15 January 2026

Northern Bowen Basin Area Plan

DISCLAIMER:

This document provides indicative future investment planning information based on current assumptions and scenarios.

It does not represent a commitment to specific investments and is subject to change in response to market developments, external environment, and regulatory requirements.

Version Control

Version	Date	Sections	Comment
1.0	07/05/2025	All	Initial draft for comment
2.0	02/06/2025	All	Updated with minor wording changes
3.0	5/12/2025	All	Updated with changed load outlook
3.1	15/01/2026	All	Issued for approval

Approvals

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Area Overview

The Northern Bowen Basin (NBB) is one of Queensland's richest mining and resource regional centres. The area also contains significant coal seam gas (CSG) reserves with existing gas generation facilities operating in parts of the basin.

The region includes a number of small townships supplied via the Energy Queensland (EQL) distribution network. The area is also supported by the Aurizon rail network which plays a vital role in transporting mining and mineral products to coastal export port terminals.

Existing Transmission Network

The NBB study area encompasses the existing 132 kV network supplied from three major bulk supply substations. These injection points comprise of Strathmore 275/132 kV in the north, Nebo 275/132 kV in the east, and Lilyvale 275/132 kV in the south.

The majority of existing overhead 132 kV transmission network within NBB was constructed in the late 1960s through to the mid-1970s. The Nebo to Moranbah transmission line extends around 94km, and comprises of double circuit single conductor with intermediate connections to Kemmis and Wotonga substations. There are additional tee-offs supplying other connection points including Coppabella and Greenland substations.

The Strathmore to Moranbah transmission 132kV line extends approximately 178 km and also comprises of double circuit single conductor overhead lattice steel towers. This transmission line supplies Collinsville North, Stony Creek, Newlands and Goonyella Riverside substations with a tee-off to North Goonyella substation.

The Lilyvale to Moranbah 132 kV transmission line is approximately 148 km in length. The section from Lilyvale to Dysart is a single circuit 132 kV line with tee-offs to Norwich Park and Bundoora substations. From Dysart to Moranbah, the line becomes a double-circuit 132 kV route supplying Eagle Downs substation and tee-off to Peak Downs substation.

The geo-schematic of the existing NBB 132kV network is shown below.

Northern Bowen Basin Demand Forecast

A number of proponents within the NBB area are investigating electrification of their mining operations as part of broader decarbonisation strategies. These electrification programs have the potential to introduce significant step increases in load demand. In addition, Powerlink has received enquiries from existing customers regarding planned expansions to mining operations which may lead to further load growth in the region.

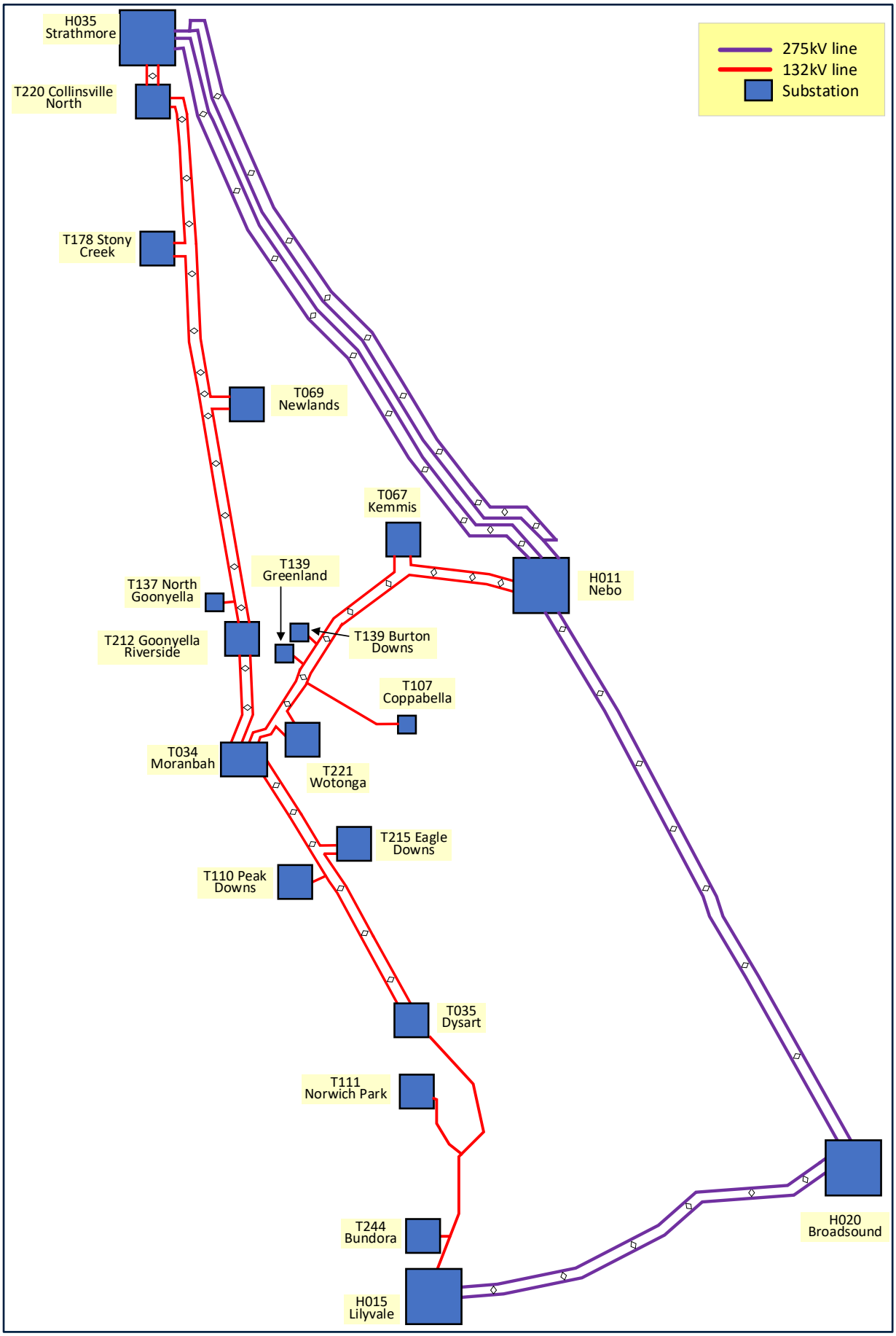
The high and central load forecasts for 10% POE and 50% POE peak demand conditions are shown in the figure below. These projections do not account for any load increases associated with the electrification of mining operations.

These load forecasts also incorporate underlying growth at Energy Queensland (EQL) substation sites reflecting increasing demand from smaller mines, industrial facilities, and townships supplied via EQL distribution networks.

