

PSE&G

New Transmission Line Proposal Eaglepoint to Penrose 230kV



Public Service Electric & Gas

7/28/2014

[Redacted content]

A. Executive Summary

- This report summarizes the conceptual study for the proposed Public Service Electric & Gas (PSE&G) Eagle Point to Penrose New 230kV Transmission Line Project.
- PSE&G's main office is located at 80 Park Plaza in Newark New Jersey 07102 with additional offices, operations and maintenance facilities stretching from the New York to Philadelphia metropolitan areas.
- [REDACTED]
- [REDACTED]
- The following proposal is to install a new Underground Cable for approximately 5.4 miles from Penrose to a new Ring Bus adjacent to Eagle Point including a underwater Delaware River Crossing [REDACTED]
- The proposed project cost: Approximately \$133 Million.
- The overall estimated schedule duration for the proposed solution is 4 (four) years.
- PSE&G currently has pre-qualification information on record submitted on June 21, 2013 under PJM ID# 1307.
- PSE&G maintains that the intent of this proposal is to seek designation to construct, own, operate, maintain and finance the proposed project, or some portion, as the designated entity for the proposed project.

B. Company Evaluation information

1. Experience

PSE&G has over 100 years of experience in the planning, construction, operation and maintenance of transmission and distribution system facilities in New Jersey. At present,

PSE&G wholly owns, operates and maintains the following existing circuit miles of transmission facilities in PJM:

Transmission Voltage Level	Circuit Miles
500 kV	378
345 kV	19
230 kV	560
138 kV	386
69 kV	115
Total	1,458

In 2013 PSE&G received the prestigious ReliabilityOne Award for the Mid-Atlantic region twelve years in a row by PA Consulting, a national industry benchmarking group. PSE&G was also named America's Most Reliable Electric Utility five out of the past nine years.

PSE&G received an award from the Edison Electric Institute for outstanding restoration efforts after Superstorm Sandy. The award acknowledges PSE&G for restoring power to its nearly 1.9 million customers impacted by Sandy, as well as for its outstanding storm management practices, such as communicating effectively with the public. This is the second year industry peers have honored PSE&G with this award; recognizing the utility each time for its efforts to restore service promptly after a storm or natural disaster. Previously, PSE&G received the award for its response efforts to Hurricane Irene and the subsequent flood that occurred in 2011.

PSE&G performs the required operations and maintenance activities on all of these facilities on a day to day basis.

PSE&G's notable technical qualifications and experience includes the following:

- [REDACTED]
- [REDACTED]

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- PSE&G developed interconnection arrangements with utilities in other regions that predate PJM's formation as an RTO.
- PSE&G has significant experience in securing the right to build in restricted and/or environmentally sensitive areas: e.g., [REDACTED]
- PSE&G also has significant experience in the Federal Environmental Permitting process [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] In recent years, PSE&G has completed a variety of significant transmission upgrades at various voltage levels.

PSE&G is uniquely qualified to perform this project based on a more than one hundred year track record of excellence in the construction, operations and maintenance of transmission facilities in this environment.

Transmission Projects Completed In Last 5 Years

1. Branchburg 500kV Capacitor Bank (b0290)

Description: The Branchburg 500kV Capacitor Bank Project consists of installing 400 MVAR capacitor banks at the Branchburg 500kV Switching Station as well as the installation of a new 500-kV Gas Insulated Switchgear (GIS) station adjacent to the existing Branchburg Switch.

[REDACTED]
Status: The project was placed in-service in May of 2012.

2. Bayonne – Marion Project (b1100)

Description: The Bayonne – Marion Project consists of constructing a new 230 kV underground pipe-type cable from Bayonne to the Marion substation and reconfiguring the Bayonne substation with new Gas Insulated Switchgear (GIS).

[REDACTED]
Status: The new circuit and GIS was placed in-service in December of 2012, and the remaining station reconfiguration was completed by June of 2013.

3. 5021 Loop Into New Freedom (b0498)

Description: This project provides for the looping of the existing Salem – East Windsor circuit into the New Freedom Substation.

[REDACTED]

Status: The project was placed in-service in March of 2009.

4. Branchburg –Flagtown-Somerville-Bridgewater C-2203 (b0664) (b0665) (b0668)

Description: This project consists of building a new 230kV transmission line from Branchburg Switching Station to Flagtown Switch Rack, separating the three ended terminal C-2203 line at Flagtown and terminate in a new 230-kV bus section at Branchburg Switching Station. The Flagtown-Somerville-Bridgewater line was reconductored to meet the required capacity of the reconfigured C-2203 line.

[REDACTED]

Status: The project was placed in-service in March of 2009.

5. J-3410 and K-3411 Re-conductoring – Waldwick Switching Station to South Mahwah Substation (b1017) (b1018)

Description: These two projects consist of removal of all previously existing circuit dielectric fluid, splices, terminations, conductors, expansion of manholes, testing pipe section integrity, installation of new copper circuit conductor, terminations, splices and associated anchor joints, skid joints, and stop joints, re-filling dielectric fluid, and repairing necessary pipe corrosion. Existing Waldwick and South Mahwah terminations were removed, and replaced with new terminations to meet the increased required.

[REDACTED]

Status: The project was placed in-service in May and December of 2011.

2. Rights of Way and Property Acquisition

[REDACTED]

Moreover, PSE&G has years of experience in undertaking the various processes necessary to secure certificates of public necessity and in acquiring the necessary rights-of-way needed to site facilities, including experience in exercising eminent domain authority.

