Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP)

Haymarket North West Plot

Sustainability Report
Report for Stage 2 State Significant Development Application - SSDA4

Lend Lease

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1.0 INTRODUCTION

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

The Application (referred to as SSDA 4) follows the submission of a staged SSD DA (SSDA 2) submitted in March 2013 to the Department of Planning and Infrastructure that set out a Concept Proposal for a new mixed use residential neighbourhood at Darling Harbour known as 'The Haymarket'. The Haymarket forms part of the Sydney international convention, exhibition and entertainment precinct (SICEEP) Project, which will deliver Australia's global city with new world class convention, exhibition and entertainment facilities and support the NSW Government's goal to "make NSW number one again".

More specifically this subsequent DA seeks approval for a mixed use development within the South West development plot of The Haymarket and associated public domain works. The DA has been prepared and structured to be consistent with the Concept Proposal DA.

1.1 Overview of Proposed Development

The proposal relates to a detailed ('Stage 2') DA for a commercial office and public car park development in the North West Plot of The Haymarket together with associated public domain works. The Haymarket Site is to be developed for a mix of residential and non-residential uses, including but not limited to residential buildings, commercial, retail, community and open space. The North West Plot is one of six development plots identified in the Concept Proposal DA.

Under the Concept Proposal DA, the North-West Plot will accommodate active ground floor uses, a mutli-storey about ground public car park and commercial office building above .More specifically, this SSD DA seeks approval for the following components of the development:

- Staged demolition of existing site improvements, including the existing Sydney Entertainment Centre (SEC), Entertainment car park, and part of the pedestrian footbridge connected to the Entertainment car park;
- Associated tree removal and replanting;
- Construction and use of a mixed use commercial building comprising:
  - ground level retail/television studio uses/IQ Hub;
  - public car park (above ground);
  - ancillary parking (above ground); and
  - commercial office space.
- Provision of vehicle access to the development from realigned Exhibition Place;
- Public domain improvements, including:
  - provision (part) of a new north-south pedestrian connection (known as the Boulevard) eventually linking Quay Street to Darling Harbour;
  - provision (part) of a new east-west pedestrian laneway (known as Dickson's Lane) linking Darling Drive to the Boulevard;
- Extension and augmentation of physical infrastructure / utilities as required.

1.2 Background

On 21 March 2013 a critical step in realising the NSW Government's vision for the SICEEP Project was made, with the lodgement of the first two SSD DAs with the Department of Planning and Infrastructure. The key components of these proposals are outlined below.

1.2.1. Public Private Partnership SSD DA (SSD 12_5752)

The Public-Private Partnership (PPP) SSD DA (SSDA 1) includes the core facilities of the SICEEP Project, comprising the new, integrated and world-class convention, exhibition and entertainment facilities along with ancillary commercial premises and public domain upgrades.

1.3 The Haymarket Concept Proposal (SSD 13_5878)

The Haymarket Concept Proposal SSD DA (SSDA 2) establishes the vision and planning and development framework which will be the basis for the consent authority to assess detailed development proposals within the Haymarket Site.

More specifically the Stage 1 Concept Proposal seeks approval for the following key components and development parameters:

- Staged demolition of existing site improvements, including the existing Sydney Entertainment Centre (SEC), Entertainment Centre Car Park, and part of the pedestrian footbridge connected to the Entertainment car park and associated tree removal;
- A network of streets, lanes, open space areas and through-site links generally as shown on the Public Domain Concept Proposal, to facilitate reintegration of the site into the wider urban context and connection with the broader SICEEP Site;
- Street layouts;
- Development plot sizes, development plot separation, building envelopes (maximum height in RLs), building separation, building depths, building alignments and a benchmark for natural ventilation and solar provision for the precinct;
- Land uses across the site, including residential and non-residential uses;
- A maximum total gross floor area (GFA) across The Haymarket Site of 197,236m^2 for the mixed use development (excluding ancillary above ground car parking), comprising of:
    - A maximum of 49,545m^2 non-residential GFA; and
    - A maximum of 147,691m^2 residential GFA;
- Above ground parking including public car parking;
- Residential car parking rates to be utilised in the subsequent detailed (Stage 2) Development Applications, being:
    - Zero (0) spaces per studio apartment;
    - Maximum one (1) space per two (2) one bedroom apartments;
    - Maximum one (1) space per one bedroom + study apartment, plus one (1) additional space per five (5) apartments;
    - Maximum one (1) space per two bedroom apartment, plus one (1) additional space per five (5) apartments; and
    - Maximum two (2) spaces per 3+ bedroom apartment.
- Design Guidelines to guide future development and the public domain; and

- A remediation strategy.

