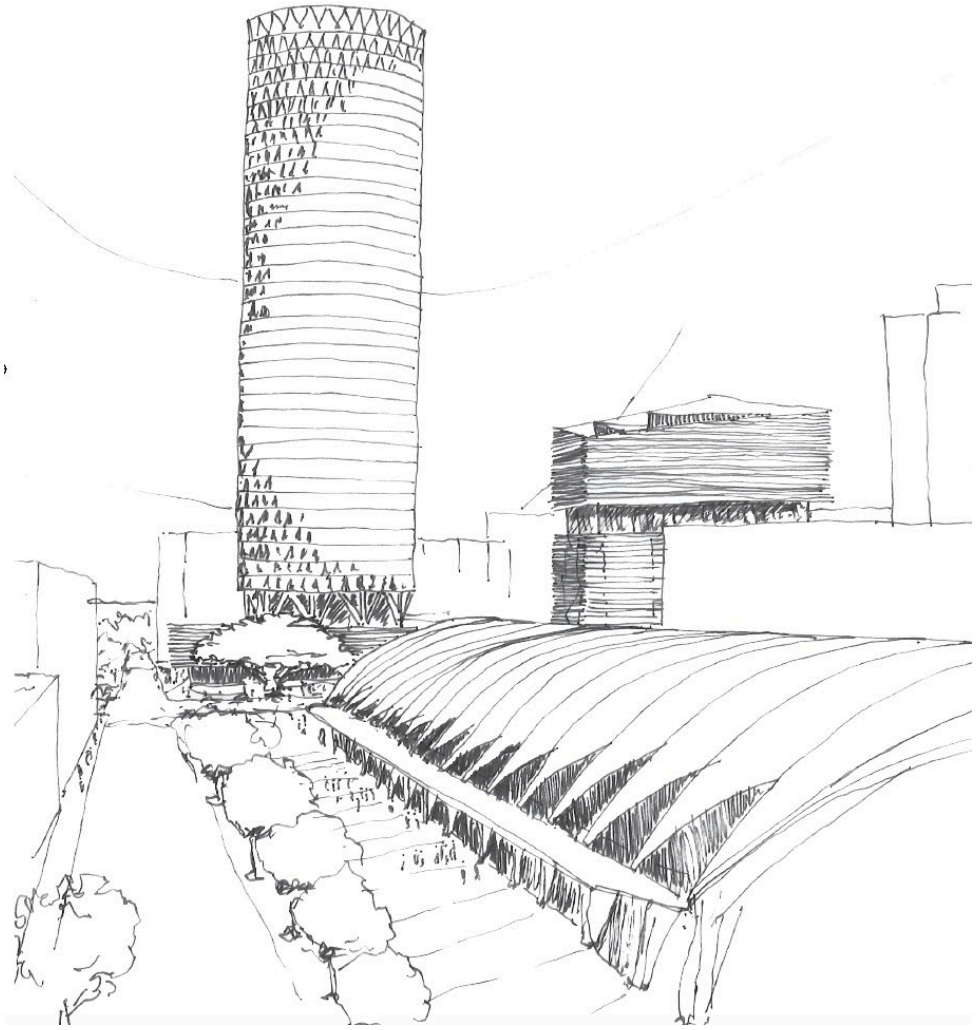

Image courtesy of Fitzpatrick + Partners

Sydney Olympic Park Site 2

Ecologically Sustainable Development (ESD) Statement

August, 2019

atelier ten

Environmental Design Consultants
atelierten.com

PROJECT INFORMATION

JOB TITLE:	SOPA SITE 2
JOB NUMBER:	1180
DOCUMENT TITLE:	1180 SOPA SITE 2_ESD STATEMENT
VERSION:	DRAFT FOR REVIEW

PREPARED

PREPARED BY:	PAUL STOLLER, DIRECTOR
SIGNED:	PDS
DATE:	09.08.2019

APPROVED

APPROVED BY:	PAUL STOLLER, DIRECTOR
SIGNED:	PDS
DATE:	09.08.2019

REVISIONS

NO	DATE	CHECKED	APPROVED
01	15.08.2019	LF	PDS

ATELIER TEN

Level 14 / 338 Pitt Street
Sydney
NSW 2000
T +61 2 9262 4500

150 Langridge Street
Collingwood
VIC 3066
M +61 458 000 210

Contents

1.0 Introduction

1.1 Project Overview

Atelier Ten, a global consultancy of Ecologically Sustainable Development (ESD) consultants with an office in Sydney, has been engaged by the property developer Ecove to provide integrated sustainability consulting throughout the process of developing a pair of buildings on Site 2 at Sydney Olympic Park in NSW, Australia.

Ecove are developing two buildings on Site 2 at Sydney Olympic Park, located at the corner of Australia Avenue and Murray Rose Avenue. Building 2A, on the northern side of the site, is a cylindrical tower over a podium. The podium houses hotel reception, restaurant, and function spaces; the tower houses twelve floors of strata office, eighteen floors of hotel, and mechanical spaces. Building 2B, on the south site of the site across Dawn Fraser Avenue, which bisects the site, comprises fourteen levels of strata office space over a ground level of retail spaces and building lobby. Underneath both buildings will be four levels of basement comprising shared end of trip facilities, loading docks, parking, and hotel back of house spaces.

