

**ESD Report
for SSDA**

Atlassian
Central
Development



Revision Information

Project	Atlassian Central development	
Title	ESD Report for SSDA	
Client	Avenor	
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Revision Schedule

Revision	Date	Issue Name	Author	Authorised
00	19.08.20	For Review	JvD, MW	LEP
01	04.09.20	For Review	JvD, MW	LEP
02	23.09.20	FINAL	JvD, MW	LEP
03	29.09.20	SSDA Submission	JvD, MW	LEP

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1.1 Description of the Site

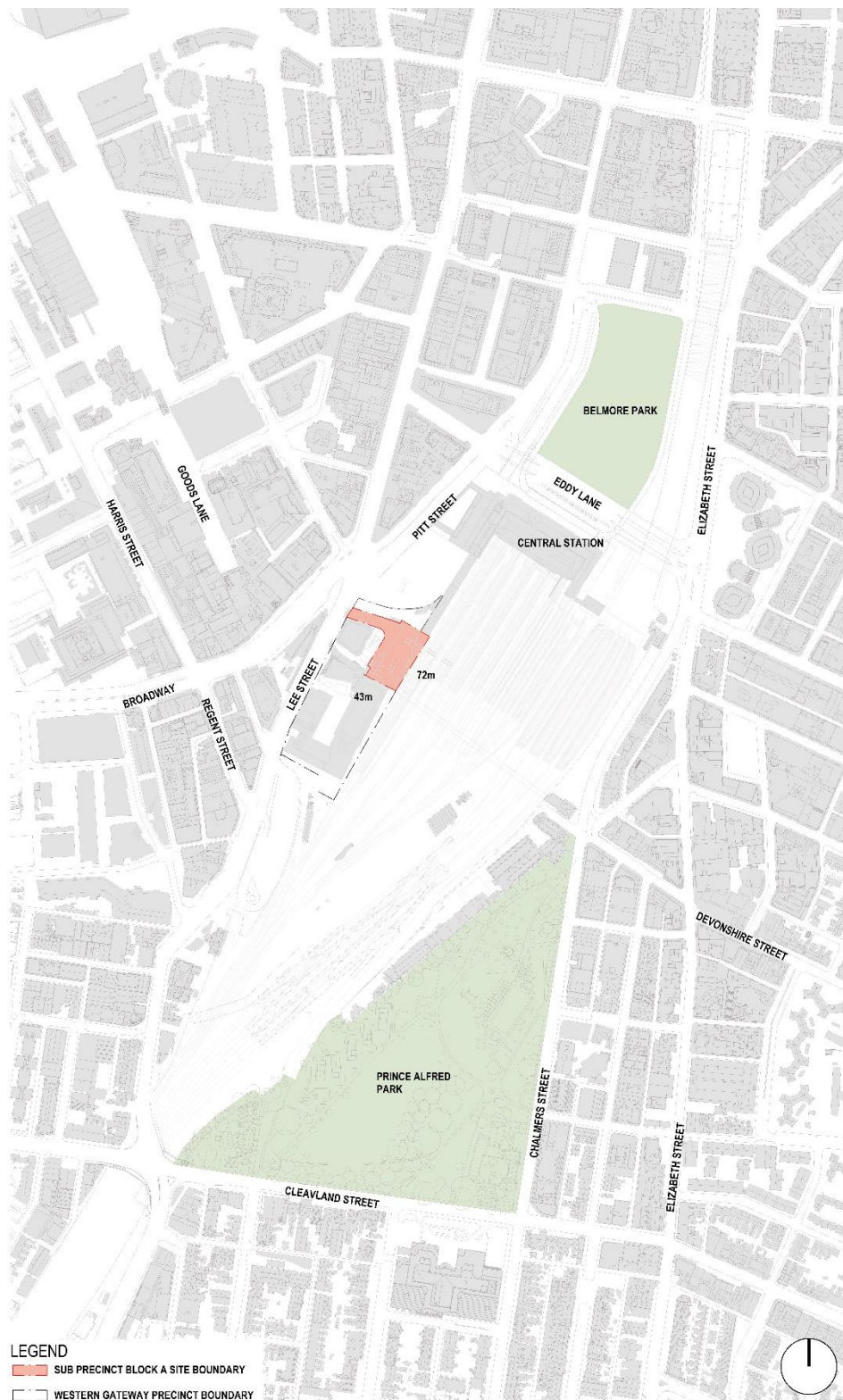
The Site is known as 8-10 Lee Street, Haymarket. It is an irregular shaped allotment. The allotment has a small street frontage to Lee Street, however this frontage is limited to the width of the access handle.

