University of Melbourne
Carlton Connect Initiative
Sustainability Report

ESD Town Planning Report

v3 | 19 July 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Document Verification

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Contents

1 Executive Summary

This ESD summary report has been produced by Arup on behalf of the University of Melbourne in support of the proposed redevelopment of the site at 700 Swanston Street, Carlton, for the Carlton Connect Initiative (CCI).

Lendlease will develop, co-fund, design, build and manage the project as a 42-year 'Build Own Operate Transfer' (BOOT), with Urbanest as the developer and operator of the student accommodation building.

The following tables demonstrate that the proposed development aligns with Melbourne City Council's applicable policy objectives (Clauses 22.19-2 and 22.23-2) and meets the performance measures (Clause 22.19-5) of the Melbourne Planning Scheme.

CCI seeks to achieve an exemplary and integrated mixed use precinct for research and development and education, co-located with industry partners and business space. As such, the development precinct consists of several space types within three buildings:

- Swanston Street Building (new Melbourne School of Engineering Fabrication Laboratory and office space)
- Grattan Street Building (Science Gallery Melbourne, Melbourne School of Engineering and office space)
- Cardigan Street building (supermarket and post-graduate student accommodation)
- Northern building (childcare and office)

The development aims to exemplify high standards of environmental sustainability, seeking sustainability ratings within the Green Star and NABERS rating tools. All buildings are being delivered together but may incorporate different initiatives within the Green Star framework, whilst aligning with the policy objectives.

Policy objectives	Project response
22.19 Energy, Water and Waste Efficiency	
To ensure buildings achieve high environmental performance standards at the design, construction and operation phases.	The project is targeting a range of environmental initiatives using the Green Star framework, as described in this report. The commercial and student accommodation sections of this project are targeting certified 6 Star and 5 Star Green Star Design and As-Built v1.1 rating, respectively.
To minimise the city's contribution to climate change impacts by reducing greenhouse gas emissions.	The project is being designed and delivered to achieve several Green Star energy credits representing a

Policy objectives	Project response
	significant improvement over the minimum requirements of the National Construction Code. Features being considered to achieve this include a high performance optimised façade, increased levels of insulation, high efficiency domestic hot water plant, energy efficient lighting, building sealing and a significant rooftop PV array. The commercial office areas are also being designed to be capable of achieving a NABERS Energy Office Base Building 5 star rating in operation.
To improve the water efficiency of buildings and encourage the use of alternative water sources.	The project will incorporate a range of water efficiency initiatives, including rainwater and grey-water harvesting, water efficient landscape irrigation and the specification of high efficiency fixtures and fittings using the WELS rating system in pursuit of high numbers of credits for Green Star. The office areas are being designed to be capable of achieving a 4.5 star NABERS Water Whole Building rating in operation.
To minimise the quantity of waste going to landfill and maximise the recycling and reuse of materials. To minimise the impacts of waste on the community.	The development will have an operational waste management system as described in a separate report by the logistics and waste consultant. A commitment of at least 80% of waste generated during construction and demolition is to be diverted from landfill with a target of 90% in accordance with the Green Star requirements.
To encourage the connection of buildings to available or planned district energy, water and waste systems in urban renewal areas in order to achieve additional energy, water and waste efficiency arising from a precinct-wide approach to infrastructure where appropriate.	The project itself is a mixed use precinct including student residential and a range of commercial spaces including a gallery, university office accommodation, and commercial office areas, a childcare and retail units. Shared services have been explored between these spaces and implemented where opportunities are appropriate including consideration of energy and water infrastructure.

Policy objectives	Project response
22.23 Stormwater management (WSUD)	
• To achieve the best practice water quality performance objectives set out in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999 (or as amended). • To promote the use of water sensitive urban design, including stormwater re-use. • To mitigate the detrimental effect of development on downstream waterways, by the application of best practice stormwater management through water sensitive urban design for new development. • To minimise peak stormwater flows and stormwater pollutants to improve the health of water bodies, including creeks, rivers and bays.	The development meets the BPEMG targets via the implementation of a mix of landscape treatments, rainwater re-use, grey-water re-use and proprietary gross pollutant traps for stormwater discharge quality. Precinct-wide rainwater harvesting (collection of stormwater from all horizontal surfaces) and grey water capture is proposed for reuse within the development. It is noted that there are known potential issues with stormwater as part of the Elizabeth Street catchment area and the proposed development should help to mitigate these issues. Please refer to the stormwater report for further information.

