

Confidential

Mowbray Road Data Centre

Hazards and Risk

SYD04_Y-R-0003

Revision 3 | 8 April 2022

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 280842-00

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Executive summary

Background

The proposed development, construction and operational use of a data centre will serve the Sydney CBD and wider area in providing an increased cloud-based storage service. The data centre is comprised of 6 levels, including an underground level and will reach a building height of 31.2 metres. It will operate 24/7 on all 6 levels. The data centre will positively impact the social and economic conditions of Lane Cove and Willoughby LGAs and is expected to generate approximately 300 construction jobs and 50 operational jobs. The site layout has been developed for three data centres with a total 144MW capacity (3 x 48MW). Full detailed design is currently underway for two 48MW centres, with the third data centre planned as a future build.

The purpose of this report is to address the relevant Secretary's Environmental Assessment Requirements (SEARs) and development control plan (DCP) requirements for Hazards and Risk. Specifically, this report contains a preliminary risk screening in accordance with the *State Environmental Planning Policy No. 33 Hazardous and Offensive Development* (SEPP 33) and if required, a preliminary hazard analysis (PHA). This report also details the location, quantity of potentially hazardous materials used onsite and the design and management measures to minimise the associated risk.

Note, since the time of writing this technical report, SEPP 33 has been replaced with the State Environmental Planning Policy (Resilience and Hazards) 2021. All references to SEPP 33 can be found within the currently in force Resilience and Hazards SEPP 2021.

Methodology

The following legislation, regulations and policies form the basis of this assessment:

- *Applying SEPP 33 Guidelines*
- Section 7.1 of the *Work Health and Safety Regulations 2011*
- *Protection of Environment Operations Act 1997*
- Australian Standard (AS) 1940-2017: *The storage and handling of flammable and combustible liquids*
- *Building Code of Australia*¹

As part of the SEPP 33 process, a preliminary risk screening in accordance with *Applying SEPP 33* has been completed to determine whether the development is considered potentially hazardous with respect to SEPP 33. The storage locations and quantities of hazardous materials such as back-up generators, diesel fuel

¹ The project fire engineers shall be provided with this report and are to incorporate any unique fire hazards into the overall fire strategy as part of the Building Code of Australia compliance process.

storage tanks, and lithium-ion batteries have been detailed in this report. Design and management measures have been identified to mitigate these risks so far as is reasonably practicable (SFAIRP).

Findings

The outcomes of this assessment are as follows:

- The site was found to be below the threshold for classification as potentially hazardous industry in terms of both storage and transportation therefore a PHA is not required.
- The manifest quantity thresholds for diesel as set out by Schedule 11 of the Work Health and Safety (WHS) Regulations are exceeded.
- The placard quantity thresholds for diesel as set out by Schedule 11 of the WHS Regulations are exceeded.
- The criteria for an environment protection licence for chemical storage under the Protection of the Environment Operations Act 1997 (PoEO) have not been met and so an environment protection licence is not required for chemical storage.

Recommendations

Arup makes the following recommendations regarding the site:

- Each room in the data halls storing battery cabinets is to be installed with the following measures:
 - A fire resistance level (FRL) of 120/120/120.
 - Adequate ventilation to relieve the off gassing of combustible gases from thermal runaway or a gas detection system.
 - Smoke detection.
 - Double knock pre-action sprinkler system.
 - The inclusion of lithium-ion batteries is to be incorporated into the overall fire safety strategy by the project fire engineer.
- The following recommendations apply to the storage of diesel fuel in storage tanks:
 - The tanks are to comply with AS 1940-2017: *The storage and handling of flammable and combustible liquids* (AS 1940).
 - Specifically, the tanks are to be located on the lowest floor of the building and comply with the requirements of Clause 5.9 of AS 1940.
 - The capacity of each tank shall not exceed 110 000 L.
 - Spacing between adjacent tanks shall be at least 600 mm.
 - The secondary containment shall be adequately designed and constructed, to contain 110% of the contents of the primary tank.
 - Each tank is to have an FRL of 240/240/240 in accordance with AS 1940.
- In addition to the requirements for the tanks, the storage room is to comply with the following:

- All load-bearing structures within the diesel storage room should have an FRL of 240/240/240.
- The diesel pipes are to comply with the following:
 - All diesel pipes are to be stainless steel and double skinned; and
 - Wet sprinklers are installed with sufficient coverage of internal pipe manifolds in the event of a leak and subsequent fire.
- The substation for oil-filled transformers is to be provided with the following:
 - The transformers shall be designed in accordance with AS 2067-2016: *Substations and high voltage installations exceeding 1 kV a.c.* (AS 2067).
 - The room is to have an FRL of 120/120/120 or 60/60/60 and automatic fire suppression.
 - Each transformer is to contain explosion preventing ancillaries such as explosion vents that are directed into the bunded area.
 - A ductile tank design that will deform instead of exploding in the event of internal deflagration of oil breakdown products from arcing inside the tank to avoid a catastrophic tank failure.
- The dry-type transformers shall be compliant with AS 2067.
- The regulator shall be notified of diesel storage exceeding manifest quantities in accordance with Regulation 348 of the WHS Regulations.
- Outer warning placards regarding quantities of diesel stored shall be displayed at any entrance where emergency services may enter the workplace in accordance with Regulation 349 and Schedule 13 of the WHS Regulations
- Placards shall be displayed on or near the containers of diesel in accordance with Regulation 350 and Schedule 13 of the WHS Regulations.
- An emergency plan shall be prepared for the site and provided to the NSW Fire and Rescue as per the requirements of Regulation 361 of the WHS Regulations.

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Glossary

Abbreviations	
ADGC	Australian Code for the Transport of Dangerous Goods by Road & Rail
AS	Australian Standard
DCP	Development Control Plan
DG	Dangerous Good
EPA	Environment Protection Agency
FRL	Fire Resistance Level
PHA	Preliminary Hazard Analysis
PoEO	Protection of the Environment Operations Act 1997
SEARs	Secretary's Environmental Application Requirements
SEPP	State Environmental Planning Policy
SFAIRP	So Far as is Reasonably Practicable
SSD	State Significant Development
WHS	Work Health and Safety

1 Introduction

1.1 Purpose of this report

This report has been prepared to support State Significant Development Application (SSD-13475973). The purpose of this report is to address the relevant Secretary's Environmental Assessment Requirements (SEARs) and development control plan (DCP) requirements for Hazards and Risk. Specifically, this report contains a preliminary risk screening in accordance with the *State Environmental Planning Policy No. 33 Hazardous and Offensive Development* (SEPP 33) and if required, a preliminary hazard analysis (PHA). This report also details the location and quantity of potentially hazardous materials used onsite.

