



Regulatory Investment Test for Distribution (RIT-D)

Addressing Reliability Requirements in the LDM Network Area

Final Project Assessment Report

13 January 2023

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

EXECUTIVE SUMMARY

About Energex

Energex Limited (Energex) is a subsidiary of Energy Queensland Limited and manages the electricity distribution network in the growing region of South East Queensland which includes the major urban areas of Brisbane, Gold Coast, Sunshine Coast, Logan, Ipswich, Redlands and Moreton Bay. Our electricity distribution area runs from the NSW border north to Gympie and west to the base of the Great Dividing Range.

Our electricity network consists of approximately 54,200 kilometres of powerlines and 680,000 power poles, along with associated infrastructure such as major substations and power transformers.

Today, we provide distribution services to more than 1.4 million domestic and business connections, delivering electricity to a population base of around 3.4 million people.

Identified Need

Lindum Zone Substation (SSLDM) is a 33kV switching station linking 110/33kV bulk supply substations SSLBS (Lytton Bulk Supply), and SSDBS (Doboy Bulk Supply). SSLBS is radially fed by two 110kV feeders on the same towers, from H21 (Powerlink Substation at Murrarie). SSLBS 33kV system feeds a total 22,700 customers (21,229 residential and 1,471 business), with a residential consumption of 115.03GWh and business consumption of 435.21 GWh. Several 33kV/11kV Zone Substations are fed by SSLBS, which include: SSGIS (Gibson Island), SSLYT (Lytton), SSFIS (Fishermans Island), SSFBS (Fishermans Bulk Supply), SSWYN (Wynnum), SSLBS (Lytton Bulk Supply), SSLTA (LTA). There are large industrial customers supplied from the 33kV network of SSLBS including, one with a maximum demand of 24.8MVA and energy consumption of 147GWh per annum, another with a maximum demand of 19.2MVA and energy consumption of 128GWh per annum and a third with a maximum demand of 11.2MVA and energy consumption of 48.1GWh per annum. SSLDM provides an alternate supply for SSLBS.

Based on a Condition Based Risk Management (CBRM) analysis, the following have been deemed to reach their retirement age at SSLDM:

- Eight 33kV Circuit Breakers: CB3X12, CB3X22, CB5992, CB6002, CB6812, CB6822, CB6872 and CB6882 by 2023
- 36 concrete busbar supports
- 13 electronic protection relays

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

Approach

The National Electricity Rules (NER) require that, subject to certain exclusion criteria, network business investments for meeting service standards for a distribution business are subject to a Regulatory Investment Test for Distribution (RIT-D). Energex has determined that network investment is essential in this case for it to continue to provide electricity to the consumers and generators in the SSLBS supply area in a reliable, safe, and cost-effective manner. Accordingly, this investment is subject to a RIT-D.

Energex published a Draft Project Assessment Report for the above described network constraint on 16 November 2022. No submissions were received by the closing date of 28 December 2022.

One potentially feasible option has been investigated:

- Option A: Replace Outdoor CBs and Maintain SSLDM

This Final Project Assessment Report (FPAR), where Energex provides both technical and economic information about possible solutions, has been prepared in accordance with the requirements of clause 5.17.4(o) of the NER.

Energex's preferred solution to address the identified need is Option A – Replace Outdoor CBs and maintain SSLDM

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

CONTENTS

Executive Summary	2
About Energex.....	2
Identified Need	2
Approach	3
1. Introduction	7
1.1. Response to the DPAR.....	7
1.2. Structure of the Report.....	7
1.3. Dispute Resolution Process.....	8
1.4. Contact Details.....	8
2. Background.....	9
2.1. Geographic Region	9
2.2. Existing Supply System	13
2.3. Load Profiles / Forecasts	15
2.3.1. Full Annual Load Profile	16
2.3.2. Load Duration Curve	17
2.3.3. Average Peak Weekday Load Profile (Summer)	18
2.3.4. Base Case Load Forecast.....	19
2.3.5. High Growth Load Forecast	20
2.3.6. Low Growth Load Forecast	21
3. Identified Need	22
3.1. Description of the Identified Need.....	22
3.1.1. Aged and Poor Condition Assets	22
3.1.2. Reliability	22
3.1.3. Safety Net Non-Compliance.....	22
3.2. Quantification of the Identified Need.....	23
3.2.1. Aged and Poor Condition Assets	23
3.2.2. Safety Net Non-Compliance.....	23
3.2.3. Risk Quantification Benefit Summary	24
3.3. Assumptions in Relation to Identified Need	24
3.3.1. Forecast Maximum Demand	24
3.3.2. Load Profile	25
4. Credible Options Assessed	25

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

4.1.	Assessment of Network Solutions	25
4.1.1.	Option A: Replace Outdoor CBs and Maintain SSLDM	25
4.2.	Assessment of Non-Network Solutions	27
4.2.1.	Non-Network Solution Summary	27
4.3.	Preferred Network Option	27
5.	Summary of Submissions Received in Response to Draft Project Assessment Report ...	28
6.	Market Benefit Assessment Methodology	28
6.1.	Classes of Market Benefits not Expected to be Material	28
6.1.1.	Changes in Voluntary Load Curtailment	28
6.1.1.	Changes in Costs to Other Parties	28
6.1.1.	Changes in Timing of Expenditure	29
6.1.1.	Changes in Load Transfer Capability	29
6.1.1.	Changes in Network Losses	29
6.1.1.	Option Value	29
7.	Detailed Economic Assessment	29
7.1.	Methodology	29
7.2.	Key Variables and Assumptions	29
7.3.	Net Present Value (NPV) Results	30
8.	Conclusion	32
8.1.	Preferred Option	32
8.2.	Satisfaction of RIT-D	32
9.	Compliance Statement	33
	Appendix A – The Rit-D Process	34
	List Of Figures	
	Figure 1: Existing network arrangement (geographic view)	10
	Figure 2: Existing 110kV network arrangement (Schematic)	11
	Figure 3: Existing 33kV network arrangement LDM (geographic view)	12
	Figure 4: Existing network arrangement (schematic view)	14
	Figure 5: Lindum Substation (geographic view)	15
	Figure 6: Substation actual annual load profile	16

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

Figure 7: Substation load duration curve.....	17
Figure 8: Substation average peak weekday load profile (summer)	18
Figure 9: Substation base case load forecast	19
Figure 10: Substation high growth load forecast	20
Figure 11: Substation low growth load forecast	21
Figure 12: Annualised Benefits of Option A.....	24
Figure 13: Option A proposed network arrangement (schematic view)	26
List Of Tables	
Table 1: Base case NPV ranking table.....	30

Addressing Reliability Requirements in the LDM Network Area

Final Project Assessment Report

1. INTRODUCTION

This Final Project Assessment Report has been prepared by Energex in accordance with the requirements of clause 5.17.4(o) of the NER.

This report represents the final stage of the consultation process in relation to the application of the RIT-D on potential credible options to address the identified need for the SSLDM network area.

In preparing this RIT-D, Energex is required to consider reasonable future scenarios. With respect to major customer loads and generation, Energex has, in good faith, included as much detail as possible while maintaining necessary customer confidentiality. Potential large future connections that Energex is aware of are in different stages of progress and are subject to change (including outcomes where none or all proceed). These and other customer activity can occur over the consultation period and may change the timing and/or scope of any proposed solutions.

1.1. Response to the DPAR

Energex published a Draft Project Assessment Report for the identified need in the Lindum network area on the 16 November 2022. No submissions were received by the closing date of the 28 December 2022.

1.2. Structure of the Report

This report:

- Provides background information on the network capability limitations of the distribution network supplying the LDM area.
- Identifies the need which Energex is seeking to address, together with the assumptions used in identifying and quantifying that need.
- Describes the credible options that are considered in this RIT-D assessment.
- Quantifies costs and classes of material market benefits for each of the credible options.
- Describes the methods used in quantifying each class of market benefit.
- Provides details of classes of market benefits that are not considered material to this RIT-D assessment and provides explanations as to why these classes of market benefits are not considered material.
- Provides the results of Net Present Value (NPV) analysis of each credible option and accompanying explanatory statements regarding the results.
- Identifies the proposed preferred option, including detailed characteristics, estimated commissioning date, indicative costs, and noting that it satisfies the RIT-D.
- Provides contact details for queries on this RIT-D.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

1.3. Dispute Resolution Process

In accordance with the provisions set out in clause 5.17.5(a) of the NER, Registered Participants or Interested Parties may, within 30 days after the publication of this report, dispute the conclusions made by Energex in this report with the Australian Energy Regulator. Accordingly, Registered Participants and Interested Parties who wish to dispute the conclusions outlined in this report based on a manifest error in the calculations or application of the RIT-D must do so within 30 days of the publication date of this report. Any parties raising a dispute are also required to notify Energex. Dispute notifications should be sent to demandmanagement@energex.com.au

If no formal dispute is raised, Energex will proceed with the preferred option to Replace 33kV outdoor circuit breakers, replace suspect busbar support structures. Replace protection relays that have reached retirement age, and upgrade substation security.