PSE&G has extensive experience in land acquisition and negotiations associated with all types of utility projects including Transmission. PSEG has an internal Corporate Properties staff responsible for the oversight and management of the corporation's real estate assets, including the purchase and sale of property rights, leasing or licensing company owned property to or from third parties, and handling day

to day property maintenance issues that may arise. [REDACTED]

Accordingly, PSEG has extensive in-house expertise to handle acquisition of property for large transmission projects. PSE&G also hires the services of outside vendors [REDACTED]

Finally, PSE&G has an in-house Environmental Projects and Permitting group dedicated to gaining approvals and dealing with environmental issues for Electric Transmission and Distribution Projects. [REDACTED]

3. Financing

PSE&G maintains solid investment grade credit ratings. This allows us consistent access to the capital markets on reasonable terms. Our current senior secured credit ratings from S&P and Moody's are A and Aa3 respectively.

C. Proposed Project Constructability Information

1. Project Scope

The proposal includes a new, approximately 5.4 mile long, underground transmission line connecting the existing 230kV Penrose station to a new [REDACTED]
[REDACTED]

a. New Transmission Line Details

Terminal points

New 230kV Eagle Point station and existing Penrose 230kV Stations.

A general description of alternative routes or routing study area

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Geographic description of any terrain traversed by the proposed new line or the study area

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Route description by segment that includes lengths and widths and that classifies by:

[REDACTED]
[REDACTED]
[REDACTED]

- New right of way to be acquired – [REDACTED]
[REDACTED]
- Expansion of existing right of way – [REDACTED]

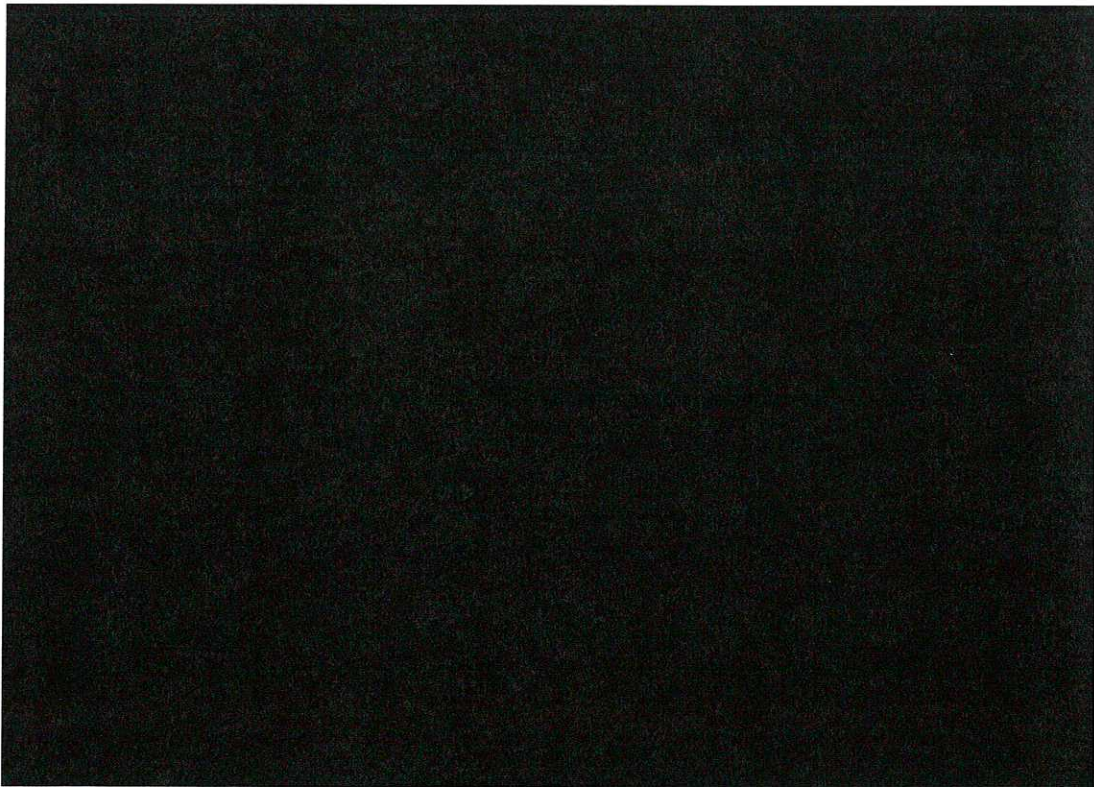
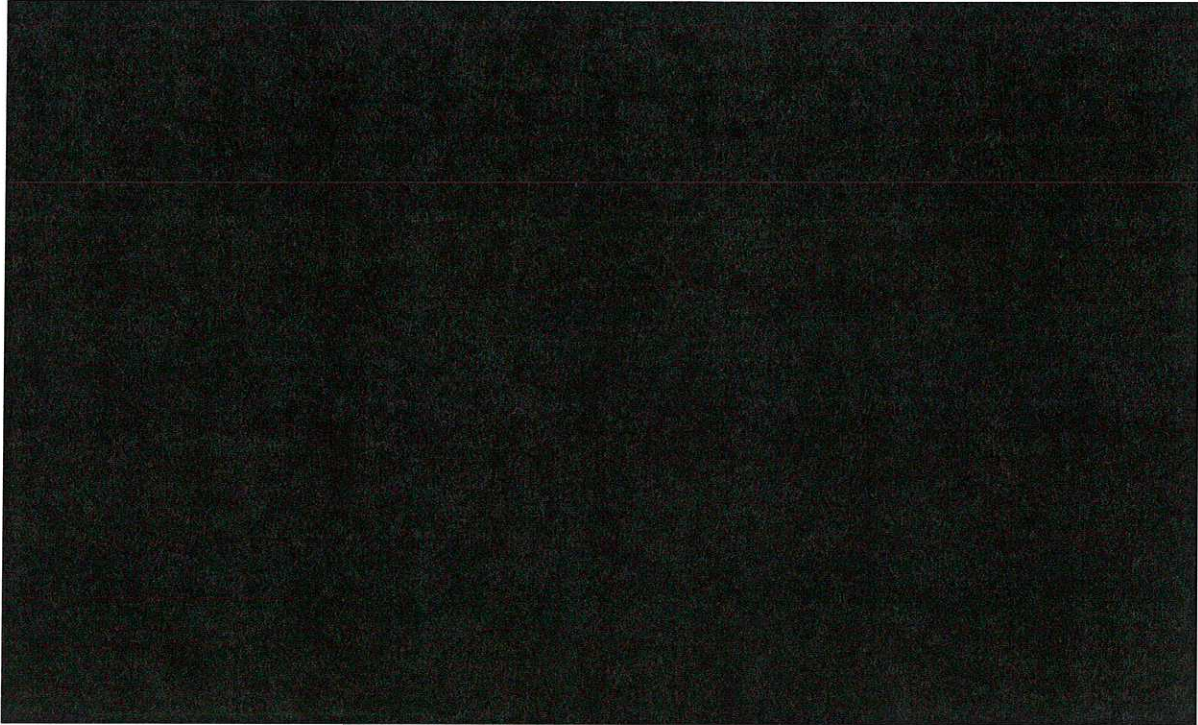
Electrical characteristics

