SYD1 Stage 2

Backup Power Report

GreenSquareDC

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Bringing ideas to life

Document control record

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1 Preface

1.1 Executive Summary

This B*ackup Power Report* has been prepared by *Aurecon* on behalf of the Development to accompany a detailed State Significant Development Application (SSDA) for the SYD1 S2 data centre development at 3 Brookhollow Avenue, Norwest NSW 2153. The site is legally described as Lot 2021 in Deposited Plan 831173. It is noted that SYD1 S1 data centre located within the Proposal Site has been approved as a 14.9MW data centre.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-81928961). This report concludes that the proposed data centre development is suitable and warrants approval subject to the implementation of the following mitigation measures.

- Acoustic attenuation on generator engine equipment
- Limiting testing frequency

Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

Backup power is required for the proposed mission critical facility as outlined in Section 3. While alternatives have been considered in Section 4, ultimately the site will be supported by backup reciprocating diesel generators housed within acoustic-rated enclosures. Considerations for the design have been outlined in Section 5 in terms of the generator itself, acoustics, and the fuel used. The exact frequency and duration of testing is not known at this stage but information has been provided within Section 5 to provide a general overview.

2 Introduction

2.1 Purpose of this Report

This report has been prepared on behalf of Project Garden 1 Pty Ltd as trustee for the Norwest Property Trust (the applicant) in support of a State Significant Development Application (SSDA) submitted to the Department of Planning, Housing and Infrastructure (DPHI) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The SSDA seeks development consent for the construction and operation of a data centre, with a total power consumption of approximately 96 MW. The proposal will form part of a state-of-the-art data centre campus operated by GreenSquareDC, equipped to cater for growing data storage needs within Australia and the emergence of artificial intelligence (AI).

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 8 April 2025 issued for the SSDA (SSD-81928961). Specifically, this report has been prepared to respond to the SEARS requirement issued below.

Table 2-1 SEARs Compliance

Item	Description of Requirement	Section Reference (this Report)
10. Backup Power Requirement	▪ Provide a detailed overview of any proposed back-up power system, including the scale and capacity of the system, and any associated testing procedures (frequency and duration). ▪ Provide a detailed justification for the proposed back-up power system, including alternatives considered.	4 Backup Power Requirement 5.2 Alternatives Considered 6.2 Generator Design 6.3 Fuel on Site 6.4 Testing Procedures

3 The Site

3.1 Site Context

The site is known as 3 Brookhollow Avenue, Norwest and is in the Norwest locality, which forms part of the Hills Local Government Area (LGA). Development surrounding the site comprises of a mix of commercial, retail and residential land uses as described below:

- To the north of the site is Norwest Boulevard, commercial office buildings, an early learning centre, ‘Castle Pines’ retirement community and Castle Hill Country Club Golf Course;
- To the east of the site is Windsor Road, commercial office buildings, small pockets of residential development and industrial development;
- To the south of the site is Brookhollow Avenue, commercial developments, a hotel and medium density residential development; and
- To the west of the site is commercial development, including a shopping centre (Norwest Marketown), various retail offerings and the Norwest Metro Station.

The site is well serviced by public transport including bus and Metro. Norwest Metro Station provides connections to Tallawong in the northwest and Sydney CBD to the southeast. Bus stops along Norwest Boulevard provide connections through to Parramatta, Seven Hills and Rouse Hill.

As shown in the below mapping, the site is in proximity to Strangers Creek and Brookhollow Reserve, located at the site’s southwestern border. Norwest Lake is located approximately 90m northwest of the site.