Both buildings back up to a new service lane to the east, leaving generous forecourts facing Australia Avenue and Jacaranda Square beyond. The open area in front of Building 2A features a sunken garden around a large fig tree. The plaza in front of building 2B will be more urban, with a mix of hardscape and planting.

Mechanical systems (heating, cooling, and ventilation) in Building 2A will be separated between the hotel and office areas so that each stratum has its own equipment without encumbrances of shared systems. Building 2B will be served by a single set of mechanical systems. The entire site will be served by recycled water from the WRAMS utility.

The buildings are arranged such that the basement and Building 2A can be built in a first construction phase, while Building 2B can be built at a later stage.

1.2 Project Sustainability Brief

Sensible, high value sustainable development principles are at the heart of the design proposals for Site 2.

Following on the commitments made by Ecove in its bid for the site, and enhanced by further design exploration, this project will be achieve the following key goals and objectives:

- Smart water management, with minimal potable water use
- Energy efficient operations, with capacity for on-site energy generation and storage
- Sustainable material and service procurement
- Sustainable procurement, material management, and low waste generation
- Transport options complementing rail and bus, extending usefulness of all modes
- Healthy environments, inside and across the public realm
- Resilient, adaptable public realm and buildings

The development team has committed to following the Precautionary Principle, namely that the development of Site 2 will avoid, where practical and verifiable, inflicting environmental damage as a consequence of the development process or from future operations of the developed site.

As a quality assurance measure to ensure that these goals and objectives are delivered, along with a broader sustainability program, Ecove commits to certifying buildings 2B and 2A at a Five Star and Four Star level, respectively, using the Green Star Design & As Built rating tool.

1.3 ESD Requirements:

This report has been written to address the following Sydney Olympic Park and State of NSW requirements for an Ecologically Sustainable Development (ESD) at Site 2. Table 1, below, lists the specific requirements addressed by this report, and notes where in the report each item is addressed.

Table 1: Sustainability reporting requirements

DOCUMENT	ITEM	REPORT RESPONSE SECTION
SEARS for Site 2A and 2B, Sydney Olympic Park, Key Issue 6: Ecologically Sustainable Development	The EIS shall: • detail 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, construction and ongoing operation phases of the development;	ALL
	• demonstrate how the proposed development responds to sustainable building principles and best practice, and improves environmental performance through energy efficient design, technology and renewable energy;	ALL
	• include a description of the measures that would be implemented to minimise consumption of resources, water and energy; and	7.0 (Materials) 6.0 (Water) 4.0 (Energy)
	• include details of how the proposal will achieve the Green Star requirements in section 4.2 of the Sydney Olympic Park Masterplan 2030 (2018 review).	14.0 Appendix B: Green Star pathways
Sydney Olympic Park Masterplan 2030 (2018 review), section 4.2	1) engage an ESD consultant as a core member of the project team	1.0
	2) connect all new development to Sydney Olympic Park's recycled water system for all approved uses of recycled water	6.2
	3) Prioritise sustainable materials selection, including sustainably sourced timber, low-emissions fibreboard, minimal chlorine-based products. All copper chrome and arsenic treated timber must be avoided.	7.2
	4) achieve minimum ratings set out in Table 4.1 Environmental Ratings. • Commercial office: 5 Star Green Star Design & As Built • Hotel: 4 Star Green Star Design & As Built	14.0 Appendix B: Green Star pathways
	5) All developments should consider the impacts resulting from climate change and include elements in building design and construction that specifically address these major impacts, consistent with guidance provided in the GBCA Green Star Design & As Built Guidelines.	2.2
NSW Environmental Planning and Assessment Regulation 2000, Schedule 2, Clause 7(4)	The principles of ecologically sustainable development are as follows: (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,	1.2
	(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,	10.2
	(c) conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,	7.2 8.2

	(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.	7.2

For clarity of reporting, the content of this report has been organised around the sustainable development categories in the Green Star Design & As Built green building rating tool: Sustainable Management, Indoor Environment Quality, Energy Efficiency, Transport, Water Efficiency, Materials, Land Use & Ecology, Emissions and Innovation. A further category has been added, entitled 'Connected Communities', to reflect the progressive social sustainability ambition of this project.

2.0 Sustainable Management

2.1 Sustainable Management Key Goals:

Objective:	Target:
Sustainability Benchmarking	• Achieve Green Star 5 Star, 'Australian Excellence' Office and Green Star 4 Star, 'Best Practice' Hotel.
Best Practice Commissioning and Tuning	• Full compliance with Green Star Commissioning and Tuning requirements
Metering and Monitoring	• Best practice metering and monitoring provision in line with Green Star and NABERS requirements
Climate Adaptation and Resilience	• Incorporate measures for future resilience and adaptation to changing climate
Operational Waste	• Facilitate circular economy approach through adequate space provision for multiple waste recycling streams and coordination with locally available recyclable and compostable waste collection providers

2.2 Design Proposals:

Whole Development:

2.2.1 The Green Star Design & As Built benchmarking tool will be used as a quality assurance methodology for the delivery of a development that represents 'Australian Excellence' in sustainability. A Green Star review has been carried out at this design stage to ensure that the design has potential for delivery of this ambition.