The Site comprises multiple parcels of land which exist at various strata levels. All the lots are in the freehold ownership of Transport for NSW, with different leasing arrangements:

- **Lot 116 in DP 1078271:** YHA is currently the long-term leaseholder of the Site which covers the areas shown in blue below.
- **Lot 117 in DP 1078271:** This is currently in the ownership of TfNSW and the applicant is seeking the transfer of the leasehold on this land to provide for an optimised basement and servicing outcome for the Site.
- **Lot 118 in DP 1078271:** This is currently in the ownership of TfNSW and the applicant is seeking the transfer of the leasehold for part of the air-rights above part of this allotment to allow for an optimised building envelope for the project. The proposal also uses a part of Lot 118 in DP 1078271 within Ambulance Avenue for Day 1 bike access, secondary pedestrian access and fire service vehicle access.
- **Lot 13 in DP 1062447:** This is currently in the ownership of TfNSW but TOGA (who hold the lease for the Adina Hotel) have a long-term lease of this space in the lower ground area.

The Site has an area of approximately 3,764sqm which includes 277sqm of air rights that apply from RL40.

Figure 1 – Site Location and Dimensions



1.2 Site and Surrounding Context

The Site is directly adjacent to the Western Wing Extension of Central Station, and forms part of the 'Western Gateway Sub-precinct' of the Central Railway Station lands. It is situated between the existing CountryLink and Intercity railway platforms to the east and the Adina Hotel (former Parcel Post Office) to the west.

Existing vehicle access to the Site is via Lee Street, however the Lee Street frontage of the Site is only the width of the access handle.

Current improvements on the Site include the Parcels Shed, which operated in association with the former Parcels Post Office (now the Adina Hotel). The Site is currently used as the Railway Square YHA. The Site also includes the western entryway to the Devonshire Street Pedestrian, which runs east-west through Central Station under the existing railway lines.

The Site is situated in one of the most well-connected locations in Sydney. It is directly adjacent to Central Station Railway which provides rail connections across metropolitan Sydney, as well as regional and interstate connections and a direct rail link to Sydney Airport. The Site is also within close proximity to several educational institutes and is a city fringe location which provides access to key support services.

Central Railway Station is currently undergoing rapid transformation to allow for integration of rail, metro and light rail transport infrastructure. This will elevate the role of Central Station not only for transport but also enhance opportunities for urban renewal and revitalisation of the surrounding precinct. This is one of the key drivers for the identification of the Central SSP and the Western Gateway Sub-precinct to accommodate a new innovation and technology precinct.

The proximity of the Western Gateway Sub-precinct to the city, while still being located outside the core Sydney CBD, provides opportunity for it to evolve to attract technology and innovation companies. It has access to all required services while being sufficiently separate to the CBD to establish a distinct technology industry ecosystem. Its CBD fringe location will provide affordable commercial rents which will support Startups and entrepreneurs which are a key component of an innovation precinct.

1.3 Project Description

The proposed SSDA will facilitate the development of a new mixed-use development comprising '*tourist and visitor accommodation*' (in the form of a 'backpackers') and commercial office space within the tower form. Retail, lobby and food and drink premises at the Lower Ground level and Upper Ground level.

Atlassian Central at 8-10 Lee Street will be the new gateway development at Central Station which will anchor the new Technology Precinct proposed by the NSW Government. The new building will be purpose-built to accommodate the Atlassian Headquarters, a new TfNSW Pedestrian Link Zone, and the new Railway Square YHA backpacker's accommodation, in addition to commercial floorspace to support Tech Start-ups.

The new development is to be built over the existing heritage former Inwards Parcels Shed (the Parcels Shed) located on the western boundary of Central Station with the Adina hotel to the west. The works includes a 38-storey mixed-use tower with basement loading dock facilities and end of trip (EOT) facilities accessed off Lee Street, 2 storey lobby utilising the Parcels Shed building, lower ground and upper ground retail, YHA hostel and commercial tower with staff amenities to the mid-level and roof top areas and a pedestrian Link Zone works for TfNSW.

The building design has been conceived to support the delivery of a site plan designed to connect with future developments to both the south and east and integrate with a cohesive public realm for the broader Sydney community in accordance with NSW government strategic planning.

The tower design is a demonstration project for Atlassian, representing their commitment to environmental sustainability and contemporary workplace settings through tower form and construction systems along with a set of emblematic outdoor workplaces stacked in the tower form.

The existing Parcels Shed will be adaptively re-used in accordance with best practice heritage process and form the upper level of a 2-storey entry volume that connects visually with the 2 level Link Zone. Over the roof of the Parcels Shed, a new privately owned but publicly accessible landscaped area will be created as the first part of a new upper level public realm that may extend to connect to a future Central Station concourse or future Over Station Development.

The proposed mixed use tower directly adjoins a live rail environment to the east and public domain to the north, west and south. These works will consider these rail environments and have been designed to ensure that all TfNSW external development standards are achieved. This ensures there is no impact to the operation or safety of these TfNSW assets.

Interfaces from the overall site and especially the State works Link Zone have been designed in consultation with the adjoining stakeholders. These stakeholders include TfNSW to the north and south, Toga and the Adina Hotel operator to the west and the Dexus Fraser's site to the south. Connections via the Link Zone, through the basements, and off the proposed new Link Zone dive ramp will be designed to enable existing and future developments to function in both the day 1 scenario and end state when all developers have completed their works.