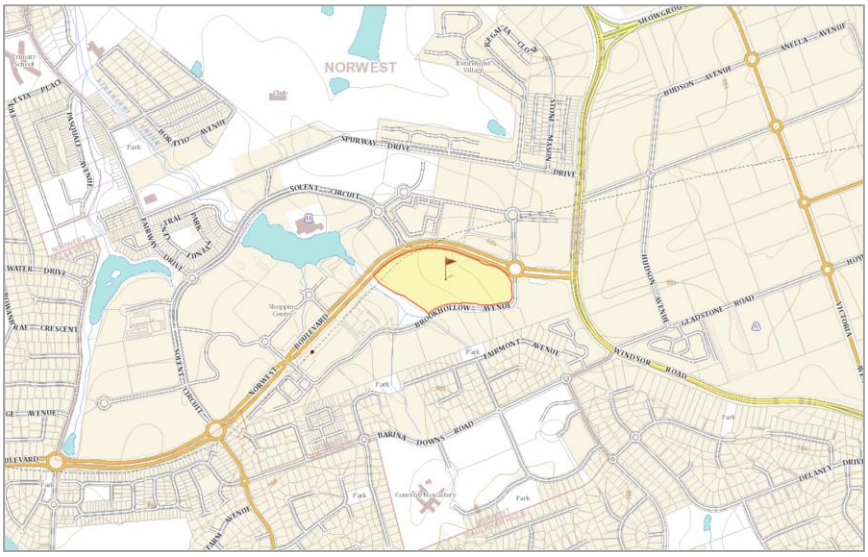

Figure 3-1 Site context map

3.2 Site Description

The subject site is legally described as Lot 2021 of Deposited Plan (DP) 831173. The site can be described as irregularly shaped and has a total land area of approximately 51,867sqm. A portion of the site currently comprises an existing 4MW data centre that was approved under D93/318, dated 21 June 1993.

The site is bound by Brookhollow Avenue to the south and east, Brookhollow Reserve and the Hills Corporate Centre to the west and Norwest Boulevard to the North. The primary frontage of the site is to Brookhollow Avenue, where vehicular access is provided.

Based on a review of topographical mapping, the site appears to fall from east to west from a maximum height of RL104 in the northeastern corner of the site to RL82m along the western portion of the site.

The site is located approximately 500m to the east of the Norwest Metro station, with the metro line running under the north / northwest boundary of the site.

The site is heavily vegetated, however, none of the vegetation is mapped on the biodiversity values mapping prepared under the *Biodiversity Conservation Act 2016* (BC Act).

Refer to aerials of the site at Figure 3-2 below.

Figure 3-2- Aerial of the site

3.3 Relevant approvals

There are several development approvals of relevance to the SSDA including:

- Complying Development Certificate (CDC): Certificate No. 25/250218-01 which provided consent for partial demolition of the existing data centre. The CDC was issued on 9 September 2025.
- Development Application for alterations and additions to existing data centre campus (1382/2025/JP) was approved by Council on 4 September 2025.
- Development Application for substation and bulk earthworks currently being prepared for submission to Council and expected for approval by June 2026.

3.4 CDC (certificate no. 25/250218-01) – demolition of existing internal structures

On 9 September 2025, a CDC, Certificate No. 25/250218-01, Council Reference 239/2026/PC was issued by Certatude, which provided consent for the partial demolition of the existing data centre. Specifically, the proposed works included the demolition of internal walls, access floors, slabs and roof, across Levels 1 to 4 of the existing data centre. The demolition works were required in order to facilitate the future Stage 1 development (1982/2025/JP).

The works have since been completed.

3.5 Stage 1 development application

Stage 1 approval was obtained from the Regional Planning Panel on 4 September 2025 under DA1382/2025/JP.

Stage 1 involves significant upgrades and refurbishment of an existing data centre facility that occupies the site previously operated by IBM. The works enable the repositioning of the existing dilapidated facility to be fit-for purpose and responsive to the evolving data storage demands of the market.

3.6 Substation and early works development application

A planning application is currently being prepared, which will seek approval for on-site power infrastructure, including a substation that will transform utility power supplied via a high voltage (132 kilovolts) line to medium voltage (33 kilovolts). The substation will comprise two main structures, a control building and two power transformers.

The substation is proposed to service Stage 1 (SYD01), with the intent to expand to Stage 2. Ahead of the construction of the substation, the intent is to connect Stage 1 to the 11 kV power supply before creating a new point of connection from the proposed substation, which will be established once constructed.

Supply infrastructure will be provided from an Endeavour substation located nearby and will be delivered to the site under Part 5 powers held by Endeavour as an Electricity Supply Authority.

3.7 Project Summary

This SSDA seeks development consent for the construction and operation of a data centre, with a total power consumption of approximately 96MW (IT load). The proposal will form part of a broader state-of-the-art data centre campus, equipped to cater for growing data storage needs within Australia and the emergence of artificial intelligence (AI).

In summary, approval for the following is sought:

- Minor excavation works beyond earthworks intended to be undertake under the separate Substation Development Application under assessment by The Hills Shire Council;
- Civil earthworks and the installation of relevant servicing infrastructure and utilities;
- Construction of a four (4) storey data centre with roof top plant, equating to an RL 130 and Gross Floor Area (GFA) of 16,191m^2;
- Installation of 77 x diesel fuel generators and associated storage
- Provision of on-site car parking for approximately 25 spaces; and
- Landscaping, tree removal and offset tree planting.

