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Environmentally Sustainable Design Strategy

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Client:

Alexandria Property Development Pty Ltd **Revision**: D **Date**: 5/07/2022



REPORT INFORMATION

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Prepared By	LCI Consultants
	Sydney Office
	Level 5
	73 Miller Street
	North Sydney 2060
ABN/ACN	92 124 107 973 / 124 107 973
Author	GM,DM

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1 Executive Summary

This report has been prepared by LCI consultants for the proposed 32-42 Bourke Road, Alexandria (Alexandria Health Centre) project. This Report provides an overview of the Ecological Sustainable Design (ESD) initiatives considered for the new Alexandria Health Centre, and to address the ESD requirements of the Secretary's Environmental Assessment Requirements (SEARs). This report will be included within the Environmental Impact Statement (EIS) that will accompany a State Significant Development Application (SSDA).

2 Overview of Proposed Development

Development consent is sought for a concept proposal for the 'Alexandria Health Centre' comprising medical centre uses and anchored by a mental health hospital. Specifically, the application seeks concept approval for:

- In principle arrangements for the demolition of existing structures on the site and excavation to accommodate a single level of basement car parking (partially below ground level).
- A building envelope to a maximum height of 45 m (RL 53.41) (including architectural roof features and building plant). The podium will have a maximum height of RL 28.41.
- A maximum gross floor area of 11,442.20 sqm, which equates to a maximum FSR of 3.85:1. The total FSR will comprise a base FSR of 2:1, a community infrastructure bonus FSR of 1.5:1 and a 10% design excellence bonus FSR (subject to a competitive design alternatives process).
- Indicative use of the building as follows:
 - Mental health hospital at levels 5-7.
 - Medical centre uses at levels 1-4; and
 - Ground level reception/lobby and pharmacy.
- Principles for future vehicular ingress and egress from Bourke Road along the site's western frontage.
- Subject to agreement on a public benefit offer submitted with this application, the proposal includes the indicative dedication of the following land to Council as envisaged by the Draft Sydney Development Control Plan 2012 Southern Enterprise Area Amendment (Draft DCP):
 - A 2.4m wide strip of land along the site's frontage to Bourke Road for the purpose of footpath widening
 - A 3m wide lane along the site's western boundary contributing towards a 6m wide lane (it is noted that the concept proposal will allocate an additional 3 m strip of land within the site along the western boundary to enable two-way vehicle movement into and out of the site).
 - A 3m wide lane along the site's southern boundary, contributing towards a 9m wide lane.

3 Site Description

The site is located within the City of Sydney Local Government Area (LGA). The site is situated approximately 4km to south of the Sydney CBD and approximately 2km north-east of the Sydney International Airport within the suburb of Alexandria.



The site comprises approximately 3,000 sqm and currently contains a one storey warehouse building used for the purpose of vehicle repairs. The surrounding context consists of similar structures utilised for light industrial purposes.

The street address for the property is 28-32 Bourke Road, Alexandria, NSW, 2015 and is known as is Lots 1,2 and 3 in Deposited Plan 324707.



Figure 1: Site plan.



4 Assessment Requirements

4.1 SEARs

The Department of Planning and Environment have issued Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development. This report has been prepared having regard to the SEARs as follows:

Ecologically Sustainable Development (ESD) and climate change	Report Reference
Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation) are incorporated in the concept design and ongoing operation of the development.	Refer to Section 5.0 in response to clause 7(4) of Schedule 2 of the EP&A Regulation
Demonstrate how the concept development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	See Section 5.2 for how the project has incorporated ESD in the design, construction, and operation of the development. See Section 6.0 and 7.0 for details regarding the proposed ESD initiatives
Demonstrate how the concept 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.	See Section 7.3 for details regarding the proposed Energy and GHG emissions reduction strategies. These strategies will contribute to the Government's goal of net zero emissions by 2050 by reducing the demand side consumption (building energy demand) and supporting transition to full electrification and elimination of fossil fuel (except for minor use i.e. backup diesel generator).
	water conservation and site treatments.
	details relating to water sensitive urban design.



5 SEAR 8 | Ecologically Sustainable Development (ESD) and Climate Change

5.1 Clause 7(4) of Schedule 2

The ESD principles that are to be incorporated into the proposed development must be aligned with Clause 7(4) – Schedule 2 – Environmental Planning & Assessment Regulation (2000).

5.1.1 The Precautionary Principle

The proposed Alexandria Health Centre will be constructed on a previously developed site, consisting of existing industrial facility and hardscaping. This will not have an adverse environmental impact and therefore alleviates concern of serious or irreversible environmental damage. Proactive measures to prevent environmental degradation have been included within the design, construction and operational phases of the proposed development. During the design and construction phases the main contractor will implement an Environmental Management System that follows NSW Environmental Management System Guidelines. The project will target sustainability initiatives that will drive efficient operation of the building, which ensures environmental risks are actively managed across the site.

