

# NEED/OPPORTUNITY STATEMENT (NOS)



New 132 kV Line Switchbay at Vineyard BSP for Endeavour Energy Connection of Proposed Box Hill ZS

NOS- 00000000691 revision 4.0

**Ellipse project description:** New 132 kV Line Switchbay at Vineyard BSP for Endeavour Energy Connection of Proposed Box Hill ZS

**TRIM file:** MF1849

**Project reason:** Other - Customer request

**Project category:** Prescribed - Augmentation

## Approvals

<b>Author</b>	Ronny Schnapp	Engineer
<b>Reviewed</b>	Charbel Lahoud	Engineer
<b>Endorsed</b>	Vincent Ong	Network and Connection Analysis Manager
	Azil Khan	Investment Analysis Manager
<b>Approved</b>	Nalin Pahalawaththa	M/PSA
<b>Date submitted for approval</b>	[Publish Date]	

## Change history

Revision	Date	Amendment
0	6/05/2016	Initial Issue
1	09/05/2016	Formatting changes
2	20/05/2016	Updated load at risk
3	20/10/2016	Formatting changes and updates to risk cost
4		Clarified all risk cost breakdowns

## 1. Background

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Vineyard 330/132 kV Substation is supplied by 330 kV transmission lines from Eraring and Sydney West substations. It is also equipped with a 132 kV 60 MVA capacitor bank and three 330/132 kV 375 MVA transformers. Vineyard Substation currently supplies four Endeavour Energy (Endeavour) 132 kV feeders; two to Rouse Hill and two to Hawkesbury. A new 132 kV switchbay was recently constructed under [Need DCN67](#) to supply Endeavour's new Marsden Park Zone Substation (ZS).<sup>1</sup>

Figure 1 on page 4 shows the high voltage operating diagram (HVOD) of Vineyard Substation.

In October 2013, the NSW Department of Planning and Infrastructure (DPI) outlined its long term plans for the development of the [Vineyard](#)<sup>2</sup> and [Riverstone East](#)<sup>3</sup> precincts (as part of the wider approach it calls Precinct Planning). The outcomes of the 2013 meeting can be read [here](#).

Through the joint planning (JP) process, Endeavour Energy has informed TransGrid that it plans to establish a new zone substation (ZS) to meet the supply needs of the NSW Department of Planning and Infrastructure's (DPI's) proposed new developments.

## 2. Need/opportunity

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The expected Need date for Box Hill ZS to take initial supply via a new line connection and new switchbay from Vineyard Substation is in summer 2021/22. The timing is to be confirmed with Endeavour Energy through the ongoing Joint Planning process.

### 2.1 Risks

The National Electricity Rules (NER) clause 5.14 – Joint Planning requires TransGrid (and Endeavour Energy) to jointly plan their regional electricity network. In this case, should TransGrid not participate with Endeavour Energy in addressing this Need, it would be violating this statutory obligation.

A further risk of not addressing this Need is a loss of load, that is, unserved energy (USE), at the new Box Hill development due to electricity supply not being provided as required.

The load at risk which is being assessed here is the forecast peak load<sup>4</sup> of 24.9 MW in 2023 at Box Hill, multiplied by a load factor<sup>5</sup> of 0.8. As Box Hill is a new development and there is no load data available yet, the 0.8 factor is used as a reasonable estimate of the likely average demand over summer 2022/23. The load at risk is therefore  $24.9 \text{ MW} * 0.8 = 19.92 \text{ MW}$ .

The risk cost of not addressing this Need is therefore composed of the following components:

- > exposing customer load of 19.92 MW to risk of being unsupplied.
- > damage to TransGrid's reputation (negative media coverage).
- > litigation by customers/consumer groups.

The total cost of these risks has been calculated in TransGrid's Investment Risk Tool thus:

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<sup>1</sup> Refer to Need/opportunity Statement 67, Request for Project Scoping 67 and Project Approval Document 67, <http://thewire/projects/prew/DCN67/SitePages/Home.aspx>

<sup>2</sup> NSW Department of Planning and Infrastructure 2014, *Vineyard*, <<http://www.planning.nsw.gov.au/Plans-for-your-area/Priority-Growth-Areas-and-Precincts/North-West-Priority-Growth-Area/Vineyard>>, accessed 7 December 2016.

