

ECOLOGICALLY SUSTAINABLE DEVELOPMENT REPORT

APPENDIX Q





Sydney Metro City & South West Pitt Street North over station development

Ecological Sustainability Development (ESD) Report

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Table of Contents

1.	Purpose of this report	3
1.1.	Background	3
1.2.	Overview of the Sydney Metro in its context	3
1.3.	Planning relationship between Pitt Street Station and the OSD	6
1.4.	The Site	8
1.5.	Overview of the proposed development.....	10
1.6.	Staging and framework for managing environmental impacts	13
2.0	Policy and Legislation	16
2.1	Secretary’s Environmental Assessment Requirements (SEARs)	16
2.1.1	Ecologically Sustainable Development (ESD).....	16
2.2	Sydney Metro City & Southwest Sustainability Strategy 2017	18
2.3	City of Sydney – Development Control Plan (DCP) 2012.....	20
2.3.1	Part 3.6 – Ecologically Sustainable Development	20
2.3.2	Part 3.6.1 Energy Efficiency in Non-Residential Developments	22
2.3.3	Part 3.6.2 Water Efficiency in Non-Residential Developments	24
2.3.4	Part 3.6.3 Photovoltaic Solar Panels.....	25
2.3.5	Part 3.6.5 Materials and Building Components	25
3.0	Sustainability Targets	27
3.1	BCA Section J	27
3.1.1	BCA Climate Zone	28
3.1.2	BCA Part J1 and J2 – Building Fabric and Glazing	29
3.1.3	BCA Part J3, J5, J6, J7 and J8	30
3.2	BASIX.....	31
3.3	Green Star.....	32
3.4	NABERS.....	33
4.0	Proposed ESD Framework	34
4.1	Framework.....	34
4.2	Energy Efficiency Initiatives	34
4.2.1	Passive Design	34
4.2.2	Active Design.....	35
4.3	Water Efficiency Initiatives	37
4.4	Indoor Environmental Quality Initiatives	37
4.5	Materials.....	38
4.6	Transport	38
5.0	Summary	40
1.	Appendix A – Green Star Targets	41

1. Purpose of this report

1.1. Background

This report supports a concept State Significant Development application (concept SSD Application) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The concept SSD Application is made under section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for a mixed use tower above the northern portal of Pitt Street Station, otherwise known as the over station development (OSD). The concept SSD Application seeks consent for a building envelope and its use for residential accommodation, visitor accommodation and commercial premises, maximum gross floor area (GFA), pedestrian and vehicular access, circulation arrangements and associated car parking as well as the strategies and design parameters for the future detailed design of development.

Sydney Metro proposes to construct the OSD as part of an integrated station development package, which would result in the combined delivery of the station, OSD and public domain improvements. The station and public domain elements form part of a separate planning approval for Critical State Significant Infrastructure (CSSI) approved by the Minister for Planning on 9 January 2017.

As the development is within a rail corridor, is associated with railway infrastructure and is for the purposes of residential or commercial premises with a Capital Investment Value of more than \$30 million, the project is State Significant Development (SSD) pursuant to Schedule 1, clause 19(2)(a) of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). The full extent of the proposed development is also State Significant Development by virtue of clause 8(2) of the SRD SEPP.

This report has been prepared to respond to the Secretary's Environmental Assessment Requirements (SEARs) issued for the concept SSD Application for Pitt Street North on 30th November 2017 which state that the Environmental Impact Statement (EIS) is to address the following requirement:

Ecologically Sustainable Development

1.2. Overview of the Sydney Metro in its context

The New South Wales (NSW) Government is implementing *Sydney's Rail Future*, 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 (Transport for NSW, 2012). Sydney Metro is a new standalone rail network identified in *Sydney's Rail Future*.

Sydney Metro is Australia's biggest public transport project, consisting of Sydney Metro Northwest, which is scheduled for completion in 2019 and Sydney Metro City & Southwest, which is scheduled for completion in 2024.

Sydney Metro West is expected to be operational in the late 2020s. (Refer to **Figure 1**).



Figure 1: Sydney Metro alignment map

Sydney Metro City & Southwest includes the construction and operation of a new metro rail line from Chatswood, under Sydney Harbour through Sydney’s CBD to Sydenham and on to Bankstown through the conversion of the existing line to metro standards.

The project also involves the delivery of seven new metro stations, including at Pitt Street. Once completed, Sydney Metro will have the ultimate capacity for 30 trains an hour (one every two minutes) through the CBD in each direction - a level of service never seen before in Sydney.

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham application as a Critical State Significant Infrastructure project (reference SSI 15_7400), hereafter referred to as the CSSI Approval.

The CSSI Approval includes all physical work required to construct the CSSI, including the demolition of existing buildings and structures on each site. Importantly, the CSSI Approval also includes provision for the construction of below and above-ground structures and other components of the future ISD (including building infrastructure and space for future lift cores, plant rooms, access, parking and building services, as relevant to each site). The rationale for this delivery approach, as identified within the CSSI application, is to enable the ISD to be more efficiently built and appropriately integrated into the metro station structure.

The EIS for the Chatswood to Sydenham component of the Sydney Metro City & Southwest project identified that the OSD would be subject to a separate assessment process.

Since the CSSI Approval was issued, Sydney Metro has lodged four modification applications to amend the CSSI Approval as outlined below:

- Modification 1- Victoria Cross and Artarmon Substation which involves relocation of the Victoria Cross northern services building from 194-196A Miller Street to 50 McLaren Street together with inclusion of a new station entrance at this location referred to as Victoria Cross North. 52 McLaren Street would also be used to support construction of these works. The modification also involves the relocation of the substation at Artarmon from Butchers Lane to 98 – 104 Reserve Road. This modification application was approved on 18 October 2017.
- Modification 2- Central Walk which involves additional works at Central Railway Station including construction of a new eastern concourse, a new eastern entry, and upgrades to suburban platforms. This modification application was approved on 21 December 2017.
- Modification 3 - Martin Place Station which involves changes to the Sydney Metro Martin Place Station to align with the Unsolicited Proposal by Macquarie Group Limited (Macquarie) for the development of the station precinct. The proposed modification involves a larger reconfigured station layout, provision of a new unpaid concourse link and retention of the existing MLC pedestrian link and works to connect into the Sydney Metro Martin Place Station. It is noted that if the Macquarie proposal does not proceed, the modification (if approved) would be surrendered. This modification application was approved on 22 March 2018.
- Modification 4 - Sydenham Station and Sydney Metro Trains Facility South which incorporated Sydenham Station and precinct works, the Sydney Metro Trains Facility South, works to Sydney Water's Sydenham Pit and Drainage Pumping Station and ancillary infrastructure and track and signalling works into the approved project. This modification application was approved on 13 December 2017. Given the modifications, the CSSI Approval is now approved to operate to Sydenham Station and also includes the upgrade of Sydenham Station.

The remainder of the City & Southwest project (Sydenham to Bankstown) proposes the conversion of the existing heavy rail line and the upgrade of the existing railway stations along this alignment to metro standards. This portion of the project, referred to as the Sydenham to Bankstown Upgrade, is the subject of a separate CSSI application (No. SSI 17_8256) for which an Environmental Impact Statement was exhibited between September and November 2017 and a Response to Submissions and Preferred Infrastructure Report was submitted to the NSW Department of Planning & Environment (DPE) in June 2018 for further exhibition and assessment.

1.3. Planning relationship between Pitt Street Station and the OSD

While the northern portal of Pitt Street Station and the OSD will form an integrated station development, the planning pathways defined under the *Environmental Planning and Assessment Act 1979* require separate approval for each component of the development. In this regard, the approved station works (CSSI Approval) are subject to the provisions of Part 5.1 of the EP&A Act (now referred to as Division 5.2) and the OSD component is subject to the provisions of Part 4 of the EP&A Act.

For clarity, the approved station works under the CSSI Approval included the construction of below and above ground structures necessary for delivering the station and also enabling construction of the integrated OSD. This included but is not limited to:

- demolition of existing development
- excavation
- station structure including concourse and platforms
- lobbies
- retail spaces within the station building
- public domain improvements
- station portal link (between the northern and southern portals of Pitt Street Station)
- access arrangements including vertical transport such as escalators and lifts
- structural and service elements and the relevant space provisioning necessary for constructing OSD, such as columns and beams, space for lift cores, plant rooms, access, parking, retail and building services.

The vertical extent of the approved station works above ground level is defined by the 'transfer slab' level (which for Pitt Street North is defined by RL 48.00), above which would sit the OSD. This delineation is illustrated in **Figure 2** below.

