



ASN Co. Building Bay 4-5

Ecologically Sustainable Development Report

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Revision

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REVISION

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ASN Co. Building Bay 4-5

1. Executive Summary

This Ecological Sustainable Development Report has been prepared for Tanner Kibble Denton Architects Pty Ltd for the proposed ASN Co. Building Bay 4-5 (Bay 5) at 1-3 Hickson Rd, The Rocks, NSW. This report provides an overview of the proposed ecologically sustainable development (ESD) principles and efficiency measures and is intended to form part of the Environmental Impact Statement (EIS) for the State Significant Development Application. This is a direct design response to the ESD component of the Secretary's Environmental Assessment Requirements (SEARs), and NSW Environmental Planning and Assessment Regulation 2000, as required by the NSW Environmental Planning and Assessment Act 1979 No 203.

This report includes:

- An overview of the sustainability drivers for the project (both regulatory & identified project drivers)
- Detail regarding specific ecological sustainable development initiatives through all phases of the project.
- Demonstration of assessment against a suitably accredited rating scheme to meet industry best practice.
- Initiatives that would minimise the consumption of resources, water (including water sensitive urban design) and energy.

Information contained within this report has been prepared in direct response to the:

- Secretary's Environmental Assessment Requirements;
- NSW Environmental Planning and Assessment Act 1979;
- NSW Environmental Planning and Assessment Regulation 2000;
- Sydney Development Control Plan 2012
- Sydney Local Environment Plan 2012

In coordination with the above, the project will implement a number of sustainable design principles and includes initiatives designed to mitigate the environmental impact of the following:

- Energy – including improved energy efficiency across the buildings and its associated sources.
- Water Efficiency – including reduced potable water demand and improved storm water quality.
- Materiality – Considering the whole of life impact of materials and considering their selection to minimise harm to the environment, including efficiency and construction.

The following sections detail the development's specific sustainable design response in more detail.

Introduction

2. Introduction

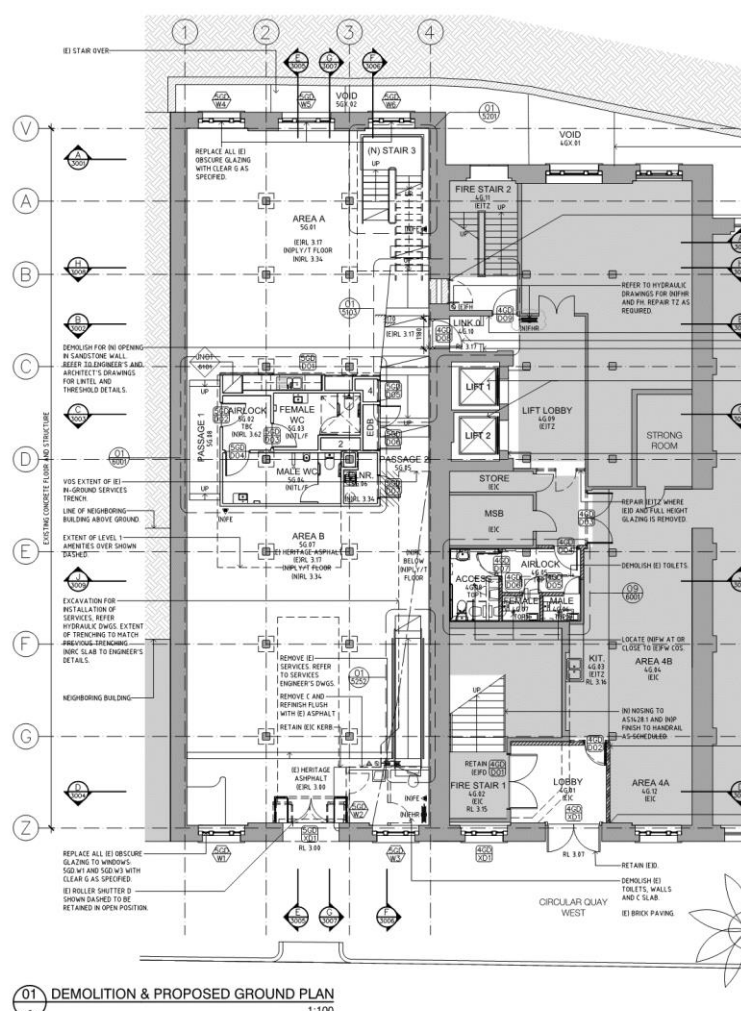


Figure 1 Overview of the site. Source: TKDArchitects (AR0.TD.1101, 2017)