1.4. Contact Details

For further information and inquiries please contact:

E: demandmanagement@energex.com.au

P: 13 74 66

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

2. BACKGROUND

2.1. Geographic Region

Lindum substation (SSLDM) is a 33kV switching station providing alternate 33kV supply to SSLBS (Lytton Bulk Supply Substation). SSLBS supply area is predominately industrial supply with several major industrial customers. LBS supplies seven 33/11/kV zone substations (GIS Gibson Island, LYT Lytton, FIS Fishermans Island, FBS Fishermans Island Bulk, WNM Wynnum, LTA Lota, LBS Lytton Bulk Supply) providing electricity supply to approximately 22,700 customers, of which 94% are residential and 6% are commercial, and industrial. Total energy supplied by LBS is 550.24 GWh of which 79% is used by in commercial and industrial processes and 21% by residential customers

LBS is radially fed by two 110kV power lines on the same tower coming from Powerlink's H21 Substation, Murrarie. SSLDM provides a necessary backup supply to SSLDM for a credible contingency event.

The geographical location of Energex's 110kV network and substations in the area is shown in Figure 1 and Figure 2 provides a schematic view. LDM 33kV feeder geographic view is shown in Figure 3

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report



Figure 1: Existing network arrangement (geographic view)

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

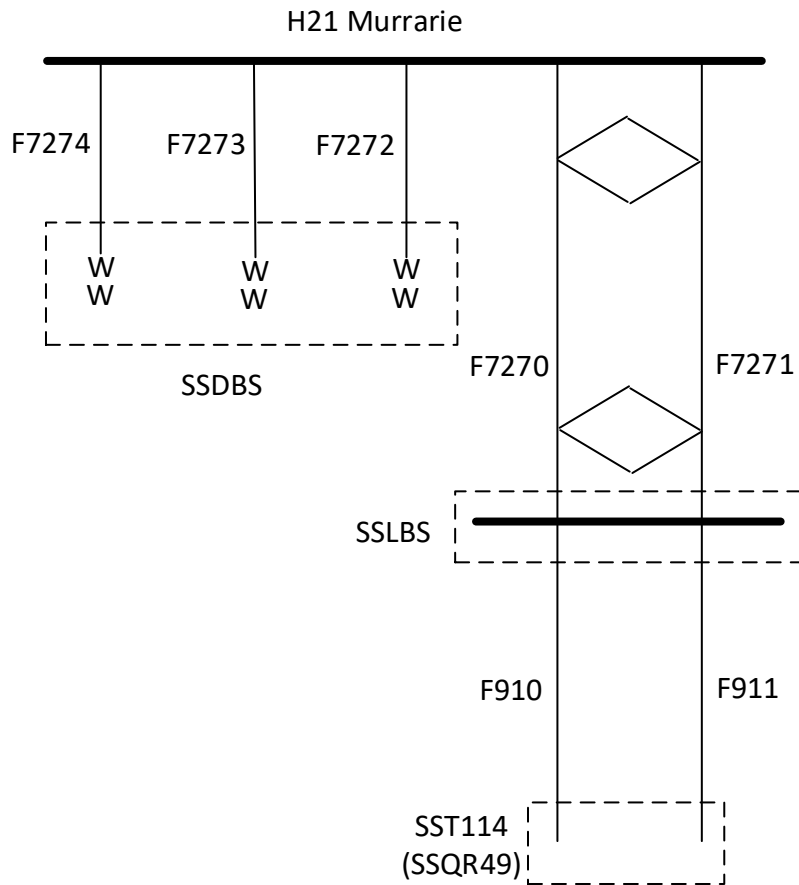


Figure 2: Existing 110kV network arrangement (Schematic)

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

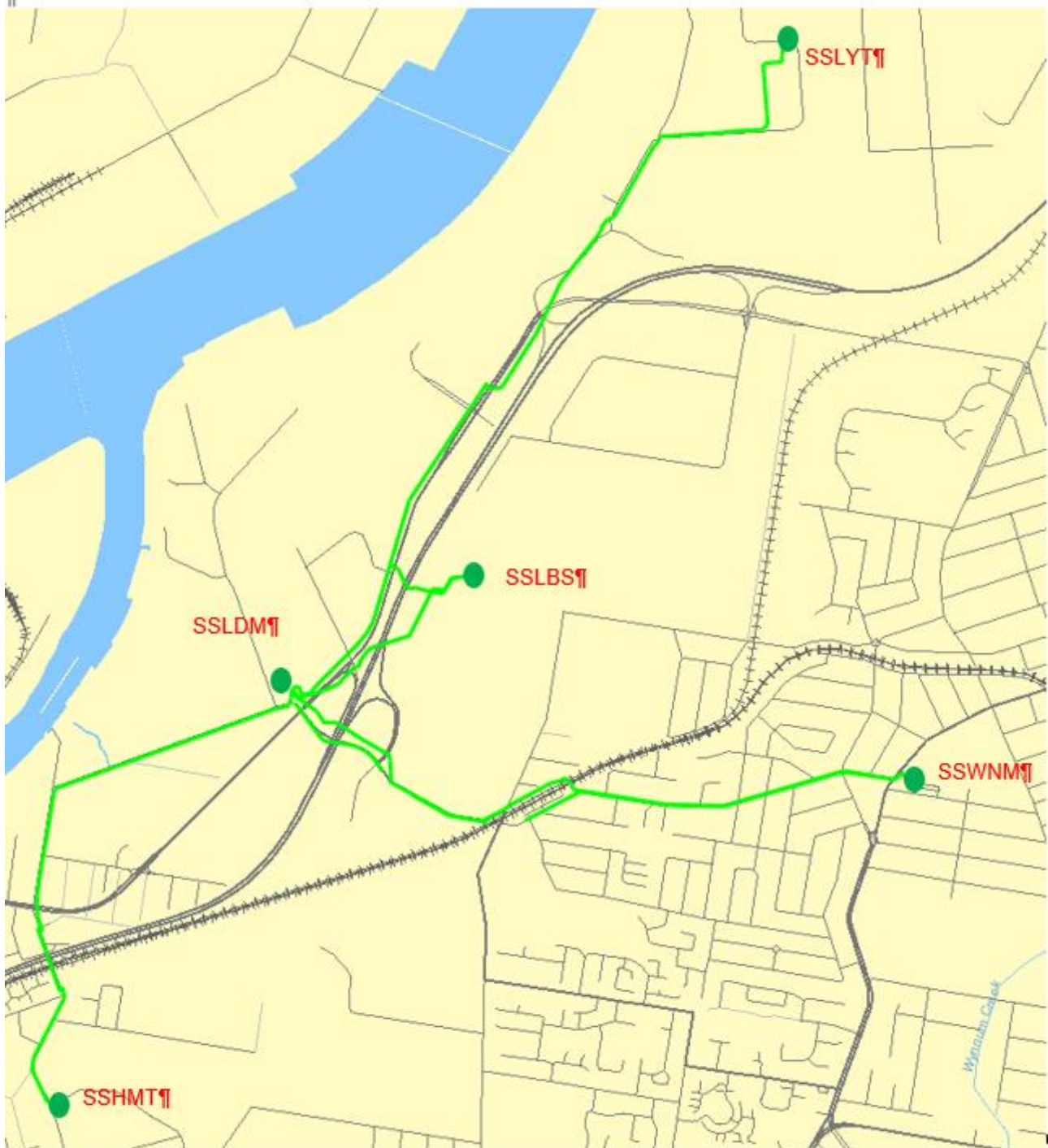


Figure 3: Existing 33kV network arrangement LDM (geographic view)

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

2.2. Existing Supply System

Lindum 33kV Switching Substation (SSLDM) is located approximately 2.7 km NE from H21 Murrarie and approximately 800m SW of LBS Lytton Bulk Supply beside the Port of Brisbane Motorway. The substation is part of the LBS / DBS 33kV sub-transmission network and aides in providing supply to Lytton Bulk Supply 110/33kV Bulk Supply Substation (LBS) for total loss of 110kV supply to SSLBS. Lindum Substation is presently supplied via two incoming 33kV feeders from LBS Lytton Bulk Substation, and there are two outgoing 33kV feeders from Lindum Substation which provide supply to Wynnum 33/11kV Substation (WNM), there is a 33kV feeder CB which is normally open at HMT (Hemmant Zone Substation) plus a tee 33kv feeder normally open at LYT (Lytton Zone Substation).

