ESD Report

250574 78 LOCKWOOD ROAD DATA CENTRE

Client:
Stack

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REPORT INFORMATION

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REVISION SCHEDULE

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C	11/08/2025	Revised Final	TD	VD
D	01/09/2025	Minor Update	TD	VD
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CONTENTS

Executive Summary

This report details the Ecologically Sustainable Design (ESD) considerations being pursued for the proposed data centre development at 78 Lockwood Road, Erskine Park. The project seeks the development of a new data centre facility including technical data halls, office areas, backup power generators and associated infrastructure.

The report was prepared to respond to the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning, Housing and Infrastructure (DPHI) on 11 April 2025. Refer to Section 2 that responds to the SEARs with reference location of the response within this report.

Following exhibition of the SSDA, the project has been refined in response to submissions from the authorities and ongoing design development. This has necessitated an update to the ESD Report as outlined below:

- Section 1 – Updated Project Description.
- Section 4.1.3 – Revised PUE annual average target to 1.3, revised NABERS Energy for Data Centre target to 5 Star and associated performance estimates.
- Section 4.2.1 – Revised estimated energy use corresponding to revised PUE annual average target of 1.3.
- Section 4.2.2 – Inclusion of water consumption estimates, comparison to benchmarks and estimate of Data Centre WUE annual average. Adjusted description of mechanical plant water consumption due to design change to dry air-sourced plant.
- Section 4.2.4 – Updated content to reflect revised GHG Assessment Report outcomes.
- Executive Summary & Conclusion – Updated to reflect design changes and revised estimated performance outcomes.

In summary, ESD targets and features pursued for the development include:

- Power Usage Effectiveness (PUE) target of circa 1.3 annual average, a marked improvement compared to the national average of approximately 1.6.
- Operational energy performance that would support a NABERS Energy for Data Centres performance of 5 star if realised in operation compared to the approximate national average performance of 4 Star.
- Commitment to a NABERS Energy for Office 5.5 Star Base Building rating and NABERS Water for Office 3 Star rating for the development office component through an Agreement to Rate.
- Incorporation of energy features to support target outcomes as follows:
    - Elevated data hall cooling setpoint temperature and relaxed humidity setpoints combined with direct to chip liquid cooling capability to maximise efficiency of mechanical plant
    - High efficiency chiller plant through modern compressor technology coupled with elevated operational chilled water temperatures due to relaxed hall conditions and direct to chip liquid cooling
    - On-site PV maximised to the available roof space with a targeted rated output capacity in the order of a minimum 115kWe per data centre building, 230kWe minimum across the site. Roof top area available for installation is limited as majority is allocated to cooling chiller plant that cannot be installed over.
    - High efficiency LED lighting selections throughout to minimise demand coupled with occupant responsive controls to minimise operational time and associated energy consumption
    - Low absorptivity / high Solar Reflective Index (SRI) building external finishes to reduce radiant heat gains
    - High performance fabric / glazing to the office spaces and glazing shading to reduce thermal loads
- Low annual water consumption supported through:
    - Air-cooled chillers used for heat rejection that do not consume water in operation leading to effectively zero water use in regular operation for the data centres.

- Low or zero irrigation demand through selection of drought tolerant planting for landscaping such as endemic native vegetation.
- Rainwater capture and reuse system for supply to flush fixtures and irrigation.

- Considerations for Net Zero emissions in operations 2050 target including:
  - Commitment to procure 100% renewable electricity for all non-IT operational energy use within the facility and data halls.
  - Hyperscale customers are committed to procurement of 100% renewable electricity for IT load, eliminating the associated scope 2 emissions.
  - Use of very low GWP refrigerants in chiller plant minimising as far as practical the associated Scope 1 emissions.
  - Future procurement of renewable diesel alternatives to fossil fuel based products subject to viability & availability, and procurement of offsets for residual scope 1 emissions.

The ESD targets and initiatives being pursued for the development above are shown in the report to support the Planning Secretary's Environmental Assessment Requirements (SEARs) including the specific applicable elements of the Sustainable Buildings SEPP 2022.

1 Introduction

This ESD Report has been prepared by LCI on behalf of STACK Infrastructure to accompany a State Significant Development Application (SSDA) for a proposed data centre development at 78 Lockwood Road, Erskine Park (the site).

