Macquarie Capital

Sydney Metro Martin Place Station

Stage 1 SSDA Report – Ecologically Sustainable Design (ESD), Green Star and NABERS

SMMPS_ARP_00_ZZ_RP_R_90002

Rev DA04 | 18 August 2017

247838

Arup

Arup Pty Ltd ABN 18 000 966 165

Arup

Level 10 201 Kent Street

PO Box 76 Millers Point

Sydney 2000

Australia

www.arup.com

ARUP

Contents

Page

Executive Summary

This report has been prepared for Macquarie Capital to outline the key Ecologically Sustainable Design (ESD) initiatives for the proposed Sydney Metro Martin Place Station Project, located in Sydney's CBD.

The project comprises of the development of a new underground station and the addition of two towers; one to the north and one to the south of 50 Martin Place. A Green Star custom tool developed for Sydney Metro will be used and further developed for the entire precinct. The overall precinct design will exceed the Sydney Metro TfNSW minimum requirements.

The station development will be designed to be consistent with Sydney Metro TfNSW guidelines such as;

- Easy door to door customer experience
- Consistent customer experience
- Integrated Customer Experience
- Way finding and coordination

The ESD objectives for the North and South Tower that form the over station development will target world best practice, summarised as follows:

- 5 star NABERS Energy minimum based on 2016 protocol
- 3.5 star NABERS Water Rating target based on 2016 protocol
- 6 Star Green Star Office Design & As-Built v1.1
- Occupant wellbeing

The above ESD objectives are outlined in Section 6. However, Macquarie is exploring additional initiatives across the precinct and station to excel beyond world's best practice. Such aspirations are included in Section 7, and will be considered throughout the design development.

1 Introduction

This report supports a State Significant Development (SSD) Development Application (DA) submitted to the Minister for Planning pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Macquarie Corporate Holdings Pty Limited (Macquarie) is seeking to create a World Class Transport and Employment Precinct at Martin Place, Sydney.

The application seeks Stage 1 approval for the establishment of building envelopes, maximum Gross Floor Areas and design parameters for two predominantly commercial office Over Station Development (OSD) towers, located above the site of the future Martin Place Metro Station (part of the NSW Government's Sydney Metro project).

In particular this report addresses the ESD elements of the Secretary Environmental Assessment Requirements (SEARs), Application number SSD 8351 which requires the EIS to *'detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation 2000) will be incorporated in the design, construction and ongoing operation of the development; and include a framework for how the proposed development will reflect best practice sustainable building principles to improve environmental performance, including energy and water efficient design and technology, and use of renewable energy.*'

2 Background

The New South Wales (NSW) Government is implementing Sydney's Rail Future (Transport for NSW, 2012), a plan to transform and modernise Sydney's rail network so that it can grow with the city's population and meet the needs of customers in the future.

Sydney Metro is a new standalone rail network identified in Sydney's Rail Future. The Sydney Metro network consists of Sydney Metro Northwest (Stage 1) and Sydney Metro City & Southwest (Stage 2).

Stage 2 of the Metro entails the construction and operation of a new Metro rail line from Chatswood, under Sydney Harbour through Sydney's CBD to Sydenham and eventually onto to Bankstown through the conversion of the existing line to Metro standards. The project also involves the delivery of seven (7) new Metro stations, including Martin Place.

This step-change piece of public transport infrastructure once complete will have the capacity for 30 trains an hour (one every two minutes) through the CBD in each direction catering for an extra 100,000 customers per hour across the Sydney CBD rail lines.

On 9 January 2017 the Minister for Planning approved the Stage 2 (Chatswood to Sydenham) Metro application lodged by Transport for NSW (TfNSW) as a Critical State Significant Infrastructure (CSSI) project (reference SSI 15_7400).

TfNSW is also making provision for future Over Station Development (OSD) on the land it has acquired for the Stage 2 Sydney Metro project, including land acquired for the purposes of delivering Martin Place Station. The OSD development is subject to separate applications to be lodged under the relevant provisions of the EP&A Act.

An Unsolicited Proposal submission has been lodged by Macquarie to the NSW Government for the delivery of a single fully integrated station/OSD solution for the new Sydney Metro Martin Place Station.