Lindum Substation was established in 1972 according to applicable design and construction standards during that time. It has an outdoor 33kV switchyard with concrete structures, and a small protection and control building.

The 33kV bus contains two bus tie circuit breakers and six 33kV feeder circuit breakers. There are eight sets of manually operated 33kV bus isolators. There is a 33kV VT providing 110 V supply for protection relay functions. Existing 415V supply to the substation is provided by the outside local distribution network. For loss of distribution supply there is no alternate backup arrangements.

A schematic view of the existing sub-transmission network arrangement is shown in Figure 4 and the geographic view of Lindum Substation is illustrated in Figure 5.

Addressing Reliability Requirements in the LDM Network Area

Final Project Assessment Report

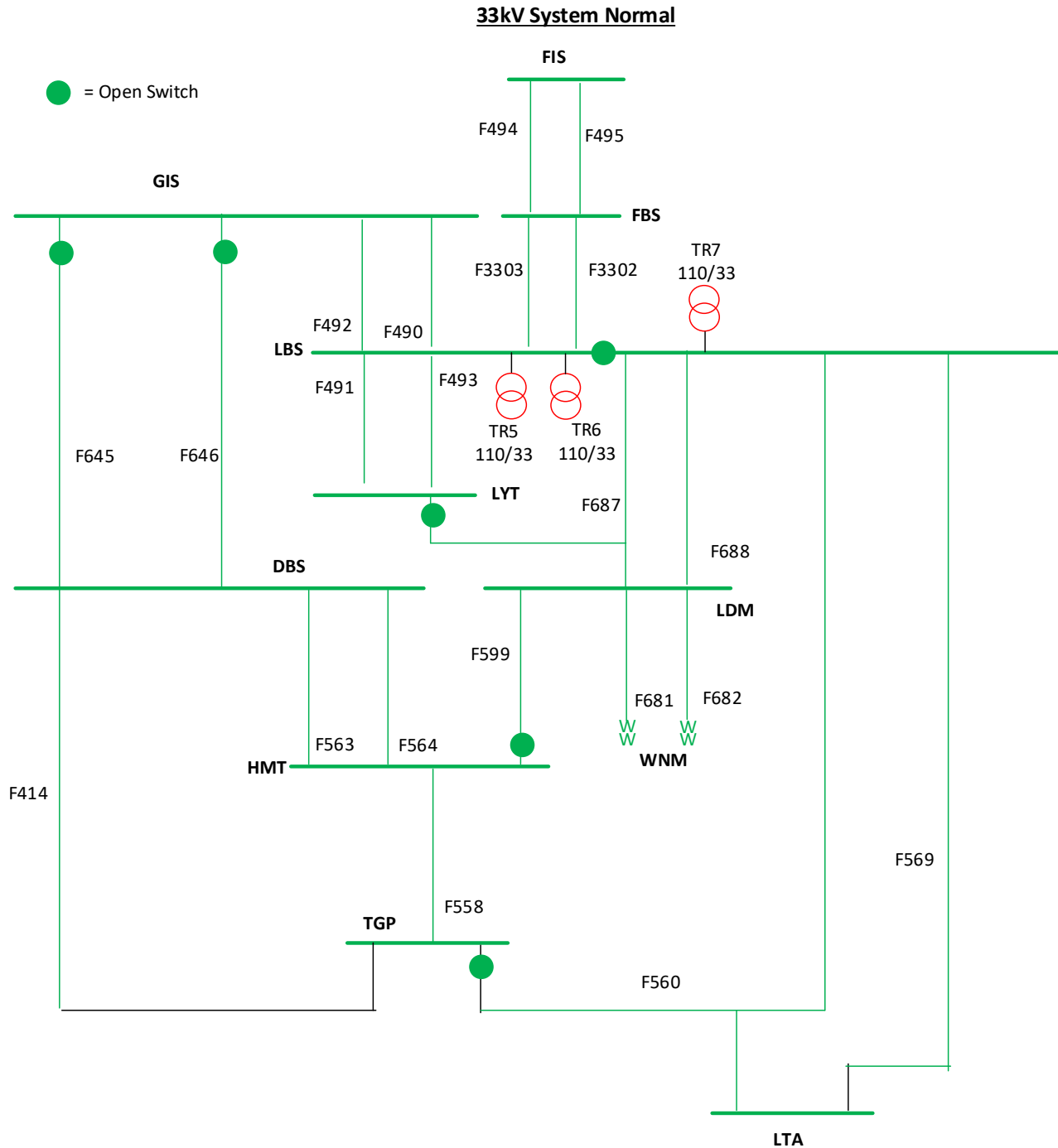


Figure 4: Existing network arrangement (schematic view)

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report



Figure 5: Lindum Substation (geographic view)

2.3. Load Profiles / Forecasts

The load at Lytton Bulk Supply Substation (110/33kV) comprises a mix of residential and commercial/industrial customers. The load is summer peaking, and the annual peak loads are predominantly driven by industrial processes.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

2.3.1. Full Annual Load Profile

The full annual load profile for LBS Substation over the 2021/22 financial year is shown in **Error! Reference source not found.6**. It can be noted that the peak load occurs during summer.

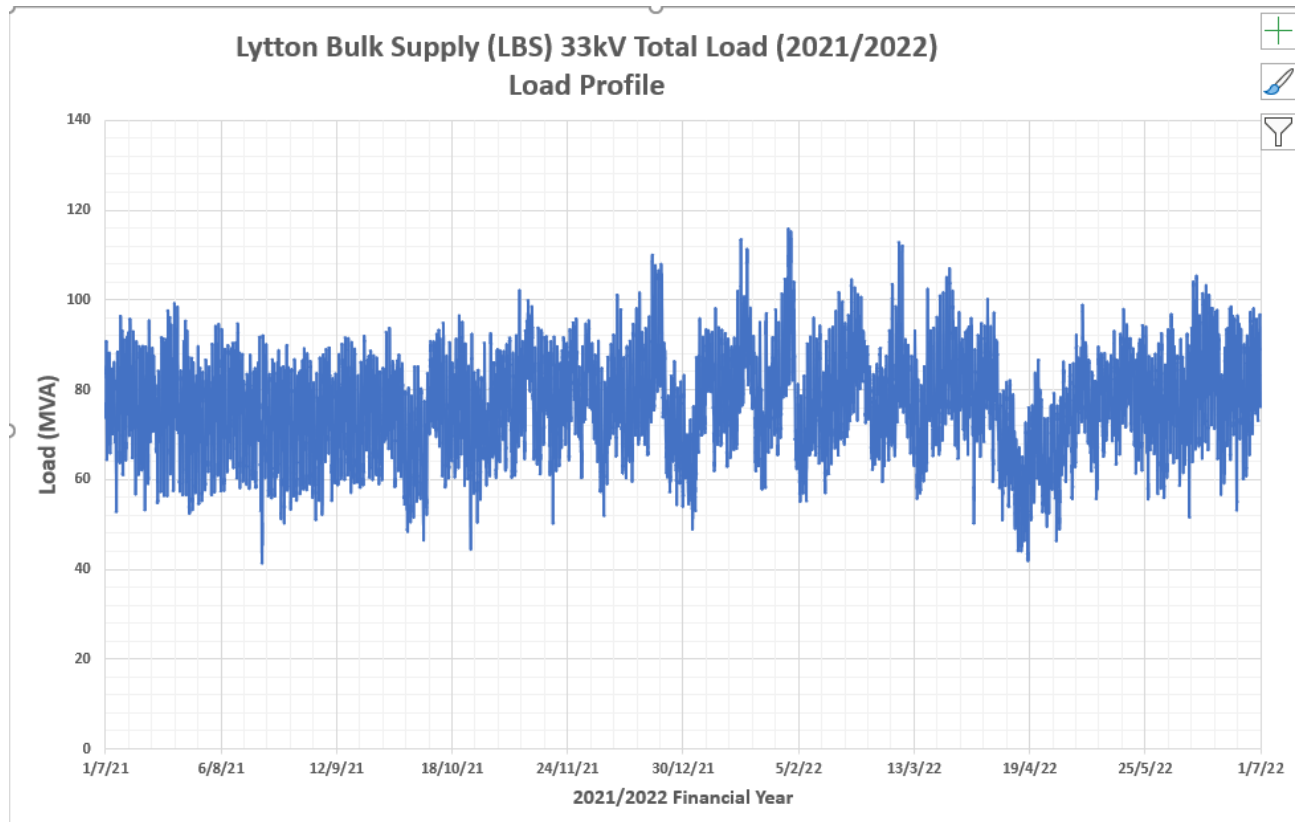


Figure 6: Substation actual annual load profile

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

2.3.2. Load Duration Curve

The load duration curve for LBS Substation over the 2021/22 financial year is shown in **Error!**
Reference source not found..