The overall project aspiration is to create a world class tech precinct with effective pedestrian links through the Atlassian site to the Central Station western forecourt to Central Walk west and adjoining stakeholder's sites.

1.4 Glossary

1.5 Glossary of Key Terms

Term	Definition
Atlassian Site	8 – 10 Lee Street, Haymarket
The Project	Commercial and hotel development above the Former Inwards Parcel Shed at 8-10 Lee Street, Haymarket
Block B or "Dexus/ Frasers Site"	14-30 Lee Street Haymarket. Adjoining land immediately to the south currently comprising three 8 storey commercial buildings.
Block C or Adina Hotel	2 Lee Street, Haymarket The Former Parcels Post Office The Adina Apartment Hotel Sydney Central
Central Sydney	Land identified as Central Sydney under the Sydney LEP 2012 and includes Sydney's Central Business District
Sub-precinct	Western Gateway Sub-precinct
Atlassian Central	The Atlassian tower building (building only)
Atlassian Central development	The whole Atlassian development within the Atlassian Site including the tower and public domain works.
Devonshire Street Tunnel	The pedestrian and cycle tunnel running between Chalmers Street and Lee Street
Link Zone	The publicly accessible land within the Site.
Central Walk West	The future western pedestrian entry to the new 19 metre wide underground concourse customers to suburban rail and Sydney Metro platforms.
Habitat Level 1	Flexibly ventilated workspace areas

1.6 Abbreviations

Abbreviation	Meaning
A	Ampere
ACHAR	Aboriginal Cultural Heritage Assessment Report
AEO	Approved Engineering Organisation
AHIMS	Aboriginal Heritage Information Management System
AS	Australian Standard
ASA	Asset Standards Authority
APAR	Airports Protection of Airspace Regulations
ASP 1	Accredited Level 1 Service Provider (High Voltage Construction)
ASP 3	Accredited Level 3 Service Provider (High Voltage Design)

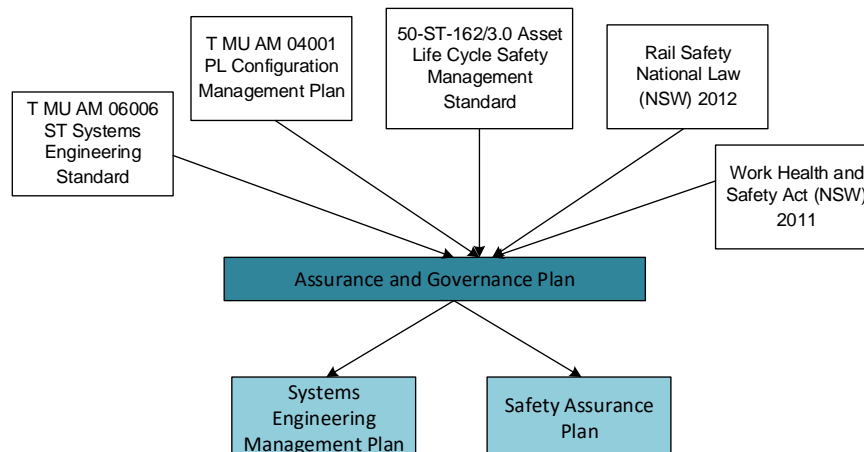
ASS	Acid Sulfate Soils
ATP	Australia Technology Park
BC Act	Biodiversity Conservation Act 2016
BCA	Building Code of Australia
BDAR	Biodiversity Assessment Report
Camperdown-Ultimo Strategy	Camperdown-Ultimo Collaboration Area and Place Strategy
CDRP	Central Design Review Panel
Central SSP	Central Station State Significant Precinct
C2E	Strategy Central to Eveleigh Urban Transformation Strategy
CMP	Conservation Management Plan
Council	City of Sydney Council
CPTED	Crime Prevention Through Environmental Design
CPTMP	Construction Parking and Traffic Management Plan
CSPS	Draft Central Sydney Planning Strategy
DAS	Distributed Antenna Service
DBYD	Dial Before You Dig
DES	Design Excellence Strategy
Design Brief	Architectural Design Competition Brief
Design Competition	Architectural Design Competition
Design Guideline	Western Gateway Design Guideline
Devonshire Tunnel	Devonshire Street Pedestrian Tunnel
District Plan	Eastern City District Plan
DIP	Ausgrid Design Information Package
DN	Diameter Nominal
DPC	NSW Department of Premier and Cabinet
DP	Deposited Plan
DSI	Detailed Site Investigation
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EPBC	Act Environment Protection and Biodiversity Conservation Act 1999
ESD	Ecologically Sustainable Development
GANSW	NSW Government Architect's Office
GFA	Gross Floor Area (as defined under the Sydney Local Environmental Plan 2012)
HIS	Heritage Impact Statement
HV	High Voltage
Infrastructure Strategy	State Infrastructure Strategy 2018-2038
kPa	kilo Pascal
kVA	kilo Volt Amp
LGA	City of Sydney Local Government Area
L/s	Litre per second
LSPS	Draft Sydney Local Strategic Planning Statement
LV	Low Voltage
m	metre
MCF	Mobile Carriers Forum
mm	millimetre