Site Description

The Sydney Metro Martin Place Station Precinct (the Precinct) project relates to the following properties (refer to **Figure 1**):

- 50 Martin Place, 9 – 19 Elizabeth Street, 8 – 12 Castlereagh Street, 5 Elizabeth Street, 7 Elizabeth Street, and 55 Hunter Street (North Site);
- 39 – 49 Martin Place (South Site); and
- Martin Place (that part bound by Elizabeth Street and Castlereagh Street).

The land the subject of this application relates only to the North and South Site (refer to **Figure 2**). Each site will accommodate one OSD tower above the future Sydney Metro Martin Place Station (representing the northern and southern entries/gateways to the Sydney Metro station). The land acquired for the Sydney Metro Martin Place Station is the same as for the Macquarie proposal, except that the Macquarie proposal includes the two properties north of Martin Place owned by Macquarie, namely 50 Martin Place and 9-19 Elizabeth Street.

Both the North and South Sites are regular in shape and have area of approximately 6,022m^2 and 1,897m^2 respectively, totalling 7,919m^2.

Figure 1 – Location map of the Precinct
Source: Google maps and JBA

Figure 2 – Aerial photo of the North and South Site
Source: Nearmap and JBA

Located close to the centre of the Sydney CBD, the Precinct comprises of the entire City block bounded by Hunter Street, Elizabeth Street, Martin Place and Castlereagh Street; that portion of Martin Place located between Elizabeth Street and Castlereagh Street and the northern most property in the block bounded by Martin Place, Elizabeth Street, Castlereagh Street, and King Street. Together it constitutes an above ground site area of approximately 9,400 square metres, with a dimension from north to south of approximately 210 metres and from east to west of approximately 45 metres. It incorporates a significant portion of one of Sydney's most revered public spaces – Martin Place.

Martin Place is recognised as one of Central Sydney's great public, civic and commemorative spaces, as well as being a historically valued commercial and finance location of Sydney's CBD. Martin Place and a large number of buildings on, or in close proximity to, Martin Place are identified as heritage items, either as items of National, State or Local significance. Number 50 Martin Place, which forms part of the Macquarie North Site, is one of these major heritage items.

There has been a number of redevelopment and refurbishment proposals in recent years along Martin Place to improve existing assets and recapture their premium commercial status (e.g. 5 Martin Place, 50 Martin Place, 20 Martin Place, upgrades of the MLC

Centre, and 60 Martin Place). The City of Sydney Council has also identified a need to reinvigorate Martin Place and upgrade the public spaces.

The surrounding locality is characterised by a variety of built forms and architectural styles, with many of the buildings, including those of relatively recent years, not complying with the current planning controls with respect to building heights, setbacks and street wall heights.

In terms of land use the area is characterised by a predominance of office uses, with some ground floor retailing, cafés, or restaurants and hotels (most notably the Westin and the Wentworth) to support its primary business centre function.

3 Overview of Proposed Development

The proposal by Macquarie is unique and innovative in aligning the aspirations for public transport, civic amenity and the long-term sustainability of Sydney as a financial centre. This will be achieved through a development designed to maximise the opportunities for an improved Metro Station, integration of the existing and new public transport infrastructure, integration of that infrastructure with modern commercial office towers and world class retailing, along with rejuvenating and complimenting some of Sydney's most revered public spaces, and substantially improving station access and connectivity.

More specifically the development will comprise a concept proposal (under section 83B of the EP&A Act) for the OSD for the North and South Sites. It will be designed as a fully integrated Station and OSD project that, subject to approval, will be built and delivered as one integrated project for opening at the same time as the Sydney Metro is commissioned.

The concept proposal establishes the vision and planning and development framework which will be the basis for the consent authority to assess future detailed development proposals (Stage 2 DAs).

The North Site

The Concept Proposal for the North Site is for a new 40+ storey, predominately commercial office building. The proposal seeks to integrate with the existing 50 Martin Place building, supporting large commercial floor plates. No connections to 50 Martin Place are proposed for the basement levels of that building, including the level of the significant heritage Safe Deposit Vault.

The South Site

The Concept Proposal for the South Site is for a new 28+ storey predominately commercial office building.