5.1.2 Inter-Generational Equity

To uphold inter-generational equity, the proposed development minimises the consumption of energy and water resources while reducing waste.

The ESD principles incorporated into the proposed Alexandria Health Centre facilitates the conservation of energy and water resources through energy and water efficiency measures. Energy reduction has been considered in the design of the building, through passive and active measures. The reduction in water use has been considered through high WELS equivalent water fixtures and fittings, low water demand landscaping and use of non-potable water sources (harvested rainwater) where appropriate.

Waste generated during the construction and operational phases will be diverted from landfill to be recycled. An Environmental Management System (EMS) will be utilised to throughout construction. Operational waste streams will be separated to maximise recycled waste.

Reducing energy, water and waste ensures that the health, diversity and productivity of the environment is maintained for the benefit of future generations.

5.1.3 **Conservation of Biological Diversity and Ecological Integrity**

The project's ESD principles to reduce energy, water and waste consumption have an indirect impact to conserve biodiversity and ecological integrity to the surrounding area. By minimising demand on energy and water resources, the need for land-clearing and the pollution generated from new Alexandria Health Centre to support the surrounding area will be minimised.

5.1.4 Improved Valuation

The valuation of the project's assets and services consider environmental factors through the implementation of various ESD initiatives. An Environmental Management System will be adhered to during construction to ensure that



contractors are responsible for costs associated with generating excessive pollution and waste. The project team will bear the extra cost of providing recycling and landfill waste streams during construction and operational phases. This creates a system where the polluter pays and creates and incentive to reduce pollution and waste.

The design of the project will be designed to meet or exceed the NCC Section J 2019 (Energy Efficiency Provisions) and benchmarked against relevant industry sustainability rating tools/frameworks guidelines which will provide environmental goals for the project. Project requirements stipulate design teams are contractually required to deliver targeted ESD initiatives for the project.



5.2 Framework to Reflect Best Practice Sustainable Design Principles

5.2.1 Green Star Design and As-built V1.3

The Alexandria Health Centre has utilised the Green Star Design and As-built V1.3 rating tool as a framework to guide the project in aligning with 'Australian Best Practice' and targeting initiatives that exceed relevant industry recognised building sustainability and environmental performance standards, such as the National Construction Code 2019 Section J Energy Efficiency Provisions.

The Green Star Design and As-built rating system provides a framework to assess how a building reduces its impact on the environment while meeting the economic and social needs for its occupants and surrounding communities. Green Star's goal is to "lead the sustainable transformation of the built environment", by encouraging practices that:

- Reduce the impact of climate change.
- Enhance the health and quality of life of inhabitants and the sustainability of the built environment.
- Restore and protect the planet's biodiversity and ecosystems.
- Ensure the ongoing optimum operational performance of buildings.
- Contribute to market transformation and a sustainable economy.

The Green Star Design and As Built v1.3 rating system assessing buildings through the following categories:

- Management
- Indoor Environment Quality
- Energy
- Transport
- Water
- Materials & Construction Waste
- Land use and Ecology
- Emissions
- Innovation

Points are awarded for a building project's ability to secure as many credits as possible from each category. Each credit targets the environmental impact of a specific design feature. The total number of points awarded determines if the level of certification (star rating) as shown in 3.



Figure 3: Available Green Star Design & As Built Certification ratings

The Green Star Scorecard has been include in Appendix A for further information.



6 Key Ecological Sustainable Design Strategies

The key ESD strategies for the project have been described below. The key ESD strategies are highly relevant to the nature of the project and will be explored further in achieving the ESD goals and within the project constraints:

- Consider the recent impacts of COVID 19 and how the development will target and improve occupant health and operate during a pandemic or similar health crisis.
- Consider the use of mixed mode operation to appropriate areas of the buildings to allow occupants to connect to the outdoor when ambient conditions are favourable.
- Consideration of Chilled water and heating hot water thermal storage subject to space to house a large thermal storage tank. Thermal storage offers opportunities to reduce operational energy cost and resilience against peak conditions.
- Consider passive ESD measures such as external shading or high-performance facades to reduce peak summer solar gain, maximise annual building energy, and create occupant comfort through effective daylighting.
- Consideration of better air tightness, similar to Passive House standard
- Consider implementing Water Sensitive Urban Design features such as water efficient fittings and appliances, rainwater tanks to reduce potable water consumption and costs, proprietary devices and other approved site-specific measures to reduce pollution from stormwater entering local waterways,
- Consider the use of low embodied carbon materials throughout the development in reducing upfront carbon emissions
- Consider high performance heating, ventilation and air conditioning (HVAC) systems, including: heat
 recovery chillers for simultaneous chilled water and heating hot water production during shoulder seasons,
 high performance water-cooled chillers, high performance air handling equipment to minimise fan energy
 consumption (equivalent to Class A Eurovent efficiency), demand controlled ventilation to maintain high
 quality indoor environment while minimising energy consumption, efficient thermal zoning to maintain
 thermal comfort and reduce over-cooling and over-heating.
- Indoor air quality, e.g. low indoor CO2 and PM2.5 levels, via increased outside air supply (over and above minimum code requirements) and enhanced filtration. Reduction of pollutant sources through use of low VOC and formaldehyde materials.
- Low energy flicker free LED lighting, with high Colour Rendering Index and glare reduction. Consideration of circadian lighting for staff and patients.
- Electrification/No fossil fuel use to support the transition to Net Zero Emissions. For example electric heat pumps to be used in lieu of gas boilers for heating hot water and domestic hot water, no gas appliances in commercial kitchens.
- Zero Ozone Depletion Potential and Lower Global Warming Potential of refrigerants



