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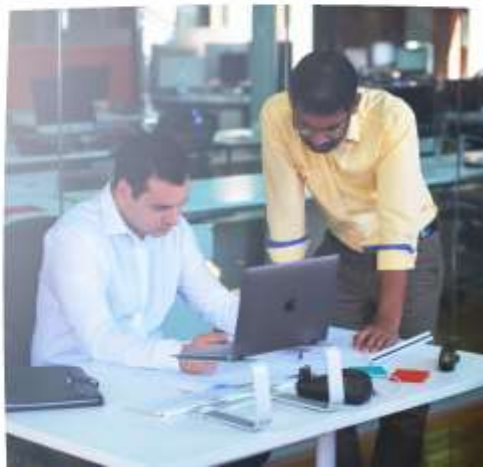
# SCEGGS Darlinghurst
# Wilkinson House

## ESD Report
## Wilkinson House



| Rev | Date | Description of Revision | Prepared By | Reviewed By |
|---|---|---|---|---|
| 0 | 19/10/18 | For Review | SM | EE |
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# 1.introduction

## 1.1 general

This ESD Report has been prepared for Tanner Kibble Denton Architects for the proposed Wilkinson House redevelopment at SCEGGS Darlinghurst at Forbes Street, Darlinghurst, NSW 2010.

This report details how ESD principles as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 will be incorporated in the design and ongoing phases of the development.

This report includes:

- Demonstration of assessment against a suitably accredited rating scheme to meet industry best practice.
- Initiatives that would minimise the consumption of resources, water and energy.

This report will address the Ecologically Sustainable Development and efficiency aspects in response to the Environmental Planning Policies for this project. It will use best practice design principles, incorporating elements from external sustainability tools to outline a set of metrics for the project.

## 1.2 project description

The site is located within the bustling central-Sydney suburb of Darlinghurst, within the East Sydney and Darlinghurst Conservation Area (CA18) in the South of Sydney LEP. The proposed Wilkinson House redevelopment is to be carried out as the first stage of work in SCEGGS' updated Masterplan 2040 framework wherein the school intends to upgrade its existing facilities as well as integrate new facilities over the next 20 years.

The redevelopment of Wilkinson House is a key component of the Masterplan in which the school has identified the following requirements:

- Large flexible learning spaces associated with the Joan Freeman Science and Technology Centre;
- Large flat flexible multi-purpose space which is suitable for meetings, music and drama rehearsals, examinations, etc.;
- Larger flexible learning space connected to the Centenary Sports Hall, to accommodate sporting activities and school functions.

The redevelopment of Wilkinson House as part of the Masterplan will enable the school to continue to provide the high standard of education which is synonymous with the SCEGGS name.

## 1.3 sources of information

This report is based upon the following information:

- Architectural plans (where available);
- SCEGGS Darlinghurst Masterplan 2040 Architectural Design Report prepared by TKD Architects;
- Wilkinson House Options Study prepared by TKD Architects;
- Green Star Design and As Built Guide https://new.gbca.org.au/green-star/rating-system/design-and-built/

# 2. environmental planning & assessment regulation 2000

The following section details how ESD principles as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 will be incorporated in the design and ongoing phases of the development.

clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 states:

*a) 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.*

*b) **"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.*

*c) **"conservation of biological diversity and ecological integrity"**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.*

*d) **"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.*

## 2.1 precautionary principle

There are no significant perceived threats of serious or irreversible environmental damage as a result of the replacement of Wilkinson House with a new building and as a result of its proposed use and activities of its future occupants.

The proposed redevelopment has predominantly the same uses as the current building, hence no serious or irreversible environmental damage is expected due to the operation of the building.

## 2.2 inter-generational equity

The proposed development has adopted the following passive design principles in an effort to maintain optimal occupant comfort and safety which in turn enacts and conserves inter-generational equity:

- Design of facades that respond to the local climate including sun, wind and aspect;
- Use of natural ventilation and mixed-mode air conditioning, providing high levels of fresh air with reduced energy consumption;

- High levels of natural daylight through windows and skylights;
- High levels of thermal insulation;
- Sunshades (both horizontal and vertical);
- Robust and durable external building materials;
- Usage of low VOC paints, sealants, adhesives, floor coverings and composite timbers used internally;
- Acoustic separation between different spaces.

The project has also proposed that energy modelling be undertaken, to demonstrate a reduction in energy consumption of the proposed Wilkinson House building compared to a reference building.

## 2.3 conservation of biological diversity and ecological integrity

The redevelopment of Wilkinson House will have limited, if any impact on the current level of biological diversity and ecological integrity due to the inherent developed nature of the current site. The proposed works will have minimal impact on existing vegetation and biological communities on the site.

# 3.rating scheme equivalence – Green Star

The project team has agreed on a bespoke environmental framework for the assessment of the proposed development's sustainability attributes. Green Star has been determined as the rating system for the proposed development to be assessed against for the purposes of demonstrating best practice on the project. Green Star evaluates the environmental initiatives of design, projects and/or buildings based on a number of criteria, including energy and water efficiency, indoor environmental quality and resource conservations.

The informal self-assessment of the proposed development intends to achieve at least a 4 Star Best Practice rating. Whilst prescriptive, it is not formally certified by the Green Building Council of Australia, which is the enacting body of Green Star.

For the purposes of this report, *Green Star – Design & As Built* is used as the rating tool to rate the design and construction of the proposed Wilkinson House redevelopment.

## 3.1 green star categories

Green Star – Design & As Built assess the sustainability attributes of a building through the following nine categories:

- Management;
- Indoor Environmental Quality;
- Energy;
- Transport;
- Water;
- Materials;
- Land Use and Ecology;
- Emissions; and
- Innovation

Each category groups a number of issues related to certain sustainability impacts, known as Credits. A Credit addresses an initiative that improves or has the potential to improve the project's sustainability performance. Points are awarded in each credit for actions that demonstrate the project has met the overall objectives or Green Star and the specific aims of the rating tool.

### 3.1.1 management

The management category aims to encourage and reward the adoption of practices and processes that support best practice sustainability outcomes throughout the different phases of a project's design, construction and ongoing operation.

The Project will include the following initiatives:

- The School will determine and establish environmental performance targets for its consumption of energy and water.
- Consistent review of design during Tender documentation and documentation for construction, for ease of maintenance for all building services and building fabric.