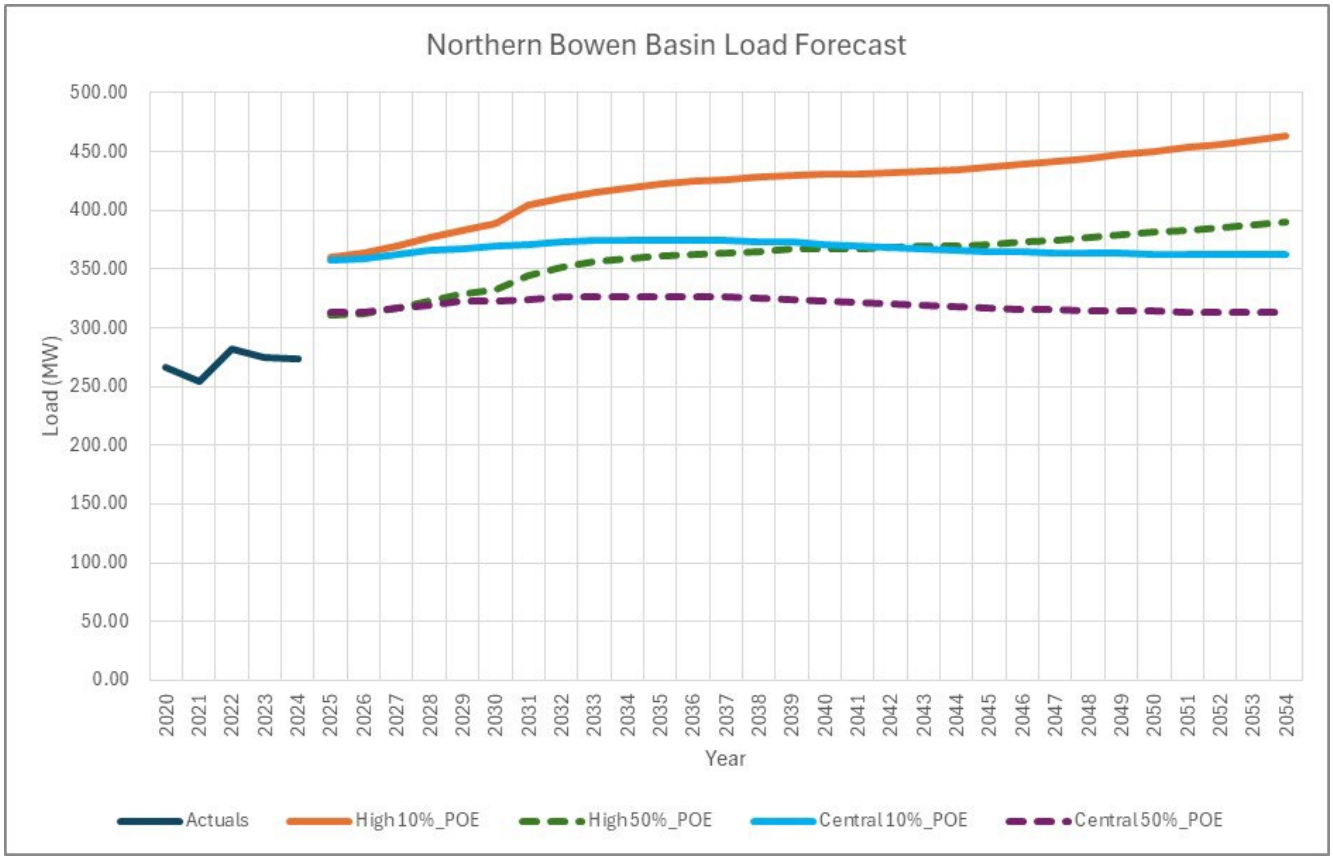
The demand profile within the NBB area across the 2025 calendar year is also shown below. The demand profile illustrates the relatively flat nature of demand across the year.

Northern Bowen Basin Area Definition

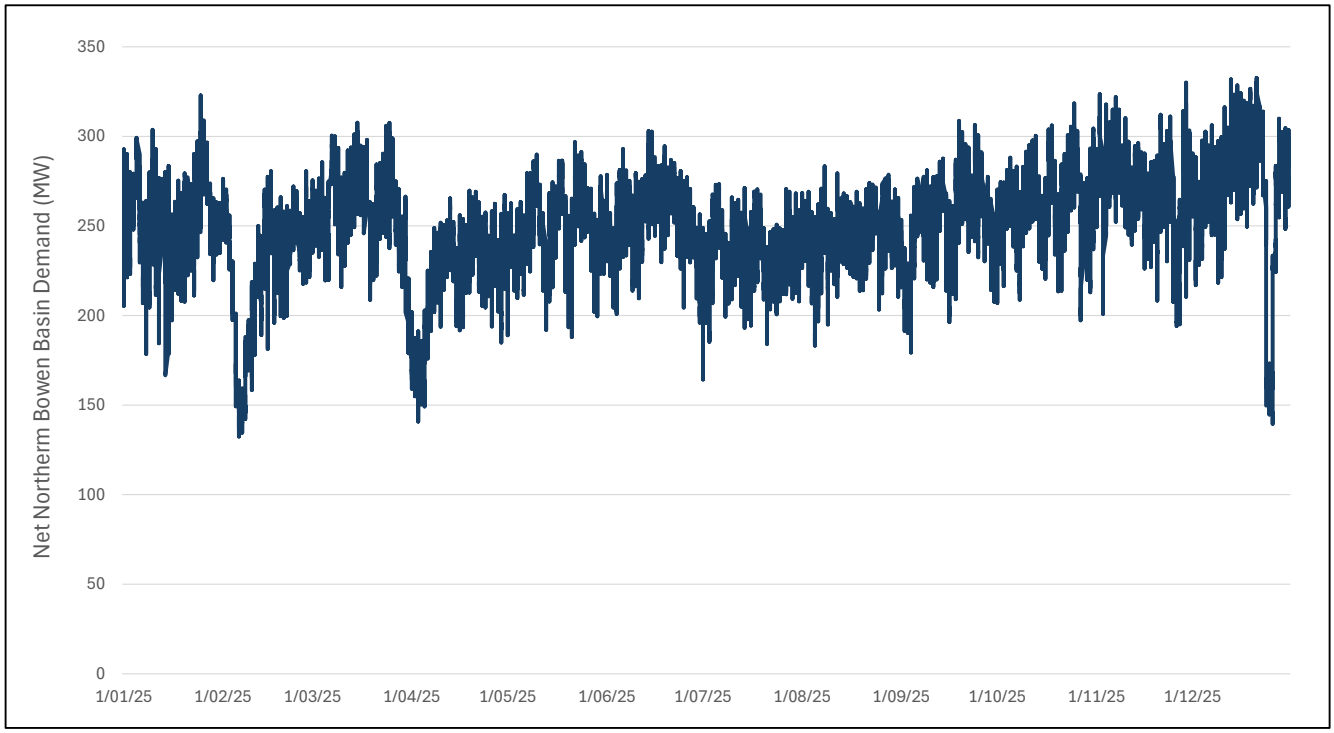
Northern Bowen Basin Transmission System



Northern Bowen Basin Demand Forecasts



Northern Bowen Basin Demand Profile (2025 Calendar Year)[1]



[1] Incorporates output from Ruby Run, Lilyvale, Moranbah North and Collinsville generating stations. Demand are averaged across hourly periods. Instantaneous peak demands can be higher than hourly demand averages.

Condition Drivers

The NBB 132kV transmission network is located within inland central west Queensland and is classified as a relatively low corrosion region. As a result, transmission structures and hardware within the area are in relatively sound condition for their age.

The most recent condition assessment indicates that the Nebo to Moranbah 132 kV overhead transmission line will reach end of technical life in the early 2040s, with structural rectification works required prior to this time to manage emerging condition risks. Insulator replacement works are projected to be required in the late 2020s. Foundations have been reported to be in good condition with no significant works expected in the near to medium term.

The Strathmore to Moranbah and Lilyvale to Moranbah 132kV overhead lines have also been assessed to be in sound condition relative to their age. The end of technical life for these built sections are expected to be in the mid 2040s.

The projected end of life timeframes for the broader 132 kV network within NBB is shown below.

Capacity Drivers

The NBB 132kV transmission system is a meshed network with loadings across the different parts of the network dependent on injection strength at Strathmore, Nebo and Lilyvale 275/132kV substations and customer load demand. Network limitations across the 132kV network comprises primarily of thermal limitations.

Under recent load projections, the 132kV transmission network meets reliability planning standards for both normal and contingency conditions over the short to medium term. However, there is very limited headroom in the existing 132kV transmission network, and Powerlink is closely monitoring developments in the area since additional load increases may change transmission network capacity requirements.

Conversely, the establishment of new generation facilities within the NBB area will reduce loadings on the existing 132kV network.

The electrification of mining operations is likely to result in a significant step increase in load demand within the NBB area. These developments are anticipated to significantly exceed the capacity of the existing 132kV transmission network with the nature, staging and timing of network augmentations dependent on the scale and pace of load developments and availability of non-network solutions.

Property and Easement Considerations

Powerlink has conducted preliminary desktop easement studies for the widening of the existing Nebo to Moranbah 132kV line easement. It has been assessed that it is feasible to widen the existing easement to enable rebuilding of the existing 132kV double circuit line adjacent to the existing line.