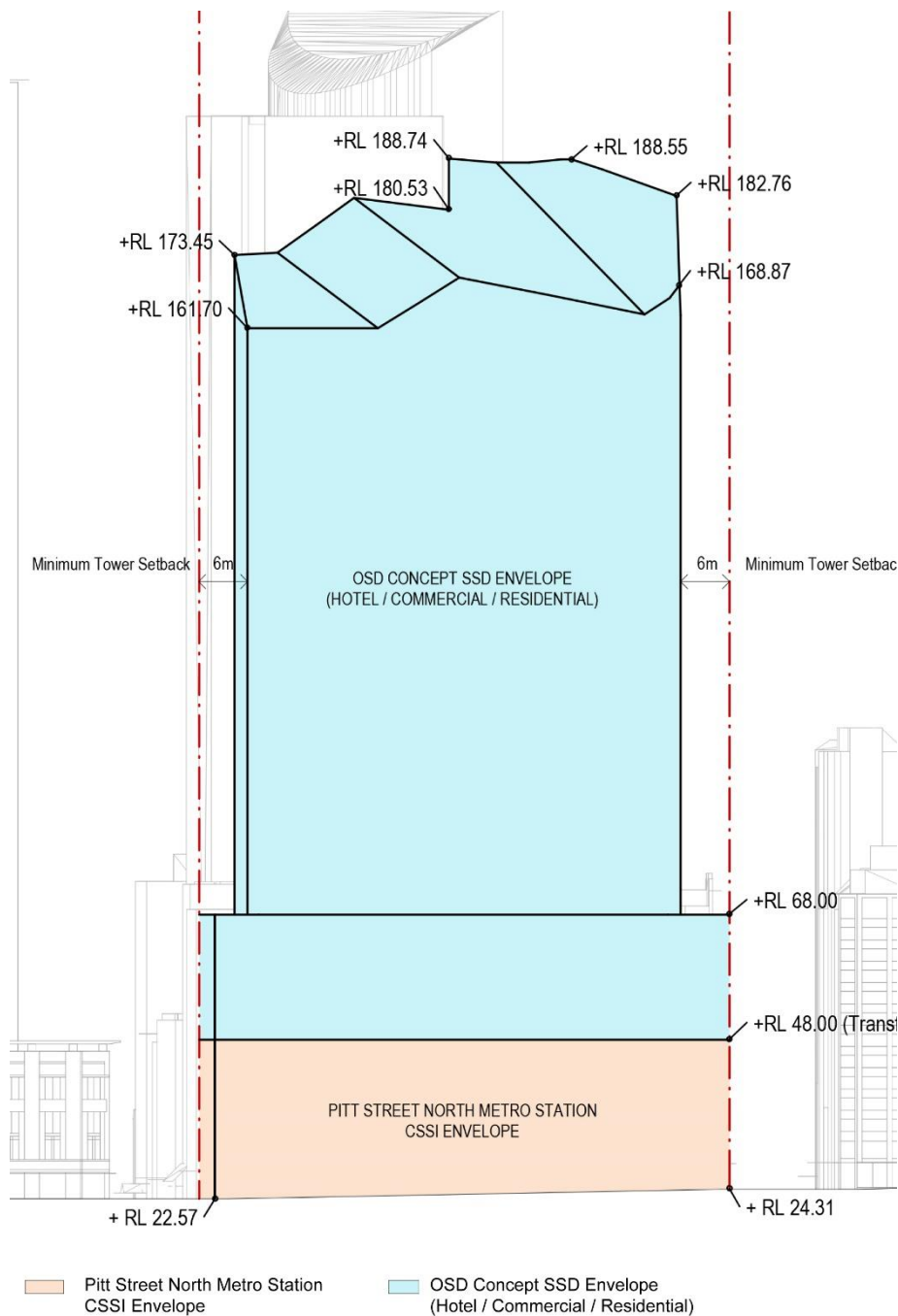


Figure 2: Delineation between station and OSD

The CSSI Approval also establishes the general concept for the ground plane of Pitt Street Station including access strategies for commuters, pedestrians and workers. In this regard, pedestrian access to the station would be from Park Street and the OSD lobbies would be accessed from Pitt Street, Park Street and Castlereagh Street.

Since the issue of the CSSI Approval, Sydney Metro has undertaken sufficient design work to determine the space planning and general layout for the station and identification of those

spaces within the station area that would be available for the OSD. In addition, design work has been undertaken to determine the technical requirements for the structural integration of the OSD with the station. This level of design work has informed the concept proposal for the OSD. It is noted that ongoing design development of the works to be delivered under the CSSI Approval would continue with a view to developing an Interchange Access Plan (IAP) and Station Design Precinct Plan (SDPP) for Pitt Street Station to satisfy Conditions E92 and E101 of the CSSI Approval.

The public domain improvement works around the site would be delivered as part of the CSSI Approval.

1.4. The Site

The Pitt Street North OSD site is located at the southern portion of the Sydney CBD block bounded by Pitt Street, Park Street and Castlereagh Street, above the northern portal of the future Pitt Street Station (refer to **Figure 3** below).

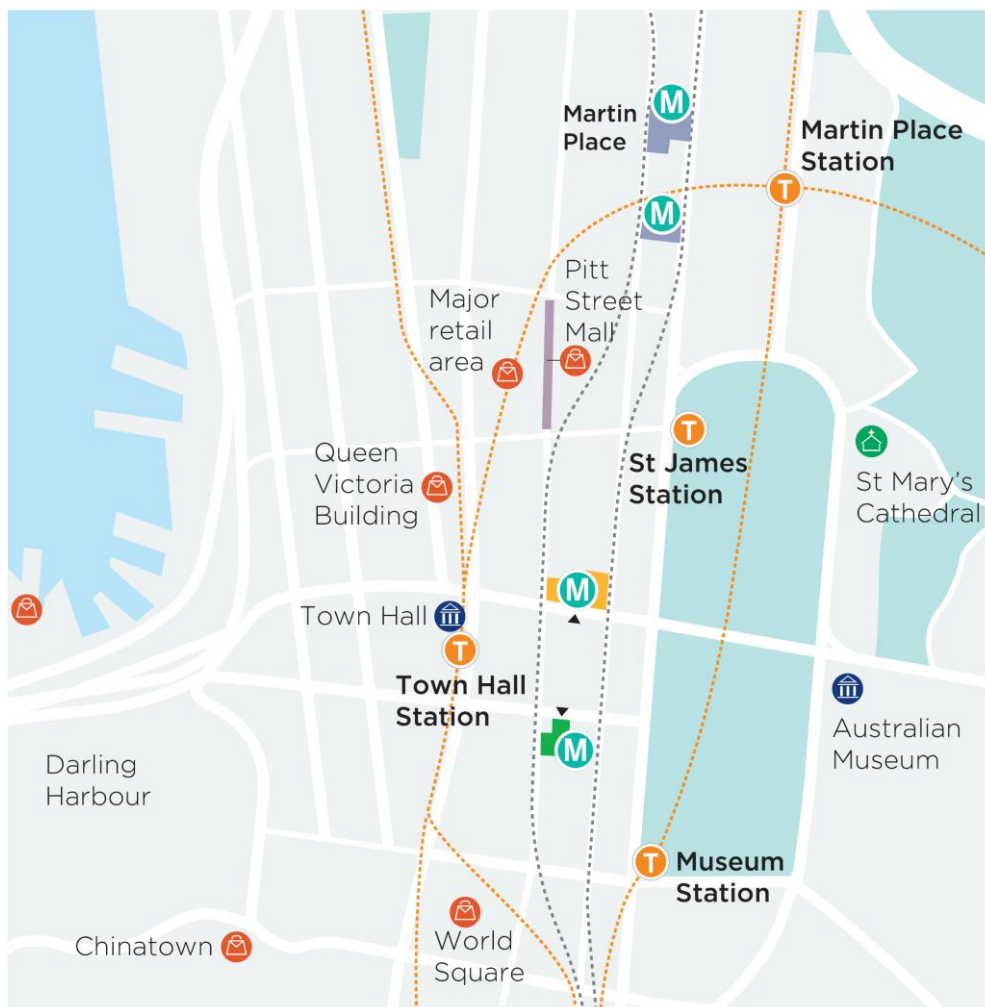
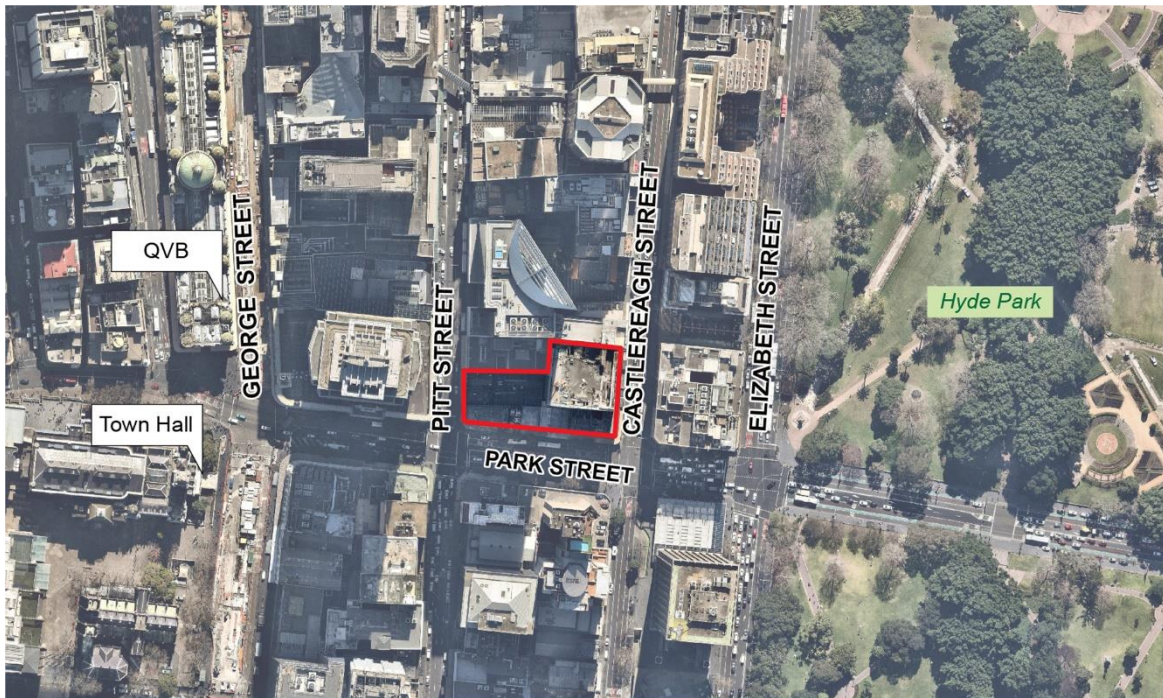


Figure 3: Pitt Street Station location plan

The site is located in the City of Sydney Local Government Area. The site (refer to **Figure 4** below) is irregular in shape, has a total area of approximately 3,150 square metres and has street frontages of approximately 28 metres to Pitt Street, 81 metres to Park Street and 48 metres to Castlereagh Street.