### 3.1.2 indoor environmental quality

The Indoor Environment Quality category aims to encourage and reward initiatives that enhance the comfort and well-being of occupants. The credits within this category address issues such as air quality, thermal comfort and acoustic comfort.

The Project will include the following initiatives:

- All habitable rooms including teaching and learning spaces will be provided with fresh air provisions in accordance with AS 1668.2-2012.
- Indoor noise levels will provide a high level of acoustic comfort, with internal noise levels being no higher than 5db(A) above the 'satisfactory' sound levels in Table 1 of AS/NZS 2107:2000;

### 3.1.3 energy

The Energy category aims to reward projects that are designed and constructed to reduce overall greenhouse emissions from operations by addressing energy demand reduction, use efficiency and generation from alternative sources.

The Project will include the following initiatives:

- Provision of motion sensors throughout to switch off the lights after period of no occupancy detection;
- Provision of sunset switches to switch off external lighting during the day.
- Lighting shall generally be low energy linear LED lighting.
- Habitable spaces will be naturally ventilated and naturally lit where possible.

### 3.1.4 transport

The Transport category aims to reward projects that facilitate a reduction on the dependency of private car use as an important means of reducing overall greenhouse gas emissions, as well as to encourage the provision of alternative forms of transportation.

The Project will include the following initiatives:

- The site is highly accessible by public transport.

### 3.1.5 water

The Water category aims to encourage and reward initiatives that reduce the consumption of potable water through measures such as the incorporation of water efficient fixtures and building systems and water re-use.

The Project will include the following initiatives:

- All bathroom fixtures (toilet pans, urinals, hand basin taps and showers) will meet minimum WELS ratings.
- Basin taps and urinals to be equal to or more than 5 Star WELS.
- Showers to be equal to or more than 3 Star WELS.
- Toilets to be equal to or more than 4 Star WELS.
- Rainwater collection and reuse.

### 3.1.6 materials

The Materials category aims to address the consumption of resources for the project, by encouraging the selection of low-impact materials.

### 3.1.7 land use and ecology

The Land Use & Ecology category aims to reduce the negative impacts on sites' ecological value as a result of urban development and reward projects that minimise harm and enhance the quality of local ecology.

The Project addresses this category through the following:

- There will be minimal negative impacts on the site's current ecological value due to retaining and reusing some of the existing buildings on site, and developing over previously developed land;

### 3.1.8 emissions

The Emissions category aims to assess the environmental impacts of 'point source' pollution generated by projects and reduce their effects on the atmosphere, watercourse and native animals.

### 3.1.9 innovation

The Innovation category aims to recognise the implementation of innovative practices, processes and strategies that promote sustainability in the built environment.

## 3.2 self-assessed Green Star Design and As Built v1.2 pathway

A 4 Star Best Practice-equivalent rating has been achieved for the Wilkinson House redevelopment, as demonstrated in the attached Design and As Built v1.2 Scorecard.

# Green Star - Design & As Built Scorecard

| | |
|---|---|
| **Project:** | Wilkinson House |
| **Targeted Rating:** | 4 Star - Best Practice |