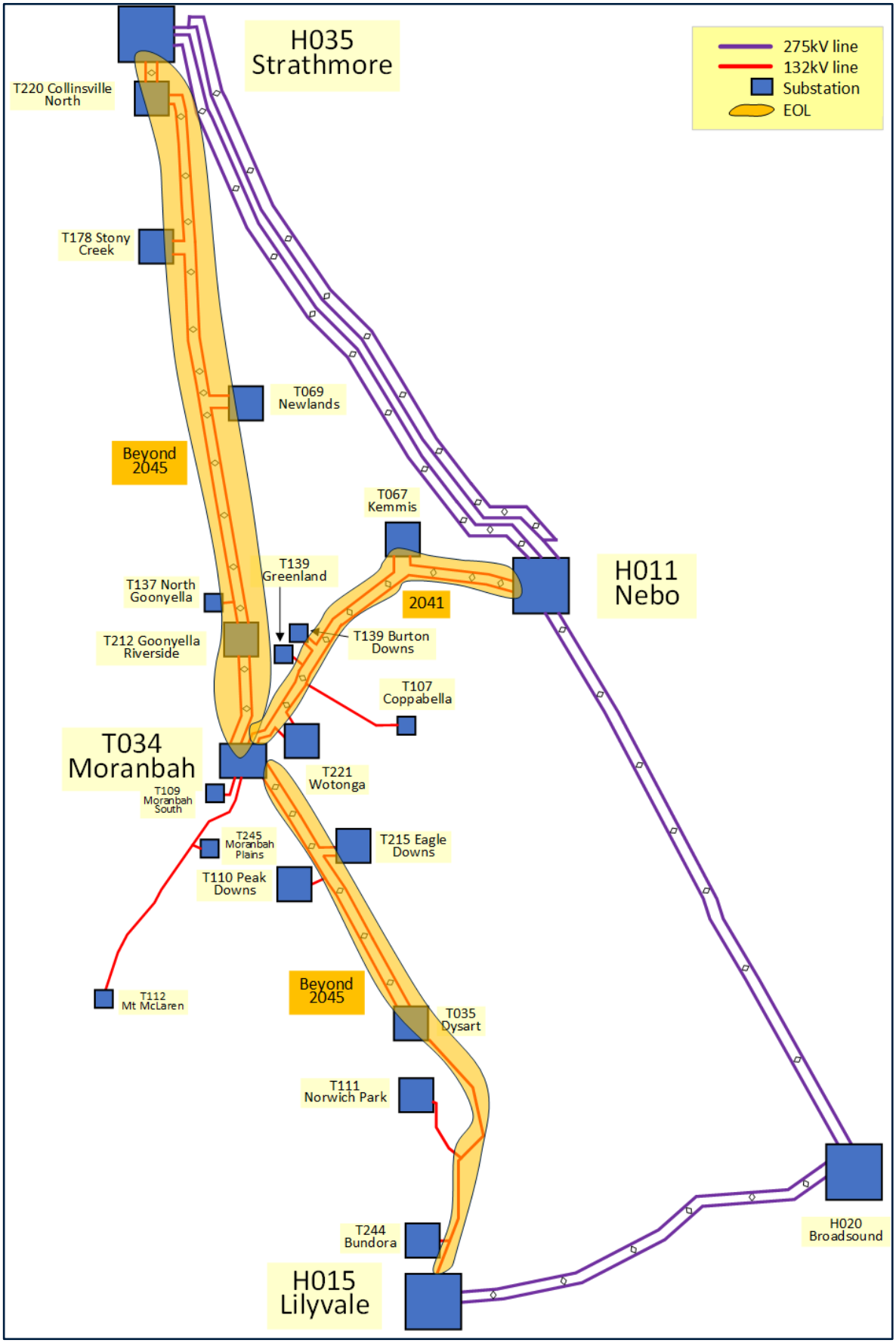
If construction of a new Nebo to Moranbah 132kV transmission line is needed, then building along the existing transmission line will be required. The insitu rebuild of the existing 132kV transmission circuits is not considered technically or economically feasible since this would require extended double circuit outages leading to high reliability of supply risk and pre-contingent load curtailment.

Powerlink also currently owns line easements between Nebo and Moorvale South substation sites, and onwards to the EQL Broadlea substation. Powerlink also owns a 275kV substation site at Moorvale South. These easement and sites provide important strategic optionality enabling future staged network augmentations if required.

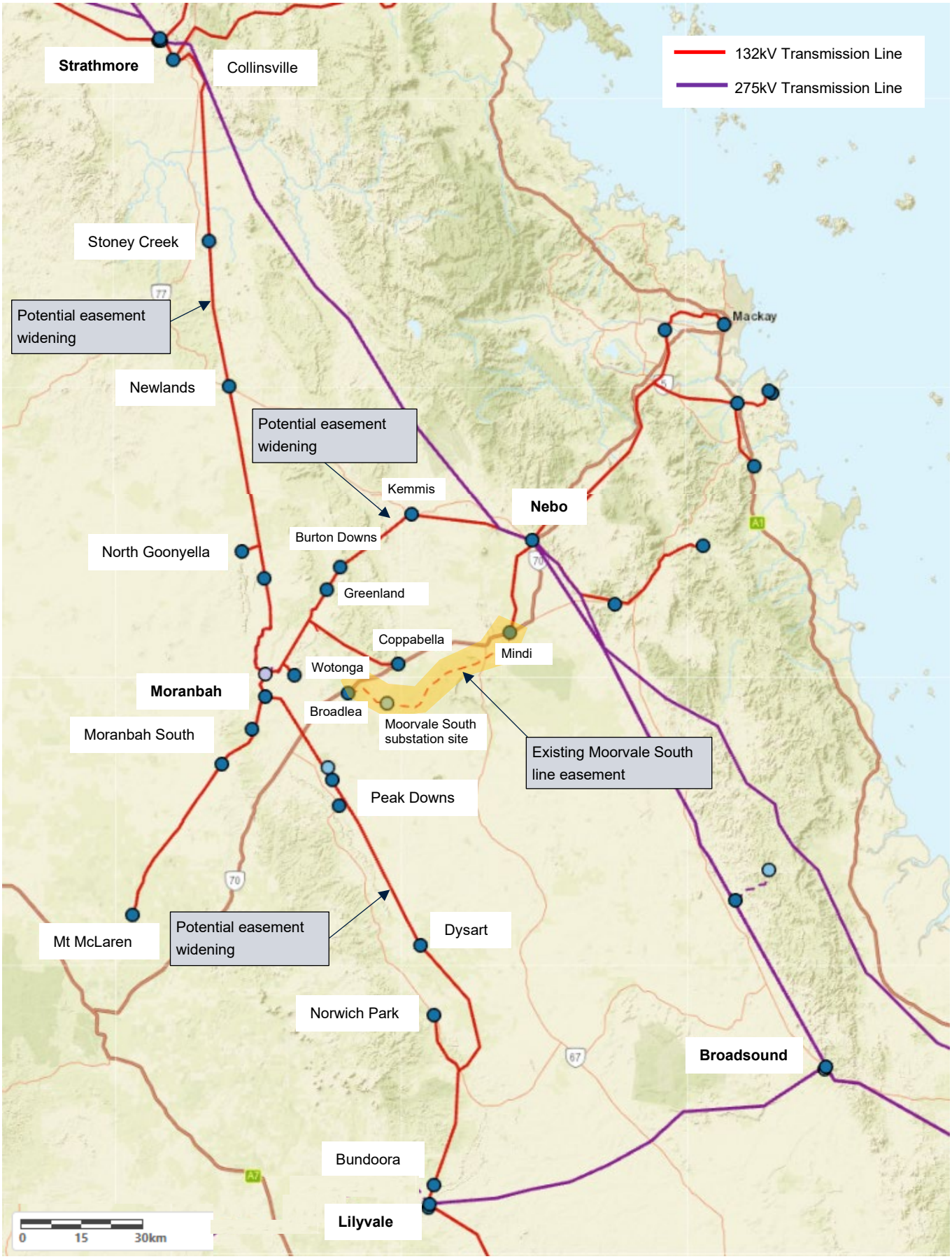
Studies are progressing regarding potential widening of the existing 132kV line easements between Lilyvale and Moranbah, and Strathmore to Moranbah substations. Widening of these easements may be required in medium to longer term if rebuild of these transmission lines are required.

