ESD REPORT

19A EVANS AVENUE, EASTLAKES

WF277-03F02(REV0)- ESD REPORT

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Prepared for:

Conquest

Level 1, 15 George Street, Burwood, NSW

WINDTECH CONSULTANTS
www.windtechconsult.com
reception@windtechglobal.com

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EXECUTIVE SUMMARY

This report has been prepared to identify and convey the design excellence ecologically sustainable design (ESD) principles/initiatives that will be implemented or investigated for the subject development located at 19A Evans Avenue, Eastlakes. This report addresses the local council planning requirements for ESD and is based on an examination of the latest architectural drawings prepared by the project architects DKO, received May 2026, and in conjunction with the relevant consultant design reports submitted as part of the development application.

The report details how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards; such as the BASIX commitments to reduce the energy and water consumption, and how the following ESD design principles will be incorporated into the project development during the life cycle of the development:

- *Passive Design – Implementing design initiatives to enhance the passive design capabilities of the building envelope to reduce the reliance on mechanical heating and cooling via mechanical means, and as a result a reduction in energy consumption and GHG emissions.*
- *GHG Emissions - Implementing design initiatives to reduce the energy consumption of the services within the development and consequently the building's contribution to GHG emissions.*
- *Water – Implementing design initiatives to reduce the on-going water consumption of the development.*
- *Pedestrian Wind Effects – Incorporating design initiatives to mitigate adverse wind impacts and improve local wind conditions for pedestrians within surrounding public and outdoor trafficable areas.*
- *Indoor Environmental Quality – Implementing design initiatives to enhance the quality of life and health of the occupants within the indoor spaces.*
- *Materials - Implementing design initiatives to reduce the embodied energy use during the construction phase of the development and minimising the potential impact on the indoor environmental quality for the occupants of the development.*

- *ESD principles as defined under Section 193 of the EP&A Regulation*
    - *The precautionary principle is 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.*
    - *The principle of inter-generational equity is that the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*
    - *The principle of the conservation of biological diversity and ecological integrity is that the conservation of biological diversity and ecological integrity should be a fundamental consideration.*
    - *The principle of improved valuation, pricing and incentive mechanisms is that environmental factors should be included in the valuation of assets and services.*

CONTENTS

1 ESD PLANNING REQUIREMENTS

This section outlines the relevant project planning requirements for Ecological Sustainable Design applicable to the subject development and are summarised as follows:

1.1 Bayside Local Environment Plan (LEP) 2021

Section 6.10 of the Bayside Local Environment Plan 2021 outlines the following considerations the development will have to exhibit design excellence in relation to Ecological Sustainable Design:

- *Environmental impact such as sustainable design… wind and reflectivity.*
- *The achievement of the principles of ecologically sustainable development.*
- *Pedestrian, cycle, vehicular and service access, circulation and requirements.*
- *The impact on, and any proposed improvements to, the public domain.*
- *Excellence and integration of landscape design.*

1.2 Bayside Development Control Plan (DCP) 2022

Part 3.3 of the Bayside Development Control Plan (DCP) 2022 sets out the Energy and Environmental Sustainability objectives and controls for the proposed development that covers the following:

- General Controls
- Natural daylight and ventilation
- Reflectivity
- Rating tools
- Energy Assessment

1.3 Planning Secretary's Environmental Assessment Requirements (SEARs)

Point 15 outlines the Planning Secretary's Environmental Assessment Requirements for Ecologically Sustainable Design:

- *Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.*
- *Where relevant, provide an assessment of the development against the standards for non-residential development set out in Chapter 3 of State Environmental Planning Policy (Sustainable Buildings) 2022.*

1.4 Environmental Planning and Assessment Regulation 2021

Section 193 of the Environmental Planning and Assessment Regulation 2021 outlines four primary principles of ecologically sustainable development detailed as follows:

- *The precautionary principle,*
- *Inter-generational equity,*
- *Conservation of biological diversity and ecological integrity,*
- *Improved valuation, pricing and incentive mechanisms*

1.5 State Environmental Planning Policy (Sustainable Buildings) 2022

The State Environmental Planning Policy (Sustainable Buildings) 2022, also known as the Sustainable Buildings SEPP, aims to simplify and coordinate the way that we plan for and design sustainable buildings in NSW.
The aims of the Policy are as follows:

- *The achievement of the principles of ecologically sustainable development.*
- *(a) to encourage the design and delivery of sustainable buildings,*
- *(b) to ensure consistent assessment of the sustainability of buildings,*
- *(c) to record accurate data about the sustainability of buildings, to enable improvements to be monitored,*
- *(d) to monitor the embodied emissions of materials used in construction of buildings,*
- *(e) to minimise the consumption of energy,*
- *(f) to reduce greenhouse gas emissions,*
- *(g) to minimise the consumption of mains-supplied potable water,*
- *(h) to ensure good thermal performance of buildings.*

1.6 National Construction Code 2022

Volume 1 Section J of the National Construction Code 2022 sets out the overall energy efficiency compliance requirements for the subject development. Pertinent to Ecological Sustainable Design is Part J4 Building Fabric sets out the energy efficiency requirements for the building envelope in terms of insulation and glazing specifications to improve the passive design and thereby reduction in the consumption of energy and thereby greenhouse gas emissions. For the non-residential component, compliance can be achieved via the Deemed to Satisfy (DTS) provisions or through the approved verification methods. For the residential component compliance can be achieved through the BASIX tool detailed further in Section 1.5 below.
A Section J assessment will be prepared for the subject development based on the Deemed to Satisfy (DCP) provisions.

1.7 Building Sustainability Index (BASIX)

BASIX stands for Building Sustainability Index. It is a sustainability assessment tool for residential buildings in NSW. BASIX aims to reduce the environmental impact of new homes by requiring them to meet certain minimum standards (for water and energy efficiency, and thermal performance) and to report on construction materials being used so their embodied energy can be calculated. BASIX aims to reduce the environmental impact of new residential development and to produce homes that are more comfortable and cheaper to run then most existing homes.

BASIX requirements apply to all residential dwelling types in NSW and form part of the development application process. NSW BASIX was a national first (starting in 2004) and is one of the strongest sustainable planning measures to be undertaken in Australia. As of 1 October 2023, the BASIX standards are aligned with and complement the National Construction Code 2022 as well as the State Environmental Planning Policy (Sustainable Buildings) 2022. The primary outcomes of BASIX are summarised as follows:

- Water Efficiency Standard: Achieve a 40% reduction in annual water consumption.
- Energy Efficiency Standard - Achieve a 60% reduction in annual energy consumption.
- Thermal Performance Standard - The minimum standard for heating and cooling homes, based on fabric performance is a 6 NatHERS Star rating for an individual residential dwelling and a minimum of 7 NatHERS Star average rating for all residential dwellings.
- Material Index: Estimate the greenhouse gas emissions associated with the production of materials and products used to construction all residential dwellings.

1.8 New South Wales Government Net Zero Statement

The New South Wales Government has whole-of-economy targets to reduce greenhouse gas emissions by 70 per cent by 2035 compared to 2005 levels and reach net zero emissions by 2050. Achieving these targets will require all new and existing buildings in NSW to be operating at net zero well before 2050. The Net Zero Statement is an incremental step to reach these targets.

2 ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD) PRINCIPLES

The following sections details the design excellence ESD design principles integrated in the design of the project development during the construction and operational phases of its life cycle; summarised as follows:

- *Passive Design*
- *GHG Emissions*
- *Water*
- *Pedestrian Wind Effects*
- *Indoor Environmental Quality*
- *Materials*
- *ESD principles as defined under Section 193 of the EP&A Regulation*
    - *The precautionary principle*
    - *Inter-generational equity*
    - *Conservation of biological diversity and ecological integrity*
    - *Improved valuation, pricing and incentive mechanisms*

2.1 Passive Design

Enhancing the passive design capabilities of the building envelope can minimise the need for auxiliary heating and cooling to maintain a comfortable temperature within the indoor space throughout the year. As a result this reduces the energy consumption of the development and consequently the emission of greenhouse gases (GHG). The project development aims to enhance the thermal comfort of the development through the following passive design initiatives:

- The passive design of the residential component of the development is addressed via the thermal comfort component of BASIX in terms of maximum allowable individual thermal loads as well as an area-weighted average for the various development sites. The various developments successfully achieve the BASIX target criteria through improvements in the dwelling envelope of the various residential tenancies through the material construction and design such as:
    - Open plan living promoting ventilation paths within the residential tenancies.
    - The use of insulation of the dwelling envelope in the walls, floors and ceilings to the outdoor environment/unconditioned spaces.
    - The selection of thermally performing glazed systems in the dwelling envelope; in particular to south-facing dwellings where the heat loss to the outdoor environment is greatest due to its inherent lack of direct sunlight.
    - Minimizing air infiltration to the dwelling through the use of draught seals to the windows, doors and exhaust fans.
- The passive design of the non-residential component of the development is addressed through the Section J Part 4 of the National Construction Code (NCC) Volume 1 for energy efficiency, building fabric, glazing and building sealing. Similar to passive design strategies for the residential component, the proposed development satisfies the NCC requirements as detailed in the Section J report for the development. The passive design strategies include the use of insulation in the building fabric, the selection of thermally performing glazed systems and effective sealing to the windows, doors and exhaust fans to minimise air infiltration.