The detailed design of the OSD is still in its preliminary stages. Critically it requires an integrated design approach to be adopted between the commercial OSD components classified as SSD, and the Station components, which are classified as CSSI and have already been approved. This is to ensure:

- all the operational needs of the Metro Station are accommodated in accordance with TfNSW requirements and the structural and other requirements of the OSD

are accommodated within the Station building beneath, in what is essentially one building; and
- a cohesive public domain and built form outcome is achieved for Sydney.

In this regard, OSD uses and structural elements are located within the below ground and lower podium levels, as conceptually approved under the CSSI consent for the Martin Place Station.

The Staged DA will seek consent for, amongst other things, land uses, gross floor area, building envelopes, and vehicle access arrangements.

A more detailed and comprehensive description of the proposal is contained in the Environmental Impact Statement (EIS) prepared by JBA.

4 Planning Approvals Strategy

The *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD) identifies development which is declared to be State Significant. Under Schedule 1 and Clause 19(2) of SEPP SRD, development within a railway corridor or associated with railway infrastructure that has a capital investment value of more than $30 million and involves commercial premises is declared to be State Significant Development (SSD) for the purposes of the EP&A Act.

The proposed development (involving commercial development that is both located within a rail corridor and associated with rail infrastructure) is therefore SSD.

Pursuant to Section 83B of the EP&A Act a Staged DA may be made setting out concept proposals for the development of a site (including setting out detailed proposals for the first stage of development), and for which detailed proposals for separate parts of the site are to be the subject of subsequent DAs. This SSD DA is a staged development application made under Section 83B of the EP&A Act.

A detailed development application(s) (Stage 2 DAs) will accordingly follow, seeking approval for the detailed design and construction of all or specific aspects of the proposal in accordance with the approved staged development application.

Submitted separately to this SSD DA are applications to modify the CSSI approval together with a Planning Proposal relating to the North Site (FSR only) and South Site (height and FSR).

For clarity, **Figure 3** below is a diagrammatic representation of the suite of applications proposed by Macquarie, to show the relationship of the SSD DA (the subject of this report) to the Planning Proposal and the Martin Place Metro CSSI.

The Department of Planning and Environment have provided Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development. This report has been prepared having regard to the SEARs as relevant.

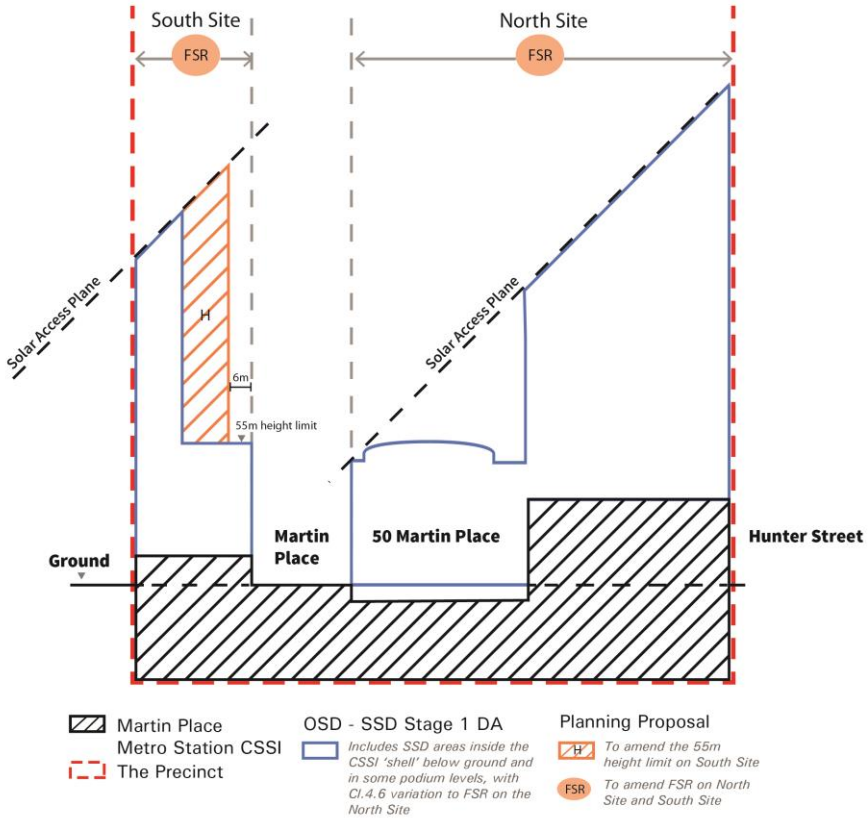

Figure 3 – Relationship of planning applications
Source: JBA

5 Response to SEARS

The SEARS for ESD are as follows:

Requirement 1: *Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation 2000) will be incorporated in the design, construction and ongoing operation of the development.*

The ESD principles will be incorporated into the design as follows, with further detail on these strategies provided in Section 7.

1. **The Precautionary Principle**
   Careful evaluation to avoid damage to the environment will be mitigated via strategies such as use of responsibly sourced materials. Such requirements will be achieved via a 6 star Green Star rating.

2. **Intergenerational Equity**
   This principle will be demonstrated via:
   - Promotion of community integration with the precinct such as a centralised waste management strategy, best practice station comfort for optimised passenger experience and improved CBD public amenity via provision for arts/culture displays.
   - Reduced carbon emissions:
     - recycled materials
     - optimised precinct energy usage through high performance façades and efficient mechanical systems
     - inclusion of renewable energy technologies
   - Reduced waste to landfill (via a centralised waste strategy)
   - Reduced potable water usage
   - A soft landings approach to minimise operational energy

3. **Conservation of Biological Diversity and Ecological Integrity**
   As the project will be on an existing site, it will be ensured that the conservation of biological diversity and ecological integrity will be maintained equal to or greater than the current level. A precinct greening strategy will be developed.

4. **Improved Valuation, Pricing and Incentive Mechanisms**

   The project aims to achieve a 6 Star Green Star rating in the most cost effective way via a life cycle cost approach that provides best return on investment.

Requirement 2: *Include a framework for how the proposed development will reflect best practice sustainable building principles to improve environmental performance, including energy and water efficient design and technology, and use of renewable energy.*

In order to address this requirement, a suite of rating systems and supporting design features are proposed. These are detailed in Section 6 of this report. Key framework elements include the development of studies for benchmarking the proposal against world's best practice in transport oriented development, Green Star to inform the design

development through to as-built documentation, and target operational ratings under NABERS Energy and NABERS Water.

6 Design Features

The project being surrounded by the pedestrianized Martin Place offers a unique opportunity; to consider the redevelopments holistically and at a precinct level, with sustainability as a key driver for the development of the design.

The following drivers form part of sustainability philosophy and aspirations for The Sydney Metro Martin Place Station Project:

- Worlds' Best Practice Benchmark using a Green Star Custom Tool
- Environmental Impact – a design capable of reducing carbon emissions, promoting energy efficiency and reducing resource consumption
- Sustainable definition – a design capable of achieving recognised high performance with efficient use of resources
- Integration of the station with the surrounding precinct
- Implementation of highly efficient systems - The use of energy efficient HVAC and lighting systems combined with the passive strategies in the building will further contribute to energy, water and carbon reduction

6.1 Key Strategies

Key design strategies that are being considered throughout the development are highlighted as follows:

Human Centred Design 

Implement initiatives which will provide tangible benefits to the community during and beyond the construction period for example the mechanical services design has focussed on occupant comfort throughout the precinct. Wellness is also a central aim for the development.

Carbon Neutral 

On-site and off-site renewables utilised to offset carbon emissions from the precinct development in operation.

Active Facades 

High performance facades utilised to offer mixed mode solutions in various areas across the development.

Water Reclaim 

A precinct-wide strategy will be implemented to optimise the water reclaim on site. Non-potable and potable operational demand targets will be reached through strategies such as

rainwater harvesting and ground water reuse systems depending on quality and quantity of water collected.

World Leading Comfort 

Various strategies will be investigated such as utilising spill air to cool public concourses in order to maintain conditions at T_a+4C. The platform systems will maintain conditions on the platform below 27degC.

Daylight and Wayfinding Design 

Optimised daylight access; penetration into the underground station and maximised useful daylight on the tower floors. Cutting edge wayfinding technology will be investigated for the precinct providing mobile applications and other technologies to assist users.