The site address is 175-183 Castlereagh Street, Sydney and comprises the following properties:

- Lot 3 in DP 74952
- Lot 1 in DP 229365
- Lot 2 in DP 900055
- Lot 1 in DP 596474
- Lot 17 in DP 1095869
- Lot 2 in DP 509677
- Lot 1 in DP 982663
- Lot 2 in DP 982663
- Lot 3 in DP 61187
- Lot 1 in DP 74367



 The Site

 NOT TO SCALE

Figure 4: Aerial photo of Pitt Street North

1.5. Overview of the proposed development

The concept SSD Application seeks concept approval in accordance with section 4.22 of the EP&A Act for the OSD above the approved Pitt Street Station (northern portal). This application establishes the planning framework and strategies to inform the detailed design of the future OSD and specifically seeks planning approval for:

- a building envelope as illustrated at Figure 5
- a maximum building height of approximately Relative Level (RL) 189 which equates to approximately 43 storeys including a podium height of RL68 (approximately 45m), which equates to approximately 12 storeys above ground
- a maximum GFA of 49,120 square metres for the OSD component, which equates to a Floor Space Ratio (FSR) of 15.59:1, resulting in a total maximum GFA at the site (including station floorspace) of 50,309 square metres and a total maximum FSR of 15.97:1, including flexibility to enable a change in the composition of land uses within the maximum FSR sought
- conceptual use of the building envelope for a range of uses including commercial office space, visitor accommodation and residential accommodation
- use of the conceptual OSD space provisioning within the footprint of the CSSI Approval (both above and below ground), including the OSD lobby areas, podium car parking, storage facilities, services and back-of-house facilities
- car parking for approximately 50 spaces located across five levels of the podium

- loading and vehicular access arrangements from Pitt Street
- pedestrian access from Pitt Street, Park Street and Castlereagh Street
- strategies for utilities and service provision
- strategies for the management of stormwater and drainage
- a strategy for the achievement of ecologically sustainable development
- indicative signage zones
- a strategy for public art
- a design excellence framework
- the future subdivision of parts of the OSD footprint (if required)

As this concept SSD Application is a staged development pursuant to section 4.22 of the EP&A Act, future approval would be sought for detailed design and construction of the OSD. A concept indicative design, showing a potential building form outcome at the site, has been provided as part of this concept SSD Application at Appendix E.

Pitt Street Station is to be a key station on the future Sydney Metro network, providing access to the Sydney Central Business District (CBD). The proposal combines the metro station with a significant mixed use tower, contributing to the Sydney skyline. The OSD would assist in strengthening the role of Central Sydney as the key centre of business in Australia and would contribute to the diversity, amenity and sustainability of the CBD.

It is noted that Pitt Street Station southern portal OSD has been subject to a separate application, and does not form part of this concept SSD Application.

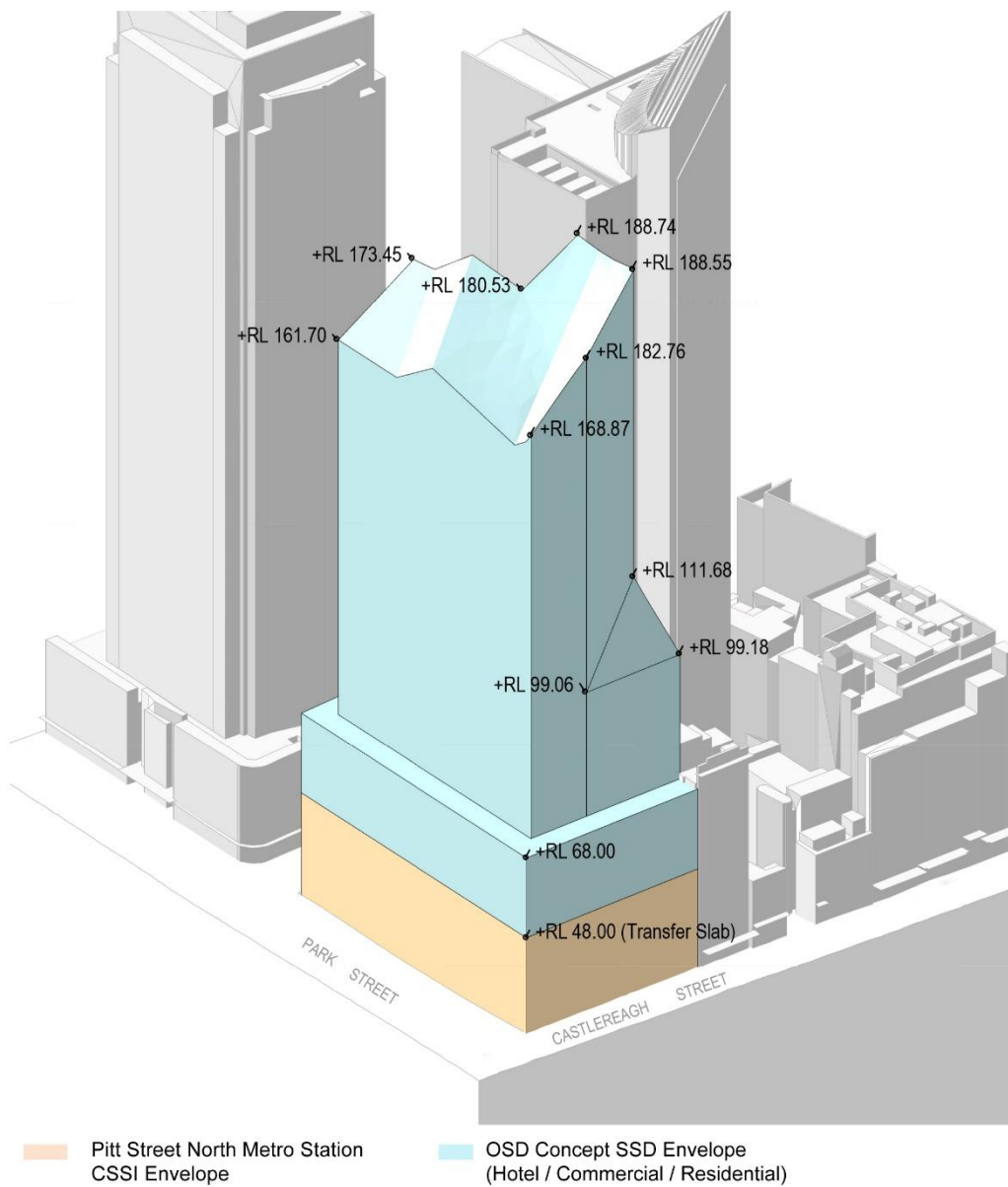


Figure 5: Pitt Street North OSD building, including OSD components (orange) and station box (grey)



Figure 6: Pitt Street North OSD indicative design, as seen from eastern, southern and western elevations

1.6. Staging and framework for managing environmental impacts

Sydney Metro proposes to procure the delivery of the Pitt Street North integrated station development in one single package, which would entail the following works:

- station structure
- station fit-out, including mechanical and electrical
- OSD structure
- OSD fit-out, including mechanical and electrical.

Separate delivery packages are also proposed by Sydney Metro to deliver the excavation of the station boxes/shafts ahead of the ISD delivery package, and line-wide systems (e.g. track, power, ventilation) and operational readiness works prior to the Sydney Metro City & Southwest metro system being able to operate.

Three possible staging scenarios have been identified for delivery of the integrated station development:

1. Scenario 1 – the station and OSD are constructed concurrently by constructing the transfer slab first and then building in both directions. Both the station and OSD would be completed in 2024.
2. Scenario 2 – the station is constructed first and ready for operation in 2024. OSD construction may still be incomplete or soon ready to commence after station construction is completed. This means that some or all OSD construction is likely to still be underway upon opening of the station in 2024.
3. Scenario 3 – the station is constructed first and ready for operation in 2024. The OSD is built at a later stage, with timing yet to be determined. This creates two distinct construction periods for the station and OSD.

Scenario 1 represents Sydney Metro’s preferred option as it would provide for completion of the full integrated station development and therefore the optimum public benefit at the site at the earliest date possible (i.e. on or near 2024 when the station is operational). However, given the delivery of the OSD could be influenced by property market forces, Scenarios 2 or 3 could also occur, where there is a lag between completion of the station component of the ISD (station open and operational), and a subsequent development.

The final staging for the delivery of the OSD would be resolved as part of the detailed SSD application(s).

For the purposes of providing a high level assessment of the potential environmental impacts associated with construction, the following have been considered:

- Impacts directly associated with the OSD, the subject of this SSD application
- Cumulative impacts of the construction of the OSD at the same time as the station works (subject of the CSSI Approval).

