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HEALTH INFRASTRUCTURE

PROPOSED ST GEORGE HOSPITAL STAGE 3 REDEVELOPMENT

ECOLOGICALLY SUSTAINABLE DESIGN

SCHEMATIC DESIGN

AUGUST 2022

WSP



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Proposed St George Hospital Stage 3 Redevelopment Ecologically Sustainable Design Schematic Design Report

Health Infrastructure

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EXECUTIVE SUMMARY

The proposed St George Hospital Stage 3 Redevelopment includes the construction of a new hospital for Health Infrastructure located 16 Kensington Street, Kogarah, NSW.

This document has been prepared as part of the Environmental Impact Statement for the purposes of the State Significant Development Application (SSDA).

This Ecologically Sustainable Development (ESD) Schematic Design Report details the initiatives that the proposed development will be implementing to deliver a highly sustainable development and in response to the objectives of the Secretary's Environmental Assessment Requirements (SEARS), Georges River Development Control Plan (DCP) 2021 and other policies influencing the development in the suburb of Kogarah.

The project team have worked to identify the potential for the development to reduce its energy and water consumption through onsite strategies. The development will also include other measures to ensure a holistic sustainable strategy for the development, such as:

- Implement energy efficiency measures to reduce greenhouse gas emissions;
- Highly efficient water fittings and fixtures to maximise reductions in water consumption, and supplemented with rainwater harvesting;
- Procurement of materials that have low environmental impacts and/or reuse of existing site materials to reduce demolition waste;
- Optimisation of Indoor Environment Quality (IEQ) as appropriate to the function of the development;
- Enhanced site ecology through high quality landscape design;
- Encourage the use of public transport and active modes of transport; and,
- Design that mitigates or adapts to climate change impacts.

Risks in delivering the sustainable initiatives have also been identified including potential impact of on the design intent and cost implication. Mitigation measures to manage these risks mainly comprise of analysing the appropriateness of these initiatives to the project in more detail, coordination with the project team and specification of these initiatives to ensure they are captured during construction.

As the Project progresses, the way that the targets are met may alter slightly to provide the best possible design outcomes for the development. At this early stage, however, the project team are satisfied that the ESD initiatives, which are beyond current best practice, are achievable within the scheme.



1 INTRODUCTION

WSP has been commissioned by Health Infrastructure (the Applicant) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the SSDA for the design, construction and operation of an Integrated Ambulatory Care Building at 16 Kensington Street, Kogarah (the Site).

St George Hospital is currently undergoing Stage 3 of a proposed five stage redevelopment. The Stage 3 Works will deliver integrated ambulatory care and sub-acute service in a combination of build and active reuse.

Specifically, this report addresses the following SEARs:

Table 1.1 SEARS Requirements

ITEM	SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	REFERENCE IN THIS ESD REPORT
9.1	Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.	Section 3
9.2	Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	Section 3.1 to 3.8
9.3	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 3.1 to 3.3

1.1 PROJECT DESCRIPTION

The St George Hospital site is located at 16 Kensington Street, Kogarah and comprises the lots outlined in the table below. It has an area of approximately 5.16Ha and currently accommodates the existing St George Hospital.

This report accompanies a State Significant Development Application that seeks approval for the construction and operation of a new Integrated Ambulatory Care Building which contains 24,000m² gross floor area over 8 storeys with additional three basement level car parks. For a detailed project description refer to the Environmental Impact Statement prepared by Ethos Urban.

The project will provide:

- Outpatient, ambulatory and integrated care services.
- Pathology specimen collection.
- Outpatient Pharmacy
- Enhanced Medical Imaging
- New day rehabilitation unit.
- Rehabilitation inpatient beds
- Acquired Brain Injury unit

- Sub-acute aged care unit.
- Behavioural management unit.
- Palliative Care beds
- Additional onsite parking
- New public forecourt

Table 1.2 Project Site, Lots and Addresses

LOT, DP	STREET ADDRESS
Lot 12, DP 800476	16 Kensington Street, Kogarah
Lot 1, DP 791072	28A Gray Street, Kogarah
Lot 1-3, 8-9 Section C, DP 976627	28-30 Gray Street, Kogarah
Lot 4, DP 9719731	34 Gray Street, Kogarah
Lot 1-2, DP 973811	36-40 Gray Street, Kogarah
Lot 1, DP 971532	36-40 Gray Street, Kogarah
Lot 7, DP 1105995	3 Short Street, Kogarah
Lot 1, Section F, DP 976627	16 Kensington Street, Kogarah
Lot 1-8, DP 1130879	18 Kensington Street, Kogarah