Active Transport 

A state of the art, precinct-wide end of trip facility will be located at the heart of the development interchange. The aspiration is to deliver a world leading active transport hub.

Smart Systems 

Digital Infrastructure will be provided to occupants in order to meet energy, waste and water targets. Educating users on their impacts on the space should aid reduction of resource use.

Green Infrastructure 

The precinct aims to utilise green infrastructure in order to compliment art and wayfinding throughout the development and provide a pleasant space for users. This infrastructure will be utilised throughout the development including subterranean areas where possible.

Resilience 

A climate change resilience plan will be developed in accordance with the following:

- The requirements of Green Star Design & As-built
- The recommendations of AS5334 Climate change adaptation for settlements and infrastructure—A risk based approach
- Arup's experience with best practice approaches to risk, resilience, and climate change vulnerability adaptation

6.2 Ratings

6.2.1 Building Codes of Australia – Section J

For the underground station and two towers, compliance with Section J Parts 1, 2, and 3 will be achieved through the Alternative Compliance path JV3 fabric.

The JV3 methodology involves the comparison of the predicted energy consumption of a reference building model that is developed using the deemed to satisfy (DTS) requirements of the National Construction Code (NCC), with the proposed building model. If the predicted energy consumption of the proposed building model is no more than the reference model then a complying alternative solution to the NCC Section J is achieved.

All other services will exceed the DTS requirements and minimum energy performance requirements (MEPs).

6.2.2 Green Star and NABERS

The strategies to achieve worlds' best practice will be addressed under rating schemes such as Green Star and NABERS. Green Star Design & As Built and NABERS are the primary benchmarks used for commercial buildings.

Green Star—Design & As Built v1.1

Green Star – Design & As Built v1.1 assesses the sustainability outcomes from the design and construction of new buildings or fit outs, across nine impact categories:

- Management
- Indoor Environment Quality
- Energy
- Transport
- Water
- Materials
- Land Use & Ecology
- Emissions
- Innovation

A precinct wide Green Star custom tool will be used to certify this project via application of the following tools:

- A combination of the Green Star – Design & As Built v1.1 and Green Star Communities v1.1 tools to cover the over station development; and
- The Sydney Metro Green Star Custom Tool will be developed to apply to the station box.

Refer to Figure 4 and Figure 5 for the breakdown of targeted points for the Green Star – Design & As Built v1.1 Green Star Communities v1.1 tools.

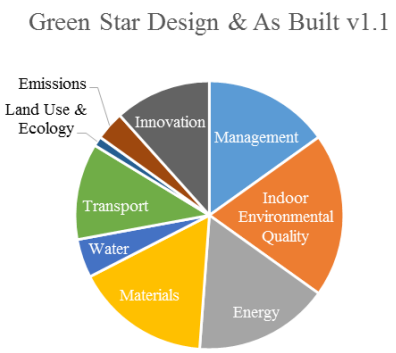

Figure 4 Targeted Point Breakdown for Green Star Design & As Built v1.1

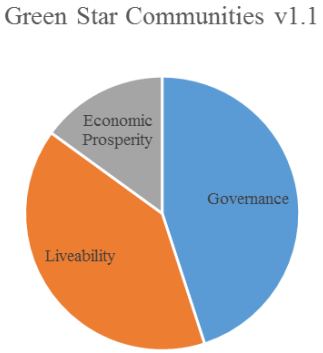

Figure 5 Targeted Point Breakdown for Green Star Communities v1.1.
Note: the Environment and Innovation categories are covered under Green Star Design & As Built v1.1.

NABERS Energy and Water

NABERS is a national rating system that measures the environmental performance of Australian buildings, tenancies and homes. This is measured in terms of the energy efficiency, water usage, waste management and indoor environment quality of a building or tenancy and its impact on the environment.

This is undertaken with measured and verified performance information, such as utility bills, and converting them into an easy to understand star rating scale from one to six stars. For example, a 6 star rating demonstrates market-leading performance, while a 1 star rating means the building or tenancy has considerable scope for improvement.