The proposed development consists of 5 levels of NCC Class 5 office space, with an NLA of approximately 270m² per floor. The property is a state heritage listed building known as Bay 5 of the ASN Co. Building.

This report addresses the Ecologically Sustainable Development and efficiency aspects in response to the Environmental Planning Policies for the project. It uses best practice sustainable design principals and borrows elements from external sustainability tools.

2.1 Sustainable Design Initiatives

In pursuit of the ecological design principles, the ASN Co. Building Bay 4-5 (Bay 5) development will pursue excellence benchmarked from a number of sources. These include best practice design initiatives from:

- Secretary's Environmental Assessment Requirements;
- NSW Environmental Planning and Assessment Act 1979;
- NSW Environmental Planning and Assessment Regulation 2000;
- Sydney Development Control Plan 2012
- Sydney Local Environment Plan 2012

Introduction

2.2 Environmental Planning and Assessment Regulation 2000

SEARs outlines requirements for this development that must be addressed as part of the Environmental Impact Statement. These are:

- Detail how **ESD principles** (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) will be incorporated in the design and ongoing operation phases of the development.

Schedule 2 7(4) of the Environmental Planning and Assessment Regulation 2000 states:

“The principles of ecologically sustainable development are as follows:

- (a) the precautionary principle, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
 - (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
 - (ii) an assessment of the risk-weighted consequences of various options,**
- (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,*
- (c) conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*
- (d) improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services, such as:
 - (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
 - (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
 - (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.”**

2.3 Sydney Development Control Plan (DCP) 2012

The City of Sydney has a specific DCP developed in 2012. The ESD elements addressed by this report are replicated below:

DCP Section 3 – General Provisions

3.6 Ecologically Sustainable Development Objectives

- (a) Apply principles and processes that contribute to ecologically sustainable development (ESD).*
- (b) Reduce the impacts from development on the environment.*
- (c) Reduce the use of resources in development and by development over its effective life.*
- (d) Reduce the cause and impacts of the urban heat island effect.*
- (e) Increase the resilience of development to the effects of climate change.*
- (f) Ensure that greenhouse gas emissions will be reduced.*
- (g) Increase the use of cogeneration and tri-generation systems.*
- (h) Replace intensive carbon power sources with low carbon and renewable energy.*
- (i) Reduce the use of potable water.*
- (j) Ensure that development can adapt to climate change.*

Introduction

(k) Ensure that waste will be reduced.

(l) Increase the use of products from recycled sources.

(m) Improve indoor environmental quality.

(n) Reduce the environmental impact from building materials through reduction, re-use and recycling of materials, resources and building components.

(o) Improve the biodiversity.

The details in each of the below Provisions are provided in the following report sub-sections.

3.6.1 Energy efficiency in non-residential developments

3.6.2 Water efficiency in non-residential developments

3.6.3 Photovoltaic solar panels

3.6.4 Wind turbines

3.6.5 Materials and building components

3. Design Response

3.1 SEARS Design Response

3.1.1 Precautionary Principle

There are no perceived threats of serious or irreversible environmental damage as a result of locating Bay 5 on the desired site. The site is a pre-existing building which used to be classed as a cinema, a change from cinema to office is not likely to result in irreversible environmental damage as their net impacts on the environment are relatively similar. A change from class 9b to class 5 is not expected to cause a change in the environmental impacts from the site.

There are no threats of serious or irreversible environmental damage as a result of the proposed use of Bay 5 and the activities of its future occupants. The proposed development has the same use as the other bays of the existing building on the site i.e. offices. Therefore, no serious or irreversible environmental damage is expected due to the operation of the building. The current building has similar operations and building services to the proposed project and has not created any serious or irreversible environmental damage.