This report has been prepared to support a detailed Stage 2 SSD DA for mixed use development and associated public domain works within The Haymarket (SSDA 5), consistent with the Concept Proposal SSD DA.

1.4 Site Description

The SICEEP Site is located within Darling Harbour. Darling Harbour is a 60 hectare waterfront precinct on the south-western edge of the Sydney Central Business District that provides a mix of functions including recreational, tourist, entertainment and business.

With an area of approximately 20 hectares, the SICEEP Site is generally bound by the Light Rail Line to the west, Harbourside shopping centre and Cockle Bay to the north, Darling Quarter, the Chinese Garden and Harbour Street to the east, and Hay Street to the south (refer to Figure 1).

The Haymarket Site is:

- located in the south of the SICEEP Site, within the northern portion of the suburb of Haymarket;
- bounded by the Powerhouse Museum to the west, the Pier Street overpass and Little Pier Street to the north, Harbour Street to the east, and Hay Street to the south; and
- irregular in shape and occupies an area of approximately 43,807m^2.

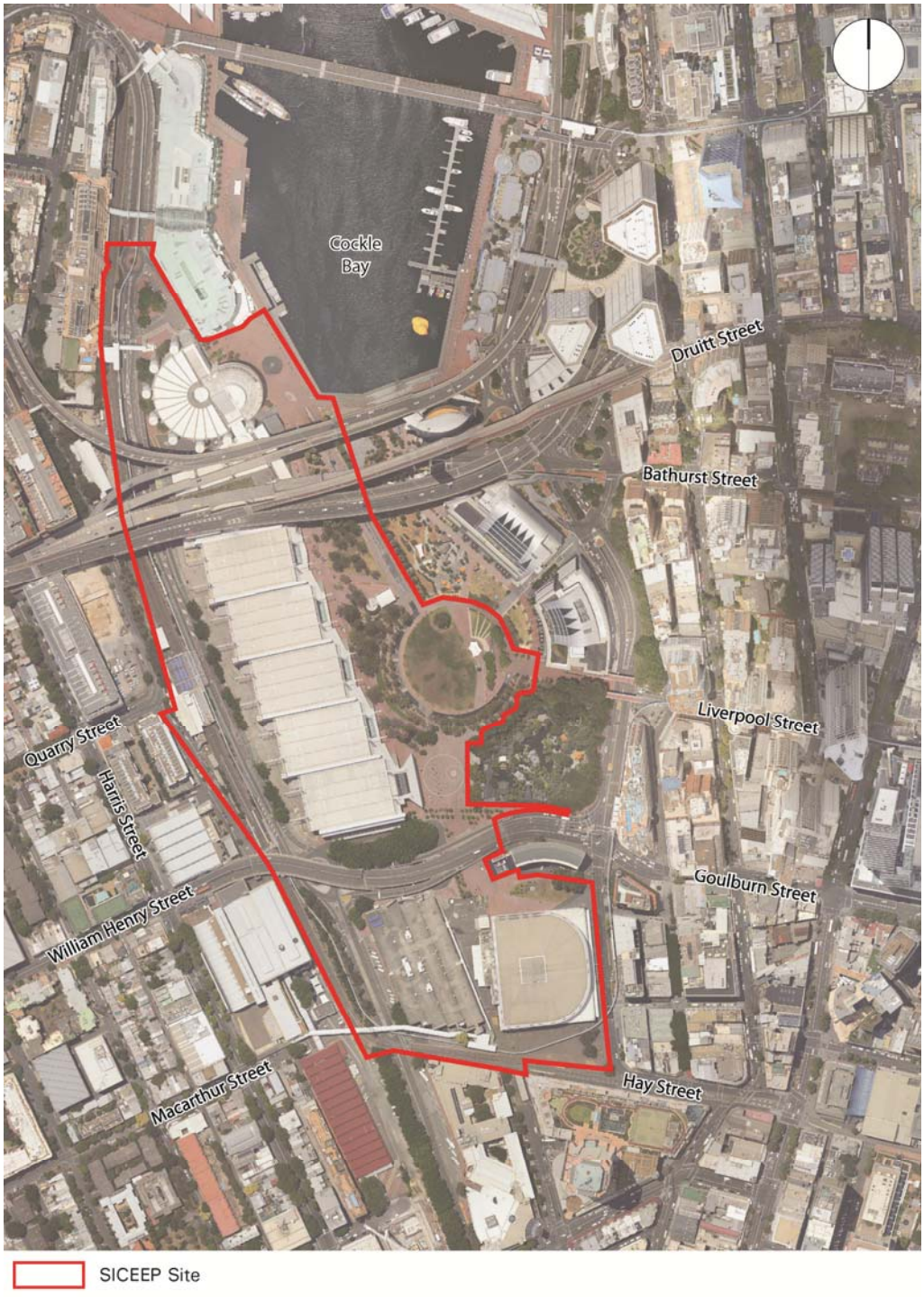

Figure 1 – Aerial Photograph of the SICEEP Site

The Concept Proposal DA provides for six (6) separate development plots across the Haymarket Site (refer to Figure 2):

1) North Plot;
2) North East Plot;
3) South East Plot;
4) South West Plot;

5) North West Plot; and
6) Western Plot (Darling Drive).