7 Sustainable Design Principles

The following sustainable design principles have been proposed for the Alexandria Health Centre and can be addressed through the categories outlined within the Green Star Design and As Built v1.3 rating system. The following sections are structured as follows:

- 7.1 Management Practices
- 7.2 Indoor Environmental Quality
- 7.3 Energy Conservation
- 7.4 Transport
- 7.5 Water Conservation
- 7.6 Materials & Construction Waste
- 7.7 Sustainable Sites: Land use and Ecology, and Emissions

7.1 Management Practices

The following sustainable building design and construction management practices have been considered for the Alexandria Health Centre. These strategies seek to implement process and practices to maximise sustainable design opportunities from project design through to construction and operation, and will be developed through design development phase.

Sustainable Building Design and Construction Management Practices	Green Star Design & As-Built v1.3 Credit
Undertake Ecological Sustainable Design (ESD) workshops to identify valuable and appropriate sustainable design initiatives for the project.	1.1 Accredited Professional
Workshops pertaining to ESD design have been undertaken to define the ESD targets for the project, opportunities, and implementation. A Climate Resilience and Adaption workshop has been undertaken to identify the climate change risks, and associated control and mitigation/management measures to be incorporated in the project. Ongoing operational performance is vital to ensure the building operates efficiently as intended. A services maintainability review led by an Independent Commissioning Agent will be undertaken, which involves reviews of systems and their characteristics that deliver on energy and water efficiency, as well as occupant comfort.	2.1 Services Maintainability Review3.0 Climate Adaptation
Establish environmental performance targets for energy and water conservation, and reporting and tracking of consumption. Inclusion of sub-metering and monitoring to facility tracking and monitoring of energy and water consumption.	2.0 Environmental Performance Targets 5.1 Environmental Building Performance
 Energy/Greenhouse Gas emissions reductions have been set, with a minimum 10% reduction compared to the NCC Section J 2019 will be achieved (refer to Section 7.3 Energy Conservation/GHG Emissions Reduction for further details) Water reduction measures including fixture and fittings targets and initiatives have been defined (refer to Section 7.5 Water Conservation). 	6.0 Metering and monitoring
Implementation of building commissioning to ensure the building is operating efficiently as intended as per the established energy and water targets. A commissioning plan will be developed for the project by an independent commissioning agent.	2.2 Building Commissioning



Sustainable Building Design and Construction Management Practices	Green Star Design & As-Built v1.3 Credit
Any systems, attributes and characteristics that deliver on environmental performance and/or required to address climate risks will be captured within the commissioning plan.	
Building tuning practices during the first year of operation to rectify operation and efficiency issues from the building services.	2.3 Building Tuning
Inclusion of contractual requirements for the contractor to provide building information in the form of Operations and Maintenance (O&M) Manuals, and the development of a building logbook for ongoing maintenance.	4.1 Building Operations & Maintenance Information
Contractual requirements for the head contractor to implement an Environmental Management Plan and management system in accordance with ISO14001.	7.0 Responsible Construction Practices
Inclusion of adequate waste storage facilities to allow for waste separation, and collection. An operational waste management plan developed by an accredited waste auditor will be developed for the project, and will include strategies to reduce operational waste, including future recommendations to further review an improve on ongoing operational waste reduction.	8.0 Operational Waste

7.2 Indoor Environment Quality

The following Indoor Environment quality strategies have been considered to improve occupant comfort and wellbeing. The strategies seek to address visual comfort, thermal comfort, indoor air quality and acoustic comfort.