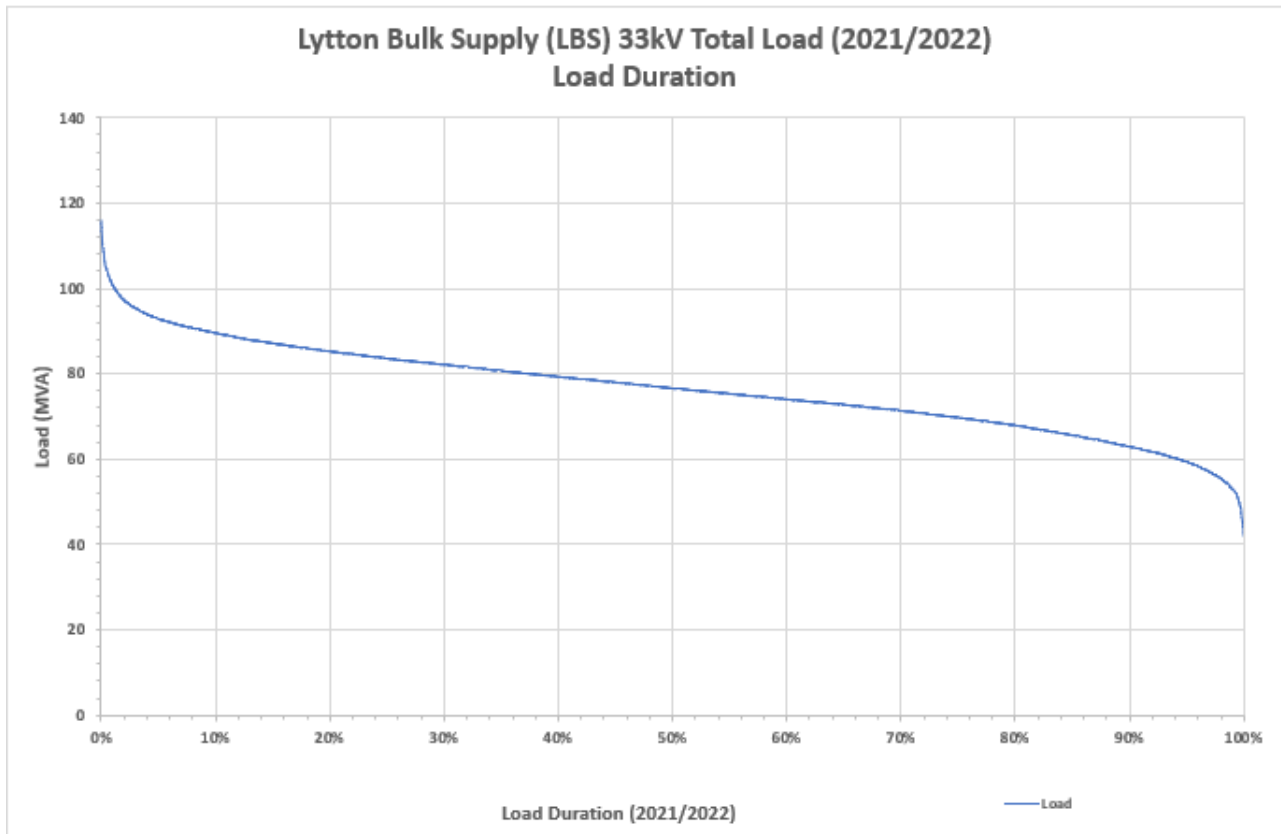


Figure 7: Substation load duration curve

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

2.3.3. Average Peak Weekday Load Profile (Summer)

The daily load profile for an average peak weekday during summer is illustrated below in Figure 8. It can be noted that the summer peak loads at LBS Substation are historically experienced in the late afternoon and evening.

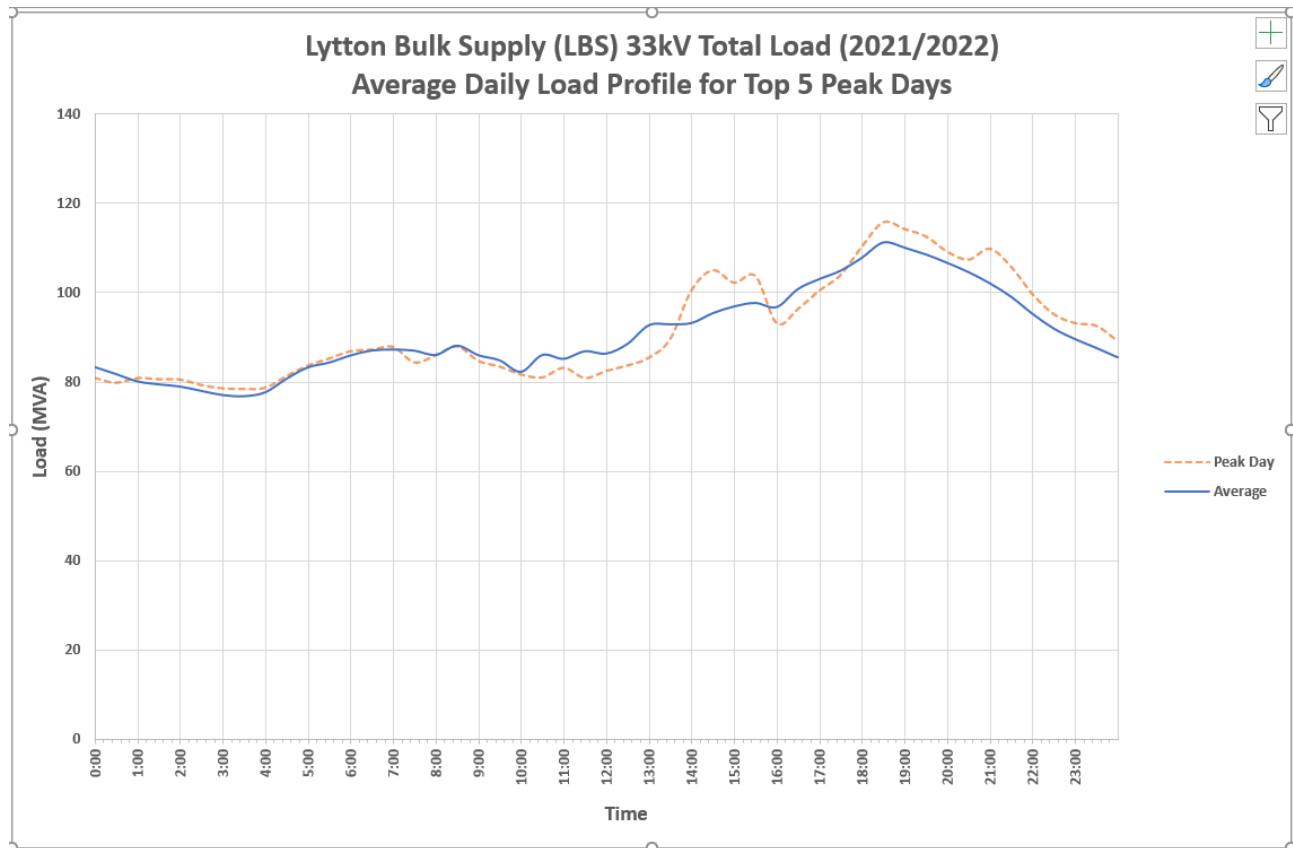


Figure 8: Substation average peak weekday load profile (summer)

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

2.3.4. Base Case Load Forecast

The 10 PoE and 50 PoE load forecasts for the base case load growth scenario are illustrated in **Error! Reference source not found.**. The historical peak load for the past six years has also been included in the graph.