<sup>3</sup> NSW Department of Planning and Infrastructure 2014, *Riverstone East Priority Growth Area*, <<http://www.planning.nsw.gov.au/Plans-for-Your-Area/Priority-Growth-Areas-and-Precincts/North-West-Priority-Growth-Area/Riverstone-East>>, accessed 7 December 2016.

<sup>4</sup> Endeavour Energy, *Box Hill – Update to Preliminary Business Case*, August 2016, [Endeavour Energy Letter](#) attachment 5. A snapshot of the load in 2023 is being used as this is the last year of the 2018/19-2022/23 revenue period.

<sup>5</sup> Load factor = average demand / maximum demand over the period assessed.

### VCR Risk Cost (Unserviced Energy)

$VCR \text{ risk cost} = \text{load at risk} * \text{probability of Box Hill going unsupplied for one day}^6 * VCR^7$

$\therefore VCR \text{ risk cost} = 19.92 \text{ MW} * 24 \text{ hrs} * \$38,350/\text{MWh}$

**$\therefore VCR \text{ risk cost} = \$18.33 \text{ million per annum}$**

### Reliability Risk Cost

$Reliability \text{ risk cost} = VCR \text{ risk cost} + \text{litigation costs}$

**$\therefore Reliability \text{ risk cost} = \$18.33\text{m} + \$0.01\text{m}^8 = \$18.34 \text{ million per annum}$**

### Financial Risk Cost

$Financial \text{ risk cost} = \text{internal investigation costs} = \$10,000^9$

### Reputational Risk Cost

$Reputational \text{ risk cost} = \text{external consultations \& communications costs} = \$34,500^{10}$

### Total Risk Cost

$Total \text{ risk cost} = Reliability \text{ risk cost} + Financial \text{ risk cost} + Reputational \text{ risk cost}$

**$\therefore Total \text{ risk cost} = \$18.39 \text{ million per annum}$**

A risk-cost summary extract from the Investment Risk Tool appears in Attachment 1.

## 3. Related needs/opportunities

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Nil.

## 4. Recommendation

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It is recommended that a project be scoped for the construction and commissioning of a new 132 kV line switchbay at Vineyard 330/132 kV Substation for the connection of Endeavour's Box Hill ZS.

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<sup>6</sup> This is a snapshot of the risk cost during a single day of summer 2022/23.