The Application Site area relates to the South West Plot and surrounds as detailed within the architectural and landscape plans submitted in support of the DA.

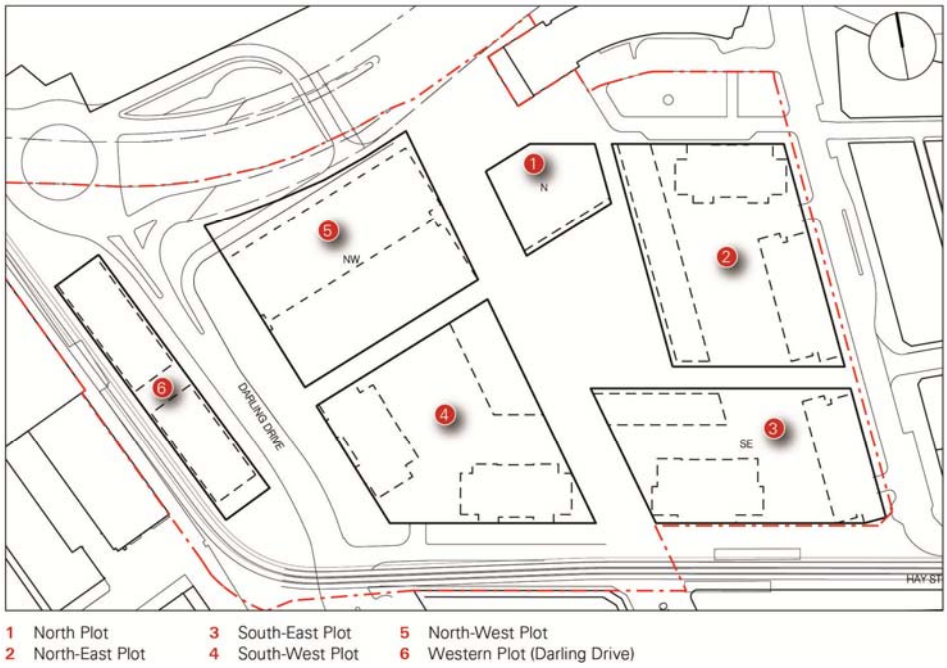

Figure 2 – Concept Proposal Development Plots

1.5 Planning Approvals Strategy

The SICEEP Project will result in the lodgement of numerous SSD DAs for the various components of the redevelopment project. SSD DAs have already been lodged for the PPP component of the SICEEP Project (comprising the convention centre, exhibition centre, entertainment facility and ancillary commercial premises and associated public domain upgrades), and the Stage 1 Concept Proposal for The Haymarket. Separate 'Stage 2' SSD DAs for the development of the North West Plot and the Western Plot (Darling Drive) and associated public domain works will be lodged concurrently with this application. Future applications will be lodged for the Hotel complex, and the remaining development plots of The Haymarket Site.

2.0 ESD PRINCIPLES

This report focuses primarily on the commercial component of the building. The Haymarket NW Plot aims to deliver a sustainable commercial project, with reduced operational energy consumption, reduced potable water use, minimisation of waste to landfill and appropriate materials selection while at the same time maintaining a high level of indoor environmental quality through appropriate mechanical design, façade configuration and materials selection.

The commercial development will be committing to a 5 Star Design and As-Built Green Star ratings under the Green Star Office v3 tool. This will be an independent certification of the project's sustainability commitments. Commitment to a Green Star rating confirms the projects commitment to deliver a development in accordance with what is considered 'Australian Excellence'. The initiatives relevant to Green Star are discussed in section 5.0 of this report and address numerous sustainability issues such as management, materials and waste, transport, ecology etc. Initiatives targeted within this Green Star tool will ensure significant sustainability principles will be incorporated into the design, appropriate management practices will be applied through the construction period and facilities and resources will be provided to ensure the delivery and operation of the building achieves the sustainability objectives.

In addition to Green Star, the project will also be designed and delivered to be capable of achieving a NABERS base building energy rating of 4.5 stars. To achieve this rating the building will have to demonstrate operational emissions have been minimised over a period of 12 months. As part of the project's Green Star rating we are committing to 12 month tuning and verification period post occupancy to ensure that the building is appropriately commissioned and tuned to operate as per design intent. This building tuning process is essential to ensure that the building is capable of achieving its predicted NABERS rating.