The key elements within and surrounding the Site include:

- The Site is located within the existing St George Hospital campus within Kogarah and currently accommodates the Skills Centre, Radiology 2, Prince William Wing and the at-grade Northern carpark;
- The site is located within the Kogarah town centre and is adjacent to the heritage listed Kogarah Fire Station, several schools and surrounding private ancillary health facilities
- Existing vehicular access to the Site comes off the main roads of Kensington Street and Gray Street;
- Is located within 400m of Kogarah Railway Station, which is spotlighted as a future Metro Station by TfNSW for 2056 connecting Kogarah to Randwick; and
- The Site is well positioned in terms of access to arterial and main roads, public transport modes of bus and rail, Sydney Airport and the retail centre of Hurstville.



Figure 1.1 Aerial view of the site (Source: Ethos Urban)



Figure 1.2 The Existing Site: Stage 3 Works with Adaptive Re-use in Orange and Demolition in Red (Source: Jacobs)

1.2 PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT

For the purposes of this report, we have used the definition of sustainability as defined in Clause 193 of the *Environmental Planning and Assessment Regulation (1979)*, which defines ecologically sustainable development as follows:

- (1) The principles of ecologically sustainable development are the following—
 - (a) the precautionary principle,
 - (b) inter-generational equity,
 - (c) conservation of biological diversity and ecological integrity,
 - (d) improved valuation, pricing and incentive mechanisms.
- (2) The precautionary principle is 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.
- (3) In applying the precautionary principle, public and private decisions should be guided by—
 - (a) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
 - (b) an assessment of the risk-weighted consequences of various options.
- (4) The principle of inter-generational equity is that the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.
- (5) The principle of the conservation of biological diversity and ecological integrity is that the conservation of biological diversity and ecological integrity should be a fundamental consideration.
- (6) The principle of improved valuation, pricing and incentive mechanisms is that environmental factors should be included in the valuation of assets and services, such as—
 - (a) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement, and
 - (b) the users of goods and services should pay prices based on the full life cycle of the costs of providing the goods and services, including the use of natural resources and assets and the ultimate disposal of waste, and
 - (c) established environmental goals 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.

Each of the items described in Section 3 have been applied to maximise the potential of St George Hospital to align with the principles defined above.

1.3 LIMITATIONS

The analysis is based on the best available information at the time of assessment.

Actual performance of the building and its system will depend on its final design, implementation, and operation.

2 ESD POLICY AND DRIVERS

Several sustainability frameworks exist at a global, federal, state and local level that have been used to provide the context for goals, objectives and targets for the ESD approach for the project.

2.1 GLOBAL

2.1.1 UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

The United Nations prioritises 17 Sustainable Development Goals (SDGs) as part of a Sustainable Development Agenda with the purpose of transforming our world by ending poverty, protecting the planet, and ensuring prosperity for all. Each goal has specific targets to be achieved by 2030 with six of these seventeen goals advocating for climate change and resource demand reduction initiatives. To achieve these goals, change is sought from governments, the private sector and civil society. The SDGs relevant to the proposed development include:

- Goal 3: Good health and well-being

The project is part of a five-stage redevelopment plan to offer future focused facilities to support best practice models of care. The redevelopment will improve clinical integration and care coordination to help patients achieve better health outcomes to meet the health needs of the community now, and into the future.

- Goal 7: Affordable and clean energy

The project is implementing strategies to optimise its energy efficiency and reduce its greenhouse gas emissions through high performance façade, highly efficient services, and on-site renewable energy source. Refer to Section 3.1.

- Goal 11: Sustainable cities and communities

The project is promoting sustainable strategies in its design, construction and operation as outlined in Section 3. The development is situated in a previously developed land and aims to improve its ecological value by promoting native landscaping. It also has convenient access to amenities and alternative form of transport.

- Goal 12: Responsible consumption and production

The project is implementing strategies to optimise its energy and water efficiency as per Sections 3.1 and 3.2. It also aims to re-use products and materials from the existing site where possible as well as procure products and materials with recycled content and/or sustainably certified as identified in Section 3.3.