NBN	National Broadband Network
NIA	Noise Impact Assessment
OEH	NSW Office of Environment and Heritage
OLS	Obstacle Limitation Surface
OWMP	Operational Waste Management Plan
Parcels Shed	Former Inward Parcels Shed
PSI	Preliminary Site Investigation
Region Plan	A Metropolis of Three Cities – Greater Sydney Region Plan
RAP	Remediation Action Plan
RAPs	Registered Aboriginal Parties
RMS	Roads and Maritime Services
RTTC	Radar Terrain Clearance Chart
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEPP 55	State Environmental Planning Policy No.55 – Remediation of Land
SEPP Infrastructure	State Environmental Planning Policy (Infrastructure) 2007
SEPP SRD	State Environmental Planning Policy (State and Regional Development) 2011
sqm	Square Metres
SREP SH	Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005
SSD	State Significant Development
SSDA	State Significant Development Application
Sub-precinct	Western Gateway Sub-precinct
Sydney 2030	Sustainable Sydney 2030 Strategy
Sydney LEP 2012	Sydney Local Environmental Plan 2012
Taskforce	Tech Taskforce
TIA	Transport and Accessibility Impact Assessment
TNSW	Transport for New South Wales
The Minister	The Minister for Planning, Industry and Environment
The Regulation	Environmental Planning and Assessment Regulation 2000
Transport Strategy	Future Transport Strategy 2056
Urbis	Urbis Pty Ltd
VA/m2	Volt Amps per square meter
VIA	Visual Impact Assessment
YHA	Youth Hostel Association
WELL	WELL Building Standard
WSAA	Water Service Code of Australia
WSC	Water Services Coordinator

2 ASA Compliance and AEO Process

The Atlassian Building Project, as part of the greater Central Precinct Renewal project, is required to comply with ASA Standards and due to the interface with the rail corridor is required to follow an AEO process throughout the project lifecycle.

The Assurance structure adopted by the project in order to deliver a compliant project is as shown below:



The Assurance and Governance of the project, in accordance with the AEO Requirements set out in the TfNSW standards - Configuration Management Plan (T-MU-AM-04001-PL V6.0), Systems Engineering Standard (T-MU-AM-06006-ST V2.0) and Asset Lifecycle Safety Management Standard (50-ST-162/3.0) is documented within the Project Assurance and Governance Plan (ABC-AGP-PLN-0001 V6.0).

This plan sets out the governance arrangement and assurance principles that will be applied throughout the project lifecycle, further details pertaining to the conduct and assurance of systems engineering principles and safety assurance are set out in the project Systems Engineering Management Plan ABC-SEMP-PLN-0001 V6.0 (SEMP) and Safety Assurance Plan ABC-SAP-PLN-0001 V6.0 (SAP) respectively.

The compliance of the project with ASA standards is carried out at an individual design discipline level. Relevant ASA Standards will be applied to the activities conducted by LCI Consultants during the design of the project.

3 Assessment Requirements and Project Responses

3.1 Clause 7(4) of Schedule 2

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

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.*

PROJECT RESPONSE

The proposed project will be constructed on previously developed land and will not disturb or degrade any local greenfield site. During the design and construction phases, the main contractor will implement an independently certified Environmental Management System (EMS), which demonstrates formalised systematic and methodical approach to planning, implementing and auditing. Throughout the building's operation, adherence to procedures that account for environmental risk and mitigation measures will be met.

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.

PROJECT RESPONSE

To uphold inter-generational equity, the proposed development minimises the consumption of energy and water resources whilst reducing embodied carbon and waste. The ESD principles incorporated into the proposed development facilitates the conservation of energy and water resources through energy and water efficiency measures.

Energy consumption will be designed to achieve a minimum 10% improvement above National Construction Code requirements (NCC BCA 2019) and is targeting even higher levels of efficiency. The building is targeting a net-zero carbon emissions pathway through reductions in operational energy consumption and offsetting strategies. This will be achieved using passive design strategies including natural ventilation and mixed mode ventilation, air stratification and internal shading to minimise energy for space conditioning. Onsite renewable energy from solar PV panels and the purchasing of offsite renewable energy will deliver operational net-zero carbon.

The reduction in water use will be established through high WELS rated water fixtures and fittings and a rooftop rainwater capture and reuse for irrigation of planting in the Crown and Park zones. Toilets and cooling towers will be connected to a dual reticulation/ third-pipe system that can be connected to any future precinct-wide recycled water networks.

Waste generated during the construction and operational phases will be diverted from landfill to be recycled. An Environmental Management System (EMS) will be established and adhered to throughout construction. Operational waste streams will be separated to maximise recycled waste once the building is complete and occupied.