Table 1 Melbourne planning scheme policy objectives and project responses

Performance measures	Project response
Office Overall: Green Star Design and As-Built v1.1 5 Star or equivalent	The project's commercial spaces are targeting a 6 Star Green Star Design and As-Built rating, exceeding the performance requirement. Sustainable fit-outs for the retail, childcare and gallery spaces will also be encouraged through the use of a tenant fit-out guide. Additionally the project's student accommodation is targeting a 5 star Green Star Design and As-built v1.1 rating.
Office Energy: NABERS Office Energy 5 Star or equivalent	The project is being designed to be capable of achieving a 5 Star NABERS Office Base Building Energy rating in operation for the commercial building. Energy efficient office fit-outs will be encouraged through the use of a tenant fit-out guide.
Office Water: 3 points for Wat-1 using the Green Star Office rating tool or equivalent.	The project is targeting at least 5 points under the Potable Water credit (18A) using the Green Star Design and As-Built v1.1 rating tool for both buildings. With 12 points available in

Performance measures	Project response
	the Water category for both the legacy Green Star tool (Offices v3) and the current Green Star Design and As-Built v1.1, this represents an improvement over the minimum requirements. Further, the office areas of the development are being designed to be capable of achieving a 4.5 Star NABERS Office Water (Whole Building) rating in operation.
Office Waste: A Waste Management Plan prepared in accordance with the current version of the City of Melbourne's Guidelines for Waste Management Plans.	Please refer to separate Operational Waste Management Plan written by the waste consultant.

Table 2 Melbourne planning scheme performance measures and project responses

The body of this document summarises the initiatives to be incorporated, or that are being considered, for the Carlton Connect Initiative.

2 Introduction

This report demonstrates how the proposed development achieves the policy objectives of Clauses 22.19 *Energy, Water and Waste Efficiency* and 22.23 *Stormwater management (Water Sensitive Urban Design)*. These objectives are:

22.19 Energy, Water and Waste Efficiency:

- To ensure buildings achieve high environmental performance standards at the design, construction and operation phases.
- To minimise the city's contribution to climate change impacts by reducing greenhouse gas emissions.
- To improve the water efficiency of buildings and encourage the use of alternative water sources.
- To minimise the quantity of waste going to landfill and maximise the recycling and reuse of materials.
- To minimise the impacts of waste on the community.
- To encourage the connection of buildings to available or planned district energy, water and waste systems in urban renewal areas in order to achieve additional energy, water and waste efficiency arising from a precinct-wide approach to infrastructure where appropriate.

This report also provides confirmation of how the proposed development achieves the performance measures of Clauses 22.19-5.

These performance measures are:

- Energy: NABERS Office – Energy 5 Stars or equivalent.
- Water: A minimum of 3 points for Wat-1 credit under a current version of the Green Building Council of Australia's Green Star – Office rating tool or equivalent.
- Waste: A Waste Management Plan prepared in accordance with the current version of the City of Melbourne's Guidelines for Waste Management Plans.
- Overall: 5 star rating under a current version of Green Star - Office rating tool or equivalent.

This report describes the full range of initiatives that are proposed, organised and with reference to the Green Star framework.

3 Referenced documentation

3.1 Architectural

Initial schematic design drawings, including plans and elevations, provided by Woods Bagot and Hayball as part of the town planning submission.

3.2 Building Services

Provisions for mechanical, electrical, fire detection and protection, and hydraulic services based on correspondence with Norman Disney Young's (NDY) engineers and design meeting minutes.

3.3 Other Consultants

Other consultants, including structural, DDA, BCA, acoustics have been based on design meeting minutes and conversations with the Development Manager and the Project Manager (Lendlease).

