	0	PM	
41	CT00	T-00 - P&C START OF CONSTRUCTION - WO#	03-Sep-24*			0	0	PM	
42		66MX Mobile Transformer	21-May-24	03-Sep-24		0	71		
43	DT1801	T-1801 ALL FIRM TOA APPLICATIONS DUE TO LCC (for DISTRIBUTION Non-transformer equipment)- MOBILE TRANSFORMER		21-May-24*		-22	0	PM	
44	DT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		01-Aug-24		32	0	PM	
45	DT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE) - Mobile Transformer		12-Aug-24		21	0	PM	
46	DT00	T-00 Start of Construction - Mobile Transformer - outage?	03-Sep-24*			0	0	PM	
47		5L-1X Transformer T-Milestones	16-Feb-24	03-Mar-25		-85	381		

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
48	FT1811	Detail Design/Engineering Completed		16-Feb-24		296	0	PM	
49	FT2404	ASSIGN LCE (LEAD COMMISSIONING ENGINEER)		23-Feb-24		289	0	PM	
50	FT0805E	Elect IFC - Electrical (AG) w/Final BOM		18-Apr-24		234	0	PM	
51	FT1301	COMMISSIONING PLAN COMPLETE		18-Jun-24		173	0	PM	
52	FT1801	T-1801 ALL FIRM TOA APPLICATIONS DUE TO LCC - FOR NEW 1X TRANSFORMER		26-Jul-24*		9	0	PM	
53	FT0814	ALL CONSTRUCTION CONTRACTS IN PLACE		29-Jul-24		132	0	PM	
54	FT0203	CAN COMPLETE (CONSTRUCTION AUTHORIZATION NOTICE)		12-Aug-24		118	0	PM	
55	FT1805	T-18 NX9 Preliminary Ratings to LCC for New Equipment (transformers are considered 'NEW EQUIPMENT')		06-Sep-24*	1	-205	0	PM	
56	FT0301	T-03 NX9 THERMAL RATINGS TO LCC AND CONVEX		14-Nov-24*		3	0	PM	
57	FT00	T-00 START OF CONSTRUCTION - outage - 80136640	09-Dec-24*			0	0	PM	
58	FT0401	ALL MATERIAL RECEIVED, STAGED, INVENTORIED, REVIEWED		03-Mar-25	8	-85	0	PM	
59	**Project Funding**		14-Aug-23 A	04-Apr-24		111	162		
60	**Full Funding**		14-Aug-23 A	04-Apr-24		111	162		
61	**PAF - FF**		14-Aug-23 A	05-Feb-24		-46	120		
62	DE1600	Create Planning Grade Estimate (+/-25% Full Funding)	14-Aug-23 A	22-Jan-24		-46	10	ENG.A	[redacted]
63	PAFF2000	Submit Full Funding PAF for Internal Review	23-Jan-24	29-Jan-24		-46	5	ENG.A	
64	PAFF2100	Incorporate Internal Review Comments & Submit Full Funding PAF to EPAC for Review	30-Jan-24	05-Feb-24		-46	5	ENG.A	
65	**EPAC - FF**		14-Feb-24	22-Feb-24		-46	5		
66	PAFF2110	EPAC Full Funding Meeting		14-Feb-24		-46	0	IP	
67	PAFF2200	Incorporate EPAC Full Funding PAF Review Comments	15-Feb-24	22-Feb-24		-46	5	PM	[redacted]
68	FF1000	EPAC Full Funding Approval		22-Feb-24		-46	0	PM	
69	**Power Plan - FF**		23-Feb-24	07-Mar-24		-46	10		
70	FF1010	Full Funding PowerPlan Approval	23-Feb-24	07-Mar-24		-46	10	IP	Eversource Project Approval Committee
71	**Full Funding Schedule Baseline Acknowledgement - FF**		08-Mar-24	04-Apr-24		111	20		
72	FFB_01	Scheduler Issues FF Schedule to PM/AM for EPAC Mtg & Snaps FF Baseline	08-Mar-24	14-Mar-24		111	5	TEPS	[redacted]
73	FFB_03	Scheduler Issues FF Baseline for Reviews/Acknowledgement by Key Parties	15-Mar-24	21-Mar-24		111	5	TEPS	
74	FFB_04A	Review and Acknowledgement of FF Baseline - PM	22-Mar-24	28-Mar-24		111	5	PM	
75	FFB_04B	Review and Acknowledgement of FF Baseline - SS Eng	22-Mar-24	28-Mar-24		111	5	ENG.S	
76	FFB_04C	Review and Acknowledgement of FF Baseline - Civ Eng	22-Mar-24	28-Mar-24		111	5	ENG.S	
77	FFB_04D	Review and Acknowledgement of FF Baseline - P&C Eng	22-Mar-24	28-Mar-24		111	5	ENG.S	
78	FFB_04E	Review and Acknowledgement of FF Baseline - OH Line Eng	22-Mar-24	28-Mar-24		111	5	ENG.S	
79	FFB_04F	Review and Acknowledgement of FF Baseline - UG Line Eng	22-Mar-24	28-Mar-24		111	5	ENG.S	
80	FFB_04H	Review and Acknowledgement of FF Baseline - LTRC	22-Mar-24	28-Mar-24		111	5	ENG.S	
81	FFB_04I	Review and Acknowledgement of FF Baseline - Permitting	22-Mar-24	28-Mar-24		111	5	PERMI	
82	FFB_04K	Review and Acknowledgement of FF Baseline - LCE	22-Mar-24	28-Mar-24		111	5	ENG.S	
83	FFB_04L	Review and Acknowledgement of FF Baseline - Con Rep	22-Mar-24	28-Mar-24		111	5	CONS	
84	FFB_04M	Review and Acknowledgement of FF Baseline - Mtls Coord	22-Mar-24	28-Mar-24		111	5	PURC	
85	FFB_10	FF Baseline Acknowledgement Rec'd <Comments Addressed / FF Baseline Set / Schedule Issued>	29-Mar-24	04-Apr-24		111	5	TEPS	
86	**Project Management**		01-Jun-23 A	12-Aug-24		21	229		
87	**Compliance Authorization Notification**		30-Jul-24	12-Aug-24		14	10		
88	1170	Prepare CAN (Construction Authorization Notice) - Civil work	30-Jul-24	12-Aug-24		14	10	PM	[redacted]
89	**Outage Permits / TOAs Request**		17-May-24	26-Jul-24		9	71		
90	3620	Construction Rep SUBMIT OUTAGE REQUESTS for Mobile Transformer (18 weeks before outage)	17-May-24	21-May-24		-22	5	CONS	[redacted]
91	3630	Construction Rep SUBMIT OUTAGE REQUESTS for NEW 1X Transformer (18 weeks before outage)	22-Jul-24*	26-Jul-24		9	5	CONS	
92	**Temporary Feeder Rerouting by Distribution**		01-Jun-23 A	31-May-24		71	179		
93	A3700	Distribution Engineering for Temporary Feeder	15-Sep-23 A	17-Jan-24		122	73	PM	
94	A3710	Distribution Material Procurement for Temporary Feeder	01-Jun-23 A	31-Jan-24		112	41	PM	
95	A3720	Distribution Construction for Temporary Feeder	01-Apr-24*	31-May-24		71	44	PM	

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
96		**SITING APPROVALS / PERMITS / PROJECT SERVICES**	05-Jul-22 A	30-Aug-24		7	545		[redacted]
97		**State Approvals and Permits**	06-May-24	30-Aug-24		0	83		
98		**Siting Council / Board**	06-May-24	30-Aug-24		0	83		
99	3570	Develop and Approve Exempt Mod for Sitting Council	06-May-24*	03-Jun-24		3	20	SITING	
100	3610	Siting Council - Exempt Mod - 45 Days	17-Jul-24*	30-Aug-24		3	45	SITING	
101		**Compliance Matrices - Regulatory Commitments**	05-Jul-22 A	29-Jul-24		14	432		
102	1230	Prepared Compliance Matrices - Regulatory	05-Jul-22 A	29-Jul-24		14	432	PM	
103		**Compliance Matrices - Non Regulatory Commitments**	05-Jul-22 A	29-Jul-24		14	432		
104	1220	Prepared Compliance Matrices - Non-Regulatory (Commitments)	05-Jul-22 A	29-Jul-24		14	432	PM	
105		**Project Services (Outreach)**	04-Jun-24	16-Jul-24		40	30		
106	3590	Outreach Activities	04-Jun-24	01-Jul-24		50	20	SITING	
107	A3610	Town Modification Letter - if needed	04-Jun-24	16-Jul-24		3	30	SITING	
108		**ENGINEERING DETAILED / IFC DESIGN**	23-Jun-23 A	14-Nov-24		-40	356		
109		**Civil Engineering**	23-Jun-23 A	18-Apr-24		14	211		
110		**Civil Engineering Detailed Design**	23-Jun-23 A	16-Feb-24		-33	168		
111	CE1200	Vendor Engineer Develop Civil Substation Detail Design	23-Jun-23 A	29-Jan-24		-33	51	ENG.S	
112	CE1210	ES Engineering Review Civil Substation Detail Design	30-Jan-24	16-Feb-24		-33	14	ENG.S	
113		**Civil Engineering IFC Design**	20-Feb-24	18-Apr-24		14	43		
114	CE1300	Vendor Engineer Develop Civil Substation IFC	20-Feb-24	21-Mar-24		14	23	ENG.S	
115	CE1310	ES Engineering Review Civil Substation IFC	22-Mar-24	18-Apr-24		14	20	ENG.S	
116		**Electrical Engineering**	23-Jun-23 A	14-Nov-24		-44	356		
117		**Electrical Engineering Detailed Design**	23-Jun-23 A	16-Feb-24		-143	168		
118	EE1200	Vendor Engineer Develop Electrical Substation Detail Design	23-Jun-23 A	29-Jan-24	1	-143	51	ENG.S	
119	EE1210	ES Engineering Review Electrical Substation Detail Design	30-Jan-24	16-Feb-24	1	-143	14	ENG.S	
120		**Thermal Ratings - Non NX-9 Thermal Ratings**	20-Feb-24	18-Mar-24		124	20		
121	NX9A-EM44	Thermal Rating- Non NX9 - P&C Develops and Provides LTRC with P&C Checklist & Thermal Ratings Data	20-Feb-24	26-Feb-24		124	5	ENG.S	
122	NX9A-EM54	Thermal Rating- Non NX9 -LTRC Prepares and Sends Thermal Rating Data for TRC Review	27-Feb-24	04-Mar-24		124	5	ENG.S	
123	NX9A-EM64	Thermal Rating- Non NX9 -TRC Reviews and Approves Thermal Rating Data	05-Mar-24	11-Mar-24		124	5	ENG.S	
124	NX9A-EM74	Thermal Rating- Non NX9 -LTRC Files Capability Sheets	12-Mar-24	18-Mar-24		124	5	ENG.S	
125		**Electrical Engineering NX-9**	20-Feb-24	14-Nov-24		-65	188		
126		**Substation Thermal Rating NX-9**	20-Feb-24	14-Nov-24		-65	188		
127		**Substation NX9 for New Construction - Mobile Transformer 66mX**	20-Feb-24	14-Nov-24		-65	188		
128		**Substation - Preliminary Thermal Data - Mobile Transformer 66mX**	20-Feb-24	06-Sep-24		-143	141		
129	NX9A-NC01	PE Updates 1-Line Nomenclature Dwgs & Complete PE Checklist M7-EN-3006.2 - e-mail link to project team & CONVEX	20-Feb-24	26-Feb-24	1	-143	5	ENG.S	
130	NX9A-NC03	LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line Nomenclature	27-Feb-24	04-Mar-24	1	-143	5	ENG.S	
131	NX9A-NC05	LTRC Submits 1-Line Nomenclature to TRC	05-Mar-24	11-Mar-24	1	-143	5	ENG.S	
132	NX9A-NC07	LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal Ratings	10-Jul-24	16-Jul-24	1	-143	5	ENG.S	
133	NX9A-NC09	LTRC Requests P&C Checklist	17-Jul-24	23-Jul-24	1	-143	5	ENG.S	
134	NX9A-NC11	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	24-Jul-24	30-Jul-24	1	-143	5	ENG.S	
135	NX9A-NC13	LTRC Reviews and Sends Thermal Rating Data for TRC Review	31-Jul-24	06-Aug-24	1	-143	5	ENG.S	
136	NX9A-NC15	TRC Reviews and Approves Thermal Rating Data	07-Aug-24	13-Aug-24	1	-143	5	ENG.A	
137	NX9A-NC17	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	14-Aug-24	20-Aug-24	1	-143	5	ENG.S	
138	NX9A-NC18	TRC Confirms Engineering Management Approvals of NX-9	21-Aug-24	27-Aug-24	1	-143	5	ENG.S	
139	NX9A-NC19	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	28-Aug-24	28-Aug-24	1	-143	1	TEPS	
140	NX9A-NC21	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	29-Aug-24	05-Sep-24	1	-143	5	ENG.A	
141	NX9A-NC23	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-18, EquipDOE, Revs DOE per M7-EN-3006- Mobile	06-Sep-24	06-Sep-24	1	-143	1	TEPS	
142		**Substation - Verify Thermal Data - Mobile Transformer 66mX**	09-Sep-24	14-Nov-24		-65	47		

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
143	NX9A-NC31	PE to Verify Thermal Data Review PE Chectlist (M7-EN-3006.2)	09-Sep-24	13-Sep-24	7	-65	5	ENG.S	[redacted]
144	NX9A-NC33	LTRC Reviews and Makes "GO / NO-GO" Decision	16-Sep-24	20-Sep-24	7	-65	5	ENG.S	
145	NX9A-NC35	LTRC Requests P&C Checklist	23-Sep-24	27-Sep-24	7	-65	5	ENG.S	
146	NX9A-NC37	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	30-Sep-24	04-Oct-24	7	-65	5	ENG.S	
147	NX9A-NC39	LTRC Reviews and Sends Thermal Rating Data for TRC Review	07-Oct-24	11-Oct-24	7	-65	5	ENG.S	
148	NX9A-NC41	TRC Reviews and Approves Thermal Rating Data	15-Oct-24	21-Oct-24	7	-65	5	ENG.Al	
149	NX9A-NC43	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	22-Oct-24	28-Oct-24	7	-65	5	ENG.S	
150	NX9A-NC44	TRC Confirms Engineering Management Approvals of NX-9	29-Oct-24	04-Nov-24	7	-65	5	ENG.S	
151	NX9A-NC45	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	05-Nov-24	05-Nov-24	7	-65	1	TEPS	
152	NX9A-NC47	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	06-Nov-24	13-Nov-24	7	-65	5	ENG.Al	
153	NX9A-NC49	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, EquipDOE, Revs DOE per M7-EN-3006- Mobile	14-Nov-24	14-Nov-24	7	-65	1	TEPS	
154	**Substation NX-9 for Equipment Modification - New 1X XFMR**		20-Feb-24	06-Sep-24		-18	141		
155	**Substation NX-9 - Equipment Modification - New 1X XFMR**		20-Feb-24	06-Sep-24		-18	141		
156	NX9A-EM01	PE Updates 1-Line Nomenclature Dwgs & Complete PE Checklist M7-EN-3006.2 - e-mail link to project team & CONVEX	20-Feb-24	26-Feb-24		-18	5	ENG.S	
157	NX9A-EM04	LTRC Reviews and Makes "GO / NO-GO" Decision for 1-Line Nomenclature	27-Feb-24	04-Mar-24		-18	5	ENG.S	
158	NX9A-EM07	LTRC Submits1-Line Nomenclature to TRC	05-Mar-24	11-Mar-24		-18	5	ENG.S	
159	NX9A-EM10	LTRC Reviews and Makes "GO / NO-GO" Decision for Thermal Ratings	10-Jul-24	16-Jul-24		-18	5	ENG.S	
160	NX9A-EM13	LTRC Requests P&C Checklist	17-Jul-24	23-Jul-24		-18	5	ENG.S	
161	NX9A-EM16	P&C Develops and Provides LTRC with P&C Checklist (M7-EN-3006.1)	24-Jul-24	30-Jul-24		-18	5	ENG.S	
162	NX9A-EM19	LTRC Reviews and Sends Thermal Rating Data for TRC Review	31-Jul-24	06-Aug-24		-18	5	ENG.S	
163	NX9A-EM22	TRC Reviews and Approves Thermal Rating Data	07-Aug-24	13-Aug-24		-18	5	ENG.Al	
164	NX9A-EM25	LTRC Sends Thermal Rating Data for Approval & Submit to NURS	14-Aug-24	20-Aug-24		-18	5	ENG.S	
165	NX9A-EM26	TRC Confirms Engineering Management Approvals of NX-9	21-Aug-24	27-Aug-24		-18	5	ENG.S	
166	NX9A-EM28	Scheduler @ NURS email "Submitted for PP Review" - Updates NURS with DOE	28-Aug-24	28-Aug-24		-18	1	TEPS	
167	NX9A-EM31	TRC Review and Submit NX-9 Data to LCC + ISO-NE for S/S Thermal Rating	29-Aug-24	05-Sep-24		-18	5	ENG.Al	
168	NX9A-EM34	Scheduler @ NURS email "Submitted for DOE Monitoring" - Updates T-3, EquipDOE, Revs DOE per M7-EN-3006- 1X	06-Sep-24	06-Sep-24		-18	1	TEPS	
169	**Outage & Energization Plan**		19-Apr-24	16-May-24		74	20		
170	EE920	Operating Instructions - SSED Review Draft Convex OI	19-Apr-24	02-May-24		84	10	ENG.S	
171	EE460	Operating Instructions - SSED Review Draft Distribution OI	19-Apr-24	02-May-24		84	10	ENG.S	
172	CSD1000	PE Initiate CASCADE Forms (Appendix A) for Construction Package	19-Apr-24	16-May-24		-16	20	ENG.S	
173	**Electrical Engineering IFC Design**		20-Feb-24	18-Apr-24		-16	43		
174	EE1300	Vendor Engineer Develop Electrical Substation IFC	20-Feb-24	21-Mar-24		-16	23	ENG.S	
175	EE1310	ES Engineering Review Electrical Substation IFC	22-Mar-24	18-Apr-24		-16	20	ENG.S	
176	**P&C Engineering**		23-Jun-23 A	02-Aug-24		31	285		
177	**P&C Engineering Detailed Design**		23-Jun-23 A	18-Apr-24		105	211		
178	PC1100	Vendor Engineer Develop P&C Detail Design	23-Jun-23 A	29-Jan-24		-33	51	ENG.S	
179	OP1010	P&C Validation of PAF's Initial Assessment Go/No-Go	06-Feb-24	07-Feb-24		139	2	ENG.S	
180	PC1110	ES Engineering Review P&C Detail Design	30-Jan-24	16-Feb-24		-33	14	ENG.S	
181	CSD1030	PE Initiate CASCADE Forms (Appendix A) for Construction Package	12-Apr-24	18-Apr-24		105	5	ENG.S	
182	**P&C Relay Settings Development**		31-May-24	02-Aug-24		0	45		
183	PC8570	Complete P&C Relay Settings Remote End Line S1 x2	31-May-24*	02-Aug-24		0	45	ENG.S	
184	PC8580	Complete P&C Relay Settings Remote End Line S2 x2	31-May-24*	02-Aug-24		0	45	ENG.S	
185	PC8590	Vendor review and Submit all IFR Settings - except Remote Ends	31-May-24*	02-Aug-24		0	45	ENG.S	
186	**P&C Engineering OP-24**		08-Feb-24	14-Feb-24		139	5		
187	OP1020	P&C Updates OP-24 Appendix B	08-Feb-24	13-Feb-24		139	4	ENG.S	
188	OP1030	P&C Submits OP-24 Appendix B to ISO-NE	14-Feb-24	14-Feb-24		139	1	ENG.S	
189	**P&C Engineering IFC Design**		20-Feb-24	11-Jul-24		43	101		
190	PC1320	Vendor Engineer Creates SDS	20-Feb-24	21-Mar-24		29	23	ENG.S	