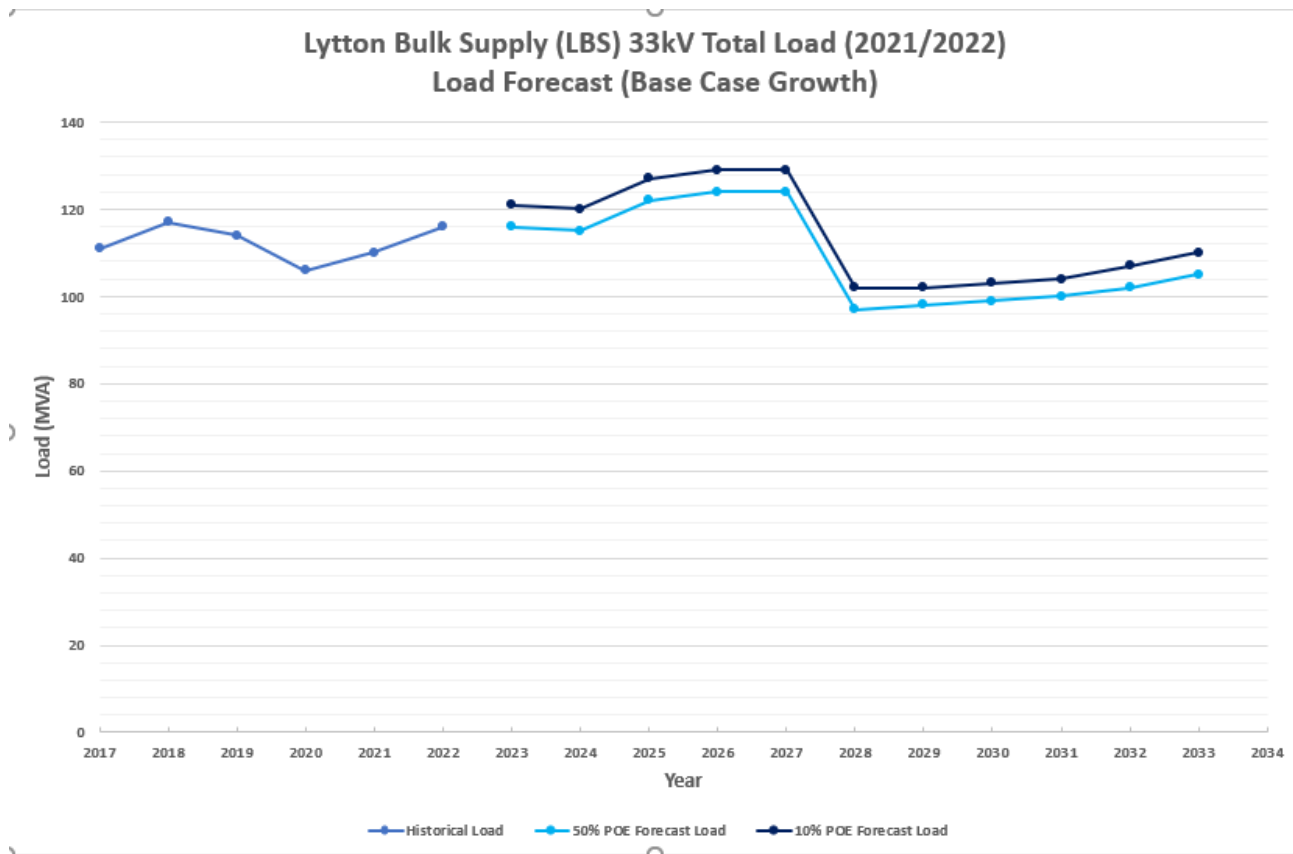


Figure 9: Substation base case load forecast

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

2.3.5. High Growth Load Forecast

The 10 PoE and 50 PoE load forecasts for the high load growth scenario are illustrated in **Error! Reference source not found.**

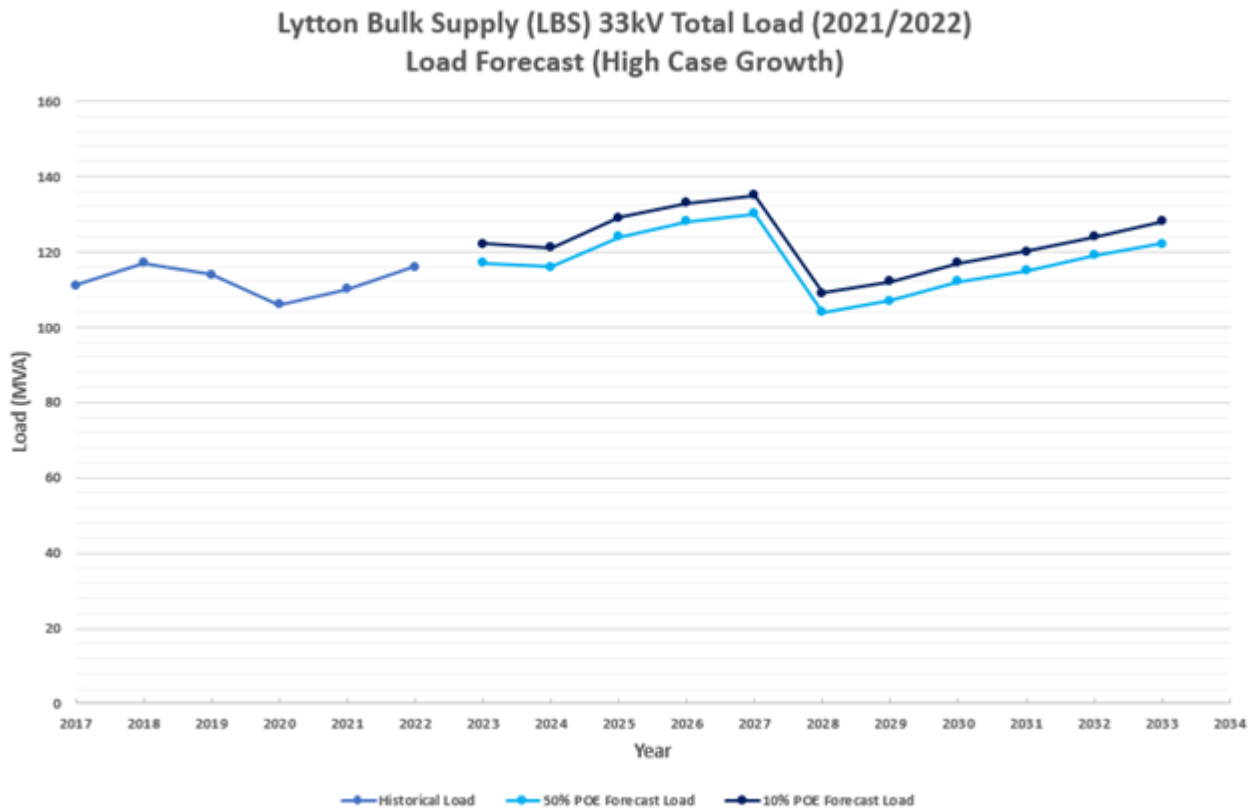


Figure 10: Substation high growth load forecast

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

2.3.6. Low Growth Load Forecast

The 10 PoE and 50 PoE load forecasts for the low load growth scenario are illustrated in **Error! Reference source not found.**

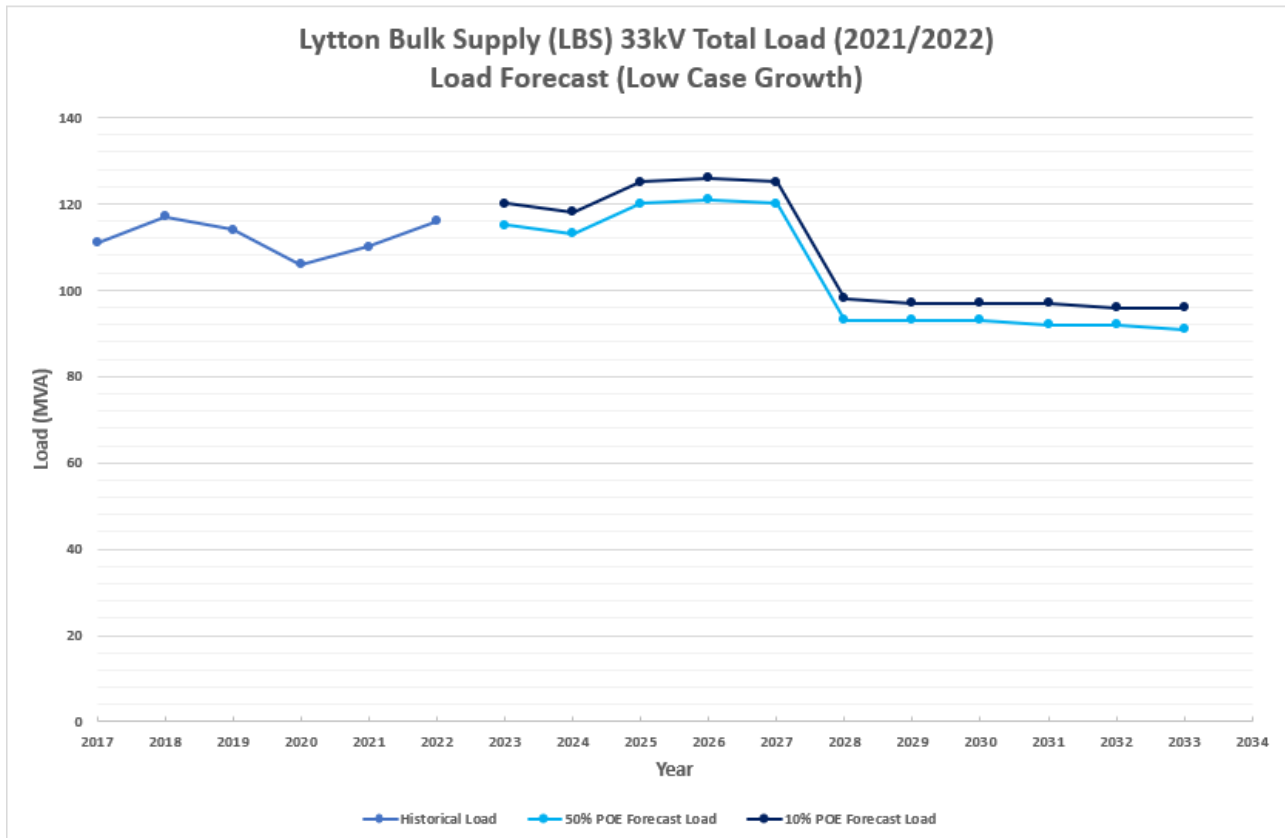


Figure 11: Substation low growth load forecast

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

3. IDENTIFIED NEED

3.1. Description of the Identified Need

3.1.1. Aged and Poor Condition Assets

A condition assessment of plant at SSLDM has highlighted that a number of critical assets are at end of life and are in poor condition. The condition of these assets presents a considerable safety, environmental and reliability risk.