- Goal 13: Climate action

The project is implementing strategies to optimise its energy efficiency and reduce its greenhouse gas emissions as outlined in Section 3.1. Further design adaptations are also currently considered in Section 3.7 and will be developed further at the detailed design stage.

2.1.2 THE PARIS AGREEMENT

The Paris Agreement is an international agreement with a central aim to:

“Strengthen the global response to the threat of climate change by keeping global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue other efforts to limit the temperature increase even further to 1.5 degrees Celsius.” (United Nations, 2017)”

The Paris Agreement came into force on 9th November 2016.

2.2 FEDERAL

Australia became a signatory to the Paris Agreement on 22 April 2016. Ratification occurred thirty days after the date that parties making up an estimated 55% of the total global Greenhouse Gas (GHG) emissions chose to become signatories.

Under the Paris Agreement, Australia has committed to reducing emissions by 26-28% on 2005 levels by 2030. The Australian government aims to meet these commitments by ‘Direct Action Policies’ created with the objective of reducing emissions, increasing energy productivity and improving environmental health. These reduction targets have set the benchmark in which each state has developed their own climate positive strategies with an emphasis on either meeting or exceeding this target.

In response to this, the project is implementing strategies to optimise its energy efficiency and reduce its greenhouse gas emissions through high performance façade, highly efficient services and on-site renewable energy source.

2.2.1 NATIONAL CONSTRUCTION CODE 2019 SECTION J COMPLIANCE

To achieve the targets set out by the Paris Agreement in 2016, Section J Energy Efficiency of the NCC has recently been revised and officially released in May 2019 to improve the energy efficiency of new development. A package of measures for Volume One focusses on delivering ~ 35% reduction in energy consumption across commercial buildings. The focus shifts from energy-based metrics to a GHG emissions metric to provide a more holistic view of a building’s environmental impact.

The 2019 updates to Section J also include Green Star and NABERS pathway options for demonstrating NCC compliance, to reflect the broad use of these rating tools and reduce the level of duplication of similar assessment processes across the industry. Section J Energy Efficiency is relevant to the Project and sets mandatory requirements for:

- The design of the building envelope and services, and provision of equipment and appliances to minimise energy use and GHG emissions;
- The design of the building envelope to maximise thermal comfort performance; and
- The provision of adequate facilities for energy monitoring.

2.3 STATE

At a state level, the policy framework for considering sustainability outcomes for the proposed development includes the following:

- NSW Climate Change Policy Framework, which seeks to achieve net zero emissions by 2050 and for NSW to be more resilient to a changing climate;
- Smart Cities Plan call for us to become smarter investors in our cities’ infrastructure through the coordination and driving of smarter city policy and smart technology to improve the sustainability of our cities and to drive innovation; and
- Future Transport strategy which sets the framework to working towards environmental sustainability, securing energy reliability and affordability, and managing a resilient transport system.

2.4 LOCAL

2.4.1 GEORGES RIVER DCP 2021

The Georges River DCP 2021 provides a guidance framework for the application of ESD principles in the design, construction and operation of buildings within the Georges River LGA. The applicable sections of the DCP for the St George Hospital Stage 3 Redevelopment are Part 3 – General Planning Considerations and Part 8 – Strategic Centres. These sections detail the specific areas that must be addressed by proposed hospital development to encourage a high standard of environmental design. Implementing these principles means that the development will be designed and constructed to comply with the following objectives:

- Ensure development incorporates environmentally sustainable design and construction – refer to Section 3 for project response;
- Reduce the impacts of development on the environment;
- Reduce the cause and impacts of the urban heat island effect – refer to Section 3.5 for project response;
- Increase the resilience of development to the effects of climate change – refer to Section 3.8 for project response;
- Ensure that greenhouse gas emissions will be reduced – refer to Section 3.1 for project response;
- Reduce the use of potable water – refer to Section 3.2 for project response;
- Ensure that development can adapt to climate change; refer to Section 3.7 for project response;
- Reduce the environmental impact from building materials through reduction, re-use and recycling of materials, resources and building components – refer to Section 3.3 for project response.