- Nominal voltage rating – 230kV
- AC or DC - AC
- Line MVA normal and emergency rating – [REDACTED]
- Grounding design for underground or submarine circuits - [REDACTED]
[REDACTED]
- Equipment ratings – [REDACTED]
- Line impedances – [REDACTED] [REDACTED]
- Total mileage – approximately 5.4 miles

Physical characteristics

- Line and shield conductor type and size – [REDACTED]
- Overhead or underground/submarine – Underground

Geographic map with proposed transmission line study area superimposed



b. [Redacted]

General description of the proposed location(s)

[Redacted]

Land ownership in vicinity of proposed location(s)

[Redacted]

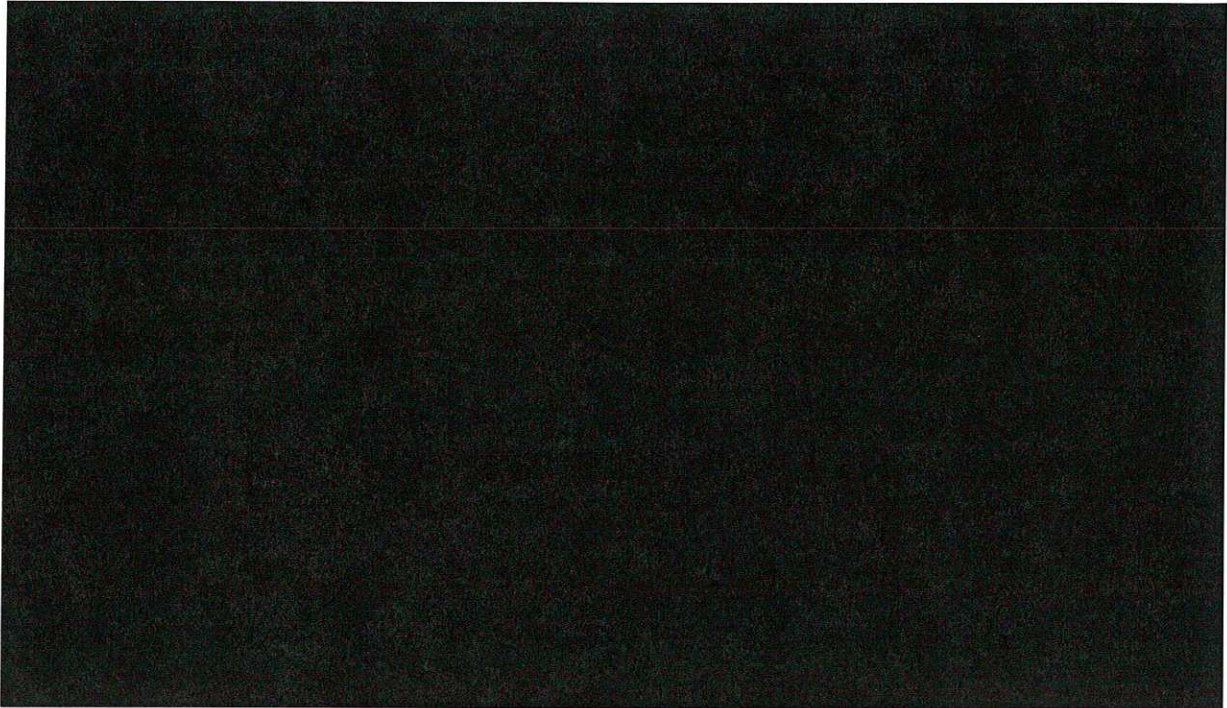
Electrical design including specifications and ratings for transformers or reactive devices

Equipment Rating – [Redacted]

One-line diagram and general arrangement drawing

[Redacted]