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
191	PC1330	ES Engineering Reviews and Issues SDS	22-Mar-24	18-Apr-24		29	20	ENG.S	[redacted]
192	**P&C DFR Design**		08-Mar-24	11-Jul-24		43	88		
193	DFR1060	DFR Pts Identified		08-Mar-24		73	0	ENG.S	
194	DFR1040	Verify CASCADE Forms Exists for S/S DFR, if not then Initiate Form	19-Apr-24	23-Apr-24		43	3	ENG.S	
195	DFR1000	Verify DFR Calibration is Required	24-Apr-24	24-Apr-24		43	1	ENG.S	
196	DFR1010	P&C Prepare Configuration for DFRs	21-Jun-24	27-Jun-24		43	5	ENG.S	
197	DFR1020	Peer Review and Comment DFR Configuration	28-Jun-24	05-Jul-24		43	5	ENG.S	
198	DFR1030	P&C Issue Configuration For DFR	08-Jul-24	10-Jul-24		43	3	ENG.S	
199	DFR1050	DFR Config Complete	11-Jul-24	11-Jul-24		43	1	ENG.S	
200	**Lead Commissioning Engineer**		20-Feb-24	18-Jun-24		52	85		
201	**LCE Commissioning Plan**		20-Feb-24	18-Jun-24		52	85		
202	LCE100	PM to Request Lead Commissioning Engineer GO/NO-GO {Preliminary or Detail design is often the predecessor}	20-Feb-24*	21-Feb-24		91	2	PM	
203	LCE200	Assign Lead Commissioning Engineer	22-Feb-24	23-Feb-24		91	2	ENG.S	
204	LCE400	Develop Test and Commissioning Plan	19-Apr-24	17-May-24		52	21	TEST	
205	LCE500	LCE Review and Approve Vendor's Test and Commissioning Plan	20-May-24	18-Jun-24		52	21	ENG.S	
206	**PROCUREMENT LONG LEAD MATERIAL**		22-Oct-22 A	03-Mar-25		186	350		
207	**Electrical Long Lead Material**		22-Oct-22 A	03-Mar-25		186	350		
208	**Low Side Disconnect Switch**		04-Mar-24	27-Aug-24		3	125		
209	MATL380	DISCONNECT SWITCHES - Prepare & Issue DR	04-Mar-24*	15-Mar-24		4	10	ENG.S	
210	MATL390	DISCONNECT SWITCHES - Procurement Issue PO	16-Mar-24	25-Mar-24		6	10	PURC	
211	MATL370	DISCONNECT SWITCHES - Material Vendor Delivery Leadtime	26-Mar-24	26-Aug-24		6	154	PURC	
212	MATL360	DISCONNECT SWITCHES - Confirm Material Delivery to Site	27-Aug-24	27-Aug-24		6	1	PURC	
213	**Low Side Transformer Breaker**		26-Jun-23 A	04-Nov-24		265	223		
214	MATL180	LS TRANSFORMER BREAKER- Prepare & Issue DR	08-Mar-24*	21-Mar-24		416	10	ENG.S	
215	MATL190	LS TRANSFORMER BREAKER - Procurement Issue PO	22-Mar-24	31-Mar-24		604	10	PURC	
216	MATL170	LS TRANSFORMER BREAKER - Material Vendor Delivery Leadtime	26-Jun-23 A	03-Nov-24		34	308	PURC	
217	MATL160	LS TRANSFORMER BREAKER - Confirm Material Delivery to Site	04-Nov-24	04-Nov-24		34	1	PURC	
218	**Arresters**		08-Mar-24	02-Sep-24		0	124		
219	MATL140	ARRESTERS - Prepare & Issue DR	08-Mar-24*	21-Mar-24		0	10	ENG.S	
220	MATL150	ARRESTERS - Procurement Issue PO	22-Mar-24	31-Mar-24		0	10	PURC	
221	MATL130	ARRESTERS - Material Vendor Delivery Leadtime	01-Apr-24	01-Sep-24		0	154	PURC	
222	MATL120	ARRESTERS - Confirm Material Delivery to Site	02-Sep-24	02-Sep-24		0	1	PURC	
223	**High Side MOD**		08-Mar-24	02-Sep-24		0	124		
224	MATL260	HIGH SIDE MOD - Prepare & Issue DR	08-Mar-24*	21-Mar-24		0	10	ENG.S	
225	MATL270	HIGH SIDE MOD - Procurement Issue PO	22-Mar-24	31-Mar-24		0	10	PURC	
226	MATL250	HIGH SIDE MOD - Material Vendor Delivery Leadtime	01-Apr-24	01-Sep-24		0	154	PURC	
227	MATL240	HIGH SIDE MOD - Confirm Material Delivery to Site	02-Sep-24	02-Sep-24		0	1	PURC	
228	**Relays**		08-Mar-24	05-Aug-24		19	105		
229	MATL220	RELAYS - Prepare & Issue DR	08-Mar-24*	21-Mar-24		20	10	ENG.S	
230	MATL230	RELAYS - Procurement Issue PO	22-Mar-24	31-Mar-24		28	10	PURC	
231	MATL210	RELAYS - Material Vendor Delivery Leadtime	01-Apr-24	04-Aug-24		28	126	PURC	
232	MATL200	RELAYS - Confirm Material Delivery to Site	05-Aug-24	05-Aug-24		28	1	PURC	
233	**Reclosers (Form 6)**		01-Apr-24	27-Aug-24		3	105		
234	MATL460	RECLOSERS (FORM 6) - Prepare & Issue DR	01-Apr-24*	12-Apr-24		4	10	ENG.S	
235	MATL470	RECLOSERS (FORM 6) - Procurement Issue PO	13-Apr-24	22-Apr-24		6	10	PURC	
236	MATL450	RECLOSERS (FORM 6) - Material Vendor Delivery Leadtime	23-Apr-24	26-Aug-24		6	126	PURC	
237	MATL440	RECLOSERS (FORM 6) - Confirm Material Delivery to Site	27-Aug-24	27-Aug-24		6	1	PURC	

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
238	**High Side Circuit Switcher**		06-Nov-23 A	03-Mar-25		-85	484		
239	MATL290	HIGH SIDE CIRCUIT SWITCHER - Material Vendor Delivery Leadtime PO 13185771	06-Nov-23 A	02-Mar-25	8	-85	476	PURC	
240	MATL280	HIGH SIDE CIRCUIT SWITCHER - Confirm Material Delivery to Site	03-Mar-25	03-Mar-25	8	-85	1	PURC	
241	**1X TRANSFORMER**		22-Oct-22 A	02-Dec-24		6	423		
242	TRANS-1070	TRANS-MATERIAL - ABB Transformer - Material Vendor Delivery Leadtime	22-Oct-22 A	01-Dec-24		6	365	PURC	
243	TRANS-570	TRANS-MATERIAL - ABB Transformer - Confirm Material Delivery to Site	02-Dec-24	02-Dec-24		6	1	PURC	
244	**Temporary Transformer**		29-Jul-24	01-Aug-24		21	4		
245	A3615	Mobile XFMR and mobile circuit switcher Delivery & on site - 66MX to be assigned or maybe 76	29-Jul-24*	01-Aug-24		21	4	CONS	
246	**PROCUREMENT MATERIAL - BALANCE OF MATERIAL**		08-Mar-24	24-Apr-24		90	34		
247	**Civil Balance of Material**		08-Mar-24	24-Apr-24		90	34		
248	CE500	MATERIAL - CIVIL - Prepare & Issue DR	08-Mar-24*	14-Mar-24		91	5	ENG.S	
249	CE1040	MATERIAL - CIVIL - Procurement Issue PO	15-Mar-24	24-Mar-24		131	10	PURC	
250	CE1050	MATERIAL - CIVIL - Material Vendor Delivery Leadtime	25-Mar-24	23-Apr-24		131	30	PURC	
251	CE560	MATERIAL - CIVIL - Confirm Material Delivery to Site	24-Apr-24	24-Apr-24		131	1	PURC	
252	**Electrical Balance of Material**		08-Mar-24	24-Apr-24		-47	34		
253	EE520	MATERIAL - Electrical - Prepare & Issue DR	08-Mar-24*	14-Mar-24		-46	5	ENG.S	
254	EE1020	MATERIAL - Electrical - Procurement Issue PO	15-Mar-24	24-Mar-24		-66	10	PURC	
255	EE1030	MATERIAL - Electrical - Material Vendor Delivery Leadtime	25-Mar-24	23-Apr-24		-66	30	PURC	
256	EE550	MATERIAL - Electrical - Confirm Material Delivery to Site	24-Apr-24	24-Apr-24		-66	1	PURC	
257	**P&C Balance of Material**		08-Mar-24	24-Apr-24		90	34		
258	PC510	MATERIAL - P&C - Prepare & Issue DR	08-Mar-24*	14-Mar-24		91	5	ENG.S	
259	PC980	MATERIAL - P&C - Procurement Issue PO	15-Mar-24	24-Mar-24		131	10	PURC	
260	PC1000	MATERIAL - P&C - Material Vendor Delivery Leadtime	25-Mar-24	23-Apr-24		131	30	PM	
261	PC1010	MATERIAL - P&C - Confirm Material Delivery to Site	24-Apr-24	24-Apr-24		131	1	PM	
262	**PROCUREMENT OF SERVICE CONTRACTS**		08-Mar-24	29-Jul-24		21	100		
263	**Constructor of Choice - Direct Award or Bid - Phase 1**		08-Mar-24	22-Jul-24		19	95		
264	3550	STAFFING DECISION -CONSTRUCTION: EVERSOURCE OR OUTSOURCE BID/COC - PH1	08-Mar-24*	14-Mar-24		44	5	PM	
265	**CONSTRUCTION SERVICES - CONTRACTOR OF CHOICE**		19-Apr-24	07-Jun-24		49	35		
266	3390	CONST.SERVICES - COC - Eversource Provides Spec / RFQ to COC	19-Apr-24	25-Apr-24		49	5	PURC	
267	3400	CONST.SERVICES - COC - COC Evaluates Spec and Provides Quote	26-Apr-24	09-May-24		49	10	CONTR	
268	3410	CONST.SERVICES - COC - Eversource Reviews Quote from COC	10-May-24	23-May-24		49	10	ENG	
269	3420	CONST.SERVICES - COC - Eversource Awards Contract - PO Issued - PH1	24-May-24	07-Jun-24		49	10	PURC	
270	**CONSTRUCTION SERVICES - BID PROCESS**		19-Apr-24	22-Jul-24		19	65		
271	3430	CONST.SERVICES - BID - Eversource provide Spec / RFP	19-Apr-24	09-May-24		19	15	PURC	
272	3440	CONST.SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	10-May-24	31-May-24		19	15	CONS	
273	3450	CONST.SERVICES - BID - Eversource reviews contractor proposals	03-Jun-24	21-Jun-24		19	15	ENG	
274	3460	CONST.SERVICES - BID - Contract is Awarded - PO Issued - PH1	24-Jun-24	22-Jul-24		19	20	PURC	
275	**Constructor of Choice - Direct Award or Bid - Phase 2 Civil**		08-Mar-24	22-Jul-24		19	95		
276	3840	STAFFING DECISION -CONSTRUCTION: EVERSOURCE OR OUTSOURCE BID/COC - PH2	08-Mar-24*	14-Mar-24		44	5	PM	
277	**CONSTRUCTION SERVICES - CONTRACTOR OF CHOICE**		19-Apr-24	07-Jun-24		49	35		
278	3760	CONST.SERVICES - COC - Eversource Provides Spec / RFQ to COC	19-Apr-24	25-Apr-24		49	5	PURC	
279	3770	CONST.SERVICES - COC - COC Evaluates Spec and Provides Quote	26-Apr-24	09-May-24		49	10	CONTR	
280	3780	CONST.SERVICES - COC - Eversource Reviews Quote from COC	10-May-24	23-May-24		49	10	ENG	
281	3790	CONST.SERVICES - COC - Eversource Awards Contract - PO Issued - PH2	24-May-24	07-Jun-24		49	10	PURC	
282	**CONSTRUCTION SERVICES - BID PROCESS**		19-Apr-24	22-Jul-24		19	65		
283	3800	CONST.SERVICES - BID - Eversource provide Spec / RFP	19-Apr-24	09-May-24		19	15	PURC	
284	3810	CONST.SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	10-May-24	31-May-24		19	15	CONS	