3.4 Limitations

This report is based on documentation supplied to Arup at the time of writing and the Lendlease Design standards assumed. This documentation is subject to change during the design development stage and specific initiatives may be substituted or omitted whilst still achieving the policy objectives of Clauses 22.19 and 22.23 and the targeted outcome of a 5 star Green Star rating under Design and As-Built v1.1 or equivalent.

4 Sustainability Initiatives

4.1 Green Star

The Carlton Connect Initiative development is targeting separate Green Star ratings for the commercial and student accommodation buildings; both will be

rated against the Design and As-Built v1.1 tool administered by the Green Building Council of Australia (GBCA).

This is consistent with the performance measure referenced within the Melbourne City Council Planning Scheme.

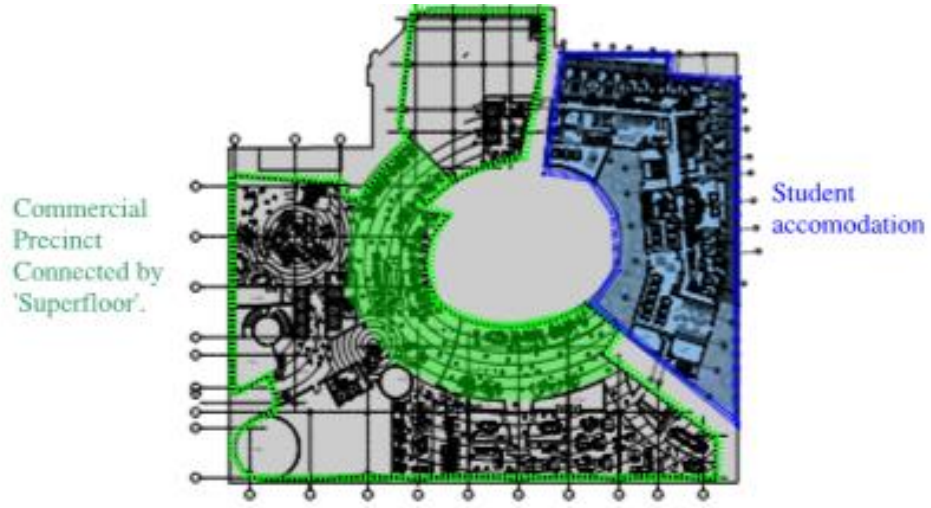

Figure 3 Proposed Green Star Rating Boundaries

Green Star is a holistic assessment scheme which assesses the sustainability features of a development within 9 different categories, including innovation.

Figure 4 Green Star Categories

Credits are awarded based on meeting criteria in each of the categories and the credits are summed according to their environmental importance and totalled to give a star rating.

There are 110 Credits available including 10 for innovation. A score of 45- 59 Credits is equal to 4 Stars (Best Practice), a score of 60-74 Credits is equal to 5 Stars (Australian Excellence) and a score of 75 or more credits is equal to 6 Stars (World Leadership).

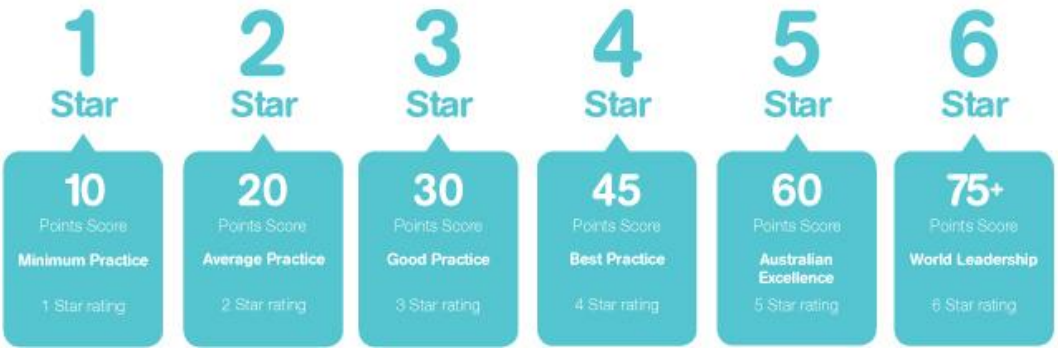

Figure 5 Green Star Ratings vs Points Targets

The following sections outline in some detail how the sustainability initiatives at the Carlton Connect Initiative can be recognised under the Green Star tool.