[Redacted]



c. Transmission Facilities to be constructed by others



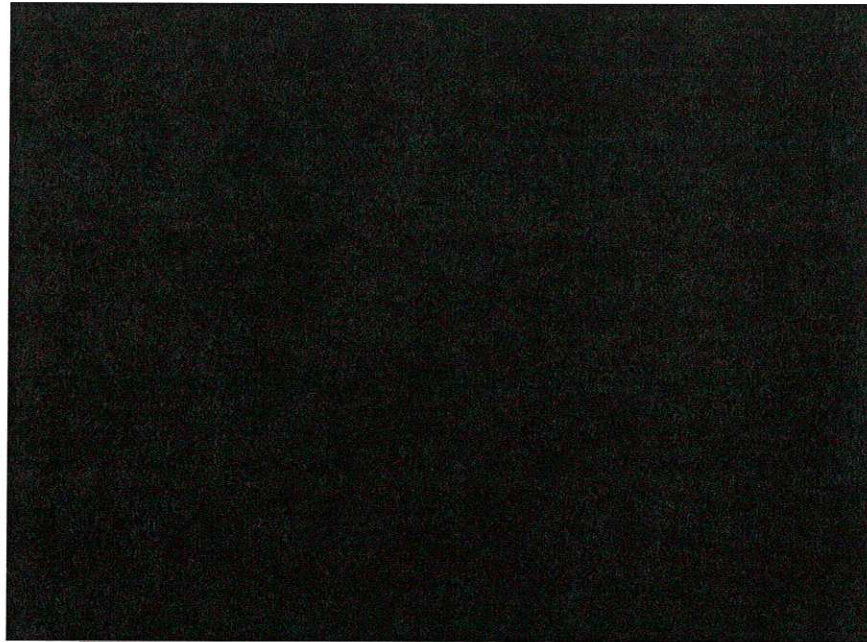
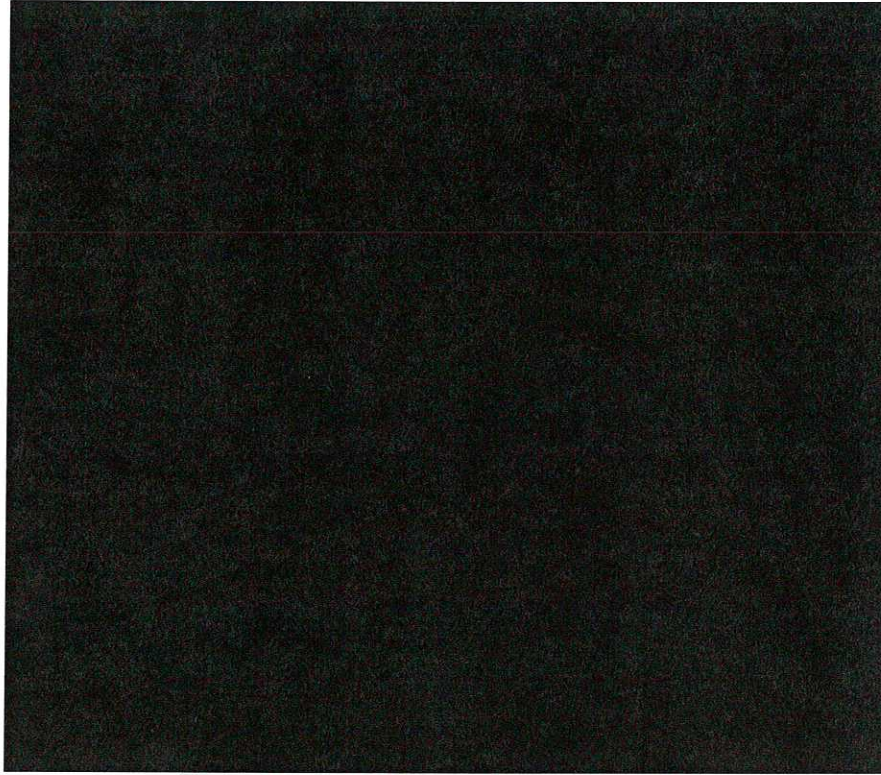
Additionally current protection and relay communications at Eagle Point and Penrose will need modification



c.1. Transmission line relocation

No existing transmission lines require relocation for this proposal.





Protection and controls plan

Line protection should be implemented appropriate to the current relay communications standards of both PSE&G and Penrose owner entity.

General description of the proposed expansion

It is proposed that Penrose station be modified to accommodate an additional line position, with associated breaker, [REDACTED]
[REDACTED]

Land ownership in vicinity of proposed expansion

[REDACTED]
[REDACTED]

Electrical design including specifications and ratings for transformers or reactive devices

Equipment Ratings - [REDACTED]

d. Environmental, Permitting and Land Acquisition

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
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- | [Redacted]
- | [Redacted]
- | [Redacted]

2. Project Component Cost estimate

- i. This document is found as attachment #1.

3. Schedule

- ii. This document is found as attachment #2.

4. On-going Transmission Facility Items

a. Operational Plan

The package shall contain the proposing entity's plan for operating the new Transmission Facilities for the proposed project. At a minimum, the plan should discuss the proposing entity's plan for securing a control center facility and provide required telemetry to PJM.

PJM is charged with control and operation of the Bulk Electric System (BES) in consultation and coordination with PSE&G's Electric System Operations Center (ESOC). The PSE&G transmission system consists of all equipment operated at 100kV and above that is used to transmit power. PSE&G operates the transmission system in compliance with the PJM Operating Agreement and Manuals. PSE&G will use its existing local control center facility with its current telemetry to communicate with PJM.

b. Maintenance Plan

PSE&G will incorporate the new transmission facilities into its existing transmission maintenance plan in compliance with organizational standards and regulations.

[REDACTED]

[REDACTED]

5. Assumptions

General

- [REDACTED]
- [REDACTED]
- [REDACTED]
- This project encounters both existing and proposed transmission crossings. It is assumed detailed engineering may provide opportunities to reduce the total number of crossings.