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
285	3820	CONST.SERVICES - BID - Eversource reviews contractor proposals	03-Jun-24	21-Jun-24		19	15	ENG	[redacted]
286	3830	CONST.SERVICES - BID - Contract is Awarded - PO Issued - PH2	24-Jun-24	22-Jul-24		19	20	PURC	
287	**Constructor of Choice - Direct Award or Bid - Phase 2 Electric**		19-Apr-24	29-Jul-24		14	70		
288	3750	STAFFING DECISION -CONSTRUCTION: EVERSOURCE OR OUTSOURCE BID/COC - PH2	19-Apr-24*	25-Apr-24		14	5	PM	
289	**CONSTRUCTION SERVICES - CONTRACTOR OF CHOICE**		26-Apr-24	14-Jun-24		44	35		
290	3670	CONST.SERVICES - COC - Eversource Provides Spec / RFQ to COC	26-Apr-24	02-May-24		44	5	PURC	
291	3680	CONST.SERVICES - COC - COC Evaluates Spec and Provides Quote	03-May-24	16-May-24		44	10	CONTR	
292	3690	CONST.SERVICES - COC - Eversource Reviews Quote from COC	17-May-24	31-May-24		44	10	ENG	
293	3700	CONST.SERVICES - COC - Eversource Awards Contract - PO Issued - PH2	03-Jun-24	14-Jun-24		44	10	PURC	
294	**CONSTRUCTION SERVICES - BID PROCESS**		26-Apr-24	29-Jul-24		14	65		
295	3710	CONST.SERVICES - BID - Eversource provide Spec / RFP	26-Apr-24	16-May-24		14	15	PURC	
296	3720	CONST.SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	17-May-24	07-Jun-24		14	15	CONS	
297	3730	CONST.SERVICES - BID - Eversource reviews contractor proposals	10-Jun-24	28-Jun-24		14	15	ENG	
298	3740	CONST.SERVICES - BID - Contract is Awarded - PO Issued - PH2	01-Jul-24	29-Jul-24		14	20	PURC	
299	**Testing Service - Direct Award or Bid**		08-Mar-24	10-Jun-24		55	66		
300	1010	STAFFING DECISION:TEST:EVERSOURCE OR OUTSOURCE BID/COC	08-Mar-24*	08-Mar-24		55	1	PM	
301	**TEST SERVICES - CONTRACTOR OF CHOICE**		11-Mar-24	26-Apr-24		78	35		
302	TSCOC100	TEST SERVICES - COC - Eversource Provides Spec / RFQ to COC	11-Mar-24	15-Mar-24		78	5	PURC	
303	TSCOC200	TEST SERVICES - COC - COC Evaluates Spec and Provides Quote	18-Mar-24	29-Mar-24		78	10	PURC	
304	TSCOC300	TEST SERVICES - COC - Eversource Reviews Quote from COC	01-Apr-24	12-Apr-24		78	10	PURC	
305	TSCOC400	TEST SERVICES - COC - Eversource Awards Contract - PO Issued	15-Apr-24	26-Apr-24		78	10	PURC	
306	**TEST SERVICES - BID PROCESS**		11-Mar-24	10-Jun-24		55	65		
307	TSBID100	TEST SERVICES - BID - Eversource provide Spec / RFP	11-Mar-24	29-Mar-24		55	15	PURC	
308	TSBID200	TEST SERVICES - BID - Contractors Evaluate RFP and Provide Proposal	01-Apr-24	19-Apr-24		55	15	PURC	
309	TSBID300	TEST SERVICES - BID - Eversource reviews contractor proposals	22-Apr-24	10-May-24		55	15	PURC	
310	TSBID400	TEST SERVICES - BID - Eversource awards contract - PO Issued	13-May-24	10-Jun-24		55	20	PURC	
311	**CONSTRUCTION**		02-Aug-24	31-May-25		6	207		
312	CSM	Construction Start Milestone	03-Sep-24			9	0	CONS	
313	DOE- Mobile	DOE - Mobile		04-Feb-25		125	0	CONS	
314	DOE-1X	DOE - 1X		29-May-25		11	0	CONS	
315	CFM	Construction Finish Milestone		31-May-25		9	0	CONS	
316	ISD	EQUIPMENT IN SERVICE DATE (requires FOOB constraint)		31-May-25*		-1	0	PM	
317	**Outages**		09-Dec-24	31-May-25		9	174		
318	TOA-Test	OUTAGE / cutover to Mobile	09-Dec-24	17-Jan-25		143	40	TEST	
319	TOA-Const	OUTAGE / test 1X	28-Jan-25	31-May-25*		-1	124	CONS	
320	**Construction Support LOEs**		03-Sep-24	31-May-25		6	186		
321	ConRep-S20	Construction Rep SS Swithgear	03-Sep-24	13-Nov-24		136	50	CONS	
322	1070	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH OUT	28-Jan-25	28-Jan-25		122	1	CONS	
323	ConRep-S	RESOURCE ONLY ACTIVITY - CONSTRUCTION - CONSTRUCTION REP	03-Sep-24	31-May-25		9	271	CONS	
324	1080	RESOURCE ONLY ACTIVITY - CONSTRUCTION - SWITCH IN	31-May-25	31-May-25		-1	1	CONS	
325	CONSTelec	RESOURCE ONLY ACTIVITY - CONSTRUCTION - ELECTRICIAN	03-Sep-24	31-May-25		9	271	ENG.S	
326	**Substation - NX-9 Pre NX9-DOE - Mobile Transformer 66mX**		03-Feb-25	03-Feb-25		87	1		
327	NX9500	Scheduler - Send Email for 48Hrs Notification before DOE. (Tie SS to Beginning of NX9 Outage)-Mobile	03-Feb-25	03-Feb-25		87	1	TEPS	
328	**Substation - NX-9 Pre NX9-DOE - New 1X XFMR**		28-May-25	28-May-25		7	1		
329	NX9A100	Scheduler - Send Email for 48Hrs Notification before DOE. (Tie SS to Beginning of NX9 Outage) - 1X	28-May-25*	28-May-25		7	1	TEPS	
330	**Site Development**		03-Sep-24	25-May-25		15	265		
331	1120	Construction - Civil - Phase 1	03-Sep-24	01-Nov-24		220	60	CONS	

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
332	3850	Construction - Civil - Phase 2	03-Sep-24	25-May-25		15	265	CONS	[redacted]
333	**Substation Construction**		02-Aug-24	30-May-25		0	207		
334	1130	Construction - Electrical	03-Sep-24	25-Jan-25		125	145	CONS	
335	**Temporary Transformer**		02-Aug-24	30-May-25		0	207		
336	A3620	Prep Mobile XFMR and mobile circuit switcher - 66MX 25MVA mobile XFMR	02-Aug-24	09-Sep-24		76	26	CONS	
337	A3670	66MX 25MVA mobile XFMR - IN SERVICE	10-Sep-24	04-Feb-25		76	100	CONS	
338	A3660	Release the Mobile Transformer and circuit switcher	23-May-25	30-May-25*		0	5	CONS	
339	**5L-1X ABB Transformer Installation**		03-Sep-24	09-Dec-24		115	66		
340	A3630	21J-1X out of service and pour new foundation	03-Sep-24	12-Sep-24		145	8	CONS	
341	A3650	New 5L-1X on Site	13-Sep-24	13-Sep-24		173	0	CONS	
342	A3690	New Transformer foundation cures	21-Oct-24	29-Nov-24		120	28	CONS	
343	A3680	Install 5L-1X Transformer	09-Dec-24	09-Dec-24		115	0	CONS	
344	**P&C Construction**		03-Sep-24	25-Jan-25		135	145		
345	1140	Construction - P&C Implement Relay Settings	03-Sep-24	25-Jan-25		135	145	CONS	
346	**Telecomm Construction**		03-Sep-24	25-Jan-25		135	145		
347	1150	Construction - Field Communications	03-Sep-24	25-Jan-25		135	145	CONS	
348	**Removals**		10-Sep-24	19-Oct-24		177	40		
349	**Remove existing 5L-1X XFRMR**		10-Sep-24	09-Oct-24		177	30		
350	3660	REMOVE - Dismantle and Remove existing Transformer	10-Sep-24	09-Oct-24		177	30	CONS	
351	**Remove existing XFRMR foundation**		10-Oct-24	19-Oct-24		177	10		
352	3650	REMOVE - Remove existing Transformer Foundation	10-Oct-24	19-Oct-24		177	10	CONS	
353	**TEST & COMMISSIONING**		28-Aug-24	29-May-25		7	188		
354	**Testing Activities**		28-Aug-24	29-May-25		7	188		
355	LCE310	Mobilize LCE Prior to Construction	28-Aug-24*	29-Aug-24		0	2	ENG.S	
356	LCE320	Mobilize Testing Vendor Prior to Construction	28-Aug-24*	29-Aug-24		0	2	TEST	
357	LCE610	LCE Oversee Execution of Test and Commissioning Plan	03-Sep-24*	29-May-25		0	185	ENG.S	
358	LCE620	Execute Test and Commissioning Plan	03-Sep-24*	29-May-25		7	185	TEST	
359	**PROJECT CLOSE OUT**		01-Jun-25	25-Nov-25		0	123		
360	**Civil Close Out**		02-Jun-25	17-Nov-25		6	117		
361	1110	Restore / Remediate Site	02-Jun-25	13-Jun-25		113	10	CONS	
362	CV1000	Prepare Civil Field Mark Ups (Tie after Last Civil Construction Activity)	09-Jun-25	08-Jul-25		6	21	ENG.El	
363	CV1100	Eversource Engineering Prepares & Sends Civil Field Mark Up Packge to Vendor	09-Jul-25	15-Jul-25		6	5	ENG.S	
364	CV1200	Vendor Engineering Verifies Civil Mark Ups and Updates As-Built Drawing Package. Submits Final Package to ES	16-Jul-25	26-Aug-25		6	30	ENG.S	
365	CV1300	Eversource Engineering Verifies Quality of Submitted Civil Drawings	27-Aug-25	24-Sep-25		6	20	ENG.S	
366	CV1400	ES Create Civil Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	25-Sep-25	01-Oct-25		6	5	ENG.S	
367	PM1000	PM to Document Civil As-Built Drawings Complete	02-Oct-25	02-Oct-25		6	1	PM	
368	CV1500	FE Files Civil Design Drawings at Station	03-Oct-25	17-Nov-25		6	30	ENG.S	
369	**Electrical Close Out**		01-Jun-25	10-Oct-25		30	93		
370	LCE700	LCE Ensure Test Group Prepare Electrical Field Mark Ups	01-Jun-25	14-Jun-25		164	14	ENG.S	
371	EV1000	Prepare Electrical Field Mark Ups	17-Jun-25	16-Jul-25		0	21	ENG.El	
372	EV1100	Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor	17-Jul-25	23-Jul-25		0	5	ENG.S	
373	EV1200	Vendor Engineering Verifies Electrical Mark Ups and Updates As-Built Drawing Package. Submits Final Package to ES	24-Jul-25	04-Sep-25		0	30	ENG.S	
374	EV1300	Eversource Engineering Verifies Quality of Submitted Electrical Drawings	05-Sep-25	02-Oct-25		0	20	ENG.S	
375	EV1400	Electrical Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	03-Oct-25	09-Oct-25		0	5	ENG.S	
376	PM1100	PM to Document Electrical As-Built Drawings Complete (Electrical & P&C)	10-Oct-25	10-Oct-25		0	1	PM	
377	**Substation - NX-9 Post NX9-DOE/ISD - Mobile Transformer 66mX**		02-Jun-25	11-Jun-25		115	8		
378	NX9FINAL50	Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or ISD)	02-Jun-25	04-Jun-25		115	3	PM	

#	Activity ID	Activity Name	Start	Finish	Float Path	Total Float	Original Duration	DEPT	Resources
379	NX9A600	Scheduler - Has 72 Hrs to Put in Service the NX-9 and Send to TOP Director in NURS after DOE/PM Note of Completion.	04-Jun-25	04-Jun-25		115	1	TEPS	[redacted]
380	NX9FINAL60	[If Required] Receive + Issue Final Affirmed NX-9 Data to NURS	05-Jun-25	11-Jun-25		115	5	ENG.AI	
381	**Substation - NX-9 Post NX9-DOE/ISD - New 1X XFMR**		02-Jun-25	11-Jun-25		115	8		
382	NX9FINAL10	Review + Affirm Accuracy of NX-9 for ISO Submission (Tie after Equip DOE or ISD)	02-Jun-25	04-Jun-25		115	3	PM	
383	NX9A200	Scheduler - Has 72 Hrs to Put in Service the NX-9 and Send to TOP Director in NURS after DOE/PM Note of Completion	04-Jun-25	04-Jun-25		115	1	TEPS	
384	NX9FINAL20	[If Required] Receive + Issue Final Affirmed NX-9 Data to NURS	05-Jun-25	11-Jun-25		115	5	ENG.AI	
385	**P&C Close Out**		17-Jun-25	25-Nov-25		0	112		
386	PC8000	Prepare P&C Field Mark Ups	17-Jun-25	16-Jul-25		0	21	ENG.EI	
387	PC1111	Eversource Engineering Prepares & Sends Electrical Field Mark Up Packge to Vendor	17-Jul-25	23-Jul-25		0	5	ENG.S	
388	PC1200	Vendor Engineering Verifies P&C Mark Ups and Updates As-Built Drawing Package. Submits Final Package to ES	24-Jul-25	04-Sep-25		0	30	ENG.S	
389	PC1300	Eversource Engineering Verifies Quality of Submitted P&C Drawings	05-Sep-25	02-Oct-25		0	20	ENG.S	
390	PC1411	P&C Transmittal, Approve Final As-Built Package, and EDC Files and Issue Drawings to Field	03-Oct-25	09-Oct-25		0	5	ENG.S	
391	PC8500	FE Files P&C Design Drawings at Station	14-Oct-25	25-Nov-25		0	30	ENG.S	
392	**LCE Closeout**		02-Jun-25	16-Jun-25		0	11		
393	LCE800	LCE Ensures Marked up Prints Ready for Pick-up	02-Jun-25	02-Jun-25		0	1	ENG.S	
394	LCE900	LCE Review Test Data and Issue Commissioning Report	03-Jun-25	16-Jun-25		0	10	ENG.S	
395	**Work Order / Financial Close Out**		02-Jun-25	28-Jul-25		83	40		
396	1020	Cost Analyst Prepares FINAL Units of Property	02-Jun-25	14-Jul-25		93	30	COST	
397	1030	Asset Management Complete Asset Update(s) in CASCADE	16-Jun-25	28-Jul-25		83	30	ENG.AI	
398	**Project Management Close Out**		02-Jun-25	25-Nov-25		0	123		
399	TD1100	Complete TD-707 Turnover Document / Forward to SOC & Mailing List	02-Jun-25	06-Jun-25		6	5	CONS	
400	1260	Construction Rep Finalize CASCADE Forms (within 14 days folloiwng ISD)	02-Jun-25	13-Jun-25		86	10	CONS	
401	1040	PM Prepares Closeout Documentation, Lessons Learned Meeting, etc.	02-Jun-25	14-Jul-25		92	30	PM	
402	1270	Prepare TD-707 Document	02-Jun-25	14-Jul-25		92	30	PM	
403	FINISH	Project / Work Order Complete (FINAL SCHEDULE TASK/MILESTONE)		25-Nov-25		0	0	PM	
404	EV1500	FE Files Substation Design Drawings at Station	14-Oct-25	25-Nov-25		0	30	ENG.S	

EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource**

Substation Constructability Review

Project Title: [redacted]-1X Transformer Replacement	☐	Prior Constructability Review Performed?
	☐	Program Related Site Specific Review?
Project Numbers(s): CS00544 & CS00634	**Project Constructability Phase:**	
Date(s) of Constructability Review: **08/09/2023** Click to enter a date	☐ Conceptual Engineering Design ☒ Preliminary Engineering Design ☐ Detailed Engineering Design	

Project Scope Statement:

CS00544/80136640: Replace the existing 25MVA 69kV-13.2kV transformer [redacted] at the [redacted] with the new Eversource standard 40MVA 115/69kV-13.2kV transformer.

CS00544/80131174 (originally CS00389): Low-side bus work: install low-side transformer breaker ([redacted], relocate and replace 5L02 feeder recloser and disconnect switches to accommodate new low-side transformer breaker, replace [redacted] and 5L-2X3-4 disconnects, install new feeder recloser [redacted], foundation, switches, and insulators to accommodate [redacted], associated P&C work.

CS00634/80250804: Replacement of Reclosers and Switches:

Replace existing [redacted] reclosers with new NOVA reclosers.

Replace existing [redacted] switches. (The [redacted] switches are newer and do not need to be replaced.

CS00544 and CS00634 will be coordinating with CD01536 to install the new feeder position and connections. The aerial cable is expected to be completed in the field by June 2024 and final connections will be completed once the feeder position is available. It will also be coordinating with CD02253 [redacted] Feeder Relocation (Reference 6) which is required to perform the outage needed to replace the bulk transformer.

Department Review/Walkdown Attendees*:

Required [X]	Attended [X]	Department	Name	Required [X]	Attended [X]	Department	Name
☐	☒	Project Management	[redacted]	☐	☒	S/S Engineering	[redacted]
☐	☐	Asset Management		☐	☒	P&C Engineering	
☐	☐	Constr. Management		☐	☐	Civil Engineering	
☐	☐	S/S Technical / LCE		☐	☐	Telecom	
☐	☒	S/S Operations**		☐	☐	Environmental	
☐	☐	Field Engineering		☐	☐	Real Estate	
☐	☐	Line Engineering		☐	☐	ROW T&D Rights & Survey	

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☐	☐	Vegetation Management	[redacted]	☐	☐	Survey Engineering	[redacted]
☐	☐	Siting		☐	☐	Cost Estimating	
☐	☐	Safety		☐	☐	Project Services (Outreach)	
☐	☐	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:

Name/Signature [redacted] Date 8/9/23

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	Location of new DSCADA Cabinet in the existing CH	Site measurements taken in the CH. Eye wash station will have to be moved to allow for the new DSCADA cabinet to be installed next to the existing SCADA cabinet.
2	Temporary station service transformer.	Temporary pad mounted SSVT will have to be added to scope.
3	Pre and post construction sound study.	Project will conduct pre and post construction sound study if existing sound study is not available.
4		
5		
6		

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Substation Constructability Review

	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 of work has been defined: **CS00544/80136640:** Replace the existing 25MVA 69kV-13.2kV transformer [redacted] at the [redacted] with the new Eversource standard 40MVA 115/69kV-13.2kV transformer. **CS00544/80131174 (originally CS00389):** Low-side bus work: install low-side transformer breaker (5L-1X3-2), relocate and replace [redacted] feeder recloser and disconnect switches to accommodate new low-side transformer breaker, replace [redacted] disconnects, install new feeder recloser (5L05), foundation, switches, and insulators to accommodate [redacted] associated P&C work. **CS00570/80250804**: Replacement of Reclosers and Switches: Replace existing [redacted] reclosers with new NOVA reclosers. Replace existing [redacted] switches. (The [redacted] switches are newer and do not need to be replaced.
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?	☐	No concerns at this time. Main material is being ordered through Material Exception Form process.
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..	☐	New DSCADA cabinet will be located inside the existing CH. Room is adequate. Eye wash station will have to be relocated.
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	☐	Equipment has been reviewed and verified.

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
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?	☐	Temporary wooden poles and reclosers will have to be installed to temporarily route feeder positions to the mobile XFMR. Poles will be installed outside of SS fence. Project will conduct pre and post construction sound study if existing sound study is not available.
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?	☐	Soil boring was done. GPR survey was done. Exploratory excavations will be conducted in August 2023 during the execution of detail engineering.
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.)	☐	Underground obstructions were identified in the area of BG duct banks and location of new feeder bay steel columns. Exploratory excavations will be conducted in August 2023 during the execution of detail engineering.
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	☐	Existing ground grid is adequate, is to current ES standards, and will be repaired/restored as necessary.