2.2 GHG Emissions

Energy production in Australia primarily comes from the incineration of non-renewable fossil fuel sources such as coal that are the greatest contributors to greenhouse gas (GHG) emissions in Australia. GHG emissions are a significant environmental concern due to their build up in the atmosphere and impact on the earth's climate. The project development aims to reduce GHG emissions through the following design initiatives:

- The use of glazed systems with high visual light transmittance (VLT) to maximise natural daylight penetration into the common areas, residential and non-residential tenancies.
- A balance of solid elements (such as masonry, precast concrete) and glazing are incorporated into the design of the development that will assist in heat transfer mitigation and thus reduce the mechanical energy consumption.
- The developments successfully achieve the targeted BASIX energy score rating of 60%; which represents the targeted reduction in energy use in comparison to a baseline development. This target score was achieved through the inclusion of recommendations as detailed in the BASIX certification.
- Energy efficient single phase air-conditioning systems will be included within the residential tenancies.
- The use of energy efficient appliances that meet the following Energy star rating standards in the site specific residential tenancies:
    - Single phase air-conditioning systems with a minimum star rating (old label) of at least 3.5 for cooling and heating.
    - Dishwasher units: 4.0 Stars
    - Clothes dryer units: 2.0 Stars
- The use of insulation within the building fabric of the development for heat transfer mitigation and thus improve thermal efficiency. In particular on the piping of the centralised hot water systems.
- To complement the passive design initiatives incorporated for the non-residential component of the development as detailed in the accompanying Section J report, the project development will satisfy National Construction Code (NCC) Volume 1, 2022 requirements for the services as part of Sections J5 to J7 of the National Construction Code (NCC) Volume 1, 2016; pertaining to the air-conditioning and ventilation systems, artificial lighting and power, heated water supply and swimming pool and spa pool plant respectively.
- Energy efficient lighting systems will be employed throughout the development. This will be in form of LED lighting fixtures and will also include the use of lighting efficiency controls that can respond to daylight levels and occupancy; such as the use of time clocks and motion sensors.
- Selection of energy efficiency HVAC systems that are capable of providing mixed-mode ventilation and zoning for better temperature management.

- The development promotes the use of renewable energy through on-site integration of renewable energy sources such as photovoltaic systems to generate clean electricity to reduce the load on the electricity grid.

- Consideration to the integration of Building Management Systems (BMS) such as the use of occupancy sensors to adjust lighting, HVAC, and other systems based on the occupancy of the spaces, and the development of awareness programs or Building User's Guide to educate the building occupants on how they can incorporate energy-efficient practices into their lifestyle and encouraging participation in energy conversation initiatives.

- Electric metering and sub-metering to monitor and manage electricity consumption in the building.

2.3 Water

Water scarcity is a major issue for Australia with water usage in buildings accounting for 10% of our overall water consumption. With fresh water supplies being a precious and limited resource, the project development aims to optimise water conservation and usage through the following design initiatives:

- The various developments successfully achieves the targeted BASIX water score rating of 40%; which represents the targeted reduction in water use in comparison to a baseline development.
- The installation of low-flow faucets, showerheads and toilets to reduce water consumption. The use of water efficient fittings and fixtures that meet the following WELS standards in the various residential tenancies:
    - Shower Heads: 4.0 Stars (>6 but <=7.5L/min)
    - Toilets: 4.0 Stars
    - Kitchen Taps: 6.0 Stars
    - Bathroom Taps: 6.0 Stars
- The use of water efficient fittings and fixtures that meet the following WELS standards in the common areas where applicable:
    - Toilets: 4.0 Stars
    - Bathroom Taps: 4.0 Stars
- The collection and storage of rainwater for non-potable water use, such as the common area landscape irrigation.
- The use of variable speed pumps to match water flow rates with actual demand, thereby improving efficiency and conservation of water.
- Implementing smart irrigation systems that considers the weather conditions and soil moisture to optimise the watering schedules.
- The development of a Building User's Guide to educate the occupants on how they can incorporate water conservation measures into their lifestyle.
- The inclusion of a stormwater management plan to minimise stormwater runoff and treatment.
- Regular inspections are to be undertaken by the building authority of toilets, urinals, bathroom taps and hot water systems for faults and leakages.