4.2 Management

Many Green Star credits relate to the way in which the project is delivered and Lendlease have in place the necessary controls and procedures to achieve the outcomes targeted.

Sustainability Champion

Arup has been engaged as ESD consultant and Green Star Accredited Professional status to provide design advice and facilitate the Green Star submissions.

The following Green Star credit is applicable and is being implemented:

- 1.0 Green Star Accredited Professional

Commissioning and Handover

The design consultants will provide documentation to the construction team that outlines the design intent and contractors will be required to ensure they commission systems in accordance with the appropriate CIBSE or ASHRAE standards.

The contractors will be required, during the first 12 months post completion, to tune the base building systems that are sometimes left operating inefficiently. This will include systems such as the chilled water plant, heating plant and common area lighting, hot water systems and car park ventilation.

A services and maintainability review is to be undertaken at the design stage, with the design team and head contractor.

The design team will produce a user guide that gives the tenants important information about how the building works and how to use the facilities most efficiently. In addition, a building operations and maintenance manual will be provided for building facilities management. During construction these guides will be updated in collaboration with the construction team.

A metering and monitoring strategy (including a metering diagram) will be developed by Arup, consistent with typical practice and a commissioning specification for meters will be nominated by Arup.

The following Green Star credits are applicable to the building commissioning and handover and are proposed for implementation:

- 2.1 Services and Maintainability Review
- 2.2 Building Commissioning
- 2.3 Building Systems Tuning
- 4.1 Building Operations and Maintenance Information
- 4.2 Building User Information
- 6.0 Metering
- 6.1 Monitoring Systems

Climate Change Adaptation Plan

A preliminary climate change adaptation plan has been developed for the project and the risk assessment process for the precinct will be developed in the design phases in accordance with the AS 5334:2013 Climate Change Adaptation for Settlement and Infrastructure standard.

This will include workshops and analysis of how future weather patterns and events are likely to impact the proposed development.

Where risks from climate change are identified as high, suitable mitigation measures will be considered for implementation by the project team.

Commitment to Performance

Environmental performance targets have been outlined for the building systems, including energy and water consumption targets and metering/monitoring systems. Targets include energy and water consumption in operation and will be benchmarked using the NABERS Energy and Water rating tools.

The following Green Star credits are applicable to the environmental performance and are considered for implementation:

- 2.0 Environmental Performance Targets
- 5.1 Environmental Building Performance

Site Management and Construction Waste

The construction team will operate the site using a Site Environmental Management Plan which is accredited/recognised against industry best practice, such as the NSW Environmental Management System Guidelines 2007 and ISO 14001.

The builders appointed for the demolition and construction works will commit to targeting at least 80% of construction and demolition waste to be diverted from landfill and aim for 90% in accordance with the Green Star requirements.

Sufficient space and access for the segregation, storage and removal of general waste and recyclables will be provided as part of the construction and demolition process.

Operational Waste Management

A specialist operational waste management plan has been developed by the project's waste consultant, outlining the targets for waste generated during operation and ensuring suitable consideration has been given to spatial requirements and access.

Please refer to this document for further information.

The following Green Star credits applicable to site management and construction waste are proposed for implementation:

- 7.0 Environmental Management Plan
- 7.1 Formalised Environmental Management System
- 8.0 Operational Waste Performance Pathway: Specialist Plan
- 22B Construction and Demolition Waste: Percentage Benchmark

4.3 Indoor Environmental Quality (IEQ)

The overall planning and design of the development has been developed to maximise IEQ outcomes. This is a process of balancing good environmental outcomes with the contradicting issues of energy and materials efficiency. Increased daylight, air movement and the use of environmentally friendly materials has been encouraged wherever possible.

Indoor Air Quality

Opportunities to provide good indoor air quality to office areas (within the commercial building) in accordance with Green Star criteria and beyond that required by the NCC are being reviewed.

Air distribution via a Variable Air Volume (VAV) system is proposed for the commercial areas will ensure air is effectively distributed in the occupied spaces through careful design of supply and return air points and appropriate selection of diffusers.