Condition data indicates that the eight 33kV outdoor oil filled circuit breakers are reaching end of life. Additionally, a civil assessment of the structures on site also identified that the substation concrete 33kV busbar support structures are deteriorating with acrow props being utilised as a temporary additional support. There are also thirteen protection relays whose electronic components are nearing retirement age.

3.1.2. Reliability

Under the existing sub-transmission network configuration any singular failure of a 33kV circuit breakers or disconnectors within Lindum Substation will result in no outage to customers supplied from Wynnum Substation. LDM substation is used to provide 33kV backup supply to several major customers, fed from LBS 33kV bus, therefore backup supply to Lytton Bulk Supply substation (110/33kV supply) would be restricted; particularly for a double 110kV outage to F7270 & F7271 which are on the same tower feeding LBS.

3.1.3. Safety Net Non-Compliance

Under a credible contingency event (such as for an outage of 110kV tower failure between Powerlink's H21 Murrarie Substation and Energex 110/33kV Bulk Supply Substation) benchmarked against 50% POE load, Energex will not be able to meet Safety Net restoration times without SSLDM as there are no alternate 110kV supply arrangements available for LBS Substation. 33kV supply from Energex Doboy Bulk Supply Substation, via SSLDM is the only means of restoring 33kV supply SSLBS.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

3.2. Quantification of the Identified Need

3.2.1. Aged and Poor Condition Assets

A condition assessment of plant at SSLDM has highlighted that a number of critical assets are at end of life and are in poor condition. The condition of these assets presents a considerable safety, environmental and reliability risk.

Condition data indicates that the eight 33kV outdoor oil filled circuit breakers are reaching end of life. Additionally, a civil assessment of the structures on site also identified that the substation concrete 33kV busbar support structures are deteriorating with acrow props being utilised as a temporary additional support. There are also thirteen protection relays whose electronic components are nearing retirement age.

The deterioration of these primary and secondary system assets poses safety risks to staff working within the switchyard. It also poses a safety risk to the general public, though the increased likelihood of protection relay mal-operation and catastrophic failure of the oil circuit breaker or busbar support structure. There is also a considerable risk of environmental harm due to loss of oil from the oil circuit breakers, which would require clean up and rectification. Additionally, the poor condition of these assets significantly increases the likelihood of outages, resulting in a reduction in the level of reliability experienced by the customers supplied from Lindum Substation.

Where Energex identifies an imminent asset safety risk, immediate temporary measures are put in place to ensure safety of staff and public until permanent remediation can be performed.

3.2.2. Safety Net Non-Compliance

Lytton Bulk Supply Substation is a 110 / 33kV substation supplied via two 110kV feeders, located on the same tower structures, from H21 Murrarie (Powerlink Substation). There is no alternate 110kV supply available to SSLBS, therefore for a double 110kV feeder outage or tower failure the only means of restoring 33kV supply to LBS is from SSDBS via SSLDM.

Zone Substations fed from LBS 33kV system are, GIS (Gibson Island), LYT (Lytton), FIS (Fishermans Island), FBS (Fishermans Island Bulk), WNM (Wynnum), LTA (Lota), LBS (Lytton Bulk Supply 11kV Network). Of these GIS and LYT are categorised as High Security Zone Substations

Several major customers would be affected including one large customer with an energy consumption for 12 months of 150GWh and AD of 25MVA, another with energy consumption for 12 months of 48.25GWh and maximum AD of 12.5MVA, a third with energy consumption for 12 months of 108GWh and maximum AD of 19.23MVA, and the fourth with a max AD of 12MVA.

SCADA data shows that LBS supplies a total of 133 MVA of load

There is a total of 120MVA of 33kV load transfer capacity available from SSDBS to SSLBS of which 22MVA is available via LDM.

Based on Energex's Safety Net contingency management plan for LBS the assessed time to carry out remote transfers (120MVA) is 2 hours with a further 12MVA of mobile generation to supplement the supply shortfall.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

3.2.3 Risk Quantification Benefit Summary

Risk quantification analysis has been completed for Option A which includes the value of customer reliability and cost of emergency replacement. Figure 12 shows the benefits of Option A in comparison to the counter-factual, which in this case is continuing the use of the existing circuit breakers, maintenance and operation until failure. The benefit of this option is primarily driven by the significant emergency replacement cost

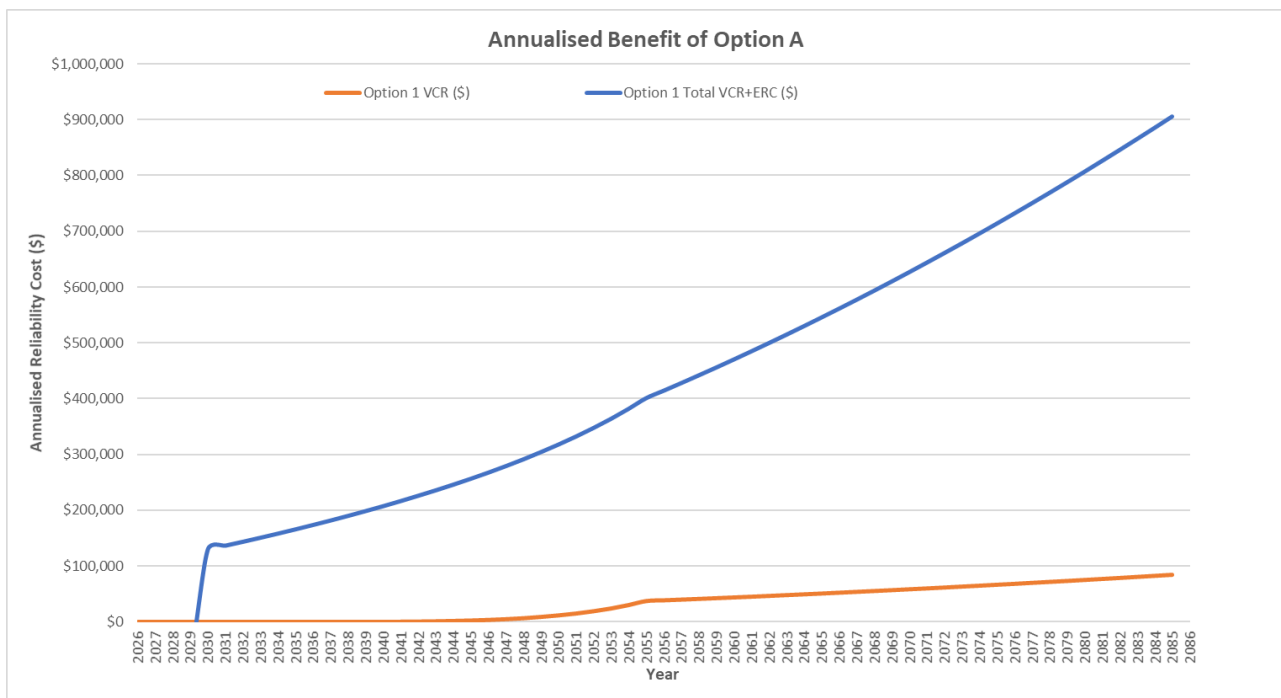


Figure 12: Annualised Benefits of Option A

3.3. Assumptions in Relation to Identified Need

Below is a summary of key assumptions that have been made when the identified need has been analysed and quantified.

It is recognised that the below assumptions may prove to have various levels of correctness, and they merely represent a 'best endeavours' approach to predict the future identified need.

3.3.1. Forecast Maximum Demand

It has been assumed that forecast peak demand at LBS Substation will be consistent with the base case forecast outlined in Section 2.3.4.