Permitting

- Property is available for new station, station expansion or new right of way
- Permits are available to construct in environmentally sensitive and other required areas
- No constraints for construction due to endangered or threatened species
- Right of way is available in proximity to existing lines

Cost

- Outages are available
- Resources are available
- No construction delays
- No material delays or exceptional cost increases
- No environmental remediation is required
- No litigation
- Space is available in station for line positions, transformer, and associated equipment
- Electrical construction costs are based on 2014 labor rates
- Civil construction costs are based on 2014 labor rates

Work Location

New Jersey

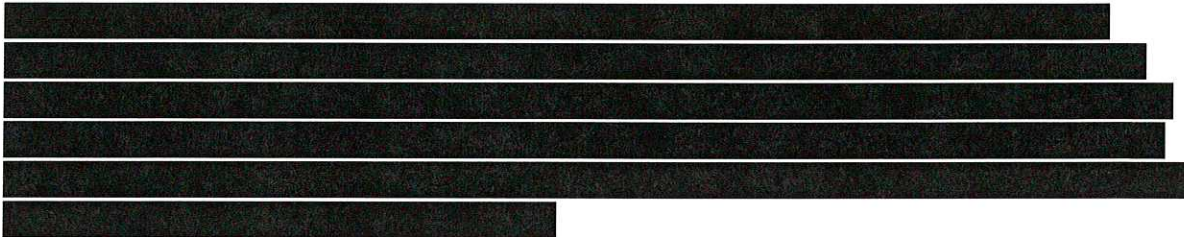
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Purpose of Estimate

Provide budget estimates based on a cost per mile for multiple routes; these estimates are to assist in the determination of route selection and further project development feasibility.

- Estimate includes Risk & Contingency
- Estimate does not include escalation
- Estimate does not include sales tax



Estimated Project Durations

- The estimated durations are conservative, high-level estimates of the project duration from kickoff to energization.
- Permitting schedule tasks were developed in coordination with PSE&G staff familiar with local and recent projects of similar scope and nature.
- It is assumed that construction resources required for this project will be available. Lack of available construction resources could impact project durations.
- It is assumed that line outages will be available.
- Lack of available outages could impact project durations.
- No input from utilities other than PSE&G or federal, state, or local agencies was available for the study.
- Other potential risks that could affect the schedule might include public opposition and organized opposition groups, state siting approval, NEPA constraints, permit and clearances, construction issues, and mitigation requirements.

D. Proposed Project Results and Technical Information

1. Scope of Project

During the Generation Deliverability analysis for the 2014 RTEP, multiple overloads were identified in the Monroe-Mickleton-Gloucester corridor. A new 230kV underground cable, originating at Eagle Point 230kV and terminating at Penrose 230kV [REDACTED]

[REDACTED]

2. Analysis

[REDACTED]