3.8 Detailed Project Description

The key components of the Project are listed in the following table.

Table 3-1 Project Details

Element	Amended Proposal
Land Use Activity	Data centre with 11 data halls
Development Area	8.206 ha (site) plus land within HV route (11,617m2)
Site Area	51,867 sqm
Total GFA	16,191 m^2
Data Hall GFA	9,889 m^2
Ancillary Office / Admin GFA	n/a
Floor Space Ratio	0.75:1
Car Parking	25 spaces
Bicycle Parking	n/a
Motorbike Parking	n/a
Maximum Building Height	130 RL Building D-approx 37.5m from natural, ground level, 3 storeys Building B &C- approx. 40.7 m from natural ground level, 5 storey
Deep Soil	12,769m^2 (15.6% of site area)
Tree Removal	60 trees are being removed under SSDA
Cut and Fill Volume	Net cut 26,000m^3 (approximately)
Power Consumption	120 MVA
Operating Hours	24-hours, 7 days a week
Jobs - full-time equivalent (FTE) employees	Construction: 569 Operation: 20 for Stage 2 and 10 for Stage 1 – Total 30
Generators	77
Utilities and services	<u>Fuel Tanks:</u> Front of House: 2 x 1 kL day tanks Building B: 6 x 86 kL bulk tanks + 25 x 1 kL day tanks Building CD: 11 x 86 kL bulk tanks + 25 x 1 kL day tanks (building C) + 25 x 1 kL day tanks (building D) <u>Industrial Water Tanks:</u> Building B - 1200kL Building C – 1200kL Building D – 1200kL Redundant – 1200kL **Total – 4800kL** <u>Fire Water Tanks:</u> 2 x 224,000L (Effective capacity) <u>Substation</u>: 132kV substation plus a 33kV switching station on site

3.9 Stakeholder Engagement

Stakeholder consultations with Endeavour Energy are at an advanced stage. Endeavour Energy has acknowledged the importance of the on-site switching station and substation, and confirmed that the proposal is being actioned. The switching station will serve the facility and form part of Endeavour Energy's wider distribution infrastructure, supporting network reliability and capacity for the broader Norwest area.

3.10 Methodology

This section outlines the methodology used to define the baseline and undertake the assessment of selection and potential impacts of the proposed backup power system on the surrounding area.

3.10.1 Study Area

It is assumed that for the purposes of testing limits that the assessment area with be limited to SYD1 S2 and not including SYD1 S1.

3.10.2 Method of Assessment

To address the project SEARs, this report has analysed the proposed electrical topology of the site and calculated the individual and aggregate backup power required for each building. The backup power sources have been identified through availability in the market, suitability for data centres, and viability for the proposed site. Through vendor discussions and application of Australian design standards, the designs of the generator enclosures and fuel storage have been proposed.

3.11 Existing Environment and Considerations

There are no backup power sources at scale known to exist at the current site. While already located in an enterprise zone, there are medium and high density residential zones to the south and north-west, public parks to the south, and Norwest Marketown shopping mall to the immediate west. All of which may be impacted by the proposed site while in construction and in operation.

The noise and emissions from the site backup power generation needs to be considered and mitigated through the design and operation of the site. While individual backup generation sources may produce limited pollution individually, the aggregate contribution of the site to the environment is of particular interest. Refer to the *Noise and Vibration* report for further details and references to other relevant reports.

4 Backup Power Requirement

The new development is proposed to be supplied by a new Endeavour Energy 132kV/33kV Substation. The power supply will be distributed within the site via the proponent's own underground electrical infrastructure.

The data centre is a mission critical facility and therefore requires back up generation if there is interruption to the utility supply. Each building will be provided with diesel-generators and uninterrupted power supply (UPS) systems. The UPS system is designed to maintain supply between loss of utility and changeover to the generator supply, it is not intended to maintain the full load on site for an extended period. For the purposes of this report, only the diesel-generators are considered as "Backup" power, the UPS and battery system are for energy storage and short-term supply only.

Although the energy transmission system in the area is designed to be highly reliable, there is always risk of interruption to utility supplies. The maximum allowable unserved energy per year from the upstream Sydney West 330kV supply point is 1 minute [1] however this does not capture incidental disruptions due to accidents, storms, etc. Any interruption without backup power generation on site would be of extreme detriment to the general community through disruption to the internet services facilitated by the data centre in the area.