Note, since the time of writing this technical report, SEPP 33 has been replaced with the State Environmental Planning Policy (Resilience and Hazards) 2021. All references to SEPP 33 can be found within the currently in force Resilience and Hazards SEPP 2021.

1.2 Proposal overview

The following section provides a general overview of the proposal.

1.2.1 Site context

The proposal would be built on 706 Mowbray Road West, Lane Cove North (Lot 10, DP 1179953). The entire site is approximately 1.8 hectares (ha) and is approximately 10 kms northwest of the Sydney Central Business District (CBD) and 13 kms east of Parramatta. Road access to the site is currently via Mowbray Road West near Taylors Drive.

The site is subject to the provisions and development controls specified within the Lane Cove Local Environment Plan 2009 (LCLEP2009) and Lane Cove Development Control Plan (DCP). It is zoned for light industrial use (IN2) under the LCLEP2009 and it is located on the boundary of the Lane Cove Council and Willoughby City Council local government areas (LGAs). Immediately to the south of the site is a vegetated buffer, zoned for environmental conservation (E2). Beyond that to the west and south is Epping Road, while to the north is Mowbray Road. Both are zoned as road infrastructure (SP2).

Broadly, the site exhibits an industrial character with mixed commercial and wholesale distributor land use. It is surrounded by similar light industrial developments to the east and west. By exception, is the Possums Corner Child Care Centre to the immediate west of the site. The centre is owned by Lane Cove Council and leased to a private operator.

There is a mix of low and medium density residential land to the site's north. Lane Cove River broadly runs north and west of the site while Stringybark Creek is located to the south east. Stringybark Creek connects to the Lane Cove River about 180 metres south of the site.

The Lane Cove Tunnel runs about 25-30 metres below the lowest level of the proposed Data Centre foundations.

The Rotary Athletics Field, Lane Cove River Kayakers and UTS Northern Suburbs Athletic Club are located at the same facility to the north, about 350 metres from the site.

Mowbray Road has direct access to Epping Road, which in turn provides access westbound to the M2 Motorway and eastbound to the Lane Cove Tunnel.

There are various public and active transport links along Mowbray Road and Epping Road. This includes bus routes 292 and 533, with a bus stop on Mowbray Road, and routes 258, 286, 287, 288, 290, 291 and 294, with bus stops on Epping Road in both directions. Dedicated bus lanes operate in both directions on Epping Road and there is a separate shared pedestrian and cycle path alongside the western lane of Epping Road. Cycle paths are also marked on both sides of Mowbray Road.

1.2.1 Overview

The proposed data centre is permissible with consent within a light industrial zone pursuant to the provisions outlined with Part 3, Division 3, Clause 27 of State Environmental Planning Policy (Infrastructure) 2007 (ISEPP).

Given the proposal has a capacity that is greater than 10 MW, the proposal classifies as State Significant Development (SSD) pursuant to the provisions outlined in Schedule 1 of the State Environmental Planning Policy (Planning Systems) 2021.

Figure 1 shows the Site and surrounding context, Figure 2 shows an enlarged image of the site context.



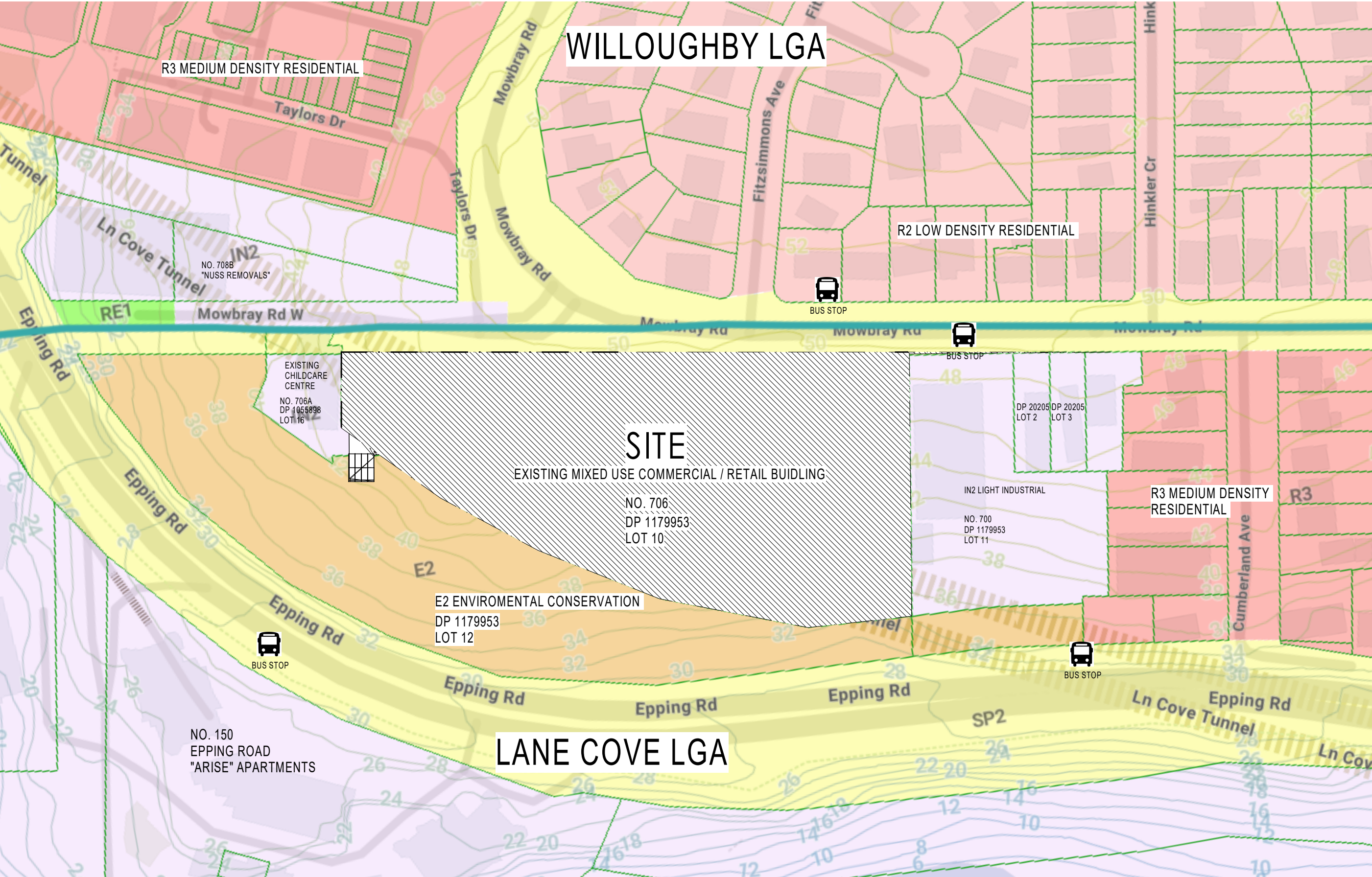
- LEGEND:**
- SUN PATH (WINTER SOLSTICE)
 - KEY VIEWS
 - INDUSTRIAL ZONE
 - ENVIRONMENTAL CONSERVATION
 - OPEN SPACE
 - R2 LOW DENSITY RESIDENTIAL
 - R3 MEDIUM DENSITY RESIDENTIAL
 - LANE COVE RIVER
 - LGA BOUNDARY LINE

