RIT-D Options Screening Report

Providing supply to the Burra Park development area of the Northern Gateway precinct

21 November 2023

Endeavour Energy

POWER together

Contents

1.0 Introduction

The Western Sydney 'Aerotropolis' area is a greenfield development of a new city covering 11,000 hectares of land, which will spearhead Western Sydney's future urbanisation. The proposed development features a precinct-based land use and zoning approach that will require significant development of electricity infrastructure to meet the needs of the area over the long term.

The Burra Park Development Area of the Northern Gateway precinct of the Aerotropolis is located in close proximity to the Western Sydney Airport and will be a hub for transport, logistics, warehousing and light industry. It will also include part of the Agribusiness precinct which is land planned for technology enabled agriculture, fresh food and value added food production with access to local and global markets via the airport.

The Burra Park development area is forecast to require approximately 78MVA of electricity supply capacity by 2031.

For the purpose of defining the identified need for this electricity supply requirement, we have named this area the Burra Park Development Area in the Northern Gateway Precinct of the Western Sydney Aerotropolis. The the purpose of the RIT-D, we have abbreviated this to the Burra Park Development Area.

We have already applied the Regulatory Investment Test for Distribution (RIT-D) to determine the most efficient means of providing the foundation supply to the Aerotropolis area – a 132 kV backbone feeder.[1] We are now commencing this RIT-D to determine the most efficient means of providing supply to the Burra Park Development Area. Although we expect there to be significant market benefits associated with providing supply to the Burra Park area, we consider the need for this investment a 'reliability corrective action' due to our regulatory obligations to connect new customers. These regulatory obligations are set out in the box below.

'Identified need' for this Regulatory Investment Test for Distribution (RIT-D)

We have initiated a Regulatory Investment Test for Distribution (RIT-D) to investigate and consult on the most efficient provision of supply to major new customer connections in the Burra Park Development Area.

Endeavour Energy is required to connect customers under section 5.2.3(d) of the National Electricity Rules (NER), which state that "A Network Service Provider must:

> (1) Review and process applications to connect or modify a connection which are submitted to it and must enter into a connection agreement…
>
> (6) Permit and participate in commissioning of facilities and equipment which are to be connected to its network in accordance with rule 5.8;"

We therefore consider the identified need for this investment to be a 'reliability corrective action' under the RIT-D because investment is required to comply with the above NER obligations.

The timing of the identified need for this RIT-D, and therefore the required timing for credible options to address the need, is determined by when the forecast customer demand requiring connection will exceed the existing network capacity. This is currently forecast to be 2025/26, based on the firm customer connection requests received to date.

This options screening notice sets out the reasons for our determination that there will not be a non-network option, or SAPS option, that could form a potential credible option on a standalone basis, or that could form a significant part of a potential credible option for the Burra Park Development Area RIT-D, i.e., in accordance with NER clause 5.17.4(c). It represents the first formal stage of the RIT-D assessing how to most efficiently provide supply the Burra Park Development Area.

[1] See: https://www.endeavourenergy.com.au/modern-grid/creating-the-modern-grid/network-planning/rit-d-projects.

The second formal stage of this RIT-D is a Draft Project Assessment Report (DPAR), which includes a full net present value (NPV) options assessment.

If you have any comments or enquiries regarding this report please send them to the Portfolio Management office at consultation@endeavourenergy.com.au.

2.0 Key assumptions underpinning the 'identified need' for this RIT-D

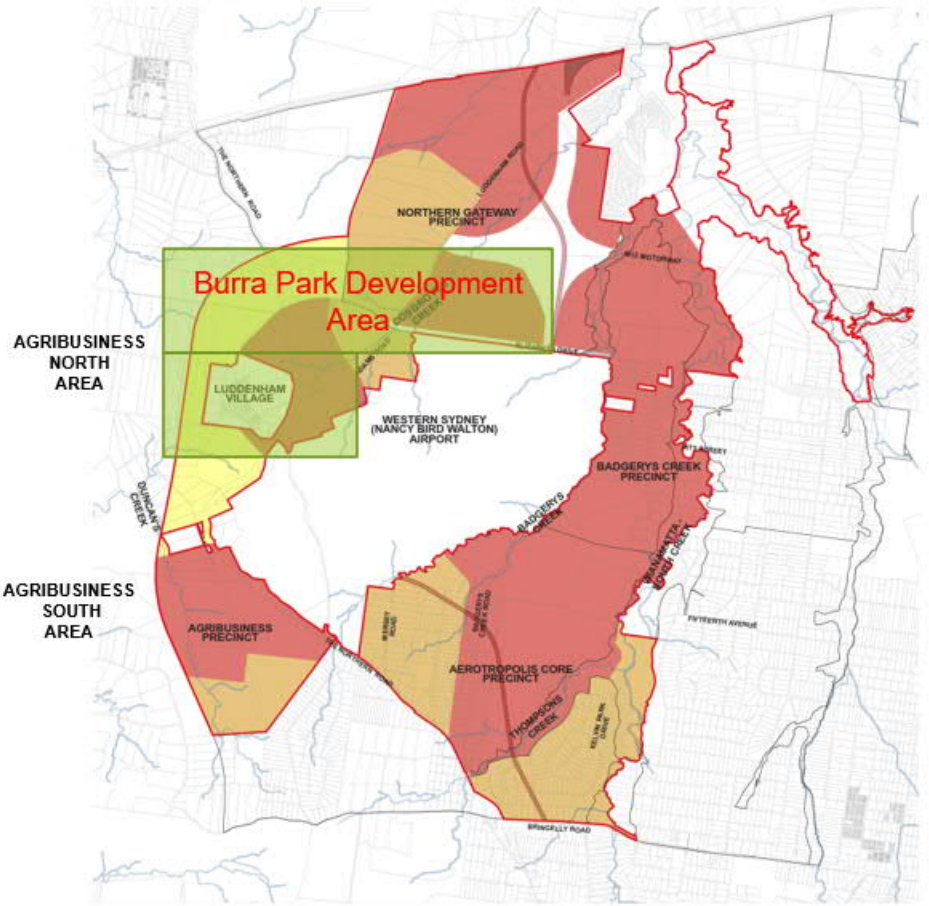
This section sets out the key assumptions and methodologies that underpin the identified need for this RIT-D. These assumptions have been used in making our determination that there will not be a potential credible non-network option, or SAPS option, on a standalone basis, or that forms a significant part of a potential credible option, i.e., in accordance with NER clause 5.17.4(c).

2.1 Relevant area of our network

The Burra Park Development Area is located within the Northern Gateway Precinct of the Western Sydney Aerotropolis in close proximity to the Western Sydney Airport.

Figure 1 below shows the geographic area that we have called the Burra Park Development Area to define the identified need for this electricity supply requirement. The area is adjacent to the north and west boundary of the airport including the area immediately north of Elizabeth Drive and to the west towards the Luddenham Village. It includes land zoned for enterprise and agribusiness use. The close proximity to the new airport and the nearby major road connections are an attraction for businesses to locate within this high growth area.