2.4 Pedestrian Wind Effects

Pedestrian wind effects have been a key consideration in the design of the development, particularly in response to the interaction between the proposed building form and height and the prevailing south-easterly, westerly, and north-easterly winds. These factors have the potential to influence adverse local airflow patterns and, in turn, affect the safety and comfort of occupants and pedestrians at ground level, as well as within elevated communal open spaces, private balconies and terraces. The wind report prepared for the subject development details treatment strategies that are expected to be effective in wind mitigation and enhance the local wind conditions.

2.5 Indoor Environmental Quality

Occupants tend to spend up to 90% of their time indoors. Minimising the toxicity of their indoor environment and improving the indoor environmental quality is therefore important for the quality of life and health of the occupants. The proposed development aims to enhance the indoor environmental quality for the occupants through the following design initiatives:

- Acoustic Noise – ensuring acoustic comfort for the occupant are at appropriate levels. This is further detailed in the acoustic report and can be in the form of acoustic insulation in the building envelope and improvements in the glazed systems.

- Natural Light – the design of the development utilises large expansive glazed systems with high visual light transmittance (VLT) to maximise the natural daylight penetration into the common areas, residential and non-residential tenancies. Through the use of natural lighting, this would reduce the energy consumption provided by electrical lighting. Furthermore, the development will aim to satisfy the SEPP65 ADG requirements for solar access relating to the residential component of the development.

- Pollutants – the materials used within the indoor spaces of the development can contribute to internal air pollutants which can affect the quality of life and health of the occupants. As such the paints, adhesives and sealants etc. used within the indoor spaces of the development will be selected to contain minimal or no volatile organic compound (VOC). Similarly, engineered and composite wood products used within the indoor spaces in the development will be selected to contain minimal or no formaldehydes.

- Solar Glare Reflectance – the development will aim to minimise the adverse glare reflected off the building facades that may provide discomfort to occupants within the development.

- Thermal Comfort – improvements to the thermal comfort for the occupants; whilst minimising the energy use via heaters and air-conditioning, can be achieved through enhancing the passive design of the development. This can be in the form of insulation in the building envelope and the selection of thermally performing glazed systems.

- Ventilation – the development aims to reduce the reliance on mechanical air-conditioning and by extension energy consumption where possible, by utilising natural airflow through the indoor environment. The natural airflow is driven by the pressure differentials at the various openings of the occupant space. The development has been designed to promote this pressure-driven airflow through the use of corner and cross-through dwellings on the various buildings. Furthermore, the development

will aim to satisfy the SEPP65 ADG requirements for natural ventilation relating to the residential component of the development. The development will also incorporate a mixed mode ventilation strategy for the common areas to introduce natural ventilation into the building when the conditions outside are acceptable.

2.6 Materials & Embodied Emissions

The NSW government's State Environmental Planning Policy (Sustainable Buildings SEPP) 2022 (SB SEPP) aim is to promote sustainable building practices and reducing impact of the built environment in NSW. To help achieve this the SB SEPP aims to reduce the embodied emissions for all new building types and associated construction materials. Tools have been developed to assist with embodied emissions such as the new BASIX Materials Index integrated into the latest version of the BASIX online tool. Construction materials has an impact on the environment primarily through its inherent embodied energy use; i.e. the consumption of energy, natural resources and toxicity in the manufacture and transport of the construction material. The proposed development aims to optimising the use of construction materials with low embodied energy emissions and minimise the development's environment impact through the following design initiatives:

- A new Materials Index has been introduced to the Building Sustainability Index (BASIX) to calculate and report on the embodied emissions of construction materials in new residential developments. However, it should be noted that currently there is no minimum threshold or target limit set to be achieved, which will be phased in the future.
- Selection of construction materials with low embodied emission factors within:
    - The building fabric of the development in the floors, walls, ceiling, roof and glazing
    - The floor finishes and interior fit-out.
- Optimise systems for material efficiency through the planned minimisation of material waste and consideration to the use of higher grade options of the material construction.
- Recycled timber components. Any timber used on the project aims to be sourced from a recycled source or shall be certified timber by the Forest Stewardship Council (FSC).
- Engineered and composite wood products used in the development will be selected to contain minimal or no formaldehydes.
- Selection of paints, adhesives and sealants etc. used in the development containing minimal or no volatile organic compound (VOC).
- Selection of piping, formwork and cabling etc. with minimal or no PVC.