1 Locality/Context Site Plan
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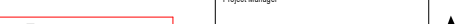
	Issue 1	Date 26.05.2021	Description SDMA Submission	Notes • Use written dimensions only • Do not scale from drawing • Contractors shall confirm all dimensions on-site prior to commencing any work or producing any shop drawings • All materials to be used in accordance with the manufacturer's specifications and instructions and shall comply with the relevant Australian Standards • Copyright of this drawing and design remain the property of Greenbox Architecture Pty Ltd • Nominated Architect - Gerard Papp, NSW reg No 7247, Vic reg No 17664, QLD reg No 4538	Key Plan 	Project Manager Construction Manager	ARUP Atty, Level 5 Barrack Place, 151 Clarence St Sydney NSW 2000 Tel +61(0)29520 9320 www.arup.com	Project SYD04 706 MOWBRAY ROAD, LANE COVE NORTH, NSW 2060 AUSTRALIA Client PROPONENT		Scale As indicated	Sheet A0	Scale Bar N.T.S	DRAWING IS NOT TO SCALE DO NOT SCALE DRAWING
	Issue 2	Date 30.03.2022	Description SDMA Submission							Project Status PRELIMINARY Drawing Title LOCALITY/CONTEXT SITE PLAN +61 2 8069 8930 LEVEL 22 68 PITT STREET SYDNEY NSW 2000 AUSTRALIA GREENBOX ARCHITECTURE PTY LTD ABN: 79 139 779 098 ISO 9001 CERTIFIED QUALITY SYSTEM 180000 SYD04_A-B-0090 Issue 2			



1 LOCALITY/CONTEXT SITE PLAN ENLARGED
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	Issue	Date	Description	Notes - Use written dimensions only - Do not scale from drawing - Contractors shall confirm all dimensions on-site prior to commencing any work or producing any shop drawings - All materials to be used in accordance with the manufacturer's specifications and instructions and shall comply with the relevant Australian Standards - Copyright of this drawing and design remain the property of Greenbox Architecture Pty Ltd - Nominated Architect - Gerard Page, NSW reg No 7247, Vic reg No 17664, QLD reg No 4538	Key Plan 	Project Manager Construction Manager	ARUP Atop, Level 5 Barrack Place, 151 Clarence St Sydney, NSW, 2000 Tel +61(0)29520 9320 www.arup.com	Project SYD04 706 MOWBRAY ROAD, LANE COVE NORTH, NSW 2066 AUSTRALIA Client PROPOSER	 +61 2 8069 8930 LEVEL 22 68 PITT STREET SYDNEY NSW 2000 AUSTRALIA GREENBOX ARCHITECTURE PTY LTD ABN: 79 139 779 098 ISO 9001 CERTIFIED QUALITY SYSTEM	Scale	Sheet	Scale Bar	Project Status	Drawing Title	Drawing Number	Issue
	2	28.03.2024	SSDA Submission							1:500	A0	N.T.S.	DRAWING IS NOT TO SCALE DO NOT SCALE DRAWING	PRELIMINARY	LOCALITY/CONTEXT SITE PLAN ENLARGED	180000

1.2.2 Description of the proposed development

The proposed development, construction and operational use of the data centre will serve Sydney and the wider region in providing for increasing cloud-based storage and compute requirements. The data centre will positively impact the social and economic conditions of Lane Cove and Willoughby LGAs, creating jobs during both construction and operation.

The design of the Data Centre is based on the end-clientâ(e)™s reference design as well as applicable Australian Standards and will deliver capacity for up to 28.8MW of IT equipment, supported by a dedicated electrical substation, with backup power provided by a combination of lithium-ion battery systems and emergency standby generators.

The four (4) level facility will reach a building height of approximately 26.7m from Mowbray Road including plant and rooftop equipment. The facility will include three (3) levels of data hall space with external plant gantries and a single level administration area incorporating secure entry facilities, loading dock, storage, and staff offices. The site shall be served from a private on-site substation, located on the western section of the building.

Significant landscaped areas are also proposed, where mature local trees will be used to improve aesthetics and amenity for local residents and businesses. The existing nature reserve within the south-eastern part of the Site will be maintained and protected.

Primary road access to the data centre will be via Mowbray Road West, at the north-western corner of the Site near Taylors Drive. On-site car parking spaces will be provided for staff and visitors, including disabled and electric vehicle parking.

Table 1 below shows the SEARs and DCP requirements relevant to Hazards and Risk and where in this report it has been addressed.