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
9	Nomenclature / Switching One-Line Diagram -Any obvious deviations from diagrams provided?	☐	Nomenclature has been updated and provided to CONVEX.
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?	☐	Brown glass insulator replacement, oil filled recloser replacement, disconnect switch replacement as part of CS00544 and CS00634.
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 concerns at this time.
3	**Identify/Consider Required Depts for Construction?** -Who is constructor: Internal vs External Resources -S/S Ops, GO, Test, Field Engineering, etc. -Specialty Contractors Required? -Required Oversite Needed - Estimated level of CR and LCE support needed	☐	Civil Construction – External Electrical Construction – External Test – External LCE - Needed

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info 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?	☐	The main gate will have to be relocated/moved towards the CH to improve mobile C/S and mobile XFMR access to SS once the new feeder bay steel/position is erected. All construction trailers will be located outside the SS fence.
5	Unique Equipment Considerations: Gas insulated substation, Gas insulated line, Gas insulated bus, Pass Breaker, Statcom, Sync Condenser		N/A

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	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	☐	Mobile XFMR will be required during the construction period. Outage sequence and construction sequence are being developed with SCLL elimination, min recall time, min outage durations in mind. 2024-2025 winter conditions might affect the construction activities.
7	**Equipment Testing & Acceptance** -Grounding plans / Resources? Will we need grounds hung? -Hi-pot testing and where will the equipment be set up?	☐	Eversource construction standard procedures will be followed.
8	Need for mobile generator and where connected (if needed)	☐	Mobile C/S and mobile XFMR will be needed and will be connected to the 694 line and temporary feeder circuits. Mobile generation is not required.
9	Need for mobile battery and where connected (if needed)	☐	N/A
10	OT work required or Notable Permit Conditions (special hours)?	☐	O/T work might be required to maintain the construction schedule, accommodate outages. 2024-2025 winter conditions might affect the construction activities.
11	Coordination of boundaries/seams (Identification of point of demarcation for	☐	Reviewed.

	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
	connection to existing equipment and/or for coordination with other municipalities)		
C	**Environmental**		
1	Soil Pre-Characterization or Grab Sampling Completed/Planned	☐	Soil boring will be performed by WELTI.
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	☐	Assessment is planned
4	Transformer Spill Containment Recommended?	☐	Yes, secondary XFMR oil containment will be installed.
5	Expanding Footprint / New Buildings or future Expansion Plans? (Enviro Impact)	☐	N/A
6	Environmental oversight considerations? (Inspection type/Interval)	☐	Typical ES type/interval.
7	Environmental mitigations - Any matting or seasonal needs? Review D&M Plan with CR.	☐	N/A
D	**Siting, Project Services, and ROW T&D Rights & Survey**		
1	**Any regulatory concerns or approvals needed?** - Any concerns noted that could be mitigated by scope/design alterations? - Likely to require visual screening? What considerations (feasibility or location)? -Zoning Relief and Permits required?	☐	N/A
2	Other siting considerations?	☐	Temporary distribution re-routing (installation of poles and reclosers) outside of SS will be executed outside of CSC Exempt Mod. Confirmed by Siting Lead.
3	**Neighbor/Abutter impacts:** - Any noise, visual impacts, or sensitive abutters - Any changes to lighting or additional lighting needed?	☐	Project will conduct pre and post construction sound study if existing sound study is not available.
4	Review for roadway, gate access, trailers, equip height, noise, weekend/night work, or any potential public disturbance related to work	☐	Main SS gate will have to be relocated closer to the R&CE to improve mobile XFMR and mobile C/S access to the back of the SS.

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
5	Installation within Eversource Rights - Is Rights and Restrictions Review required?	☐	Within ES rights.
6	Expanding Footprint / New Buildings / Fence line or future Expansion Plans?	☐	N/A
7	Proposed Equipment on same property? - Any Encroachments	☐	On same property. N/A
F	**Protection & Controls**		
1	Panel Graphic additions and/or Modifications	☐	[redacted] Transformer meters and relays will be replaced. Additions/Modifications to the panel graphics will be needed.
2	Space on existing panels for new equipment? (front & rear of panel fronts)	☐	[redacted] Transformer meters and relays will be replaced. We will retain the panel and replace the face plate of the panel. The relays will be mounted inside the current panel with cutouts on the new face plate.
3	Panel fronts conform to drawings	☐	[redacted] Transformer meters and relays will be replaced. Additions/Modifications to the panel fronts will be needed.
4	Access to bring new panels into control enclosure	☐	There is ample access space to be able to bring new panels into the control enclosure.
5	Nameplate list and location of nameplates	☐	[redacted] Transformer meters and relays will be replaced. Additions/Modifications to the nameplates will be needed.
6	Verifies that relays and meters that will be an interconnected project work are as shown on the drawings.	☐	[redacted] Transformer meters and relays will be replaced. Additions/Modifications to the drawings will be needed.
7	Temporary protection, relays, control cable needed? How long will they be required?	☐	Temporary protection settings will be needed and issued for a mobile transformer and circuit switcher during the [redacted] Transformer outage.
8	Will relay setting changes be needed? Any additional outage requirements for changes?	☐	New relays will replace the existing relays for the [redacted] Transformer. These relays will require new settings. Relays will be installed while the [redacted] Transformer is replaced. New reclosers will require settings.
G	**Telecom Engineering**		
1	Review telecom equipment in existing control enclosure	☐	[redacted]
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. No new telecom circuits are being added into [redacted]

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	Key Review Item Description	N/A or No Concern	Review Notes, Concerns, or Additional Info Needed
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. There is no line relaying at [redacted]
4	Review current Telecom fiber diversity and validate with P&C any fiber diversity requirements.	☐	N/A. There is no line relaying at [redacted]
5	Review and list any remote station impacts/updates	☐	N/A. There are no remote station impacts.
6	Confirm whether correct interface equipment is available (i.e.) for fiber termination or multiplexor termination	☐	N/A. There is no fiber termination or multiplexor termination work on this project.
7	Confirm whether existing communications cabinets are enough to support additional telecommunications equipment installed	☐	[redacted]
8	Review space for any required additional communications cabinets which may be required to support additional telecommunications equipment installed	☐	
9	Review third party Telecommunications at substation and confirm whether additional capacity or Ground Potential Rise protection is required	☐	N/A. Additional capacity or Ground Rise Protection is not required for this project.

Photos

(Ex. Equipment control cabinet, Breakers, MODs, CCVTs, PTs, Transformers)

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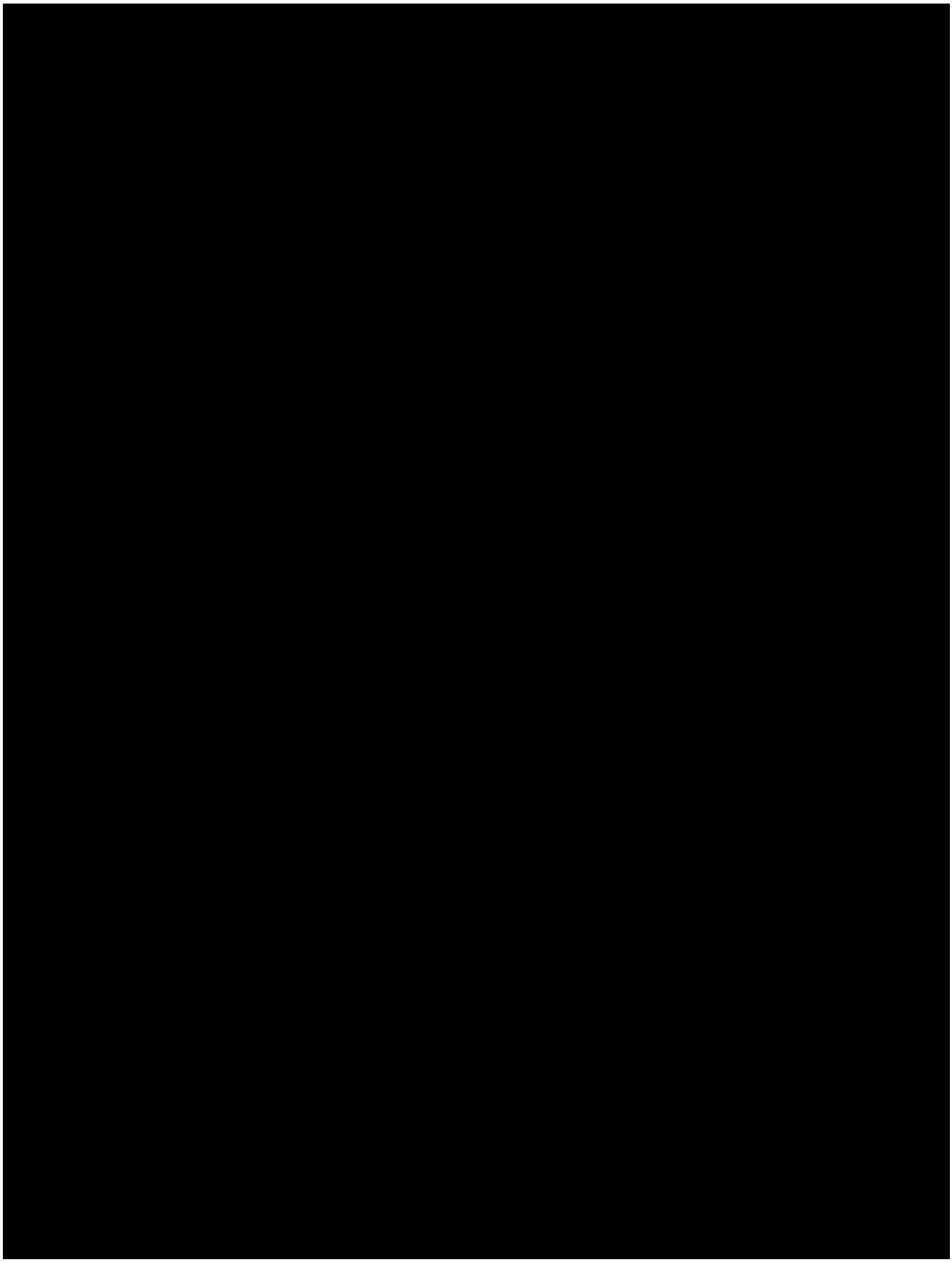

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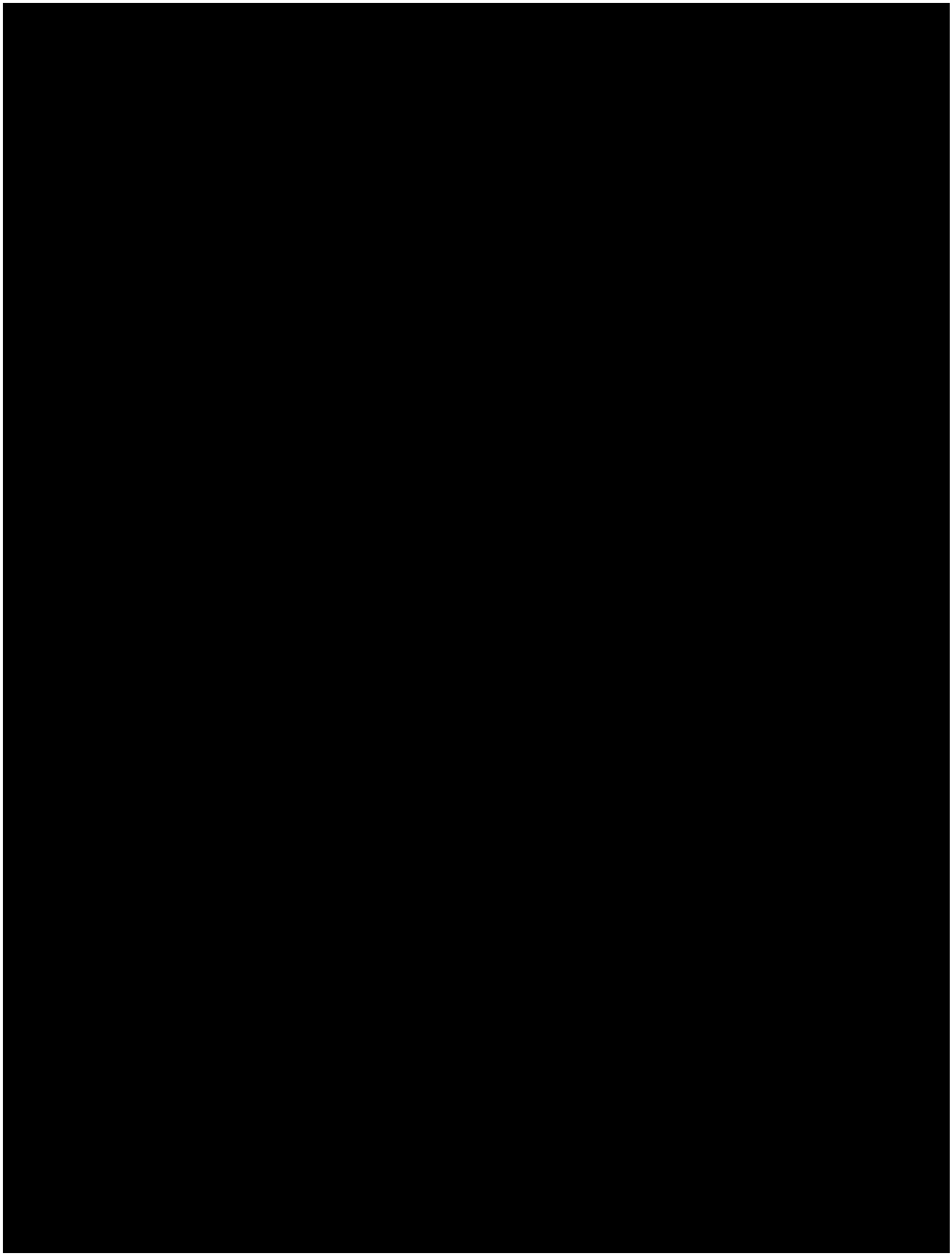

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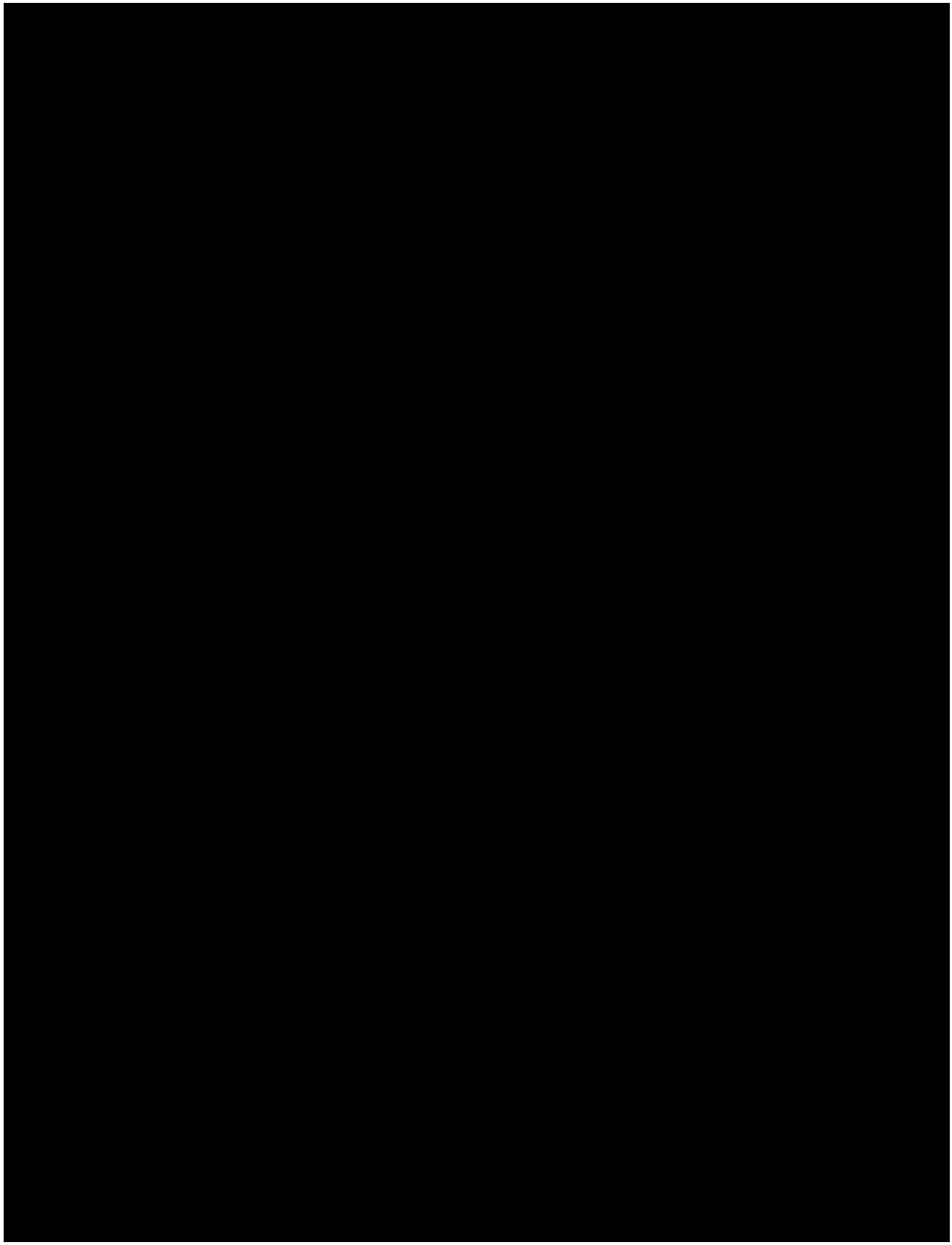