Given the integration of the delivery of the Sydney Metro City & Southwest metro station with an OSD development, Sydney Metro proposes the framework detailed in

Figure 7 to manage the design and environmental impacts, consistent with the framework adopted for the CSSI Approval, which includes:

- project design – measures which are inherent in the design of the project to avoid and minimise impacts
- mitigation measures – additional to the project design which are identified through the environmental impact assessment
- construction environmental management framework – details the management processes and documentation for the project
- construction noise and vibration strategy – identifies measures to manage construction noise and vibration
- design guidelines – provides an assurance of end-state quality
- environmental performance outcomes – establishes intended outcomes which would be achieved by the project

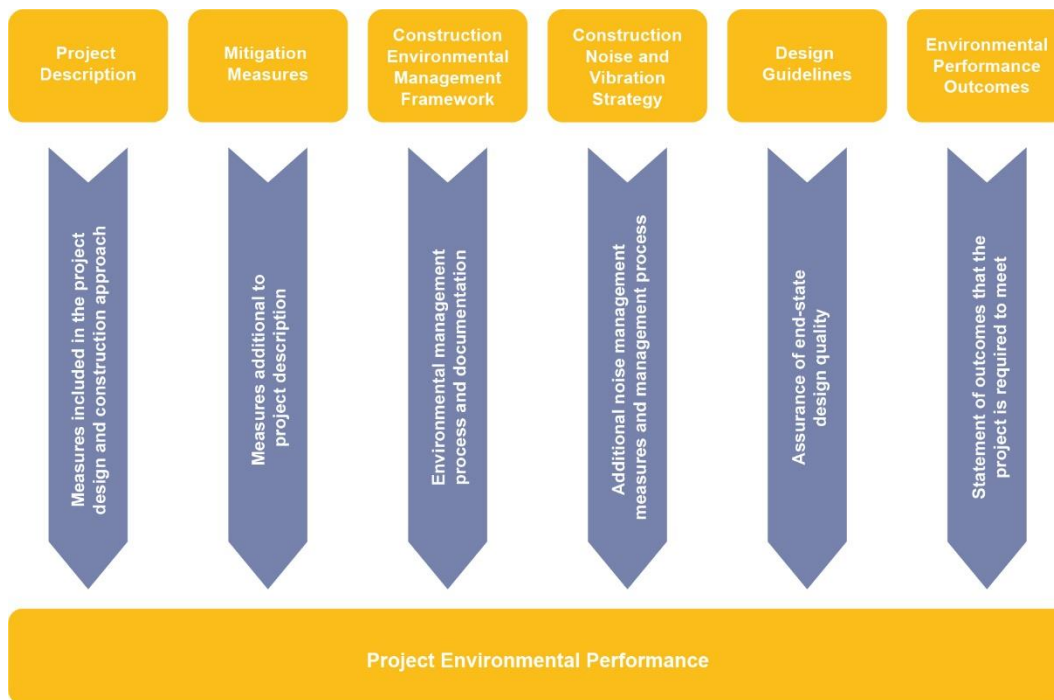


Figure 7: Project approach to environmental mitigation and management

Sydney Metro proposes to implement a similar environmental management framework where the integrated delivery of the CSSI station works and the OSD occur concurrently. This would ensure a consistent approach to management of design interface and construction-related issues.

Sydney Metro proposes this environmental management framework would apply to the OSD until completion of the station and public domain components of the integrated station development delivery contract (i.e. those works under the CSSI Approval). Should the OSD be constructed beyond the practical completion and opening of the section, standard practices for managing construction related environmental impacts would apply in accordance with the relevant guidelines and Conditions of Approval for the detailed SSD application(s).

2.0 Policy and Legislation

2.1 Secretary’s Environmental Assessment Requirements (SEARs)

This ESD section of the EIS addresses the principles of ecologically sustainable development in relation to the project and sets out an ESD framework to be incorporated into the detailed design of the future development.

The provisions of State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 for the residential component will be addressed under the detailed SSD application.

The EIS also details how the relevant requirements in the City & Southwest Sustainability Strategy (Sydney Metro, 2017) have informed the design of the development to promote the use of sustainable transport initiatives.

2.1.1 Ecologically Sustainable Development (ESD)

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

Clause	Comment
<p>(4) The principles of ecologically sustainable development are as follows:</p> <p>(a) 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:</p> <p>(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and</p> <p>(ii) an assessment of the risk-weighted consequences of various options,</p>	<p>Carbon emission is the major threat for irreversible environmental damage.</p> <p>In order to minimise the development's carbon mission and subsequently the energy consumption, the commercial component of the development will be targeting a 5 Star NABERS Energy rating and the entire development will be targeting a Green Star Design and As Built rating tool.</p> <p>The Green Star rating tool assists the development in reduction of carbon emissions and resource usage throughout the design and construction phase of the development.</p> <p>During the operational stages of the development, the NABERS energy tool will evaluate the development's commercial office's operational energy consumption and carbon emission and benchmark it against best practice targets annually (i.e. 5 Stars). This will ensure that the operation of the commercial office component of the development continues to minimise carbon emission and energy</p>

Clause	Comment
	<p>consumption.</p> <p>For the residential component of the development, in addition to Green Star, the adherence to the requirements of BASIX will also ensure the building will minimise the consumption of energy and water usage through good design practice.</p>
<p>(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,</p>	<p>The Green Star rating tool, which is to be adopted by the development, is a holistic tool that takes into consideration all aspects of the development including; building occupants health, environmental factors and how the development may impact / benefit the surrounding and local community.</p> <p>Many of the credits within Green Star is aimed to maintain or enhance the environment for future generations, such as encouragement to reuse materials, or select materials with high recyclable contents or certificated materials.</p>
<p>(c) conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,</p>	<p>Ecological integrity has been considered for the development. Historic context of the site will be addressed in the Heritage Impact Statement.</p> <p>Biodiversity assessment and reporting will be conducted in accordance with the Biodiversity Conservation Act. This is demonstrated in the Biodiversity Report.</p>
<p>(d) improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services, such as:</p> <p>(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,</p> <p>(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,</p> <p>(iii) environmental goals, having been established, should be pursued in the most cost</p>	<p>To minimise pollution (carbon emission), the commercial component of the development will be targeting a 5 Star NABERS Energy rating.</p> <p>As part of the development's Green Star pathway, material will be selected based on its life cycle analysis cost and benefit. Materials with recycled content or third-party certification will be preferred over standard materials.</p>

Clause	Comment
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.	

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

The proposed framework to reflect national best practice sustainable building principles are shown in Section 4.1.

2.2 Sydney Metro City & Southwest Sustainability Strategy 2017

The City & Southwest Sustainability Strategy document outlines performance targets, initiatives and outcomes which will be adopted across key policy areas in the design, construction and operation stages of the Metro Project.

The Sustainability Objectives shown below have been developed for the Metro project, and in particular the Station below the OSD. However, not all of them are relevant to the privately owned Over Station Development above.

Notwithstanding this, the residential, hotel, and commercial offices which make up the proposed design will be required to address the following sustainability objectives:

Objectives	Comment
Governance	Sustainability governance is not a mandatory requirement for the OSD, however good ongoing governance of the development should include sustainability as a consideration. Governance related credits are considered in the Green Star pathway.
Climate Change Resilience	The building would need to be designed to withstand increased peak weather events including temperatures and higher wind forces, as predicted be the IPCC for the life of the building. This includes for example the façade, plant capacity, etc.
Carbon & Energy Management	The building would be designed to minimise energy carbon emissions through the implementation of high efficiency air conditioning and lighting systems. Many of the proposed energy efficiency initiatives are necessary to comply with the requirements of BASIX and Section J. Providing an added NABERS energy efficiency target for the commercial office component of the development will ensure the building will meet its carbon and energy targets.

Objectives	Comment
Pollution Control	The building would be designed to minimise pollution through the application of pollution reduction strategies as listed in the Green Star schedule. These include minimising light pollution, minimising usage of materials with VOC or formaldehyde, minimising peak stormwater discharge, and minimising the use of ozone depleting refrigerants.
Water Efficiency	The building has provision for meeting water efficiency standards through the allowance for rainwater capture and use of low flow fittings throughout as recommended in the Green Star pathway matrix.
Waste & Material Consumption	Minimising waste is considered in the Green Star pathway which addresses a demolition and construction waste as well as operational waste. In addition, a separate report for operational waste management has been prepared for SEARs.
Biodiversity Conservation	Biodiversity conservation is difficult to address for high rise inner city developments; however, the building has demonstrated reuse of already developed land and provides opportunity for the planting of flora on podium decks.
Heritage Conservation	Heritage conservation is not applicable to the Over Station Development as the site has already been fully excavated.
Liveability	The aspect of liveability though access to transport and amenities is well developed in the location proposed for the residential component of the development. Consideration of this has been taken into account in seeking seven out the 10 points in the Green Star Sustainable Transport credit.
Community Benefit	Although the OSD project is a private development, there will be some benefit to the community by the development of inner-city residential living and local employment.
Workforce Development	The proposed OSD will accommodate apartments, an hotel and commercial offices. Although each will result in the development of employment, the hotel component will demonstrate the best example of workforce development on the site.
Supply Chain	The OSD is to be designed to demonstrate minimum life cycle impact through the selection of sustainable products and responsible building materials as required through the proposed Green Star pathway.
Economic	The building above the station will be a private entity which will require to demonstrate sound economic return for the developer.

2.3 City of Sydney – Development Control Plan (DCP) 2012

2.3.1 Part 3.6 – Ecologically Sustainable Development

The Sydney Development Control Plan (DCP) 2012 is not applicable to State Significant Development (in accordance with Clause 11 of the State and Regional Development SEPP), however, the DCP has been used in this instance to guide the proposed development. On this basis, the following sections are relevant to the proposal:

Objective

- (a) Apply principles and processes that contribute to Ecologically Sustainable Development (ESD)
 - Development will apply best practice ESD principles as outlined in the NCC Section J, Green Star and NABERS.
 - Green Star and NABERS commercial office energy rating targets (minimum of 5 Stars) will be set for the development.
- (b) Reduce the impacts from development on the environment
 - Environmental impacts from the development will be minimised through the adoption of Green Star credits such as site specific Environmental Management Plan.
- (c) Reduce the use of resources in development and by development over its effective life
 - Development to consider life cycle impacts in its material selection and select materials that are durable and long lasting
 - Maximise reuse and/or recyclable material where feasible
 - Unnecessary use of materials and finishes will be avoided through adopting a frugal design approach where feasible
 - Development to maximise points targeted under the Materials category in the Green Star Design and As Built rating.
- (d) Reduce the cause and impacts of the urban heat island effect
 - Heat island effect to be reduced through the use of hardscape finishes with high surface reflectance index (SRI) values, vegetation/soft landscape, PV systems etc. where applicable
- (e) Increase the resilience of development to the effects of climate change
 - Design of development will take into consideration of climate change effects such as increased rainfall and temperature and incorporate the requirements

of the relevant Australian Standards. This is Applicable for Façade design and increasing plant capacities for changing temperature and humidity levels.