As with the Nebo to Moranbah line, it is not considered technically or economic viable to rebuild these overhead lines insitu unless there is significant future headroom available within the transmission network to address prolonged network outages and reliability of supply risks.

Northern Bowen Indicative End of Life Timings



Northern Bowen Basin Existing and Potential Easement Widening



Investment Strategies

Three selected investment pathways have been assessed for the NBB area. Each pathway consists of several stages designed to address emerging condition risks across the 132kV network under the central load forecast scenario. Under this scenario there are no requirements to increase capacity to the NBB area over the short to medium term.

Investment Pathway A – Nebo to Moranbah 132 kV Life-Extension Followed by Rebuild

This investment pathway comprises of life extension works to maintain the existing topography and capability of the transmission network followed by future build of the Nebo to Moranbah 132kV transmission line.

Stage 1

Life extension works on the Nebo to Moranbah 132 kV network comprising of life refit and hardware replacement providing an equivalent of ten years of additional serviceable life.

Stage 2

Life extension works on the Strathmore to Moranbah and Lilyvale to Moranbah 132 kV overhead lines when these approach end of life.

Stage 3

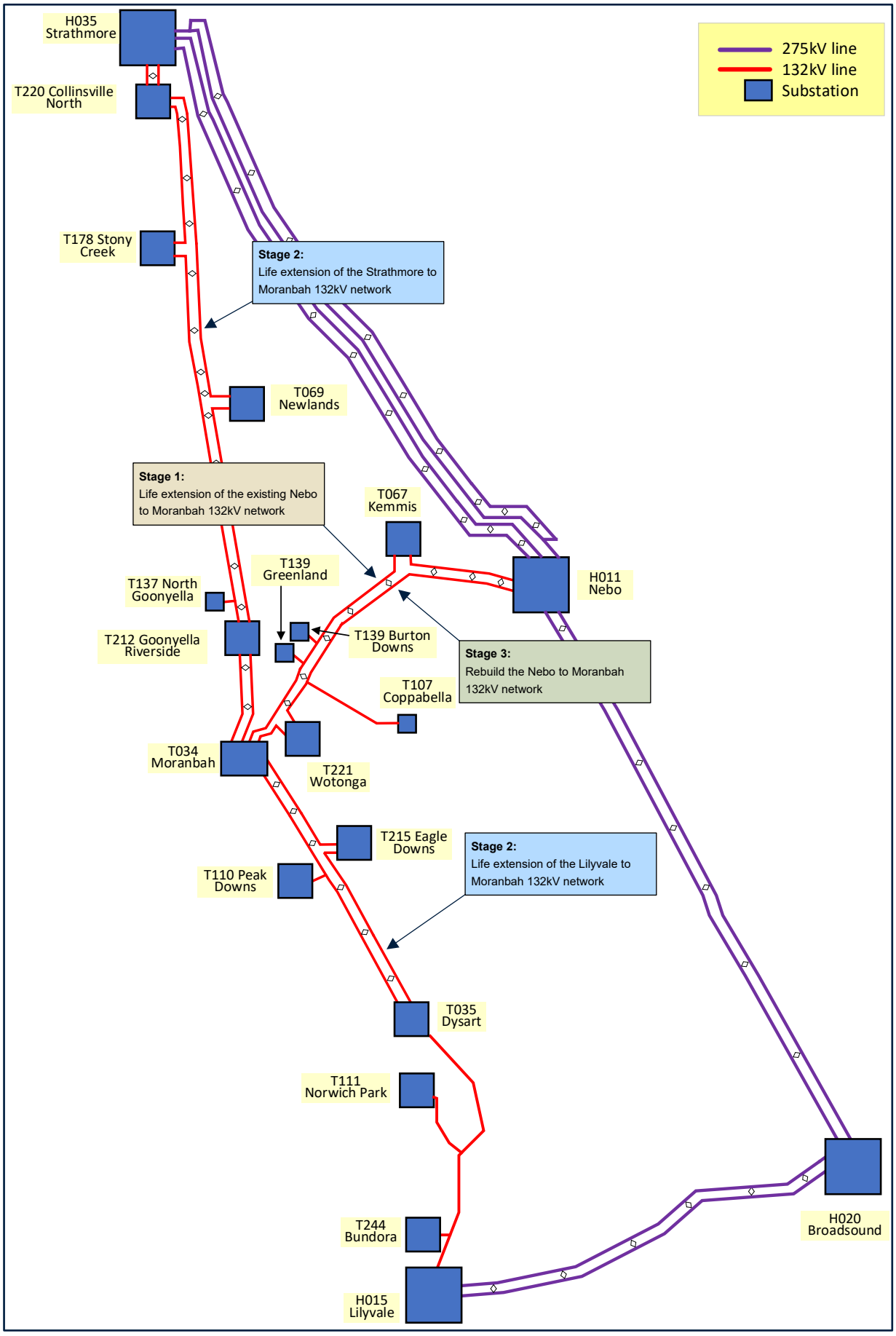
Rebuild of the existing Nebo to Moranbah 132 kV transmission line.

Overview and Rationale

This strategy maintains the currently topography and power transfer capability to NBB customers through incremental life extension works to the existing overhead 132kV lines. However there is very limited capacity to supply additional loads or expansion within the area in the short to medium term under this strategy.

The rebuild will require construction of new transmission circuits adjacent to the existing line and cutting over associated intermediate connection points prior to disconnection of the line. This rebuild approach is required to avoid prolonged outages and maintain reliability of supply to mining, rail, industrial and township loads.

Investment Pathway A - Nebo to Moranbah 132 kV Life-Extension Followed by Rebuild



Investment Pathway B – Nebo to Moranbah 132 kV Rebuild

This investment pathway comprises of upfront construction of a new Nebo to Moranbah 132kV transmission line in lieu of life extension works.

Stage 1

This stage involves construction of a new Nebo to Moranbah 132kV transmission line upfront alongside the adjacent 132kV line. Widening of the existing easement will be required to enable the rebuild.

Stage 2

Structural refit of the Strathmore to Moranbah 132 kV overhead line when this reaches end of life.

Stage 3

Structural refit of the Lilyvale to Moranbah 132 kV overhead line when this reaches end of life.