2.2.2 Buildings 2A and 2B will be rated independently of each other using Green Star, 2B will achieve a 5 Star rating and 2A will achieve a 4 Star rating. The basement facilities will be apportioned to each building using standard Green Star methodology for shared facilities.

2.2.3 The building will be designed and constructed with the end user tenancies in mind; to facilitate their ability to carefully manage energy and water consumption, minimising their running costs and environmental impact. During the design development stages, consultation will be held with future user group representatives. As part of this the design team will engage with users on the proposed building systems and their sustainable management and operation principles.

2.2.4 All key environmental building systems including indoor environmental quality, energy and water will follow Green Star best practice with regards to design, commissioning and testing, to ensure that the building is handed over to the end-users in line with design intent.

2.2.5 The commissioning process will be targeted to include air-pressure testing of typical floors of the building to target a minimum air-tightness target in line with Green Star standards to deliver improved energy efficiency and internal thermal comfort. High-quality building sealing will also contribute to improved acoustics and project wellness aspirations for achieving reduced infiltration of dust particles and air pollutants to the internal environment.

2.2.6 The project will employ submetering systems for each individual tenancy in line with NABERS Energy and Water reporting protocols so that tenants will be empowered with immediate information on energy and water consumption. Options for cost effective integration of smart energy management technologies for tenants will be explored in more detail in the design stages.

2.2.7 During the construction period the contractor will follow best practice and develop a site specific environmental management plan. Sufficient support will be given to the site team such that they are educated in sustainable construction methods and understand the performance quality aspects required for this project.

2.2.8 During building operation, waste-to-landfill will be minimised through the provision of recyclable waste, e-waste and non-recyclable waste storage, and exploring opportunities to separate organic waste streams. Space allocation for waste collection will be dependent upon the availability of consolidated precinct-wide waste management.

2.2.9 An initial Climate Change and Resilience Risk Review will be undertaken in the Design Development stage and this will be developed further through all design stages. The project team has already identified three key concerns: hotel residents safely sheltering in place through extreme events, the effects of utility failure on basic operations of the hotel, and the effects of heatwaves and droughts on pedestrian comfort and plant health in the public realm.

Program Specific – *Strata Office:*

2.2.10 The strata offices component will be tracked against a NABERS Office Energy ratings, but because of the nature of the building as a strata of small offices, whether a full NABERS rating is required is subject to further discussion with the NABERS program officers. Regardless, the building management system will provide a monitoring and reporting framework for the management of energy efficiency and reduced greenhouse gas emissions in keeping with NABERS protocols.

Program Specific – *Hotel:*

2.2.11 The hotel component will be tracked against a NABERS Hotel Energy ratings, but pursuit of a full NABERS Hotel rating is subject to future agreement with the hotel operator. Regardless, the hotel energy and water management systems will provide a monitoring and reporting framework for the management of energy efficiency and reduced greenhouse gas emissions in keeping with NABERS protocols.

3.0 Health and Wellness

3.1 Health and Wellness Goals:

Objective:	Target:
Provide best practice Indoor Environmental Quality (IEQ)	• Achieve minimum 12/17 credits for Green Star IEQ section
Indoor Air Quality	• Indoor air quality to be provided at a best practice rate of 50% greater than required by AS1668 or CO_2 concentrations maintained below 800ppm
Visual Comfort	• Primary spaces that will receive high levels of daylight for at least 40% of the occupied office floor area and 50% of hotel bedrooms • 80% of building areas will have views out
Thermal Comfort	• Mechanically ventilated spaces will be designed to achieve thermal comfort in line with ASHRAE best practice
Acoustic Comfort	• Achieve Green Star credits 10.1 Internal Noise Levels and 10.3 Acoustic Separation
Indoor Pollutants	• Occupant health will be safeguarded through specification of low VOC and low formaldehyde interior materials

3.2 Design Proposals:

Whole Development:

3.2.1 The building tower facades are going through an extensive design optimisation process to maximise their passive design benefits of good daylight provision, improved thermal comfort, reduced space conditioning energy use, and reduced peak power loads. Both building facades will incorporate external shading elements as a way to improve passive design performance and also create an elegant and appropriate architectural expression for this site.

3.2.2 In line with Green Star targets all regularly occupied spaces in the 2A tower and 80% of the tenancies in building 2B will aim to achieve a minimum of 2% daylight factor for a minimum of 40% of the primary occupied floor area. At least 60% of the primary occupied floor zones will achieve a high quality external view out.

3.2.3 Generally, outside air provision will be increased over the minimum requirement of AS 1668.4:2012, to ensure optimum indoor air quality in line with the best practices for indoor air quality. Subject to further cost review, internal CO_2 monitoring will be provided to all strata offices and hotel rooms to ensure indoor CO_2 levels are maintained below a best practice threshold and allow for outside air reduction without compromising air quality during times of temperature extreme.

3.2.4 Artificial lighting design will complement natural daylight provision and will be designed to provide a high quality of general illuminance and be glare free in line with AS/NZS 1680.

3.2.5 In accordance with Green Star and NCC requirements, thermal comfort assessment will be carried during the design process and verified during commissioning to ensure that both buildings accord with best practice thermal comfort performance standards in regularly occupied zones.

3.2.6 In accordance with Green Star requirements, strata office spaces will achieve Green Star credits 10.1, for appropriate internal ambient noise levels, and 10.3 for minimal noise transfer between offices.