The site is located in the Penrith Local Government Area (LGA) and is approximately 40km west of the Sydney Central Business District (CBD), 20km west of the Parramatta CBD, and 10km north-east of the future Western Sydney International Airport.

The site is an irregular shaped 7.7-hectare lot bounded to the north by Lenore Drive and to the east by an E2 Environmental Conservation corridor that follows Ropes Creek. The site relies upon access from a cul-de-sac at the eastern end of Lockwood Road at the site's southern boundary. An aerial photograph is provided at Figure 1.

Figure 1: Aerial Photograph of Site (Source: Urbis GIS, 2025)

The project comprises the construction of a data centre development including the following key components:

- Site preparation and bulk earthworks.
- Temporary construction access from Lenore Drive.
- Construction of a three-storey data centre comprising two buildings, with a maximum height of 26.5 metres and a total gross floor area (GFA) of approximately 56,506m^2, including technical data halls, office and administrative areas, and ancillary circulation space.
- At grade under-croft car parking (34 spaces) within the building footprint, plus an additional 44 on-site spaces, providing a total of 78 parking spaces.

- Separate generator gantry accommodating 188 backup generators.
- Landscaping and associated public domain works.
- Extension and augmentation of physical infrastructure and utilities as required, including an on-site substation and water storage tanks integrated within the building footprints.
- Off-site works comprising the delivery of two 330kV transmission lines from the TransGrid Sydney West Substation site to the subject site, utilising existing road reserve along Lenore Drive.

2 Response to SEARS

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 11 April 2025 issued for the SSDA (SSD-82211208). Specifically, this report has been prepared to respond to the SEARS requirement issued below.

Table 1: SEARs Compliance

Item	Description of Requirements	Section Reference (this report)
Ecologically Sustainable Development (ESD)	Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.	Section 4.1.1
	Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	Section 4.1.3 and Section 4.2
	Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	Section 4.2.1 and Section 4.2.2
	If Chapter 3 of SEPP (Sustainable Buildings) 2022 applies: • demonstrate how the development has been designed to enable the general sustainability provisions, as defined in Chapter 3.2(1). • provide a NABERS Embodied Emissions Material Form to disclose the amount of embodied emissions attributable to the development in accordance with section 35BA of the EP&A Regulation.	Section 4.1.2 The NABERS Embodied Emissions Material Form excel file has been submitted separately from this report with the SSDA submission.
Plant and equipment systems	The EIS must: • provide demonstration the development can achieve a NABERS 3 stars energy rating or higher including the Power Usage Effectiveness (PUE) calculations of plant and equipment required for the operation of a data centre.	Section 4.1.3
Urban heat island effect	The EIS must evaluate the impact of heat rejection on habitable rooms and communal open spaces, including those of neighbouring properties.	Section 4.3

3 Stakeholder Engagement

NSW EPA Consultation

An initial consultation was held with the NSW Environmental Protection Agency (EPA) on 15th July 2025 to discuss environmental matters relating to the project. The meeting included attendees from the NSW EPA, a representative of the Proponent and project team members. The project response to the requirements of the issued SEAR's and associated cover letter was described for ESD amongst other disciplines including infrastructure, hazard/risk and dangerous goods, air quality and noise.

During the consultation meeting, the NSW EPA representatives expressed that a Greenhouse Gas (GHG) Assessment Report for the development will be required to accompany the SSDA submission in addition to the project's response to addressing the SEARs requirements provided in the ESD Report.

A greenhouse gas assessment has therefore been undertaken for the project and a GHG Assessment Report is submitted separately from this report with the development SSDA submission.

Query with NSW Department of Planning, Housing and Infrastructure

A query was raised with the NSW Department of Planning, Housing and Infrastructure (DPHI) regarding the applicability to the development of energy and water commitment requirements for office developments per the Sustainable Buildings SEPP Section 3.3. The NSW DPHI confirmed on 25th August 2025 that a commitment to NABERS Energy and Water performance is required to address the office component of the development.

In response, the proponent has committed to a NABERS Energy for Office 5.5 Star Base Building rating and a NABERS Water for Office 3 Star rating. An Agreement to Rate covering these ratings will be completed for application to the office component of the development.