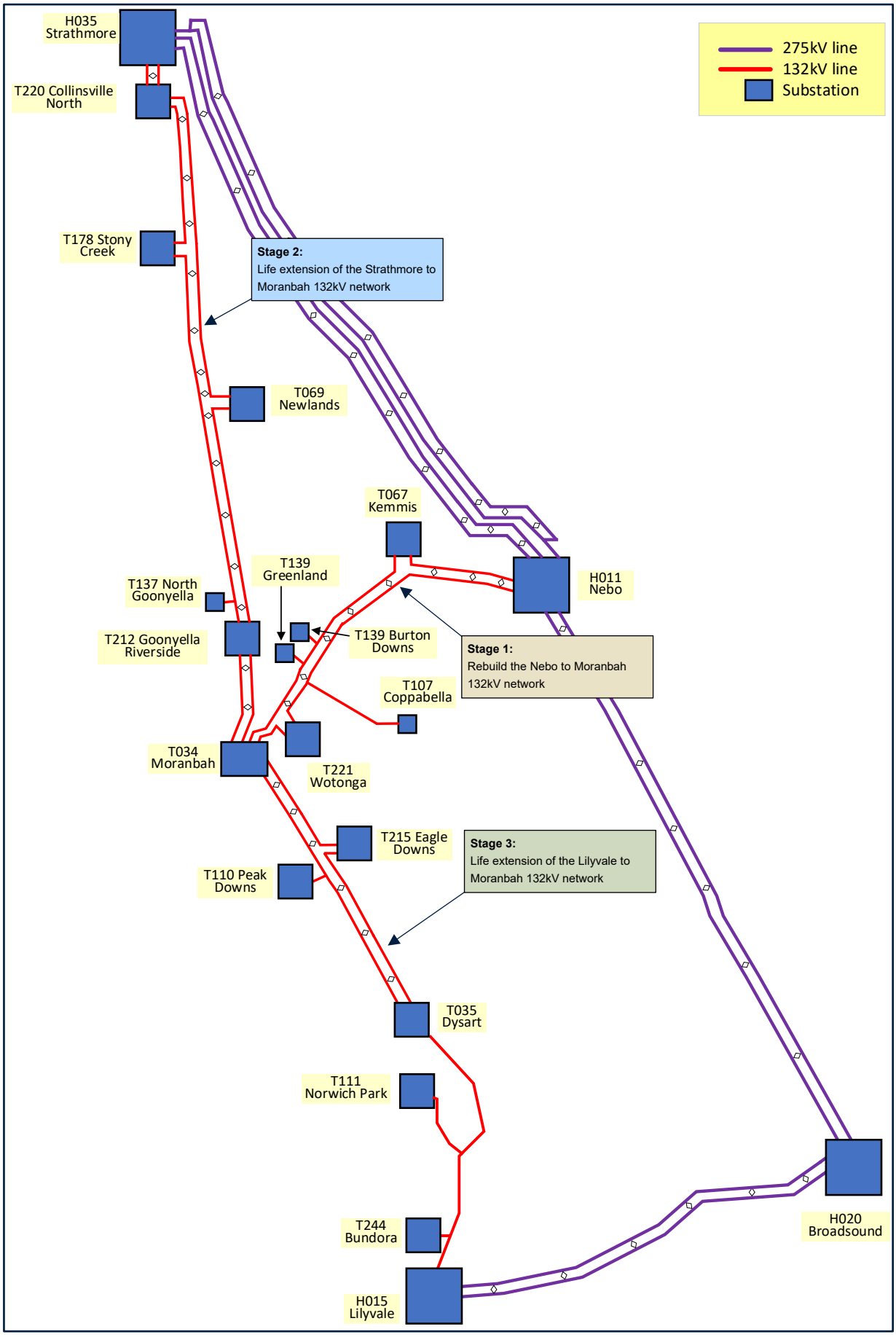
Overview and Rationale

This strategy involves rebuilding of the Nebo to Moranbah 132 kV transmission line upfront as single conductor double circuit line to replace the capacity of the existing line in lieu of life extension.

This approach would involve constructing the new Nebo to Moranbah 132kV circuits adjacent to the existing transmission line, and cutting over existing connections to the new line prior to disconnection and eventual dismantling. To enable the rebuild, easement widening of the existing transmission alignment is required.

Subsequent stages involve life extension of the existing Lilyvale to Moranbah and Strathmore to Moranbah 132kV lines as these approach end of life to address emerging condition risks.

Investment Pathway B – Nebo to Moranbah 132kV Rebuild



Investment Pathway C – Nebo to Moranbah Rebuild with Future Consolidation

This investment pathway comprises of upfront rebuild of a new Nebo to Moranbah 132kV transmission line as high capacity twin conductor double circuit line in lieu of life extension works. However, this strategy involves potential future consolidation of the network due to higher capacity provided by the Nebo to Moranbah build.

Stage 1

This stage involves construction of a new Nebo to Moranbah 132kV transmission line as a high capacity twin conductor double circuit line alongside the adjacent 132kV line. Widening of the existing easement will be required to enable the rebuild.

Stage 2

Structural refit of the Strathmore to Moranbah 132 kV overhead line when this reaches end of life.

Stage 3

Structural refit of the Moranbah to Peak Downs 132kV line and rebuild of the existing Lilyvale to Dysart 132kV single circuit line to double circuit enabling consolidation of the network.

Overview and Rationale

This strategy involves upfront rebuilding of the Nebo to Moranbah 132 kV transmission as high capacity twin conductor double circuit 132kV line in lieu of life extension works. This approach involves constructing the new Nebo to Moranbah 132kV circuits adjacent to the existing transmission line, and cutting over existing connections to the new line prior to disconnection and eventual dismantling. To enable the rebuild, easement widening of the existing transmission alignment is required.

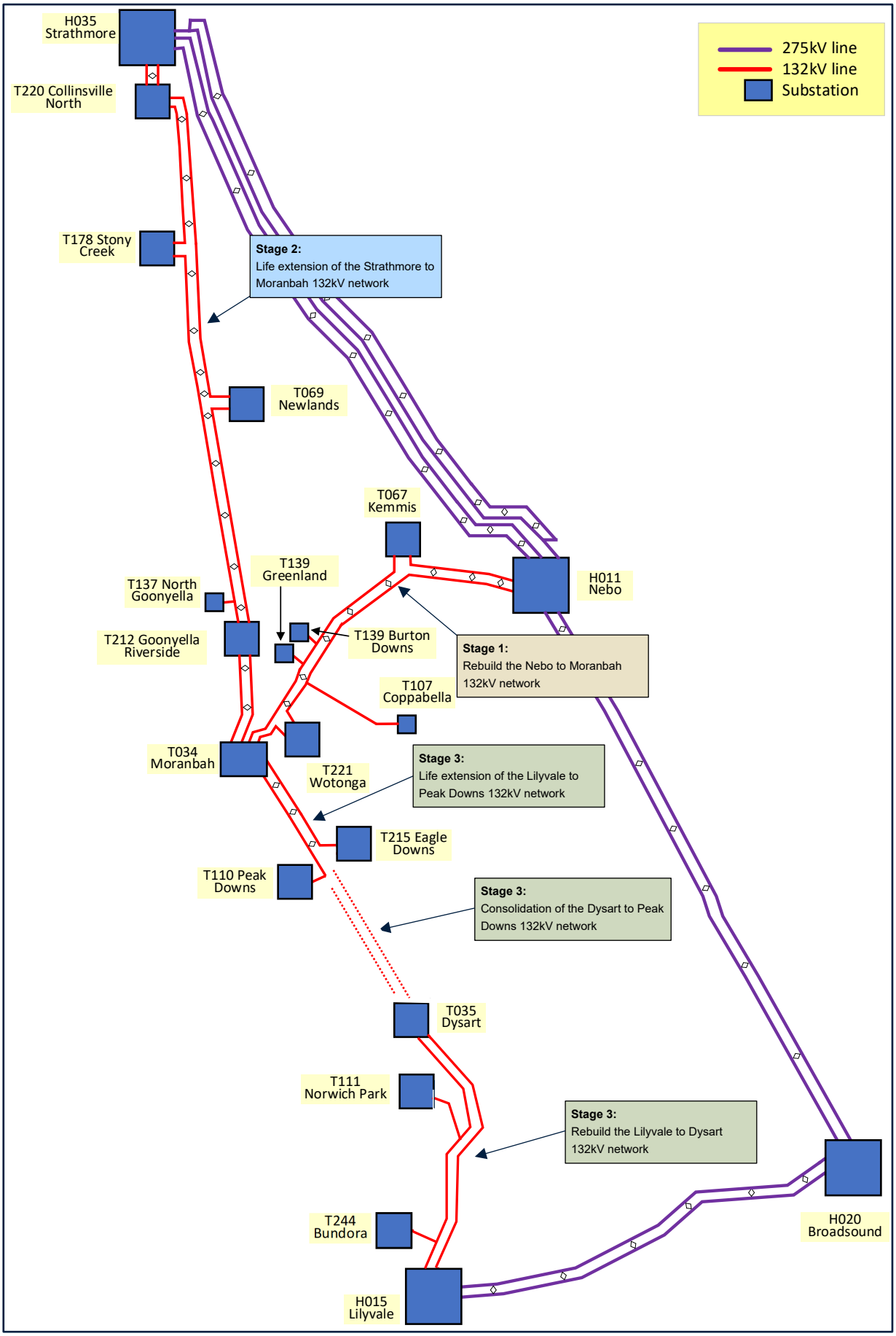
The subsequent stages involve structural refit of the existing Strathmore to Moranbah 132kV line as this approaches end of life, rebuild of the existing Lilyvale to Dysart 132kV single circuit line, and structural refit of the Peak Downs to Moranbah 132kV transmission line. This may enable the section between Dysart and Peak Downs to be decommissioned. The Lilyvale to Dysart section would need to be rebuilt since this is currently a single circuit line and a double circuit line is required to maintain reliability of supply.