| Core Points Available | Total Score Targeted |
|---|---|
| 100 | 46.0 |

| Total Points Awarded | Total Points TBC |
|---|---|
| 0.0 | 0.0 |

| NA | CATEGORY / CREDIT | AIM OF THE CREDIT / SELECTION | CODE | CREDIT CRITERIA | POINTS AVAILABLE | POINTS TARGETED | POINTS AWARDED | POINTS TBC | OUTCOME | ASSESSMENT COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Management** | | | | **14** | | | | | |
| | **Green Star Accredited Professional** | To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended. | 1.0 | Accredited Professional | 1 | 1 | | | | Self-assessed. No Green Star involvement. |
| | **Commissioning and Tuning** | To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential. | 2.0 | Environmental Performance Targets | - | Complies | | | | The project is targeting between 3.5 to 4 Star Equivalent rating. |
| | | | 2.1 | Services and Maintainability Review | 1 | 1 | | | | |
| | | | 2.2 | Building Commissioning | 1 | 1 | | | | Pre-commissioning and commissioning must be undertaken to AIRAH, CIBSE and/or ASHRAE standards/guidelines. |
| | | | 2.3 | Building Systems Tuning | 1 | 1 | | | | FM team to allow for quarterly reviews of the building operation throughout defects liability period. |
| | | | 2.4 | Independent Commissioning Agent | 1 | | | | | |
| | **Adaptation and Resilience** | To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters. | 3.1 | Implementation of a Climate Adaptation Plan | 2 | | | | | Not claimed. Requires specialist to be engaged to identify climate change related risks with specific design responses. |
| | **Building Information** | To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance. | 4.1 | Building Information | 1 | 1 | | | | Head Contractor to ensure that Owners Manual includes information on the types of sustainability systems adopted in the development. |
| | **Commitment to Performance** | To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way. | 5.1 | Environmental Building Performance | 1 | 1 | | | | Point claimed for School's commitment to set targets and measure results for the building's environmental performance. |
| | | | 5.2 | End of Life Waste Performance | 1 | | | | | Not claimed. Requires the School's commitment to reduce demolition waste at the end of life of an interior fitout or base building componen |
| | **Metering and Monitoring** | To recognise the implementation of effective energy and water metering and monitoring systems. | 6.0 | Metering | - | Complies | | | | Intelligent BMS to be incorporated in development to monitor energy usage |
| | | | 6.1 | Monitoring Systems | 1 | 1 | | | | |
| | **Responsible Building Practices** | To reward projects that use best practice formal environmental management procedures during construction. | 7.0 | Environmental Management Plan | - | Complies | | | | A comprehensive Energy Management Plan (EMP) must be in place for construction. |
| | | | 7.1 | Formalised Environmental Management System | 1 | 1 | | | | Head Contractor EMP to be in accordance with NSW Environmental Management Systems Guidelines. |
| | | | 7.2 | High Quality Staff Support | 1 | 1 | | | | |
| | **Operational Waste** | Prescriptive Pathway | 8A | Performance Pathway - Specialist Plan | - | | | | | |
| | | | 8B | Prescriptive Pathway - Facilities | 1 | 1 | | | | Requires on-site waste management system. |
| | **Total** | | | | **14** | **10** | **0** | **0** | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Indoor Environment Quality** | | | | **17** | | | | | |
| ☐ | **Indoor Air Quality** | To recognise projects that provide high air quality to occupants. | 9.1 | Ventilation System Attributes | 1 | 1 | | | | |
| ☐ | | | 9.2 | Provision of Outdoor Air | 2 | 1 | | | | Minimum requirements to be provided as per AS1668.2-2012. |
| ☐ | | | 9.3 | Exhaust or Elimination of Pollutants | 1 | 1 | | | | Minimum exhaust requirements to be provided as per AS1668.2-2012. |
| ☐ | **Acoustic Comfort** | To reward projects that provide appropriate and comfortable acoustic conditions for occupants. | 10.1 | Internal Noise Levels | 1 | 1 | | | | Acoustic engineer to confirm. Acoustic treatment to separate spaces is documented in Architectural package. |
| ☐ | | | 10.2 | Reverberation | 1 | 1 | | | | |
| ☐ | | | 10.3 | Acoustic Separation | 1 | 1 | | | | Documented in Architectural Design Report. Partitions between spaces should be constructed to achieve Rw determined by Acoustic engine |
| | | | 11.0 | Minimum Lighting Comfort | - | Complies | | | | Lighting shall be provided in accordance with AS 1680 for maintained lighting levels. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | **Lighting Comfort** | To encourage and recognise well-lit spaces that provide a high degree of comfort to users. | 11.1 | General Illuminance and Glare Reduction | 1 | 1 | | | |
| ☐ | | | 11.2 | Surface Illuminance | 1 | | | | Not claimed. Requires additional lighting calculations. |
| ☐ | | | 11.3 | Localised Lighting Control | 1 | 1 | | | Lighting can be controlled by occupants. |
| | **Visual Comfort** | To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants. | 12.0 | Glare Reduction | - | Complies | | | Architect to confirm glare is reduced via blinds, curtains or sunshades as documented in Architectural package. |
| ☐ | | | 12.1 | Daylight | 2 | 1 | | | Point claimed for extent of glazing to development. Requires daylight modelling to confirm 2 points. |
| ☐ | | | 12.2 | Views | 1 | 1 | | | Claimed for high quality views due to extent of glazing. |
| ☐ | **Indoor Pollutants** | To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels. | 13.1 | Paints, Adhesives, Sealants and Carpets | 1 | 1 | | | Low VOC materials to be specified. Documented in Architectural Design Report. |
| ☐ | | | 13.2 | Engineered Wood Products | 1 | 1 | | | All engineered wood products shall meet stipulated formaldehyde limits or no new engineering wood products are used in the building. |
| ☐ | **Thermal Comfort** | To encourage and recognise projects that achieve high levels of thermal comfort. | 14.1 | Thermal Comfort | 1 | | | | |
| ☐ | | | 14.2 | Advanced Thermal Comfort | 1 | | | | |
| | **Total** | | | | **17** | **12** | **0** | **0** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Energy** | | | | | **22** | | | | |
| **Greenhouse Gas Emissions** | A. Prescriptive Pathway | | 15A.0 | Conditional Requirement: Prescriptive Pathway | - | Complies | | | Requires minimum Deemed-to-Satisfy (DTS) requirements of Section J (Parts J1 building fabric and J2 glazing) to be exceeded by 5%. |
| | | | 15A.1 | Building Envelope | 1 | 1 | | | |
| | | | 15A.2 | Glazing | 1 | 1 | | | |
| | | | 15A.3 | Lighting | 1 | 1 | | | |
| | | | 15A.4 | Ventilation and Air-conditioning | 1 | 1 | | | |
| | | | 15A.5 | Domestic Hot Water Systems | 1 | 1 | | | |
| | | | 15A.6 | Accredited GreenPower | 5 | | | | |
| | | | 15B.0 | Conditional Requirement: NatHERS Pathway | - | | | | |
| | | | 15B.1 | NatHERS Pathway | - | | | | |
| | | | 15C.0 | Conditional Requirement: BASIX Pathway | - | | | | |
| | | | 15C.1 | BASIX Pathway | - | | | | |
| | | | 15D.0 | Conditional Requirement: NABERS Pathway | - | | | | |
| | | | 15D.1 | NABERS Energy Commitment Agreement Pathway | - | | | | |
| | | | 15E.0 | Conditional Requirement: Reference Building Pathway | - | | | | |
| | | | 15E.1 | Comparison to a Reference Building Pathway | - | | | | |
| **Peak Electricity Demand Reduction** | Prescriptive Pathway | | 16A | Prescriptive Pathway - On-site Energy Generation | 1 | | | | |
| | | | 16B | Performance Pathway - Reference Building | - | | | | |
| **Total** | | | | | **11** | **5** | **0** | **0** | |

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|---|---|---|---|---|---|---|---|---|---|
| **Transport** | | | | | **10** | | | | |