To prevent mould build up within the commercial air distribution system, all debris generating components such as cooling coils, heating coils, humidifiers and filters will allow for access for maintenance where feasible.

The provision of at least 50% more outside air than required by the NCC is being targeted for the commercial spaces, in comparison to the requirements in Australian Standard AS 1668.2.

Additional tenant exhaust beyond PCA Grade A is being reviewed for both buildings, and guidance to tenants for appropriate installation will be provided.

The following Green Star credits are applicable to indoor air quality and are being considered:

- 9.1 Ventilation System Attributes – Commercial building

- 9.2A Provision of Outdoor Air: Comparison to Industry Standards – Commercial building
- 9.3 Exhaust or Elimination of Pollutants

Acoustic Comfort

The proposed development is considering acoustic design to enable occupants and students to work and study effectively respectively. This includes sufficient noise protection from air conditioning plant and noise transfer between areas. The requirements are being reviewed for incorporation into the project. The project will be designed in consultation with the Arup acoustic consultants, and with consideration of noise from the lobby area, adjacent road and tram stops.

The following Green Star credits are applicable to acoustic comfort and are being considered:

- 10.1 Internal Noise Levels
- 10.2 Reverberation
- 10.3 Acoustic Separation

Lighting and Visual Comfort

Functional interior lighting will be provided throughout the building. The proposed lighting system will be designed to achieve the recommended illumination levels as stipulated in AS/NZS 1680. The designed power density of the lighting system will comply as a minimum with Section J6 of the NCC.

The lighting system is being designed for occupants to have localised lighting control. Task lighting in the residential spaces is being considered for bathrooms and kitchens, or the provision of power outlets for connection of lamps.

The following Green Star credits applicable to lighting quality and visual comfort are being considered:

- 11.0 Minimum Lighting Comfort
- 11.1 General Illuminance and Glare Reduction
- 11.3 Localised Lighting Control
- 12.0 Glare Reduction
- 12.2 Views

Indoor Pollutants

The project aims to optimise occupant health via the reduction of internal air pollutant levels, with the careful selection of paints, adhesives, sealants, carpets and engineered wood products. Products are to have low volatile organic compounds and formaldehyde levels; Arup are to review the finishes of these products as the design progresses.

The following Green Star credits are applicable to indoor pollutants and are being considered:

- 13.1 Paints, Adhesives, Sealants and Carpets
- 13.2 Engineered Wood Products

Thermal Comfort

The office spaces will be designed to optimise thermal comfort conditions through appropriate controlled variable air volume (VAV) air distribution systems, a high performance building envelope featuring a parametric, self-shading façade which varies with orientation and effective solar control in the perimeter zones.

The following Green Star credits applicable to thermal comfort and are being considered:

- 14.1 Thermal Comfort
- 14.2 Advanced Thermal Comfort

4.4 Energy

The design of the Carlton Connect Initiative prioritises passive design and energy efficient solutions following the energy hierarchy.

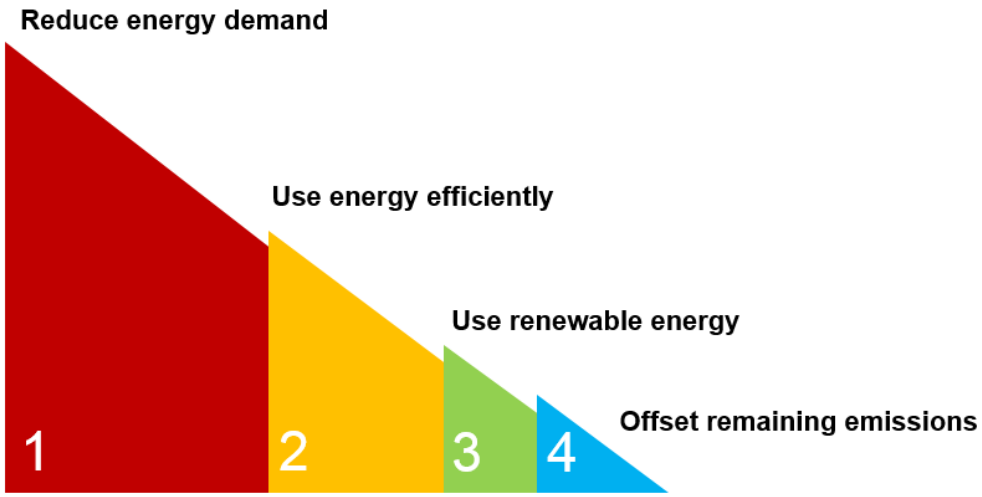

Figure 6 Energy Hierarchy

Green Star set minimum standards for energy consumption beyond the minimum requirements defined by the National Construction Code's Section J.