The site selection and proposed use of Bay 5 are associated with low risks of serious environmental consequences as there are strong similarities with the current fitout of the building. The current building has had no serious environmental impacts due to its location or use. What's more, the Bay 5 development shall include items from the Sydney DCP, which are designed to reduce potential environmental damage.

3.1.2 Inter-generational equity

Bay 5 conserves inter-generational equity through minimising the consumption of resources whilst providing an office environment that will ensure the health and well-being of occupants into the future. Bay 5 will reduce demand for resources by reusing an existing building. This initiative will free up more resources for future generations, instead of their immediate consumption by the current generation. In addition, the conservation of the current building preserves built environment history for future generations to appreciate.

As the site is already developed, and therefore contains no environment with valuable biological utility, the state of the environment is maintained. The limited diversity of the environment currently on the site will not be changed by this project.

All waste streams will be dealt with in ecologically safe methods; waste water and storm water will be plumbed to the sewers or storm water drains as required by law. In addition, waste water will be lower for this development compared with a standard practice development as low-flow fixtures and fittings will be used to reduce water consumption throughout the building.

The below methods will be implemented on this project to contribute to a greater sustainable outcome for this generation and those following:

- The original timber structure (columns, posts, beams and joists) salvaged from the cinema, and stored at White Bay, will be assessed and returned to the Bays for reinstatement.
- Sustainably sourced timber.
- Careful use of water and low flow fittings.
- LED lights, which have longer lives, consume less energy and produce a higher quality light than their counterparts.
- Low-VOC paints, which do not emit dangerous volatile components, risking the health of users.
- Best practice PVC plastics in formwork, piping, cables and conduits. These materials have a reputation for damaging the environment in their production, both upstream and downstream of the manufacturing process.
- A target of 90% of construction and demolition waste will be diverted from landfill.

Design Response

- Consideration for low embodied energy products, recycled or green rated products, such as GECA or “Global Green Tag”.

Inter-generational equity is realised in the use of energy and water efficiency measures, which aim to reduce the consumption of limited resources, preserving these for future generations. In addition, the design principles outlined in the following sections are for buildings that will be occupied by the next generation. The healthy interior environments which they create will benefit occupants up to 60 years from today.

3.1.3 Conservation of biological diversity and ecological integrity

There is limited biological diversity on the current site due to the site being previously developed and occupied. The Bay 5 development will have limited, if any, impact on the current level of biological diversity and ecological integrity as there is no green landscaping on the current site.

3.1.4 Improved valuation, pricing and incentive mechanisms

This project will consider the integration of a number of initiatives, which aim to internalise pollution and other undesirable environmental outcomes. Contractors may be requested to provide and abide by an Environmental Management Plan and Environmental Management System that is in accordance with NSW Environmental Management Systems Guidelines or a similar standard. This places a value on environmentally responsible building practices and places a form of “polluter pays” onto the contractors to ensure they are held responsible for the environmental management of the building site as they complete their work.

The cost to recycle the construction and demolition waste may be borne by the project team. The team may be required to target 90% recycling of construction waste. This would have a greater financial cost to the project, however it provides a more accurate reflection of the full life cycle costs of the materials which were on the site, and the waste from the new materials as a result of the construction. The increased cost of recycling construction materials will also incentivise the purchase of less materials, thereby reducing over-ordering and material wastage.

The costs of producing the following pollution: sewage, landfill waste, and CO₂ emissions are partially borne by the project team and accounted for in the project’s sustainability initiatives. The project has voluntarily elected to:

- improve their water consumption efficiency, thereby paying to reduce production of sewage;
- reduce their energy consumption, which means the project has paid for the design and implementation of solutions which will reduce CO₂ emissions; and

recycle waste streams in the construction and operation of the project, which will cost more than standard practice where all material waste is directed to landfill.

Design Response

3.2 Sydney DCP 2012 Design Response

The Ecologically Sustainable initiatives that are proposed for consideration in the design have been developed to align with the controls and objectives of the Sydney DCP 2012. The following highlights where initiatives directly respond to the DCP's criteria. As the design progresses, a number of documented elements may prove unfeasible, as well as undocumented initiatives proving attainable.