Table 1: SEARs and DCP requirements for Hazards and Risk

SEARs relevant to this technical report	Where addressed in this technical report
A preliminary risk screening completed in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 with clear indication of class (and any subsidiary hazard), quantity and location of all dangerous goods and hazardous materials associated with the development. Should the preliminary risk screening indicate that the development is “potentially hazardous” a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6, ‘Hazard Analysis’ and Multi-Level Risk Assessment	This report forms the preliminary risk screening. Section 4 demonstrates that the development is not potentially hazardous.
Details regarding the location of any proposed back-up generators, diesel fuel storage tanks and lithium-ion batteries (with details of peak discharge rate (MW)).	Section 5
Public authority requirements	

Willoughby Council	
A Dangerous Goods Report will be prepared to assess any potential requirements for an Environment Protection Licence required for the proposal pertaining to diesel fuel storage.	Section 7
Environment Protection Agency (EPA)	
The EPA understands that there is proposed to be one diesel storage area with multiple belly tanks. It is anticipated that 1,800 tonnes of diesel fuel will be stored on the premises.	
The EPA requests clarification on the total volume of diesel proposed to be stored at the premises and the capacity of the tanks in which the diesel is to be stored. Under Clause 9 of the POEO Act, an activity requires a licence if there is a capacity to store more than 2,000 tonnes of petroleum products (which includes diesel).	Section 4.1 and Section 7
Information on the location and design of chemical bunding and containments should also be included in the EIS. If diesel storage tanks are above ground, bunding requirements are set out in AS 1940:2017 The storage and handling of flammable and combustible liquids.	Section 5.3
Lane Cove Development Control Plan (DCP) Requirements	
N/A	N/A

2 Policy and planning context

The following legislation, regulations and policies form the basis of this assessment:

- *Applying SEPP 33 Guidelines*
- *Section 7.1 of the Work Health and Safety Regulations 2011*
- *Protection of Environment Operations Act 1997*
- *Australian Standard (AS) 1940-2017: The storage and handling of flammable and combustible liquids*
- *Building Code of Australia*²

² The project fire engineers shall be provided with this report and are to incorporate any unique fire hazards into the overall fire strategy as part of the Building Code of Australia compliance process.

3 Methodology

This chapter outlines the methodology used to carry out the preliminary risk screening, including definition of the study area used as the basis of the assessment.

3.1 Study area

The preliminary risk screening covers the area defined by the fenced in boundary line of the site. Figure 2 above shows this area that is considered to be ‘on site’. The area outside of this boundary is considered offsite for the purposes of this assessment.

3.2 SEPP 33

State Environmental Planning Policy No. 33 Hazardous and Offensive Development (SEPP 33) is used in New South Wales to regulate the planning approval process for developments in hazardous and offensive industries, and potentially hazardous and potentially offensive industries. The SEPP 33 process is shown in Figure 3.

Note, since the time of writing this technical report, SEPP 33 has been replaced with the State Environmental Planning Policy (Resilience and Hazards) 2021. All references to SEPP 33 can be found within the currently in force Resilience and Hazards SEPP 2021.

A key part of the SEPP 33 process is the Preliminary Hazard Analysis (PHA). If the development application includes dangerous goods (DGs) with quantities or transport frequencies above defined thresholds, a PHA must be produced as part of the SEPP 33 process.

Section 4 below assesses the site against the SEPP 33 guidelines to determine whether a PHA must be undertaken.