As there are up to 20 Green Star points available, it is anticipated that the proposed development will achieve several of these points to achieve the targeted 6 star Green Star rating overall for the commercial areas, as well as the 5 star Green Star rating for the student accommodation building.

These self-imposed targets represent a significant improvement over the National Construction Code (NCC) and are driving the delivery of a highly energy efficient development.

The commercial portion of the project is also being designed to be capable of achieving a 5 star NABERS Energy Office Base Building rating under defined operating conditions. This will help to ensure the as-built building performs in line with the design intent.

The 5 star NABERS target is above average compared to the existing building stock in Victoria as shown in the following image and aligns with the Melbourne City Council Planning Scheme performance measures for buildings of this size.

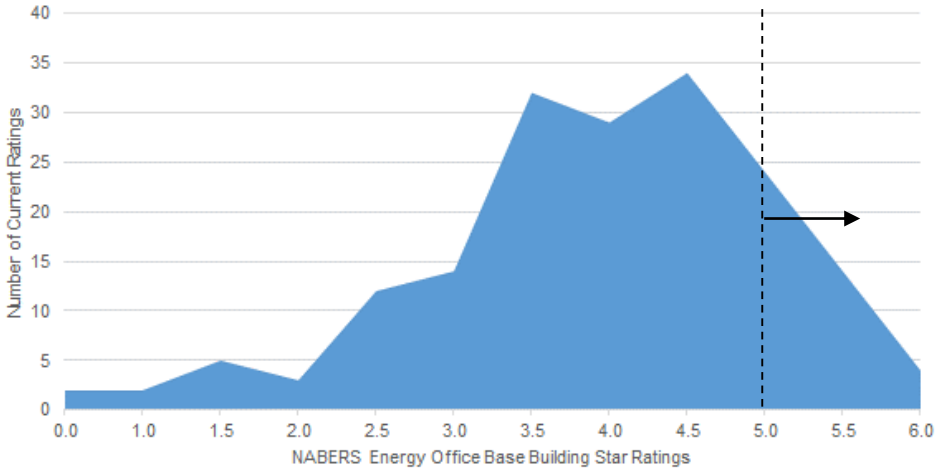

Figure 7 NABERS Rating distribution for Office Base Building Energy ratings in Victoria compared to proposed 5 star target

To achieve these targets, a key feature of the proposed development is the high performance passive external façade which features optimised shading designs and building geometry to maximise daylight and views whilst minimising solar gains and glare.

In addition to the shading systems proposed, the façade and building envelope features high performance double glazing and increased levels of thermal insulation compared to the minimum requirements of the National Construction Code (NCC).

As well as minimising heating and cooling demands, the proposed development will have energy efficient lighting, cooling, hot water systems and controls.

It is anticipated that these active and passive features in addition to the significant rooftop PV array will result in a significantly lower peak electrical energy demand for the precinct.

A comprehensive metering strategy will be provided to allow building management to view and manage their real-time consumption of electricity and water. Base building energy, water and gas consumption will be sub-metered by end-use and consumption monitored to ensure the buildings are operating as efficiently as designed.

The following Green Star credits are applicable to energy consumption and are being considered:

- 15 Greenhouse Gas Emissions: Performance Pathway

- 16B Peak Electricity Demand Reduction: Performance Pathway

4.5 Transport

The Carlton Connect Initiative benefits from an ideal location close to Melbourne's CBD and amongst a varied selection of community and food outlets.

Its proximity to the tram stop on Swanston Street provides a direct connection to Melbourne Central Station and the CBD. In future, it will be further connected via the planned Melbourne Metro rail station on Grattan Street.