Given initiatives currently proposed annual greenhouse gas emissions from the proposed development are expected to be reduced by a minimum of 30% when compared to the Green Building Council's benchmark. In addition potable water consumption is expected to be reduced by up to 50% when compared to the Green Building Council's benchmark.

3.0 WHOLE OF PRECINCT ESD PRINCIPLES

Lend Lease has undertaken an integrated approach to sustainability across the total SICEEP site. In addition to the building based initiatives, a number of whole of precinct initiatives will be delivered to benefit the community including:

3.1 Enhanced connections and public transport links

The master plan design for the precinct lays out a connected and enhanced navigation through the site; enticing the local community as well as visitors through improved walkability and innovative interactive way finding, making public transport the easy and obvious choice for people providing affordable, green and safe travel options;

3.2 Car Share Network

Car Share networks reduce the cost of car ownership and minimise embodied carbon. Electric vehicles reduce carbon emissions and local air pollution. Lend Lease is partnering with GoGet to establish Australia's first Electric Car Share Network for use by the community within the precinct and beyond;

3.3 Passive Signage

Simple material that indicates the sustainability attributes of key items. This could include:

- Labelling of key materials that indicate what it is, where it is from, how much embodied carbon it contains and how it may be recycled – "This bench is made from plantation spotted gum from North Queensland and has absorbed 100kgs of carbon dioxide from the atmosphere";
- Design attributes that support sustainable outcomes – "this landscaped area treats stormwater runoff to reduce pollution into the harbour";
- Directional information such as links to public transport;
- Heritage and Indigenous references to the precinct's past;

3.4 Dynamic Informatics Systems and Technology

- Online and mobile phone applications that provide more detailed information about the sustainability credentials of the precinct that can be automatically activated by proximity or scanning QR codes with a smartphone;
- Digital pods in the public domain that offer Wi-Fi hotspots;
- Interactive signage and lighting, in combination with augmented visuals on smart devices, to highlight physical building elements; and

3.5 Aspirational Initiatives

In addition to the above, the following aspirational initiatives are being investigated:

Recycled Water

Lend Lease is in the unique position to facilitate a potential option of bringing recycled water produced at the nearby Barangaroo South Treatment plant to the Facilities and Haymarket buildings. The recycled water plant would result in a significant reduction in mains water use throughout the whole of precinct with recycled water being potentially provided to toilets, washing machines, cooling towers and irrigation.

Precinct Thermal Plant

Beyond the centralised thermal plant for the Convention and Exhibition Facilities, there are also opportunities to expand the thermal plant into the Haymarket precinct. The Precinct plant would take advantage of the diversity of uses across the whole of precinct resulting in electrical infrastructure and greenhouse gas emission savings.

4.0 BUILDING DESIGN

4.1 Overall Development Description

The proposed development of the NW Plot within The Haymarket will consist of a six level commercial office development above a four level multi-level public car park facility, with ground level mixed and retail uses. The planning has been guided by prescribed site development guidelines, required building efficiencies and commercial market drivers. The design aligns, in the first instance, with a form follows function approach which is then interpreted in the greater context of the Precinct Plan. The intent is to generate a contemporary and innovative architecture, setting the built form in dialogue with the new SICEEP Theatre north of the site and creating the notion of "an object / form" set within the urban grain of the city and the redevelopment of the area.

4.2 Floor Plate Concept

The building comprises of a single wide floor plate of approximately 55 metres wide, separated by a centralized core with the ability for tenant input/demand to determine floor to floor penetrations/voids/atriums where desired between structural bays. This design will result in a flexible working environment that encourages a high level of interaction. The floor plates have been design to accommodate a central atrium with the inclusion of a skylight at the roof, should a tenant elect the option of incorporating an Atrium within their tenancy.

4.3 Building Envelope

The unencumbered commercial floor plates are glazed on all sides emphasising the openness of the floor plate, and maximising the natural light, transparency and outlook from the working environment. To ensure that good indoor environmental quality and energy efficiency is achieved a system consisting of a high performance glazing and appropriate shading elements is proposed.

Key design features include vision glass area which is maximised at each level combined with performance glazing technology and fixed external solar shading devices specific to façade orientation. A typical vision glass height of 2700mm is proposed with a nominal sill height (below 250 mm) combined with a "raised" ceiling profile to encourage and maximise natural light penetration deep within the floor plate.