3.2.1 Energy efficiency in non-residential developments (DCP 3.6.1)

A variety of energy efficiency measures are applicable to the proposed office redevelopment. These energy efficiency measures may form part of the final design and operation of the spaces. The final strategy will always be a combination of sustainability, operational feasibility, architectural intent and site-specific appropriateness.

The energy efficiency strategy follows the hierarchy pyramid below. Best practice energy conservation dictates that in the first instance demand is reduced. This has a much greater benefit to the overall long-term sustainability of the site compared to efficiency measures or renewables/offsets. As such, the focus will be on the elements that provide the greatest return on investment.

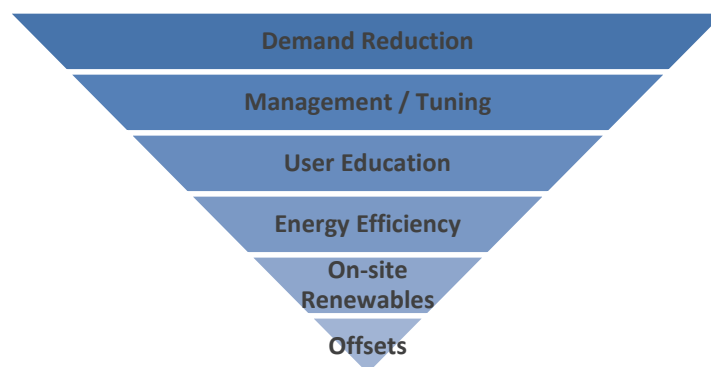


Figure 2 Energy efficiency strategy hierarchy.

ESD Objectives

Figure 3 shows a graph of the typical ratios of energy end uses in an office base building in NSW. Since the greatest energy consumption within the design control is HVAC, lighting and vertical transportation, these present the greatest opportunity for energy reduction. Energy efficiency measures integrated by the project focus on these energy end uses.

Design Response

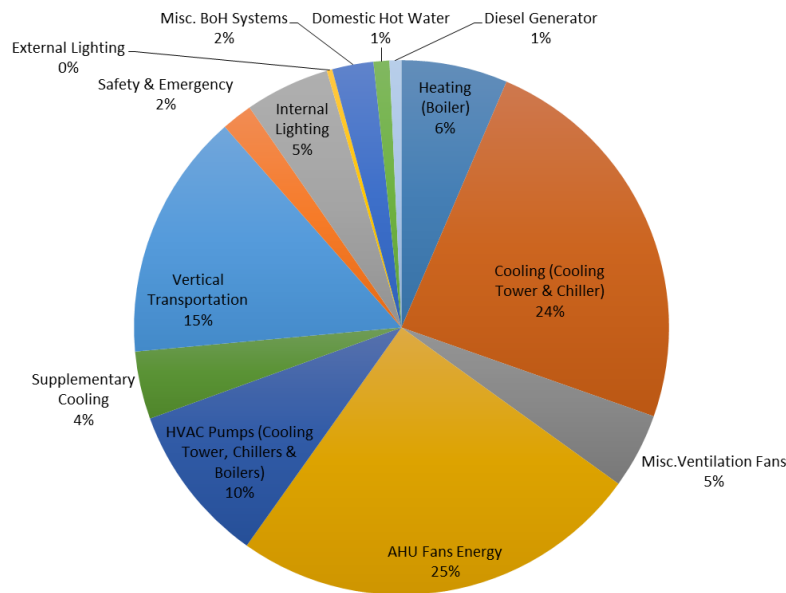


Figure 3 Typical greenhouse gas production of the base building of an office. (NABERS Preliminary Assessment of an office in NSW, 2017)

Energy efficiency measures, which will reduce greenhouse gas emissions, include:

- Efficient lighting e.g. LEDs. This will reduce the electrical load on the grid for the same electrical output. Further, LED globes have a longer life, reducing replacement periods which demands less maintenance, as well as reducing landfill of precious materials
- Motion sensors for lighting.
- Minimisation of conditioned spaces
- High performance glazing, to meet or exceed the requirements of the Building Code of Australia.
- Efficient HVAC systems with high COPs, appropriately designed to meet the needs of the system.
- Bespoke mechanical design systems sized appropriately for the development. These systems will have adequate efficiency, possible measures include economy cycles, CO2 monitoring or temperature band fluctuation control to promote energy efficiency in the design.
- Energy and water efficient appliances
- Lighting controls including timing and occupancy sensors to reduce the demand on the lighting system.