Indoor Environment Quality Strategies	Green Star Design & As-Built v1.3 Credit
 Design and installation of mechanical services in line with best practice design to reduce pollutants from sources and dust/particulates during installation. The design will incorporate the following measures: maintaining separation distances between outdoor intakes and exhausts, with distances based on classification of exhaust types. Inclusion of adequate access (access panels) to coils and filters in air-conditioning equipment for ease of cleaning and maintenance. Provision of increased outdoor air (when compared to Australian Standards) to appropriate spaces. Exhaust of indoor pollutants through dedicated exhausts. Procurement of low emitting printers and photocopiers. Development of a Construction Indoor Air Quality Management Plan by the head contractor to reduce dust/particulate build-up in ventilation elements during construction. 	9.1 Ventilation System Attributes 9.3 Exhaust OR Elimination of Pollutants
Spaces designed in accordance with best practice noise levels. The building fabric (façade and internal surfaces/partitions) will include acoustic insulation and surface treatments to control noise levels from the exterior and mechanical plant, reverberation within the spaces, and acoustic separation between relevant spaces.	10.1 Internal Noise Levels 10.2 Reverberation 10.3 Acoustic Separation



Indoor Environment Quality Strategies	Green Star Design & As-Built v1.3 Credit
All lighting will achieve a minimum Colour Rendering Index of 80 for lighting, include ballasts or drivers to reduce flicker in lighting and local occupant controls	11.1 General Illuminance & Glare Reduction 11.3 Localised Lighting Control
External shading and internal blinds are to be considered to assist with glare control. Views and daylight to existing tree canopies and/or the harbour through windows and façade openings. Existing trees east of the building have also been considered as part of the solar shading strategy and adds to views/connection to nature.	12.0 Glare Reduction 12.1 Daylight 12.2 Views
Specification of low VOC paints, adhesives, sealants and carpets (where appropriate). Specification of low formaldehyde engineered wood products.	13.1 Paints, Adhesives, Sealants & Carpets 13.2 Engineered Wood Products
Design of building fabric to assist with improved thermal comfort, through appropriate window to wall ratios, insulation level, window U- values and solar control performance. See Section 7.3 for further details regarding the insulation and window performance.	14.1 Thermal Comfort



7.3 Energy Conservation/GHG Emissions Reduction

The Alexandria Health Centre has adopted the energy hierarchy approach in reducing energy use. The energy hierarchy approach seeks to systematically targeting building energy use through passive means first, then supported by efficient active systems and renewable energy. The energy conservation strategies considered for the Alexandria Health Centre are included below.

Energy Reduction Hierarchy	Energy Conservation Strategies	Green Star Design & As- Built v1.3 Credit
Demand Reduction through high performance building envelope	 Passive Design Appropriate window to wall ratios to ensure a good access to views, natural daylight, whilst balancing the thermal requirement of heat loss and heat gains. External solar shading appropriate to orientations. Appropriate thermal performance through insulation performance. Window U-values and Solar Heat Gain Coefficients (SHGC) have been considered for the thermal zones. Double glazed units will be installed to façades to reduce solar heat gains whilst balancing visible light transmittance, as well thermal transmittance. 	15A.0 Conditional Requirement 15A.1 Building Envelope 15A.2 Glazing
Efficient Systems and Electrical Demand Reduction	 Active Design Consider high performance heating, ventilation and air conditioning (HVAC) systems, including: heat recovery chillers for simultaneous chilled water and heating hot water production during shoulder seasons, high performance water-cooled chillers, high performance air handling equipment to minimise fan energy consumption (equivalent to Class A Eurovent efficiency), demand controlled ventilation to maintain high quality indoor environment while minimising energy consumption, efficient thermal zoning to maintain thermal comfort and reduce over-cooling and over-heating. LED lighting throughout where appropriate including programmable lighting control system (intelligent lighting) High efficiency domestic hot water technology (Heat Pumps) has been considered. Appliances must be a minimum of 4 energy star rating. 	15A.3 Lighting 15A.4 HVAC 15A.5 Domestic Hot Water 15A.9 Vertical Transport 15E
Onsite Generation and Renewable Energy	 Solar Photovoltaics (Electricity) to be considered for the project. The location of solar panels considers the impact of overshadowing and orientation to target optimum yield of onsite energy generation. 	15 Greenhouse Gas Emissions reduction



Energy Reduction Hierarchy	Energy Conservation Strategies	Green Star Design & As- Built v1.3 Credit
Building Networks	 Energy metering, Sub-metering of Air-conditioning, general power, lighting, domestic hot water will be considered to allow for waste energy use and peak electricity demand. Metering and monitoring do not reduce energy; however, they facilitate energy management practices. Building Management System to track power and energy use for ongoing monitoring and reporting 	6.0 Metering and Monitoring
Offsite Renewable Energy	- Offsite renewable energy can be considered by the building owner.	15A.10 Off-Site Renewables
Electrification	 No fossil fuels (gas) equipment has been incorporated. Minor fossil fuel use for diesel generator backup may not be feasible to electrify. Diesel generators will be used infrequently for the purposes of backup power only. Electrification has been achieved through no use of natural gas in the building. Conventional buildings typically utilise gas boilers to provide heating hot water for air-conditioning as well as domestic hot water. The project will utilise electric heat pumps in lieu of gas fired equipment for heating hot water and domestic hot water. 	15A.8 Fuel Switching
Refrigerants	- A leak detection system will be considered for the project to capture refrigerants in HVAC plant, thus limiting the refrigerant leak to the atmosphere.	29.0 Refrigerants