North Façade – Commercial Floor Plates

The northern façade will consist of a horizontal shade at the top of the vision glass element at each level. This shade will ensure that peak cooling load is reduced, operational cooling energy is reduced and glare from direct solar is reduced to minimise blind operation and maintain views. In addition there will be vertical fins sized and spaced to reduce the potential for solar radiation to be reflected from the north façade onto Pier Street. While these fins are primarily to reduce this potential for glare they will also assist in reducing annual cooling loads.

South Façade – Commercial Floor Plates

The southern façade will consist of vision glass only with no external shades. External shades are not required to the southern façade where minimal direct solar radiation is received. This ensures maximum daylight penetration and maintenance of views without increasing the cooling load of the building.

East and West Façades – Commercial Floor Plates

The eastern and western facades will consist of vertical fin elements approximately 300mm deep spaces at 1200mm centres. While these shades will provide some reduction in peak load they will also reduce operational cooling energy and glare from direct solar. The vertical fins are very effective in reducing glare and therefore reducing internal blind use and maintaining external views.

Car Park Façade

The car park façade is designed to be sufficiently open to enable natural ventilation. This is a significant reduction in ventilation associated energy typically associated with a building of this type.

4.4 Mechanical and Other Building Systems

In addition to the building envelope, the following are technologies essential to ensure that the project's sustainability targets are achieved including the greenhouse gas emissions reductions required to ensure that the building is capable of achieving a 4.5 star NABERS Energy rating.

- High efficiency chilled water plant: High efficiency chillers will be selected to ensure high coefficient of performance is achieved throughout the year.
- High efficiency motors: All central pumps, air handling units, return air fans and larger miscellaneous fans will be specified with high efficiency motors.
- Fan and pump selections: Minimum performance will be set for all equipment.
- Low-temperature variable air volume (VAV) air distribution: The low temperature VAV design to be adopted will lower design air volumes and thus fan energy use over conventional VAV systems. The VAV system temperature will be controlled to make maximum use of high efficiency chilled water plant while avoiding reheat. Controls will be configured to maximise the benefit of economy cycle cooling when ambient conditions are appropriate.
- Efficient Lighting: Lighting is designed to minimise the heat load on the base building cooling plant. House lighting will also be designed to minimise energy consumption through the appropriate selection of fittings and controls.
- High Façade Performance: Optimisation studies have been undertaken to establish the most appropriate façade for the project. A horizontal overhang is currently proposed to shade the north façade, while vertical fin elements are proposed for the east and west. In addition to shading a glazing type with appropriate solar control and visual light transmittance will be selected in the next phase of design.
- Heating / Boilers: The heating hot water plant will be designed to be efficient during part load operation as the building is expected to not need the full heating design capacity for the majority of the year.

- Car park: The proposed car park is above ground and will therefore be naturally ventilated resulting in significant energy savings.

- Energy and water metering: Energy and water metering will be provided to monitor energy and water use and a system for monitoring consumption by end-use will be provided to enable building management to monitor the building's performance. This will enable the building management team to focus their attention and assist in their maintenance of the anticipated NABERS rating.

4.5 Stormwater Management & Water Minimisation

Stormwater Drainage and Water Sensitive Urban Design

The total catchment area for the entire SICEEP development is approximately 210 ha. Of this approximately 120 ha is to the south of the precinct and will drain through the Haymarket either from the south east at the junction of Hay and Harbour Streets or south west at the corner of Hay Street and Darling Drive. Ultimately this enters the harbour at Cockle Bay.

In order to facilitate the 1 in 100 year flows, the Boulevard will accommodate a continuous overland flow path that can direct high velocity stormwater away from Haymarket and toward Cockle Bay. Stormwater will be directed toward the Boulevard from the east and west along Hay Street, with some flow diverted to flow along Darling Drive.

Water Sensitive Urban Design Principles within the Public Domain

The expected velocity of the stormwater in high rainfall events means that infiltration into porous surfaces will not occur during these events. Low flow events, however will be mostly absorbed through porous surfaces or soft landscape areas. As such, the public domain will be designed to facilitate bio filtration within the events and capture stormwater through permeable paving and suitable filter soil media, on ground, along the western side of the building, on Darling Drive.

Water Minimisation of the North West Plot

To ensure the project is capable of achieving the 50% reduction in potable water predicted using the Green Star water calculator a target a number of initiatives are currently proposed. In the first instance potable demand is reduced through the selection of fittings and fixtures with flow rates as low as practically possible.

The collection of rainwater is also proposed to provide non-potable water for toilet flushing and also for any irrigation that is required on site. In addition fire services test water will not be directed to the sewer or to stormwater. A tank will be provided to ensure that fire services test water can be re-circulated minimising the consumption of potable water.

Given the existing site condition and the proposed landscaping associated with the proposed development, stormwater flows are not expected to be increased post development.