4 Assessment and Mitigation of Impacts

4.1 Relevant legislation and policies

4.1.1 EP&A Regulation 2021 Ecologically Sustainable Development (ESD) Principles

Ecologically sustainable development (ESD) principles (as defined in Clause 193 of the Environmental Planning and Assessment Regulation 2021) will be incorporated into the design, construction and ongoing operation of the proposed development. The ESD principles defined are to be aligned with Section 193 – Environmental Planning & Assessment Regulation and include the following:

1. The precautionary principle
2. Inter-generational equity
3. Conservation of biological diversity and ecological integrity
4. Improved valuation, pricing and incentive mechanisms

1. The Precautionary Principle

namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

i) Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and

ii) An assessment of the risk-weighted consequences of various options.

PROJECT RESPONSE

The development aims to identify potential environmental risks and minimise any threats of serious or irreversible environmental damage through the environmental impact statement process undertaken. Potential issues identified have been addressed through analysis resulting in the reports produced for this submission. The following environmental initiatives are being pursued to prevent environmental degradation:

- The Proponent has committed to improve the ecological function through planting of over 18% of the site area to enhance visual amenity and contribute to biodiversity.
- The Proponent will implement a site specific environmental management plan during construction that will minimise environmental impacts by implementing best practice processes and procedures.
- Various sustainability measures covering aspects such as energy and water consumption will be targeted (see Section 4.2), in order to reduce the environmental footprint, including greenhouse gas emissions, and minimise the long-term impact of the development on the environment.

2. Inter-generational Equity

namely, that the present generation should ensure that the health, diversity, and productivity of the environment are maintained or enhanced for the benefit of future generations

PROJECT RESPONSE

To uphold inter-generational equity, the proposed development design is being carried out such that it minimises the consumption of energy and water resources whilst reducing waste.

Considerations for the project include:

- The proposed building systems are optimised so that energy and water consumption is minimised through efficiency measures as described in Section 4.2.
- The project is targeting high electrical power efficiency with a target PUE of 1.3 annual average.
- Waste generated during the construction and operational phases will be diverted from landfill and recycled or reused where possible.

The measures and targets outlined above shall ensure the development minimises its impact on the health, diversity and productivity of the environment, thus maintaining it for the benefit of future generations and supporting Inter-generational Equity.

3. Conservation of Biological Diversity and Ecological Integrity

namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration

PROJECT RESPONSE

The Proponent is committed for the proposed development to improve the current ecological value within the site. The proposed development landscape design will include the following features to enhance visual amenity, improve pedestrian environment and conserve biodiversity and ecological integrity.

- 20.5% of the site is to be landscaped with the vast majority deep-soil planting.

- The site planting will incorporate a diversity of trees, shrubs, grasses and groundcovers, that are both native and exotic species and to be selected ensuring they are climate ready, have minimal water use and will thrive under changing conditions.

4. Improved Valuation, Pricing and Incentive Mechanisms

namely, that environmental factors should be included in the valuation of assets and services, such as:

i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance, or abatement,

ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

PROJECT RESPONSE

The valuation of the project's assets and services consider environmental factors through the implementation of various ESD initiatives.

- A construction and demolition waste management plan will be implemented to establish recycling and landfill waste streams during construction. This will create a system where pollution is managed and controlled and creates an incentive to reduce pollution and waste.
- The energy and water conservation measures in the proposed design shall reduce consumption of resources by the development and associated operational cost relative to IT tenant load maximising asset value. See Section 4.2 for further details.
- The proponent is committed to procure 100% renewable electricity for all non-IT operational energy use within the facility and data halls, paying for the abatement of emissions. Leading hyperscale AI and cloud providers, are actively investing in renewable energy procurement as part of their broader commitment to sustainable operations and net-zero carbon goals.

4.1.2 State Environmental Planning Policy (Sustainable Buildings) 2022

The NSW State Environmental Planning Policy (Sustainable Buildings) 2022 came into effect in August 2022 and applies to relevant projects lodged for State Significant DA after 1 October 2023.

The Sustainable Buildings SEPP encourages the design and delivery of more sustainable buildings across NSW. It sets sustainability standards for residential and non-residential development and starts the process of measuring and reporting on the embodied emissions of construction materials.