- A site-specific climate change and resilience plan to be developed to address effects of climate change
- (f) Ensure that greenhouse gas emissions will be reduced
- Greenhouse gas emission will be minimised through the selection of energy and carbon efficient design and systems.
 - The NABERS Energy rating will ensure development is designed to achieve high level of greenhouse gas emission reduction.
 - On-site renewable energy generation to be considered to further reduce greenhouse gas emission.
- (g) Increase the use of cogeneration and tri-generation systems
- Not applicable, no co-generation or tri-generation are proposed.
- (h) Replace intensive carbon power sources with low carbon and renewable energy
- On-site renewable energy generation to be considered to further reduce greenhouse gas emission.
- (i) Reduce the use of potable water
- Potable water reduction through the selection of high WELS rated fittings and fixtures throughout the development
 - Provision of rainwater harvesting and reuse system to reduce use of potable water for toilet flushing and irrigation
 - Water efficient cooling towers to be considered for development
- (j) Ensure the development can adapt to climate change
- Design of development will take into consideration of climate change effects such as increased rainfall and temperature.
 - A site-specific climate change and resilience plan to be developed to address effects of climate change
- (k) Ensure that waste will be reduced
- Construction waste shall be reduced through the adoption of a site-specific Environmental Management Plan with minimum landfill diversion target.
 - The Green Star credit, Operational Waste will be considered to facilitate the re-use and recycling of waste during operation.

-
- (l) Increase the use of products from recycled sources
 - Maximise reuse and/or recyclable material where feasible
 - Development to maximise points targeted under the Materials category in the Green Star Design and As Built rating.
 - (m) Improve indoor environmental quality
 - Indoor air quality improvement through the supply of additional outside air and usage of materials with low VOC and formaldehyde levels
 - Acoustic comfort through provision of comfortable internal noise levels and reverberation within the development
 - Provision of well-lit spaces with flicker free lights and glare elimination
 - Thermal comfort through the provision of draught free environment via well designed ventilation and air-conditioning distribution system. Shading and blinds provided to control excessive daylight and solar heat gain.
 - (n) Reduce the environmental impact from building materials through reduction, re-use and recycling of materials, resources and building components
 - Maximise reuse and/or recyclable material where feasible
 - Where feasible, select materials with third-party environmental certificates, possesses recycled content or chain or custody agreements over standard materials
 - Development to maximise points targeted under the Materials category in the Green Star Design and As Built rating.
 - (o) Improve the biodiversity
 - Due to the location of the development, there are limited opportunities to improve the biodiversity of the site. Nonetheless, green roofs/gardens and soft landscape to be included as much as possible within design.

2.3.2 Part 3.6.1 Energy Efficiency in Non-Residential Developments

Provision

- (1) Development is to be designed and constructed to reduce the need for active heating and cooling by incorporating passive design measures including design, location and thermal properties of glazing, natural ventilation, appropriate use of thermal mass and external shading, including vegetation.

- The hotel and commercial office components of the development shall incorporate high performance glazing and building fabric insulation to minimise the requirement for active heating and cooling.
 - Appropriate use of thermal mass and external shading to be considered to reduce need for active cooling and heating.
- (2) Lighting for streets, parks and any other public domain spaces provided as part of a development should be energy efficient lighting such as LED lighting.
- This is generally not applicable however any podium outdoor spaces would be provided with low energy LED lighting.
- (3) In multi-tenant or strata-subdivided developments, electricity sub-metering is to be provided for lighting, air-conditioning and power within each tenancy or strata unit. Locations are to be identified on the development plans.
- The non-residential components of the development shall incorporate sub-metering for lighting, air-conditioning and power
 - The metering strategy shall follow NABERS metering protocol, where extensive metering requirements are required for accurate measurement and monitoring
- (4) Electricity sub-metering is to be provided for significant end uses that will consume more than 10,000 kWh/a
- Sub-metering shall be provided to all consuming components of more than 10,000 kWh per annum
 - The metering strategy shall follow NABERS and Green Star metering protocol, where sub-metering is required for all major plant items and components with high energy usage.
- (5) Car parking areas are to be designed and constructed so that electric vehicle charging points can be installed at a later time
- Car parking spaces in the non-residential component of the development shall be provided with infrastructure capable of EV charging point installation at a future date.
- (6) Where appropriate and possible, the development of the public domain should include electric vehicle charging points or the capacity for electric vehicle charging points to be installed at a later time.
- This requirement is not applicable as there is no public domain carparking.

2.3.3 Part 3.6.2 Water Efficiency in Non-Residential Developments

Provision

- (1) All new water fittings and fixtures such as showerheads, water tap outlets, urinals and toilet cisterns, in all non-residential development, the public domain, and public and private parks are to be the highest Water Efficiency Labelling Scheme (WELS) star rating available at the time of development
 - High WELS rated fittings and fixtures shall be provided to all classifications of the development.
- (2) Generally, rainwater tanks are to be installed for all non-residential developments, including major alterations and additions that have access to a roof form from which rainwater can be feasibly collected and plumbed to appropriate end uses.
 - Rainwater tanks and pump/filter units shall be installed on Level 5 plantroom to serve the hotel component of the building
- (3) Where a non-residential building, the public domain, a public or private open space or a community facility is serviced by a dual reticulation system for permitted non-potable uses such as toilet flushing, irrigation, car washing, fire fighting and certain industrial purposes, the development is to be connected to the system.
 - Refer to item 2 above. Harvested rainwater shall be used for non-potable use on the amenities floor for toilet flush and level 12 irrigation.
- (4) Generally, water used for irrigation of public and private open space is to be drawn from reclaimed water or harvested rainwater sources. Possible sources include harvested stormwater, treated greywater and wastewater and water from a decentralised local network
 - Refer to item 3 above where private open spaces on the podium roof shall be irrigated.
- (5) Separate meters are to be installed for each individual tenancy in commercial or retail buildings over 5,000sqm, such as separate tenant areas within a shopping centre.
 - Separate water meters shall be provided for each commercial tenancy over 5000sq.m
 - Water meters to follow NABERS and Green Star metering protocol
- (6) Separate meters are to be installed for the make-up lines to cooling towers, swimming pools, on the water supply to outdoor irrigation, and other major uses.
 - Separate meters to be installed on all major uses including cooling towers, swimming pools, irrigation etc. as per NABERS and Green Star metering protocol

(7) Where cooling towers are used they are to be connected to a:

(a) recirculating cooling water loop; and

(b) conductivity meter so that the blow down or bleed off system in a cooling tower can be automated based on conductivity. This ensures that the water is being re-circulated an optimum number of times before being discharged to the sewer.

- Cooling towers shall be capable of a minimum of 6 Cycles of Concentration operation and incorporate a re-circulating cooling water loop.

(8) Cooling towers are discouraged where they are a single pass cooling system.

No single pass cooling towers are proposed for the OSD.

2.3.4 Part 3.6.3 Photovoltaic Solar Panels

(1) The use, location and placement of photovoltaic solar panels is to take into account the potential permissible building form on adjacent properties

- Due to the possibility of shade from neighbouring buildings for many hours per year, Photovoltaic arrays are not specifically recommended at this stage of the design.

(2) Where possible proposals for new buildings, alterations and additions and major tree plantings are to maintain solar access to existing photovoltaic solar panels having regard to the performance, efficiency, economic viability and reasonableness of their location

- This is not applicable for the OSD.

2.3.5 Part 3.6.5 Materials and Building Components

(1) Paints and floor coverings with low levels of volatile organic compounds (VOC) and low formaldehyde wood products are to be used where possible.

- Low VOC and low formaldehyde wood products shall be used as proposed in the Green Star pathways matrix.

(2) Where possible, use building materials, fittings and finishes that:

- a. have been recycled;
 - b. are made from or incorporate recycled materials; and
 - c. have been certified as sustainable or 'environmentally friendly' by a recognised third party certification scheme.
- Maximise reuse and/or recyclable material where feasible within the development

-
- Where feasible, select materials with third-party environmental certificates, possesses recycled content or chain of custody agreements over standard materials
 - Development to maximise points targeted under the Materials category in the Green Star Design and As Built rating.
- (3) Design building components, including the structural framing, roofing and facade cladding for longevity, adaptation, disassembly, re-use and recycling
- Materials with low life cycle impacts shall be used as proposed in the Green Star pathways matrix.
- (4) Reduce the amount of materials used in the construction of a building wherever possible. Examples of potential methods include:
- a. exposing structures to reduce the use of floor, ceiling and wall cladding and finishes;
 - The finishes for many parts of the development will be subject to the final interiors design for each tenant.
 - b. naturally ventilating buildings to reduce ductwork;
 - Natural ventilation within the non-residential components of the building is not proposed due to the size of the floor plates and necessity to filter any outdoor air supplied to the internal zones of the development.
 - c. providing waterless urinals to reduce piping and water use;
 - Waterless urinals have not been considered at this stage of the development to keep options open for the proposed developer.
 - d. using prefabricated components for internal fit outs; and
 - The use of prefabricated components will be considered during the design and construction stages,
 - e. Providing only one bathroom for every two bedrooms in residential developments.
 - The final design of the internal layouts of the residential component shall be considered further in the next stage of the design.