4.6 Integrated Fit-out

It is proposed that the building will be delivered as an integrated fitout to eliminate the need for immediate tenant refit. This will reduce the materials waste associated with traditional speculative buildings which are fitted out with ceilings and floor coverings prior to attracting a tenant. These finishes are then typically removed by the future tenant to enable their own selections. An integrated fitout will eliminate this unnecessary material waste.

4.7 Indoor Environment Quality

The proposed building will ensure a high level of indoor environmental quality as follows:

- Thermal Comfort: Thermal comfort will be achieved through a combination of the mechanical air distribution system, high performance façade and large floor plates. A high performance façade including appropriate glazing and external shading will ensure that thermal comfort impacts of the façade are minimised. The mechanical air distribution system will be appropriately sized, designed and commissioned to ensure comfortable conditions can be maintained throughout the space for all climatic variations experienced. In addition the large floor plates will ensure that impacts from the façade are further reduced.
- Air Quality: Air quality is addressed through careful selection of finishes to minimise the quantity of pollutants into the space and good ventilation to ensure any pollutants are removed from the space. Finishes will be selected to ensure that volatile organic compounds and formaldehyde emissions, which can be hazardous to human health, are minimised. In addition ventilation air will be increased beyond minimum standards and will be controlled via CO2 sensors to ensure appropriate ventilation at all times to remove both CO2 and other pollutants. The distribution of ventilation air throughout the space will also be carefully considered to reduce the age of air within the space.
- Acoustics: The building services design and the overall building will be designed to achieve a high level of acoustic comfort.
- Lighting: Lighting will be designed to ensure adequate uniform light is provided which does not cause flicker or glare. Fixed external shading will also be provided to ensure glare from direct is minimised.

4.8 Green Commuter Strategy

The proposed NW plot building is situated in an ideal location close to public transport to ensure that transport associated emissions will be minimised. In addition there are a number of initiatives which are to be incorporated which will further reduce transport emissions as follows:

Car Parking: While there is a large number of car spaces provided, the majority of these are public car parks for the Entertainment Centre and therefore there will be minimal car associated transport emissions associated with the proposed NW building. A significant proportion of the car parking will be sized to be for small cars only and there will also be a significant number of motorcycle parking provided to encourage more fuel efficient transport.

Cyclist Facilities: There will be a large number of commercial office staff cyclist facilities provided included secure storage, lockers and shower facilities. Visitor cyclist parking will also be provided at ground level near the main entry.

5.0 GREEN STAR RATING - OFFICE V3 TOOL

The Green Star rating scheme, a voluntary national sustainable design rating tool set up and managed by the Green Building Council of Australia (GBCA) is being used to guide the design process. The Green Star scheme is a comprehensive rating system that evaluates the environmental design and construction of buildings and communities - 4, 5 and 6 Star ratings can be awarded by the GBCA.

This document discusses the requirements associated with achieving a 5 star Green Star rating under Green Star Office v3 rating and the implications on each of the disciplines forming part of the overall building design. .

Green Star is a holistic assessment scheme, which assesses the sustainability features of a development within 8 different categories.

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

Credits are awarded based on meeting criteria in each of the categories and the credits are summed and weighted according to their environmental importance and totalled to give a star rating. There are 105 Credits available. A score of 45-59 Credits is equal to 4 Stars (Best Practice), a score of 60-74 Credits is equal to 5 Stars (Australian Excellence) and a score of 75 or more credits is equal to 6 Stars (World Leadership).

The following sections outline in some detail how the sustainability initiatives for the NW Building can be recognised under the Green Star tool.

5.1 Management

Lend Lease has a proven track record in the management of sustainability in its projects. Many credits relate to the way in which the project is delivered and Lend Lease Project Management and Construction (PMC) have in place the necessary controls and procedures to achieve the outcomes targeted.

MAN-1. Green Star Accredited Professional. The majority of Lend Lease's sustainable design personnel are Green Star Accredited Professionals and the ESD consultant on the Haymarket North West Plot has been accredited since 2005 and served in many Green Star working groups, assessments and peer reviews.

MAN-2. Commissioning Clauses. The design consultants will provide documentation that outlines the design intent and contractors will be required to ensure they commission systems in accordance with the appropriate CIBSE and ASHRAE standards.

MAN-3. Building Tuning. The contractors will be required, during the first 12 months post completion, to tune the base building systems and ensure that all controls are optimised. This may include systems such as the chilled water plant, lighting, heating plant and hot water systems.

MAN-4. Commissioning Agent. An individual will be responsible for providing commissioning advice to the building owner and the design team and to monitor and verify the commissioning of all building systems.