3. Additional Benefits

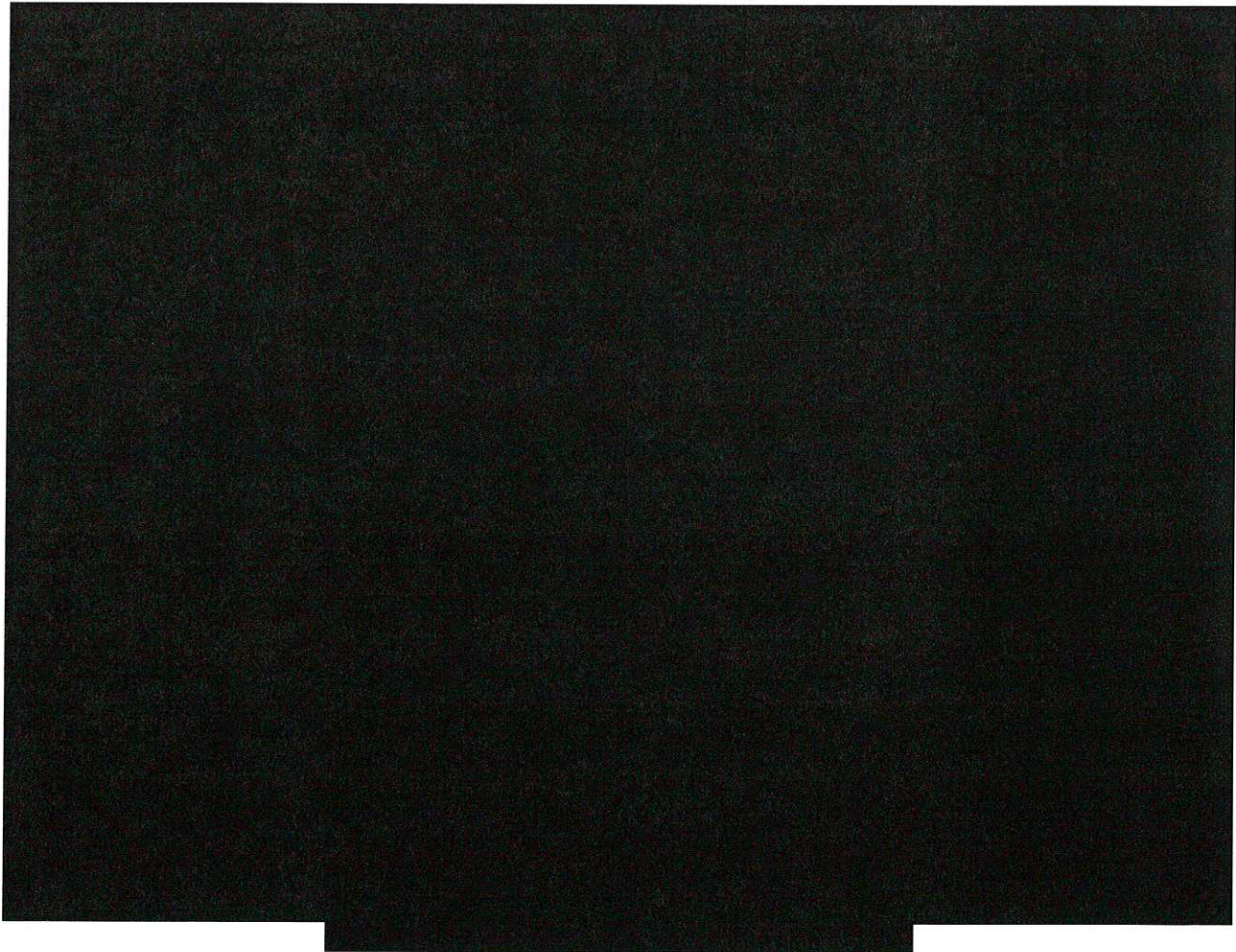
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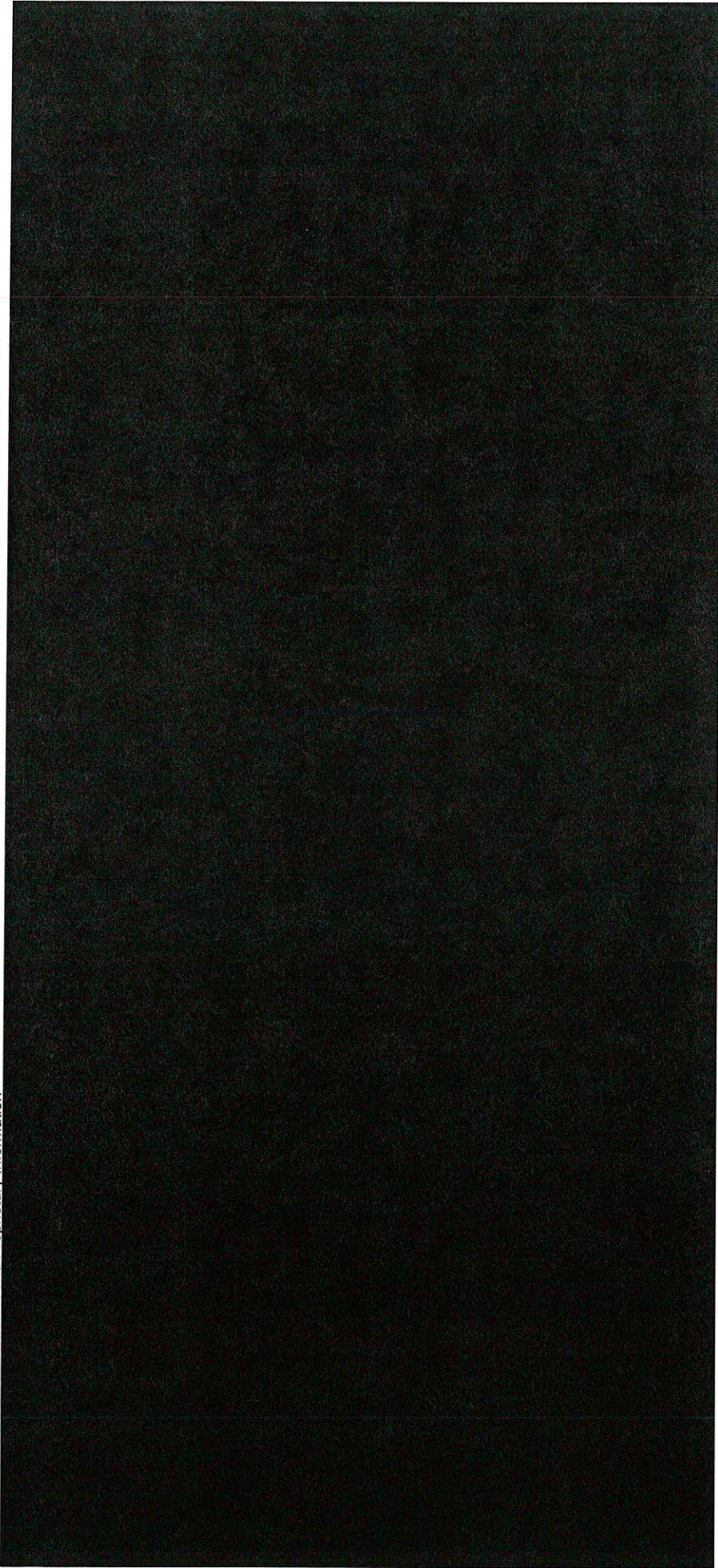
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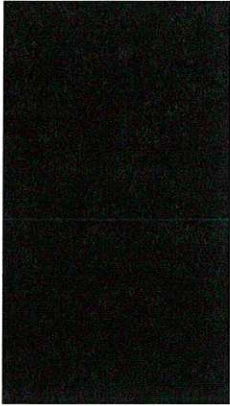
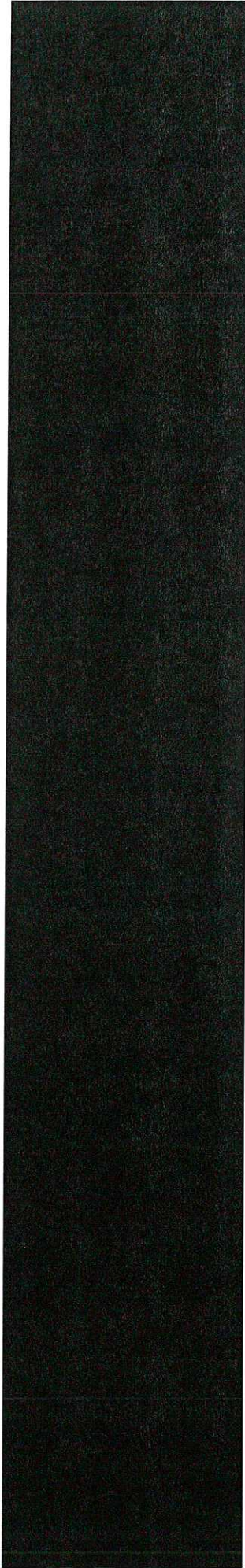
Eagle Point to Penrose 230kV		
Eagle Point to Shore at 230kV - 3000 XLPE		
R (pu)	X (pu)	B (pu)
0.0001175	0.0014879	0.2545744
Shore to Penrose - Submarine		
R (pu)	X (pu)	B (pu)
0.0001358	0.0012812	0.0444854
Total Impedance		
R (pu)	X (pu)	B (pu)
0.0002533	0.0027690	0.2990599