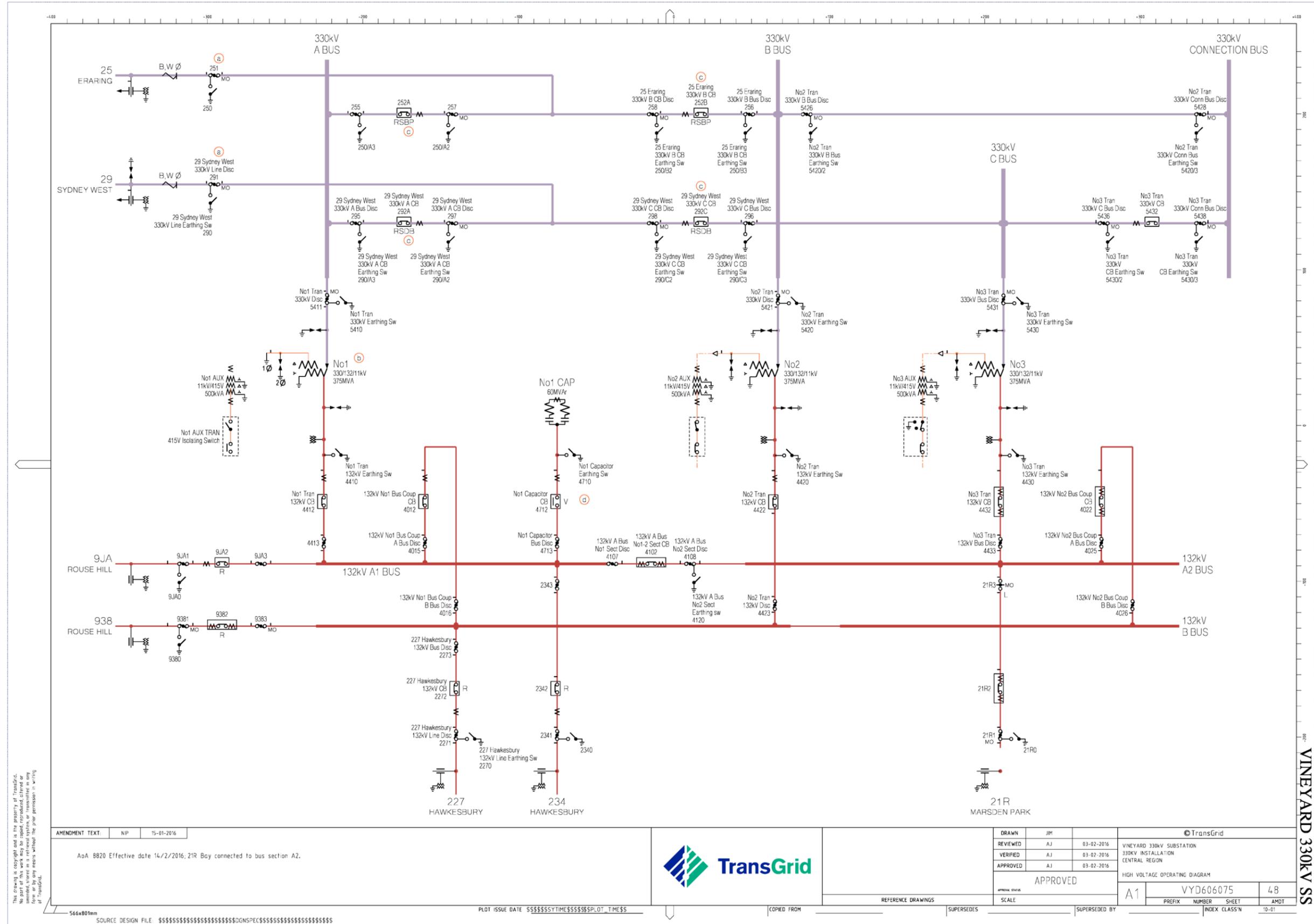
<sup>7</sup> TransGrid's Investment Risk Tool bases the Value of Customer Reliability (VCR) on figures published by AEMO in its *Value of Customer Reliability Review - Final Report*, September 2014. In this case we use the mixed residential/industrial figure of \$38,350/MWh.

<sup>8</sup> This component is an assumed litigation risk cost for this event.

<sup>9</sup> This component is an assumed financial risk cost for this event.

<sup>10</sup> This component is an assumed reputational risk cost for this event.

Figure 1: Vineyard 330/132 kV Substation Present Arrangement



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AMENDMENT TEXT:	N/P	15-01-2016
AoA 8820 Effective date 14/2/2016, 21R Bay connected to bus section A2.		



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DRAWN	JJM		
REVIEWED	AJ	03-02-2016	VINEYARD 330kV SUBSTATION
VERIFIED	AJ	03-02-2016	330kV INSTALLATION
APPROVED	AJ	03-02-2016	CENTRAL REGION
HIGH VOLTAGE OPERATING DIAGRAM			
APPROVED		A1	VYD606075
SCALE			48
REFERENCE DRAWINGS			AMDT
SUPERSEDES			INDEX CLASS N
SUPERSEDED BY			10-01

VINEYARD 330kV SS

# Attachment 1 Risk Cost Summary



## Current Option Assessment - Risk Summary

Project Name: New 132 kV Switchbay at Vineyard BSP for Connection of Endeavour Energy's Box Hill ZS

Option Name: 691 - Base Case

Option Assessment Name: 691 - Base Case - Assessment 1

Rev Reset Period: Next (2018-23)

Major Component	No.	Minor Component	Sel. Hazardous Event	LoC x CoF (\$M)	Failure Mechanism	NoxLoC xCoF (\$M)	PoF (Yr 1)	Total Risk (\$M)	Risk (\$M) (Rel)	Risk (\$M) (Op)	Risk (\$M) (Fin)	Risk (\$M) (Peo)	Risk (\$M) (Env)	Risk (\$M) (Rep)
Line Switchbay and secondary systems	1	Electrical	Unplanned Outage - HV (Line Switchbay and secondary systems)	\$18.39	Failure	\$18.39	100.00%	\$18.39	\$18.34		\$0.01			\$0.03
				\$18.39		\$18.39		\$18.39	\$18.34		\$0.01			\$0.03

Total VCR Risk: \$18.33

Total ENS Risk: \$0.00