7.4 Transport

Low carbon transport initiatives have been considered for the project including:

- End-of-trip facilities such as showers and lockers for staff to encourage active transport commuting.
- Secure Bicycle racks
- Small Vehicle parking spaces and motorbike parking
- Electric Vehicle Charing points will be considered.

7.5 Water Conservation

The project has adopted the water hierarchy approach in reducing potable water use. The water hierarchy is similar to the energy hierarchy, and seeks to reduce potable water demand, then supported by efficient distribution systems and recycled water / non-potable water sources. The water conservation strategies considered for the Alexandria Health Centre are included below.



Water Reduction	Water Conservation Strategies	Green Star Design &
Hierarchy		AS-Built VI.3 Creait
Demand Reduction	 Low flow fixtures, fittings and appliances rated to the WELS standard. The project will target the following WELs rated Taps: 5 Star or higher Urinals: 5 Star or higher Toilet: 4 Star or higher Showers: 2 Star or higher Dishwasher: 5 Star or higher Native landscape species selection will include native endemic species that require watering for establishment, and minimal watering (other than natural rainfall). Weather and moisture sensing technology for landscape irrigation 	ISB. I Sanitary Fixture Efficiency
Efficient distribution	 Landscape Irrigation will consist of a low water demand system, such as drip irrigation or sub-soil drip irrigation. Water metering of equipment will also be included in the design for ongoing monitoring and tracking of any wasted water/water leaks 	18B.4 Landscape Irrigation
Water Recycling	- Rainwater Harvesting	18B.2 Rainwater Reuse
Fit for purpose water sources	 Potable water will be avoided for uses that can be substituted for non-potable water (harvested rainwater). Rainwater reuse in toilet flushing will also be considered. 	18B.2 Rainwater Reuse
Discharge to Sewer	- Reduced discharge from low flow fixtures.	18A Discharge to Sewer (performance pathway)

7.6 Materials & Construction Waste

The following materials and construction waste strategies have been considered for the Alexandria Health Centre to increase the uptake of environmentally preferable materials with a focus on reuse and recycle content, reduced embodied energy, greater transparency, and reduction of waste to landfill.

Indoor Environment Quality Strategies	Green Star Design & As-Built v1.3 Credit
Concrete mixes with Portland cement reduction, contains at least 50% captured or reclaimed water, and aggregates Reduction through course or fine aggregates	19B.1 Concrete
The project will investigate the use of low carbon concrete during construction stage.	
Reduce reinforcing steel use, sourced from a Responsible Steel Maker,	19B.2 Steel
and at least 60% of all reinforcing bar and mesh is produced using energy-reducing processes (such as Polymer Injection Technology)	20.1 Structural and Reinforcing Steel



Indoor Environment Quality Strategies	Green Star Design & As-Built v1.3 Credit
Timber products used are certified by a forest certification scheme such as Forest Stewardship Council (FSC) certified. Use rapidly renewable	20.2 Timber Products
materials (eg. bamboo flooring) where possible.	
All permanent formwork, cables, pipes, flooring and blinds do not contain	20.3 Permanent Formwork,
PVC and have an Environmental Product Declaration (EPD) OR meet Best	Pipes, Flooring, Blinds &
Practice Guidelines for PVC.	Cables
Preference for products and materials with sustainability credentials	21.1 Product Transparency
such as Reused Products, Recycled Content Products, Environmental	
Product, Declarations, Third Party Certifications (such as GECA) and	
Stewardship Programs.	
Commit to at least 90% of the waste generated during construction and	22.1 Demolition and
demolition to be diverted from landfill for recycling. This includes re-use	Construction Waste
of onsite spoil where appropriate, or back fill aggregate with clean	
recycled content (e.g. Construction Demolition waste aggregate).	
Materials are sourced locally where possible to reduce emissions	19A life Cycle Impacts
associated with transportation.	

7.7 Sustainable Sites: Land use and Ecology, and Emissions

The following sustainable site strategies have been considered to:

- Reduce the negative impacts on sites as a result of construction and development and enhancing the local ecology.
- Reduce the negative impacts associated with buildings, such as refrigerant leaks, storm water peak discharge and pollution and light pollution.