The NSW Government's objectives for the SEPP are to:

- minimise the consumption of energy and potable water
- reduce greenhouse gas emissions from energy use
- monitor the embodied emissions of building materials
- deliver buildings that are comfortable in summer and winter
- provide household bill savings to families, especially for heating and cooling.

In response to the project SEARs, consideration must be given to Clause 3.2(1) of the Sustainable Buildings SEPP which requires the development be designed to enable the following :

a) the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,
b) a reduction in peak demand for electricity, including through the use of energy efficient technology,
c) a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,
d) the generation and storage of renewable energy,
e) the metering and monitoring of energy consumption,
f) the minimisation of the consumption of potable water.

Further, the SEPP Embodied Emissions Reporting requires quantification of embodied emissions attributable to the development through the disclosure of materials quantities. Quantification is completed through the NABERS Embodied Emissions Materials Form.

PROJECT RESPONSE

The proposed development will demonstrate compliance and will meet or exceed the requirements as detailed below (project specific responses referenced):

a) The project will minimise waste from associated demolition and construction, including the use of recycled materials where possible – refer Section 4.2.3.
b) The project will have a reduction in peak demand for electricity, including through the use of energy efficient equipment – refer Section 4.2.1.
c) The project will have a reduction of the dependence of cooling through passive design features – refer Section 4.2.1.1 and 4.2.1.2.
d) The project includes on-site generation of renewable energy – refer Section 4.2.1.4.
e) The project will provide metering and monitoring of energy consumption – refer Section 4.2.1.4.
f) The project will minimise the consumption of potable water – refer Section 4.2.2.

The NABERS Embodied Emissions Materials form provides for the collection of key development construction materials across the substructure, superstructure and facade of the building. The NABERS Embodied Emissions Materials form excel file has been submitted separately from this report with the development SSDA submission.

4.1.3 Sustainability Rating Tool - NABERS Benchmarking and PUE

NABERS Energy ratings for data centres provides an indication of the operational energy efficiency and environmental impact of data centres in Australia. There are three rating scope types within the data centre tool covering the categories of IT energy, Infrastructure energy and the Whole Building energy. The Infrastructure energy scope rating that is most applicable to the development gives data centres a rating from one to six stars per the following figure based on Power Usage Effectiveness (PUE), a globally accepted metric.

Figure 2: How NABERS Energy for Data Centre star ratings correspond to PUE values (Source: Data Centres | NABERS)

The proposed development is targeting an annual average PUE of circa 1.3 that represent a significant improvement on the national average PUE that is approximately 1.6. A PUE of 1.3 annual average represents excellent performance which would be sufficient to support a NABERS Energy for Data Centres Infrastructure rating of 5 Stars above the national average NABERS Energy rating currently at 4 Star, based publicly available data on current rated facilities. Refer to Section 4.2.1 for details of the energy efficiency considerations being pursued for the development design to support the target PUE.

A predictive assessment was undertaken to estimate the NABERS Energy for Data Centres position for the proposed development and to estimate the PUE. Summary of the assessment results are listed in the table below.

Table 2: Estimated Energy Consumption, PUE and NABERS Energy for Data Centres Infrastructure Scope Performance

Parameter for Estimating NABERS Energy for Data Centres Performance *Infrastructure Scope*	**Project Output**
Postcode	2759
IT Occupied Capacity	90%
IT Load Capacity Annual Average Utilisation	60%
Estimated energy consumed by the IT equipment load (MWh/yr)	1,816,473.6
Metered Heat Rejection Rate	100%
Estimated Data Centre Infrastructure electrical energy use (MWh/yr)	543,057.3
Estimated Backup Generator Testing diesel energy use (kL/yr)	175.78
Estimated PUE	1.3
Potential Infrastructure NABERS Energy for Data Centres Rating	5

Note the estimate calculations have been based on various assumptions that includes operational diversity that may not be reflective of actual performance in operation.

As discussed in Section 3, the NSW DPHI confirmed that the SEPP Sustainable Buildings Section 3.3 requirements regarding energy and water performance standards for office developments must be supported for the office component of the development. The proponent has committed to the following ratings for the development office component that an Agreement to Rate will be completed for:

- NABERS Energy for Office 5.5 Star Base Building rating (development office component only)
- NABERS Water for Office 3 Star rating (development office component only).