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|---|---|---|---|---|---|---|---|---|
| | **Sustainable Transport** | Prescriptive Pathway | 17A.1 | Performance Pathway | 0 | | | |
| | | | 17B.1 | Access by Public Transport | 3 | 3 | | Claimed based on accessibility of the site by public transport. |
| | | | 17B.2 | Reduced Car Parking Provision | 1 | 1 | | Claimed based on minimal on-site car parking. |
| | | | 17B.3 | Low Emission Vehicle Infrastructure | 1 | | | Not claimed due to requirement of provisions of electric vehicle charging infrastructure and.or dedicated car share spaces. |
| | | | 17B.4 | Active Transport Facilities | 1 | 1 | | Requires bicycle parking, access to showers and lockers on site for occupants. |
| | | | 17B.5 | Walkable Neighbourhoods | 1 | 1 | | |
| | **Total** | | | | **7** | **6** | **0** | **0** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Water** | | | | **12** | | | |
| | **Potable Water** | Prescriptive Pathway | 18A.1 | Potable Water - Performance Pathway | 0 | | | |
| | | | 18B.1 | Sanitary Fixture Efficiency | 1 | 1 | | |
| | | | 18B.2 | Rainwater Reuse | 1 | 1 | | Civil to confirm. Rainwater tank is intalled to collect and reuse rainwater. |
| | | | 18B.3 | Heat Rejection | 2 | 2 | | Based on Mechanical system where no water cooled systems are used. |
| | | | 18B.4 | Landscape Irrigation | 1 | | | |
| | | | 18B.5 | Fire System Test Water | 1 | | | |
| | **Total** | | | | **6** | **4** | **0** | **0** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Materials** | | | | **14** | | | |
| | **Life Cycle Impacts** | Performance Pathway - Life Cycle Assessment | 19A.1 | Comparative Life Cycle Assessment | 6 | 3 | | At least 3 points will be achieved for an energy efficient building design. |
| | | | 19A.2 | Additional Life Cycle Impact Reporting | 4 | 2 | | Generally included on a standard project with an LCA. |
| | | | 19B.1 | Concrete | 0 | | | |
| | | | 19B.2 | Steel | 0 | | | |
| | | | 19B.3 | Building Reuse | 0 | | | |
| | | | 19B.4 | Structural Timber | 4 | | | |
| | **Responsible Building Materials** | To reward projects that include materials that are responsibly sourced or have a sustainable supply chain. | 20.1 | Structural and Reinforcing Steel | 1 | | | |
| | | | 20.2 | Timber Products | 1 | | | |
| | | | 20.3 | Permanent Formwork, Pipes, Flooring, Blinds and Cables | 1 | | | |
| | **Sustainable Products** | To encourage sustainability and transparency in product specification. | 21.1 | Product Transparency and Sustainability | 3 | | | |
| | **Construction and Demolition Waste** | Percentage Benchmark | 22A | Fixed Benchmark | - | | | |
| | | | 22B | Percentage Benchmark | 1 | 1 | | Requires reducing construction waste going to landfill by reusing or recycling 90% of the waste generated during construction. |
| | **Total** | | | | **14** | **6** | **0** | **0** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Land Use & Ecology** | | | | **6** | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Ecological Value** | To reward projects that improve the ecological value of their site. | 23.0 | Endangered, Threatened or Vulnerable Species | - | | | |
| | | 23.1 | Ecological Value | 3 | | | |
| **Sustainable Sites** | To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land. | 24.0 | Conditional Requirement | - | | | |
| | | 24.1 | Reuse of Land | 1 | 1 | | Given based on the site located on previously developed land. |
| | | 24.2 | Contamination and Hazardous Materials | 1 | | | |
| **Heat Island Effect** | To encourage and recognise projects that reduce the contribution of the project site to the heat island effect. | 25.0 | Heat Island Effect Reduction | 1 | | | |
| **Total** | | | | **6** | **1** | **0** | **0** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Emissions** | | | | **5** | | | |
| **Stormwater** | To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure. | 26.1 | Stormwater Peak Discharge | 1 | | | |
| | | 26.2 | Stormwater Pollution Targets | 1 | | | |
| **Light Pollution** | To reward projects that minimise light pollution. | 27.0 | Light Pollution to Neighbouring Bodies | - | | | |
| | | 27.1 | Light Pollution to Night Sky | 1 | | | |
| **Microbial Control** | To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems. | 28.0 | Legionella Impacts from Cooling Systems | 1 | 1 | | |
| **Refrigerant Impacts** | To encourage operational practices that minimise the environmental impacts of refrigeration equipment. | 29.0 | Refrigerants Impacts | 1 | 1 | | All installations to comply with AS 1677. |
| **Total** | | | | **5** | **2** | **0** | **0** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Innovation** | | | | **10** | | | |
| **Innovative Technology or Process** | The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world. | 30A | Innovative Technology or Process | | | | |
| **Market Transformation** | The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in | 30B | Market Transformation | | | | |
| **Improving on Green Star Benchmarks** | The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points. | 30C | Improving on Green Star Benchmarks | 10 | | | |
| **Innovation Challenge** | Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools. | 30D | Innovation Challenge | | | | |
| **Global Sustainability** | Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star | 30E | Global Sustainability | | | | |
| **Total** | | | | **10** | **0** | **0** | **0** |

| **TOTALS** | **AVAILABLE** | **TARGETED** |
|---|---|---|
| **CORE POINTS** | **100** | **46.0** |
| **CATEGORY PERCENTAGE SCORE** | | **46.0** |
| **INNOVATION POINTS** | **10** | **0.0** |
| **TOTAL SCORE TARGETED** | | **46.0** |

| **AWARDED** | **TBC** |
|---|---|
| **0.0** | **0.0** |

# SCEGGS Darlinghurst Masterplan

## ESD Initiatives Report

| Rev | Date | Description of Revision | Prepared By | Reviewed By |
|---|---|---|---|---|
| 0 | 13/09/18 | For Review | EE | MR |
| 1 | 28/09/18 | Client Issue | EE | MR |
| 2 | 19/10/18 | Final Report | EE | MR |
| 3 | 23/10/18 | Final Report | EE | MR |
| 4 | 13/11/18 | Final Report | EE | MR |
| 5 | 14/01/19 | Final Report | SM | MR |

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# 1.introduction

## 1.1 general

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This report details how ESD principles as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 will be incorporated in the design and ongoing phases of the development.

This report provides a description of the ESD initiatives that are available to be implemented to minimise consumption of resources, water (including water sensitive design) and energy.

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*(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.*

## 2.1 precautionary principle

There are no significant perceived threats of serious or irreversible environmental damage as a result of the replacement of the library with the new Multipurpose building and the redevelopment of Barham building, and as a result of its proposed use and activities of its future occupants.

The proposed redevelopment have predominantly the same uses as the current buildings, hence no serious or irreversible environmental damage is expected due to the operation of the buildings.

## 2.2 inter-generational equity

The proposed development have adopted the following passive design principles in an effort to maintain optimal occupant comfort and safety which in turn enacts and conserves inter-generational equity:

- Design of facades that respond to the local climate including sun, wind and aspect;
- Use of natural ventilation and mixed-mode air conditioning, providing high levels of fresh air with reduced energy consumption;
- High levels of natural daylight through windows and skylights;
- High levels of thermal insulation;
- Sunshades (both horizontal and vertical);
- Robust and durable external building materials;
- Usage of low VOC paints, sealants, adhesives, floor coverings and composite timbers used internally;
- Acoustic separation between different spaces.

The project has also proposed that energy modelling be undertaken, to demonstrate a reduction in energy consumption of the proposed Multipurpose building compared to a reference building.

## 2.3 conservation of biological diversity and ecological integrity

The redevelopment of Barham Building and the Multipurpose Building will have limited, if any impact on the current level of biological diversity and ecological integrity due to the inherent developed nature of the current site. The proposed works will have minimal impact on existing vegetation and biological communities on the site.