Figure 1 – Location of the Burra Park Development Area



2.2 Load characteristics and demand forecast

The Burra Park Development Area will comprise land zoned for enterprise and agribusiness use. This will result in the area having a customer demand profile similar to other areas in Western Sydney with a transport and logistics major customer base.

The agribusiness area will be based on high technology agriculture and intensive value added food production using the close access to the airport for local and global markets for exports. The load characteristics for the agribusiness customers are expected to be similar to transport and logistics but with a flatter load profile based on a continuous operating profile through the day and week. Major customer connection requests have been received for the Burra Park Development Area and have been used to determine demand forecasts.

Key committed developments in the area include:

- The Burra Park warehousing and advanced logistics area to the east of Luddenham Road. The area will include the proposed M12 motorway interchange providing motorway road access to the airport. The development covers 250Ha of land and a proposed subdivision to enterprise lots. Based on the land area and the land use indicated by the developer, this has an assessable maximum demand of 37MVA. Initial network connection of 6MVA in 2023/24 and forecast to be 20MVA in 2025;

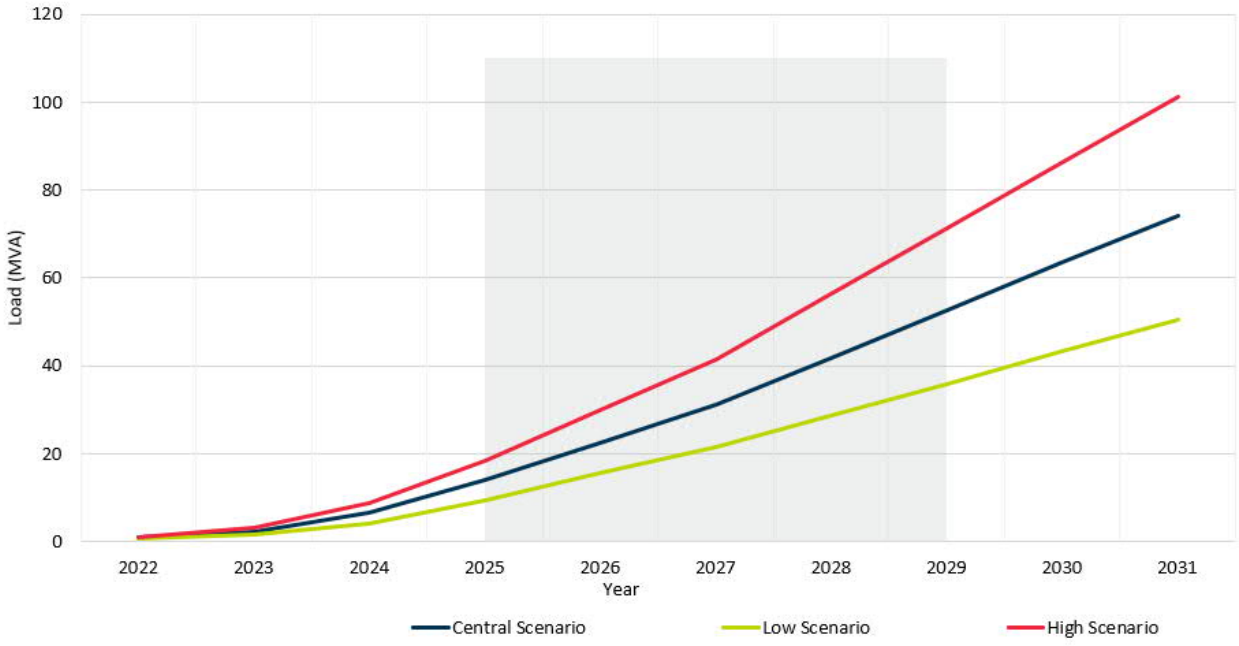
- Agribusiness North development for 55Ha of land dedicated to high technology agriculture and intensive food production with an ultimate demand of 20MVA by 2041. This area is located to the east of Luddenham Village and aligns to the historical agricultural land use in the area. The entire Agribusiness Precinct is expected to be fully developed by 2050 and based on the total land area and the end-use for intensive high technology agriculture will require at least one or maybe two additional zone substations by 2050. The area to the south of Luddenham Village is forecast to develop at a slower rate and is not included in the scope of this study and the demand forecast. Initial network connections are required by 2024; and

- West Luddenham Road including the area along Luddenham Road to the north of Burra Park has a similar expected land use to Burra Park east of Luddenham Road, however is likely to lag several years (possibly 4 to 5 years) behind the development of Burra Park due to it being further from the major access point to the airport via Elizabeth Drive and the M12 interchange. This area is also likely to be delayed due to roadworks and development of Luddenham Road. Our demand forecast takes into account the likely delay in this development by incorporating it into the forecast scenarios used in the study. Based on the land area available for development this has an ultimate maximum demand of 20MVA by 2041.

The total customer demand from these developments in this area are expected to require approximately 78 MVA of capacity by 2031.

Figure 2 below shows our forecast annual maximum demand to 2031 with central, low and high demand scenarios for the Burra Park development Area.

Figure 2 – Burra Park Development Area maximum demand forecasts from 2023 to 2031



The demand forecast scenarios have been identified and developed on the following assumptions:

- The Central Scenario demand forecast is based on the expected demand from the committed major customers and the expected timing of their connections based on information provided by the customers and the overall rate of development of the area.
- The Low Scenario demand forecast is based on a delay to the Central Scenario and represents a 2 year delay.
- The High Scenario demand forecast is based on an accelerated rate of development from the Central Scenario, however given the fixed development timeframes of the airport, major road works and the Metro this represents a possible acceleration of approximately one year ahead of the Central Scenario.

2.3 Expected pattern of use

Due to the fact that major customers have not yet connected to the network in this greenfield area, we have assessed the identified need using a representative demand profile, which assumes a representative load profile from an existing substation that we expect (at least initially), will have similar demand characteristics as the forecast demand (i.e. capturing the time of day, day of week and seasonal demand variations).

Specifically, the demand profile is based on the Marayong Zone Substation load profile which is an existing commercial and industrial area with a large transport and logistics customer base. The Burra Park Development Area will have a similar customer base, however with the addition of the agribusiness customer base which we expect will have a flatter load profile reflecting a more continuous mode of operation.

Although the area is zoned for exclusive enterprise and agribusiness land use, the area will eventually provide back-up supply to the adjacent Sydney Science Park which is planned to have a partly residential customer base. The normalised load duration curve and pattern of use that has been used in this analysis reflects the expected customer base planned for the area.

Figure 3 below presents the normalised load duration curve (LDC) assumed based on the representative demand profile and Figure 4 presents the peak load profile for a summer day assumed for the customer connections expected within the Burra Park Development Area based on the representative demand profile.