The structure of the building will consist of a steel frame and concrete core coupled with cross-laminated timber (CLT). These materials reduce embodied carbon in two ways; by avoiding the use of energy intensive cement and by sequestering carbon in the timber structure.

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

Conservation of Biological Diversity and Ecological Integrity

Namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.

PROJECT RESPONSE

The Project will be built on a previously-developed site, ensuring no loss of biodiversity or ecological integrity. In fact, the landscaping proposed for the Crown levels will include native plant selections that will generate a habitat that could support insect and bird species that have been previously displaced.

The implementation of a Construction Environmental Management Plan (CEMP) during delivery will ensure that any stormwater captured will be treated before being discharged from the site, rendering a positive impact on balance to the water aspects that sustain threatened species and ecological communities.

Further, the project's ESD principles to reduce energy, water and waste consumption have an indirect impact to conserve biodiversity and ecological integrity to the broader environment. By minimising demand on energy and water resources, the need for land-clearing and the pollution generated from utility infrastructure will be minimised.

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; and*
- (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.*

PROJECT RESPONSE

The valuation of the project's assets and services consider environmental factors through the implementation of various ESD initiatives. An Environmental Management System will be in place throughout the construction to ensure that excessive pollution and waste are minimised, and to establish recycling and landfill waste streams during construction and operational phases. This creates a system where pollution is managed and controlled and creates an incentive to reduce pollution and waste.

In operation, the pursuit of environmental ratings such as Green Star and NABERS promote resource efficiency that reduces running costs and increases the value of the development to investors, owners and tenants.

3.2 Frameworks for Best Practice Sustainable Design Principles

3.2.1 Sustainable Design Principles at Atlassian Railway Square

Sustainability is embedded in the ethos of Atlassian which has been evident in the leadership displayed by the founders of the organisation. Consequently, sustainability has been a key foundation of the project since the inception in 2017 and is seen as providing the opportunity to pave the way for the Western Gateway Sub-Precinct. Indeed, Atlassian is committed to achieving carbon neutrality by 2025 through the RE100 program which will ensure that the new development has net-zero emissions.

In recognition of the importance of these values, Atlassian engaged specialists from Australia (LCI) and Europe (Transsolar) during the pre-competition stages of the project to work with the competition architects EC3 and embed these values as part of the reference design's DNA. Located in Germany, Transsolar is an internationally acclaimed climate consulting practice specialising in very low energy and carbon neutral buildings.

As part of the competitive design process for the site, the sustainability brief was used as a critical guide for competitors, and LCI/Transsolar were part of the technical team appraising the competition entries. These sustainability aspirations were also a key component of the weighting for the assessment and appraisal of the competition entries.

The response of Atlassian and the design team has been to design a unique building which is true to the holistic sustainability aspirations of the design rather than designing to achieve the specific outcomes of a formal green building rating. Indeed, the process has been to develop the design with the highest sustainability intent and then see how it rates. The result is a building that is not chasing points but aspiring to deliver sustainable concepts which match the development's vision.

Table 2 includes some examples of ESD framework elements or principles that SEARS suggests may be considered.

Table 2 – Suggested Framework Principles from SEARS requirements.

SEARS Principle referenced	Atlassian Railway Square Design Response
Waste reduction design measures	<p>During Construction, more than 90% of demolition and construction waste will be recycled.</p> <p>During Operation, initiatives including food rescue, segregation and dehumidification of food waste, container deposit recycling and comingled recycling will occur.</p>
Future proofing,	<p>The building incorporates mixed mode and naturally ventilated spaces that could be conditioned by future tenants, if required.</p> <p>A third-pipe recycled water reticulation network is provided for connection to future recycled water networks.</p>
Use of sustainable and low-carbon materials	<p>Timber structure has been introduced in habitats that allow for high rise construction, using 'megafloor' structural transfer slabs.</p> <p>Where possible, concrete will be high in supplementary cementitious materials to reduce Portland cement.</p> <p>Steel structures and aluminium façade elements will be refined and will be sourced from suppliers with low carbon practices and technologies.</p>
Energy and Water efficient design and technology (including water sensitive urban design)	<p>Proposed Mechanical, Electrical and Hydraulic building services will be efficient and minimise the use of energy and water.</p> <p>The roof (Crown) will incorporate significant landscaping for heat island minimisation and biodiversity improvement, whilst ameliorating stormwater impacts.</p>
Use of renewable energy	<p>In addition to the potential inclusion of renewable energy on-site (i.e. solar PV panels), Atlassian is committed to operating the building using 100% Renewable Energy sourced off-site.</p>

Figure 3 demonstrates some of the inherent sustainability attributes of the proposed design. These attributes contribute to the sustainability story that the building portrays, however they may not necessarily translate into a high rating score for any or all of the various Sustainability Rating tools. Notwithstanding this, the following section provides an indication of how the current design currently rates for a variety of tools.