## 2.4 Improved valuation, pricing and incentive mechanism

The Head Contractor shall provide a Sustainability Master Plan in which operational requirements are captured and formulated with sustainable outcomes in mind. Contractors shall be required to provide and abide by an Environmental Management Plan and Environmental Management System in accordance with NSW Environmental Management Systems Guidelines or a similar standard.

# 3. ESD initiatives

The following table of General ESD Recommendations are proposed to be implemented in the SCEGGS Darlinghurst re-development to mitigate the project's environmental impact on energy, indoor environmental quality, transport, water, materials, land use and ecology and emissions.

# SCEGGS Darlinghurst

## General ESD Recommendations

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| | **Notes: 1. Secondary costs means 'hard to quantify' payback. Maybe sold as marketing, comfort issues or point of difference advantage and not a direct primary cost saving. 2. Costs ratings are subjective and are subject to detail design outcomes. 3. Priority ratings are also subjective and are based on a range of factors that the consultant believes are important. Design development and resultant costings still need to be undertaken 4. This is a living document and is not exhaustive. Further development will add to /change the recommendations. 5. Some initiatives that are not applicable to this development such as wind turbines have been left off this list. 6. This is designed to promote discussion with the project team.** | | | | | | |
| **No.** | **Initiative** | **Detail** | **Benefits** | **Costs** | **ROI** | **Priority** | **Concerns** |
| **1.00** | **Site Recommendations** | | | | | | |
| **1.01** | Maximised solar access | Buildings on site maximised for winter solar access and minimised for summer heat gain. | Reduced heating loads, improved comfort, improved views | Low | N/A; Secondary costs | High | |
| **1.02** | Appropriate landscaping | Utilise landscaping to improve solar heat gain in winter, shelter from cold winds and shade buildings and outdoor areas in summer. Also consider use of native plants specific to this area | Reduced heating and cooling loads , improved external comfort, increased residence privacy and improve connection with nature | See Landscaper | Hard to quantify | High | |
| **1.03** | Improved connection to public transport | Ensure public transport has good access for students and staff | Encourages students and staff to go out and utilise surrounding neighbourhood. Reduces demand for independent vehicle usage. Ensure good access to doctors and hospitals | Hard to value | Hard to quantify | Medium | |
| **1.04** | Utilise Landscaping design to generate power | Utilisation of new roof areas for PV panels | Maximise value of design by ensuring everything does more than one task | Can be quite cost effective if well designed | Hard to quantify | Low | |
| **2.00** | **Built Form -General** | | | | | | |
| **2.01** | Improved roof insulation over BCA | R5 roof insulation | Reduced heating or cooling loads. Improved occupant comfort. Strongly recommend some thermal modelling analysis of built form be done to understand value of R5 roof extra insulation in this climate | $8 sq. meter- subject to design | N/A; Secondary costs | Medium to High | Extra over costs -Hard to quantify exact value. In this climate the extra roof insulation may not be required |

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| **2.02** | Kingspan or similar integrated roofing system | Proprietary combined roofing and insulation product | Ease of install, superior insulation and ceiling lining all in one product | Subject to scope | N/A; Secondary costs | High | Possible extra cost Tbc |
| **2.03** | Increased wall insulation over BCA | Raise current wall insulation level from current BCA level (3.2) to R4 | Reduced internal heat loads, Improved occupant comfort, reduced heating and cooling costs. | $12 sq. meter=- subject to type | N/A; Secondary costs | High | Extra costs not yet approved |
| **2.04** | Proprietary Daylight Systems | Utilise efficient daylight systems, operable roof windows on top floor. | Significantly Reduced electrical lighting requirements and ore daylight as opposed to artificial light in space. | Subject to design but not too expensive | ROI can be around 7 years | High | Possible extra up front costs, needs some small roof design works/will require small shafts to go through ceiling. |
| **2.05** | Light coloured roofs or Colorbond Cool Max | Use a light coloured roof product. Coolmax will reduce cooling loads by around 8% | Reduced building cooling loads, increased comfort and productivity of staff | Light colour = 0 Coolmax <3%E/O | E/O cost can be recovered in under 24 months | High | Detailed building energy modelling may assist in selecting value here |
| **2.06** | Specific shading design | Ensure shading of windows and roof glass is maximised to suit summer and winter sun angles. Western and eastern facades are problematic -northern can be fixed with large overhangs. Further design work needed to finalise. | Reduced running costs for heating and cooling, reduced glare, improved resident comfort | $1-K Per large window-est. | Hard to quantify but will be required under Section J anyway | High | Requires coordination and detail examination before final decision is made. Design must be appropriate and cost must be tolerable. Current experiences of overheating in existing buildings on west façade indicates this is an important issue |
| **2.07** | Automated window systems | Automate windows at high level, where air flow control is required | Will maximise air flows in summer, ensure controlled fresh air in winter and reduce operational requirements | $700-1000 per window | Can save 10-20% of cooling energy due to maximising fresh or cool air when suitable | Medium to High | Suitable training to be provided so staff understand value and don't override system |
| **2.08** | Maximised thermal mass | Maximum thermal mass exposed wherever possible in facility | Reduced heating and cooling loads and improved comfort outcomes -Can reduce heating and cooling loads by up to 40% | Low -medium | hard to quantify- depends on final solution | High | Needs an early decision on what the thermal mass /sustainable design strategy is so as to ensure correct location and quantity, type etc. |
| **2.09** | Maximised door and windows sealing details | Ensure doors and windows are sealed to relevant CIBSE (tba) standard ensuring minimal air infiltration/leakage | Reduced heating and cooling loads, easier to manage and control | Low | hard to quantify | High | Can have an adverse impact on opening doors if not properly considered. |