Factors that have been taken into account when the load forecast has been developed include the following:

- load history;
- known future developments (new major customers, network augmentation, etc.);
- temperature corrected start values (historical peak demands); and
- forecast growth rates for organic growth.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

3.3.2. Load Profile

Characteristic peak day load profiles shown in Section 3.3.1 are unlikely to change significantly from year to year and the shape of the load profile is assumed to remain virtually the same with increasing maximum demand.

4. CREDIBLE OPTIONS ASSESSED

4.1. Assessment of Network Solutions

Energex has identified one credible network option that will address the identified need.

4.1.1. Option A: Replace Outdoor CBs and Maintain SSLDM

This option involves replacing eight outdoor 33kV oil circuit breakers with vacuum breakers, replacing all concrete 33kV ring bus structures and upgrading the substation physical security and addressing secondary systems limitations in order to address the identified need.

A schematic diagram of the proposed network arrangement for Option A is shown in Figure 13.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

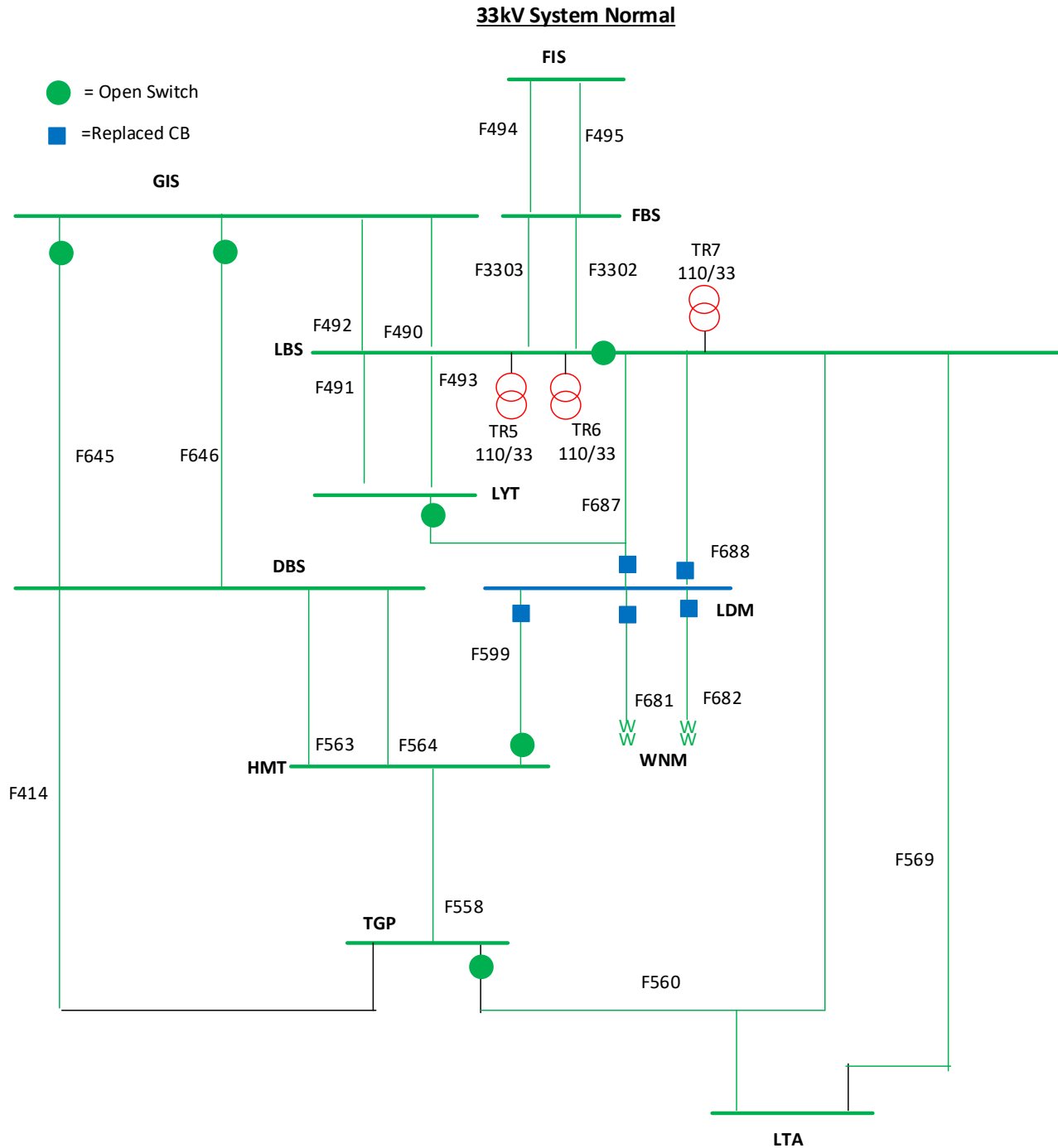


Figure 13: Option A proposed network arrangement (schematic view)

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

4.2. Assessment of Non-Network Solutions

Energex's Demand & Energy Management (DEM) team has assessed the potential non-network alternative (NNA) options required to defer the network option and determine if there is a viable demand management (DM) option to replace or reduce the need for the network options proposed.

Credible options must be technically and commercially viable and must be able to be implemented in sufficient time to satisfy the identified risk to the public and/or the network due to the identified constraints.

4.2.1. Non-Network Solution Summary

Energex has not identified any viable non-network solutions internally that will provide a complete or a hybrid (combined network and non-network) solution to provide the magnitude of network support required in the LBS area to address the identified need.

4.3. Preferred Network Option

Energex's preferred internal network option is Option A, involving replacing eight outdoor 33kV oil circuit breakers with vacuum breakers, replacing all concrete 33kV ring bus structures and upgrading the substation physical security and addressing secondary systems limitations in order to address the identified need.

Upon completion of these works, the asset safety and reliability risks at Lindum Substation will be addressed. The preferred option will provide the greatest reliability benefit for customers, whilst also reducing expenditure on obsolete and non-compliant assets while ensuring more efficient use of design and construction resources.

The estimated capital cost of this option inclusive of interest, risk, contingencies and overheads is \$13.4 million. Annual operating and maintenance costs are anticipated to be 1.5% of the capital cost. The estimated project delivery timeframe has design commencing in mid-2024 and construction completed by September 2026

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

5. SUMMARY OF SUBMISSIONS RECEIVED IN RESPONSE TO DRAFT PROJECT ASSESSMENT REPORT

On 16 November 2022, Energex published the Draft Project Assessment Report providing details on the identified need on the sub-transmission network that supplies LDM network. This report provided both technical and economic information about possible solutions and sought information from interested parties about possible alternate solutions to address the need for investment.

In response to the Draft Project Assessment Report, Energex received no submissions by 28 December 2022, which was the closing date for submissions to the Draft Project Assessment Report.

6. MARKET BENEFIT ASSESSMENT METHODOLOGY

The purpose of the RIT-D is to identify the option that maximises the present value of net market benefits to all those who produce, consume and transport electricity in the National Electricity Market (NEM).

In order to measure the increase in net market benefit, Energex has analysed the classes of market benefits required to be considered by the RIT-D.

6.1. Classes of Market Benefits not Expected to be Material

The following classes of market benefits are not considered to be material for this RIT-D, and have not been included in this RIT-D assessment:

- Changes in voluntary load curtailment
- Changes in costs to other parties
- Changes in timing of expenditure
- Changes in load transfer capability
- Changes in network losses
- Option value

6.1.1. Changes in Voluntary Load Curtailment

Because none of the credible options include any voluntary load curtailment, and because there are no customers on voluntary load curtailment agreements in the Lindum area at present, any market benefits associated with changes in voluntary load curtailment have not been considered.

6.1.1. Changes in Costs to Other Parties

Energex does not anticipate that any of the credible options included in this RIT-D assessment will affect costs incurred by other parties.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

6.1.1. Changes in Timing of Expenditure

None of the credible options included in this RIT-D assessment is expected to affect the timing of other distribution investments for unrelated identified needs.

6.1.1. Changes in Load Transfer Capability

None of the credible options included in this RIT-D assessment are expected to have an impact on the load transfer capability between the zone substations in the Lindum area.

6.1.1. Changes in Network Losses

Energex does not anticipate that any of the credible options included in the RIT-D assessment will lead to any significant change in network losses.

6.1.1. Option Value

The AER's view is that option value is likely to arise where there is uncertainty regarding future outcomes, the information that is available in the future is likely to change, and the credible options considered by the RIT-D proponent are sufficiently flexible to respond to that change¹.

Energex does not consider that the identified need for the options included in this RIT-D would be affected by uncertain factors about which there may be more clarity in future.

7. DETAILED ECONOMIC ASSESSMENT

7.1. Methodology

The Regulatory Investment Test for Distribution requires Energex to identify the credible option that maximises the present value of net economic benefit to all who produce, consume and transport electricity in the National Electricity Market.