Figure 3 – Sustainability Initiatives



3.3 Third Party ESD Certification

3.3.1 Green Star Design and As- Built v1.3

The project has committed to achieving a 6 Star Green Star Design and As-Built rating which exceeds 'Australian Best Practice' and is considered to exhibit 'World Leadership' design. The Green Star rating system provides a framework to assess how a building reduces its impact on the environment while meeting the economic and social needs for its occupants and surrounding communities.

The Green Star rating system assessing buildings through the following categories:

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

Points are awarded for a building project's ability to secure as many credits from each category. Each credit targets the environmental impact of a specific design feature. The total number of points awarded determines if the project earns a rating as shown in Figure 4. The Green Star Design and As-Built v1.3 pathway for Atlassian Railway Square is summarised in Appendix A.



Figure 4: Available Green Star Certification ratings

3.3.2 NABERS Energy

The National Australian Building Energy Rating Scheme (NABERS) is a performance-based tool used to measure the operational impacts in existing buildings. The NABERS rating scheme rates energy, water, waste and IEQ in offices, shopping centres, data centres, hotels, and apartment buildings. Depending on the building type, the base building, tenancy or whole building can be rated.

The City of Sydney sets bold targets for energy efficiency in its 2012 DCP (updated in August 2018) which include a peer-reviewed NABERS Energy Commitment Agreement of at least 5.5 Stars prior to CC approval. This target is one of the highest of all planning jurisdictions in Australia and to exceed this requirement and achieve a 6 Star NABERS Energy rating is rare because the scale beyond 5 Stars becomes non-linear and equipment efficiency improvements become less effective in increasing the rating.

Only a small number of projects in the Sydney CBD have achieved a 6 Star rating without the use of Green Power (only 12 across the whole country). One is a small A-Grade building with little external fabric and the other two are low rise waterfront buildings with access to harbour cooling. These buildings are not directly comparable to the Atlassian Central Development and therefore idealised assumptions about occupant behaviour and operation

must be made. This is even more challenging in a building that incorporates innovative mixed mode and natural ventilation features that rely on all tenants committing to fully utilising adaptive comfort behaviours.

The commercial office portion of the proposed development will target a 5.5 Star NABERS Office Base Building Energy rating (without GreenPower). A 6 Star rating may be achievable if accredited Green Power is procured but this would restrict Atlassian's procurement options and may not be desirable.

The YHA cannot be rated using the NABERS tool as it is not of a sufficient quality star rating to be comparable to a typical full service hotel.

3.3.3 NABERS Water

The proposed target of 4.5 Star for NABERS Water is also aspirational and not yet widely achieved. Only a small number of commercial buildings in Sydney have achieved a 4.5 Star rating or better (just one 5 Star rating) and of that number;

- Approximately a quarter have no co-incident NABERS Energy rating, suggesting high water efficiency but no energy efficiency.
- Nearly a third have harbour heat rejection systems, rather than conventional cooling towers, significantly reducing water usage.
- At least one building has a recycled water treatment plant that minimises potable water use.
- More than half are low-rise buildings with less than 20,000sqm of NLA with large roofs for rainwater capture and, in some instances, air cooled plant that does not consume water for heat rejection.

Site constraints and the tall form of the building preclude many of these opportunities, making a 4 Star NABERS Water rating a more realistic target for larger commercial towers. The areas of naturally ventilated and mixed mode air conditioning should minimise heat rejection water demand and the vegetated and landscaped areas of the building will be drained to a rainwater tank for irrigation. Additionally, the building will include dual reticulation of potable and non-potable water to allow the development to access any recycled water network in the future which will deliver an immediate and measurable improvement in NABERS Water rating.

The YHA cannot be rated using the NABERS tool as it is not of a sufficient quality star rating to be comparable to a typical full service hotel.



Figure 5: NABERS Star Scale

3.3.4 WELL Rating

The US developed Health and Wellbeing rating, WELL, is relatively new to Australia but is gaining traction with commercial building owners and tenants. Atlassian Central is aspiring to achieve a WELL Core rating for the commercial base building. A full WELL rating includes concepts that reward tenant HR policies and operational provisions that do not influence the base building design. Some WELL concepts relate to external influences that are hard to design for, such as municipal water quality criteria (i.e. no fluoride) and outdoor pollution from the absence of catalytic converters on passing buses and trucks.

WELL builds on the committed Green Star Design and As-Built rating scheme and also rewards design features that support the wellbeing of occupants. Atlassian Railway Square's 6 Star Green Star pathway includes 15 of the 17 points available for the Indoor Environment Quality category and include Transport category credits that promote health and wellbeing such as End of Trip facilities and a high Walkability score.



Figure 6: WELL Rating Scale

3.4 Design for Climate Change Resilience

The new Atlassian Central will be designed to future-proof itself from the potential impacts of climate change.

NARCLIM Climate Change Projections

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

1. more hot days and fewer cold nights;
2. an increase the number of heatwave events;
3. more hot days above 35°C; particularly in Spring and Summer;
4. an increase in rainfall in Summer and Autumn and a decrease in Winter and Spring; and
5. a change in rainfall patterns that will affect drought and flooding events.