Figure 3 – Normalised LDC assumed for customer connections expected in the Burra Park Development Area

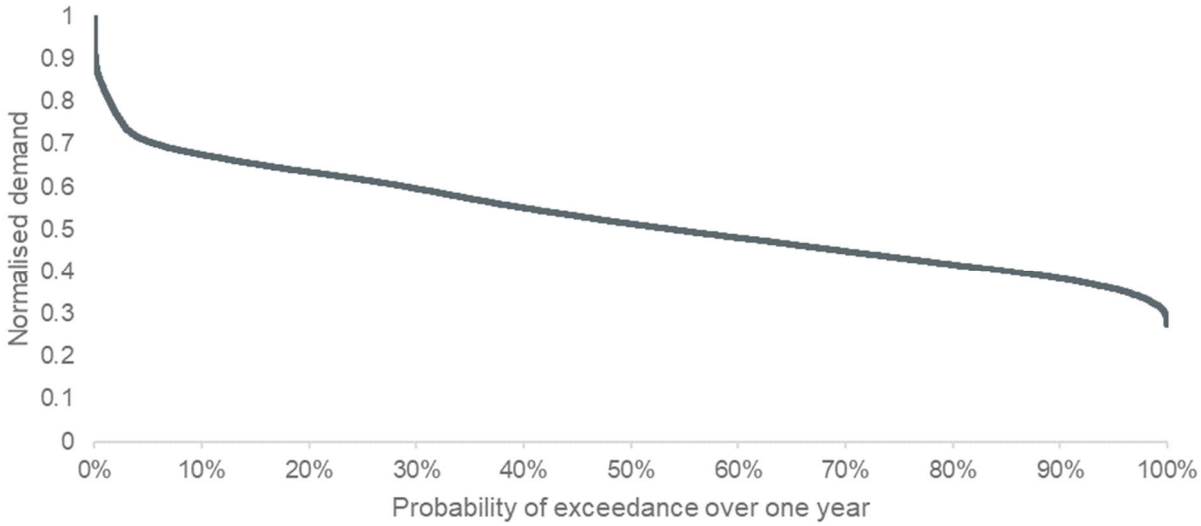
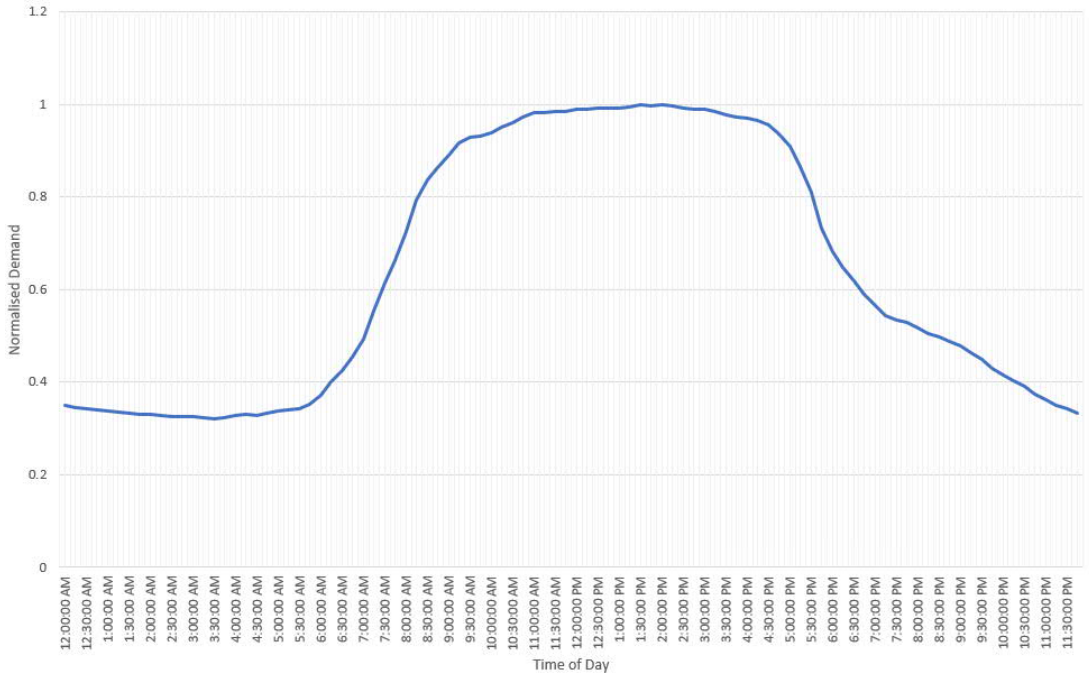


Figure 4 – Peak summer day profile for customer connections expected in the Burra Park Development Area



2.4 Existing network

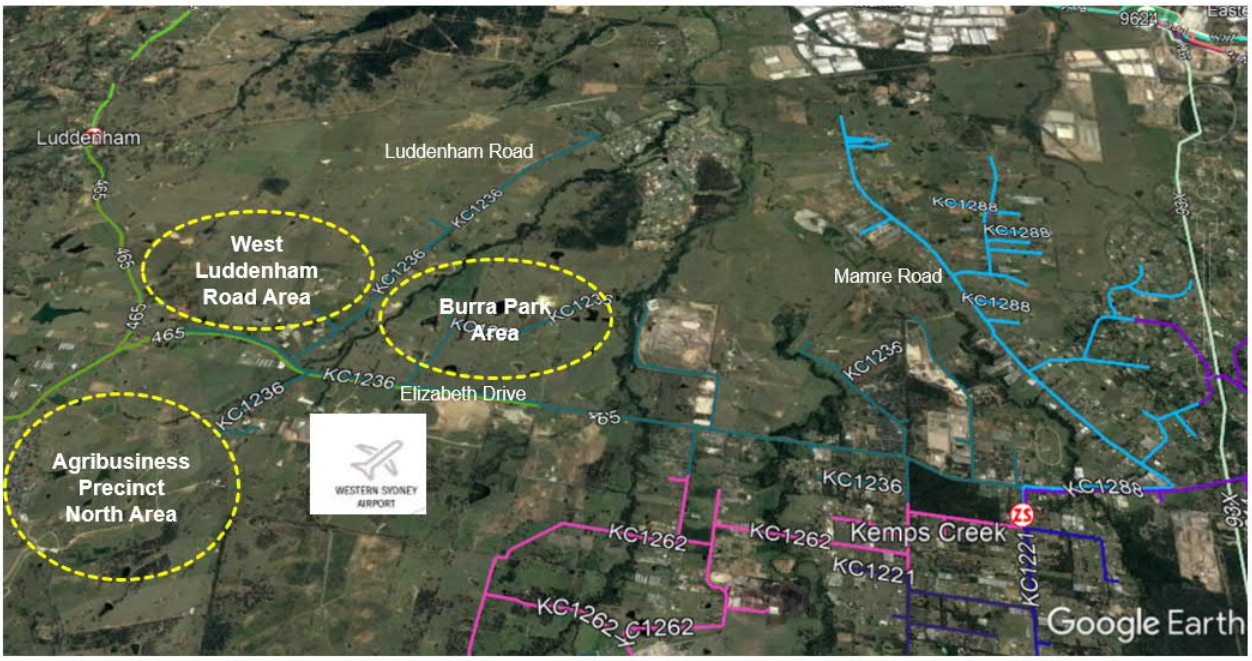
The location of the Burra Park Development Area is currently served by the Kemps Creek Zone Substation by a single 11kV distribution feeder (KC1236).