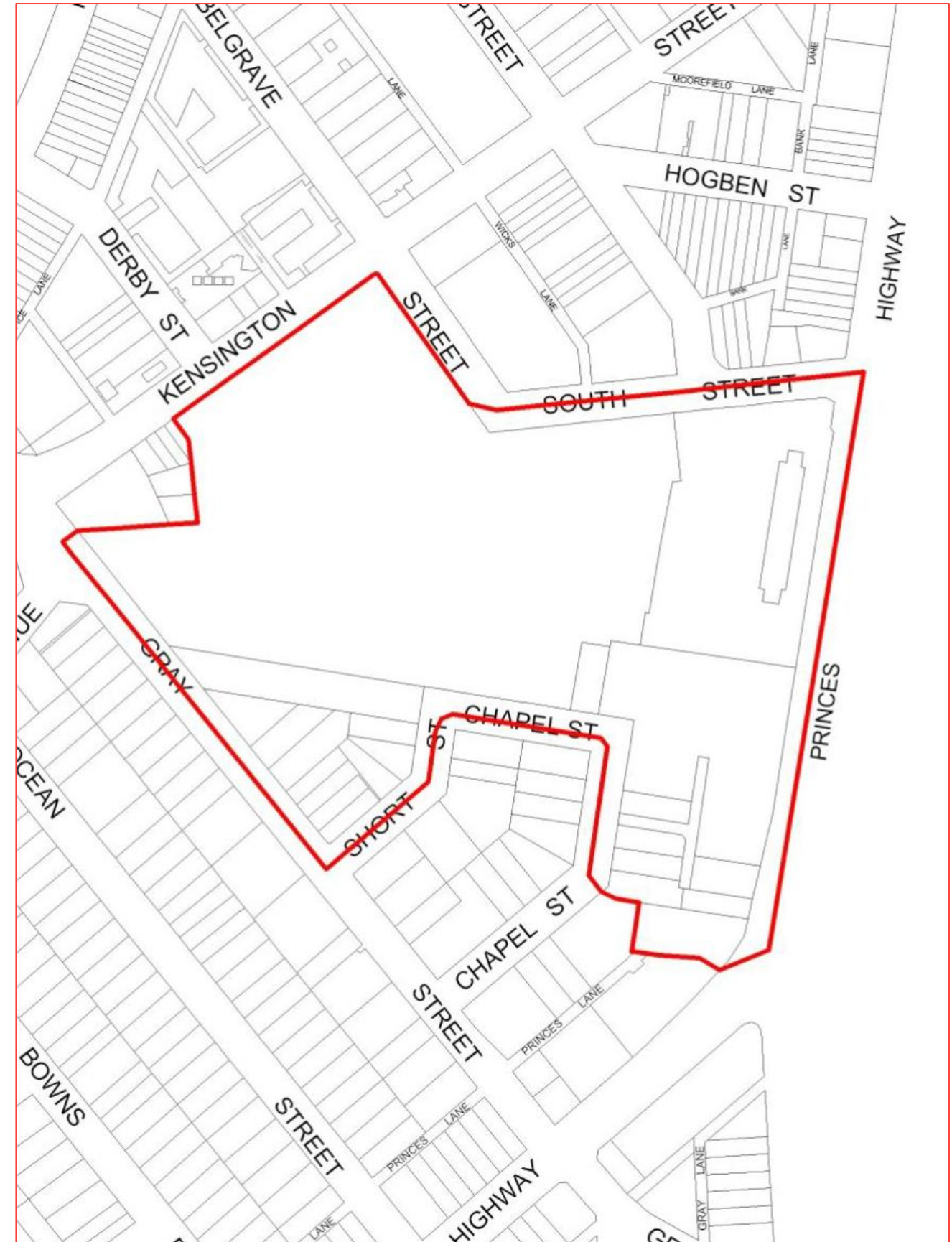


Figure 2.1 The Hospital Precinct (Source: Georges River DCP 2021, Part 8 – Strategic Centres)

3 ESD STRATEGY

The following section sets out the sustainability strategy for meeting the relevant requirement as outlined in the SEARS and Section 2. The strategies address the project’s aim to demonstrate high standard of environmental design and efficient operation as well as consideration on reducing environmental impact during construction.

3.1 ENERGY AND GREENHOUSE GAS EMISSIONS

The reduction of GHG emissions in the built environment is a major focus at global, federal, state, and local levels to curb the impacts of climate change. Improving energy efficiency leads to a reduction in carbon emissions and reduces the consumption of finite resources.