CSIRO Climate Future Projections

In addition, the Intergovernmental Panel on Climate Change (IPCC) published four greenhouse gas (GHG) concentration trajectories known as Representative Concentration Pathways (RCPs) which are used by CSIRO for climate projection modelling at a regional scale within Australia. The four RCPs and its definitions include:

- **RCP 2.6** – Emissions peak 2010-2010, decline substantially – 1.0°C of Global Warming Mean and likely temperature range of 0.3°C – 1.7°C
- **RCP 4.5** – Emissions peak around 2040, then decline – 1.8°C of Global Warming Mean and likely temperature range of 1.1°C – 2.6°C
- **RCP 6.0** – Emissions peak around 2060, then decline – 2.2°C of Global Warming Mean and likely temperature range of 1.4°C – 3.1°C
- **RCP 8.5** – Emissions continue to rise throughout the 21st century – 3.7°C of Global Warming Mean and likely temperature range of 2.6°C – 4.8°C

The series of climate futures matrices representing the combination of time periods and greenhouse gas scenarios and classified by the combined changes of the climate variables identified above are provided in *Table 7: Climate futures matrices for RCP 4.5 and RCP 8.5 at East Coast*

PROJECT RESPONSE (See *Table 8: Climate change projections and response initiatives for Atlassian Railway Square*)

To provide practical and realistic design advice, the use of climate projection data from the medium range scenarios, RCP 4.5, is considered for the 2030 climate projections. The RCP 8.5 scenario is considered an extreme worst-case scenario and has been considered for the 2070 climate projections.

The projections will have an impact on operational costs and occupancy comfort and safety. Hotter days with more heatwave events will particularly affect comfort in the naturally ventilated spaces and the operation of building services equipment. This will also require higher capacity and operational costs for mechanical services to maintain occupancy comfort. Increased drought events will require provisions to supplement shortages in potable water. Stronger and reinforced façade components may be required to withstand increased intensity of storm events

The design initiatives in Figure 7 aim to mitigate the effect of future climate change. These measures should allow the project to meet the difficulties predicted by the CSIRO's climate change projections while maintaining occupancy comfort and operational efficiency.

Table 7: Climate futures matrices for RCP 4.5 and RCP 8.5 at East Coast

East Coast Climate Futures		Year																																																													
		Summer 2030	Summer 2070																																																												
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Source: CSIRO and Bureau of Meteorology, Climate Change in Australia website (<http://www.climatechangeinaustralia.gov.au>)

Table 8: Climate change projections and response initiatives for Atlassian Railway Square

Climate Change Projections	Project Responses
<ul style="list-style-type: none"> Hotter days and more frequent heatwave events 	<p>Mechanical System Provision</p> <ul style="list-style-type: none"> External Ambient conditions should include an extra 1°C (dry bulb) temperature to calculate the required cooling load of the building as a measure of accounting for 2030 RCP4.5 projections. The cooling load is satisfied by the chillers, cooling towers, chilled water pumps, condenser water pumps, pipework and air side systems, and, as such, all the aforementioned equipment associated with cooling accounts for the requirement of RCP 4.5. Further, the increase in temperatures as per 2070 RCP8.5 projections will be met as the main HVAC equipment that will satisfy the cooling demand will be replaced in approximately 25-30 years. Spatial provision is enabled through the equipment selection process which inherently provides for larger equipment typically in the range of 4-8% than that of the design requirement. However, it is also noted that equipment produced in 25-30 years will be of a much higher efficiency than that currently produced and, as such, will require a smaller footprint to satisfy the same load as that of its current day equivalent. Selecting external ambient conditions now to account for the provisions of RCP8.5 projections would be counter intuitive, as the main equipment items which satisfy the cooling demand will be oversized and will not operate with the desired efficiency. <p>Architectural Design</p> <ul style="list-style-type: none"> Increase in hotter ambient temperature is addressed via use of a high-performance façade to improve overall thermal resistance, minimising radiation penetrating the building, which affects energy consumption and thermal comfort. Working zones are biased towards the South-East of the floorplate with the setback from the façade on the North and West providing self-shading. In addition, shading platforms/ledges in the articulated façade provide external shading and further reducing direct solar radiation.
<ul style="list-style-type: none"> Extended drought periods 	<p>The current hydraulic services design implements water efficient fittings and a roof capture and reuse strategy to reduce potable water consumption that will assist in combating extended drought periods.</p> <ul style="list-style-type: none"> The design incorporates a compact rooftop rainwater harvesting and reuse system that captures rainwater from the roof areas to reuse for irrigation. Toilets, urinals, and cooling towers will be connected to a future precinct-wide rainwater harvesting network. In addition, strategies that assist water efficient design include, subject to detailed design of the project: Potable water using fixtures to be low-flow and WELS rated. Potable water sub-metering to be connected to the BMCS to reduce wastage through identifying leaks, or poor operational performances
<ul style="list-style-type: none"> More extreme rainfall events 	<ul style="list-style-type: none"> Significant works to raise basement ramp entry levels to reduce flooding of basement Significant stormwater upgrade and diversion works to integrate with broader precinct infrastructure.