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| **2.10** | Wintergarden design areas | Provide a sealable heavy mass area facing north with appropriate glazing design to capture winter sun. | Creates a warm space with a view to sit in winter and can also create a cool space to sit in summer | Medium | hard to quantify | High | Must have suitable shading design to minimise summer overheating yet maximise winter sun ingress. Must be secure and have the right amount of thermal mass. Windows must be operable and prefer automatic. |
| **3.00** | **Infrastructure** | | | | | | |
| **3.01** | Single point services connection | Ensure all services are bought into the facility at the same location. | Maximises single point metering and building services control | Low | N/A; Secondary costs | Low -Medium | Maybe restricted by authority requirements and site constraints |
| **3.02** | Intelligent Building Management System | Computerised monitoring system to connect all inputs including security, staff control, wages, foods handling etc., electrical metering and monitoring, renewables, billing etc. and provide back to base control | Maximised efficiency, reduced labour costs, improved management and cost reporting | TBC -depends on design, loads, roof space and design etc. | Can be as good as 5 years | High | Can be a complicated system, needs training and well thought through design at initial stages |
| **3.03** | Micro Turbines | Use of gas micro turbines for peak load generation | Will reduce overall energy generation costs | High | Can be around 5-7 years | Medium | Needs detailed investigation and design may be too developed or the new facility too small |
| **3.04** | Renewable energy generation | Install Photovoltaics' where possible on main roof facing north | Assists with power costs reduction, may be able to gain feed in tariff, Should be legible for some grants -Vim to advise, Promotes ESD to outsiders and inhabitants | Tbc -depends on design | can be as good as 5 years | High | Infrastructure costs, maintenance and aesthetics |
| **3.05** | Energy efficient lighting design | Lighting design to suit operations, low energy high efficacy lighting, revisit Aged Care certification requirements re Lux levels and see if it is an imperative to meet those requirements in lieu of improved resident comfort. | Significantly reduced running costs, maintenance and heat loads | Tbc -depends on design | Hard to quantify but there will savings by using energy efficient lighting design | High | Suitable lighting design for suitable lux levels is very important. Still some resistance to LED lights |
| **4.00** | **Transport** | | | | | | |
| **4.01** | Electric car charging | see above in Infrastructure | | | | | |
| **5.00** | **External Environment** | | | | | | |

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| **5.01** | Specific type of landscaping design to reduce water use | Holistic water sensitive landscape design to include drainage swales and maximum water absorption by landscape ,specific plant types | Integrated landscaping will improve external environment, reduce water usage encourage native birds and ensure staff have a nice place to relax in outdoors | Minimal | N/A; secondary costs | Medium | |
| **5.02** | Drought tolerant plants | Part of WSUD | Reduce water usage and garden maintenance | Minimal | Med | Medium | |
| **5.03** | Make hardstands permeable | Utilise permeable hardstands and permeable road drainage systems | Reduce water run off, return water to water table, maximised stormwater value to site, less drainage required | TBC | N/A; secondary costs | Medium | Possible extra over costs, hard to quantify a dollar value on ROI ,needs suitable hydrology input and design |
| **5.04** | Native and indigenous plants used on site | Consider indigenous planting found pre white man era. Talk to local plant authority, local tribe, historian | Maximised relevant to locale, increased native birds requirements, encouragement of local input and relevance | No real extra costs, good design required | N/A; non structural costs | Medium | May cost a bit more to provide a landscape design |
| **5.05** | Bicycle facilities including staff showers and lockers | Locate covered bicycle facilities and showers etc. near the office or staffing areas | Will encourage bike use and minimise car use, less carbon pollution, less car park wear and tear | $30k | N/A; secondary costs | High | Need to decide if worth the cost |
| **5.06** | Trees to shade car park | Dark hard stand car park will generate large amounts of heat. | Utilise appropriate trees and design to shade, keep cool and reduce heat flow into buildings | TBC see landscapers | N/A; secondary costs | High | Maintenance issues, damage to cars from sap droppings and damage to road surface from root systems |
| **5.07** | Use of native grass to reduce hard stand impacts | Design planting on car park to reduce heat loads | Will reduce car park over heating and create life in the car park area, reduce hardstand run off | Low | N/A; secondary costs | Low | Issues with longevity and design |
| **5.08** | Car charging points in car parks, above and below ground - see above infrastructure section | Provide in ground car charging points for future electric cars | Will encourage use of electric cars, can charge for electricity and can assist in power generation | Subject to number | N/A; secondary costs | Low | Must ensure they points are well located and are practical to encourage use |
| **5.09** | Smaller car park sizes in some sections | Provide more car spaces for smaller cars | Encourage more small car use. | TBC | N/A; secondary costs | Medium | More line marking costs |
| **5.10** | Worm Farm | Provide worm farm to minimise food waste taken off site | Significantly reduces land fill, methane production ,provides on site fertiliser for gardens etc. | Minimal | N/A; secondary costs | Medium | Some one has to regularly monitor and design correctly. |
| **5.11** | External Privacy zones | Provide peaceful calming zones with views for students and staff to use | Improves resident amenity and offers opportunity to ponder | Minimal | N/A; secondary costs | Medium | May create some conflicts with landscape design |

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| **5.12** | Child playground area | Locate a playground area in the facility | Encourage families to visit with Grandchildren. Can help reduce the lack of young children in the development thereby minimising nursing home feel. | Low | N/A; secondary costs | Medium | May encourage noise |
| **5.13** | Waste Management | On site Cardboard waste control and possible reuse. | Measurable reduction in waste costs and company contribution to waste profile | Minimal | N/A; secondary costs | Medium | Requires correct management and a suitable procurement strategy. |
| **Building Services General** | | | | | | | |
| **6.00** | **Electrical** | | | | | | |
| **6.01** | Air blade hand dryers in toilets. | Proprietary energy efficient hand dryers. Save money on paper towels. | Maximised efficiency, low maintenance, proven in high use areas | High | NA | Low | Higher upfront costs |
| **6.02** | Motion sensors for lighting control in most areas. | Ensure lights are only on when required. | Reduce energy usage and maintenance due to lower operating times | Low | < 1 year | High | Need to ensure design incorporates same and also understand operational issues and conflicts. Can create issues around mobility and safety for residents |
| **6.03** | Correct zoning of lighting | Ensure lighting design is suitable for day lighting and operational requirements. | Reduce energy usage and wastage, improved working conditions, integrated design outcome | NA | NA | High | Can affect operations if badly configured |
| **6.04** | All external lighting on timers and/or sunset switches. | Ensure an appropriate light design strategy. | Reduced electrical usage. | Low | < 1 year | High | Needs to adjusted to correct lighting levels |
| **6.05** | No lighting pointing towards the sky | Ensure all external lighting is pointing down. | Minimise light glare to sky and neighbours, maximise lighting efficiency and reduce light pollution. | Low | < 1 year | High | Recommend high cut-off angles for the luminaire |
| **6.06** | Renewable energy | Photovoltaic system with roof mounted solar panels. | Reduced energy costs. | Medium | 10 years | Medium | Up front cost, visual impact, management |
| **6.07** | LED lighting | Use of low energy and long life LED lighting. | Reduces ongoing running and maintenance costs. | Low | < 1 year | High | Must be selected at right time, no real concerns |
| **7.00** | **Hydraulics** | | | | | | |
| **7.01** | Low flush and automatic urinals | Utilise toilets with 4/6 litre split flush | Significantly reduce water use | zero | N/A | High | Need to ensure are easily operated by older people. Don't recommend the 6/3 flush. not as effective. |
| **7.02** | Low water use taps | Utilise WELS level 4 taps | Reduced water use | Low to medium | Can be short term | High | Some people feel flow is too low but most new taps are level 3 minimum -May need nursing input |