Figure 1: The SEPP 33 Process

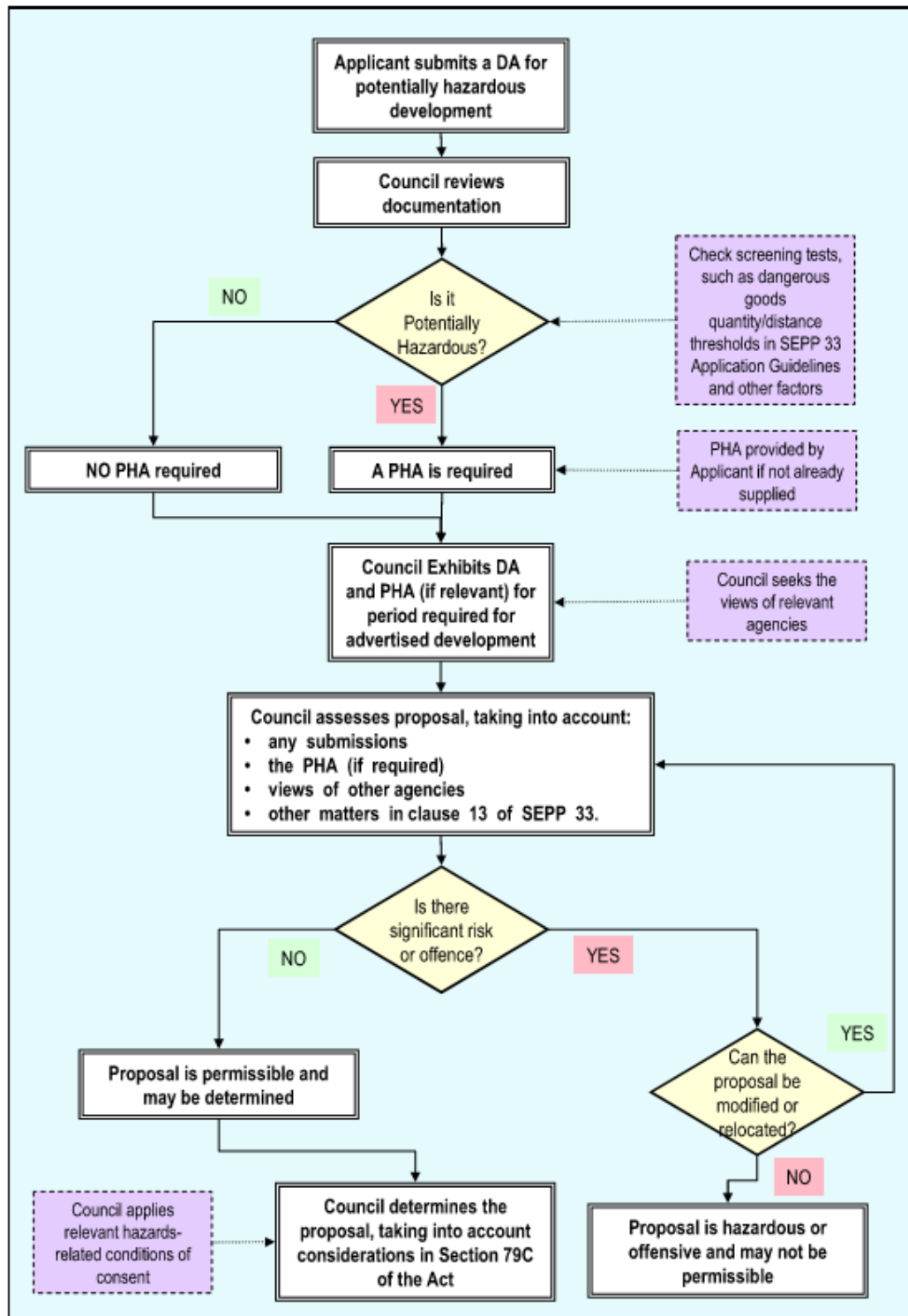


Figure 3: The SEPP 33 Process

3.3 Storage of hazardous goods

The storage locations and quantities of all dangerous goods and hazardous materials such as back-up generators, diesel fuel storage tanks, and lithium-ion batteries have been detailed in Section 5 below. The potential risks that may arise as a result of the storage of these hazardous materials have also been addressed to mitigate these risks so far as is reasonably practicable (SFAIRP).

3.4 Section 7.1 of the WHS Regulations

Section 7.1 of the *Work Health and Safety Regulations 2011* (WHS Regulations) is applicable to the use, handling and storage of hazardous chemicals at a workplace. Section 6 below sets out the WHS requirements for workplaces that exceed the manifest and placard quantities of hazardous chemicals.

3.5 Protection of the Environment Operations Act

The *Protection of the Environment Operations Act 1997* (PoEO) sets out the conditions that would necessitate the issuance of an environment protection licence. Section 7 below assesses whether any of these conditions are met and therefore if the site would require an environment protection licence.

4 Applicability of SEPP 33

In order to carry out the SEPP 33 screening, each substance stored onsite has been classified in accordance with the National Transport Commission's *Australian Code for the Transport of Dangerous Goods by Road & Rail* (ADGC). This process includes substances not classified as DGs by the ADGC but has been directed by the SEARs statement to be considered.

4.1 Hazardous substances onsite

The substances to be stored onsite are listed in Table 2 below. This table shows the UN number, DG class, and approximate quantities.

Table 2: Hazardous substances stored onsite

Substance	UN Number	DG Class	Quantity
Lithium-ion batteries ³	3480/3481	9	48.8 t
Diesel	1202	N/A – not a DG but it is a C1 combustible liquid	402.6 kL
Transformer oil (ester oil)	N/A – not a DG but it is usually a C2 combustible liquid		60 kL

It should be noted that Class 9 DGs are excluded from the risk screening. Since no thresholds set out by Table 1 of *Applying SEPP 33* are exceeded, the development is not considered to be potentially hazardous and SEPP 33 does not apply in terms of storage.

Quantities of hazardous goods

There will be one diesel storage area located on the lowest floor of the building. This storage area will have six (6) bulk fuel tanks and 13 day tanks, with the bulk fuel tanks having a capacity of 65kL each.. There will be approximately 360kL (~306t) of diesel in bulk storage, day tank storage volume of 6kL (~5.1t) and with associated services tanks and pipework (~10% of the total system volume), this totals approximately 402.6kL or 342.2t of diesel stored onsite.

There is 12 data halls spread across the multi-storey building, and each data hall will have its own battery storage room. There is a total of 169 cabinets across the site. The following calculation shows there are approximately 48.8 t of lithium-ion batteries to be stored onsite. As the final supplier has not been chosen yet, these calculations are indicative only:

$$1 \text{ battery cabinet} = 17 \text{ battery modules}^4$$

³ Note that this is the total quantity. The batteries will be stored across the site in multiple fire separated rooms.

⁴ Schneider Electric, 2018. *Product Specification Lithium Ion Battery Rack Type G*. https://www.se.com/ww/en/download/document/SPD_ACOS-B27UL8_EN/, accessed 22 April 2021.

$$\begin{aligned}
 1 \text{ battery module} &= 17 \text{ kg}^5 \\
 1 \text{ battery cabinet} &= 17 \text{ kg} \times 17 \text{ modules} \\
 &= 289 \text{ kg} \\
 169 \text{ battery cabinets} &= 289 \text{ kg} \times 169 \text{ cabinets} \\
 &\cong 48.8 \text{ t}
 \end{aligned}$$

There will be two oil-filled transformers, and each transformer will hold approximately 30 kL of ester oil totalling 60 kL for both transformers.

4.2 Transportation of dangerous goods

As the only Dangerous Good as classified by the ADGC is the lithium-ion battery, the transportation screening has been carried out only for lithium-ion batteries. It has been assumed that batteries are delivered once at the commissioning of the site and typically require replacement once every 5 to 15 years.

Table 3: Transportation of dangerous goods

DG Class	Cumulative Annual Movements Expected	Annual Movements Threshold	Peak Weekly Movements Expected	Weekly Movements Threshold	Threshold Exceeded
9	5	>1000	1	>60	No

As can be seen by the table above, transportation thresholds are not exceeded and so the development is not considered to be potentially hazardous, and SEPP 33 does not apply in terms of transportation criteria.

Further, while diesel is not included in the SEPP 33 screening as it is not classified as a DG by the ADGC, it is not expected that there is a noticeable risk of diesel transportation. This is due to the low annual and weekly movements expected as diesel will only be used in generators when back-up power is required, and testing undertaken.

⁵ Schneider Electric, 2018. *Product Specification Lithium Ion Battery Rack Type G*. https://www.se.com/ww/en/download/document/SPD_ACOS-B27UL8_EN/, accessed 22 April 2021.

5 Storage of Hazardous Goods

This section details the storage quantities and locations of hazardous goods used at the site. If a potential risk of loss of control exists with the storage of a hazardous good, measures required to mitigate the risk SFAIRP are also detailed.

5.1 Lithium-ion batteries

Lithium-ion batteries will be stored within battery rooms in each data hall of the building. Figure 4 below shows the likely location of the battery rooms within each data hall.