The development's proximity to the main University of Melbourne campus means it is also well placed for student accommodation.

The development is situated in a highly walkable area and also in close proximity to the tram network, achieving a Walkscore of 98 and a Transit Score of 100.

Figure 8 Walkscore and Transit Score for existing site

Both buildings are targeting the Performance Pathway of the Green Star Sustainable Transport credit, to reduce the impacts from transport as compared to a reference building.

The project aims to do so by enabling access to sustainable transport infrastructure (thereby decreasing greenhouse gas emissions) and encouraging the use of active modes of transport (promoting health and fitness).

Pedestrian and bicycle routes provide connections between the site and the University campus, CBD and Carlton area. Vehicular access is currently restricted on the Grattan Street and Swanston Street frontages.

Car Parking + Bike Parking

Given the central location of the development and anticipated tenants, the development is only proposing to include 55 car parking spaces which is substantially less than any planning requirements and will therefore result in lower transport emissions associated with the student residence and commercial building.

A significant provision of bike parking and end of trip facilities will be provided for building office tenants and students including 299 bike parks in the basement for users of the various buildings including students, academics, retail staff and commercial building tenants. A further 80 bike parks will be provided for the student residence building.

The provision amounts to 10% of the precinct's regular occupants which is more than typically provided for commercial developments in Melbourne.

For visitors, 45 bike hoops are being provided on the footpath to encourage and enable up to 90 visitors to park their bikes when visiting the precinct.

Please refer to the transport plan for further information.

The following Green Star credit is applicable to transport and is being considered:

- 17A Sustainable Transport: Performance Pathway

4.6 Water

The Carlton Connect Initiative will be targeting exemplar water efficiency for the commercial and student accommodation buildings through a range of measures. The commercial portion of the project is being designed and to be capable of achieving a 4.5 star NABERS Water Whole Building rating in operation.

The commercial buildings will also comply with the Green Star Performance Pathway, seeking a significant reduction in potable water consumption compared to a standard practice reference building through the following measures:

- Water efficient fixtures and fittings including showers, taps, toilets and urinals using the Water Efficiency Labelling Standard (WELS) ratings in accordance with the Green Star requirements.
- A rainwater harvesting system collecting water from the various roof tops.
- A grey water harvesting system collecting water from showers and taps.
- The fire protection system test water will be designed to recapture the water used for testing.
- All non-potable water demands (toilets, urinals, cooling towers, irrigation) will have reused water (rainwater, grey-water) available to them.

The following Green Star credit is applicable to water consumption and is being considered:

- 18A Potable Water: Performance Pathway

4.7 Materials

In comparison to standard development standards, the materials category offers the greatest scope for improvement but also the greatest challenges. In addition to providing waste recycling facilities, a reduction of material use will be targeted for concrete and steel, and PVC will be sourced from environmentally managed

supplies. Alternative materials will be investigated for major construction materials and alternatives considered.

Sustainable Materials

Life cycle impacts for concrete and steel will be considered, whereby a reduction in material use is targeted, in comparison to a reference building. A reduction in the cement, water consumption or aggregate consumption will therefore be investigated, as well as a reduction in the use of steel reinforcement or steel framing.

The site includes a cross laminated timber (CLT) building, one of the first commercial timber construction buildings in Australia. This is anticipated to significantly reduce the extent of concrete and steel used in the construction of this building and will demonstrate an exemplar building precedent to the rest of Melbourne with regards to materiality.

The requirement for steel and timber sourced from accredited suppliers and sustainable sources respectively is being considered for the development's specifications. Similarly, the specification and installation of best practice PVC and/or alternative products to PVC are being considered.

Sustainable product initiatives will be targeted for a proportion of the products used within the development, such as reused/recycled content, 3rd party certified products (e.g. GreenTag, Good Environmental Choice Australia etc.) and/or products with Environmental Product Declarations (EPDs).