3.0 Sustainability Targets

3.1 BCA Section J

Section J requirements are only applicable to the Non-Residential part of the Development. Residential parts of the Development are addressed under the BASIX requirement (Section 3.2).

The National Construction Code (NCC): Building Code of Australia (BCA) Section J sets minimum energy performance requirements for all new developments, including the performance of building fabric, glazing thermal performance, air-conditioning, ventilation, lighting, power and hot water.

BCA Section J compliance can be demonstrated by complying with the Deemed-to-satisfy (DTS) provisions stipulated in the BCA or an Alternative Solution Approach.

The figure below from the BCA provides the performance-based compliance frameworks for compliance with BCA Section J. The proposed non-residential component of the development shall meet these BCA energy efficiency requirements through the selection of high performance glazing, high performance insulation levels, and meeting the minimum efficiency requirements for the air conditioning, ventilation, domestic hot water, and lighting systems.

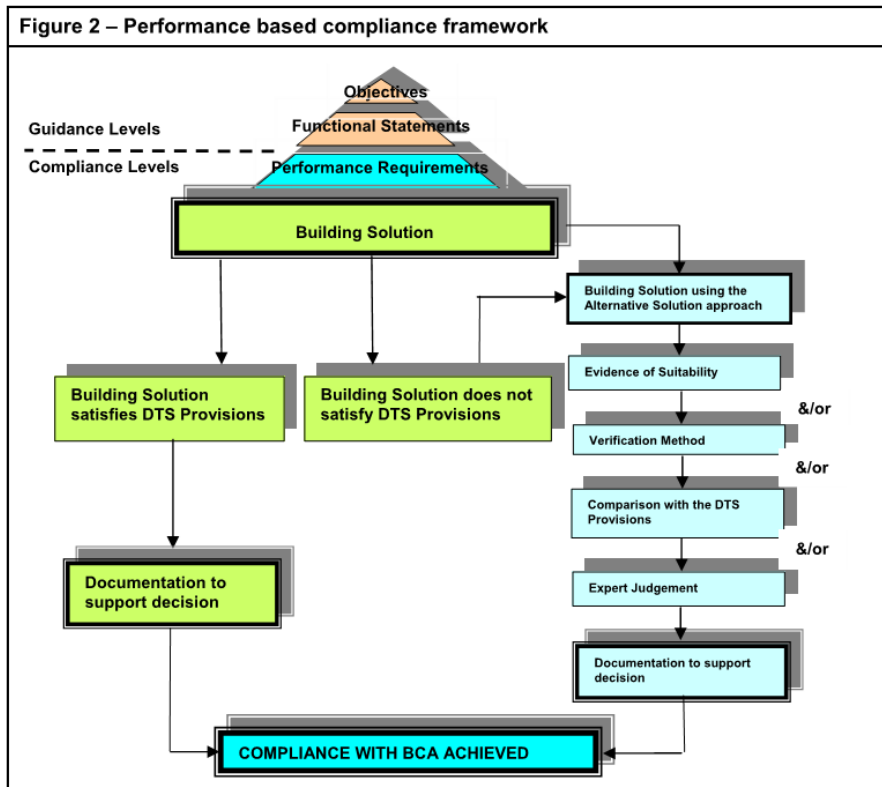


Figure 3.1: BCA Section J Compliance Framework Source: National Construction Code – Building Code of Australia

3.1.1 BCA Climate Zone

The Development is located in Climate Zone 5. The climate zone influences the thermal performance requirements in the following Sections.

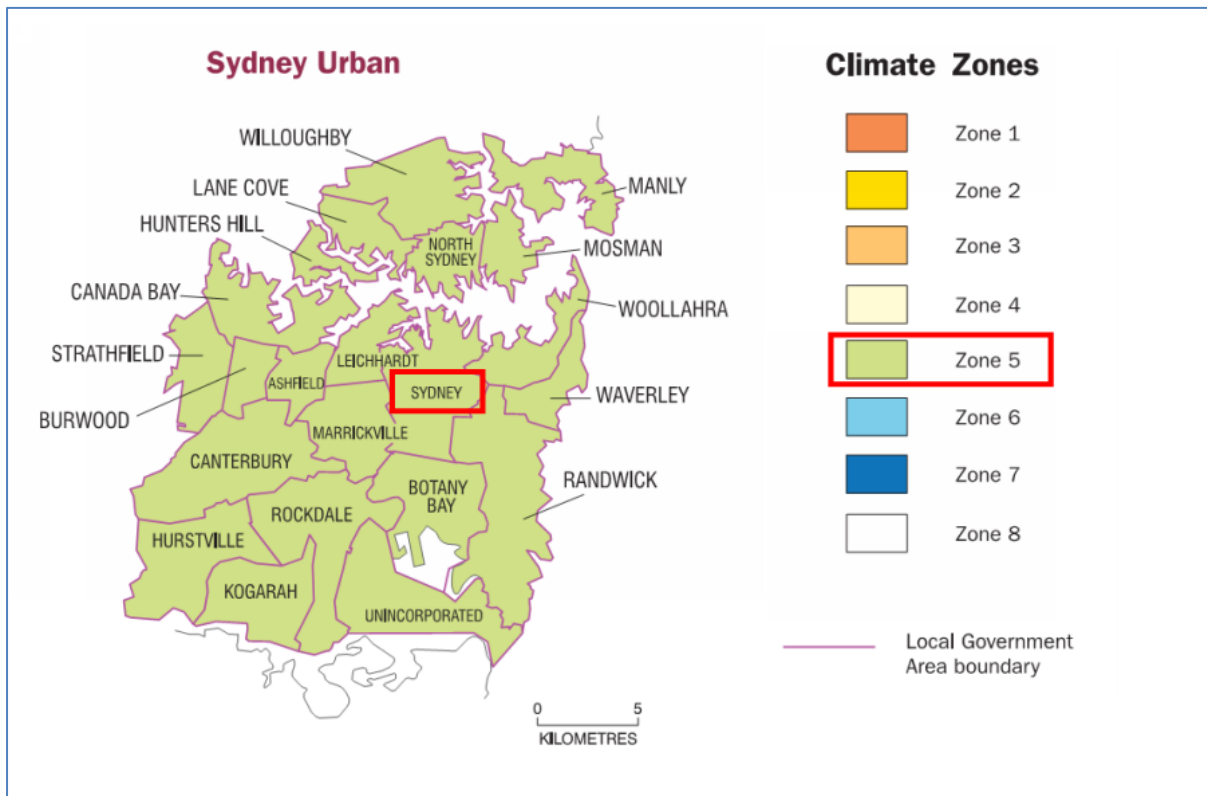


Figure 3.2: BCA Sydney Climate Zone Source: National Construction Code – Building Code of Australia

3.1.2 BCA Part J1 and J2 – Building Fabric and Glazing

The minimum building fabric thermal performance for the proposed Non-Residential Development will be in accordance with BCA Part J1 Deemed-to-Satisfy (DTS) thermal performance as summarised in the Table below.

Building Fabric Within Building Envelope*	Minimum Thermal Performance Requirement
Roof	Total R-Value (m ² K/W) – <u>R4.2</u>
External Walls	Total R-Value (m ² K/W) – <u>R2.8</u>
Internal Walls	Total R-Value (m ² K/W) – <u>R1.8</u>
Floor	Total R-Value (m ² K/W) – <u>R2.0</u>

* Envelope is defined by the BCA as the “parts of a building’s fabric that separates a conditioned space from the exterior of the building or a non-conditioned space”.

The glazing system for the proposed development will be required to comply with the thermal performance requirement of Part J2 – Glazing.

The glazing thermal performance requirement will be required to meet the DTS requirements of Part J2 using the BCA Glazing Calculator.

For the Development, an Alternative Solution utilising the JV3 Verification Method approach is proposed to be undertaken in the design stage to demonstrate compliance to Part J2 DTS. It is proposed that a high performance low-e double glazed unit (DGU) be used for the non-residential component of the Development. It is expected that the high performance DGU will be required to have a thermal performance of:

- Total System (Glass + Frame) U-value of 2.8 (W/m²)
- Total System (Glass + Frame) SHGC of 0.24

For the residential component of the Development, it is expected that a similar DGU is required to pass BASIX (residential apartments are not assessed under Part J2). It is expected that the residential DGU will be required to have a thermal performance of:

- Total System (Glass + Frame) U-value of 3.1 (W/m²)
- Total System (Glass + Frame) SHGC of 0.27

3.1.3 BCA Part J3, J5, J6, J7 and J8

Section J requirements specific to building services will be implemented using the deemed-to-satisfy approach and will be documented by the project's services engineers during detailed design stages.

Parts of NCC BCA Section J	Responsibility and Documented by	Compliance Approach
Part J3: Building Sealing	Architect, Façade & Mechanical Services	Deemed-to-satisfy provisions of Part J3
Part J5: Air-conditioning and Ventilation Systems	Mechanical Services	Deemed-to-satisfy provisions of Part J5
Part J6: Artificial Lighting and Power	Electrical Services	Deemed-to-satisfy provisions of Part J6
Part J7: Heated Water Supply and Swimming Pool and Spa Pool Plant	Hydraulic Services	Deemed-to-satisfy provisions of Part J7
Part J8: Facilities for Energy Monitoring	Mechanical & Electrical Services	Deemed-to-satisfy provisions of Part J8

3.2 BASIX

The Building Sustainability Index (BASIX) contains a number of mandatory provisions and guidance to reduce consumption of potable water, emission of greenhouse gases, and to improve the thermal performance of residential buildings.