MAN-5. **Building User Guide**. The design team will be responsible for producing a user guide that gives the residents important information about how the building works and how to use the facilities most efficiently. During construction the guide will be updated in collaboration with the construction team.

MAN-6. **Environmental Management**. The construction team will operate the site using a Site Environmental Management Plan which is accredited/recognised against industry best practice, such as the NSW Environmental Management System Guidelines 2007 and ISO 14001.

MAN-7. **Waste Management**. The construction team will aim to recycle at least 80% of construction and demolition waste using a waste contractor that can sort and direct waste for recycling. It is anticipated that this 80% target will be easily exceeded.

5.2 Indoor Environmental Quality (IEQ)

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

IEQ-1. **Ventilation Rates**. Outdoor air ventilation will be increased beyond minimum standards to improve air quality through the building.

IEQ-2. **Air Change effectiveness**. Low temperature VAV air distribution, appropriate selection of diffusers and careful design of supply and return air points will ensure that air is appropriately distributed throughout the space.

IEQ-3. **CO2 Monitoring and Control**. CO2 sensors will be provided to control outdoor air to ensure there is sufficient ventilation given varying occupancy levels. These sensors can also be used to reduce outdoor air at times of low occupancy.

IEQ-5. **Daylight Glare Control**. While fixed external shading will provide significant reduction in glare, internal blinds will be provided to ensure that glare is not an issue, in particular on the east and west facades.

IEQ-6. **High Frequency Ballasts**. Fluorescent lighting to include high frequency/electronic ballasts.

IEQ-7. **Electric Lighting Levels**. Lighting throughout the NLA to be designed to ensure that illuminance is no greater than 400lux for 95% of the floor area.

IEQ-12. **Thermal Comfort**. Appropriately controlled low temp VAV air distribution in combination with proposed fixed external shading will ensure that a high level of thermal comfort is achieved.

IEQ-13. **Internal Noise Levels**. The building services design and the overall building will be designed to achieve a high level of acoustic comfort.

IEQ-14. **Volatile Organic Compounds**. Lend Lease engaged with its supply chain some time ago to deliver finishes products that were low VOC without significant cost impost. This includes paints, adhesives & sealants and floor coverings.

IEQ-15. **Formaldehyde Minimisation**. All composite wood products to be utilised on the project will have low formaldehyde content to ensure contaminants within the building are reduced.

IEQ-16. **Mould Prevention**. All debris generating components of the air delivery system such as cooling coils, heating coils, humidifiers and filters to have access for maintenance.

IEQ-17. **Tenant Exhaust Riser**. A dedicated mechanical exhaust riser will be provided for tenant general exhaust to enable tenants to remove pollutants associated with printers photocopiers.

5.3 Energy

The design of the commercial building prioritises energy efficient and cost effective solutions. The need for air conditioning will be minimised through a good façade design which has been optimised through the concept design phase.

ENE-1. Conditional Requirement/Greenhouse Gas Emissions. The building will incorporate a high efficiency chilled water plant, low temp VAV air distribution to minimise fan energy, efficient lighting selections and appropriate control, high efficiency motors and appropriate equipment selections and control strategies.

ENE-2. Energy Sub-Metering. A comprehensive metering system will be provided to allow building management to view and manage their real-time consumption of electricity and water. Base building energy, water, and gas consumption will be sub-metered by end-use and consumption monitored to ensure the building is operating as efficiently as designed.

ENE-3. Office Lighting Power Density. The proposed design will result in a lighting power density of less than 1.5W/m^2 which is a very efficient design.

ENE-4. Lighting Zoning. Lighting zones no greater than 100m^2 to be provided with an individual switch per zone to minimise after hours energy consumption.

ENE-5. Peak Energy Demand Reduction. Compared to a building only meeting the minimum requirements of the BCA, the proposed building will provide significant reductions in peak demand.

5.4 Transport

The commercial building will benefit from an ideal location at Sydney's Darling Harbour. All commercial and residential buildings, including the North West plot commercial building, within the precinct will include a portion of retail tenancies giving residents access to a variety of services. Public transport facilities including trains, buses and ferries will also be readily accessible.

TRA-1. Car Parking. While 450 car park spaces are provided in total, only 50 of these are attributable to the commercial building. This would be substantially less than any planning requirements and will therefore result in lower transport emissions associated with the commercial building.

TRA-2. Fuel Efficient Transport. Small car parking spaces and motorbike spaces are currently proposed within the commercial car park which will encourage fuel efficient transport options.

TRA-3. Cyclist Facilities. Bicycle facilities will be provided for tenants included bicycle storage, lockers and showers. In addition visitor bike spaces will be provided at ground level.

TRA-4. Commuting Mass Transport. The SICEEP precinct has good access to public transport including Central station trains, buses within the CBD and ferries.