Accordingly, a base case Net Present Value (NPV) comparison of the alternative development options has been undertaken. A sensitivity analysis was then conducted on this base case to establish the option that remained the lowest cost option in the scenarios considered.

7.2. Key Variables and Assumptions

The economic assessment contains anticipated costs of providing, operating and maintaining the options as well as expected costs of compliance and administration associated with each option.

¹ AER "Regulatory Investment Test for Distribution Application Guidelines", Section A6.
Available at: <http://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/regulatory-investment-test-for-distribution-rit-d-and-application-guidelines>

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

The present value comparison summary includes all costs directly associated with constructing and providing the option. This includes the cost of land and easements currently owned or to be acquired for network augmentation.

Interest on borrowings is not included as a cost in the comparison of options as it represents a cost of project financing, and as such is accounted for in present value calculations through the discounting of the project cash flows at the regulated WACC. The interest on borrowings is included in the Total Project Cost for which approval is being sought as it represents a legitimate cost of network augmentation.

7.3. Net Present Value (NPV) Results

An overview of the initial capital cost and the base case NPV results are provided in Table 1.

Option	Option Name	Rank	Net NPV	PV of Capex (\$ real)	Net Economic Benefit (\$ real)	PV of Opex (\$ real)
A	Replace CBs and maintain SSLDM	1	-\$3,944,000	-\$13,456,000	\$12,589,000	-\$2,077,000

Table 1: Base case NPV ranking table

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

Based on the detailed economic assessment, Option A is considered to provide the optimum solution to address the forecast limitations, meet customer timeframes for connection and is therefore the recommended development option.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

8. CONCLUSION

The Final Project Assessment Report (FPAR) represents the final stage of the consultation process in relation to the application of the RIT-D.

Energex intends to take steps to progress the proposed preferred option to ensure any statutory non-compliance is addressed and undertake appropriately justified network reliability improvements, as necessary.

8.1. Preferred Option

Energex's preferred option is Option A, which involves replacing eight outdoor 33kV oil circuit breakers with vacuum breakers, replacing all concrete 33kV ring bus structures and upgrading the substation physical security and addressing secondary systems limitations in order to address the identified need at Lindum Substation.

Upon completion of these works, the asset safety and reliability risks at Lindum Substation will be addressed. The preferred option will provide the greatest reliability benefit for customers, whilst also reducing expenditure on obsolete and non-compliant assets while ensuring more efficient use of design and construction resources.

The estimated capital cost of this option inclusive of interest, risk, contingencies and overheads is \$13.4 million. Annual operating and maintenance costs are anticipated to be 1.5% of the capital cost. The estimated project delivery timeframe has design commencing in mid-2024 and construction completed by September 2026. It should be noted that the timing of this project is a dependency for future customer related projects.

8.2. Satisfaction of RIT-D

The proposed preferred option satisfies the RIT-D.

This statement is made on the basis of the detailed analysis set out in this report. The proposed preferred option is the credible option that has the highest net economic benefit under the most likely reasonable scenarios.

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

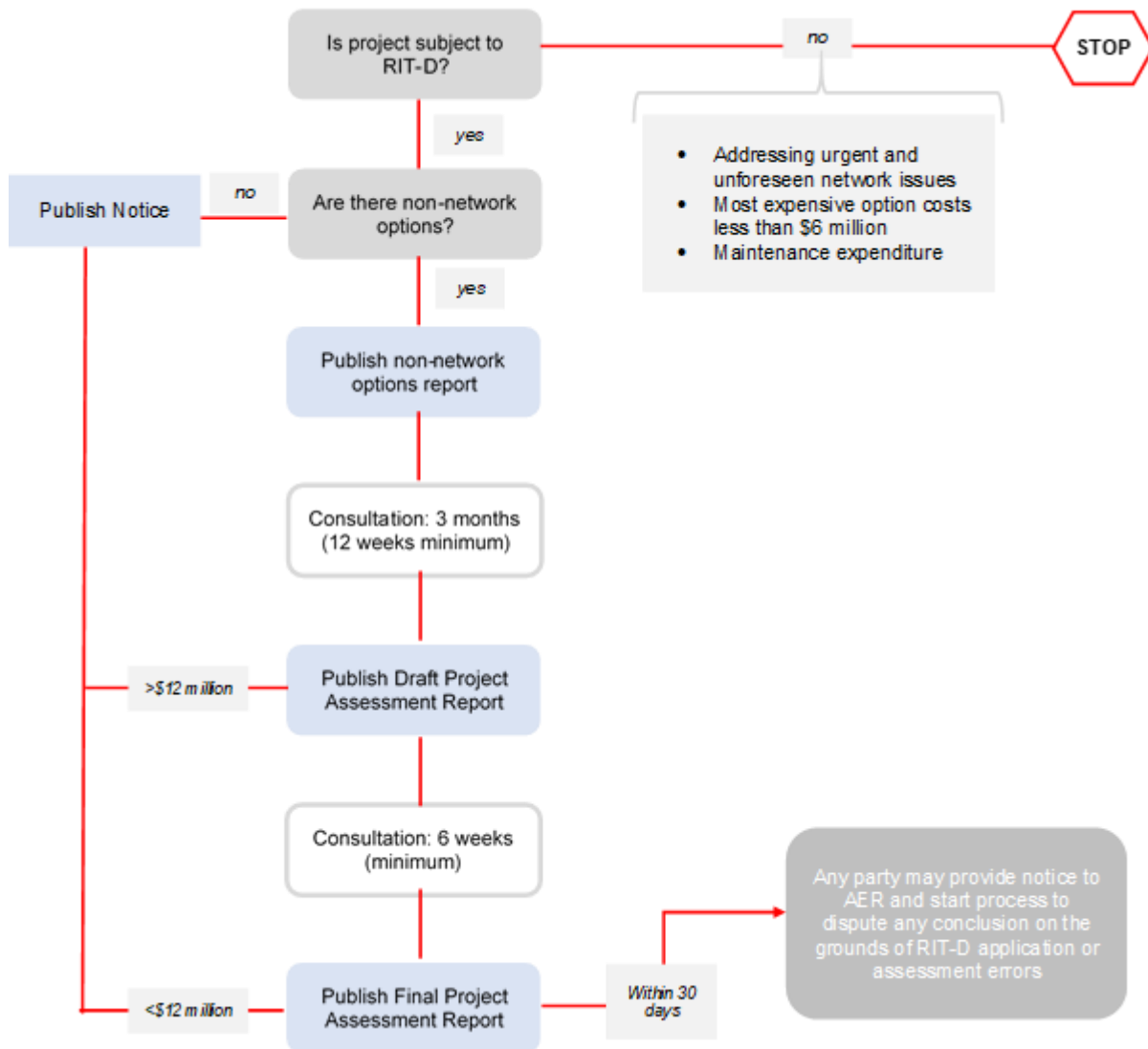
9. COMPLIANCE STATEMENT

This Final Project Assessment Report complies with the requirements of NER section 5.17.4(j) as demonstrated below:

Requirement	Report Section
(1) a description of the identified need for investment;	3
(2) the assumptions used in identifying the identified need (including, in the case of proposed reliability corrective action, why the RIT-D proponent considers reliability corrective action is necessary;	3.3
(3) if applicable, a summary of, and commentary on, the submissions received on the DPAR;	5
(4) a description of each credible option assessed	4 & 5
(5) where a <i>Distribution Network Service Provider</i> has quantified market benefits in accordance with clause 5.17.1(d), a quantification of each applicable market benefit of each credible option	6
(6) a quantification of each applicable cost for each credible option, including a breakdown of operating and capital expenditure	3.2
(7) a detailed description of the methodologies used in quantifying each class of costs or market benefit	6
(8) where relevant, the reasons why the RIT-D proponent has determined that a class or classes of market benefits or costs do not apply to a credible option	6.2
(9) the results of a NPV analysis of each credible option and accompanying explanatory statements regarding the results	7.3
(10) the identification of the proposed preferred option	8.1
(11) for the proposed preferred option, the RIT-D proponent must provide: <ul style="list-style-type: none"> (i) details of the technical characteristics; (ii) the estimated construction timetable and commissioning date (where relevant); (ii) the indicative capital and operating costs (where relevant); (iv) a statement and accompanying analysis that the proposed preferred option satisfied the RIT-D; and (v) if the proposed preferred option is for reliability corrective action and that option has a proponent, the name of the proponent 	8.1 & 8.2
(12) contact details for a suitably qualified staff member of the RIT-D proponent to whom queries on the final report may be directed.	1.4

Addressing Reliability Requirements in the LDM Network Area Final Project Assessment Report

APPENDIX A – THE RIT-D PROCESS



Source: AEMC, *Rule determination: National Electricity Amendment (Replacement expenditure planning arrangements) Rule 2017*, July 2017, p. 64.