Figure 5 below shows the existing 11kV network in the Burra Park Development Area. This includes the three contained areas of: Burra Park, West Luddenham Road and Agribusiness Precinct North.

These three areas combined form the Burra Park Development Area that is the identified need and currently served by the single feeder supply.

The existing network is an overhead network and was constructed to meet the historical requirements of the area which was sparsely populated with a rural residential customer base engaged in agriculture and related light industry.

Figure 5 – Existing Network in the vicinity of the Burra Park Development Area



Importantly, the existing network in the area is not capable of servicing the growth in electricity demand. In particular, there are a number of network constraints that inhibit the ability to supply the forecast demand and customer connection requirements in the area. These network constraints are summarised in **table 1** below.

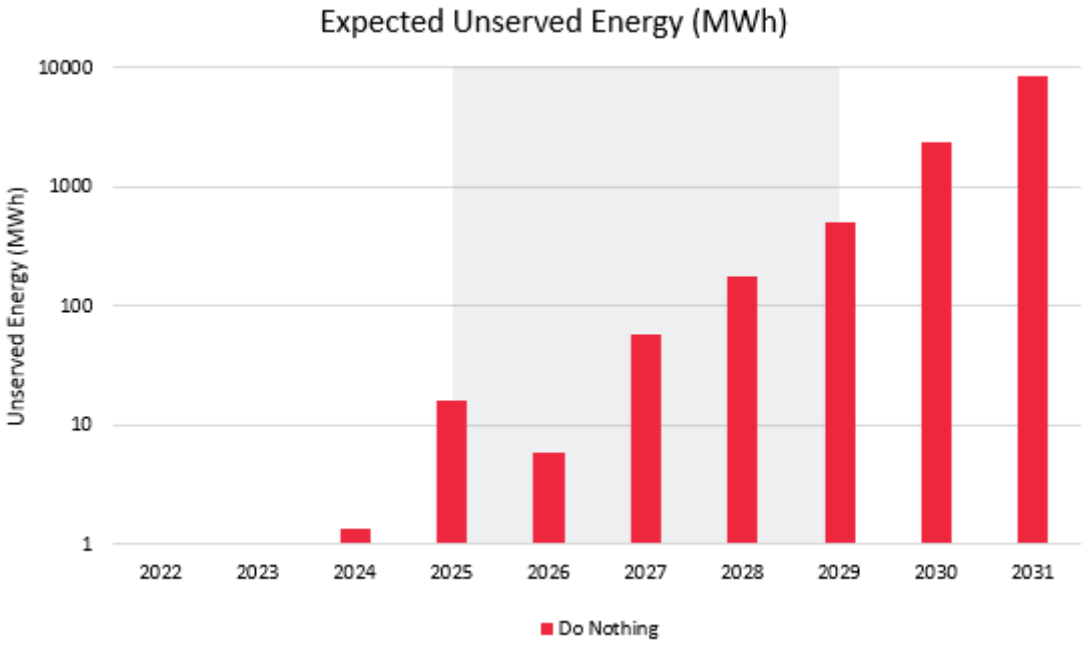
Table 1 – Network constraints in the Burra Park Development Area

Network Constraint	Description
Lack of distribution feeders	The area is a greenfields development and is currently served by one single distribution feeder with limited coverage to enable customer connections. The geographic area covered by the single feeder is limited and will not support the major customer connection requests received.
Distribution network capacity from Kemps Creek ZS to the Burra Park development area.	The Burra Park Development Area is currently supplied from Kemps Creek ZS via a single 11kV feeder (KC1236). The feeder has a total route length of approximately 7.0km and is further allocated to supply other developments on Elizabeth Drive that are closer to Kemps Creek ZS. No additional 11kV feeders are possible from Kemps Creek ZS into the Burra Park development area due to the distance of the development from Kemps Creek ZS and the lack of egress for feeders along Elizabeth Drive due to the current development in the area and the potential for road works which would widen the road and result in overhead asset relocation requirements.
Kemps Creek ZS transformer firm capacity.	The Kemps Creek ZS firm transformer capacity will be exceeded by 2025. This is due to the demand growth in the Kemps Creek area, Elizabeth Enterprise Precinct, the Sydney Water Facility, the Badgerys Creek area (south of Elizabeth Drive), the Austral areas, the provision of construction supplies for the WSA and Sydney Metro. Kemps Creek ZS has 2 x 25MVA transformers. Demand is forecast to exceed 25MVA in 2025 which would exceed firm capacity of supply.
Supply from Luddenham ZS.	Luddenham ZS is approximately 5.0km from the Burra Park Development Area. However, Luddenham ZS has limited firm capacity available. For the purpose of this requirement, we have allocated 15MVA of transformer firm capacity at Luddenham ZS for Burra Park, however there are currently no 11kV feeders from Luddenham ZS extending into the Burra Park area and there are no available distribution feeder connections possible at Luddenham ZS. Endeavour Energy has already maximised distribution feeder connection capacity at Luddenham ZS to provide connection capacity for two new feeders supplying adjacent development areas to the north of the Burra Park Development Area.

2.5 Expected unserved energy if action is not taken

If network augmentation is not undertaken there will be significant unserved energy in our network over the next decade with available capacity being exceeded in 2025/26. Figure 6 presents the estimated unserved energy if no action is taken.

Figure 6 – Forecast unserved energy for the Burra Park Development Area based on the Central scenario



2.6 Proposed scenarios for the forthcoming RIT-D NPV assessment

We propose to assess three scenarios as part of the DPAR NPV assessment, namely:

- a **central demand scenario** – consisting of the central demand forecast, our capital cost estimate, the load weighted Value of Customer Reliability (VCR), discount rate based on our WACC and maintenance costs based on 0.4% per annum of capital cost, which, in our opinion, provides the most likely scenario with a 50% probability;
- a **high demand scenario** – consisting of the high demand forecast, our capital cost estimate, the load weighted VCR, discount rate based on our WACC and maintenance costs based on 0.4% per annum of capital cost, which, in our opinion, provides a possible scenario with a 25% probability; and
- a **low demand scenario** – consisting of the low demand forecast, our capital cost estimate, the load weighted VCR, discount rate based on our WACC and maintenance costs based on 0.4% per annum of capital cost, which, in our opinion, provides a possible scenario with a 25% probability.

A summary of the key parameters expected to be used for each scenario is provided in Table 2 below.

Table 2 – Proposed scenarios for the forthcoming RIT-D NPV assessment

Variable	Central scenario	High benefits	Low benefits
Capex	Central estimates	-25%	+25%
Demand	Central demand forecast	High demand forecast	Low demand forecast
VCR	Load-weighted AER VCR	+30%	-30%
Discount rate	3.26%	2.22%	4.30%
Maintenance costs	Central estimates	-25%	+25%

We have reviewed the recent regulatory developments in the application of scenarios for RIT-D and RIT-T projects and intend on using the Central scenario to determine the preferred option and use the other scenarios to examine the robustness of the preferred option in relation to scenarios that we consider to be at the boundaries of the possible variation in key variables.