5.5 Water

The Haymarket will be targeting a high level of reduction in potable water through the selection of fixtures and fittings and the use of non-potable water for toilet flushing and irrigation.

WAT-1. Occupant Amenity Water. This credit relates to the efficiency of the water fittings provided and the availability of any non-potable water sources. The development will be provided with highly water efficient fittings including dual flush toilets and low-flow taps and showerheads. It is currently proposed to collect rainwater from the roof and reuse for toilet flushing and/or irrigation.

WAT-3. Landscape Irrigation. There may be some rooftop landscaped areas which would require irrigation. Potable water consumption will be minimised through a combination of low water use species and rainwater.

WAT-4. Fire System Water. Fire services test water will not be directed to the sewer or to stormwater. Test water will be recirculated via a break tank.

5.6 Materials

In addition to providing waste recycling facilities, materials will be specified and selected to ensure minimal environmental impact. Alternative materials will be investigated for all constructions and these alternatives employed wherever practical.

MAT-1. Recycling Waste Storage. A waste storage area is provided sized to be sufficient to enable the storage of both general waste and recyclables. Advice regarding required areas and access has been provided by a specialist waste consultant to ensure the volume of waste generated from the office building which can be recycled is maximised.

MAT-4. Integrated Fitout. Provided a tenant is secured, the fitout design can be integrated into the base building design to ensure there is no waste in materials.

MAT-5. Concrete. The reduction of Portland cement is proposed which will reduce the embodied carbon associated with the development.

MAT-6. Steel. Steel will be sourced from 'responsible steel makers' in accordance with GBCA requirements. In addition reinforcement steel will be procured from a supplier who produces steel using energy reducing processes during its manufacture.

MAT-7. PVC. Revised credit criteria have been developed by the GBCA to recognise environmental improvements in PVC manufacture. The Haymarket will utilise PVC that complies with the Green Building Council Best Practice guidelines, or alternatively use alternatives to PVC.

MAT-8. Sustainable Timber. All timber to be used on the project will be either certified under the FSC or PEFC schemes or reused timber.

MAT-9. Design for Disassembly. The proposed facade system can be disassembled at the end of the project life.

5.7 Land Use and Ecology

The Haymarket site benefits from its position as a brownfield district with potential for land re-use rather than developing new land. For this reasons the site meets the conditional requirement that it has not been of prime agricultural value, contained old growth forest and has not been a wetland.

ECO-2. Re-use of Land. The site is currently developed. Redeveloping the site for apartments is a clear re-use of land.

ECO-3. Reclaimed Contaminated Land. A remedial action plan will be produced and the land will be decontaminated accordingly.

ECO-4. Change of Ecological Value. The predevelopment condition of the site was hard standing. While significant native planting or similar is not proposed the development will not reduce the ecological value of the site.

5.8 Emissions

The Haymarket will be minimised as far as possible. By using environmentally friendly refrigerants and insulation and eliminating light spill and cooling tower emissions any negative impact of the building can be significantly reduced.

EMI-1. Refrigerant ODP. The air-conditioning units will utilise refrigerants with zero ozone depleting potential. These HFC based gases are controlled substances which, if accidentally leaked, will not damage the ozone layer. The refrigerants associated with the project are located within the district cooling plant.

EMI-4. Insulant ODP. The fabric and services insulation specified at The Haymarket will be of a type that does not use any material with Ozone Depleting Potential in its manufacture or composition.

EMI-7. Light Pollution. The design of the external lighting system will ensure that light does not spill upwards to the sky or beyond the boundary. This can be a nuisance to adjacent properties, particularly residential neighbours.

With the above credits an overall weighted score of 66 points for The Haymarket NW Plot is targeted. While only 60 points are required to achieve a 5 star rating, the targeted 66 points are deemed necessary given the early stage of design and the risks associated with some of the credits.

6. CONCLUSION

The North West Plot commercial development will achieve the sustainability aspirations set for The Haymarket precinct. This project aims to deliver a sustainable commercial building, with low operational energy consumption, reduced potable water use and appropriate materials selection while at the same time maintaining a good level of indoor environmental quality through appropriate mechanical design, façade configuration and finishes selection.

The commercial development will be committing to a 5 Star Design and As-Built Green Star ratings under the Green Star Office v3 tool. Initiatives targeted within this Green Star tool will ensure significant sustainability principles will be incorporated into the design, appropriate management practices will be applied through the construction period and facilities and resources will be provided to ensure the delivery and operation of the building of the building has the potential to achieve the sustainability objectives. Many of the initiatives proposed as part of the Green Star strategy will also ensure that the building will be designed and delivered to be capable of achieving a minimum of a 4.5 star NABERS Energy base building rating.