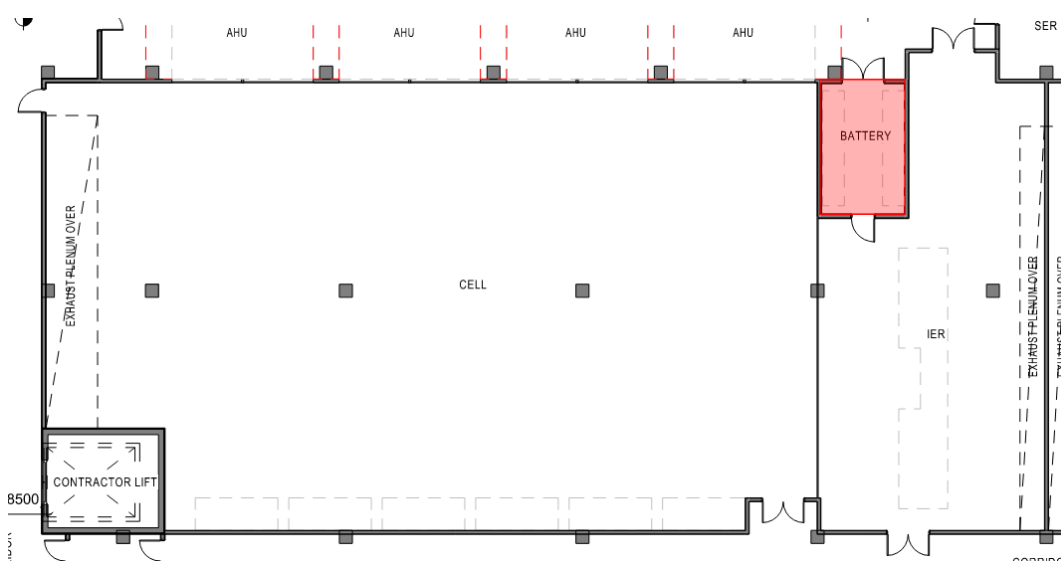


Figure 4: Indicative battery room location

There will be approximately 169 battery cabinets in multiple fire separated rooms within data halls onsite. Lithium-ion batteries do have the potential for thermal runaway and the following controls are considered sufficient to mitigate this risk SFAIRP. Each room in the data halls storing battery cabinets is to be installed with the following measures:

- A fire resistance level (FRL) of 120/120/120.
- Adequate ventilation to relieve the off gassing of combustible gases from thermal runaway or a gas detection system.
- Smoke detection.
- Double knock pre-action sprinkler system.
- The inclusion of lithium-ion batteries is to be incorporated into the overall fire safety strategy by the project fire engineer.

Additionally, there will be a small number of battery racks in the administration building. These battery racks are likely to be located in the main switch room which is adequately fire protected.

5.2 Back-up generators

Back-up generators will be located in external plant rooms. Figure 5 below shows the arrangement of generators and likely locations of generators outside the data hall.

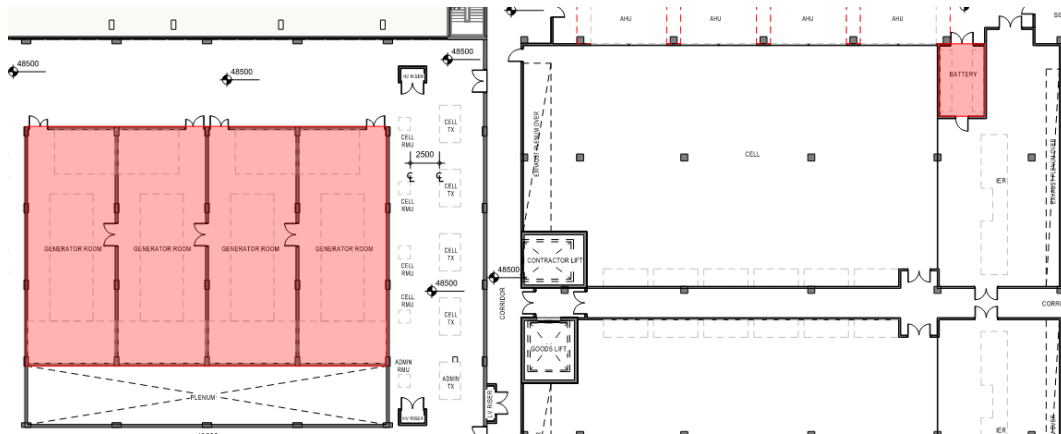


Figure 5: Indicative generator location

In order to maintain uninterrupted power supply for the data halls given limited space onsite, there will be six stacks of generator floors for the east building and four stacks of generator floors for the west building aligning with the storeys of the building.

5.3 Diesel storage

There will be one diesel storage area located on the lowest floor of the building. This storage area will have six (6) bulk fuel tanks and 13 day tanks, with the bulk fuel tanks having a capacity of 65kL each. There will be approximately 360kL (~306t) of diesel in bulk storage, day tank storage volume of 6kL (~5.1t) and with associated services tanks and pipework (~10% of the total system volume), this totals approximately 402.6kL or 342.2t of diesel stored onsite. This storage area is in the northwest corner of the site and tanks are shown in blue in Figure 6 below.

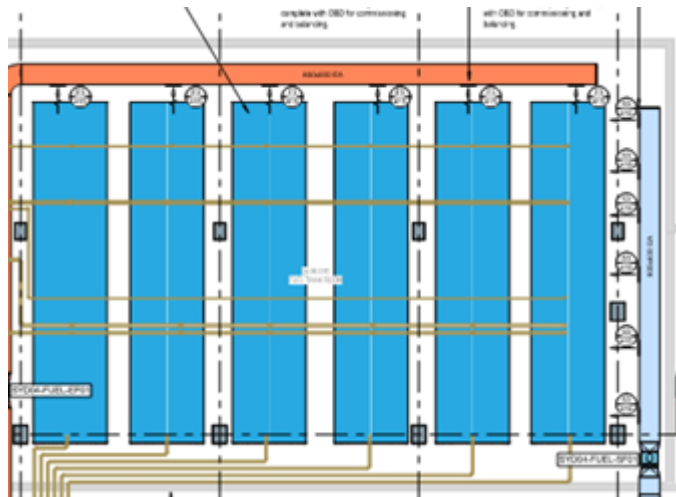


Figure 6: Indicative location of the diesel storage tanks

While diesel is not classified as a dangerous good by the ADGC, it is a Class C1 combustible liquid. As such there exists a fire risk in the event of loss of control of the diesel stored in each tank.