3.0 Proposed network options to meet the identified need

We have identified three credible network options to meet the identified need. This section provides more information on the scope and cost of these options. It also outlines several options that were considered but that we do not propose to progress further.

Two of the credible options involve establishing a Burra Park Zone Substation using a 132kV supply from the Western Sydney Airport Transmission Substation which is currently under construction and due to be commissioned in FY24. The third option involves establishing a Zone Substation within the Western Sydney Airport Transmission Substation (WSA TS).

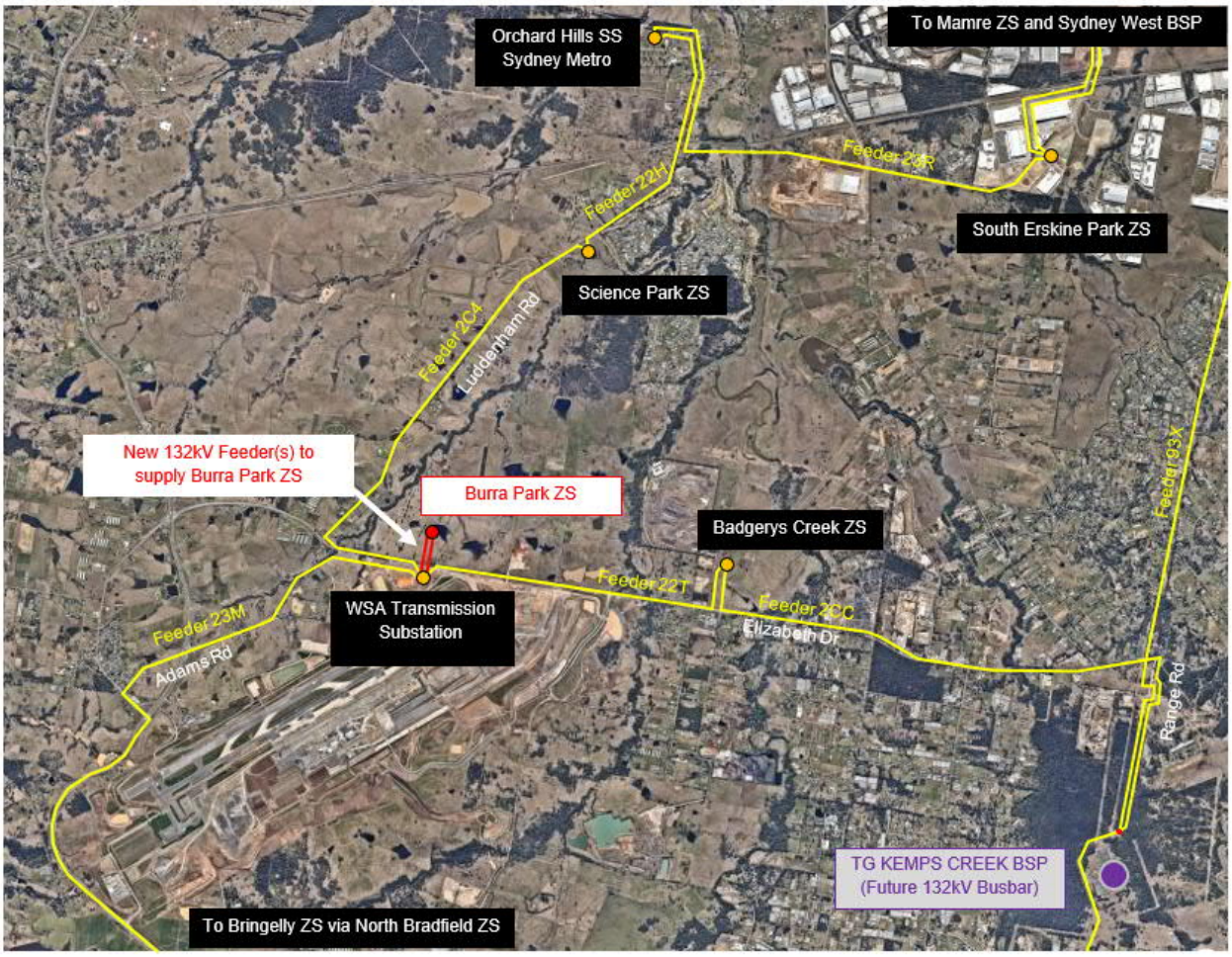
The three network options will provide the required supply and connection capacity for the development area. All three options would provide 22kV supply from a high capacity 132/22kV Zone Substation.

Figure 7 provides an overview of our Aerotropolis plan and shows the location of the credible network options considered at Burra Park and the Western Sydney Airport. It also shows the adjacent areas of Science Park, Badgerys Creek and North Bradfield which have proposed zone substations subject to separate independent RIT-D processes.

Figure 8 provides an aerial view of the development area and proposed network infrastructure. Showing the credible network options at Burra Park and Western Sydney Airport.

Figure 7 – Overview of our Aerotropolis plan with proposed and existing network infrastructure

Figure 8 – Aerial photography of the Aerotropolis area with an overlay of existing and planned major network assets including the network options for the Burra Park Development Area



3.1 Option 1 – Establish Burra Park ZS with tail ended transformers

Option 1 involves the establishment of the Burra Park Zone Substation at a location within a suitable business park in an area north of the Western Sydney Airport to supply the Burra Park Development Area.

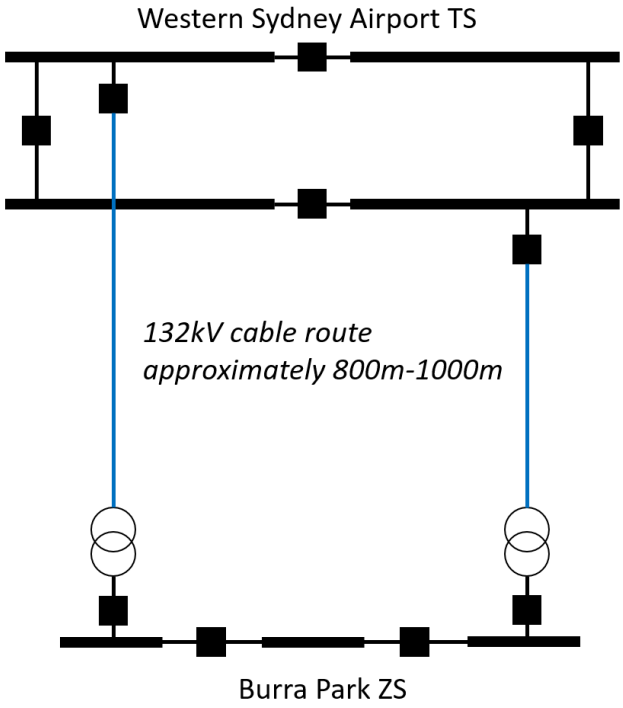
The location would be approximately 1.0km north of the airport and to the north of Elizabeth Drive.