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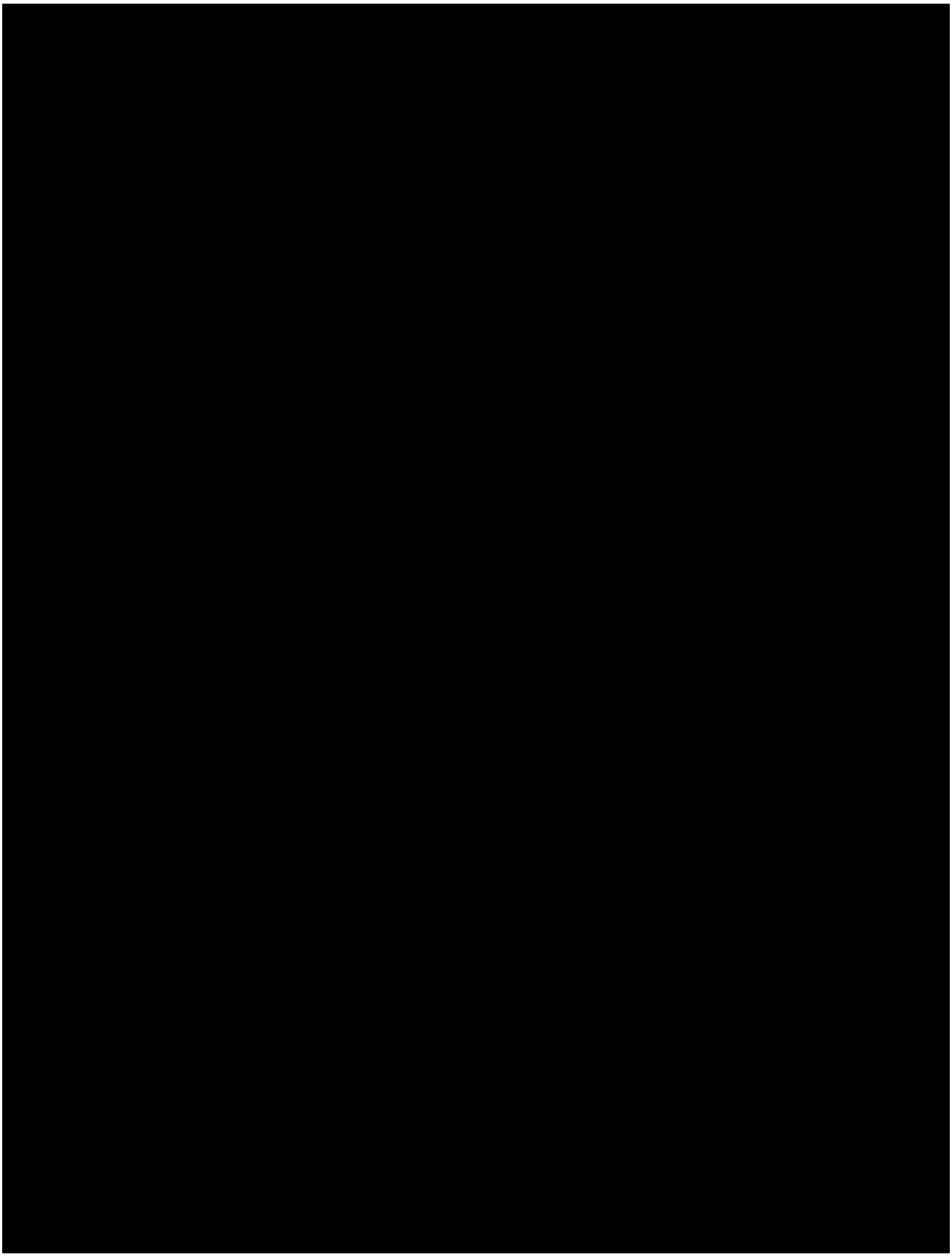

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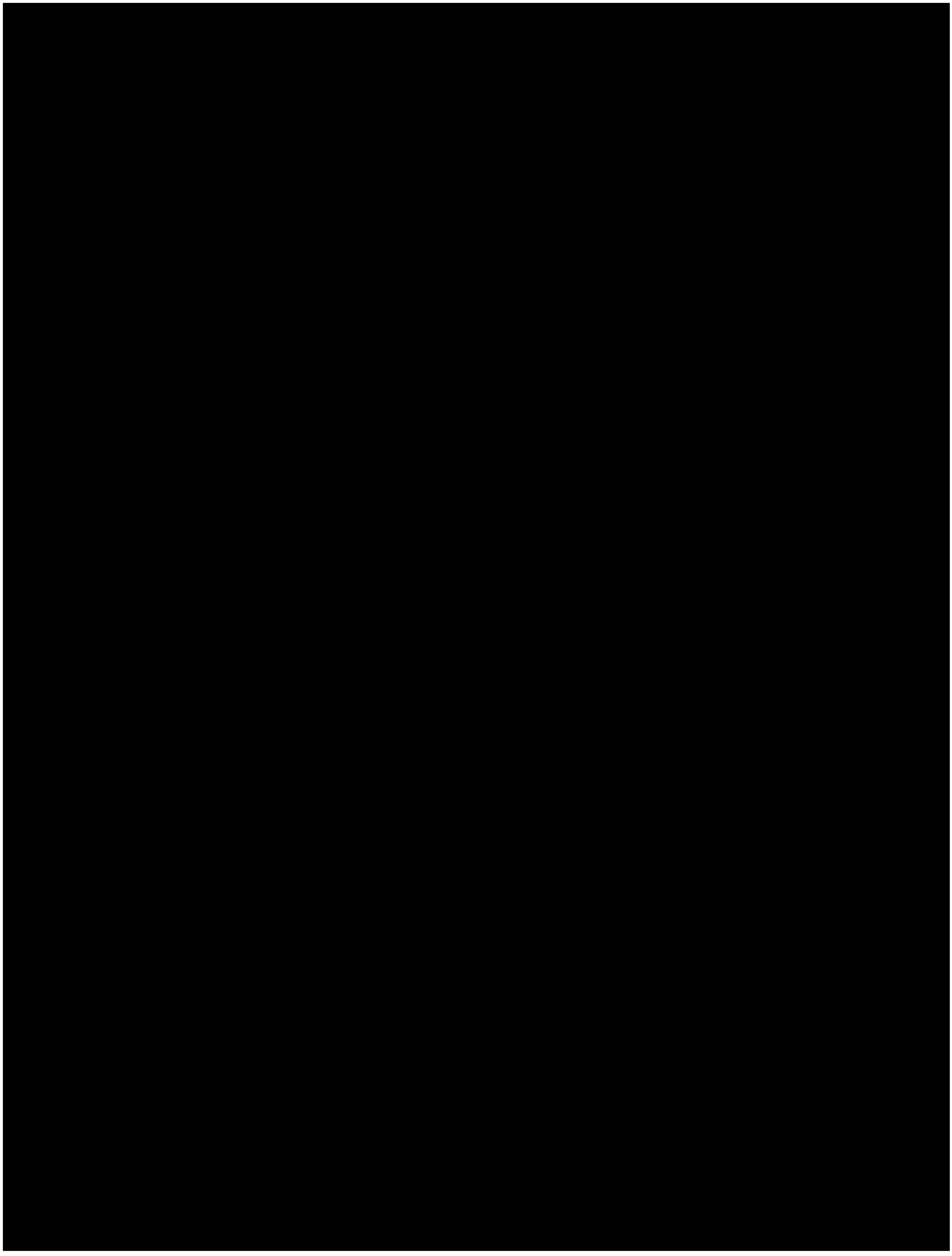

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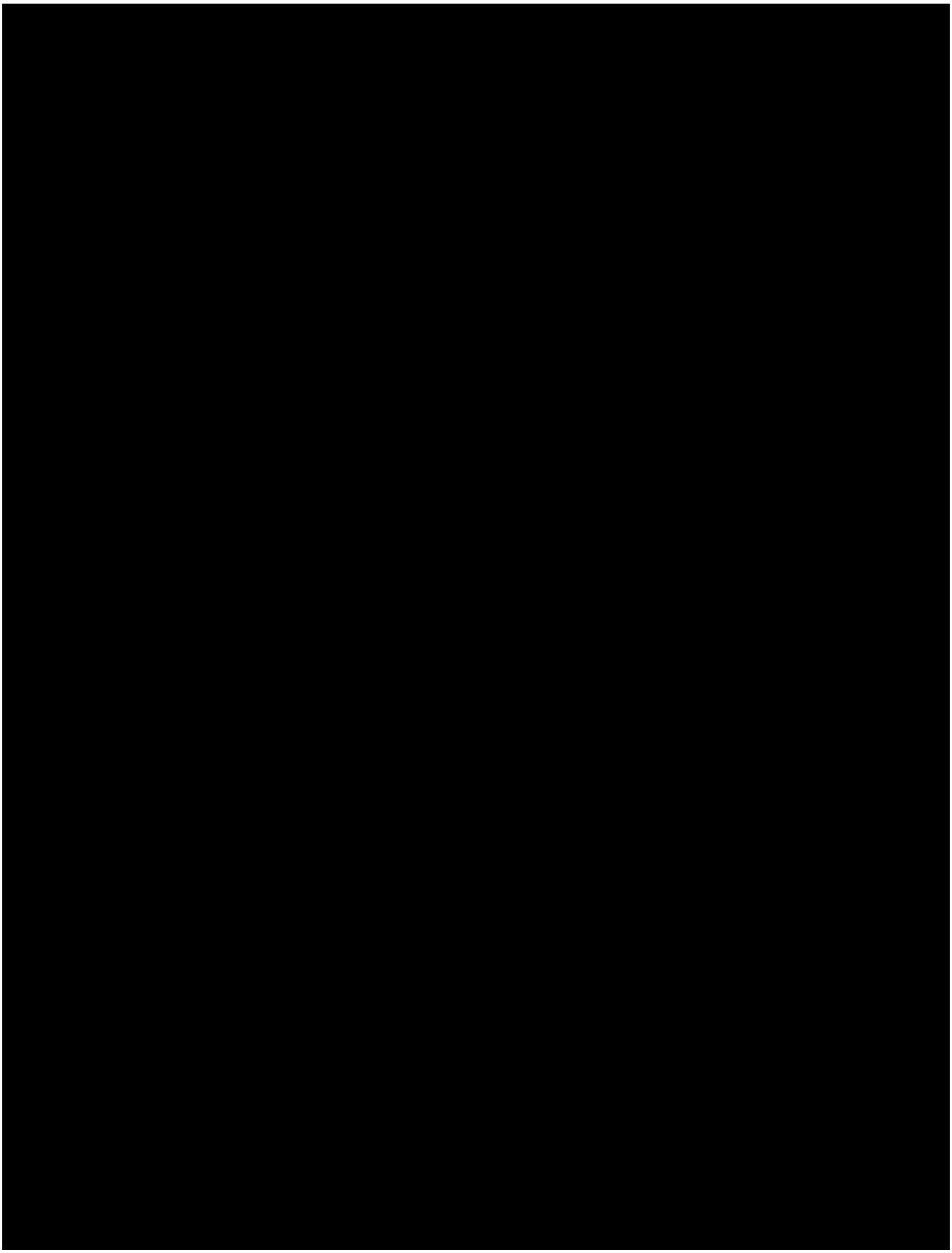

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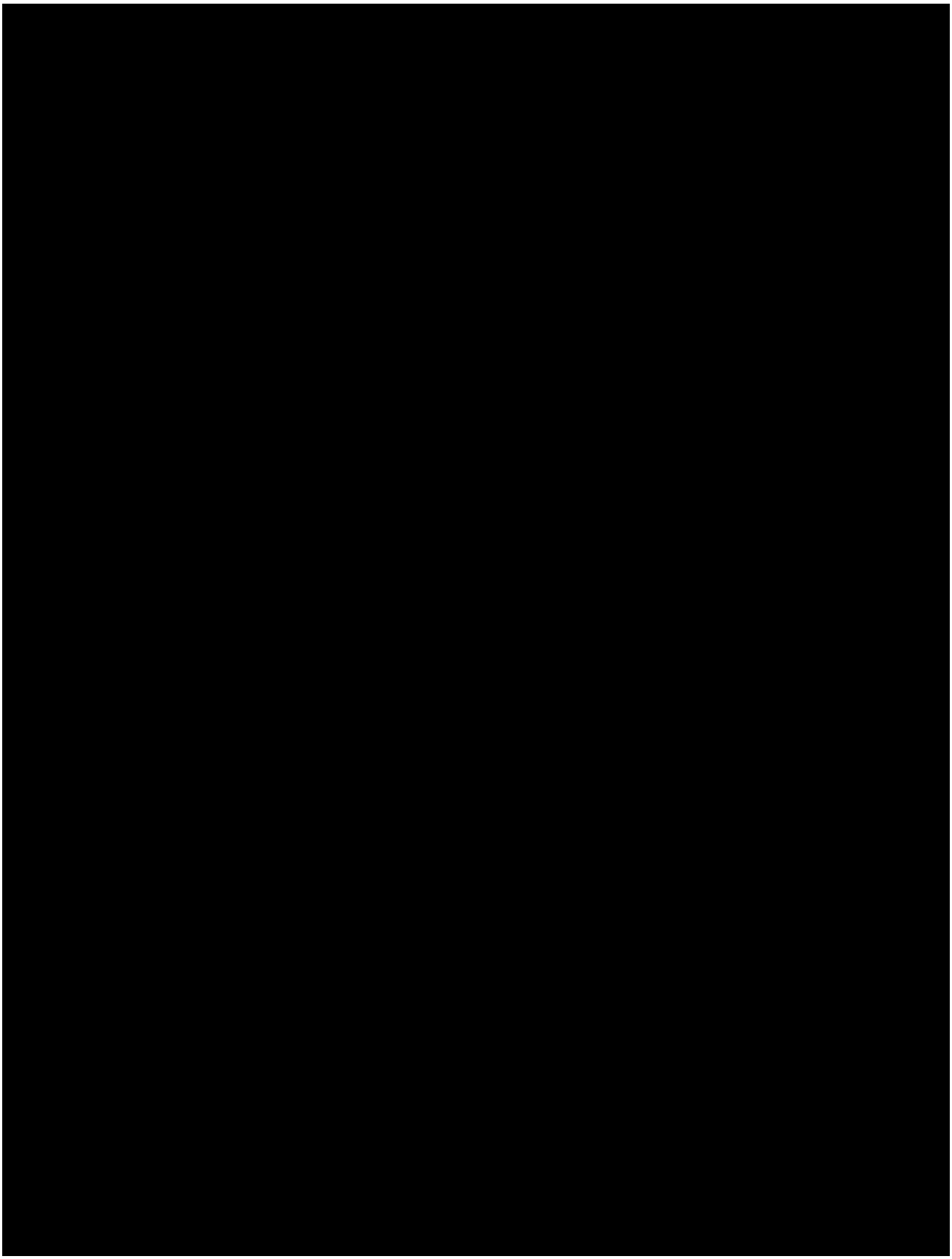

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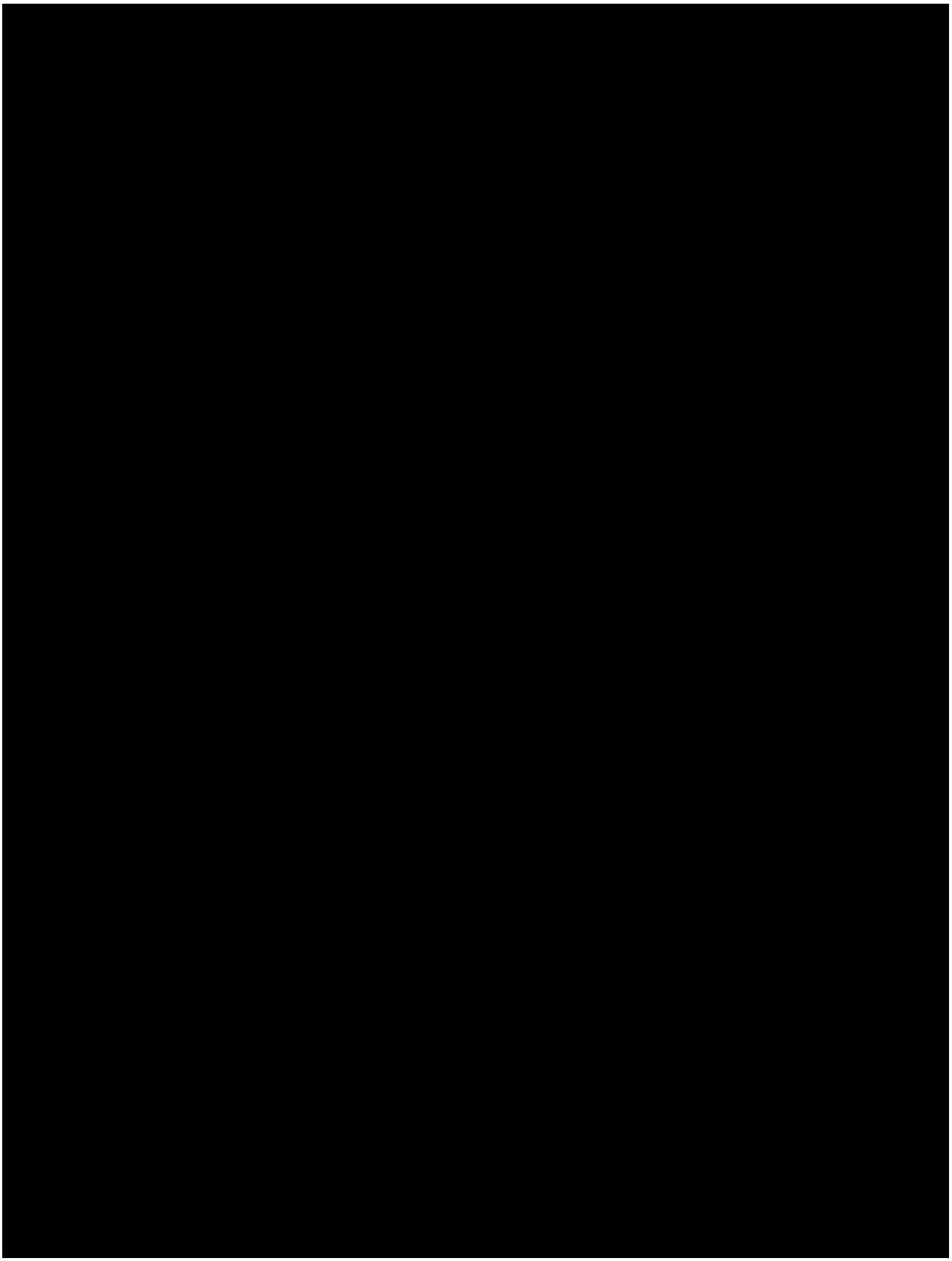