4.2 Sustainable Design Principles

4.2.1 Energy Use

Energy efficient initiatives are being pursued for the design as described in this section in support of the targeted PUE of 1.3 annual average representing an improvement on the national average PUE that is approximately 1.6.

The pursued energy performance initiatives will lead to reductions in operational energy consumption and associated greenhouse gas emissions from grid sourced electricity. The following table provides a comparison of the targeted performance to that of the approximate national average based on the loading assumptions of Table 2.

Table 3: Operational Energy and Greenhouse Gas Emissions Reduction Estimates

Item	National Average Performance	Proposed Development	Percentage Improvement Estimate
PUE	1.6	1.3	
Infrastructure Energy Consumption (MWh/yr)	1,089,884	544,942	50%
Whole Data Centre Energy Consumption (MWh/yr)	2,906,358	2,361,416	19%

The targeted performance for the proposed development compared to the approximate national average performance shown above represents around a 50% reduction in Infrastructure energy consumption, 19% energy reduction overall and contributes the same percentage reductions in associated greenhouse gas emissions from grid sourced electricity. Greenhouse gas emissions will be reduced further in consideration of the proponents net zero pursuits as described in Section 4.2.4 and detailed further in the project GHG Assessment Report provided with the submission.

Note the estimate calculations have been based on various assumptions that includes operational diversity that may not be reflective of actual performance in operation.

4.2.1.1 Passive Design

Data Hall External Surface Finishes

All external surfaces of the data halls will be selected with finishes that support low absorptivity and high solar reflective index (SRI). This is to minimise the solar radiant heat gains and associated cooling loads.

Office Space Thermal Performance

The office areas of the data halls will be built with high thermal performance fabric and glazing to minimise thermal loads utilising continuous insulation where possible and avoiding thermal bridging that degrade thermal performance. Shading devices to the northern façade will be pursued optimised to limit solar gains during cooling seasons and provide passive solar heating during winter at lower solar altitudes.

4.2.1.2 Mechanical Services

Elevated Data Hall Conditions and Direct To Chip Cooling

Significant reductions in mechanical system energy consumption are supported through the utilisation of relaxed data hall air temperature and humidity control setpoints in combination with the capability for direct to chip cooling through incorporating the necessary cooling fluid loops for improved heat exchange and utilisation of free cooling.

Chiller Plant

New chiller plant producing cooling chilled water will be of very high efficiency gained through current compressor technology and operating at elevated chilled water temperatures. Providing capability for direct to chip cooling and elevated hall temperatures allows the chilled water temperature to reset upwards optimising compressor efficiency and reducing subsequent energy consumption.

Waterside Free Cooling / Economy Cycle

Data hall cooling will be provided direct from the hybrid coolers when ambient conditions allow bypassing the chiller plant to further improve energy efficiency. Combined with the elevated hall conditions and direct to chip cooling increases the annual operating time using waterside free cooling further reducing energy consumption.

4.2.1.3 Backup Power

Uninterruptible Power Supply (UPS) System

Utilisation of static UPS (battery type) for backup power in lieu of rotary flywheel style backup. Battery UPS provides a significant reduction and associated energy consumption of standby losses in comparison to rotary units.

4.2.1.4 Electrical Services

On-site Solar PV

On-site photovoltaics (PV) is being pursued for the design maximised for installation to the available roof space, coordinating with the roof area required for allocation to the cooling and other services plant. The project will incorporate a solar PV system with rated capacity anticipated to exceed 115 kWe per data centre building, or 230kWe across the finished site, subject to the availability of roof space to be finalised during detailed design. Based on the anticipated on-site solar PV rated capacity, generated energy is estimated to exceed 303,000 kWh/yr across the finished development that will be 100% utilised by the development.

Lighting

The proposed development will use robust, long-life LED lighting throughout the building for all luminaires to reduce the power demand and energy consumption. Occupant responsive controls will be utilised to ensure lighting is only engaged when required by occupants, dimmed or switched off when unoccupied, to further reduce energy consumption. The long life of LEDs also reduces the need for replacement, which further reduces waste and its associated impact on the environment.