The strategy for emissions reduction is to follow a “Lean, Clean, Green” approach, balancing immediate environmental and economic performance with long term deep-cut emissions potential. This approach has delivered opportunities to maximise development potential while minimising carbon footprint.

- **Lean** | Prioritising passive design, to mitigate the demand for resources through design of natural ventilation
- **Clean** | Selection of efficient equipment to deliver further improvements
- **Green** | Selection of green technology to reduce remaining carbon emissions

The following initiatives are proposed to ensure the Project reduces its carbon emissions as far as possible with on-site measures:

- Fully electric building to ensure that emissions from the building will reduce as the electricity grid decarbonises
- For the conditioned areas, high performance façade: optimisation of window to wall ratio on NCC2019 compliance
- Optimised shading, suited to orientation, to allow natural daylight in the space while blocking increased solar loads
- Mixed mode natural ventilation in foyer, waiting rooms and cafes
- High efficiency heating, ventilation and air-conditioning (HVAC) systems
- High efficiency LED lighting (particularly relevant to the warehouse as lighting will be the main energy consumer)
- Roof mounted PV systems to offset grid energy and minimise peak energy demands
- Refrigerant with low global warming potential

Future considerations will include:

- Implement sustainable strategies during construction, including procurement of green power electricity, and construction and demolition waste recycling and recovery separation to minimise construction waste to landfill.
- Incorporation of commissioning, maintenance and building tuning into the project programme
- Incorporation of ongoing monitoring trends from energy metering.

3.1.1 ENERGY METERING AND MONITORING

Electrical sub metering is to be provided for significant end uses. Metering of energy consumption can assist considerably in ensuring that energy used in operation is measured and monitored so that it can be reduced. The meters should be connected to a central BMS or similar logging system, which will record the energy use and be

capable of producing reports (hourly, daily, monthly and annual) to enable the effective monitoring of energy consumption.

3.2 WATER CONSUMPTION

Water scarcity is a major concern for Australia’s growing population due to changing weather patterns that are occurring because of climate change. The water strategy for the building will be to first reduce consumption through maximised efficiency. The next step will be to include metering and monitoring to identify any leaks or unusual uses. The final step in the water strategy will be to supply non-potable uses with water from alternative sources such as rainwater.

To achieve water efficiency there will be a heavy emphasis on the efficiency of the water fixtures and fittings. Recommended WELs ratings are provided in Table 3.1.

Table 3.1 Recommended water fixture and fittings efficiencies

FIXTURE	WELS RATING AND FLOW/FLUSH RATE
Toilets	5 Star – 3L dual flush
Urinals	6 Star – 1 L/flush
Kitchen and bathroom taps	6 Star – 4.5L/min
Showers	3 Star – no more than 6L/min
Dishwashers	6 Star
Clothes Washing Machines	5 Star

- Commit to the installation of a rainwater tank, from which rainwater can be feasibly collected and plumbed to appropriate end uses such as toilets and urinal flushing, landscape irrigation and washdown. The development has a very large roof area with good potential to collect rainwater and simultaneously reduce stormwater flows requiring treatment. The strategy for rainwater reuse can be addressed through detailed design, however space for the tank will need to be allowed for and dual reticulation piping throughout the building should be included for applicable uses. The optimal tank size taking into consideration roof area, available rainfall and climate change scenarios will be determined in detailed design.

3.2.1 WATER METERING AND MONITORING

- Meters will be installed for all major water uses in the building, such as irrigation systems, toilets, and other major uses.
- Water meters should be connected to a central BMS, which will record the water use and will produce reports (hourly, daily, monthly and annual) to enable the effective monitoring of water consumption.

3.3 MATERIAL SELECTION

The targeted selection of materials with low environmental impacts can greatly contribute to sustainable outcomes and can also reduce total embodied carbon and improve indoor air quality for occupants.

The following initiatives are proposed for the Project.

- Use of concrete with reduced Portland cement content

- Use building materials, fittings and finishes that: have been recycled; are made from or incorporate recycled materials; and have been certified as sustainable or 'environmentally friendly' by a recognised third-party certification scheme
- Certified timber products

3.4 HEALTH AND WELLBEING

Occupant comfort and health is a growing focal point of ESD policies both locally and internationally. ESD initiatives that support the improvement of Indoor Environment Quality (IEQ) are often complementary to ESD initiatives in other areas including energy, water, and materials.