3.2.7 Internal fit-out materials specification will be reviewed in accordance with Green Star best practice to avoid internal off-gassing of pollutants, including volatile organic compounds (VOCs) and formaldehyde, that are detrimental to health and well-being.

Program Specific – *Strata Office:*

3.2.8 Building 2B include interesting and aesthetically pleasing stair towers to encourage use of stairs rather than lifts. Daily experience exercise like this contributes to occupant health and wellness, as well as providing places for chance encounters and community-building moments.

3.2.9 Building 2B is exploring the provision of amenity natural ventilation to each strata zone. This provision will increase thermal comfort, user control, and expand biophilic connections between occupants and the outdoor environment.

4.0 Energy Efficiency and Operational Emissions Reductions

4.1 Energy Efficiency Key Goals:

Objective:	Target:
Building Fabric Performance	• Improve upon NCC building envelope performance requirements
NABERS Rating	• Enable NABERS rating for strata office areas • Enable NABERS rating for the hotel
Energy Efficient Operations	• Achieve a minimum of 3 points in Green Star for energy savings

4.2 Design Proposals:

Whole Development:

4.2.1 Reducing greenhouse gas emissions and on-going energy use are a key driver for this project. The approach is to firstly reduce energy demand through passive design measures wherever possible. The development is being designed using a “fabric first” approach that integrates passive design into the architecture – especially the in shading the building envelopes – to ensure that space conditioning and lighting energy needs are minimised.

4.2.2 Energy efficient building systems have been selected for both buildings, including:

- High efficiency fan coils with variable speed fans will provide space heating and cooling
- Tempered outdoor air will be provided mechanically to all spaces, with volume controlled by CO2 sensors to reduce fan energy and air conditioning energy
- High efficiency chillers and condensing boilers
- A heat reclaim chiller for the hotel to provide domestic hot water preheating is being considered
- LED lighting with daylight and vacancy controls

4.2.3 Building services that minimise peak power loads on the electricity network are being considered, including:

- Thermal storage that allows generation of chilled water at night

- Integrated thermal mass through building structure or phase change materials in finishes to minimise peak loads

5.0 Sustainable Transport

5.1 Sustainable Transport Key Goals:

Objective:	Target:
Support active modes of transportation	• Bicycle storage racks for occupants and visitors, together with end-of-trip facilities, to be provided in line with Green Star requirements as a minimum
Prioritise low emissions vehicle spaces	• Parking spaces closest to building entrances will be reserved for low-emissions vehicles, increasing visibility and incentivisation.

5.2 Design Proposals:

Whole Development:

5.2.1 Site location offers good public transport connections and is located in a walkable neighbourhood with good pedestrian and cycleway links to surrounding parks, the Parramatta River, and neighbouring communities.

5.2.2 The development will meet at a minimum the Green Star requirements for bicycle storage capacity, based on needs for office occupancy and staff of hotel (not including guests).

5.2.3 The project will be designed to provide easy, safe linkage from the bicycle parking and end-of trip facilities to surrounding bicycle routes.

5.2.4 Designated car share spaces will be provided either in the parking garage or, subject to discussions with authorities, in more visible on-street parking spots.

5.2.5 Infrastructure for electric vehicle charging will explored for provision in select parking bays. Site electrical supply constraints may limit expansion of any electric vehicle infrastructure, though where viable it will be pursued.

6.0 Water Efficiency

6.1 Water Efficiency Key Goals:

Objective:	Target:
Reduce potable water consumption	• Implement a holistic water management strategy across all building programs to reduce potable water consumption in line with Green Star water efficiency targets
Use recycled water for all non-potable needs	• Supply recycled water from the WRAMS throughout the development to all approved end uses

6.2 Design Proposals:

Whole Development:

6.2.1 Generally, across the whole development, water conservation considerations include fixtures and fittings selected for high WELS ratings as appropriate to minimise water consumption

6.2.2 WCs throughout the development will be specified as dual flush type, with efficient average flush capacity

6.2.3 Sub-metering of water use will be provided to each strata or tenant, where the strata or tenant is provided water. Metering will be in accordance with relevant NABERS protocols for Office or Hotel to suit end use.

6.2.4 A leak-detection system will be provided to ensure that uses throughout the building can be interrogated. This will enable abnormal water uses to be detected and for reporting against project water consumption targets.

6.2.5 The development will be plumbed with a recycled water supply to the following SOPA approved end uses of recycled water:

- Cooling towers
- Irrigation
- Fire systems
- Site wash-down hose bibs

7.0 Materials and Embodied Carbon Reductions

7.1 Materials Key Goals:

Objective:	Target:
Reduced embodied carbon of building development	• Mass timber structure for Building 2B • Explore opportunities to use low carbon cements and pozzolans in concrete, specify low embodied carbon products for major trade packages
Responsibly and sustainably sourced building materials	• Major materials and products will be responsibly sourced for low environmental impact with third-party accreditation
Targeted reduction in construction materials waste sent to landfill	• Waste sent to landfill <10kg/m^2 in line with Green Star best practice
Enable comprehensive operational waste recycling, including composting of organic wastes	• Divert as much waste as possible from landfill, including organic waste diversion to composting programs run by partners