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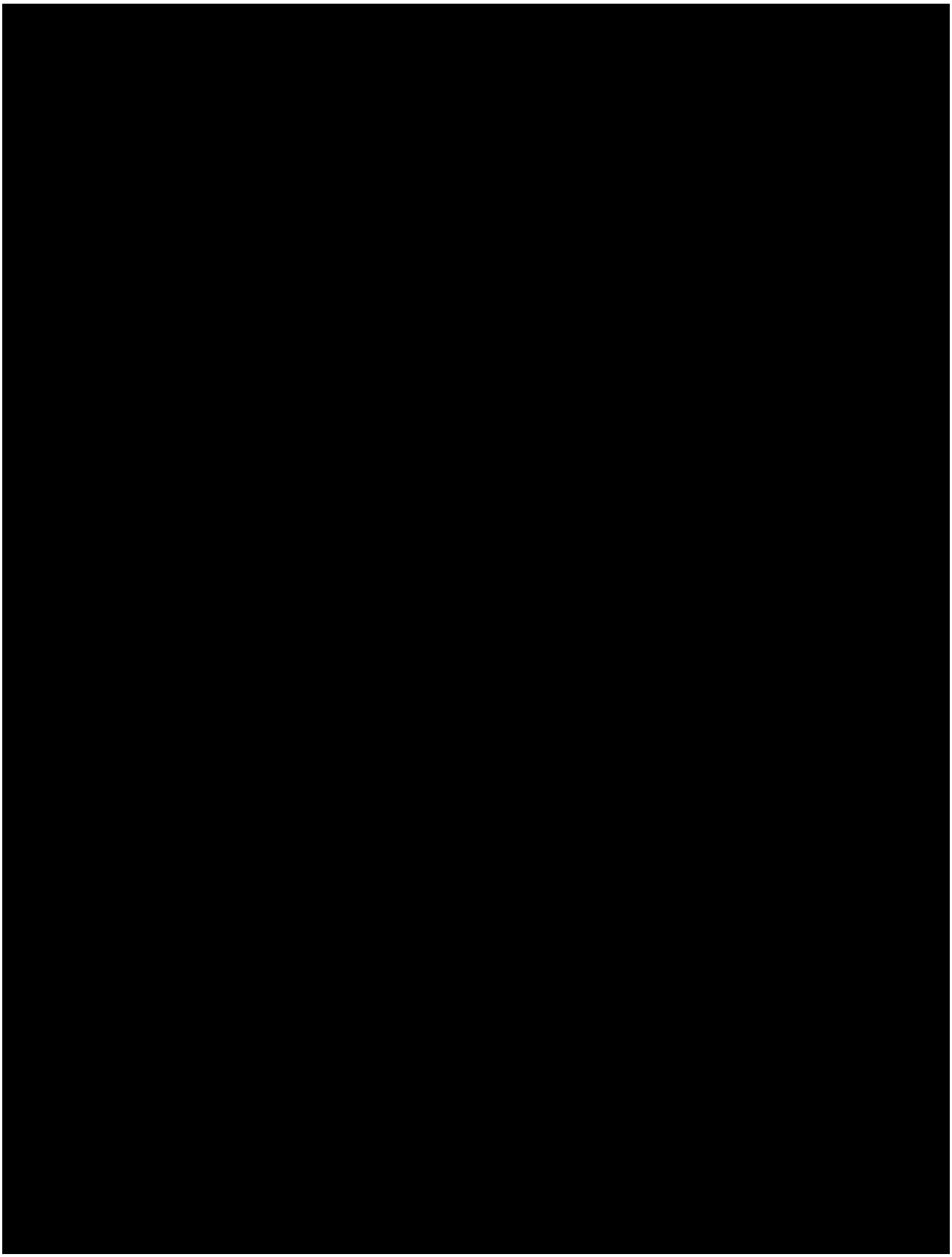

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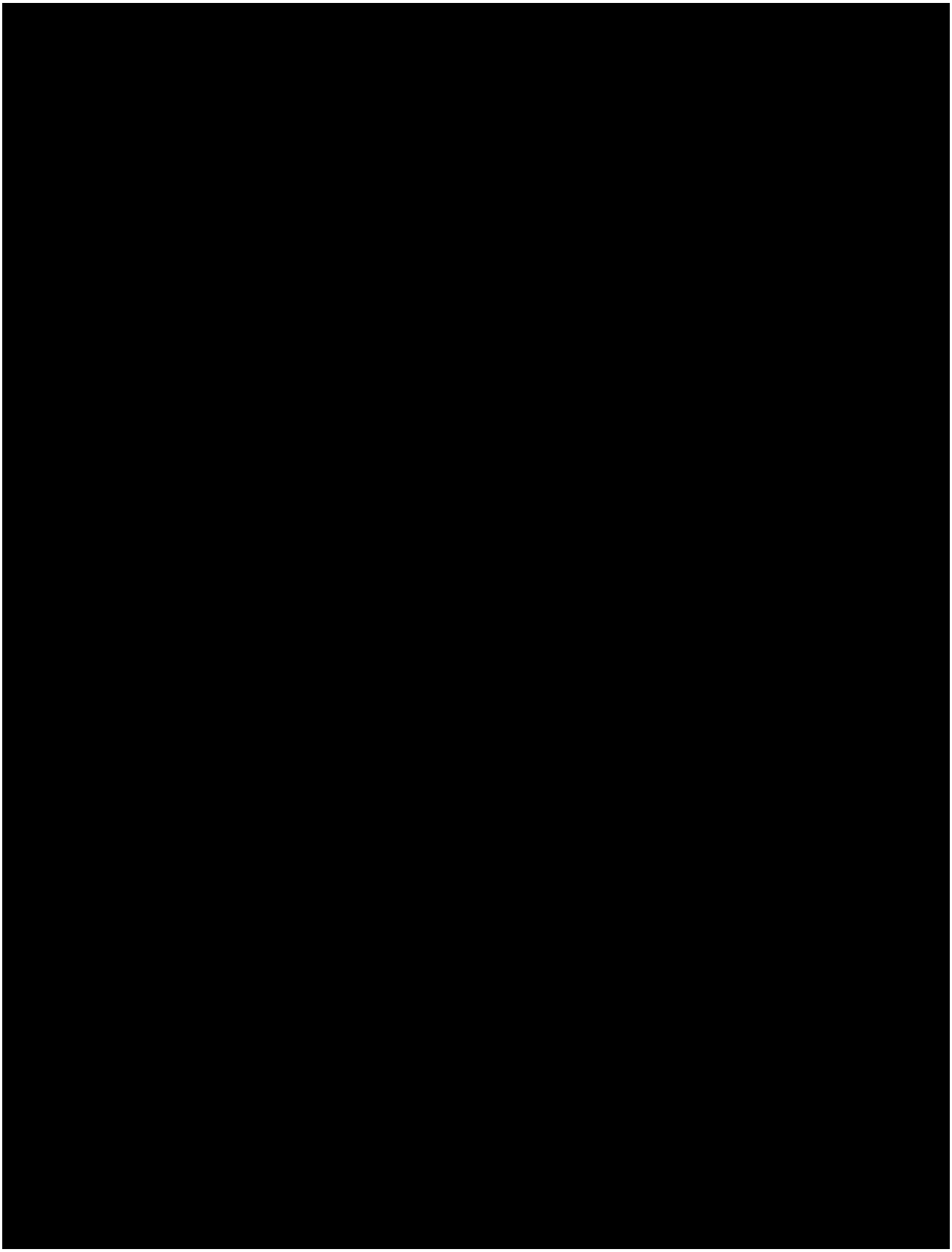

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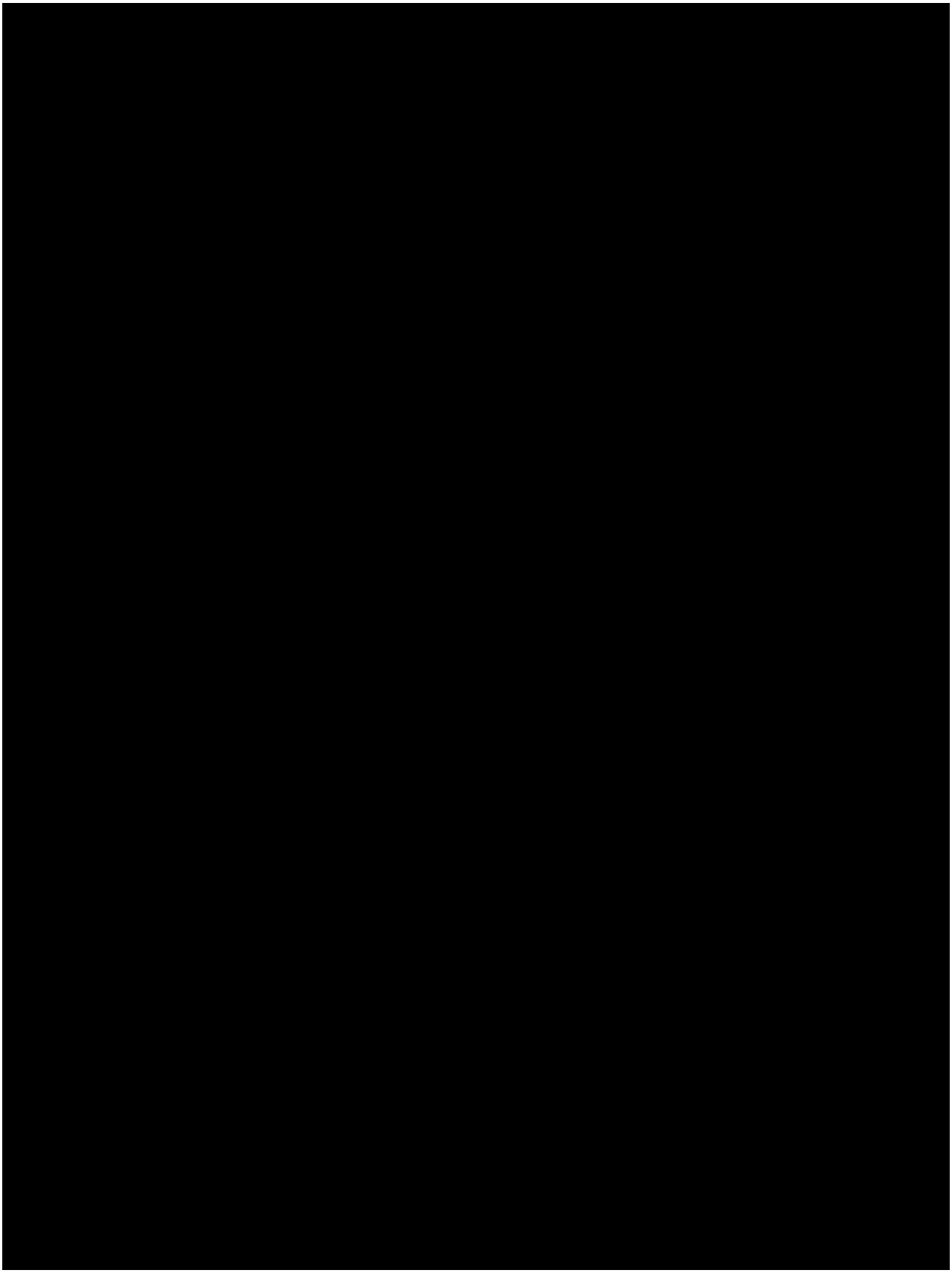

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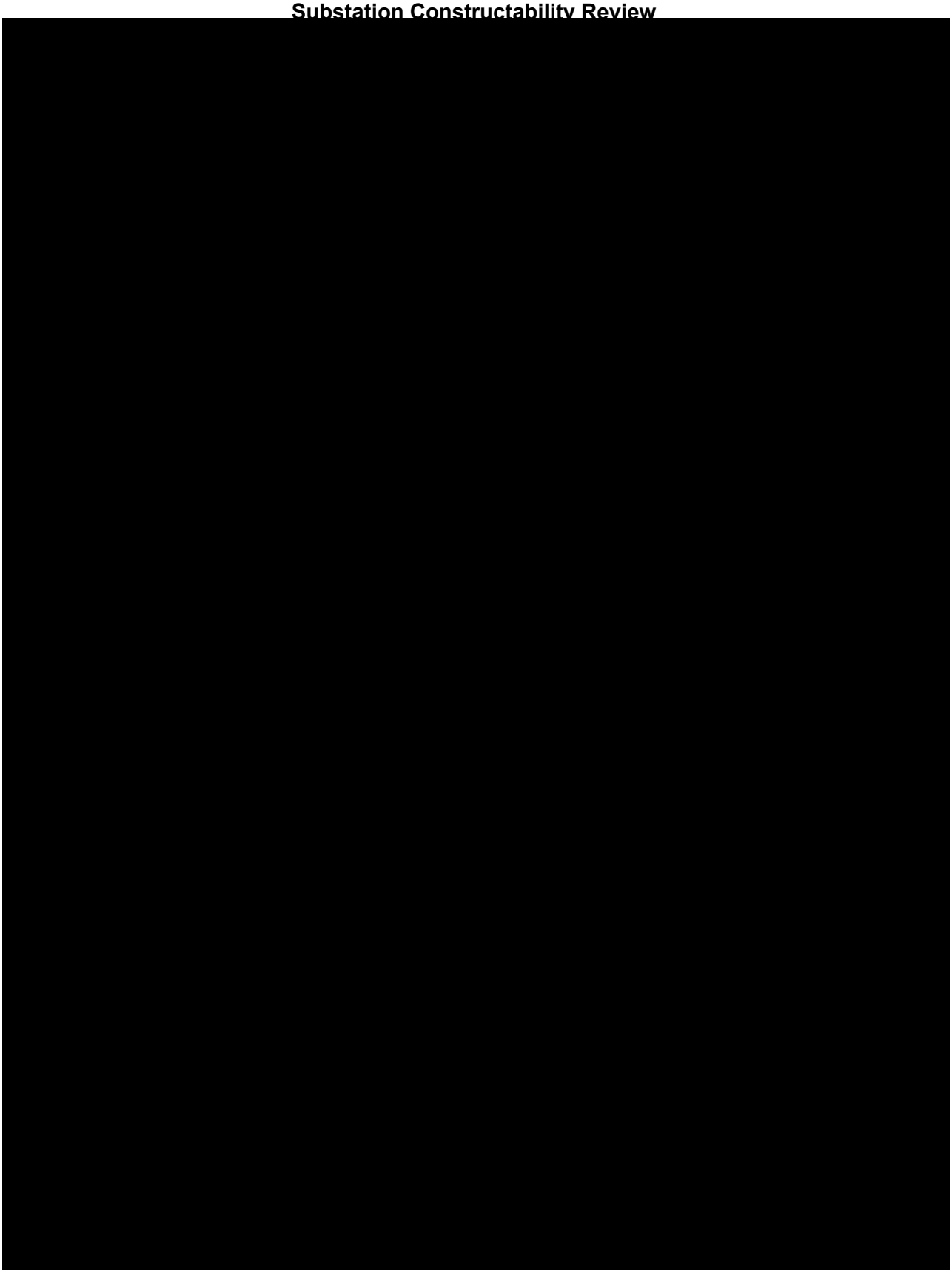