Energy Metering

Energy meters at the building level and sub-meters on major plant elements will be provided to enable ongoing tracking of energy consumption and identification of targeted energy management strategies to reduce consumption.

4.2.2 Water Use

Water efficient initiatives are being pursued for the design as described in this section.

The pursued initiatives for the data centres are estimated to support annual average Water Usage Efficiency (WUE) approaching zero due to essentially no operational water use, a vast improvement on an industry benchmark of 1.73.

Water Usage Effectiveness (WUE) is a metric providing assessment of the water used on-site for operation of a data centre relative to the IT equipment energy consumption. The lower the WUE the more water efficient a data centre is.

The following table provides a comparison of the targeted water performance to a benchmark aligned to the Australian average performance of NEXT DC facilities[1] at a WUE of 1.73, based on the IT loading assumptions of Table 2. Note that there is presently an absence of any published industry benchmarks for WUE available and limited publicly information on data centre water consumption. NEXT DC performance was utilised as a comparison due to having a large Australian industry presence and publicly available published data.

Table 4: Operational Water Consumption Estimates and Comparison to Benchmark for Data Centres

Item	Benchmark Performance	Proposed Development	Improvement Estimate
Estimated energy consumed by the IT equipment load for whole development (MWh/yr)	1,816,474	1,816,474	-
Annual Data Centre Water Consumption (kL/yr)	3,142,499	70,000[1]	3,072,499
Water Usage Effectiveness (WUE)	1.73	<0.04	

Note: 1. Generally, no water will be consumed in operation of the data centre plant however a nominal allowance has been made for water consumption due to reactive maintenance of the closed water loop systems that may require draining and refilling.

The targeted performance for the proposed development compared to the benchmark performance shown above represents a significant reduction in water consumption at over 97%.

Note the estimate calculations have been based on various assumptions that includes operational diversity that may not be reflective of actual performance in operation.

The pursued initiatives across the other project elements also support a reduction in water consumption compared to industry benchmarks. The following table provides a comparison of the targeted water performance to a benchmark based on the Green Star assessment tools.

Table 5: Operational Water Consumption Estimates and Comparison to Benchmark for Other Project Elements

Water End Use	Standard Practice Building (kL)	Proposed Building (kL)
Toilets	512	512
Indoor taps	156	156
Showers	258	258
Dishwashers	72	72
Washdown	219	274
Landscape irrigation	3,161	2,093
Total Water Demand	**4,382**	**3,365**
Reuse Rainwater	*0*	*2,204*
Net Potable Water Use	***4,382***	***1,161***
Percentage Reduction		*73.5%*

Mechanical Plant Water Consumption

Air-cooled chillers are utilised for all data hall cooling that utilise dry air-sourced heat rejection that consumes no water.

[1] NEXT DC average WUE performance sourced from their Climate Active Public Disclosure Statement available at https://www.climateactive.org.au/sites/default/files/2024-07/NextDC_Public%20Disclosure%20Statement_Org_Signed%20%281%29.pdf

Fittings and Fixtures

All fittings and fixtures selections will be made for the design with water efficiency and consumption minimisation in mind. Where appropriate, selections will be made toward the highest efficiency available.

Low-Irrigation Demand Plant Selection

Plants with low or zero ongoing irrigation demands such as endemic native vegetation are being considered for the development to reduce watering requirements. The potential for plants that require low or no ongoing irrigation will contribute strongly towards water usage minimisation.

Rainwater Collection and Reuse

The development will include a tank in each building for the collection of rainwater runoff from the roofs on site. The collected rainwater will be reused for flush fixtures and irrigation.

Strategic Water Metering

Building-level and sub-metering will be provided to monitor and record the water consumption of the overall development, as well as irrigation systems, water fixtures and water use for the mechanical systems. This will enable ongoing tracking for identification of targeted strategies to minimise operational water consumption.

4.2.3 Waste Minimisation and Materials

Construction and Demolition Waste Reduction

Construction and demolition waste will be reduced by diverting waste from going to landfill. The project will identify the potential waste streams and their expected quantities, collection and diversion methods for each waste stream, roles and responsibilities, and the waste haulers to be engaged. Targets will be set for waste diversion from landfill with ongoing monitoring throughout construction to ensure project is on track.