Suitable Application

This strategy may be suited to scenarios where there are load increases within the NBB area requiring higher upfront capacity. However this strategy provides possible future cost savings through consolidation.

This strategy may be appropriate where load growth increases at particular levels but does not reach the highest electrification scenarios, and/or downstream generation develops in the future which reduces reliance on the 132kV transmission network.

Investment Pathway C – Nebo to Moranbah Rebuild with Future Consolidation



Assessment of Other Alternatives

A range of other investment strategies were investigated as part of the NBB area plan. A number of these were discounted due to a very high upfront capital cost.

Others may be economically and technically feasible under modest load growth or other development scenarios. Further assessment of these investment strategies will progress as more information regarding the scale and pace of load commitments within the NBB area is available.

(D) Construction of new Nebo to Moranbah 275kV Transmission Line

This strategy involves construction of a new Nebo to Moranbah 275 kV transmission line to replace the existing 132kV transmission line. This option involves significant more upfront capital expenditure due to the higher cost of constructing 275kV transmission and the need to establish a new 275kV substation within the greater Moranbah area.

In addition, it would not be possible to decommission the existing Nebo to Moranbah 132kV line entirely as this approaches end of life since there are intermediate connection points along the line comprising of Kemmis, Coppabella and Wotonga substations. Hence this approach would still need to maintain the 132kV connection radials to these substations from Nebo and Moranbah. This would subsequently involve life extension works for a significant proportion of the existing Nebo to Moranbah 132kV line (around half of the existing route length).

However, this option will significantly increase power transfer capability to the NBB area. Preliminary information has indicated that a rebuild of the existing Nebo to Moranbah 132kV line to high capacity twin conductor 132kV double circuit will meet projected load requirements over the medium to longer term taking into account preliminary electrification and load expansion information to date. Powerlink is not aware of any additional proposals at this stage which warrant the need for a large scale 275kV augmentation.

Accordingly, this strategy is not recommended based on information to date.

(E) Nebo to Moorvale South 275kV New Build (and 132kV to Moranbah)

The strategy involves construction of a new Nebo to Moorvale South 275kV transmission line, and establishment of a new Moorvale South 275kV substation. This option would also involve construction of a new Moorvale South to Broadlea 132kV line to enable augmentation of supply to Moranbah.

This option is significantly more expensive than other options due to construction of new 275kV line and substation works. One advantage is that Powerlink already owns the easement corridor between Nebo and Moorvale South so this will reduce easement related works.

As with the other 275kV strategies, this strategy needs to maintain existing connections along the existing Nebo to Moranbah 132kV line. Hence this line would not be able to dismantled entirely once end of life is reached. Ongoing life extension works will be required along a significant proportion of the existing 132kV line to maintain reliability of supply to existing connection points.

Given the high capital cost of this solution, and the continued need to maintain parts of the legacy 132kV network, this strategy is not recommended based on information to date.

(F) Nebo to Wotonga 275kV New Build

The strategy involves construction of a new Nebo to Wotonga 275kV transmission line using Powerlink's existing easement from Nebo to Moorvale South. This option involves significant more upfront capital cost due to the higher cost of the 275kV transmission line and the need to establish a new 275kV substation at Wotonga.

As with the other 275kV strategies, this strategy needs to maintain existing connections along the existing Nebo to Moranbah 132kV line. Hence this line would not be able to dismantled entirely once end of life is reached. Ongoing life extension works will be required along radials from Nebo and Moranbah to these connection points to maintain reliability of supply.

However, this option will significantly increase power transfer capability to the NBB area. Powerlink is not aware of any proposals at this stage which warrant the need for the scale of additional capacity that development of new 275kV provides to the NBB area.

Accordingly, this strategy is currently not recommended based on information to date.

(G) Upfront Rebuild of Strathmore to Moranbah 132kV or Lilyvale to Moranbah 132kV

This strategy involves rebuilding of either the Strathmore to Moranbah or Lilyvale to Moranbah 132kV lines in lieu of rebuilding the Nebo to Moranbah 132kV line.

These options are significantly more expensive than rebuilding of the Nebo to Moranbah 132kV line due to significantly longer route lengths. Furthermore, these circuits are more inland and are generally in better condition than the Nebo to Moranbah line with a higher degree of remaining asset life.

Due to the significantly longer route lengths, rebuild of the Strathmore to Moranbah or Lilyvale to Moranbah 132kV lines are not economic compared to the Nebo to Moranbah rebuild strategy. Accordingly this strategy is not recommended.

(H) Upfront Nebo to Moorvale South and Wotonga 132kV New Build

This strategy involves constructing a new 132 kV transmission line from Nebo to Moorvale South and Broadlea and onto Wotonga along an existing easement. Under scenarios where there a significant step increase in load, the new line could be constructed as a twin conductor double circuit 132kV line providing a significant increase in capacity. One advantage is that Powerlink already owns the line easement between Nebo and Moorvale South so this will reduce easement related works.

However, as with other strategies above, there will still be a need to maintain connection to existing substations along the Nebo to Moranbah 132kV line. Hence radial connections from Nebo and Moranbah to existing substations at Kemmis, Coppabella and Wotonga would still need to maintained involving life extension works along a significant proportion of the route length.

Furthermore, this strategy means that Powerlink is not able to use this strategic line easement for 275kV construction in the future should the need arise. Construction of new 275kV transmission may be required as a result of new generation and/or significant new load developments within the inland north Queensland area.

Although Powerlink currently owns the Nebo to Moorvale South 275kV line easement, an economic assessment would still need to take into account costs associated with acquisition of this line easement (as per the AER Regulatory Investment Test for Transmission methodology).

For these reasons, rebuilding of the Nebo to Moranbah line to high capacity 132kV line is more economic than rebuilding along an alternate line easement. Accordingly this strategy has not been considered further.

(I) Nebo to Moranbah 132kV Build and Maintain Existing 132kV Line

This strategy involves upfront construction of a new Nebo to Moranbah 132kV double circuit line. However there is continued minimal condition related works to enable continued operation of the existing older transmission line.

This strategy enables higher power transfer capacity into the Moranbah area across the short to medium term until it is no longer economic to maintain operation of the existing aged transmission line.

This strategy is a variant of Investment Pathway 2 and may be a cost effective means to achieve high transfers to the NBB area at modest incremental cost. This strategy also defer costs associated with cut-overs and outages of the 132kV network, and decommissioning of the existing 132kV double circuit line.

(J) Insitu Rebuild of Nebo to Moranbah 132kV Line

This strategy involves an in-situ rebuild of the existing Nebo–Moranbah 132 kV transmission line. Easement widening is not required, as the new 132 kV line would be constructed entirely within the existing line easement. However, this approach would necessitate extended double-circuit outages to enable in-situ construction, as sections of the existing 132 kV overhead line would need to be progressively dismantled and replaced.

It has been confirmed that it is not technically feasible to construct a new 132 kV double-circuit transmission line within the existing line easement alignment, due to insufficient easement width.

Power system studies have also confirmed that double circuit outages would result in significant pre-contingent load curtailment within the NBB area in order for the power system to operate in a secure manner. Accordingly, this option is not considered technically or economically feasible and has not been considered further.

(K) Restringing Existing Nebo to Moranbah 132kV with High Temperature Conductor

It may be possible to restring the existing Nebo to Moranbah 132kV circuits with high temperature conductor to increase the thermal transfer capability. This approach could provide an additional 50MW to 100MW in net supportable load subject to further detailed power system and engineering analysis.