Sustainable Site Strategies	Green Star Design & As-Built v1.3 Credit
Water Sensitive Urban Design principles are incorporated Porous/permeable landscaping and ground surfaces where appropriate to reduce stormwater runoff.	26.1 Peak Discharge 26.2 Stormwater Pollution Targets 18B.4 Landscape Irrigation 25.1 Heat Island effect
No critically endangered, endangered, vulnerable species or ecological communities were present on the site at the time of purchase. The site does not include old growth forest or wetland of 'High National Importance', or did not impact on 'Matters of National Significance'	23. Ecological Value
Site contamination or hazardous materials survey is identified with remedial steps undertaken to decontaminate site prior to construction.	24.2 Contamination and Hazardous Materials
Consideration of site surface treatments to reduce heat island effect, such as vegetation and light-coloured roofs to reflect solar radiation. The roof colour will consider a light colour with a high Solar Reflectance Index (SRI).	25.1 Heat Island effect
Achieve a reduction in peak sewer discharge comparing pre- development to post-development discharge. Achieve a reduction in pollution levels.	26.1 Peak Discharge 26.2 Stormwater Pollution Targets



Sustainable Site Strategies	Green Star Design & As-Built v1.3 Credit
All outdoor lighting to comply with AS4282:1997 to reduce light pollution, downlighting for external light fixtures including external pathway.	27.0 Light Pollution Neighbouring Properties 27.1 Light Pollution Night Sky
Zero ozone depletion potential (ODP) and Low Global Warming Potential (GWP) refrigerant will be considered for all refrigerant based systems. A leak detection system will be considered for the project to capture refrigerants in HVAC plant, thus limiting the refrigerant leak to the atmosphere.	29.1 Refrigerants



8 Design for Climate Change Resilience

The proposed 32-42 Bourke Road, Alexandria (Alexandria Health Centre) project will be designed to future-proof itself from the potential impacts of climate change. This section provides an overview of how the design of the development is responsive to the NARCliM projected impacts of climate change.

The project will undertake a Climate Change Risk and Adaptation (CCRA) workshop to identify climate change risks for the project and mitigation strategies to reduce the environmental, social and economic consequence on the project.

NARCLIM Climate Change Projections

The NSW Office of Heritage and Environment, now part of the NSW Department of Planning, Industry and Environment, has developed the NSW and ACT Government Regional Climate Modelling (NARCLiM) climate change projections to provide a dataset for detailed near future (2020-2039) and far future (2060-2079) projections. Generally, it determines that there will be:

- 1. more hot days and fewer cold nights;
- 2. an increase the number of heatwave events;
- 3. more hot days above 35°C; particularly in Spring and Summer;
- 4. Rainfall is projected to remain similar, projected to increase across the region during autumn
- 5. a change in rainfall patterns that will affect drought and flooding events.

PROJECT RESPONSE

These projections will have an impact on operational costs and occupancy comfort and safety. Hotter days with more heatwaves will particularly affect patients and the operation of building services equipment. This will also require higher capacity and operational costs for mechanical services to maintain occupancy comfort. Increased drought events will require provisions to supplement shortages in potable water. Stronger and reinforced façade components will be required to withstand increased rainfall and wind gust events.

The following Climate Change design initiatives will be considered as part of the Climate Change Risk and Adaptation workshop to mitigate the effect of future climate change while maximising efficiency in energy, water and material use. These measures should allow the project to meet the difficulties predicted by the climate change projections while maintaining occupancy comfort and operational efficiency.

Climate Projectio	Change ons	Climate Change Design Considerations
Ċ,	Hotter days and more frequent heatwave events	 Design Considerations Minimise unwanted solar heat gain into spaces through shading and/or glazing performance. Improve efficiency of mechanical services. Additional Cooling Plant Capacity to assist with peak cooling events Façade Systems to consider exposure to high temperatures (superficial peeling, cracking, corrosion, etc.)
Ċ,	Extreme Heat	 Design Considerations Improved thermal performance building fabric to mitigate heat discomfort and heat stress.



Climate Change		Climate Change Design Considerations
Projectio	ons	
		 Mechanical system is designed to provide adequate thermal comfort to
		occupants and to ensure safe operation of equipment during extreme heat
		events.
		 Backup power generation and load shedding during peak cooling events
		Design Considerations
Ø 0	Extended	 Landscaping with native low-water plant species.
<u> </u>	drought periods	- Drought tolerant species
		- Capture and reuse of rainwater for landscape irrigation and/or toilet flushing
		Design Considerations
\sim	More extreme	- Rainwater tank to consider impacts from more extreme rainwater events
\square	rainfall events	- Increase peak stormwater discharge capability.
1.1.1		- Increase over-flow drainage from site.
		Design Considerations
		 Increase peak stormwater discharge capability.
M la	Storms and	 Increase over-flow drainage from site.
- <u>1</u>	Flooding	 Location of critical plant so not be affected by potential flooding
		- Water sensors in lift pits to send lifts to the highest level in a flood event.
0		Design Considerations
	Gustier wind	 Design of façade elements/systems to minimise strain or loss of building
و رو	conditions	fixtures, fittings and fastenings.
		Design Considerations
		- Outdoor air filter grades and ongoing operational measures to manage smoke
	Bushfire	ingrase from hushfires