DCP Provision 1 (3.6.1.1)

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 pre-existing building has a number of design elements, which reduce the need for active heating, and cooling, these include: a small glazing to wall ratio, and insulation due to contact with neighbouring buildings. Size of conditioned spaces will be minimised in the design. As this is a redevelopment, which is not altering external façade, the thermal mass and external shading will not be changed.

DCP Provision 2 (3.6.1.2)

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.

No public domain spaces are provided in the redevelopment.

Design Response

DCP Provision 3 (3.6.1.3)

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 redevelopment has separate power metering for each of the tenants, further consideration will be given to providing sub-metering for lighting, air-conditioning and power within each tenancy.

DCP Provision 4 (3.6.1.4)

Electricity sub-metering is to be provided for significant end uses that will consume more than 10,000 kWh/a.

The redevelopment shall provide sub-metering for significant end uses that will consume more than 10,000 kWh/a.

DCP Provision 5 (3.6.1.5)

Car parking areas are to be designed and constructed so that electric vehicle charging points can be installed at a later time.

The redevelopment does not include car parking areas.

DCP Provision 6 (3.6.1.6)

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.

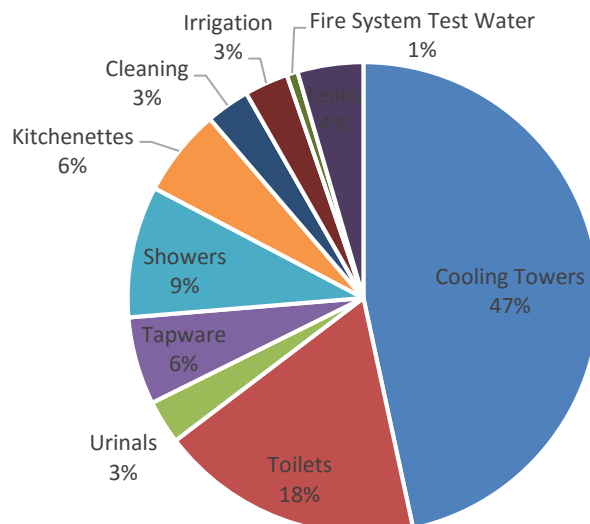
The redevelopment does not include car parking areas.

3.2.2 Water efficiency in non-residential developments (DCP 3.6.2)

A variety of water efficiency measures are applicable to the office redevelopment. These water efficiency suggestions are intended to influence the final design and operation of the spaces. Due to design constraints as the design progresses, not all of the below efficiency measures will be implemented in the final design.

ESD Objectives

The following chart describes the typical water consumption of an office. It can be seen that the largest use can be landscaping due to grassed sports fields. There are a number of strategies that can be implemented to reduce the overall potable water consumption of the development.

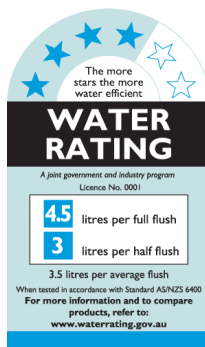


Design Response

Figure 4 Typical water consumption for an office in NSW. (NABERS Preliminary Assessment of an office in NSW, 2017)

Water efficiency measures, which reduce water consumption, include:

- Water efficient fixtures and fittings. By implementing low-flow water fixtures, the consumption associated with bathrooms is reduced.
- Water monitoring systems, which can identify leaks and amend losses before greater loss occurs.



DCP Provision 1 (3.6.2.1)

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.