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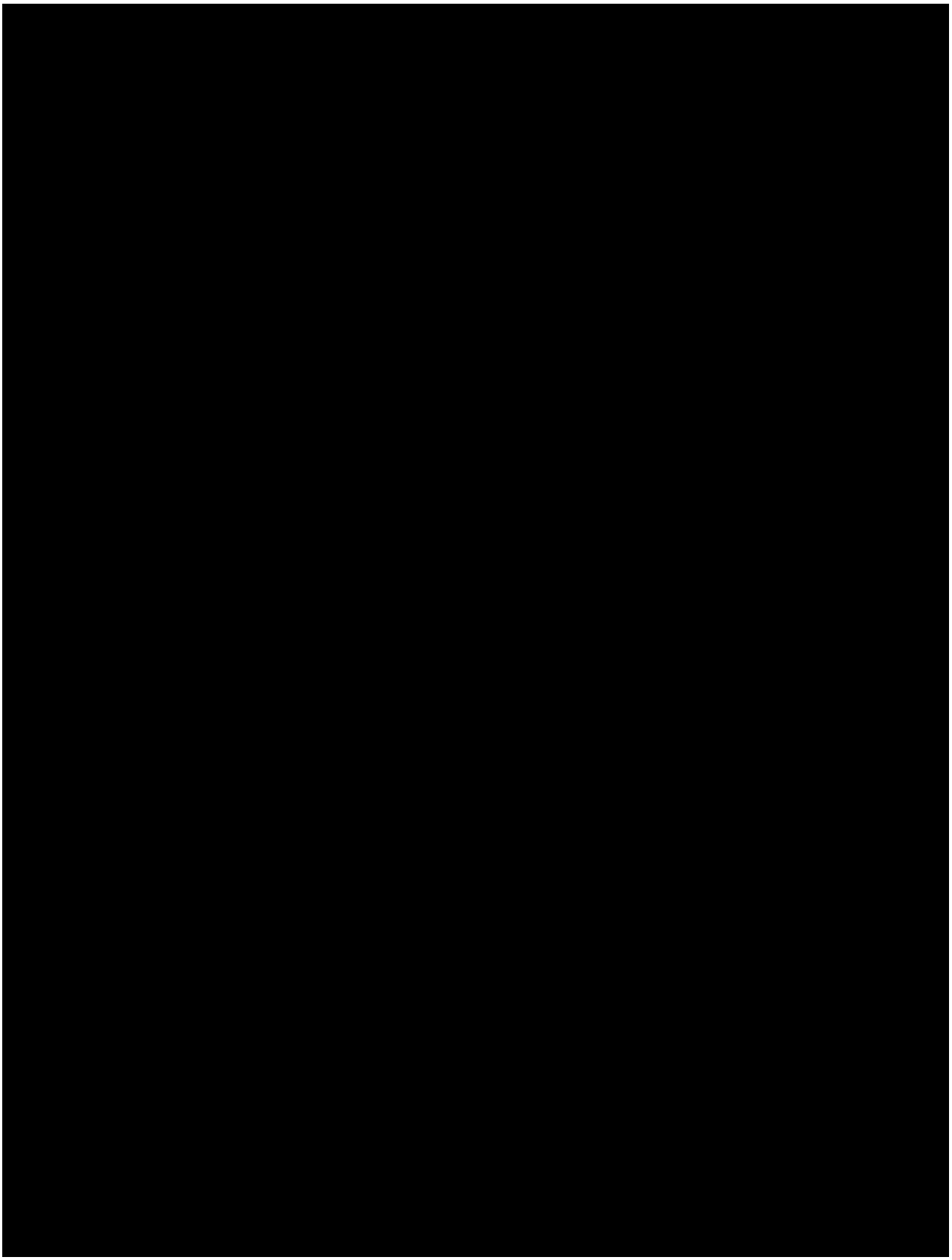

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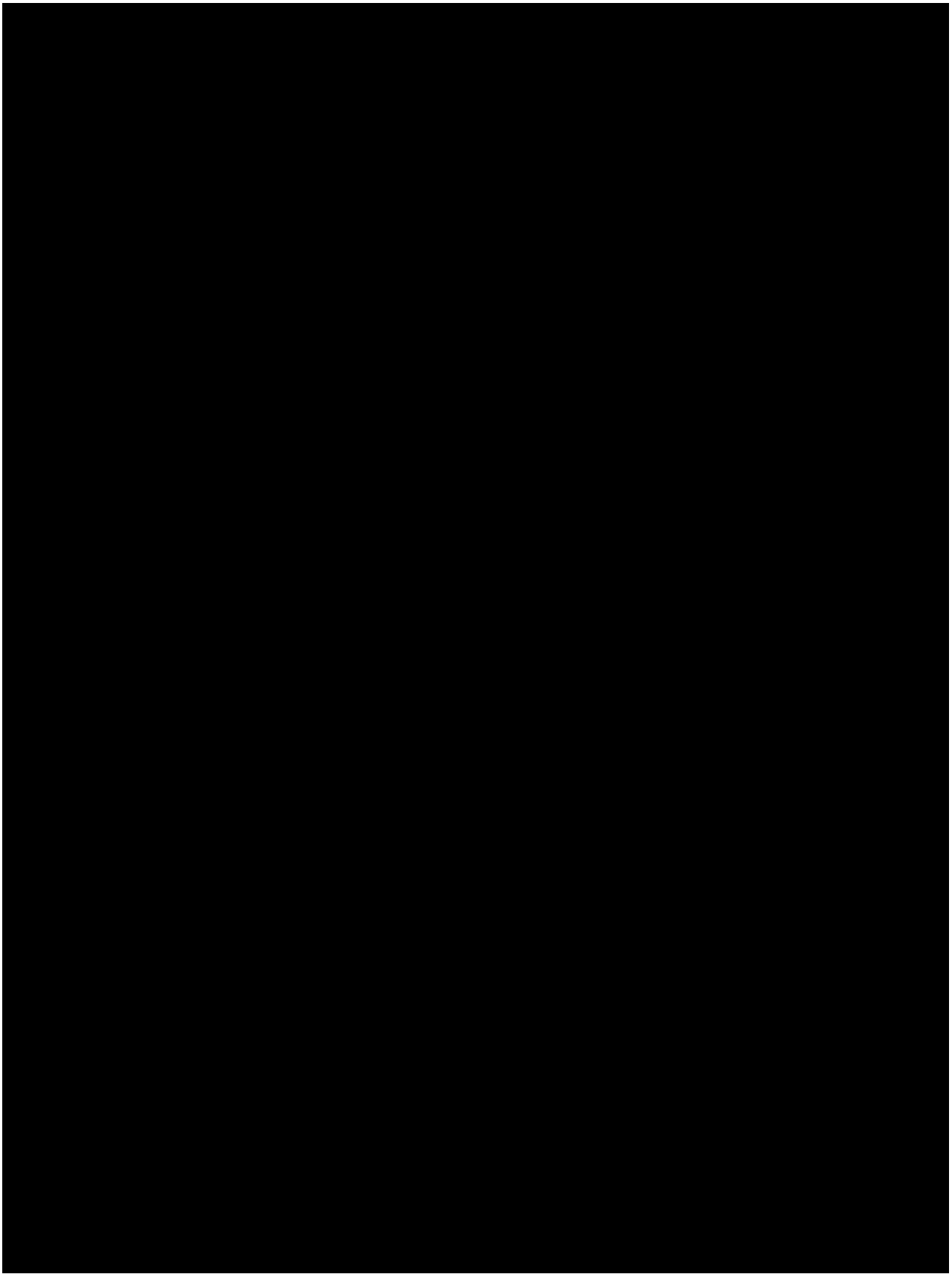

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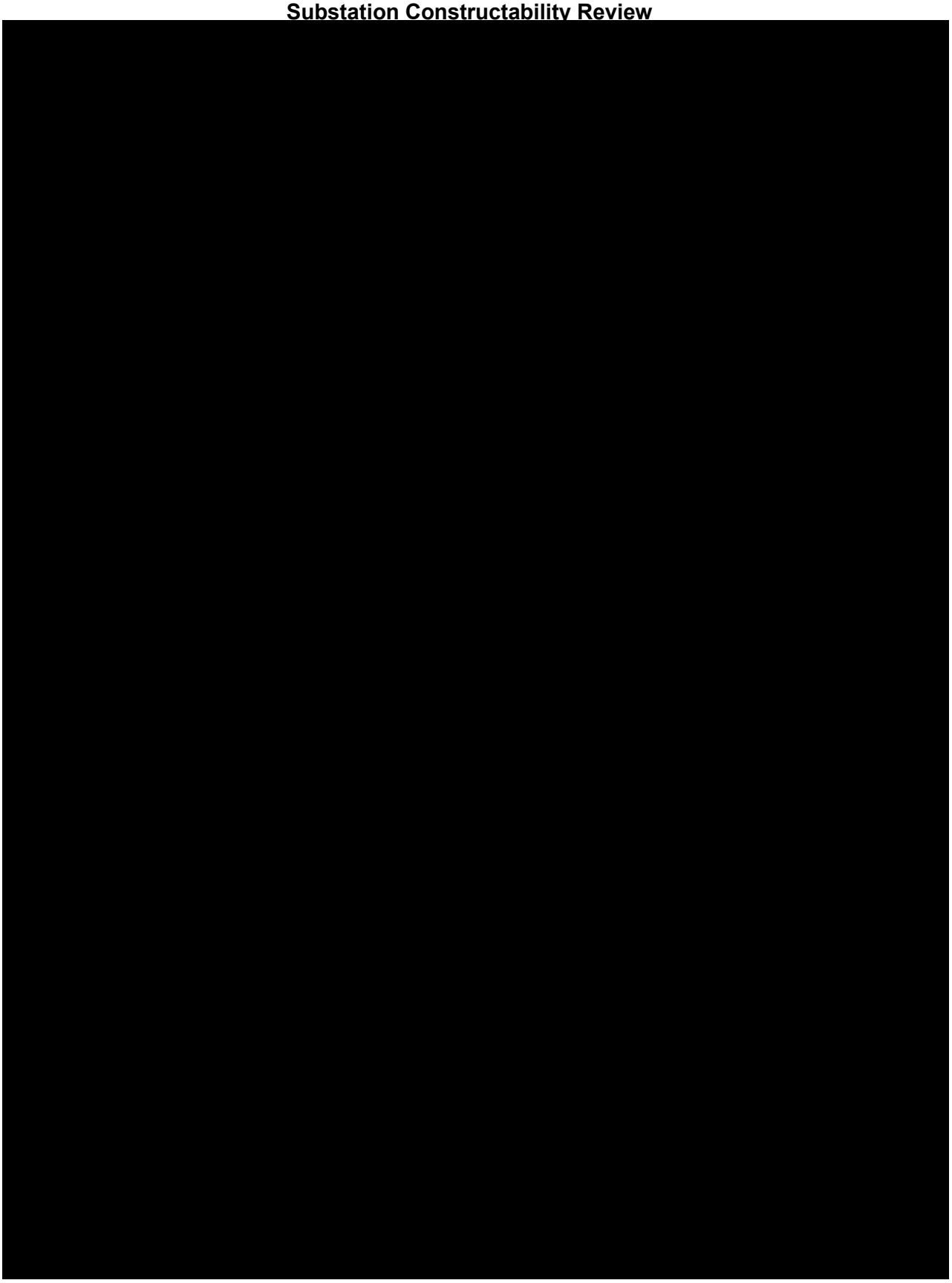

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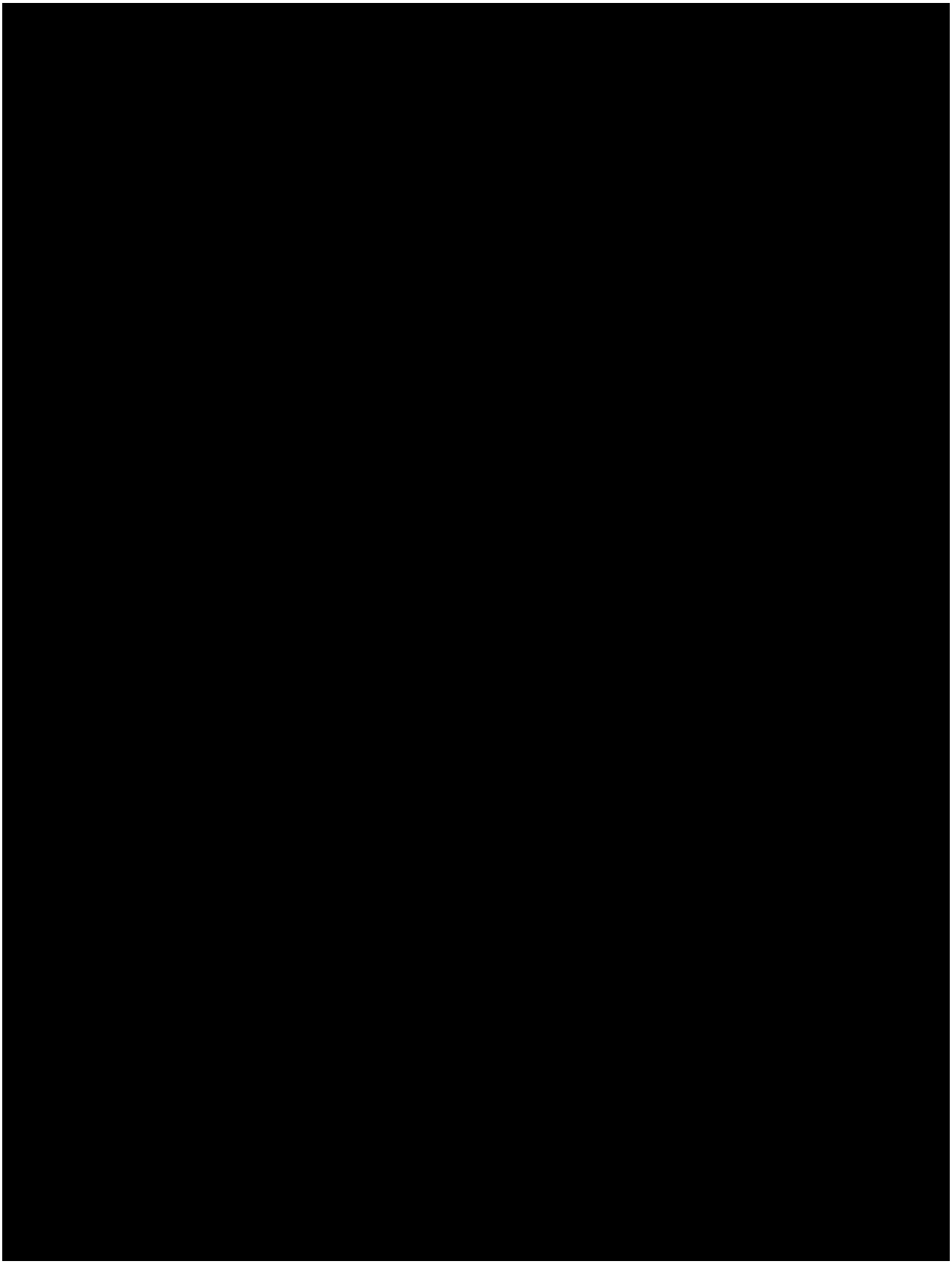

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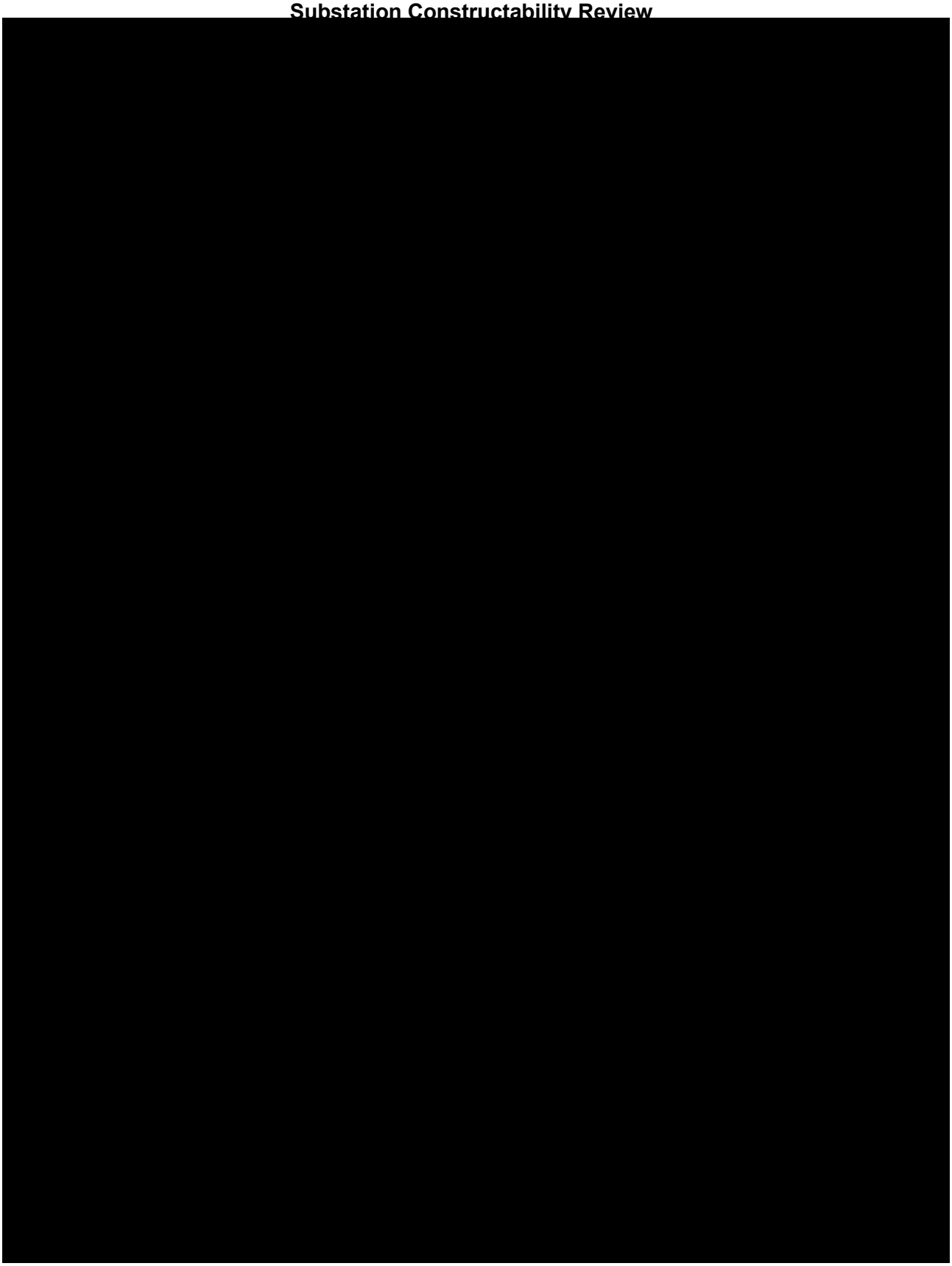