The residential component of the OSD will be required to comply with the BASIX assessment.

The BASIX assessment is divided into three sections, each independently measuring the efficiency of the development. These are:

- Water; a minimum potable water usage reduction of 40% compared to a 'pre-BASIX' home benchmark home
- Thermal Comfort; the expected level of energy consumption to heat and cool for the whole development (weighted average) must comply with the Thermal Comfort target
- Energy; the development must achieve an energy reduction target of 25% to units

The BASIX assessment is undertaken during the Stage 2 DA assessment phase of the project. With the architectural detail available at Stage 1 a BASIX assessment cannot be undertaken. The full BASIX assessment is undertaken during the Stage 2 DA as it results in stamped drawings which reflect what will be constructed.

3.3 Green Star

Green Star is a voluntary scheme administered by the national, not-for-profit organisation Green Building Council of Australia (GBCA). The Green Star suite of tools provides an environmental rating of buildings performance. The tools are performance based and assess the environmental attributes of new and refurbished buildings in every state across Australia. The Green Star rating system is scaled to a star level from 0 to 6 stars, where ratings of 4 stars or higher are able to be submitted for certification. The current target is 4 Green Star for residential and 5 green star for non-residential.



Figure 3.3: Green Star Rating Scale Source: Green Building Council of Australia

The Green Star Buildings rating tool assesses a project’s performance against nine (9) environmental categories

- Management;
- Indoor environmental quality;
- Energy;
- Transport;
- Water;
- Materials;
- Land use & ecology;
- Emissions;
- Innovation.

The Sydney Metro City & Southwest Sustainability Strategy has identified that Metro Stations are to target 5 Stars and OSD will seek to achieve high benchmarks using rating systems.

A preliminary Green Star assessment identifying potential credits to achieve a 5 Star rating is included in Appendix A.

3.4 NABERS

The National Australian Built Environment Rating System (NABERS) is a government initiative to measure and compare the environment performance of Australian buildings. NABERS measures the energy efficiency, water usage, waste management and indoor environment quality of a building or tenancy and its impact on the environment. NSW Office of Environment and Heritage is the NABERS administrator, on behalf of the Commonwealth, state and territory governments.

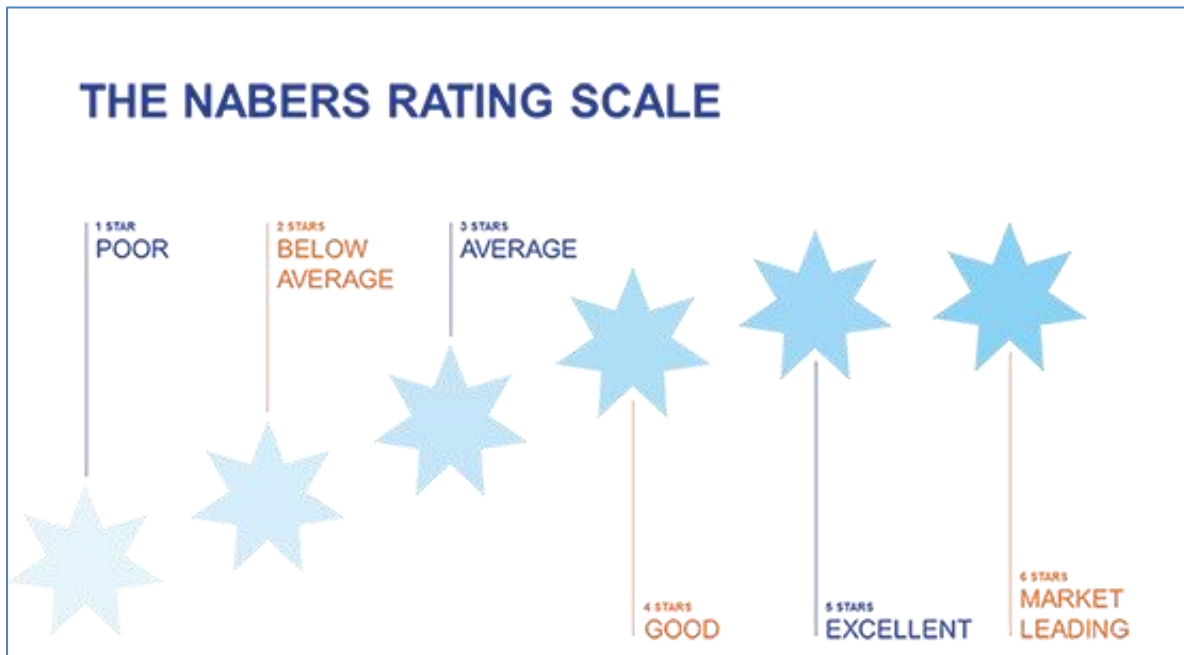


Figure 3.4: NABERS Rating Scale Source: NABERS

The commercial component of the Development will be targeting initiatives to achieve a NABERS 5 star base building energy rating is outlined in section 4 of this report..

The proposed energy and carbon reduction initiatives proposed for the Development is shown in the following section.

4.0 Proposed ESD Framework

4.1 Framework

The ESD Framework is based on designing the various classifications of the development to achieve the following sustainability targets:

ESD Category	Commercial Office	Hotel	Apartment
Energy/Greenhouse	NABERS 5.0 Star	Green Star 5 Star	BASIX
Water	NABERS 3.0 Star	Green Star 5 Star	BASIX
Management	Green Star 5 Star	Green Star 5 Star	Green Star 4 Star
Indoor Environment			
Material			
Transport			
Land Use and Ecology			
Emissions			
Innovation			

The initiatives proposed for achieving these Sustainability targets are set out in the following sections.

4.2 Energy Efficiency Initiatives

The design strategy to target low energy consumption and Greenhouse Gas (GHG) emissions for the development is through:

- Energy conservation through passive design approaches; and
- Energy efficiency through active / mixed mode air conditioning design approaches

The design strategies and initiatives that are proposed in this section will be further investigated and considered for implementation during the design phase of the project.

4.2.1 Passive Design

The proposed passive design approach responds to the local climate, local sun path and wind profile, reducing the building's demand for active building-services systems to provide thermal comfort and lighting and reducing peak energy demand and annual energy consumption.

- The commercial and hotel components of the building are relatively well shaded. High thermal performance of the building's glazing and envelope along with passive solar

design features (e.g. internal blinds) will be utilised to reduce the need for cooling and heating and improve thermal comfort;

- The site's microclimate provides suitable conditions during shoulder seasons to support economy cycle and natural ventilation. Whilst not suited to offices or meeting rooms, natural ventilation or mechanically assisted ventilation may be used as part of a mixed mode system in areas such as the residential components, or even the hotel. However due to the inner-city location of the development, mechanical ventilation will be provided.
- The diurnal temperature fluctuation in the Sydney region also indicates that with the potential use of exposed thermal mass used in conjunction with night time purging, and night cooling, the total air conditioning energy consumption could be reduced. This strategy can be considered further during the detailed design stage once further details about requirements for internal finishes are known.
- The floor plan and expected façade system are well suited to allowing excellent levels of natural light into the building

4.2.2 Active Design

Good passive design will contribute to occupant comfort and reduced energy use. Beyond this, there will be a need for low energy space heating and cooling to maintain comfortable internal conditions.

Analysis of past operational base building performance data shows which active systems contribute most to operational energy consumption and GHG emissions.

Mechanical services typically consume the bulk of base building energy and contribute to around 70% of the base building GHG emissions. As such efficiency improvements to mechanical services yield the largest gains for overall base building performance. Lighting systems are next contributing around 12-15% of base building GHG emissions. Vertical Transportation contributes around 10-15% of base building GHG emissions with other miscellaneous systems responsible for the remainder.

Using building operational simulation tools, active system design strategies will be optimised to maximise energy efficiency and consequential GHG emissions performance.

The following summarises energy efficiency strategies recommended for the Development to maximise active building systems performance and to target the 5 Star NABERS Base Building energy rating (for Commercial office only), BASIX rating (for Residential) and contribute to the Green Star Greenhouse Gas reduction credit.

Non-Residential Development

Incorporate a number of ESD strategies which will demonstrate the commercial office development's target to a 5 Stars NABERS Energy rating. The proposed strategy includes:

- High efficiency air conditioning systems with preference for water-based heat rejection for improved efficiency
- Economy cycle will be used when outside conditions are favourable.
- Appropriate zoning and control for HVAC systems to condition spaces when required. Well zoned systems enable buildings to respond to variable heat loads which can lead to energy savings. It is recommended that the building include zonings for perimeter and centre zones
- High efficiency modular boilers to provide heating hot water.
- Fan with low static pressures
- High efficiency, demand-controlled ventilation system fitted with Variable Speed Drives (VSD).
- High efficiency pumps fitted with VSD.
- A Building Management Control System BMCS and comprehensive metering and monitoring system.
- Lifts to be provided with regenerative braking.
- High efficiency LED and fluorescent lighting with an average power density reduction of no less than 25% over Part J6 DTS lighting power densities (not considering adjustment factors). Light fitting of types suits to task will be provided in the common / back of house / plant room areas.
- Appropriate lighting control strategy which includes timers, photocells and dimming
- Provision of daylight sensor lighting control to areas adjacent to the façade.
- Provision of dedicated DX air conditioning systems serving 24/7 operation spaces.
- Multi fan carpark ventilation systems each controlled by carbon monoxide sensors.
- Extensive energy metering to facilitate energy monitoring.
- Natural ventilation of plantrooms where practicable.