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| **7.03** | Sensor taps | Sensor taps will turn off when not in use. They monitor the user and stop- as required | Significantly lower water usage and related costs | Low to medium | Longer term | High | maintenance issues possible, functionality can be an issue |
| **7.04** | Remove hot water to taps | Remove hot water to all taps. Reduce pipework, gas/elec for hot water units | Reduced water use | Low | Can be short term and longer term | Low | No real payback, extra cost |
| **7.05** | Solar boost hot water | Use solar panels to heat the hot water | Reduce electrical/gas usage | Low | Longer term | Low | Requires management input and follow up |
| **8.00** | **Internal Environment Quality** | | | | | | |
| **8.01** | Low VOC paints | Use paints with no toxic emissions | Improved air quality and working environment | minimal -allow +5% on normal paint costs | N/A; Secondary costs | High | Some products designed for aged care may not be available in this material |
| **8.02** | Low VOC glues | Use glues with low toxic emissions | Improved air quality and working environment | Zero | N/A; Secondary costs | Medium | Need to ensure specification is clear and precise on the low VOC adhesives. |
| **8.03** | Low formaldehyde furniture | Use  furniture with low toxic emissions | Improved air quality and working environment | plus around 10% on normal furniture costs | N/A; Secondary costs | Medium | Some products designed for aged care may not be available in this material |
| **8.04** | Low toxic and recyclable carpets - consider Ontera | use floor coverings and carpets | Improved air quality and working environment, recyclable, repairable, removable | plus around 10-15% on normal carpet costs | N/A; Secondary costs | Medium to high | Some products designed for aged care may not be available in this material |
| **8.05** | All timber FSC compliant  or equivalent | Select timber that complies with sustainable requirements | Maximised sustainability outcomes, no contribution to rainforest felling etc. | plus around 10% on normal timber costs | N/A; Secondary costs | Medium | Some products designed for aged care may not be available in this material |
| **8.06** | CO2 Sensors in all A.C ducts and habitable areas | Monitor CO2 levels to ventilate rooms cost effectively | Reduced A/C running costs, improved air quality. Reduced absenteeism from flu and asthma etc. | Low | N/A; Secondary costs | Medium | Some products designed for aged care may not be available in this material |
| **8.07** | Ceiling fans -reversible | Install ceiling fans on ceiling - prefer four blade type -better efficacy | Improved comfort, reduce need for heating and cooling | Allow $300 each | N/A; Secondary costs | High | Some issues with strobing or dementia patients, don't locate below lights. Must be located correctly in smaller rooms -not above  beds. Air Pears are another option |

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| **8.08** | Natural Ventilation | Design cross flow window opening systems. Ensure air flow paths inside buildings are maximised with minimal constraints. | Improved comfort, reduced need for artificial heating and cooling | Allow +5% on fixed window costs | N/A; Secondary costs -needs modelling works to verify | High | May cause drafts, needs to be designed/ managed correctly. Prefer implemented/coordinated with window automation in common areas. |
| **8.09** | Paint colours | Select suitable paint colours for calming, happiness and healing | Will improve internal comfort and healing outcomes; improve emotional stars | Low -nil; | Low -nil; | High | Ensuring the correct colour value is achieved requires the right designer with the right skill set |
| **8.10** | Smell absorbing paints | Special paints can absorb smells | Will improve internal environment quality | Low to medium | N/A Secondary costs | Medium | Needs to be thought through although there is no real negatives apart from costs. |
| **8.11** | Automated windows | Smart auto window systems can read indoor and outdoor climate and operate windows as required to suit pre-programmed conditions. Come with their own weather station | No requirement for operational input, can be overridden, can manage a range of cooling and ventilation requirements and can also do night purging | see above | Can be high subject to design and other items | Medium | Needs to be correctly implemented in the design phase and THE smart requirements of system need to be discussed with team. Training has to be undertaken by management and staff. |
| **8.12** | Maximised daylight | Wherever possible daylight into the buildings is to be maximised | Improved comfort, occupant health and well being, reduced lighting energy costs, reduced lighting heat loads | Low | N/A; Secondary costs | High | Need to minimise overheating. May have implications on architectural intent, needs to implemented asp into the design |
| **8.13** | Window design to maximise air flow and daylight access | Design windows to maximise air flow; subject to shape and location | Window design has a major impact air flow n rooms. Improved cooling without breeze can be achieved by ensuring the windows are located in a preferred position with maximised opening options | Minimal -is an outcome of design | N/A; Secondary costs | High | Needs to be implemented into the design early and can have an impact on architectural intent. Need to consider impact of fly screens on air flows |
| **9.00** | **Mechanical** | | | | | | |
| **9.01** | Heat recovery | Air to Air heat exchanger to precondition outside air using the exhaust air | Reduced system load. Reduce plant size | TBC -Subject to design and scope. | Can be around 8-10 years | Low -Medium | The air distribution system must be designed so the placement of the heat exchanger adds as little as resistance as possible to minimise static pressure. |
| **9.02** | Electronic commutator Indoor Fans | Indoor fans to be equipped with electronic commutators (EC) fans | High Efficiency. Low temperature fans reducing heat in supply air. Superior Air dispersion control when used in conjunction with VAV | TBC | TBC | HIGH | As zones are closed off, the fan needs to slow down. Not having this feature will over supply air into other zones |