There are inadequate options in the highest WELS rated fixtures and fittings i.e. only vacuum toilets are listed as 6 Star and only basin integrated toilets are listed as 5 Star. The project will install new water fixtures and fittings in accordance with the Green Star Design and As Built v1.2 (refer to Figure 6).

18B.1 Sanitary Fixture Efficiency

One (1) point is awarded where all fixtures are within one star of the WELS rating stated below:

Table 18B.1 Nominated fixture WELS Rating

Fixture / Equipment Type	WELS Rating
Taps	6 Star
Urinals	6 Star
Toilet	5 Star
Showers	3 Star (> 4.5 but ≤ 6.0)**
Clothes Washing Machines	5 Star
Dishwashers	6 Star

Figure 6. Nominated fixture WELS Rating extract from the Green Star Design and As Built Submission Guidelines v1.2.

DCP Provision 2 (3.6.2.2)

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.

Design Response

The building occupies 100% of the site and due to the heritage listing of the building, no rainwater tanks may be installed.

DCP Provision 3 (3.6.2.3)

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.

The building is not serviced by a dual reticulation system.

DCP Provision 4 (3.6.2.4)

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.

The redevelopment does not include public or private open space requiring irrigation.

DCP Provision 5 (3.6.2.5)

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.

No individual tenancies are over 5,000sqm in this redevelopment.

DCP Provision 6 (3.6.2.6)

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.

The redevelopment does not have any cooling towers, swimming pools, or outdoor irrigation.

DCP Provision 7 (3.6.2.7)

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.*

The redevelopment does not have any cooling towers.

DCP Provision 8 (3.6.2.8)

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

The redevelopment does not have any cooling towers.

3.2.3 Photovoltaic Solar Panels (DCP 3.6.3)

DCP Provision 1 (3.6.3.1)

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

The redevelopment does not include any photovoltaic solar panels.

Design Response

DCP Provision 2 (3.6.3.2)

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.

No changes have been made to the building's external structure, which may impact on the solar access of other buildings in the area.

3.2.4 Wind Turbines (DCP 3.6.4)

DCP Provision 1 (3.6.4.1)

Wind turbines are not to cause the following LAeq levels to be exceeded in any nearby residential development (with windows closed):

- (a) in any bedroom in the building—35 dB(A) at any time between 10pm and 7am;*
- (b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.*

The redevelopment does not include any wind turbines.

DCP Provision 2 (3.6.4.2)

Wind turbines are:

- (a) not to involve the removal or pruning of a tree or other vegetation that requires a permit or development consent for removal or pruning, unless that removal or pruning is undertaken in accordance with a permit or development consent;*
- (b) to be clear from power lines in accordance with the requirements of the relevant electricity authority;*
- (c) not to affect the structural integrity of the building;*
- (d) not to detract from the significance of a heritage item or a heritage conservation area; and*
- (e) to be installed in accordance with manufacturer's specifications.*

The redevelopment does not include any wind turbines.

3.2.5 Materials and Building Components (DCP 3.6.5)

Other resources besides water and energy are consumed by a development. These include the building materials in the initial build, through to the food eaten by the building occupants. The following resource efficiency measures are intended to influence the architecture in finalising the design and operation of the spaces. Due to design constraints which enter as the design progresses, not all of the below efficiency measures will be implemented in the final design.

ESD Objectives

Construction materials

Construction materials are a highly carbon intensive component of any development. They often involve very energy intensive production processes, large amounts of raw materials including water and energy, and long transport distances to reach the location of the development. However, there are a number of environmentally friendly practices starting to become accepted by the construction industry. The following will be adopted by the project to reduce waste from construction materials.

- Reuse of existing materials – the original timber structure (columns, posts, beams and joists) salvaged from the cinema and stored at White Bay will be assessed and returned to the Bays for reinstatement with new timbers sourced from sustainable sources.
- Minimisation of excess wasted material.
- Sustainably sourced timber.
- Quantification of materials in the planning stages to reduce the risk of over ordering materials.
- A high recycling target by of the construction and demolition waste.