9 ESD Scorecard





					Green Star Design and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
MANAGEMENT						
Accredited Professional	1.1	Accredited Professional	1	No Risk	1	
Commissioning and Tuning	2.0	Environmental Performance Targets	Credit Minimum	No Risk	Complies	
	2.1	Services & Maintainability Review	1	Low	1	
	2.2	Building Commissioning	1	Medium		1
	2.3	Building Systems Tuning	1	Low	1	
	2.4	Independent Commissioning Agent (ICA)	1	Medium		1
Adaptation and Resilience	3.1	Climate Adaption Plan	2	Low	2	
Building Information	4.1	Building Operations & Maintenance Information	1	Low	1	





					Green Star Design and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
Commitment to	5.1	Environmental Building Performance	1	Low	1	
Performance	5.2	End of Life Waste Performance	1	Medium		1
Metering and	6.0	Metering	Credit Minimum	Low	Complies	
Monitoring	6.1	Monitoring Systems	1	Low	1	
	7.0	Environmental Management Plan (EMP)	Credit Minimum	Low	Complies	
Responsible Construction	7.1	Formalised Environmental Management System	1	Low	1	
Practices	7.2	High Quality Staff Support	1	Medium	1	
Operational Waste: Performance Pathway	8A	Performance Pathway: Specialist Plan	1	Low	1	
	8B	Prescriptive Pathway: Facilities Category Total	1 14		11	3





						Green Star Design and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points	
INDOOR ENVIRONM	ENT QUALITY		T				
	9.1	Ventilation System Attributes	1	Low	1		
Indoor Air Quality	9.2	Provision of Outdoor Air	2	High		1	
	9.3	Exhaust OR Elimination of Pollutants	1	Low	1		
Acoustic Comfort	10.1	Internal Noise Levels	1		1		
	10.2	Reverberation	1			1	
	10.3	Acoustic Separation	NA	Medium		1	
	11.0	Minimum Lighting Comfort	Credit Minimum	Low	Complies		
Linhting Countrat	11.1	General Illuminance & Glare Reduction	1	Low	1		





						Green Star Design and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points	
Lighting Contion	11.2	Surface Illuminance	1				
	11.3	Localised Lighting Control	1	High	1		
	12.0	Glare Reduction	Credit Minimum	Low	Complies		
Visual Comfort	12.1	Daylight	2	Medium	1		
	12.2	Views	1	Medium	1		
Indoor Pollutants	13.1	Paints, Adhesives, Sealants & Carpets	1	Low	1		
Indoor Pollutants	13.2	Engineered Wood Products	1	Low	1		
Thermal Comfort	14.1/2	Thermal Comfort	2	Low	1		
	•	Category Total	16		10	3	





				Green Star Desigr	and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
ENERGY						
	15E.0	Conditional Requirement	Conditional	Low	Will Comply	
	15E.1	GHG Emissions Reduction: Building Fabric		Medium		
	15E.2	GHG Emissions Reduction: Proposed Building	20	Medium	3.4	
	15D.3.1	Transition Plan				
	15D.3.2	Fuel Switching		High		2
	15D.3.3	On-Site Storage				
Greenhouse Gas	-	-	-			
Emissions	-	-	-			
Modelled	-	-	-			
Performance Pathway	-	-	-			
(max 20 of 20 points)	-	-	-			
	15A/B/C/D	Other Options	-			
Peak Electricity Demand Reduction	16A	Prescriptive Pathway: On-site Energy Generation	-			
Modelled Performance Pathway (max 2 of 2 points)	16B	Modelled Performance Pathway: Reference Building	2	Medium	1	





				Green Star Desigr	and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
		Category Total	22		4.4	2
TRANSPORT						





					Green Star Desigr	and As-Built v1.3
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
	17A	Transport - Performance Pathway	10	Medium	5	
Sustainable	17B.1		3			
Transport: Performance Pathway	17B.2	Prescriptive Pathway	1			
	178.3		1			
	178.4		1			
	17B.5		1			
		Category Total	10		5	0
	18A	Performance Pathway	12			
	18B.1	B.1 Sanitary Fixture Efficiency (1 point) - WELS Ratings of 6 Star for Taps/Urinals, 5 Star for Toilets, 3 Star (≤6l/min) for Showers.	1	Low	1	
	18B.2	B.2 Rainwater Reuse (1 point) - Rainwater collection & on-site reuse system incorporating a tank sized to 10L/m2.	1	Medium	1	
Potable Water: Prescriptive Pathway	18B.3	B.3 Heat Rejection (2 points) - No water consumption used for heat rejection equipment.	2			