7.2 Design Proposals:

Whole Development:

7.2.1 Subject to confirmation in the next design stage, it is intended that the project will pursue a low embodied carbon development strategy.
7.2.2 Mass timber structure will be used in Building 2B, displacing high carbon structural materials with low carbon timber.
7.2.3 Subject to supply availability, concretes will be specified that incorporate alternative low-carbon cements and cementitious materials reclaimed from waste streams; these may include geopolymers, ground granulated blast furnace slag or fly ash. The team will also pursue recycled aggregates to minimise demand of virgin materials and reduce CO_2 emissions.
7.2.4 Preference will be given to other major products and materials with embodied carbon rates lower than industry standards.
7.2.5 All materials selection and sourcing within the development will be undertaken with the principles of sustainable development in mind. The two key principles will be for the selection of products and materials with lower life-cycle impact and to target a reduction in waste to landfill compared to typical practice.
7.2.6 As possible, water used in concrete will be from captured or reclaimed sources.
7.2.7 Opportunities for refinement of structural design to minimise concrete and steel usage will be explored in the next design stage.
7.2.8 Subject to supply availability, structural steel will be sourced from a certified Responsible Steel Maker with as high a recycled content as possible.
7.2.9 All timber products will be specified to come from certified sustainably managed sources.
7.2.10 Subject to product availability, products without chlorine-based materials (PVC, for example) will be avoided.

7.2.11 All timber products will be specified to be free of copper chrome and arsenic treatments, including timber used in formwork or other temporary applications.
7.2.12 Generally, where possible, materials will be selected to meet Green Star product transparency and sustainability requirements with third-party supply chain certification.
7.2.13 On-site construction waste minimisation will be targeted in line with Green Star best practice and where appropriate off-site pre-fabricated components will be considered.
7.2.14 Construction waste landfill diversion of a minimum of 90% will be specified for all construction stages.

8.0 Land Use & Ecology

8.1 Land Use & Ecology Key Goals:

Objective:	Target:
Improved Ecological Value	• Enhance ecological value of the site through increased greening over public realm and rooftop levels. Use appropriate native, drought tolerant species.
Mitigate Heat Island Effect	• Contribute to reduced urban heat island effect through increased tree canopy, soft landscaping and high SRI surfaces and finishes.

8.2 Design Proposals:

Whole Development:

8.2.1 Noting that the public realm needs to accommodate substantial pedestrian movements, the development will work to introduce planted landscapes into the public realm in front of both Building 2A and Building 2B, and along Murray Rose, Dawn Fraser, and Parkview Drive.
8.2.2 A vegetated sunken garden around the fig tree at the corner of Murray Rose and Australia Avenues will include substantial planted areas.
8.2.3 All species will be selected to be drought tolerant to minimise irrigation requirements. The team will aim to include a significant percentage of native species from SE Australia and ecologically appropriate planting to contribute towards creating a net increase of urban biodiversity.
8.2.4 Irrigation systems will be designed to incorporate monitoring devices to detect sub-soil moisture, weather and other environmental data to efficiently control irrigation regimes
8.2.5 Ground level public realm and roofscapes without vegetation will be designed to achieve a high solar reflective index (SRI) to minimise urban heat island effect where this aligns with SOP public realm plans and does not reduce visual comfort.

9.0 Pollution Emissions

9.1 Pollution Emissions Key Goals:

Objective:	Target:
Storm water retention and treatment	• Reduce peak outflows and meet all regional stormwater quality objectives
Microbial Control	• Best practice measures to reduce legionella risk in water cooling and domestic hot water systems throughout the development
Reduced refrigerant impacts	• Zero ozone depletion potential (ODP) and low global warning potential (GWP) refrigerants specified in line with Green Star best practice

9.2 Design Proposals:

Whole Development:

The development will make a significant improvement upon peak stormwater outflow and water quality compared to the current site condition

10.2.1 Onsite stormwater will detained on-site and treated to meet regulatory water quality requirements prior to discharge off site. Note that stormwater runoff from roads are expected to be managed by precinct infrastructure (e.g. Dawn Fraser Ave).

10.2.2 Generally, all heat rejection and domestic hot water systems will be designed to accord with best practice for the minimisation of microbial growth and associated risks to human health.

10.2.3 Chiller plant and all refrigeration systems in the base buildings will be selected on the basis of minimising environmental impacts through the selection of low ozone depletion potential (low ODP) and low global warming potential (low GWP) refrigerants and through implementing leak detection and management measures.

10.0 Connected Communities

10.1 Innovation Key Goals:

Objective:	Target:
Activated engagement with Jacaranda Square and rail station corridor	• Street level retail and public realm amenities
Extended hours activity	• Hotel events and amenities encourage extended daily life in the Precinct
Inclusive, Universal Design	• Provide Universal Access throughout development
Smart community	• Implement a Smart Community strategy for improved social cohesion, environmental and economic benefits

10.2 Design Proposals:

Whole Development:

10.2.1 The redevelopment aims to participate in a larger, more active, and better connected public realm along the Olympic Park Station and Jacaranda Square corridor.

10.2.2 A mix of hotel, retail, and food and beverage outlets will extend the hours of activation of this Site and this end of the central Station and Park corridor.

10.2.3 The project will be designed for all ages and abilities, aiming to meet best practice Universal Access principles.