In particular, the first stage would commence construction in 2023/24 with commissioning in 2025/26 and involves installing two 45MVA power transformers. These transformers would be connected to the WSA TS via two 132kV cables without installing a 132kV busbar at the proposed Burra Park ZS. This would take advantage of the relative proximity of the location to the WSA TS. This configuration is identified as "tail ended" transformers. This configuration provides an economic advantage of avoiding the cost of a primary busbar, however also foregoing the benefit by marginally reduced supply security and operational flexibility.

A final stage would add an additional power transformer and 132kV busbars in 2035. This would provide a final configuration of the Burra Park Zone Substation with three power transformers and a 132kV busbar to provide enhanced supply security and operational flexibility.

Figure 9 below provides an overview of Option 1. This shows the initial stage of the proposed implementation.

Figure 9 – Simplified line diagram of Option 1



The total cost of this option is estimated to be **$52.8 million** and the construction of the proposed Burra Park Zone Substation would commence in 2023/24 with commissioning in 2025/26. Table 3 provides an overview of the scope of works and capital cost of works for Option 1, with operating costs assumed to be 0.4 per cent per annum of the option's capital expenditure.

Table 3 – Scope of works and costs for Option 1

Stage	Commissioning	High Level Description of Scope and Deliverable	Cost Estimate ($M)
1	2025/26	Establishment of the Burra Park Zone Substation, including: • Suitable Land (minimum 10,000m2). • 2 x 132kV feeders from WSA TS. • 2 x 132/22kV 45MVA transformer. • Buildings for housing staff worker amenities, switchgear, protection and control. • 3 x 22kV bus sections. Providing connection for up to 15 distribution feeders. • 22kV distribution works including: o Multiple distribution feeders to provide connection and supply capacity to the development area. o Auto-transformers for 11/22kV interconnection to adjacent areas. o Targeted 11kV to 22kV network conversion in existing adjacent 11kV supply area.	38.7
2	2034/35	Augment the proposed Burra Park Zone Substation with additional network assets as follows: • 1 x 132/22kV 45MVA transformer. • 3 x 132kV bus sections. • Terminate 2 x 132kV feeders to new 132kV circuit breakers.	14.1
		Total Cost over the two stage development of the proposed Burra Park Zone Substation.	**52.8**

3.2 Option 2 – Establish Burra Park ZS with a 132kV busbar

Option 2 involves the establishment of the Burra Park Zone Substation with the inclusion of a 132kV primary busbar in the initial stage.

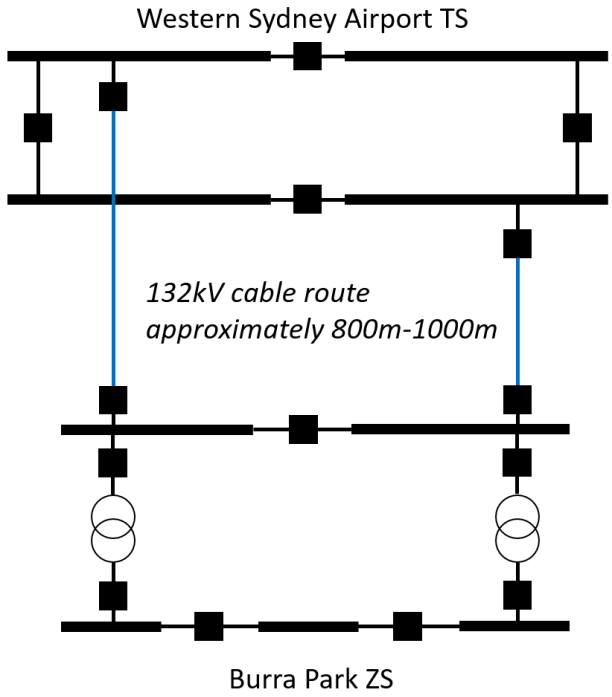
It differs from Option 1 by incorporating the installation of the 132kV busbar in the initial stage of works. This would provide an increase level of supply security and operational flexibility by providing configurable 132kV supply to the ZS.

Similarly to Option 1, this option would use a suitable land parcel in a business park located not more than 1.0km from the WSA TS location.

The first stage would commence construction in 2023/24 with commissioning in 2025/26.

Figure 10 below provides an overview of Option 2.

Figure 10 – Simplified line diagram of Option 2



The total cost of this option is estimated to be **$51.4 million** and the construction of the proposed Burra Park Zone Substation would commence in 2023/24 with commissioning in 2025/26.

Table 4 provides an overview of the scope of works and capital cost of works for Option 2 with operating costs estimated to be 0.4 per cent per annum of the option's capital expenditure.

Table 4 – Scope of works and costs for Option 2

Stage	Commissioning	High Level Description of Scope and Deliverable	Cost Estimate ($M)
1	2025/26	Establishment of the Burra Park Zone Substation, including: • Suitable Land (minimum 10,000m2). • 2 x 132kV feeder from Western Sydney Airport TS. • 2 x 132/22kV 45MVA transformer. • Buildings for housing staff worker amenities, switchgear, protection and control. • 3 x 132kV bus sections. • 3 x 22kV bus sections. Providing connection for up to 15 distribution feeders. • 22kV distribution works including: o Multiple distribution feeders to provide connection and supply capacity to the development area. o Auto-transformers for 11/22kV interconnection to adjacent areas. o Targeted 11kV to 22kV network conversion in existing adjacent 11kV supply area.	44.1
2	2034/35	Augment the proposed Burra Park Zone Substation with additional network assets as follows: • 1 x 132/22kV 45MVA transformer.	7.3
		Total Cost over the two stage development of the proposed Burra Park Zone Substation.	**51.4**

3.3 Option 3 – Establish a 22kV Zone Substation at the WSA TS

Option 3 involves the establishment of the Western Sydney Airport Zone Substation (132/22kV) to be co-located with the Western Sydney Airport Transmission Substation (WSA TS).

The WSA TS is currently under construction and is planned to be commissioned in late 2024. The WSA TS was the preferred option to address 33kV constraints in the Luddenham, Kemps Creek and Badgerys Creek areas and completed its RIT-D process in 2022 (Refer to Footnote[1] above for URL to the documents in relation to the previous completed RIT-D for the 33kV constraints and preferred option).