					Green Star Design	and As-Built v1.3
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
	18B.4	B.4 Landscape Irrigation (1 point) - Drip irrigation system with moisture sensor override is used OR no potable water is used for irrigation.	1	Medium	1	
	18B.5	B.5 Fire System Test Water (1 point) - No water is expelled for system testing OR 80% of test water is captured & reused on-site	1	High		1
		Category Total	12		3	1







					Green Star Design and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
MATERIALS		•				
	19A.1	Comparative Life Cycle Assessment	6	Low		2
	19A.2	Additional Life Cycle Impact Reporting	4	Medium		1
Life Cycle Impacts: 19A Life Cycle	19B.1	Concrete	3	Low	2	1
Assessment	19B.2	Steel	1	Low		1
	19B.3	Building Reuse	2		0	
	19B.4	Structural Timber	3		0	
Responsible Building Materials	20.1	Structural and Reinforcing Steel	1	Low	1	
	20.2	Timber Products	1	Low	1	
	20.3	Permanent Formwork, Pipes, Flooring, Blinds & Cables	1	Low	1	
Sustainable Products	21.1	Product Transparency	3	Medium	1	1





					Green Star Design and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
Construction and Demolition Waste	22.1	2.1 Demolition and Construction Waste		Low	1	
		Category Total	14		5	4





					Green Star Design and As-Built v1.3	
Credit Title	Credit Code	edit Code Criteria Title		Risk	Targeted Points	Potential Points
LAND USE & ECOLO	GY					
	23.0	No Endangered, Threatened or Vulnerable Species	Credit Minimum	Low	Complies	
	23.1	Ecological Value	3	High		
	24.0	The site did not include old growth forest or wetland of 'High National Importance', or did not impact on 'Matters of National Significance'	Conditional	No Risk	Complies	
Sustainable Sites	24.1	Reuse of Land	1	No Risk	1	
	24.2	Contamination and Hazardous Materials	1			
Heat Island Effect 25.1 Heat		Heat Island effect	1	High		
FMICCIONIC		Category Total	6		1	0
EMISSIONS	26.1	Peak Discharge	1	Medium	1	
	26.2	Stormwater Pollution Targets	1	Low	1	
Light Dollution	27.0	Light Pollution Neighbouring Properties	Credit Minimum	Medium		1





					Green Star Design	and As-Built v1.3
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
Light Fondtion	27.1	Light Pollution Night Sky	1	High		1
Microbial Control	28.1	Microbial control	1			
Refrigerant Impacts 29.1 Refrigerants		1	Low	1		
Category Total					3	2
	BASE TOTAL POINTS				42.4	57.4





					Green Star Desigr	and As-Built v1.3
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points

INNOVATION						
Innovative Technology or Process	30A	On-site Renewable Energy		Medium		
		Building Integrated PV				
Market Transformation	30B	Soft Landings		Medium		
		Supplementary or Tenancy Fitout Systems Review				
	30C	Ultra Low VOC Paints		Low	1	
Improving on Green		No New Car Parks on Site				
Star Benchmarks		Comparative Life Cycle Assessment				
		Product Transparency and Sustainability				
		Stormwater Pollution Targets		High	1	
		Community Benefits	10			
		Culture, Heritage and Identity		Medium		
		Financial Transparency		Low	1	





4 Star: 45 to 59 Points, 5 Star: 60 to 74 Points, 6 Star: 75+ Points

					Green Star Design and As-Built v1.3	
Credit Title	Credit Code	Criteria Title	Points Available	Risk	Targeted Points	Potential Points
		High Performance Site Offices		Medium		1
Innovation Challenge	30D	Marketing Excellence				
		Occupant Engagement				
		Pathways to Carbon Positive - Responsible Carbon Impact				
		Reconciliation Action Plan		High	1	
		Social Return on Investment				
Global Sustainability	30E	International green ratings				1
		Category Total	10		4	2

Points Available	Targeted Points	Potential Points
14	11	3
16	10	3
22	4	2
10	5	0
12	3	1
14	5	4
6	1	0
5	3	2
99	42.4	57.4
100	42.8	58.0
10	4	2
110	46.8	64.0
	4 Stars	

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MELBOURNE

L2/616 St Kilda Rd Melbourne, VIC 3004 P (03) 9230 5600

SYDNEY

_5/73 Miller St North Sydney, NSW 2060 P: (02) 9157 0570

BRISBANE

L9/490 Upper Edward St Spring Hill, QLD 4000 P (07) 3831 3300

PERTH

L15/123 St Georges Terrace Perth, WA 6000 P: (08) 9242 5857

CANBERRA

_2/1 Farrell Place Canberra, ACT 2601 P: (02) 9157 0570

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