10.2.4 The project is considering implementing inclusive, non-gendered toilet facilities for Building 2B and the Strata office portion of 2A.

11.0 Innovation

11.1 Innovation Key Goals:

Objective:	Target:
Innovation in sustainable design	• Target at least 7 Green Star innovation credits
Living Lab enabling	• Include systems that enable the development to host in situ research and continuous learning

11.2 Design Proposals:

Whole Development:

11.2.1 As part of the Green Star 5 Star accreditation pathways at least 8 sustainable design and construction innovation measures will be pursued. These potential innovation areas are focused on bringing improvements upon standard Green Star benchmarks, innovation based on implementing measures from other leading global sustainability benchmarks such as the WELL Building Standard and meeting a number of the pre-defined Innovation Challenges or potentially defining some bespoke innovation measures for this project.

11.2.2 Since health and wellness is a core project value, the project will target enhancements to indoor and outdoor spaces that bring health, comfort and wellness benefits to occupants. The project will innovate through targeting a number of key value-add measures from the WELL Building Standard v2.0.

12.0 References

This report has been compiled based on discussion with the client and design team and through the review of the following information:

1. Sydney Olympic Park Master Plan 2030 (2018 Review)
2. SEARS for Site 2A and 2B, Sydney Olympic Park (SSD 9383)
3. NSW Environmental Planning and Assessment Regulation 2000, Schedule 2, Clause 7(4)
4. Green Star Design & As-Built v1.2
5. WELL Building Standard v2.0

13.0 Appendix – Evidence of Green Star Application

Green Star project profiles have been established with the GBCA and the below reference numbers have been provided:

1. SOPA Site 2 Building 2A - GS-4605DA.
2. SOPA Site 2 Building 2B - GS-4643DA.

14.0 Appendix B –Green Star Pathways

Appended to this report are pathways to 5 Star Green Star Design & As Built ratings for the two separate Green Star projects:

1. SOPA Site 2 Building 2A
2. SOPA Site 2 Building 2B

Pathways at this stage of design development are indicative and subject to change as detailed design is progressed with the design team. Accordingly, Atelier Ten have assigned weighted probabilities to each credit, as opposed to a yes/no selection. The below achievability weightings factor in technical and economic risks to the project, which are then multiplied through the total points under that designation. The resultant weighted score is the 'projected points' total.

Weightings are applied as per the following 'achievability' scale:

Achievability	High	Medium	Low	No (unachievable)
Weighting Factor	90%	60%	10%	0%

Green Star Design & As Built v1.2

APPRAISAL Rev 02

1180.1 SOP SITE 2B OFFICE

15.08.2019

Achievability

Hi	Med	Low	No	Total
38	23	2	0	63

Four Star 45 to 59 points **Five Star** 60 to 74 points **Six Star** 75 or more points

Achievability rating: **Hi** = 90%, **Med** = 60%, **Low** = 10%, **NP** = not possible.

Projected Points

Hi	Med	Low	No	Poss-ible			
8	6	0	0	14	**Management**		
1				1	**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.	1.1 Accredited Professional
Y	-	-	-	-	**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
1				1			2.1 Services and Maintainability Review
1				1			2.2 Building Commissioning
1				1			2.3 Building Systems Tuning
1				1			2.4 Independent Commissioning Agent
1	1			2	**Adaptation and Resilience**	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.0 Climate Adaptation Plan
	1			1	**Building Information**	To recognise the development and provision of information that facilitates operator and user understanding of Building systems, their operation and maintenance requirements, and their environmental targets, to enable optimised performance.	4.1 Building Information
	1			1	**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 Reporting
	1			1			5.2 End of Life Waste Management
Y	-	-	-	-	**Metering and Monitoring**	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0 Metering Strategy
1				1			6.1 Monitoring Strategy
Y	-	-	-	-	**Construction Environmental Management**	To reward projects that use best practice formal environmental management procedures during construction.	7.0 Environmental Management Plan
	1			1			7.1 Formalised Environmental Management System
	1			1			7.2 High Quality Staff Support
1				1	**Operational Waste**	To recognise projects that implement waste management plans that facilitate the re-use, upcycling to reduce the quantity of outgoing waste	8.1 Waste in Operations

Hi	Med	Low	No	Possible
7	6	4	0	17

Indoor Environment Quality

1				1	**Quality of Indoor Air**	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes
		2		2			9.2	Provision of Outside Air
		1		1			9.3	Exhaust or Elimination of Pollutants
1				1	**Acoustic Comfort**	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.0	Internal Noise Levels
	1			1			10.1	Reverberation
		1		1			10.2	Acoustic Separation
Y	-	-	-	-	**Lighting Comfort**	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort
1				1			11.1	General Illuminance and Glare Reduction
	1			1			11.2	Surface Illuminance
	1			1			11.3	Localised control
Y	-	-	-	-	**Visual Comfort**	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction
1	1			2			12.1	Daylight
1				1			12.2	Views
1				1	**Reduced Exposure to 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			13.2	Engineered wood products
1				1	**Thermal Comfort**	To encourage and recognise projects that achieve high levels of thermal comfort.	14.0	Thermal Comfort
	1			1			14.1	Advanced Thermal Comfort