Design Response

Operational materials

The major waste streams from offices are comprised of paper and cardboard from writing and study materials, mixed glass, plastics recyclables, and organics from food items.

The tenancies will be responsible for providing operational waste facilities in accordance with Sydney waste removal and separation guidelines.

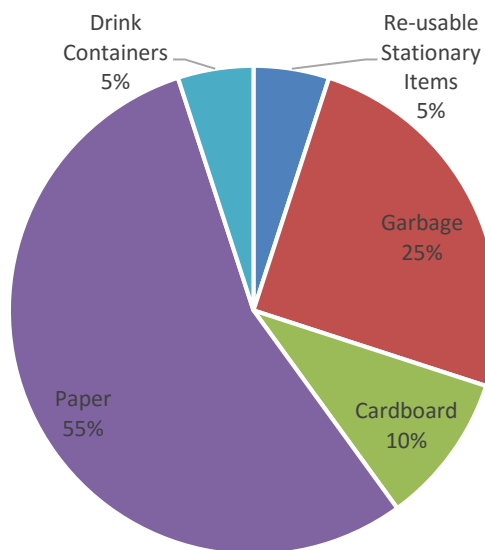


Figure 7 Typical composition of office waste streams (Source: Recycling Near You)

DCP Provision 1 (3.6.5.1)

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

The redevelopment will use paints with low levels of VOCs and wood products with low levels of formaldehyde. The only flooring materials on the job are concrete, timber board, and vinyl, which are low VOC by their nature.

DCP Provision 2 (3.6.5.2)

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.*

The redevelopment is reusing the existing heritage façade, which demonstrates a considerable extent of material reuse and a dedication to the reduction of waste. In addition, the redevelopment will consider the use of GECA and Green Tag accredited products for items such as plasterboard.

DCP Provision 3 (3.6.5.3)

Design building components, including the structural framing, roofing and facade cladding for longevity, adaptation, disassembly, re-use and recycling.

Structural elements of the building will be retained and not altered for the redevelopment.

Design Response

DCP Provision 4 (3.6.5.4)

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;*
- (b) naturally ventilating buildings to reduce ductwork;*
- (c) providing waterless urinals to reduce piping and water use;*
- (d) using prefabricated components for internal fit outs; and*
- (e) providing only one bathroom for every two bedrooms in residential developments..*

The redevelopment will retain exposed structures to reduce the use of floor, ceiling and wall cladding finishes.

3.3 Indoor Environmental Quality

Improved indoor environment quality is a significant benefit of sustainable design. The design by TKD Architects gives significant consideration to the incorporation elements within the project intent to improve indoor environment quality.

The following design features will improve indoor environmental quality:

- Thermal comfort provided by the bespoke air conditioning system, which will also maintain energy efficiency throughout the design.
- Lighting design, which is zoned & designed appropriately to ensure the optimum lighting comfort. This includes consideration of general illuminance and glare reduction in accordance with best.
- Material selections, which focus on reducing volatile organic compounds (VOC) levels and minimise formaldehyde impacts. Paints, sealants, adhesives, carpets, floor and material finishes will all comply with best practice VOC criteria.

Summary

4. Summary

Ecologically Sustainable Design is a driving consideration in the redevelopment of the ASN Co. Building Bay 4-5. The building will incorporate a number of ESD initiatives to reduce the greenhouse gas emissions, potable water consumption and material resources of the site. These have been developed around a response to the *Secretary's Environmental Assessment Requirements* by Department of Planning and Environment.

The ESD initiatives outlined in this report are intended to be used as a design guide for the redevelopment. The specific initiatives that will be installed will be determined throughout the development application stage and will be subject to feasibility analysis. The initiatives will comply with the guidelines set out by the relevant authorities.

The development's commitment to reducing the overall environmental impact is evident of the holistic approach taken to long-term sustainability. Documented initiatives cover a range of categories including:

- Energy & greenhouse gas emissions
- Potable water reduction
- Minimising waste to landfill
- The indoor environment
- Occupant amenity and comfort

We trust this report provides sufficient overview of the project commitment to environmentally sustainable design and the sustainability vision for the ASN Co. Building Bay 4-5.