5 Backup Power Selection

5.1 Selected Power Generation Technology

The Proponent has opted for reciprocating diesel-generator sets for the backup power source for the proposed site. This is based on being the most appropriate technology for a mission critical data centre and the market readiness for this technology in New South Wales. Alternatives have been considered for this site, but none are considered viable except for alternative fuel for the generator engines. See Section 5.2 for further details.

5.2 Alternatives Considered

Aurecon has previously investigated several options for backup power supply technologies for data centre applications in terms of suitability for deployment in data centres, technological maturity in Australia, and viability for the site [2].

5.2.1 Potentially Suitable for Deployment

Table 5-1 describes the potential backup supply technologies, rates their technology maturity, and provides a recommendation on their suitability for data centres.

As outlined in the table, the following technologies were recommended as potentially suitable for deployment as long duration backup supply in data centres:

- Lithium-ion batteries
- Vanadium redox flow batteries
- Diesel generators with renewable diesel (HVO) as a fuel
- Open Cycle Gas Turbines (OCGT) or Reciprocating Engines with natural gas as a fuel
- Hydrogen Fuel Generators

Table 5-1 Backup Power Options Analysis Summary

Technology	Description	Technology maturity	Suitability for deployment in data centres	Trigger points for viability	Viability for proposed site
Lithium-ion battery	• Lithium-ion batteries uses a cathode (positive electrode), an anode (negative electrode) and electrolyte as conductor. Li-ion battery cells come in many varieties – but all use lithium ions. During charging the lithium ions flow from the cathode to the anode through the electrolyte and separator. When discharging the flow of ions reverses from the anode to the cathode.	• **High** - Lithium-ion batteries have been widely deployed in electric vehicles and are increasingly being deployed as stationary storage for grid applications.	• **Potentially suitable** - The high energy and power density, proven performance and declining costs of lithium-ion batteries make it an attractive option as a backup energy source. • Required physical footprint, standby power consumption and fire risk management to be considered. Fire prevention and protection requirements shall be in accordance with the regulatory requirements at the design time. Possible risk assessment might also be required because of the Li-ion batteries.	• Capex costs drop per MWh to levels in line with alternatives • Space requirements reduce (unlikely for this tech)	Due to the spatial requirements of Lithium-ion batteries for both fire-separation, fuel separation, and general safety requirements, it is difficult to provide enough battery storage to the site for a medium-term power failure. The current provision for battery storage on site is for short-term supply and energy storage only, to facilitate the switch between utility supply and the backup power supply if interruption to utility occurs (up to 5 minutes only). Thus, this technology is **not viable** be used as a standalone backup power supply for this site.

Technology	Description	Technology maturity	Suitability for deployment in data centres	Trigger points for viability	Viability for proposed site
Vanadium redox flow battery	• Flow batteries store energy in electrolytes in electrolyte tanks. The active material of flow batteries comprises of electrolyte solutions that are stored in tanks. The electrolyte is pumped through a reaction stack of electrochemical cells, in which charge, and discharge reactions take place at electrode surfaces. • Vanadium redox is the leading flow battery technology in terms of technical and commercial readiness.	• **Low / Moderate** – Limited number of vanadium redox flow batteries in commercial deployment. Most deployments are currently 10-20MWh in energy storage capacity. One 800MWh project is planned is under construction in China.	• **Potentially suitable** – Vanadium redox flow batteries are well suited to long duration storage (4+hrs) by increasing the size of the electrolyte tanks. Cost per MWh expected to decrease as storage duration increases. • Higher costs and bigger physical footprint required compared to lithium-ion batteries.	• Capex costs drop per MWh to levels in line with alternatives • Space requirements reduce (unlikely for this tech) but potential to stack to reduce m2 requirements, potentially advantageous over lithium ion batteries	**Not viable** for this site due to commercial availability and scale required to achieve energy autonomy on site during utility failure.