Table 1 – Eagle Point to Penrose 230KV Impedances





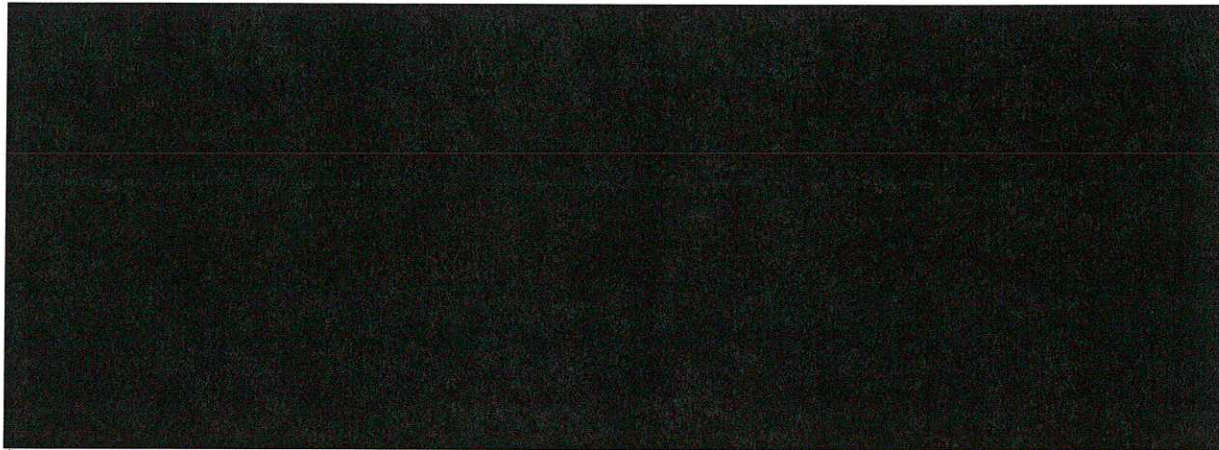
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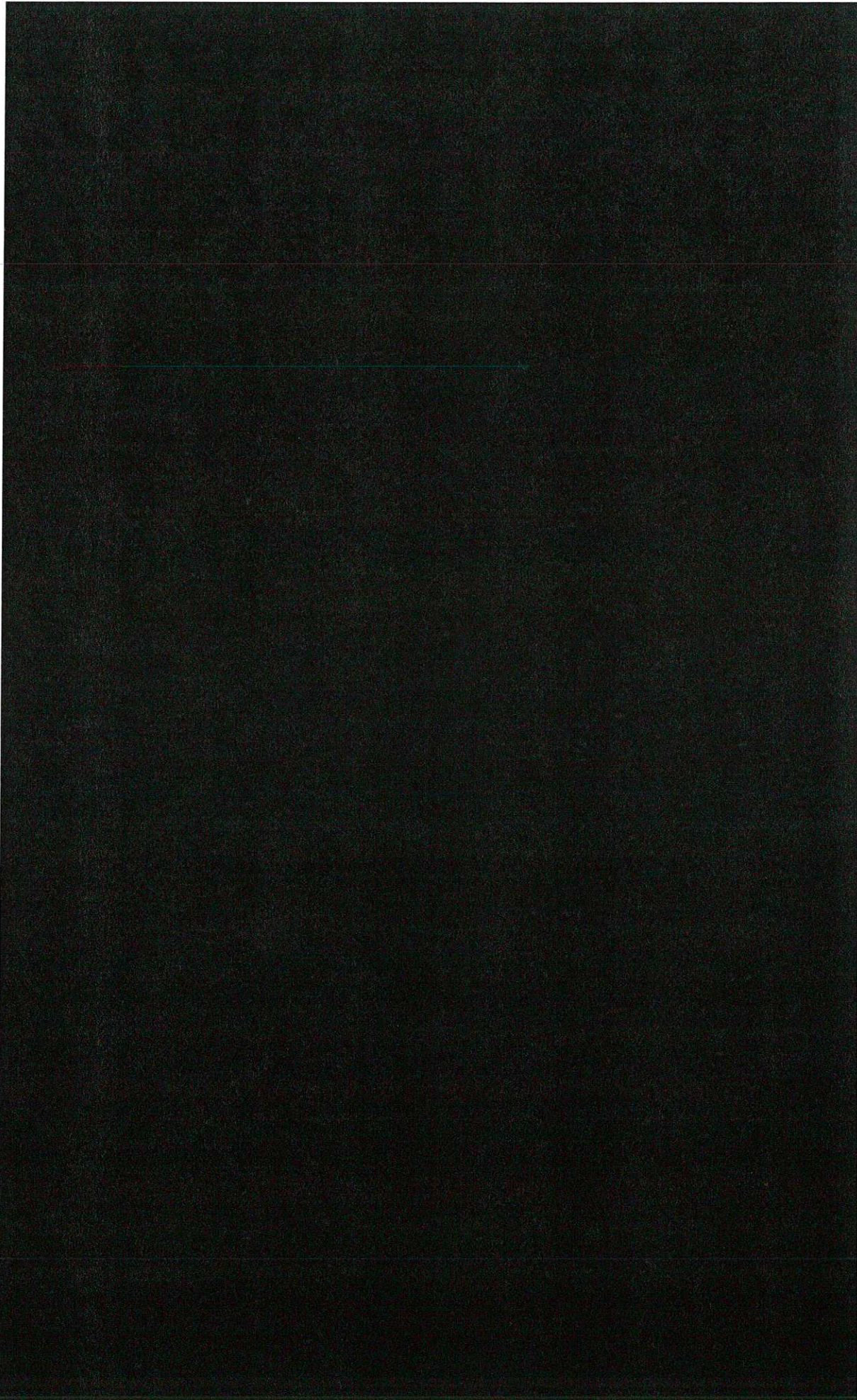
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Attachment #1: Cost Estimate