One of the main drawbacks of this option is these works will require significant and prolonged network outages with the removal of existing conductor and subsequent restringing of new high temperature low sag conductor.

The existing NBB load profile is relatively flat and there are no windows where there is subdued load demand to enable prolonged network outages. Extended outages will place a significant quantity of mining and industrial load at risk, and may require curtailment under certain circumstances to maintain a secure network. Furthermore the existing Nebo to Moranbah 132kV circuits is approaching end of life, and significant life extension of the underlying structures and hardware would also need to occur.

Accordingly, the retrofitting of existing transmission line with high temperature low sag conductor is currently not the preferred solution.

(L) Installation of Power Flow Control Devices

The existing 132kV network is configured as a meshed network with supply from eastern, northern and southern 275/132kV injection points at Nebo, Strathmore, and Lilyvale substations respectively. The Nebo to Moranbah is generally more heavily loaded than the northern Strathmore to Moranbah 132kV, and southern Lilyvale to Moranbah circuits. Depending on system conditions the critical contingency is either an outage of the 132kV circuit between Lilyvale and Dysart or one of the 132kV circuits between Nebo and Moranbah.

It may be possible to increase the net supportable load within the NBB area by improving load sharing across the meshed 132kV network. One potential solution is the installation of series compensation devices across the Nebo to Moranbah 132kV circuits to increase line impedance. This will decrease loadings across the Nebo to Moranbah circuits and increase loadings on the other circuits potentially improving load sharing across the 132kV network.

Similarly, it may be possible to install series compensation devices on the Lilyvale to Moranbah 132kV circuits and/or Strathmore to Moranbah 132kV to reduce series impedance to increase loadings across these circuits. This may subsequently reduce loadings across the Nebo to Moranbah 132kV line thereby improving sharing.

Another alternative is to apply a combination of series compensation across the three 132kV circuits increasing impedance across the Nebo to Moranbah circuits and decreasing impedance across the other two circuits to more evenly distribute loadings.

Following an outage of one of these circuits, the Northern Bowen Basin network needs to be resecured. For the current system this involves opening the 132kV south of Goonyella Riverside. This resecures the

network such that for the next contingency and subsequent operation of over current protection the Northern Bowen Basin load (excluding Goonyella and north) will be disconnected in a controlled manner. Hence power flow control devices are unlikely to increase the secure supportable load under this network configuration and a special protection scheme would need to be implemented.

Preliminary estimates indicate that the installation of series compensation ranges in the order of $50 to $200 million depending on the degree of compensation. Hence this may provide a modest increase in net supportable load within the NBB area (around 50MW to 100MW) depending on load and generation operating patterns and distribution.

Accordingly, this an expensive option relative to the increase in net supportable load. However, this option may be worth investigating under scenarios where there is a modest increase in load and there are no other cost effective network solutions and/or non-network solutions.

(M) System Protection Schemes

Given that power transfers on the network are constrained by thermal limits, it may be possible to improve transfer capability through the implementation of system protection schemes that automatically reconfigure or split the network following a contingency event. Such schemes can temporarily separate parts of the network to prevent post contingent overloads thereby enabling higher pre-contingent power transfers.

This type of operational strategy may be viable where incremental load growth occurs and full network augmentation is not yet justified. While system protection schemes do not provide the same level of long term capacity as network upgrades, they may be able to offer an efficient interim solution by leveraging existing network assets and reducing the need for immediate capital investment.

This strategy may be cost effective depending on the degree of load increase, and will be investigated such there be a need for additional transmission capacity through incremental load growth.

(N) Dynamic and/or Real Time Line Ratings

It may be possible to increase the thermal transfer capability of the NBB 132kV network through the implementation of real time or dynamic line rating schemes. These systems adjust transmission line ratings based on actual environmental conditions such as wind speed, conductor temperature, and ambient temperature. Under favourable conditions, these schemes can provide additional short term capacity and support higher power transfers.

Further investigations are required to assess the suitability and effectiveness of applying dynamic and/or real time ratings within the NBB area. The assessment would need to consider local climatic conditions including prevailing wind patterns and temperature variability.

While dynamic and real time ratings do not provide the same level of firm long term capacity as network augmentations, they may offer a cost effective interim measure when combined with other solutions should there be a need to provide incremental additional network capacity.

(O) Non-Network Solutions

There may be opportunities for non-network solutions to address emerging network constraints under scenarios where there is additional load growth.

The availability of gas generation and/or large scale renewable energy coupled with battery energy storage systems may be able to alleviate network limitations under increasing load growth scenarios. Demand side management through contracts with industrial customers may also be effective in addressing potential network limitations.

Non-network solutions will be assessed further closer to investment timings under scenarios where there is load growth within the NBB area requiring an increase to transmission capacity.

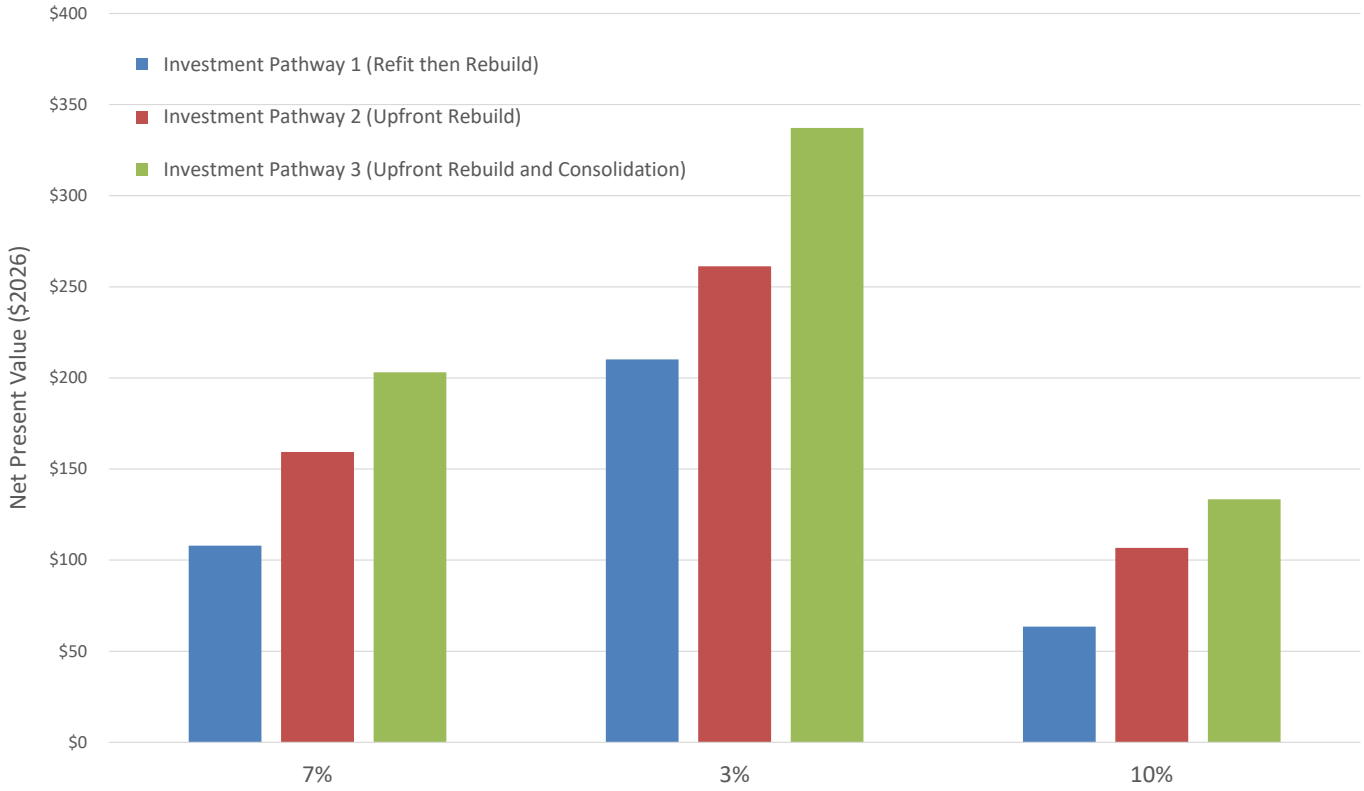
Economic and Multi-Criteria Assessment

The economic merits of an upfront build (Investment Pathways B and C) versus incremental life extension work within the NBB area (Investment Pathway A) have been assessed using NPV techniques.