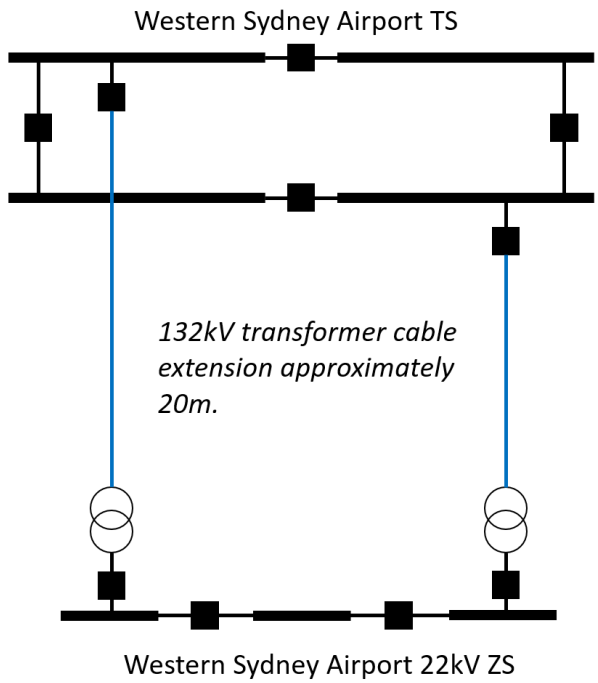
The WSA TS is a 132/33kV substation which will provide a strong 33kV source of supply to major customers in the area and supporting the 33kV network. There is sufficient available space on the site to accommodate both the WSA TS and WSA 22kV ZS. Major civil works and geo-technical ground works have been completed on the site as part of the construction of the WSA TS.

Option 3 will utilise the 132kV busbar to be constructed for the WSA TS to provide supply to the WSA 22kV ZS. This will enable the 22kV supply capacity and customer connection capability for the Burra Park Development Area. Option 3 also includes substantial 22kV feeder development works allowing low cost connection for major customers, installation of auto-transformers to interconnect to the historical 11kV network and will include targeted 11kV to 22kV conversion to upgrade the supply capacity in the local distribution network.

The WSA 22kV ZS would be commissioned in 2025/26 and a final stage would be commissioned in 2034/35 with the addition of a third power transformer and a 132kV busbar extension from WSA TS.

Figure 11 provides an overview of Option 3.

Figure 11 – Simplified line diagram of Option 3



The total cost of this option is estimated to be **$45.3 million** and the construction of the proposed WSA 22kV Zone Substation would commence in 2023/24 with commissioning in 2025/26.

Table 5 provides an overview of the scope of works and capital cost of works for Option 3 with operating costs estimated to be 0.4 per cent per annum of the option's capital expenditure.

Table 5 – Scope of works and costs for Option 3

Stage	Commissioning	High Level Description of Scope and Deliverable	Cost Estimate ($M)
1	2025/26	Establishment of the WSA 22kV Zone Substation including the following components: • 2 x 132/22kV 45MVA transformers. • 3 x 22kV switchboards. • Construct a 22kV switchroom and control room. • 2 x 132kV cables from the WSA TS to the WSA 132/22kV transformers. • 22kV distribution works including: o Multiple distribution feeders to provide connection and supply capacity to the development area. o Auto-transformers for 11/22kV interconnection to adjacent areas. o Targeted 11kV to 22kV network conversion in existing adjacent 11kV supply area.	30.3
2	2034/35	Augment the WSA 22kV Zone Substation as follows: • 1 x 132/22kV 45MVA transformer. • 2 x 132kV bus sections. • Reconfigure 132kV cables to terminate on the new bus sections.	15.0
		Total Cost over the two stage development of the WSA 22kV Zone Substation.	**45.3**

3.4 Options considered but not proposed to be progressed in the DPAR

Endeavour Energy has considered a number of options that we propose not to progress to the DPAR. These options, and our reasoning for not progressing them further, are summarised in Table 6.

Table 6 – Options considered but not proposed to be progressed in the DPAR

Option	Reason not progressed
Augmentation of existing Kemps Creek Zone Substation	A network option considered was to supply the area by augmenting the existing Kemps Creek Zone Substation by adding a third transformer, augmenting the existing transformers to 35MVA (from 25MVA) and conversion of the Kemps Creek Zone Substation to 132kV. However, this option would require taking the Kemps Creek ZS out of service for a long period of time during the construction period and is not feasible due to the impact on the existing Kemps Creek customers and the prolonged loss of supply. This option would also require construction of long feeders with a route length of 5 to 7km from Kemps Creek ZS to the development area which would be difficult due to existing egress and congestion issues with distribution feeders from Kemps Creek to the development area using Elizabeth Drive as a possible distribution corridor.
Augmentation of existing Luddenham Zone Substation	The augmentation of the existing Luddenham ZS to supply the Burra Park Development Area was considered, however there are a number of reasons that this option was not progressed, they are: • There are no available 11kV circuit breakers to support a supply to Burra Park. Luddenham ZS is located on a small land parcel and bordered to a major water pipe easement and is not capable of being augmented to increase supply and connection capacity. • The location of the Luddenham ZS is approximately 5.0km from the Burra Park Development Area and there would likely be voltage regulation issues using the existing 11kV supply available at Luddenham ZS. Our supply strategy for the Aerotropolis area utilises 22kV in preference to 11kV to provide a more economic supply for the area. • Any distribution feeders from Luddenham ZS to supply the Burra Park area are likely to be impacted by road works in the area over the next few years and result in costly asset relocation.
Utilise a 33kV supply option	While there is existing 33kV supply in the local area, this is used to supply the existing 33/11kV zone substations at Luddenham, Kemps Creek and Bringelly and provide a direct 33kV supply to major customers. The overall supply strategy for the Aerotropolis area will use 22kV and this is incompatible with a 33kV supply option. Our 22kV supply strategy will be more economic due to it resulting in a lower number of zone substations required to supply to overall area and the longer route length provided by 22kV feeders compared to 11kV feeders. Auto-transformers will be used to interconnect our 11kV and 22kV networks.

4.0 Assessment of non-network solutions and SAPS

Following a review of the expected future customer demand requirements of the Burra Park Development Area and the nature of the existing network capability, Endeavour Energy has determined that there is unlikely to be a non-network option, or SAPS option, that could form a potential credible option on a standalone basis, or that could form a significant part of a potential credible option for this RIT-D.

This section sets out the assessment behind this determination, which draws on the assumptions outlined in the sections above, and considers the required technical characteristics that a non-network option, or SAPS option, would need to meet the identified need.

4.1 Requirements that a non-network option would need to satisfy

We have considered the requirement that a non-network option would need:

- to be able to form a credible stand-alone option; or
- to defer the network investment.

A viable non-network option that maintains supply to all customers must be capable of reducing the estimated shortfall on the network from the firm capacity available at Luddenham Zone Substation. Under the central scenario, by the end of 2024/25 a shortfall is estimated to exist for 195 days in the year and is at a maximum of about 69 MWh per day in the summer period. By 2027/28, a shortfall is estimated to exist for 260 days in the year and at a maximum of about 81 MWh per day in the summer period under the central scenario. The requirement for support from non-network options is therefore substantive in both the number of days expected to be required and the magnitude of the support needed.

In addition, we note that for any non-network solution to be effective it would need to locate near, and essentially connect to, the new customer connection points. We consider that any such co-location would be extremely difficult at the required capacity given the substantial land requirements for many non-network options, the planning approvals, issues with community acceptance and these being in addition to and in competition with the underlying developments expected in these areas. Further, the lack of existing customer base (other than rural residential customers) in the area negates the potential for demand reduction approaches.

Table 7 below summarises the expected network support requirements out to 2027/28 for any non-network solutions to form standalone options under the central scenario. We note that the requirements would increase further beyond 2027/28 as more customers connect to the network in the area.