Technology	Description	Technology maturity	Suitability for deployment in data centres	Trigger points for viability	Viability for proposed site
HVO renewable diesel fuel	• Biodiesel is produced from a diverse mix of resources including vegetable oils (corn, soybeans, rapeseed, palm etc.), animal fats (beef tallow, pork lard etc.), and recycled cooking oil. • Conventionally feedstock goes to a transesterification process and becomes biodiesel, which can be blended with petroleum diesel. • Advanced methods such as hydrotreatment, gasification, and pyrolysis can be used to produce 'drop in' biofuels. These biofuels are chemically the same as petroleum diesel fuel and is compatible with existing infrastructure designed around petroleum.	• **Moderate** – The biodiesel supply chain is still a localised industry, with some regions having higher biodiesel availability due to access to feedstock, or government mandates. No large scale HVO supply chain or policy support exists yet in Australia. ~440ML of biodiesel produced p.a. (not all are HVO)	• **Potentially most suitable short-term solution** – Biodiesel blends and renewable diesel that are compatible with the existing diesel generator infrastructure. • Biodiesel has lower emissions compared to petroleum diesel. Full lifecycle emissions are dependent on the feedstock source.	• Supply chain readiness in Sydney & AU around HVOs • Confirm high volume of diesel tanker trucks are possible to site for refills	• **Moderate viability** - This site is proposed to use diesel generators and HVO renewable diesel fuel could be used in lieu of standard diesel fuel subject to local supply chain availability.

Technology	Description	Technology maturity	Suitability for deployment in data centres	Trigger points for viability	Viability for proposed site
Natural gas fuel	• Natural gas as a fuel source, can be used as a backup power source through gas turbines generators. • Gas turbine generators draw air into the engine and combusts the fuel to produce a high-pressure gas. This gas expands and rotates the turbines to produce electricity. • Can also be used as fuel in fuel cells (e.g. Bloom Energy)	• **High/ Moderate -** Natural gas has a mature global supply chain, with gas turbines widely deployed in electricity grids around the world.	• **Potentially suitable** - Gas turbines are a proven technology. Fuel delivery can be through existing gas pipelines. • Natural gas has slightly lower emissions compared to petroleum diesel • Fire detection and suppression requirements as a standalone infrastructure will need to be considered to suit the NG turbine plans.	• Environmental approvals possible: depends on exact technology selected, expected usage, emissions profile, noise outputs, etc • Pipeline capacity confirmed as feasible, impacting transmission throughout Sydney / Newcastle given other gas plants planned for the area	• **Not viable** – the technology requires more space than is currently possible on site compared to other solutions due to increased cooling/ventilation requirements. The impact of a 500MW gas turbine on existing natural gas pipelines may require significant upgrades in the area.
Hydrogen fuel	• Hydrogen can be used as a fuel sourcewhen using fuel cells. A fuel cell consists of a negative electrode (anode) and a positive electrode (cathode) sandwiched around an electrolyte. • A catalyst at the anode separates hydrogen molecules into protons and electrons, which then flow to the cathode through different paths. The electrons go through an external circuit, creating a flow of electricity. The protons migrate through the electrolyte to the cathode, where they unite with oxygen and the electrons to produce water and heat.	• Moderate – The hydrogen production, delivery and storage supply chain are still immature, but progress is accelerating. One data centre owner is trailing a 3MW hydrogen fuel cell.	• Potentially suitable - Highly dependent on further cost reductions and the emergence of an established supply chain • Hydrogen storage and delivery requires detailed planning to ensure safety and reliability • Case-by-case fire and risk assessment studies need to be considered. • Storage likely to trigger Major Hazard Facility requirements	• Safety exclusion zones for storage addressed – large site required • H2 supply chain established, including market to contract supply • H2 pipeline established, including safety and operational concerns addressed • Capex costs drop per MWh to levels in line with alternatives	• **Not Viable** – significant spatial requirements of industrial tanks for 24-48 hours of hydrogen fuel on site. No current hydrogen pipeline would be possible within site development timeframe. Additional safety requirements for hydrogen usage on site. Safety considerations for nearby residential areas.

6 Backup Power Generators

6.1 Site Design

The generators are located adjacent to the buildings they serve in an external generator structure (Figure 6-1). The generators are housed on raised structures and are located on the exterior of the buildings. Refer to Section 7.1.5 of the *SEARs Infrastructure Report* for breakdown of generator quantities per building.