The following initiatives are proposed:

- Localised lighting control
- Flicker free lighting that accurately addresses the perception of colour
- Circadian lighting will be investigated further to provide users with appropriate light exposure to enhance circadian rhythms.
- Optimized building layout to ensure greater access to daylight and high-quality external views– the upper levels of the hospital have expansive views to the city and Botany Bay
- Glare reduction from the installation of blinds or shading devices that can be controlled by the occupant
- Provide high rates of outdoor air to reduce the level of indoor pollutants
- Consider the use of natural or mixed mode natural ventilation where appropriate
- Use paints, sealants, and floor coverings with ultra-low levels of volatile organic compounds (VOC) and wood products with low formaldehyde
- High indoor air quality (50% increase in outside air)
- High level of thermal comfort
- Investigate the use of mattresses with low levels of total VOC and with low formaldehyde.
- An active circulation network that promotes regular movement and stair use through aesthetic design, signage and visibility of staircases

3.5 GREEN SPACES

Appropriate landscaping can improve urban ecology and enhance the users experience of a space. It has been evidenced to support better health and wellbeing outcomes for occupants and visitors.

The following landscape design elements are proposed:

- Use of native vegetation as opposed to exotic species in terraces and other applicable areas, which encourage native wildlife and have lower water requirements
- The implementation of vegetation to reduce the causes and impacts of the urban heat island effect, including efforts to retain tree canopy where possible and landscaped roof area for the office
- Green roofs to provide quality views and accessible outdoor space (green space included in the podium)

3.6 TRANSPORT

Reducing individual car use and promoting alternative means of transport leads to minimising GHG emissions, reducing traffic congestion, improving air quality and encouraging active transport as a means of mobility. The location of the development is suitable for alternative forms of transport due to its proximity to a range of public transport services such as bus routes and rail.

The following initiatives will be investigated in more detail as the design develops for potential to support increased use of public transport and active modes of transport:

- The building benefits from its proximity to Kogarah (400m away) and Carlton train station and bus routes;
- The building is conveniently located to various amenities, reducing the number of incidental vehicle trips required;
- A travel plan will be developed identifying likely quantities of mode share now and, in the future
- The building will include electric vehicle charging stations
- The building will provide active transport facilities such as bicycle storage, showers and lockers.

3.7 CLIMATE CHANGE

The impacts of climate change are starting to be seen and would become more extreme throughout the life of the development. Design adaptations are to be embedded to improve the resilience of the development to climate change including initiatives such as:

- Low carbon building design, including future proofing strategies for replacement of plant and equipment with technologies that may become more efficient in future
- Building design that is resilient to future changes in temperatures
- Reducing the urban heat island effect of the building
- Reduced use of resources and materials in the design of the building
- Reduced consumption of potable water
- Diversion of operational waste from landfill to more productive uses and reuse, maximising resource recovery and reducing landfill-associated greenhouse gas emissions.

3.8 DGN058 GUIDELINE

Design Guidance Note No. 58 is based on the approach used by the Green Building Council of Australia (GBCA) and its purpose is to provide instructions on how ESD is to be addressed on all HI Projects. DGN 58 process does not deliver a certificated Green Star Rating, it rather uses an Evaluation Tool where a minimum number of points need to be achieved. In addition, a minimum of 10% improvement in energy efficiency compared to a baseline of NCC Section J compliance is to be achieved.

The design of St George Hospital is required to achieve a minimum of 60 points (equivalent Green Star rating of 5 stars) when assessed against the HI ESD Criteria as detailed in DGN 58. A Pathway has been developed in the Evaluation Tool to identify which points will be targeted to meet this requirement. This Pathway is provided in Appendix A.

4 CONCLUSION

This ESD Report has set out how the proposed St George Hospital Stage 3 Redevelopment at 16 Kensington Street, Kogarah has considered sustainable design strategies from the outset of the project.

This has been achieved through the holistic approach to sustainable design detailed in this report, with a strong focus on energy efficiency, low carbon design strategies and reduced water consumption.

The proposed design targets have high ESD standards in accordance with SEARS, Georges River DCP 2021 and other policies influencing the development in the suburb of Kogarah.

APPENDIX A

DGN 58 PATHWAY