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| **9.03** | Refrigerant | Air conditioning to use R410a refrigerant or latest equivalent | Zero ozone depleting potential | N/A | TBC | HIGH | There must be a phase out plan for the refrigerant being used |
| **9.04** | Air Conditioning Energy Efficiency | Maximised efficiency in HVAC system and as minimal compliance with Section J 2013.Prefer aiming for a higher standard. | Energy Efficient Air Conditioning above the minimal national standards | N/A | TBC | HIGH | State and/or national minimal energy efficiency standards must be adapted for all equipment |
| **9.05** | Variable Speed Control condenser fans | Variable Speed Control condenser fans at times of low ambient temperatures | Energy Efficient and Low Acoustic Noise | TBC | TBC | MED | |
| **9.06** | Outdoor Air | 7.5L/s.person<br>Air Filters to be Multilayer Deep Bed air filters to minimum standard F7 | Reduced ventilation load<br>Reduced plant size | NIL | N/A | HIGH | High performance filters must be frequently changed/cleaned |
| **9.07** | CO2 monitoring | CO2 Monitors to match outside air to occupant density | Energy efficiency | TBC | TBC | MED | Sensors to be checked and calibrated at every maintenance interval |
| **9.08** | Thermal sensor control for areas of intermittent occupancy | Thermal sensor control air conditioning or heating and cooling as required subject to occupancy | Minimise energy wastage when space not occupied | TBC | TBC | HIGH | Occupant dissatisfaction primarily staff |
| **9.09** | All zones to have their own thermostats | In community centre and other commercial areas are to be individually zoned. | To prevent energy wastage by not conditioning unoccupied areas | TBC Subject to design | TBC | HIGH | Some thought has to go into the location and scope |
| **9.10** | Exhaust Fan controls | Exhaust fans to be electronically interlocked to the air conditioners and/or lighting and/or BMS | To prevent energy wastage after hours | Nil | TBC | HIGH | Needs the right control type selected |
| **9.11** | Heat reclaim (hot water) | Need to review wherever we can active heat reclaim using heat pumps or reheating of water | Free hot water | TBC subject to design | TBC | LOW | Must have back up gas/electric heating source during heat pump downtime |
| **9.12** | VRV -3 pipe type - | Specific type of A/C system. Using a high COP system can improve efficiency | Heating and cooling of different zones at same time | Med | 7-10 Years subject to design | High | Maintenance and controls costs can be higher than other options. |
| **9.13** | Gas Condensing boilers | A specific type of water boiler- very efficient | Maximise water heating value by preheating incoming water | Medium | Quite good - subject to design | High | Must be integrated into design and right type selected. Water input needs to be correctly located |
| **9.14** | One or two head split A.C units - -if only air conditioning students and staff rooms or smaller areas | Cost effective heating and cooling system located in main bedroom and/or lounge room | Cheap to purchase, can heat or cool as required | Medium | 7-10 Years subject to design | High | Expensive to run and maintain. Cheap up front but expensive over the longer term |
| **9.15** | Air Pears or similar to provide car park ventilation with no ducts -more cost effective | Air Pears are ductless ducts and for comparative low cost and low energy can help evacuate car park ventilation | Easy to install and effective | Low | 4 years | High | Needs to be designed and units may need to be daisy chained |
| **9.16** | Condensate Water | Condensate water to run off to the water harvesting tanks | Capturing water | TBC subject to design | TBC subject to design | n/a | Water treatment required. Humidity too low to obtain adequate condensation |

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| **10.00** | **Passive Option** | | | | | | |
| **10.01** | Natural Ventilation | Mixed mode design, using operable windows during shoulder seasons and Split heat pump unit during summer and winter. | Maximised internal air quality, low energy assists air con system to reduce energy use | TBC subject to design | TBC subject to design | High | Ambient noise levels, dust and other particles a concern, better if lots of thermal mass available and good air paths available for night purge and summer cooling |
| **10.02** | Night Purging in the new sections | Utilises the high diurnal range found in Darlinghurst to bring cool night air into buildings in summer | Reduced ventilation load Reduced plant size, Reduced need for air con, improved comfort and air quality | Low | Subject to design but can be good | High | Need to ensure over cooling or cold air flows won't impact on residents. Must have a good provision of thermal mass to maximise strategy |
| **10.03** | Temperature set points- 21-27 Deg C | A range of set points to be provided to include for air conditioning or natural ventilation to separate areas | Can improve comfort while also reducing energy use. Can also reduce size of air con systems if correct set points are selected | Nil | Can offer very good returns | | A subjective and personal issue. Generally though aged care people tolerate higher temperatures than colder ones. |
| **11.00** | **Management** | | | | | | |
| **11.01** | Sustainability Master Plan | Provide a precinct Sustainability Master Plan to capture all operational requirements and ensure sustainable outcomes are maximised | Ensure all operations are formulated with a sustainable outcome in mind therefore maximising ESD outcomes including efficiency | $20-30K | N/A | High | Needs to be properly thought through and have management buy in |
| **11.02** | Staff Training | Provide staff training on sustainability | Ensure staff inductions have a large section on Sustainability explaining the company's performance requirements | $5K | N/A | High | Requires staff participation and commitment |
| **11.03** | Sustainability Policy | Provide and promote a sustainability policy | Provision of a sustainability policy and promotion of same within the precinct will ensure all staff are aware of company commitment and will act in concert with company requirements | Zero | N/A | High | Requires senior management commitment and needs to implemented asap |
| **11.04** | Advertise Sustainability Policy | Locate sustainability policy n prominent locations on front entry and within the facilities | Promotion of sustainability commitment to general; public and staff will assist in efficiencies and maintaining CSR profile | Zero | N/A | High | Requires senior management commitment and needs to be implemented asap |
| **11.05** | Staff rewards | Provide staff rewards when certain performance requirements are met | Maximise ESD Value . | $1K per annum | N/A | High | Requires some monitoring and management commitment and direction |
| **11.06** | Sustainable Procurement policy | Sustainable procurement policy to be devised in conjunction with relevant staff and suppliers | Minimise waste, improve sustainable products, indicate UC commitment to sustainable purchasing | Zero | N/A | High | Requires commitment across the business. Needs detailed coordination with mangers and decision makers. |

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| **11.07** | Building User Guide | Ensure sufficient training and documentation is provided | Building user guide provides details to operational staff o n the design implications and ensure the building is managed the way it was designed | $5K | N/A | High | The building user guide must be well put together to ensure maximum value. |
| **12.00** | **Embodied Energy** | | | | | | |
| **12.01** | Selection of materials | Review materials selection for embodied energy analysis | Understanding of energy used in material manufacture | TBC | TBC | Medium | Design will be developed without any understanding of embodied energy. Hard to quantify as there is no clear standard on embodied energy. |