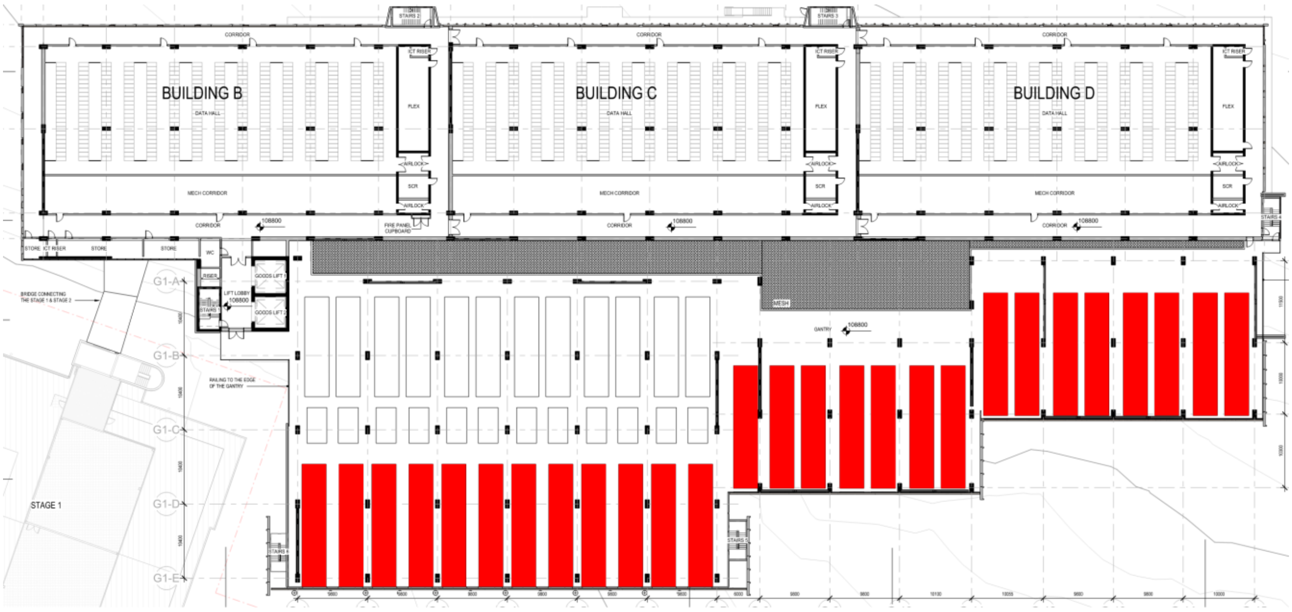

Figure 6-1 Location of Generators on Proposed Site – Plan View (Red)

Note that not all positions are occupied by generators on all levels. Figure 6-2 shows the positions by level which are generators.

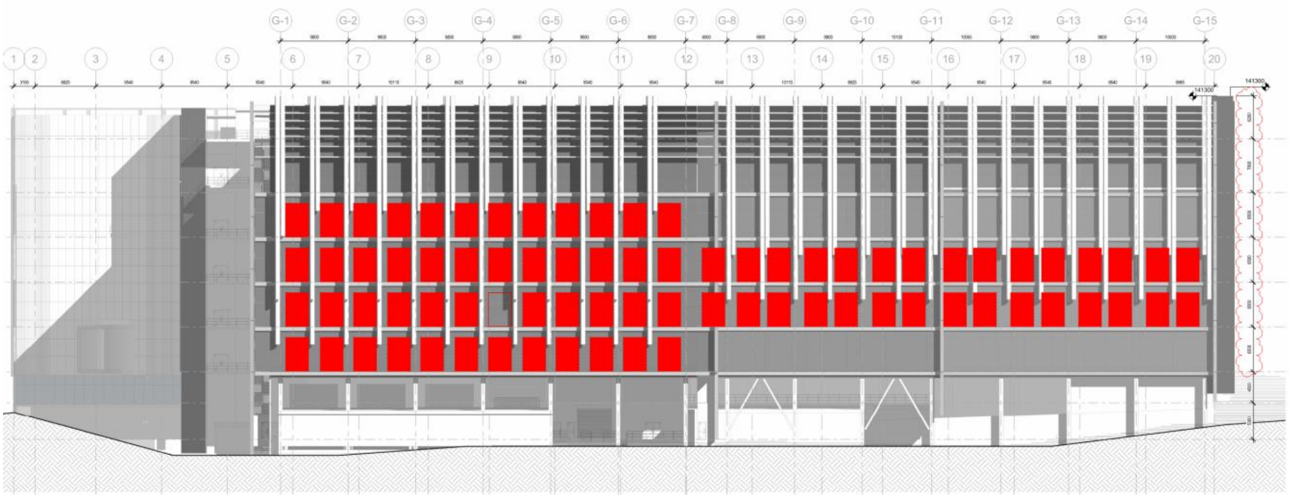

Figure 6-2 - Location of Generators on Proposed Site - South Elevation (Red)

6.2 Generator Design

The proposed build, SYD1 S2, will use 77 standby generators, positioned across four floor levels for operational purposes, capable of supporting 96MW IT. Each of the three buildings will have 25 generator sets supporting its IT loads and associated cooling infrastructure. In addition, two additional generator sets will support the base building and site loads (Front of House).