The final selection of which of these strategies will be adopted into the design will be dependent upon the conclusion of detailed energy modelling demonstrating the anticipated performance of the development.

Residential Development

The residential component of the development will be designed to comply with the BASIX requirements.

The following energy efficiency strategies will be assessed to serve the residential development:

- Provision of energy efficient direct expansion (DX) fan coil units sized to cater for the thermal loads serving the main living space and bedrooms
- Use of natural and mixed mode ventilation where applicable
- Provision of high efficiency LED downlights

4.3 Water Efficiency Initiatives

Hydraulic services and infrastructure will consider the following initiatives for the Development. Further investigation on these initiatives will be undertaken as the project progresses:

- Efficient hydraulic fittings and fixtures are recommended based on Water Efficiency Labelling and Standards (WELS) scheme rating.
- A recycled water system will be investigated to harvest rainwater off the roof and facade and would be treated to a level suitable for reuse in the building for flushing toilets and irrigation.
- Fire system test water be installed on a closed loop and recirculated during testing to reduce potable water use and avoid the need for additional waste water storage capacity to be implemented.

4.4 Indoor Environmental Quality Initiatives

- To maintain good indoor air quality, the following initiatives will be considered. Further investigation on these initiatives will be undertaken as the project progresses.
 - Reduction of outdoor pollutants entrance to the building through positioning air intakes which are away from major road corridors and transport pollution.
 - High efficiency filtration for further improvement on air quality by removing a large percentage of contaminants from the air stream.
 - Duct work and HVAC components will be designed for ease of maintenance and cleaning.
 - Provisions of outside air flow rates above the minimum regulatory requirements will be considered.
 - Use of low Volatile Organic Content (VOC) and low formaldehyde materials to reduce air pollution.

- Systems will be designed to provide high levels of thermal comfort. A draught free environment will be provided through design of ventilation and properly zoned air conditioning system air distribution. Shading and blinds to control excessive daylight and solar heat gain.
- Design of internal ambient noise levels in accordance with AS2107 to provide acoustic amenity, which will assist with reducing distraction due to noise and maintain privacy. External noise ingress will be controlled through the building envelope;
- Provision of flicker free lighting system with appropriate colour rendering to provide good visual comfort. Lighting glare will be minimised through selection and position of fittings. Lighting will be designed to provide required lighting levels for the task.

4.5 Materials

The proposed materials strategy aims to limit the broader environmental impact of the development through the selection and use of materials. Initiatives to support the materials strategy include the following. Further investigation on these initiatives will be undertaken as the project progresses.

- The unnecessary use of materials and finishes will be avoided through adopting a frugal design approach to minimise internal finishes where feasible.
- Consideration for material selections Life Cycle Impacts and use of materials that are durable and long lasting; to reduce replacement / maintenance intervals.
- The project will consider using materials with lower embodied carbon. This includes use of lower carbon concrete (e.g. through reduced portland cement) and recycled aggregate and water where practical.
- Modular construction of building components such as plantroom components and service risers fabricated off site will also be considered.
- Where practical, materials that are third party environmentally certified, have recycled content or have chain of custody agreements will be used over standard materials.

4.6 Transport

A sustainable transport plan for the operational building should be developed to encourage and promote reduced car usage and alternatives active modes of transport including walking and cycling. The following initiatives will be considered and investigated as the project progresses:

- A portion of the car parking spaces shall be reserved for sole use of small / fuel efficient vehicle;
- Provision for future connection of Electric Vehicle (EV) charging infrastructure

- Extensive bicycle parking and end of trip facilities comprising change room, lockers and showers to provide facilities for residents
- Information will be readily available in public areas of the building regarding location of local cycle routes and public transport locations and timetables.

5.0 Summary

A series of initiatives have been considered and targeted for the OSD Pitt St North Development to achieve an environmental performance compliant with the Sydney Metro and Regulatory policies and the City of Sydney DCP.

The specific policy targets on which the strategies are based include:

- Building Code of Australia Section J
- City of Sydney DCP 2012
- Sydney Metro City & Southwest Sustainability Strategy
- BASIX Rating
- Green Star Design and As Built Rating
- NABERS Base Building Energy Rating

This report demonstrates general compliance with the objectives of these requirements. The Development is still to progress through detailed design, which will allow for improvements to its ESD commitments.

The Basix rating is a pass or a fail. The development will ultimately need to pass so the final design of apartment room layouts, window sizes, window performance selections will need to be determined in the next stage to ensure a pass is achieved.

1. Appendix A – Green Star Targets

Green Star - Design & As Built Scorecard

Project:	OSD Pitt St North
Targeted Rating:	5 Star - Australian Excellence

Core Points Available	Total Score Targeted
100	63.0

NA	CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Management					14	
	Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.0	Accredited Professional	1	1
	Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets	-	Complies
			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
	Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan	2	2
	Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information	1	1
	Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance	1	1
			5.2	End of Life Waste Performance	1	1
	Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering	-	Complies
			6.1	Monitoring Systems	1	1
	Responsible Building Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan	-	Complies
			7.1	Formalised Environmental Management System	1	1
			7.2	High Quality Staff Support	1	1
	Operational Waste	Performance Pathway	8A	Performance Pathway - Specialist Plan	1	1
			8B	Prescriptive Pathway - Facilities	-	
Total					14	14

Indoor Environment Quality					17	
L	Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes	1	1
L			9.2	Provision of Outdoor Air	2	1
C			9.3	Exhaust or Elimination of Pollutants	1	1
C	Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1	1
C			10.2	Reverberation	1	1
C			10.3	Acoustic Separation	1	
			11.0	Minimum Lighting Comfort	-	Complies

☐	Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.1	General Illuminance and Glare Reduction	1	1
☐			11.2	Surface Illuminance	1	
☐			11.3	Localised Lighting Control	1	
L	Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	-	Complies
L			12.1	Daylight	2	1
L			12.2	Views	1	1
L	Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1	Paints, Adhesives, Sealants and Carpets	1	1
L			13.2	Engineered Wood Products	1	1
☐	Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	1	1
☐			14.2	Advanced Thermal Comfort	1	1
Total					17	12

Energy		22				
Greenhouse Gas Emissions	E. Modelled Performance Pathway	15A.0	Conditional Requirement: Prescriptive Pathway	-		
		15A.1	Building Envelope	-		
		15A.2	Glazing	-		
		15A.3	Lighting	-		
		15A.4	Ventilation and Air-conditioning	-		
		15A.5	Domestic Hot Water Systems	-		
		15A.6	Accredited GreenPower	-		
		15B.0	Conditional Requirement: NatHERS Pathway	-		
		15B.1	NatHERS Pathway	-		
		15C.0	Conditional Requirement: BASIX Pathway	-		
		15C.1	BASIX Pathway	-		
		15D.0	Conditional Requirement: NABERS Pathway	-		
		15D.1	NABERS Energy Commitment Agreement Pathway	-		
		15E.0	Conditional Requirement: Reference Building Pathway	-	Complies	
		15E.1	Comparison to a Reference Building Pathway	20	4	
Peak Electricity Demand Reduction	Performance Pathway	16A	Prescriptive Pathway - On-site Energy Generation	-		
		16B	Performance Pathway - Reference Building	2	1	
Total					22	5

Transport

10

☐ ☐	Sustainable Transport	Performance Pathway	17A.1 Performance Pathway	10	7
			17B.1 Access by Public Transport	0	
			17B.2 Reduced Car Parking Provision	0	
			17B.3 Low Emission Vehicle Infrastructure	0	
			17B.4 Active Transport Facilities	0	
			17B.5 Walkable Neighbourhoods	0	
Total			10	7	

Water			12		
☐ ☐	Potable Water	Performance Pathway	18A.1 Potable Water - Performance Pathway	12	4
			18B.1 Sanitary Fixture Efficiency	0	
			18B.2 Rainwater Reuse	0	
			18B.3 Heat Rejection	0	
			18B.4 Landscape Irrigation	0	
			18B.5 Fire System Test Water	0	
Total			12	4	

Materials			14		
☐	Life Cycle Impacts	Prescriptive Pathway - Life Cycle Impacts	19A.1 Comparative Life Cycle Assessment	0	
			19A.2 Additional Life Cycle Impact Reporting	4	
			19B.1 Concrete	3	2
			19B.2 Steel	1	1
			19B.3 Building Reuse	4	
			19B.4 Structural Timber	4	
☐ ☐ ☐	Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1 Structural and Reinforcing Steel	1	1
			20.2 Timber Products	1	1
			20.3 Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1
Sustainable Products		To encourage sustainability and transparency in product specification.	21.1 Product Transparency and Sustainability	3	
☐	Construction and Demolition Waste	Fixed Benchmark	22A Fixed Benchmark	1	1
			22B Percentage Benchmark	-	
Total			12	7	

Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	-	Complies
		23.1	Ecological Value	3	1
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	-	Complies
		24.1	Reuse of Land	1	1
		24.2	Contamination and Hazardous Materials	1	1
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.0	Heat Island Effect Reduction	1	1
Total				6	4

Emissions				5	
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge	1	1
		26.2	Stormwater Pollution Targets	1	1
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies	-	Complies
		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.	28.0	Legionella Impacts from Cooling Systems	1	
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.0	Refrigerants Impacts	1	1
Total				5	4

Innovation				10	
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process	10	2
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in	30B	Market Transformation		
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks		2
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge		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	30E	Global Sustainability		
Total				10	6

TOTALS	AVAILABLE	TARGETED
CORE POINTS	100	57.0
CATEGORY PERCENTAGE SCORE		57.0
INNOVATION POINTS	10	6.0
TOTAL SCORE TARGETED		63.0