Materials

Initiatives are being pursued for major materials elements of the development to minimise the embodied emissions footprint and environmental impact including:

- Use of concrete mixes with supplementary cementitious materials from recycled byproduct sources such as fly ash and granulated blast furnace slag to reduce Portland Cement content and the associated production greenhouse gas emissions.
- Use of structural steel and reinforcement products with high recycled material content to reduce the quantity of virgin material sourcing.
- Selection of low maintenance and high durability materials will be selected where practical for extended service life to minimise replacement needs and additional materials usage over the development lifetime.

4.2.4 Net Zero Pursuits

In addition to the energy efficiency and on-site renewable energy initiatives being pursued for the development to reduce energy and associated greenhouse gas emissions, further considerations are being made by the Proponent regarding support of the Government's goal of Net Zero by 2050 goal. Considerations include:

- Commitment to procure 100% renewable electricity for all non-IT operational energy use within the facility and data halls.

- Hyperscale customers are committed to procurement of 100% renewable electricity for IT load, eliminating the associated scope 2 emissions.
- Selection of chiller plant refrigerants with very low Global Warming Potential (GWP) at 1 minimising as far as practical the associated Scope 1 emissions from leakage.
- Procurement of non fossil fuel based diesel fuel such as HVO diesel for some or all of the fuel stored on-site for emergency backup power is being considered. This would lead to a reduction in emissions from the diesel fuel in the order of 75%. Viability testing is currently being undertaken by the Proponent on other project sites.

The GHG Assessment Report prepared provide more detailed information on the emissions associated with the development. In summary, the GHG assessment reviewed three comparative scenarios as follows across the identified assessment boundary to estimate the emissions for the anticipated sources of the project:

- **Scenario 1: Baseline –** Equivalent to the national average data centre performance of an approximate PUE of 1.6 that is sufficient to support the 3 Star NABERS Energy for Data Centres Infrastructure minimum per the project SEARS (see Section 4.1.3).
- **Scenario 2: Design Measures –** Includes the targeted project design features that minimise demand and maximise efficiency in support of the target annual PUE of 1.3 (see section 4.2.1) and considers the proponent's Hyperscale customers that are committed to procuring 100% renewable electricity for IT loads, i.e. zero scope 2 emissions for IT load electricity.
- **Scenario 3: All Measures –** Includes Per scenario 2 plus all electricity is 100% renewable electricity for all non-IT operational energy use within the facility and data halls, per the proponent commitment detailed above.

The following table provides the Scope 1 and 2 emissions estimates summary from the GHG Assessment Report for the assessed scenarios.

Table 6: Operational Scope 1 and Scope 2 Emissions Estimate Summary Across Assessment Scenarios

Emissions Scope	**Operational Throughput Lifetime GHG Emissions (t-CO_2-e)**				
	Scenario 1 Benchmark	*Scenario 2 Design Measures*	*% Difference to Benchmark*	*Scenario 3 All Measures*	*% Difference to Benchmark*
Scope 1 Subtotal	*889,272*	*25,132*	*-97.2%*	*9,967*	*-98.9%*
Scope 2 Subtotal	*5,092,288*	*952,702*	*-81.3%*	*0*	*-100.0%*
Total Scope 1 & 2	**5,981,561**	**977,834**	***-83.7%***	**9,967**	***-99.8%***
Average Annual 1 & 2	110,770	18,108		185	

The pursued design measures of Scenario 2 are seen to reduce the estimated annual Scope 1 & 2 emissions by over 80% compared to the approximate national average performance, as seen in Section 4.2.1.

When the commitment to procure 100% renewable electricity for all non-IT operational energy use within the facility and data halls is also considered per Scenario 3, the operational Scope 1 & 2 GHG emissions are close to entirely mitigated compared to the Benchmark scenario.

4.3 Urban Heat Impact Considerations

The Planning Secretary's cover letter to the SEARs outlined additional requirements that included the following:

The EIS must evaluate the impact of heat rejection on habitable rooms and communal open spaces, including those of neighbouring properties.

The potential impacts of urban heat island and heat rejection from the proposed development are significantly mitigated due to the following project features being pursued.