The back-up generator model selection is not currently finalised, however, to power IT loads and associated cooling infrastructure two potential candidate generator sets have been considered and are detailed below:

Table 6-1 – Power output and fuel usage by of CAT model 3516E by fuel type

Loading	Output (kWe)	Fuel Usage - Diesel (L/h)	Fuel Usage - HVO (L/h)
100%	2800	713.6	785
75%	2100	577.7	635.5
50%	1400	398.1	437.9
25%	700	221.3	243.4

Table 6-2 Power output and fuel usage by of Cummins C3750 D5 by fuel type

Loading	Output (kWe)	Fuel Usage - Diesel (L/h)	Fuel Usage - HVO (L/h)
100%	3000	704	774.4
75%	2250	541	595.1
50%	1500	379	416.9
25%	750	216	237.6

Other generators may be selected for installation, however, the emission assessment has been completed using the potential candidate generators nominated above.

Further, the two proposed 1000 kWe Front of House generators have not yet been evaluated.

6.2.1 Generator Enclosures

The generators will be located on the outdoor plant gantry at the south side of the site. Each generator will be individually housed in its own acoustic canopy enclosure.

Each enclosure generally includes the following:

- Generator engine set
- Fuel system, including day tank
- Control and power panels
- Acoustic attenuation for cold air intake, hot air discharge (for ventilation)
- Exhaust gas silencer and flue
- Radiator and fan

6.2.2 Acoustics

At this early stage the final acoustic requirements are not known. For preliminary results and details on the noise modelling for the site (including the generator enclosures), see *Noise and Vibration* report.
The generators will be acoustically treated to meet these requirements.

6.2.3 Emissions

For further details please refer to the *SEARs Air Quality Report*.

6.3 Fuel on Site

The generator engines on site will use diesel or HVO fuel to generate power. All 2.8 MW and 1 MW generators enclosures will be located within the gantry. Each generator enclosure contains a fuel day tank. These generator day tanks will be supplied with fuel from bulk fuel tanks located in fully contained fuel rooms (i.e. tank chambers) on the ground floor. The fuel system in each fuel room provides sufficient fuel to run the generators fed from that fuel room for a minimum of 24 hours. Fuel tanks will be designed to comply with AS 1692 and AS 1940 requirements. The following table provides the storage requirements per building based on the proposed design.

Table 6-3 Fuel Storage per Building

Building	Nominal Fuel Storage Capacity	Comment
B	543 kL	Building B: 25 x 2.8MW Gensets and 25 x 1 kL Day Tanks Building B FOH: 2 x 1MW Gensets and 2 x 1 kL Day Tanks Fuel Room B: 6 x 86 kL Bulk Tanks
C & D	996 kL	Building C: 25 x 2.8MW Gensets and 25 x 1 kL Day Tanks Building D: 25 x 2.8MW Gensets and 25 x 1 kL Day Tanks Fuel room CD: 11 x 86 kL Bulk Tanks

The fuel system design is based on the fuel consumption of the CAT 3516E generator for the mechanical and datahall backup power generation, and the CAT DE1100 GC generator for the FOH backup power generation. The system has been sized to use HVO, conservatively modelling the HVO demand as 110% of the diesel fuel demand at a given load. The generator loading has been calculated with all five generators in a set running (distributed redundant - normal mode), as this was found to have a higher fuel demand than the same output from four generators (distributed redundant - failover mode).

6.3.1 Worst-Case Fuel Consumption

The worst-case fuel consumption configuration is all generators running in a distributed redundant – normal mode arrangement. Refer to Table 6-4 and Table 6-5 for worst case fuel consumption for generators in Buildings B, C and D.