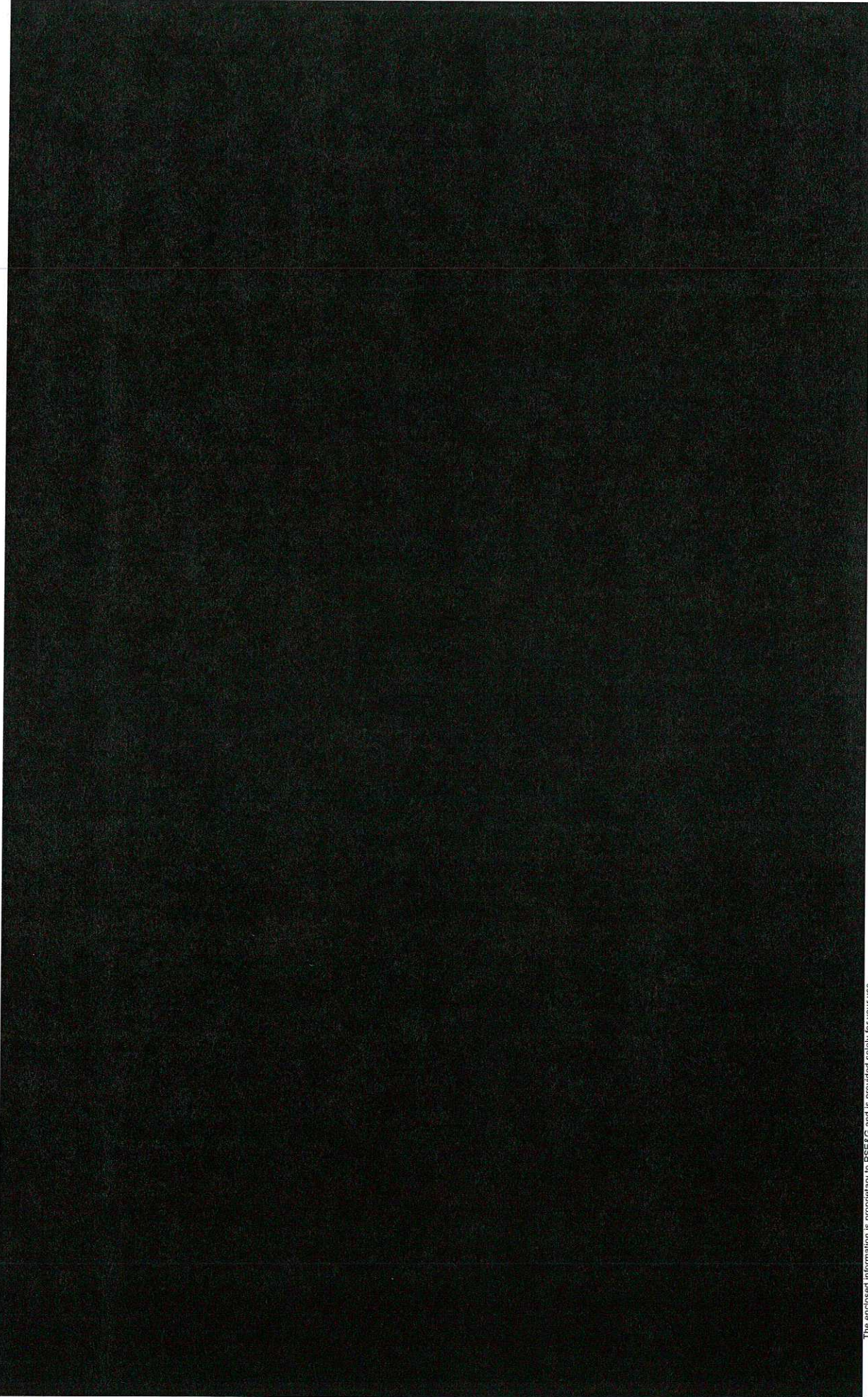
<i>Option Base Total Cost</i>	\$88,789,926
Scope Change Risk & Contingency	\$44,394,963
<i>Total Option Base Cost Total with R&C</i>	\$133,184,890

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