External Surface Finishes

Through integrating high solar-reflective low solar absorptive building finishes, the project will dramatically reduce roof and façade heat gain leading to:

- Lower surface temperatures cutting conductive heat transfer to the structure and the ground plane, and minimises sensible heat added to the local air
- Shedding of residual heat more rapidly after sunset lowering nighttime ambient temperature and reducing 'heat island' carry-over.

These properties will not only cut the building's own cooling load but also limit its contribution to broader urban heat buildup, leading to cooler environment around the development, reduced peak ambient air temperatures, and improved comfort for neighbouring areas.

Landscaping

By dedicating 20.5% of the site to landscaping with the vast majority deep-soil landscaping, the project will realise the following benefits:

- Canopy shading from mature trees intercept the majority of solar radiation before hitting the ground reducing ground surface temperatures.
- Evapotranspiration cooling due to water evaporating from planting & soil contributing to the lowering of ambient temperatures.

These integrated measures flatten ambient temperature peaks, reduce heat buildup and foster a resilient microclimate.

Distance to Sensitive Receivers

The large distances to nearby sensitive residential or communal receivers will limit any potential impacts.

As can be seen in Figure 3, industrial properties are adjacent the site directly on the West and South, and to the North on the other side of Lenore Drive is a large open car storage lot. The Eastern side of the site is adjacent a vegetation corridor and the closest residential properties with habitable spaces are over 400m to the North from the proposed data hall position on the site, separated by the above ground electrical transmission line corridor.

Figure 3: Aerial Photograph of Site (Source: Urbis GIS, 2025)

With no nearby residential dwellings or communal open spaces, following the project features outlined above that substantially limit urban heat impacts, any potential impacts to the local community comfort or amenity value are avoided.

5 Conclusion

The report has described the Ecologically Sustainable Design (ESD) features being pursued for the development design. These are seen to support the Planning Secretary's Environmental Assessment Requirements (SEARs) that includes specific elements of the Sustainable Buildings SEPP 2022 applicable to the project.

In summary, ESD targets and features pursued for the development include:

- The project is targeting a PUE of circa 1.3 annual average representing a marked improvement on the national average of approximately 1.6.
- Operational energy performance that would support a NABERS Energy for Data Centres performance of 5 star if realised in operation compared to national average performance of 4 Star, based on publicly available data for current ratings.
- Incorporation of energy features to support target outcomes as follows:
    - Elevated data hall cooling setpoint temperature and relaxed humidity setpoints combined with direct to chip liquid cooling capability to maximise efficiency of mechanical plant.
    - High efficiency chiller plant through modern compressor technology coupled with elevated operational chilled water temperatures due to relaxed hall conditions and direct to chip liquid cooling.
    - On-site PV maximised to the available roof space with a targeted rated output capacity in the order of a minimum 115kWe per data centre building, 230kWe minimum across the site. Roof top area available for installation is limited as majority is allocated to cooling chiller plant that cannot be installed over.
    - High efficiency LED lighting selections throughout to minimise demand coupled with occupant responsive controls to minimise operational time and associated energy consumption.
    - Low absorptivity / high Solar Reflective Index (SRI) building external finishes to reduce radiant heat gains.
    - High performance fabric / glazing to the office spaces and glazing shading to reduce thermal loads.
- Low annual water consumption supported through:
    - Air-cooled chillers used for heat rejection that do not consume water in operation leading to effectively zero water use in regular operation for the data centres.
    - Low or zero irrigation demand through selection of drought tolerant planting such as endemic native vegetation for landscaping.
    - Rainwater capture and reuse system for supply to flush fixtures and irrigation.
- Net Zero emissions in operations considerations by the Proponent with a target achievement by 2050 including:
    - Commitment to procure 100% renewable electricity for all non-IT operational energy use within the facility and data halls. Leading hyperscale AI and cloud providers are actively investing in renewable energy procurement as part of their broader commitment to sustainable operations and net-zero carbon goals.
    - Hyperscale customers are committed to procurement of 100% renewable electricity for IT load, eliminating the associated scope 2 emissions.
    - Use of very low GWP refrigerants in chiller plant minimising as far as practical the associated Scope 1 emissions.
    - Future procurement of renewable diesel alternatives to fossil fuel based products subject to viability & availability, and procurement of offsets for residual scope 1 emissions.

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