6.3 Strategies: Precinct and Station Development

The precinct will be designed as to be consistent with Sydney Metro TfNSW requirements such as;

- Easy door to door customer experience
- Consistent customer experience
- Integrated Customer Experience
- Wayfinding and coordination
- Best practice adaptive comfort
- Initiatives to integrate with the surrounding precinct and community

For information, the ESD objectives for the Station Box and Precinct are summarised as follows:

- Green Star Office Design & As-Built equivalence
- Daylight for way finding

- Best practice adaptive comfort
- Initiatives to integrate with the surrounding precinct and community

Key design strategies that are being considered throughout the development are highlighted as follows:

Precinct and Station Development

Heritage

- Design to respond to the historical nature of the precinct

Best Practice Station Comfort

- Provide adaptive comfort temperate in station concourse and platforms
- Utilise natural ventilation where possible along with local cooling

Design for active transport

The following strategies are included to encourage zero emissions transportation options both to and from work, as well as within the working day. The proximity of the two towers to the refurbished Martin Place Train Station will encourage the building occupants to travel via public transportation.

The below strategies are proposed to encourage both building occupants and the general public to travel by carbon neutral modes:

- Provide convenient pedestrian routes with interesting nightscapes and secure routes

Water

- Bio retention to tree pits where the design permits
- Storm water management (refer to Hydraulic strategy)

Innovation

- Development of best practice indoor environments
- Soft landings to minimise operational energy
- Potential to purchase of Green Power to offset carbon emissions and improve performance in Energy credits
- Stakeholder participation: View of build works and smart hoarding

Materials

- Materials strategies are applied uniformly across the site. Refer to the towers section for details