4 Conclusion

The framework for the competition has produced an exceptional architectural design response which reflects the sustainability aspirations and draft design guidelines framework.

The successful scheme represents a significant step up in design quality which puts sustainability at the fore front of the design. There is ongoing refinement and technical work as part of the design development to ensure that the ESD principles are further enhanced beyond the SSDA submission.

The high performance level of the building will be realised through the application of a high performance double operable façade, innovative low energy air conditioning system, significant areas of natural ventilation to the tower, integrated on-site renewable power generation, a low carbon timber structure, and a commitment to off-site renewable power.

4.1 Appendix A – Green Star Design & As Built v 1.3 Scorecard

The following Green Star credit assessment for the combined development has been based on a combination of the SHoP/BVN competition design and a typical Business As Usual approach to PCA Premium Grade commercial office building in Sydney.

The credit analysis is based on current design initiatives and does not rely on implementing strategies to solely seek Green Star Credit points. It is worth noting that the main credit point benefit is due to the commitment of off-setting all greenhouse gas emissions through off-site renewables.

The following Green Star pathway demonstrates that the building as currently designed, is capable of achieving a 6 Star Green Star rating. Specific credits may change through design development and the following list should not be relied upon, however the Project is committed to achieving the targeted rating.

Credit Code	Criteria Title	Points Targeted
Management Category		
1.1	Accredited Professional	1
2.0	Prerequisite: Environmental Performance Targets	Will Comply
2.1	Services & Maintainability Review	1
2.2	Building Commissioning	1
2.3	Building Systems Tuning	1
2.4	Independent Commissioning Agent (ICA)	-
3.1	Climate Adaption Plan	-
4.1	Building Operations & Maintenance Information	1
5.1	Environmental Building Performance	1
5.2	End of Life Waste Performance	-
6.0	Prerequisite: Metering	Will Comply
6.1	Monitoring Systems	1
7.0	Prerequisite: Environmental Management Plan (EMP)	Will Comply
7.1	Formalised Environmental Management System	1
7.2	High Quality Staff Support	1
8B	Prescriptive Pathway: Facilities	1
IEQ Category		
9.1	Ventilation System Attributes	1
9.2	Provision of Outdoor Air	1
9.3	Exhaust OR Elimination of Pollutants	1
10.1	Internal Noise Levels	1
10.2	Reverberation	-
10.3	Acoustic Separation	-
11.0	Prerequisite: Minimum Lighting Comfort	Will Comply
11.1	General Illuminance & Glare Reduction	1
11.2	Surface Illuminance	-
11.3	Localised Lighting Control	-
12.0	Prerequisite: Glare Reduction	Will Comply
12.1	Daylight	1
12.2	Views	1
13.1	Paints, Adhesives, Sealants & Carpets	1
13.2	Engineered Wood Products	1
14.1/2	Thermal Comfort	2

Credit Code	Criteria Title	Points Targeted
Energy Category		
15E.0	GHG Emission: Conditional Requirement	Will Comply
15E.1	Building Fabric Improvement	-
15E.2	Whole Building Improvement	8
15E.3	Off-Site Renewables	12
15E.5.2	Fuel Switching	2
Transport Category		
17A	Sustainable Transport: Performance Pathway	7.5
Water Category		
18A	Potable Water: Performance Pathway	5
Materials Category		
19A.1	Comparative Life Cycle Assessment	6
19A.2	Additional Life Cycle Impact Reporting	1
20.1	Structural and Reinforcing Steel	1
20.2	Timber Products	-
20.3	Permanent Formwork, Pipes, Flooring, Blinds & Cables	1
21.1	Product Transparency	-
22.1	Demolition and Construction Waste	1
Land Use and Ecology Category		
23.0	Prerequisite: Endangered, Threatened or Vulnerable Species	Will Comply
23.1	Ecological Value	1
24.0	Conditional Requirement: Sustainable Sites	Will Comply
24.2	Contamination and Hazardous Materials	-
25.1	Heat Island effect	1
Emission Category		
26.1	Peak Discharge	1
26.2	Stormwater Pollution Targets	1
27.0	Conditional Requirement: Light Pollution Neighbouring Properties	Will Comply
27.1	Light Pollution Night Sky	-
28.1	Microbial control	-
29.1	Refrigerants	1
Innovation Category		
30A	On-Site Renewable	2
30B	Soft Landings	1
30C	Supplementary or Tenancy Fit-out Systems Review	1
30C	No New Car Parks on Site	1
30D	Financial Transparency	1
30D	High Performance Site Offices	1
30D	Reconciliation Plan	1
Total Green Star Points		79.5
Green Star Rating		6 Star