Table 7 – Network support required for a standalone option under the central scenario

Year	Peak demand reduction required (MW)	Days required	Hours required	Total MWh required
FY25	8.8	195	1,374	3,332
FY26	14.0	285	2,775	11,300
FY27	6.0	100	645	1,213
FY28	10.0	260	1,900	4,726

Table 8 below sets out the requirements for non-network options to defer network expenditure in a cost effective manner, i.e., for them to be coupled with a network option in order to form a combined credible option.

Given that the comprehensive NPV assessment of the network options is yet to be undertaken (and will be part of the DPAR), the deferral assessment has been undertaken in this screening report using the preliminarily preferred network option, Option 3.

Table 8 – Network support required to defer a network option under the central scenario

Deferral period	Deferral year	Peak demand reduction required (MW)	Days required	Hours required	Total MWh required	Deferral value[2]
1 year	FY25	8.8	195	1,374	3,332	$0.95M
2 years	FY25	8.8	195	1,374	3,332	$1.90M
	FY26	14.0	285	2,775	11,300	

The required characteristics for non-network solutions set out above demonstrates that the level of demand reduction and/or local storage/generation that would be required to represent a credible option for this RIT-D is in an order of magnitude which does not appear realistically achieveable, given the existing demand in the area. We therefore do not consider it technically feasible that non-network technologies can form standalone credible options that meet the entire identified need.

Similarly, the amount of demand reduction that would be required in order to enable a deferral of network augmentation by one year is also high, particularly when considering the deferral value. We therefore also do not consider it commercially feasible that non-network technologies can be coupled with a network option to form a credible option.

[2] The deferral value is calculated as the net present value of deferring the preliminary preferred network option by one year using the central scenario's discount rate.

4.2 Assessment of specific non-network technologies

In addition to our general assessment of whether non-network options are likely able to form a potential credible option on a standalone basis, or form a significant part of a potential credible option for the Burra Park Development Area RIT-D, we have considered individual non-network technologies. Our assessment is summarised in Table 9.

Table 9 – Assessment of non-network technologies

Non-network technology	Assessment
Grid-scale storage	Not feasible because it would not defer network investment due to the energy storage system itself requiring connection to the network to provide charging supply.
VPP	Not feasible because the Burra Park Development Area is a new development. Uptake initially requires customers to connect to the network, which is not feasible with the existing network infrastructure and small existing customer base in the area.
Residential BESS	Not feasible because the Burra Park Development Area is zoned for enterprise land use and there will be no residential dwellings in the area. Although, the area may provide a back-up supply to the adjacent Sydney Science Park which includes residential dwellings, this will not be developed for several years after the proposed development of enterprise customer connections in the Burra Park area.
Commercial direct load control	Not feasible because the Burra Park Development Area is a new development with no significant existing commercial or industrial customer base to utilise for demand management, control or response programs.
Behaviour demand response	Not feasible because the Burra Park Development Area is a new development. Uptake and enrolment onto a behaviour based demand response program requires customers to firstly connect to the network, which is not feasible with the existing network infrastructure.

Endeavour Energy acknowledges that non-network solutions may be able to assist in the future as demand continues to grow following the establishment of the initial network infrastructure for the Burra Park Development Area. We would expect that major customers connecting in the development area are likely to participate in demand management programs either via their Retailer and/or with Endeavour Energy.

4.3 Consideration of SAPS options

Recent changes to the NER, RIT-D and RIT-D application guidelines require Endeavour Energy to consider whether a SAPS option can fully or partly address an identified need. In practice, this relates to consideration of whether an identified need could be fully or partly addressed by converting part of our distribution network forming part of the interconnected national electricity system to a regulated SAPS.[3] Regulated SAPS are set out in section 6B of the National Electricity Law (NEL), which defines a SAPS as a system that:[4]

- generates and distributes electricity; and
- does not form part of the interconnected national electricity system.

We consider that there is not a SAPS option that could form a potential credible option on a standalone basis, or that could form a significant part of the credible option, in this RIT-D. In particular, the load requirements of the greenfield development area are significant and therefore could not be supported by a network that is not part of the interconnected national electricity system with the ability to draw on grid-connected generation sources. In forming this conclusion, we have considered both the potential to convert part of our distribution network to a regulated SAPS as well as the potential to build a new SAPS (given the greenfield nature of the network development in this area).

We note that this conclusion does not preclude the development of embedded generation and storage by specific loads to meet part of their supply needs and/or as back-up to their grid connections. Such developments fall outside of the definition of a SAPS and are coupled with those loads continuing to also require their full demand to be able to be met from the grid.

[3] See definition of 'SAPS option' in the NER.

[4] Section 6B(6) of the NEL.

5.0 Conclusion

The Burra Park Development Area of the Northern Gateway precinct of the Aerotropolis is located in close proximity to the Western Sydney Airport and will be a hub for transport, logistics, warehousing and light industry. It will also include part of the Agribusiness precinct which is land planned for technology enabled agriculture, fresh food and value added food production with access to local and global markets via the airport.

Although the existing network capacity may be able to service the initial customer connections, as demand continues to grow it will exceed the existing firm capacity of the network resulting in a large amount of load at risk and unserved energy in the area. In particular, the Burra Park Development Area is expected to have a peak demand of 78 MVA by 2031, which will exceed the capacity of the existing 11 kV supply network from Kemps Creek and also the existing available supply capacity from the Luddenham Zone Substation.

Based on the extent of forecast demand for the Burra Park Development Area, the expected cost of network options and the capacity of the existing network to facilitate non-network technologies, it is not considered feasible that a non-network solution will form a potential credible option on a standalone basis, or form a significant part of a potential credible option for this RIT-D. Further, SAPS options are unlikely to contribute to meeting the identified need because the size of greenfield development cannot be supported by a network that is not part of the interconnected national electricity system. Consequently, an Options Screening Report is not intended to be prepared for this RIT-D in accordance with clause 5.17.4(c) of the NER.

We consider that non-network solutions may be more likely to be feasible for future developments in the area as the cost of large scale battery storage continues to decrease, the widespread inclusion of solar PV in new commercial and industrial developments continue to increase, and the uptake of electric vehicles, including electric buses offer opportunities for network support.

The load duration curve and peak load profile used in our analysis are based on our best estimate of the expected pattern of use in the area, however given the uptake of EVs, battery storage behind the meter and continued higher penetration of solar PV the load duration curve and the pattern of usage will change.

For example, we expect that the impact of EV charging cycles in both homes (although this area will not include residential homes based on the land use zoning) and workplaces will change the pattern of usage over time and will then impact the sizing of network infrastructure and potentially the capital investment required. Future changes to energy prices from retailers and network use of system charges are also likely to change the pattern of usage in the area over the long term.

These developments will be closely monitored as the Burra Park Area develops over the next decade and non network options will be considered as part of future network augmentations. In particular, Endeavour Energy will monitor these changes and assess whether an update to the evaluation in this RIT-D is needed should non-network options be a credible alternative to the subsequent stages of network investment.

CONTACT

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