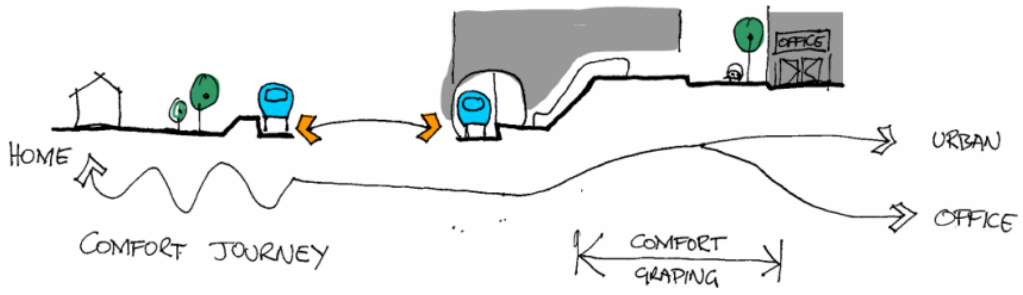

Figure 6 Schematic Depicting the Comfort Journey of a Typical Station User

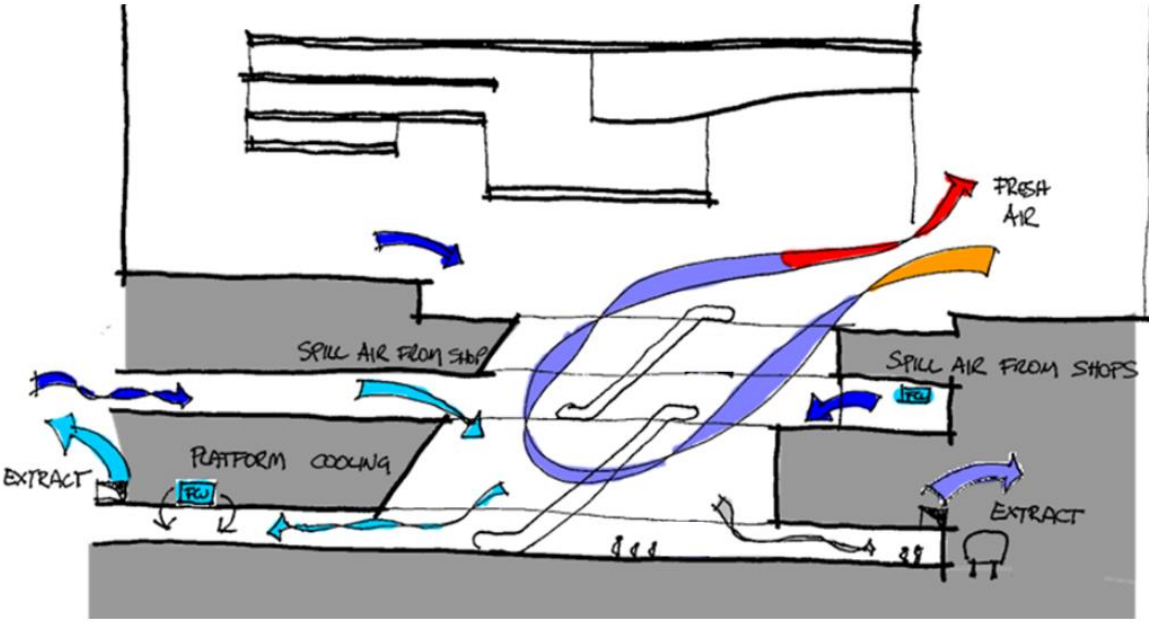

Figure 7 Schematic Depicting the Station Comfort Strategy

Figure 8 **End of Trip Facilities: Bike Rack Stacking Example, Barangaroo**

Figure 9 **End of Trip Facilities Example: 2014 Venice Biennale**

6.4 Strategies: North and South Tower

The ESD objectives for the North and South Tower are summarised as follows:

- 5 star NABERS Energy minimum based on 2016 protocol
- 3.5 star NABERS Water Rating target based on 2016 protocol
- 6 Star Green Star Office Design & As-Built v1.1
- Occupant wellbeing

Key design strategies that are being considered throughout the development are highlighted as follows:

	North and South Tower
	**Facade** • Exceed BCA compliance by a combination of internal and external shading with high performance glazing • Reflectivity of the façade will be designed to comply with City of Sydney minimum performance guidelines
	**Mechanical / BMS** • High end mechanical systems to optimise indoor environmental quality, environmental and energy performance. Systems being considered are VAV, chilled beams, under floor chilled ceilings and underfloor or overhead air distribution • Reduced demand on the electrical grid through systems such as cogeneration plants
	**Electrical/Hydraulic** • WELS rated fixtures, rain-water harvesting and recycling where possible • Water quality testing
	**Carbon Shift** • Renewable energy options and efficient tenant systems
	**Architectural** • Area considerations for recycled waste and garbage rooms and effective waste management to optimise land fill diversion • Note that the end of trip facilities, from an operational standpoint, are part of the station box development and do not contribute to the NABERS Water target.
	**Materials** • Recycled demolition and construction waste • Provision for responsibly sourced construction materials • Minimised inclusions of PVC • Material Transparency

North and South Tower

Indoor Environmental Quality (IEQ)

- Optimizations that address air filtration, natural and artificial lighting control
- Space provision for carbon filtration to AHU

Innovation

- Development of best practice indoor environments
- Soft landings to minimise operational energy
- Potential to purchase of Green Power to offset carbon emissions and improve performance in Energy credits
- Tenancy fit out systems review