In order to mitigate this potential loss of control, the diesel storage tanks are to comply with AS 1940-2017: *The storage and handling of flammable and combustible liquids* (AS 1940).

Clause 5.6.3.2 of AS 1940 states that tanks containing Class C1 liquids with capacity greater than 1000 L shall be:

- (a) a double-wall tank buried in accordance with Clause 5.12; or
- (b) installed on or below the lowest floor level of a building, in a tank chamber in accordance with Clause 5.13; or
- (c) a tank having integral secondary containment with an FRL of 240/240/240 and complying with Clause 5.9.

Additionally, any such tank shall be installed on or below the lowest floor of the building.

The diesel storage tanks will be located on the lowest floor of the building and the tanks will be designed in accordance with Clause 5.9 of AS 1940. Some of the pertinent requirements from Clause 5.9 are shown below:

- The capacity of each tank shall not exceed 110 000 L.
- Spacing between adjacent tanks shall be at least 600 mm.
- The secondary containment shall be adequately designed and constructed, to contain 110% of the contents of the primary tank.
- Each tank is to have an FRL of 240/240/240.

In addition to the requirements stated above, the following recommendation has been made to improve the resilience of the room in the event of an incident with the diesel:

- All load bearing structures within the diesel storage room should have an FRL of 240/240/240.

There is also the possibility of an incident with the diesel pipes leading from the diesel storage to the generators causing a leak and subsequent fire. In order to reduce the risk of this scenario SFAIRP, the following recommendations are considered sufficient:

- All diesel pipes are to be stainless steel and double skinned; and
- Wet sprinklers are installed with sufficient coverage of internal pipe manifolds in the event of a leak and subsequent fire.

The measures outlined above are considered sufficient to reduce the risk of a diesel fire onsite SFAIRP.

5.4 Transformer oil for the 132/22kV transformers

There will be two 70 MVA transformers in the substation. Each transformer will be designed to AS/NZS 60076-2014: *Power Transformers* and installed as per AS 2067-2016: *Substations and high voltage installations exceeding 1kV a.c.* (AS 2067) and specifically, adhere to Table 6.2 of AS 2067 reproduced below. It should be noted that ester oil is defined as less combustible under AS 2067 and the relevant row has been highlighted in Table 4 below.

Table 4: Minimum fire safeguards for the installation of indoor transformers

Transformer type	Liquid volume L	Safeguards
Oil-insulated transformers (O)	≤1000	FRL 120/120/120
	>1000	FRL 120/120/120 or FRL 60/60/60 and automatic fire suppression protection
Less combustible liquid-insulated transformers (K) without enhanced protection	All	FRL 120/120/120 or FRL 60/60/60 and automatic fire suppression protection
Less combustible liquid-insulated transformers (K) with enhanced protection Dry-type transformer (A)	≤10 MVA and $U_m \leq 36$ kV	FRL 120/120/120 or separation distances 0.9 m horizontally and 1.5 m vertically
	Fire behaviour class F_0	FRL 60/60/60 or separation distances 0.9 m horizontally and 1.5 m vertically
	F_1	Non-combustible walls

Each substation shall have an FRL of 120/120/120 or 60/60/60 and automatic fire suppression protection. This is considered sufficient to reduce the risk of a transformer fire SFAIRP.

In the event of a significant transformer fault, a confined vapour cloud explosion may occur. This risk should be addressed given that the substations are indoors and contain administration offices above the transformers. In order to reduce both the likelihood of this occurring and the consequence if it does occur, the following mitigations are proposed:

- Each transformer is to contain explosion preventing ancillaries such as explosion vents that are directed into the bunded area; and
- A ductile tank design that will deform instead of exploding in the event of internal deflagration of oil breakdown products from arcing inside the tank to avoid a catastrophic tank failure.

The measures outlined above are considered sufficient to reduce the risk of a transformer explosion SFAIRP.

5.5 Dry type transformers

Additionally, there will be two transformers installed on each floor between the generators plant room. These will be dry-type transformers, and the space will be naturally ventilated through louvres. These transformers will comply with AS 2067.

6 WHS Regulations

Section 7.1 of the WHS Regulations sets out the requirements for the use, handling, and storage of hazardous chemicals at a workplace. Specifically, this report assesses requirements for exceeding manifest and placard quantities found in Division 3 and 4 of Section 7.1, respectively.

Regulation 328(4) sets out the exclusions from Section 7.1 for hazardous chemicals in certain circumstances. Regulation 328(4)(a) excludes “hazardous chemicals in batteries when incorporated in plant”. As such, the use of lithium-ion batteries at the facility is considered to be excluded from the requirements of Section 7.1.

It should be noted that Regulation 328(4)(b) excludes “fuel, oils or coolants in a container fitted to a vehicle, vessel, aircraft, mobile plant, appliance or other device, if the fuel, oil or coolant is intended for use in the operation of the device”. This would also exclude diesel stored in tanks with connecting pipework to the generators from the requirements of Section 7.1. However, due to the large total quantity of diesel present at the facility, it is considered best practice to follow the requirements of Section 7.1. Recommendations have therefore been made for the storage of diesel in line with Section 7.1 of the WHS Regulations.

6.1 Manifest quantities

Regulation 347 sets out the requirements for maintaining a manifest of hazardous chemicals if they exceed the manifest quantities. Regulation 348 sets out the requirements for the notification of the regulator if manifest quantities are exceeded. Regulation 361 also requires an emergency plan to be prepared if manifest quantities are exceeded.

The maximum allowable manifest quantity of diesel (category 4 flammable liquid) as per Schedule 11 of the WHS Regulations is 100 000 L or 100 kL. This is exceeded by approximately 402.6 kL of diesel proposed to be stored onsite. As such, the following recommendations have been made:

- A manifest of diesel storage should be prepared in accordance with Regulations 347 and Schedule 12 of the WHS Regulations.
- The regulator should be notified of diesel storage exceeding manifest quantities in accordance with Regulation 348 of the WHS Regulations.
- An emergency plan should be prepared for the site and provided to the NSW Fire and Rescue as per the requirements of Regulation 361 and Division 4 of Part 3.2 of the WHS Regulations.