2.7 ESD principles as defined under Section 193 of the EP&A Regulation

In accordance with Section 193 of the EP&A Regulation, the precautionary principle, the principles of inter-generational equity, conservation of biological diversity and ecological integrity, and improved valuation, pricing, and incentive mechanisms have been considered in the design and assessment of the proposed mixed-use development.

2.7.1 The precautionary principle

In accordance with Section 193 of the EP&A Regulation, the precautionary principle has been applied in the planning and design of the proposed mixed-use development. Given the project's location within a highly urbanised environment and its integration with an existing development, a risk-averse approach has been adopted to minimise potential environmental impacts where uncertainty may exist. This includes the use of conservative design assumptions and the implementation of appropriate mitigation measures to address risks associated with urban heat island effects, wind conditions, and resource efficiency.

The inclusion of tree planting within and around the subject development further contributes to mitigating environmental risks by enhancing microclimatic conditions, improving thermal comfort, and supporting urban greening outcomes. Overall, the development demonstrates a commitment to avoiding or minimising environmental harm through proactive and responsive design strategies. This is further supported by the integration of sustainable design measures, careful material selection, and operational strategies aimed at reducing environmental risk and improving long-term performance outcomes, particularly in relation to solar reflectivity (glare), thermal performance, water efficiency, and energy consumption.

2.7.2 Inter-generational equity

The principle of inter-generational equity has been addressed by ensuring that the development incorporates sustainable design strategies that do not compromise the ability of future generations to meet their own needs. This is demonstrated through the integration of long-term performance measures, including energy and water efficiency initiatives, durable material selection, and passive design responses to enhance occupant comfort. The inclusion of rooftop solar panels further supports reduced reliance on non-renewable energy sources, contributing to improved long-term environmental performance and resilience.

2.7.3 Conservation of biological diversity and ecological integrity

The conservation of biological diversity and ecological integrity has been considered through the integration of urban greening initiatives within the highly urbanised site context. Dense landscaping is proposed within and around the subject development. These measures contribute to enhancing local ecological value, supporting urban biodiversity, and improving the continuity of green infrastructure within the surrounding area. While the site is constrained by its urban setting and existing development footprint, opportunities to incorporate vegetation and improve ecological outcomes have been maximised where feasible.

2.7.4 Improved valuation, pricing and incentive mechanisms

The principle of improved valuation, pricing, and incentive mechanisms has been addressed through the adoption of design measures that recognise and respond to the environmental costs associated with resource consumption and environmental impacts. This includes the implementation of energy-efficient systems, water-saving initiatives, and façade treatments that mitigate solar reflectivity and associated glare impacts. These measures contribute to reducing lifecycle costs, improving environmental performance, and aligning the development with regulatory frameworks and sustainability benchmarks, thereby supporting more sustainable economic and environmental outcomes.

2.8 Design purpose of the NSW Net Zero Statement

The purpose of the NSW Net Zero Statement is to reduce greenhouse gas emissions by 70 per cent by 2035 compared to 2005 levels and reach net zero emissions by 2050. The development incorporates a number of design strategies to reduce greenhouse gas emissions summarised as follows:

- Improved thermal performance in the building envelope through the use of high-performance glazed systems, building materials and increased thermal insulation in the building fabric to mitigate the thermal transfer between the indoor and outdoor environments. The development will target a minimum average NatHERS star rating of 7.0 to minimise the reliance on the use of heating or cooling appliances, thereby reducing energy consumption.

- Improved passive design of the development, minimising the need for auxiliary heating and cooling to maintain a comfortable temperature within the indoor space throughout the year. These include open plan design promoting airflow through the indoor space with external openings aligned with the prevailing wind directions for the region where possible and the inclusion of large glazed systems to maximise of the potential daylight solar access to the indoor space that can also improve indoor amenity for the occupants.

- Selection of energy efficient building HVAC systems to reduce GHG emission production and utilises low-impact refrigerants with low global warming and Ozone depletion potential.

- Utilising energy efficiency ventilation and lighting system measures in the mechanical plant, services and common areas such as the use of time clocks, thermostatic controls and motion sensors.

- Incorporation of on-site renewable energy systems such as the rooftop photovoltaic systems to reduce the reliance on the electricity grid and provide on-site energy generation.

- Implement an energy transition strategy for potential electrification of the development such as potential EV charging services to be available within the car-parking premises to promote the use of EV vehicles in lieu of ICE vehicles.