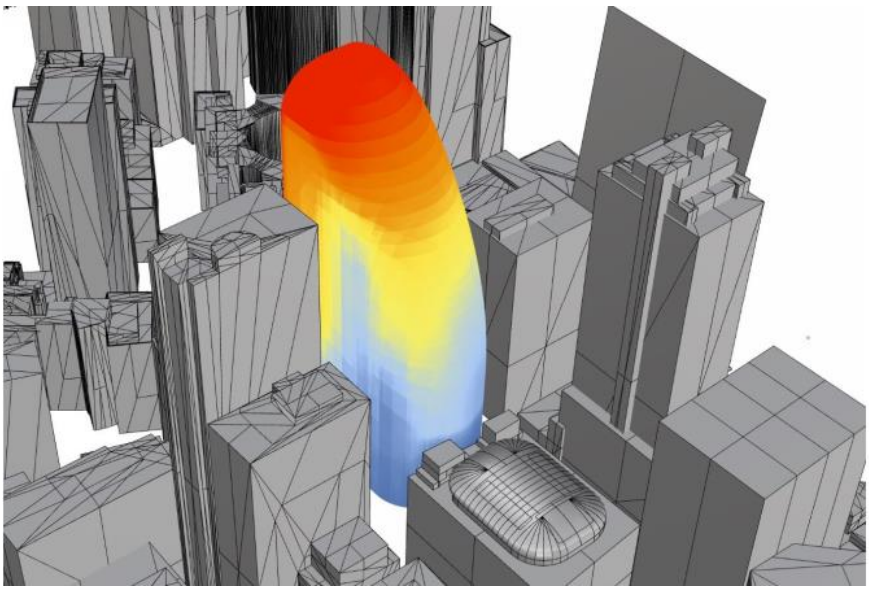

Figure 10 Contour Plot of Annual Solar Loads Analysis Undertaken to Inform Facade Design

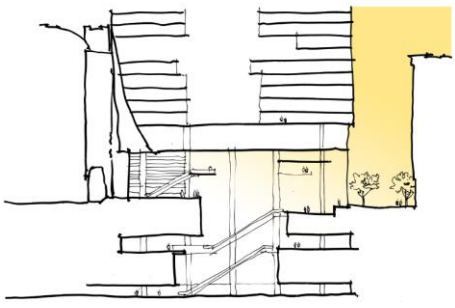

Figure 11 Predicted Daylight Behaviour into the North Station Box

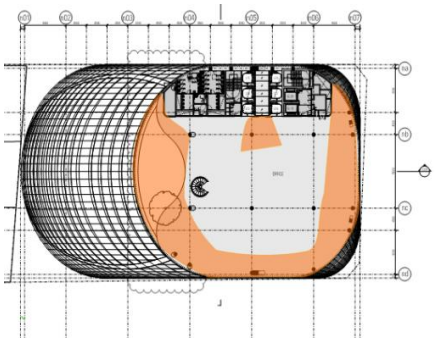

Figure 12 Daylight Analysis Summary for an example floor of the North Tower highlighting targeted area with sufficient daylight

The figure below highlights the area available to provide daylight access to the North Tower through the side lit atrium, in comparison to 50 Martin Place.

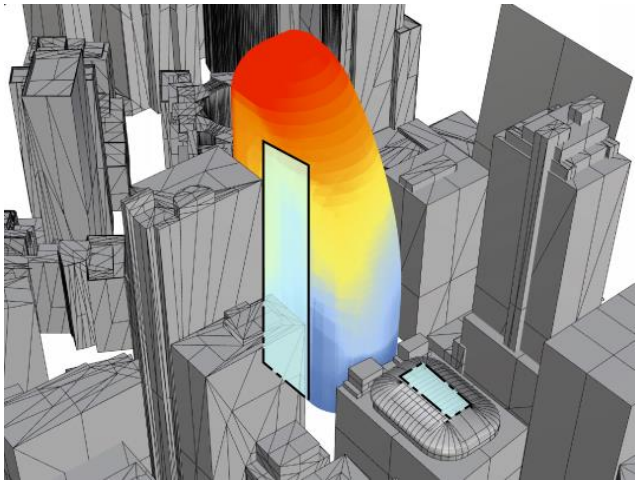

Figure 13 Side Lit Atrium of the North Tower

6.5 Integrated Metro Sustainability

As previously mentioned, a precinct-wide Green Star custom tool will be implemented to exceed the Sydney Metro minimum requirements and target worlds' best practice for the precinct.

An initial review of the tool has illustrated the Macquarie approach is in line with the Sydney Metro minimum requirements and exceeds the line-wide target. The next stage of this process will be a review meeting with the GBCA to ensure the viability of these targets.

7 Stretch Targets

The project aims to strive beyond the design features noted in the previous section. The following aspirations will also be considered through design development:

Net Positive (Regenerative) Precincts

- No fossil fuel supply to site, by considerations such as removing all gas appliances and make building fully electric
- Use of offsite renewables to offset precinct-wide energy use
- Energy Reclaim from station condenser water to heat precinct

Precinct-Wide Greening Strategies

- Further extension of green infrastructure to celebrate culture and wellbeing

Digital Infrastructure

- Considerations such as mobile applications with features for monitoring and feedback to promote an integrated precinct

Community Facilities

- Such as by providing support facilities and retail spaces for cyclists, buskers and active commuters, to further promote active lifestyles, arts and culture