6.2 Placard quantities

Division 4 states that outer warning placards and placards are to be displayed if placard quantities are exceeded. The maximum allowable placard quantity of diesel as per Schedule 11 of the WHS Regulations is 10 000 L or 10 kL. This is

exceeded by approximately 402.6 kL of diesel proposed to be stored onsite. As such, the following recommendations have been made:

- Outer warning placards regarding quantities of diesel stored should be displayed at any entrance where emergency services may enter the workplace in accordance with Regulation 349 and Schedule 13 of the WHS Regulations.
- Placards should be displayed on or near the diesel storage tanks in accordance with Regulation 350 and Schedule 13 of the WHS Regulations.

7 Protection of the Environment Operations Act

The *Protection of the Environment Operations Act 1997* (PoEO) sets out the scheduled activities for which a licence is required. Table 5 below shows the criteria required for chemical storage to be classified as a scheduled activity and therefore requiring a licence.

Table 5: Criteria for chemical storage under the PoEO

Activity	Criteria
General chemicals storage	Capacity to store more than: 20 t (pressurised gases) 200 t (liquefied gases) or 2000 t (chemicals in any other form)
Onsite generated chemical waste storage	Involves storing onsite at any time more than 5 tonnes of any chemical substance produced onsite that is prescribed waste, not including excluded material
Petroleum products storage	Capacity to store more than: 200 t (liquefied gases) or 2000 t (chemicals in any other form)

General chemical storage is defined to include all chemical substances classified as dangerous goods by the ADGC. As lithium-ion batteries are classified as Class 9 DGs by the ADGC, a licence would be required if more than 2000 t of lithium-ion are to be stored at the facility.

There are approximately 48.8 t of batteries stored onsite. This is below the 2000 t limit and so lithium-ion battery storage is not considered as a scheduled activity and a licence is not required.

There are approximately 342.2 t of diesel proposed to be stored onsite. This is below the 2000 t limit and so diesel storage is not classified as a scheduled activity and a licence is not required.

As none of the criteria for chemical storage under the scheduled activities of the PoEO have been met, a licence is not required for chemical storage. A licence may be required by the PoEO for other scheduled activities such as electricity generation, but this is out of the scope of this report. More information on electricity generation as a scheduled activity can be found in the Infrastructure Requirements Report.

8 Findings and recommendations

A preliminary risk screening in accordance with SEPP 33 has been undertaken. The outcomes of this assessment are as follows:

- The site was found to be below the threshold for classification as potentially hazardous industry in terms of both storage and transportation therefore a PHA is not required.
- The manifest quantity thresholds for diesel as set out by Schedule 11 of the Work Health and Safety (WHS) Regulations are exceeded.
- The placard quantity thresholds for diesel as set out by Schedule 11 of the WHS Regulations are exceeded.
- The criteria for an environment protection licence for chemical storage under the Protection of the Environment Operations Act 1997 (PoEO) has not been met and so an environment protection licence is not required for chemical storage.

Arup makes the following recommendations regarding the site:

- Each room in the data halls storing battery cabinets is to be installed with the following measures:
 - A fire resistance level (FRL) of 120/120/120.
 - Adequate ventilation to relieve the off gassing of combustible gases from thermal runaway or a gas detection system.
 - Smoke detection.
 - Double knock pre-action sprinkler system.
 - The inclusion of lithium-ion batteries is to be incorporated into the overall fire safety strategy by the project fire engineer.
- The following recommendations apply to the storage of diesel fuel in storage tanks:
 - The tanks are to comply with AS 1940-2017: *The storage and handling of flammable and combustible liquids* (AS 1940).
 - Specifically, the tanks are to be located on the lowest floor of the building and comply with the requirements of Clause 5.9 of AS 1940.
 - The capacity of each tank shall not exceed 110 000 L.
 - Spacing between adjacent tanks shall be at least 600 mm.
 - The secondary containment shall be adequately designed and constructed, to contain 110% of the contents of the primary tank.
 - Each tank is to have an FRL of 240/240/240 in accordance with AS 1940.
- In addition to the requirements for the tanks, the storage room is to comply with the following:
 - All load-bearing structures within the diesel storage room should have an FRL of 240/240/240
- The diesel pipes are to comply with the following:

- All diesel pipes are to be stainless steel and double skinned; and
- Wet sprinklers are installed with sufficient coverage of internal pipe manifolds in the event of a leak and subsequent fire.
- The substation for oil-filled transformers is to be provided with the following:
 - The transformers shall be designed in accordance with AS 2067-2016: *Substations and high voltage installations exceeding 1 kV a.c.* (AS 2067).
 - The room is to have an FRL of 120/120/120 or 60/60/60 and automatic fire suppression.
 - Each transformer is to contain explosion preventing ancillaries such as explosion vents that are directed into the bunded area.
 - A ductile tank design that will deform instead of exploding in the event of internal deflagration of oil breakdown products from arcing inside the tank to avoid a catastrophic tank failure.
- The dry-type transformers shall be compliant with AS 2067.
- The regulator should be notified of diesel storage exceeding manifest quantities in accordance with Regulation 348 of the WHS Regulations.
- Outer warning placards regarding quantities of diesel stored should be displayed at any entrance where emergency services may enter the workplace in accordance with Regulation 349 and Schedule 13 of the WHS Regulations
- Placards should be displayed on or near the containers of diesel in accordance with Regulation 350 and Schedule 13 of the WHS Regulations.
- An emergency plan should be prepared for the site and provided to the NSW Fire and Rescue as per the requirements of Regulation 361 of the WHS Regulations.

References

- [1] NSW Department of Planning, Industry and Environment (DPIE), *Applying SEPP 33*, 2011.
- [2] Australian Standards, *AS 1940-2017: The storage and handling of flammable and combustible liquids*.
- [3] Australian Standards, *AS 2067-2016: Substations and high voltage installations exceeding 1 kV a.c.*.
- [4] National Transport Commission Australia, *Australian Code for the Transport of Dangerous Goods by Road & Rail, Edition 7.6*, 2018.
- [5] *Protection of the Environment Operations Act*, 1997.
- [6] *Work Health and Safety Regulations 2011*, 2021.