Under scenarios where there is a relatively flat load outlook in the short to medium term, the assessment indicates that is more economic to undertake life extension works on the existing Nebo to Moranbah 132kV double circuit line rather than an upfront rebuild. The line refit works would need to commence in the late 2030s in order to address condition issues in a timely manner.

One of the drawback of life extension works is that these will involve higher levels of network outages compared to an upfront rebuild strategy. However, if condition issues are addressed in a timely manner avoiding the need for more extensive corrosion intervention measures, then recall times and associated risk may be manageable. Further optimisation of structure refit works may be possible through a series of staged target refits consistent with Powerlink's Asset Reinvestment Review (ARR).

Net Present Value of NBB Investment Pathways (Sensitivity to Discount Rates)



Under scenarios where there is significant step load increase, the most cost effective network investment strategy involves the rebuild of the existing Nebo to Moranbah 132kV line to high capacity twin conductor double circuit 132kV transmission. This rebuild strategy is more cost effective than rebuilding the existing Strathmore to Moranbah or Lilyvale to Moranbah 132kV circuits due to the significant shorter route lengths. At this stage, Powerlink has not received information from customers of plans to increase load levels to a scale which would warrant development of 275kV transmission into the greater Moranbah area.

For scenarios where there is incremental load growth which marginally exceeds the capacity of the existing 132kV network, it may be cost efficient to consider other measures as detailed within this report. The optimal investment strategy will depend on the extent and pace of load growth, and will be assessed further as developments materialise more fully.

A Multi Criteria Assessment of the different strategies comparing the merits and drawback of a range of investment strategies has been undertaken. This assessment is shown within Appendix A.

Recommended Strategy

There is an enduring need for the 132kV transmission network within the NBB area based on current information to date. There is very limited available headroom within the existing 132kV network so potential load increases will require works and/or procurement of non-network services to maintain reliability of supply.

Accordingly, the recommended investment strategy is to maintain the existing network topography through life extension and/or replacement works for network assets where there are emerging condition and/or obsolescence risks.

Under scenarios where there are significant step increases in load due to electrification of mining operations and/or other load developments, the most cost effective approach involves rebuilding of the existing Nebo to Moranbah 132kV transmission line to a higher capacity overhead line. These works will require easement widening along the existing transmission line alignment since it is not considered technically feasible to rebuild the new line insitu.

Where there are incremental load increases which exceed the existing capacity of the NBB 132kV transmission network, it may be economic and appropriate to implement interim solutions. These could take the form of operational system protection schemes, real time ratings, series compensation, and/or non-network solutions.

The cost effectiveness of these measures will depend on the scale and pace of load developments, and will be further assessed as market developments materialise.

Powerlink's 2027-32 Revenue Proposal

Consistent with this NBB Area Plan strategy, Powerlink has included condition related works for network assets where there are identified emerging condition and/or obsolescence risks. These works maintain the existing topography and capacity of the 132kV transmission network ensuring continued reliability of supply.

Powerlink has also included a contingent project within its Revenue Proposal for the rebuild of the existing Nebo to Moranbah 132kV line and associated easement widening works. Powerlink will undertake activities relating to this contingent project subject to relevant triggers being met.

Appendix A – Northern Bowen Basin Investment Strategies – Multi-Criteria Assessment

Strategy	Investment Pathway/Option	Economics	Constructability	Technology	Outages	Easement	Network Reliability and Resilience	Legal and Compliance
A	Nebo to Moranbah Refit followed by 132kV Rebuild	Lowest NPV under flat load outlook scenarios	Straightforward constructability	Standard technology	Life refit requires outage windows	No additional easement acquisition required	Maintains existing reliability and resilience	Compliant
B	Upfront Nebo to Moranbah 132kV Rebuild	Highest upfront cost	Straightforward constructability	Standard technology	Minimal outage requirements associated with cutovers only	Requires easement widening required adjacent to existing alignment	Maintains existing reliability and resilience	Compliant
C	Upfront Nebo to Moranbah 132kV Rebuild Followed by Future Consolidation	May be most economic in the future under changing load patterns and distribution	Straightforward constructability	Standard technology	Minimal outage requirements associated with cutovers only	Requires easement widening required adjacent to existing alignment	Lower resilience due to reduce meshed links	Compliant
D	Nebo to Moranbah 275kV Build	Highest upfront cost	Straightforward constructability	Standard technology	Minimal outage requirements associated with cutovers only	Requires easement widening required adjacent to existing alignment	Maintains existing reliability and resilience	Compliant
E	Nebo to Moorvale South 275kV Build	Highest upfront cost	Straightforward constructability	Standard technology	Minimal outage requirements associated with cutovers only	No significant additional easement acquisition required	Maintains existing reliability and resilience	Compliant
F	Nebo to Wotonga 275kV Build	Highest upfront cost	Straightforward constructability	Standard technology	Minimal outage requirements associated with cutovers only	No significant additional easement acquisition required	Maintains existing reliability and resilience	Compliant
G	Upfront Rebuild of Lilyvale to Moranbah 132kV or Strathmore to Moranbah 132kV	Higher upfront cost than Nebo to Moranbah 132kV rebuild due to longer route lengths	Straightforward constructability	Standard technology	Minimal outage requirements associated with cutovers only	Requires easement widening required adjacent to existing alignment	Maintains existing reliability and resilience	Compliant

Appendix A (Cont'd) – Northern Bowen Basin Investment Strategies – Multi-Criteria Assessment

Strategy	Investment Pathway/Option	Economics	Constructability	Technology	Outages	Easement	Network Reliability and Resilience	Legal and Compliance
H	Upfront Nebo to Wotonga 132kV Build	Higher upfront cost than Nebo to Moranbah 132kV rebuild due to need to maintain connections	Straightforward constructability	Standard technology	Minimal outage requirements associated with cutovers only	Some additional line acquisition requirement from Broadlea to Wotonga	Maintains existing reliability and resilience	Compliant
I	Nebo to Moranbah 132kV Build and Maintain Existing 132kV Line	Higher cost than Investment Strategy B but enables high power transfers at modest incremental cost	Straightforward constructability	Standard technology	Minimal outage requirements associated with cutovers only	Requires easement widening required adjacent to existing alignment	Improved network resilience and security compared to Investment Strategy B	Compliant
J	Insitu Rebuild of Nebo to Moranbah 132kV Line	Lower cost compared to an adjacent 132 kV rebuild since avoids need for easement widening	Complex constructability	Standard technology	Significant levels of 132kV double circuit outages requiring pre-contingent load curtailment	No additional easement acquisition required	Lower levels of network resilience during construction works	Not considered compliant
K	Restringing Existing Nebo to Moranbah 132kV with High Temperature Conductor (HTC)	Moderate upfront costs	Requires significant prolonged outages and long recall times resulting in high network risk	Non standard associated with retrofitting high temperature conductor on aged structures	Significant prolonged outages required with extended recall time. May require load curtailment.	No additional easement acquisition required	Maintains existing reliability and resilience	May not be compliant depending on constructability requirements
L	Implementation of Power Flow Control Devices	Moderate upfront costs	Straightforward constructability	Non standard technology associated with power sharing enabling	Minimal outage requirements associated with cutovers only	No additional easement acquisition required	Maintains existing reliability and resilience	Compliant
M	System Protection Schemes	Low upfront cost	Relatively straightforward	Standard technology	No outages required.	No additional easement acquisition required	Maintains existing reliability and resilience	Compliant
N	Installation of Real Time Ratings (RTR)	Low upfront cost	Relatively straightforward	Further investigations required relating to the effectiveness of the scheme	No outages required.	No additional easement acquisition required	Maintains existing reliability and resilience	Compliant