The following Green Star credits are applicable to life cycle impacts and are being considered:

- 19A. Life cycle impacts – Performance pathway
- 20.1 Structural and Reinforcing Steel
- 20.3 Permanent Formwork, Pipes, Flooring, Blinds and Cables
- 21.1 Product Transparency and Sustainability

4.8 Land Use and Ecology

The site benefits from its position as a brownfield area (the existing site comprises several multi-storey concrete buildings), and redeveloping the site is therefore reusing land rather than developing on greenfield land. Hence the site meets the Green Star conditional requirements that it has not been of prime agricultural value, contained old growth forest and has not been a wetland.

Ecological Value

Due to its location, there is low risk of the development having a negative impact on endangered, threatened or vulnerable species.

A range of landscaped areas are proposed as part of the development with consideration of the City of Melbourne's Urban Forest Strategy and the University of Melbourne's Biodiversity Management Plan.

Please refer to the landscape design report for further information.

The extent of the improvement in ecological value of the site is being investigated compared to the existing site condition an improvement being considered on the basis of the Green Star Ecological Value calculator.

The following Green Star credits are applicable to ecological value and are being considered:

- 23.0 Endangered, Threatened or Vulnerable Species
- 23.1 Ecological Value

Sustainable Sites

A site contamination assessment is to be undertaken and best practice remediation measures will be considered if contamination is found.

The following Green Star credits are applicable to sustainable sites and are being considered:

- 24.1 Reuse of Land
- 24.2 Contamination and Hazardous Materials

4.9 Emissions

Emissions from the development will be minimised as far as practical with consideration of the Green Star criteria and best practice standards.

Stormwater

Reduced peak event discharge post-development has been targeted, and the stormwater discharged from the site is to meet best practice performance objectives as specified in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999 (or as amended).

A preliminary analysis has been undertaken using the Stormwater Modelling software (MUSIC) in accordance with Melbourne Water MUSIC modelling guidelines.

The results show that with the design as it stands, the stormwater design proposed aligns with the objectives of the City of Melbourne Planning Scheme. As the design develops and more information becomes available, the stormwater design will be adjusted to ensure the compliance with the Planning Scheme is maintained.

It is noted that there are known potential issues with stormwater as part of the Elizabeth Street catchment area and the proposed development should help to mitigate these issues.

A standalone report outlining the stormwater strategy proposed for the Carlton Connect precinct is provided within this Planning Application.

The rainwater that is collected from the building roofs is proposed to be used for toilet flushing. The rainwater would be appropriately treated and distributed to where it is needed.

The maintenance of the recycled water system would be carried out as part of the general maintenance contract for a development of this size with a clear and thorough maintenance strategy developed.

In addition, the water efficient fittings specified and the greywater system will likely also contribute to a reduction in sewer flows. The magnitude of this reduction is currently being investigated.

The following Green Star credits are applicable to stormwater and are being considered:

- 26.1 Reduced Peak Discharge
- 26.2 Reduced Pollution Targets

Light Pollution

The design of the external lighting system will consider light spill upwards into the sky or obtrusively beyond the property boundary. It is noted that this could be a nuisance to adjacent properties, particularly residential neighbours.

The following Green Star credits are applicable to light pollution and are being considered:

- 27.0 Light Pollution to Neighbouring Bodies
- 27.1 Light Pollution to Night Sky

4.10 Innovation

The proposed development at Carlton Connect is seeking to achieve recognition from the GBCA for innovative design practices and exceeding Green Star benchmarks for particular credits.

The maximum 10 points are targeted for the Innovation category for Green Star.

5 Summary

Clause 22.19 of the Melbourne Planning scheme provides guidelines to ensure sustainable outcomes for the design, construction and operation of buildings and urban renewal areas.

The objectives of Clause 22.19 will be met through the initiatives proposed as part of the CCI commercial building's targeted 6 star Green Star Design and As-Built v1.1 rating and the CCI student residence's targeted 5 star Green Star Design and As-Built v1.1 rating.

Further the CCI commercial areas of the project are being designed to be capable of achieving a 5 star NABERS Offices Base Building Energy rating and a 4.5 Star NABERS Water Whole Building rating in operation.

Please refer to the Executive Summary for a tabular summary of the CCI project's response to each of the Melbourne Planning Scheme Clause 22.19 objectives and performance requirements.