Hi	Med	Low	No	Possible
5	4	4	9	22

Energy

				-	**Greenhouse Gas Emissions**	NABERS Energy Commitment Agreement Pathway	15D.0	Conditional Requirement: NABERS Pathway
				20			15D.1	NABERS Energy Commitment Agreement Pathway
Y	-	-	-	-		Performance Pathway: Reference Building Pathway	15E.0	Conditional Requirement: Reference Building Pathway
3	4	4	9	20			15E.1	Comparison to a Reference Building Pathway
					Peak Electricity Demand Reduction	Prescriptive Pathway	16E.0	Prescriptive Pathway - On-site Energy Generation
2				2		Performance Pathway	16E.1	Performance Pathway - Reference Building

Hi	Med	Low	No	Possible
3	3	1	3	7

Transport

		Performance Pathway	17A.0	Travel Emissions Calculator
2	1	Prescriptive Pathway	17B.1	Access by Public Transport
		1	17B.2	Reduced Car Parking Provision
1			17B.3	Low Emission Vehicle Infrastructure
	1		17B.4	Active Transport Facilities
	1		17B.5	Walkable Neighbourhoods

Sustainable Transport

Hi	Med	Low	No	Possible
4	3	3	2	12

Water

4	3	3	2	12
				1
				1
				2
				1
				1

Performance Pathway: Reference Building Pathway — 18A — Reference Building Model

Potable Water — Prescriptive Pathway

18B.1	Sanitary Fixture Efficiency
18B.2	Rainwater Reuse
18B.3	Heat Rejection
18B.4	Landscape Irrigation
18B.5	Fire System Test Water

Hi	Med	Low	No	Possible
9	4	1	0	14

Materials

4	1			6
2				4
				3
				1
				4
				3
1				1
	1			1
	1			1
1	1	1		3
				-
1				1

Life Cycle Impacts

Performance Pathway - Life Cycle Assessment Maximum 7 points	19.A.1	Comparative Life Cycle Assessment
	19.A.2	Additional Life Cycle Impact Reporting
Prescriptive Pathway - Life Cycle Impacts Maximum 5 points	19B.1	Concrete
	19B.2	Steel
	19B.3	Building Reuse
	19B.4	Structural Timber

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
20.2	Timber
20.3	Cables, pipes, floors and blinds

Sustainable Products — To encourage sustainability and transparency in product specification. — 21.1 — Sustainable Products

Construction and Demolition Waste

Prescriptive Pathway	22A	Fixed Benchmark
Performance Pathway	22B	Percentage Benchmark

Hi	Med	Low	No	Possible
1	3	2	0	6

Land Use & Ecology

Y	-	-	-	-	**Ecological Value**	To reward projects that improve the ecological value of their site	23.0	Endangered, Threatened or Vulnerable Species
	1	2		3			23.1	Ecological Value
Y	-	-	-	-	**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
1				1			24.1	Reuse of Land
	1			1			24.2	Contamination and Hazardous Materials
	1			1	**Heat Island Effect**	Heat Island Effect Reduction	25.0	Heat Island Effect Reduction

Hi	Med	Low	No	Possible
1	4	0	0	5

Emissions

1				1	**Stormwater**	To reward projects that minimise peak storm water outflows and reduce pollutants	26.0	Stormwater Peak Discharge
	1			1			26.1	Stormwater Pollution Targets
Y	-	-	-	-	**Light Pollution**	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Properties
	1			1			27.1	Light Pollution to Night Sky
	1			1	**Microbial Control**	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28.1	Microbial Control
	1			1	**Refrigerant Impacts**	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerant Impacts

Hi	Med	Low	No	Possible
4	6	0	0	10

Innovation

					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.	30.A	Innovative Technology or Process
	1			1	**Market Transformation**	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30.B	Market Transformation
1	1			2	**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.	30.C	Improving on Green Star Benchmarks
3	2			5	**Innovation Challenge**	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30.D	Innovation Challenge
	2			2	**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 rating tools.	30.E	Global Sustainability

Green Star Design & As Built v1.2

APPRAISAL Rev 02

1180.1 SOP SITE 2A HOTEL

15.08.2019

Achievability

Hi	Med	Low	No	Total
32	23	2	0	57

Four Star 45 to 59 points **Five Star** 60 to 74 points **Six Star** 75 or more points

Achievability rating: **Hi** = 90%, **Med** = 60%, **Low** = 10%, **NP** = not possible.

Projected Points

Hi	Med	Low	No	Poss-ible				
7	7	0	0	14	**Management**			
1				1	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.	1.1	Accredited Professional
Y	-	-	-	-	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
1				1			2.1	Services and Maintainability Review
1				1			2.2	Building Commissioning
1				1			2.3	Building Systems Tuning
1				1			2.4	Independent Commissioning Agent
1	1			2	Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.0	Climate Adaptation Plan
	1			1	Building Information	To recognise the development and provision of information that facilitates operator and user understanding of Building systems, their operation and maintenance requirements, and their environmental targets, to enable optimised performance.	4.1	Building Information
	1			1	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 Reporting
	1			1			5.2	End of Life Waste Management
Y	-	-	-	-	Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering Strategy
1				1			6.1	Monitoring Strategy
Y	-	-	-	-	Construction Environmental Management	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan
	1			1			7.1	Formalised Environmental Management System
	1			1			7.2	High Quality Staff Support
	1			1	Operational Waste	To recognise projects that implement waste management plans that facilitate the re-use, upcycling to reduce the quantity of outgoing waste.	8.1	Waste in Operations