Table 6-4 Worst-case Building Fuel Consumption Building B

Description	Value	Comment
N Datahall Gensets Required	20	
N Mechanical Gensets Required	5	
Front of House Gensets required	2	
Usage per Datahall Genset	603.9 L/h	Interpolated from CAT 3516E datasheet for 71% load
Usage per Mechanical Genset	580.2 L/h	Interpolated from CAT 3516E datasheet for 68% load
Usage per FOH Genset	166.4 L/h	Interpolated from CAT DE1100 GC datasheet for 60% load
Total Consumption	15,311 L/h	
Pumpable Fuel Required	367,457 L	

Description	Value	Comment
Total Usable Bulk Tank Fuel Capacity (N+1 Bulk Tanks)	443,760 L	
Backup Provided	24.2 hours	

Table 6-5: Worst-case Building Fuel Consumption Buildings C and D (combined)

Description	Value	Comment
N Datahall Gensets Required	40	
N Mechanical Gensets Required	10	
Front of House Gensets required	0	
Usage per Datahall Genset	603.9 L/h	Interpolated from CAT 3516E datasheet for 71% load
Usage per Mechanical Genset	580.2 L/h	Interpolated from CAT 3516E datasheet for 68% load
Total Consumption	29,956 L/h	
Pumpable Fuel Required	718,943 L	
Total Usable Bulk Tank Fuel Capacity (N+1 Bulk Tanks)	813,560 L	
Backup Provided	24.7 hours	

6.3.2 AS 1940 Separation Distances

AS 1940 details separation distance requirements from outdoor fuel tanks to protected places and property lines. There are no separation distance requirements which apply to tanks within tank chambers. The design of this building places all bulk fuel tanks within tank chambers.

The tank chambers are designed as per section 5.13 of AS 1940.

6.4 Testing Procedures

The Generators will each be tested to ensure they are functional in the event of a utility failure. Initially all generators as they are installed at the proposed site will undergo commission testing which involves several hours that the generator will run. After the generator is installed and commissioned, regular testing will occur for all generators. For a breakdown of generator testing across the site, refer to below.

Table 6-6 Summary of Stage 2 Generator Testing

ID	Test	Exercises per Year	Generators		Test			Total Run Time (mins)
			Overall	Per Test	No. of Tests	Run Time (mins)	Cooldown, excl. from Runtime (mins)	
1	Full Load Run	1	77	2	39	40	15	1.560
2	Start Test	11	77	2	39	10	15	4,290
3	Transformer Maintenance	0.2	77	1	77	240	15	3,840
	Total							9,690 minutes **161.5 hours**

In accordance with the Protection of the Environment Operations Act 1997 Clause 17(1A), the total testing time of site generators shall not exceed 200 hours. Our proposed generator testing method complies with this requirement.

Table 6-7 Summary of Tests Per Day

Test	Test Run Time (mins)	Approximate Preparation Time (mins)	Total Test Time (mins)	Simultaneous tests planned	Approximate No. of Tests Able to Be Completed in a Day
Full Load Run	40	30	70	2	12-16
Start Test	30	5	35	2	26-30
Transformer Maintenance	240	30	15	2	2

For a Full Load Run, generators are tested by connecting to a load bank (equipment that consumes electricity for testing purposes). Due to their physical location, the generators are split into a group of 47 and a group of 30. Whenever possible, two tests will be undertaken concurrently to minimise total run time. When not possible, only one test will be run. Testing is limited to 7am to 6pm (Monday to Saturday) and 8am to 6pm (Sundays and public holidays), subject to confirmation.

7 Conclusion

This report has provided an overview of the proposed diesel backup power system which will support the 96MW of IT capacity through 75 no. 2.5MW generators and 2 no. 1MW generators. These generators will be tested at commissioning for several hours each, and subsequently started on a monthly basis for a cycle of different tests, including start tests, live load runs, and offline full load runs.

Housing these generators inside acoustic-rated enclosures will mitigate risks of excessive noise pollution in the area. Limiting testing to the frequency mentioned within this report will reduce overall emissions and fuel usage at the site.

Although alternative technologies exist to provide backup power generation, none are viable for the site due to a combination of several factors. The main issues for alternatives are market availability and infrastructure readiness to cater for the increase in load, and the space available on site to make alternative options work for a medium-term utility power interruption.

The backup power generation design has been curated to deliver the most viable solution for the proposed site and ensure this state significant development will provide its services as early as possible with minimal impact to the surrounding area and community.

8 References

[1] D. Harwin, *NSW Electricity Transmission Reliability and Performance Standard 2017,* Sydney: NSW Government, 2017.

[2] Aurecon, “Low carbon Backup Options,” Aurecon, Sydney, 2022.

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