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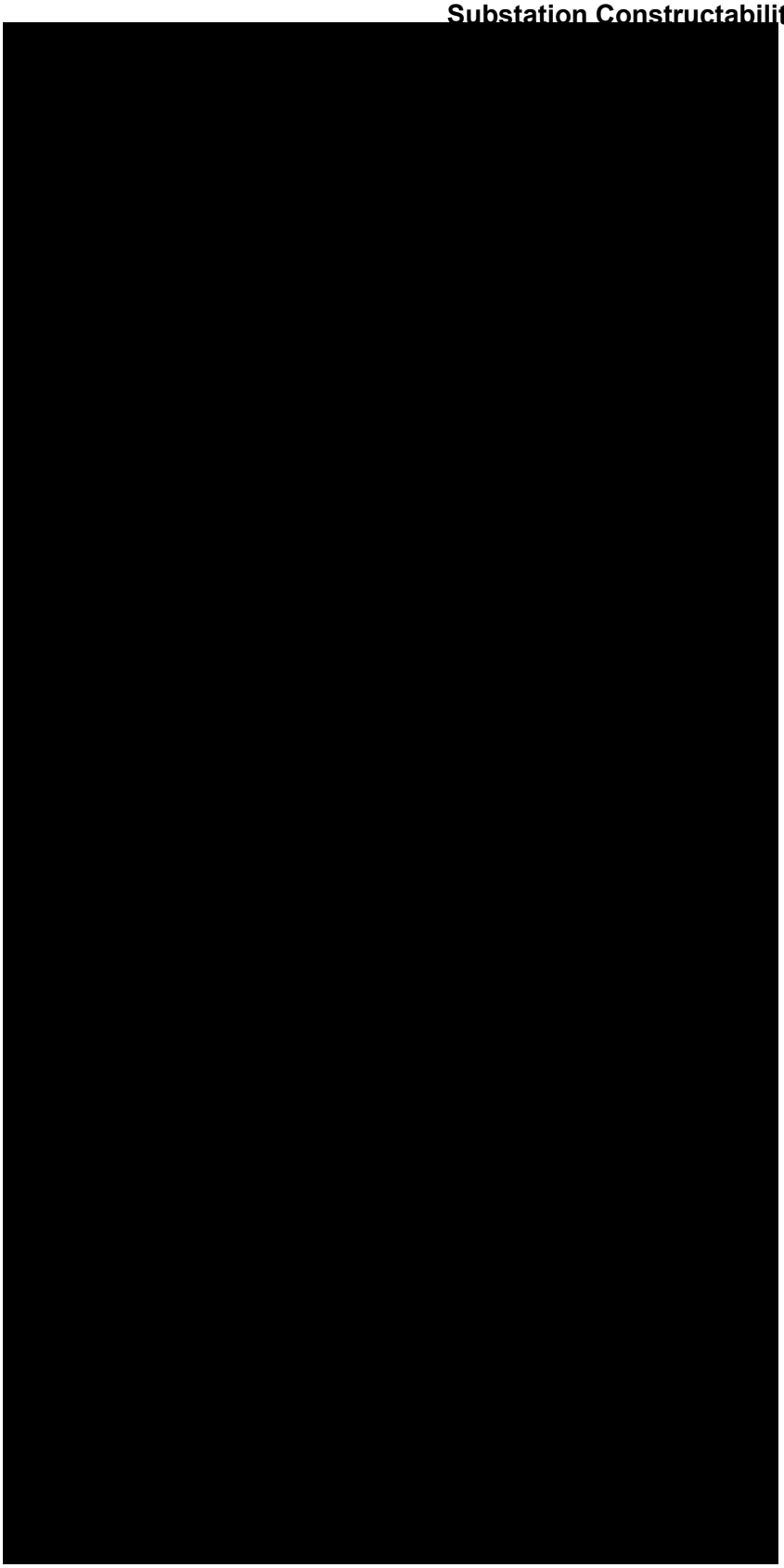

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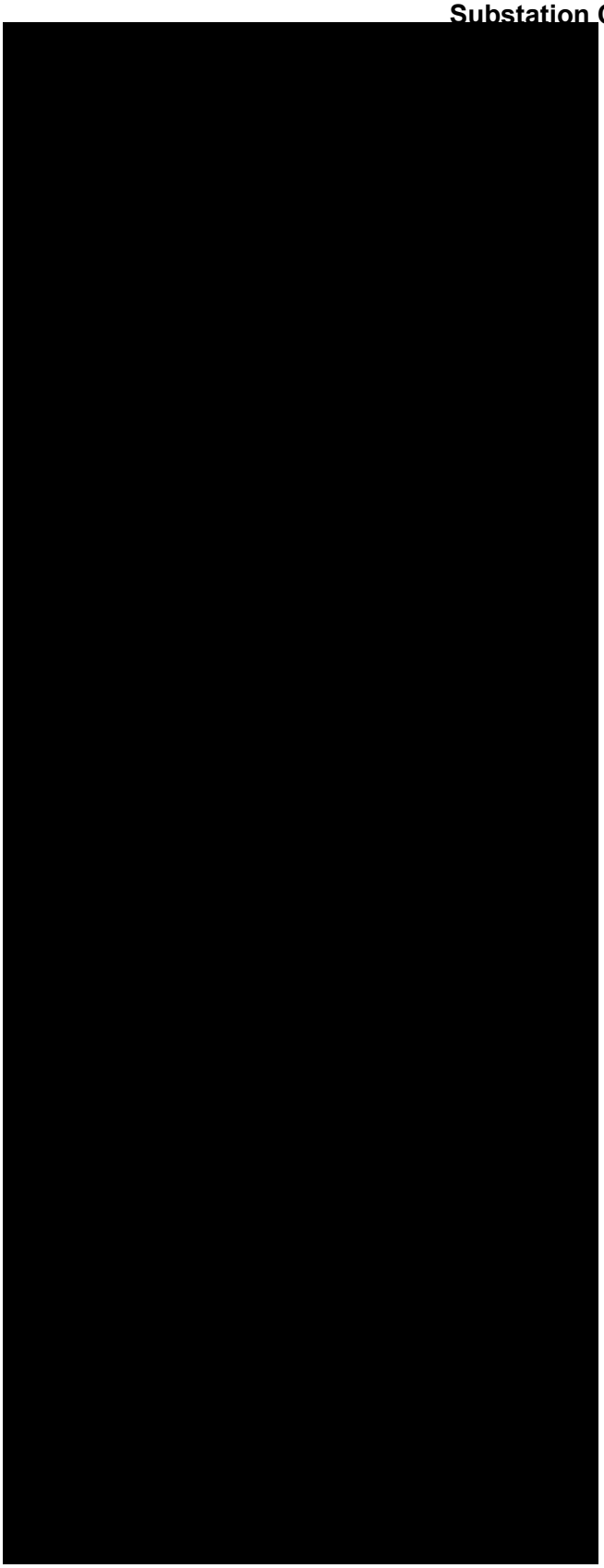

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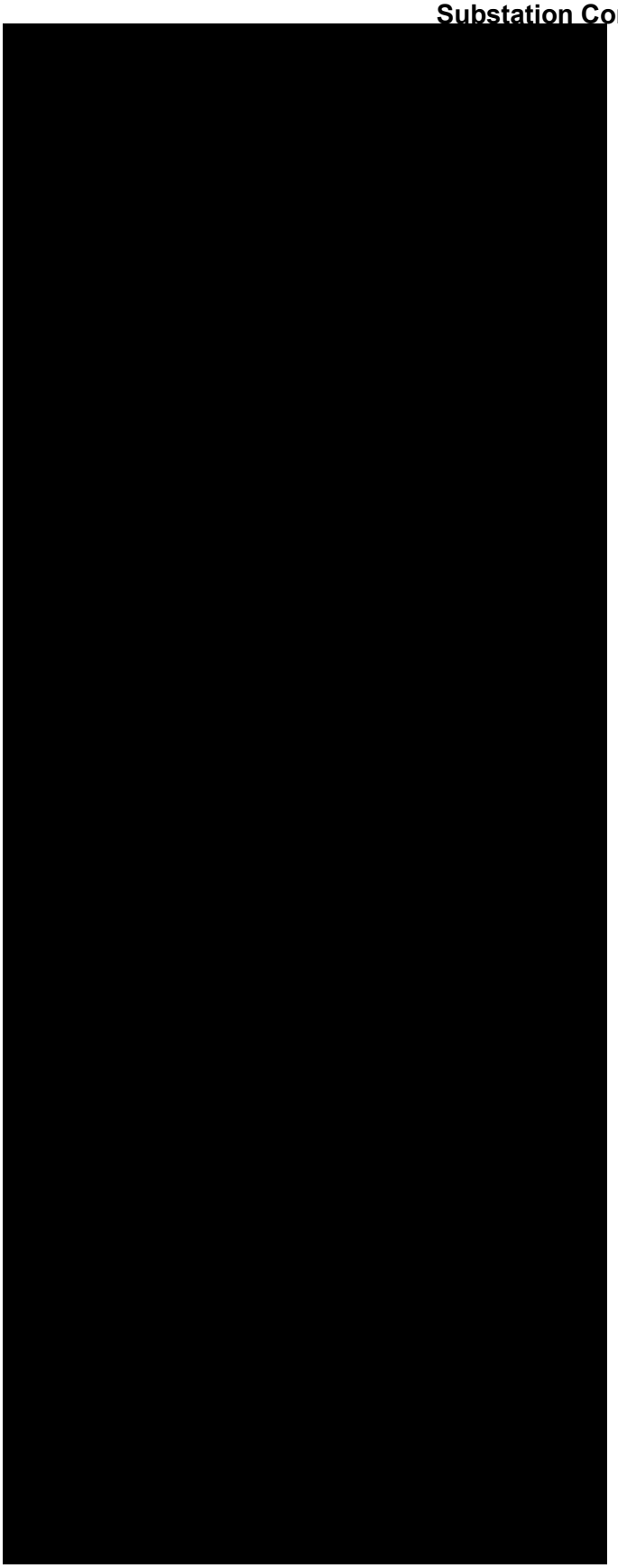

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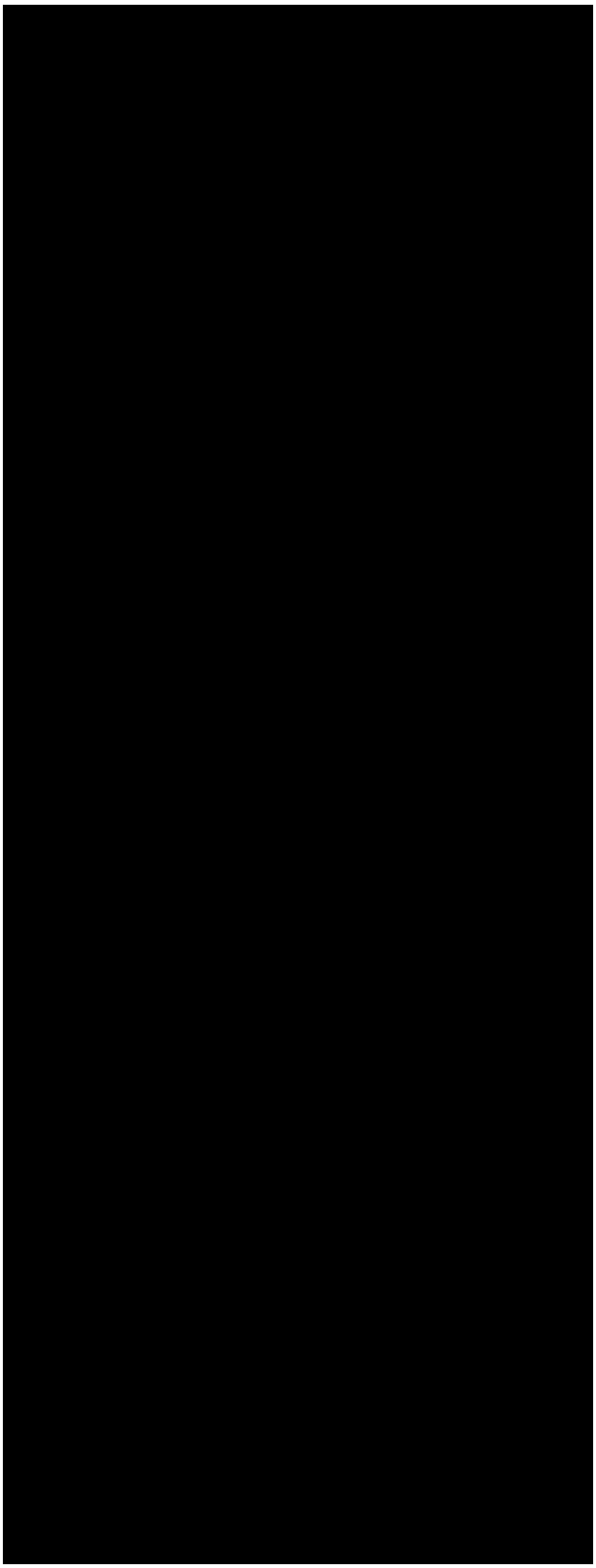
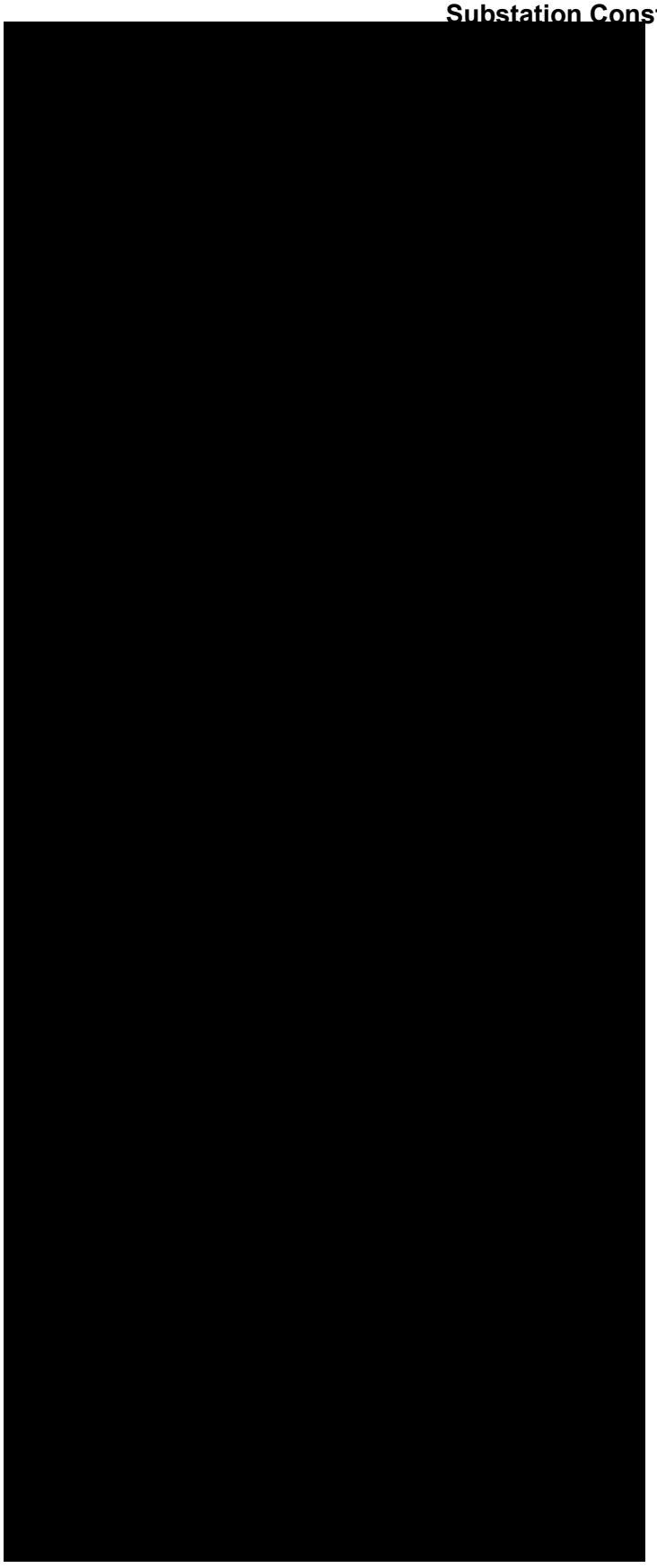
Substation Constructability Review



Constructability Review Form: **M6-PM-2012 - Eversource Substation Constructability Review**



EVERSOURCE

Constructability Review Form: **M6-PM-2012 - Eversource Substation Constructability Review**