atelier ten

Hi	Med	Low	No	Poss-ible	Indoor Environment Quality			
8	5	3	1	17				
1				1	**Quality of Indoor Air**	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes
		2		2			9.2	Provision of Outside Air
	1			1			9.3	Exhaust or Elimination of Pollutants
1				1	**Acoustic Comfort**	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.0	Internal Noise Levels
1				1			10.1	Reverberation
1				1			10.2	Acoustic Separation
Y	-	-	-	-	**Lighting Comfort**	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort
	1			1			11.1	General Illuminance and Glare Reduction
			1	1			11.2	Surface Illuminance
1				1			11.3	Localised control
Y	-	-	-	-	**Visual Comfort**	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction
	1	1		2			12.1	Daylight
1				1			12.2	Views
1				1	**Reduced Exposure to 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			13.2	Engineered wood products
1				1	**Thermal Comfort**	To encourage and recognise projects that achieve high levels of thermal comfort.	14.0	Thermal Comfort
	1			1			14.1	Advanced Thermal Comfort

Energy

Hi	Med	Low	No	Poss-ible
5	3	4	10	22
				-
				20
Y	-	-	-	-
3	3	4	10	20
2				2

Greenhouse Gas Emissions	NABERS Energy Commitment Agreement Pathway	15D.0	Conditional Requirement: NABERS Pathway
		15D.1	NABERS Energy Commitment Agreement Pathway
	Performance Pathway: Reference Building Pathway	15E.0	Conditional Requirement: Reference Building Pathway
		15E.1	Comparison to a Reference Building Pathway
Peak Electricity Demand Reduction	Prescriptive Pathway	16E.0	Prescriptive Pathway - On-site Energy Generation
	Performance Pathway	16E.1	Performance Pathway - Reference Building

Transport

Hi	Med	Low	No	Poss-ible
3	3	1	3	7
				10
2	1			3
		1		1
1				1
	1			1
	1			1

	Performance Pathway	17A.0	Travel Emissions Calculator
Sustainable Transport	Prescriptive Pathway	17B.1	Access by Public Transport
		17B.2	Reduced Car Parking Provision
		17B.3	Low Emission Vehicle Infrastructure
		17B.4	Active Transport Facilities
		17B.5	Walkable Neighbourhoods

Water

Hi	Med	Low	No	Poss-ible
2	3	5	2	12
2	3	5	2	12
				1
				1
				2
				1
				1

	Performance Pathway: Reference Building I	18A	Reference Building Model
Potable Water	Prescriptive Pathway	18B.1	Sanitary Fixture Efficiency
		18B.2	Rainwater Reuse
		18B.3	Heat Rejection
		18B.4	Landscape Irrigation
		18B.5	Fire System Test Water

Hi	Med	Low	No	Poss-ible	Materials			
4	6	1	3	12				
				6	Life Cycle Impacts	Performance Pathway - Life Cycle Assessment Maximum 7 points	19.A.1	Comparative Life Cycle Assessment
				4			19.A.2	Additional Life Cycle Impact Reporting
1	2			3		Prescriptive Pathway - Life Cycle Impacts Maximum 5 points	19B.1	Concrete
	1			1			19B.2	Steel
				4			19B.3	Building Reuse
			3	3			19B.4	Structural Timber
1				1	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			1			20.2	Timber
	1			1			20.3	Cables, pipes, floors and blinds
1	1	1		3	Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Sustainable Products
				-	Construction and Demolition Waste	Prescriptive Pathway	22A	Fixed Benchmark
1				1		Performance Pathway	22B	Percentage Benchmark

Hi	Med	Low	No	Poss-ible	Land Use & Ecology			
1	3	2	0	6				
Y	-	-	-	-	Ecological Value	To reward projects that improve the ecological value of their site	23.0	Endangered, Threatened or Vulnerable Species
	1	2		3			23.1	Ecological Value
Y	-	-	-	-	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
1				1			24.1	Reuse of Land
	1			1			24.2	Contamination and Hazardous Materials
	1			1	Heat Island Effect	Heat Island Effect Reduction	25.0	Heat Island Effect Reduction

Hi	Med	Low	No	Poss-ible	Emissions			
2	2	1	0	5				
1				1	**Stormwater**	To reward projects that minimise peak storm water outflows and reduce pollutants	26.0	Stormwater Peak Discharge
	1			1			26.1	Stormwater Pollution Targets
Y	-	-	-	-	**Light Pollution**	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Properties
		1		1			27.1	Light Pollution to Night Sky
1				1	**Microbial Control**	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28.1	Microbial Control
	1			1	**Refrigerant Impacts**	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerant Impacts

Hi	Med	Low	No	Poss-ible	Innovation			
4	6	0	0	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.	30.A	Innovative Technology or Process
	1			1	**Market Transformation**	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30.B	Market Transformation
1	1			2	**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.	30.C	Improving on Green Star Benchmarks
3	2			5	**Innovation Challenge**	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30.D	Innovation Challenge
	2			2	**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 rating tools.	30.E	Global Sustainability