NORTHROP

SSDA ESD REPORT

Aldington Road – Stage 1

113-153 Aldington Road, Kemps Creek, NSW 2178

PREPARED FOR
DEXUS
c/o- Archile Projects
606/50 Clarence Street
Sydney NSW 2000

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SSDA ESD Report

Revision Schedule

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Northrop Consulting Engineers Pty Ltd

ACN 064 775 088 | ABN 81 094 433 100

Level 11, 345 George Street, Sydney NSW 2000

02 9241 4188 | sydney@northrop.com.au | www.northrop.com.au

Table of Contents

1. Introduction

This Ecologically Sustainable Design (ESD) and Greenhouse Gas Assessment has been prepared on behalf of DEXUS for the proposed development, located on 113-153 Aldington Road, Kemps Creek, NSW 2178.

This report is intended to provide an overview of the ESD principles and greenhouse gas and energy efficiency measures that will be implemented and is intended to form part of the Environmental Impact Statement (EIS) for the State Significant Development Application (SSDA).

Specific sustainability initiatives proposed for the building include, but are not limited to:

- Space efficient building layout.
- Water Sensitive urban design principles
- High Efficiency Electrical Systems
- Large scale on-site renewable energy generation
- Increased use of daylighting to reduce power usage
- Installation of a rainwater capture and reuse system for all buildings on-site
- Energy Efficient heating, ventilation and air conditioning including natural ventilation to open spaces.
- Waste Minimisation strategies.

Through the implementation of the initiatives noted in this report, the project addresses and endeavors to mitigate against negative environmental, social and economic impacts associated with the site.

1.1 Response to Secretaries Environmental Assessment Requirements (SEARs)

This report addresses how the proposed project addresses the SEARs. These requirements are outlined below alongside where the response to each can be found within this report.

Key Issue	Item for inclusion	Action to Address Requirement	Report Location
Greenhouse Gas and Energy Efficiency	Including an assessment of the energy use of the proposal and all reasonable and feasible measures that would be implemented on site to minimise the development's greenhouse gas and carbon emissions	The proposal, as outlined in the report, will seek to include substantial energy efficiency measures to minimise the proposal's greenhouse gas and carbon emissions. An assessment of the GHG Emissions for the project is outlined in Section 3.1	Section 3.1 & Section 3.2
Ecologically Sustainable Development	Description of how the proposal will incorporate the principles of ecologically sustainable development in the design, construction, and ongoing operation of the development.	This ESD report details how the project aims to address ESD Principles and their incorporation into the design and ongoing operation of the project.	Section 3
	A description of the measures to be implemented to minimise consumption of resources, especially energy and water.	A report is to be prepared regarding strategies put in place to manage increasingly volatile climate situations. This report will produce outcomes for design to reduce the impact of these climate outcomes.	Section 3.2 & Section 3.6

1.2 Sustainable Buildings SEPP 2022

Northrop has undertaken a cursory review of the State Environmental Planning Policy (Sustainable Buildings) 2022 (Sustainable Buildings SEPP) as it relates to the proposed development of 113-153 Aldington Road. Generally, the ESD Report issued in connection with the EIS demonstrates compliance with requirements under this SEPP.

Those items not covered are outlined below:

Item	Response
(1) In deciding whether to grant development consent to non-residential development, the consent authority must consider whether the development is designed to enable the following:	These items are generally already covered within the ESD report, for reference, the targets proposed for the development (aligned to Greenstar), against each one of these items within the report.
a) the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,	The Building is targeting a diversion of more than 90% of construction and demolition waste from landfill.
b) a reduction in peak demand for electricity, including through the use of energy efficient technology	Energy Efficient design through use of passive design, cool roofs, natural ventilation (where possible) and an integrated energy monitoring system will reduce the peak electricity demand across the project.
c) a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,	The project includes skylights throughout industrial areas to maximise daylighting and minimise reliance on artificial lighting. Within the office spaces, the building fabric (including glazing) will be improved to reduce design heating and cooling loads.
d) the generation and storage of renewable energy,	The majority of warehouse roof space will be able to cater to large-scale PV installation, of which is currently planned to reduce the reliance on grid electricity within the site.
e) the metering and monitoring of energy consumption,	An energy management system will be provided to ensure the management of energy resources across the building. This system will provide metering for all major energy sources, and a monitoring platform to identify trends and changes.
f) the minimisation of the consumption of potable water.	A strong focus has been put on the effective management of water within the building, through the use of water efficient fixtures and fittings, integration of rainwater capture and reuse, and incorporation of principles of Water Sensitive Urban Design
(2) Development consent must not be granted to non-residential development unless the consent authority is satisfied the embodied emissions attributable to the development have been quantified.	The current ESD report does not quantify the embodied carbon emissions associated with the development. Northrop acknowledges that whilst this is a requirement of the Sustainable Buildings SEPP, the quantification process will not directly contribute to design changes at this stage of the project.
(3) In deciding whether to grant development consent to large commercial development, the consent authority must consider whether the development minimises the use of on-site fossil fuels, as part of the goal of achieving net zero emissions in New South Wales by 2050.	Northrop have been informed by the Proponent that no gas has been proposed as part of this development. The project has also estimated the Greenhouse Gas emissions of the project on an annual basis, which can be seen within the report

1.3 Limitations

Due care and skill have been exercised in the preparation of this report.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Northrop for detailed advice, which will consider that party's requirements.

All simulations and performances noted within this report are estimations only. They are based on the existing design of the facility and best practice estimation techniques. These figures are indicative only and should not be used for cost or other analysis purposes.

2. The Proposal

The proposal comprises a Site Layout Plan for 113-153 Aldington Road consisting of two (2) warehouse and distribution centre buildings, an internal road network layout including a temporary connection to Aldington Road, building locations, gross floor area (GFA), car parking, hardstand areas, concept landscaping, building heights, setbacks, built form parameters, one (1) on-site bioretention basin and the realignment of a riparian corridor.

The development application for the Site Layout Plan is made up of detailed approval of warehouse and distribution centre buildings comprising 70,100 m2 of warehouse area and 1,900 m2 of office area across two (2) warehouse buildings, supported by an internal road network, landscaped areas, E2 environmental conservation area and an on-site detention.

The proposed development includes detailed approval and consent for site preparation works, construction, fit out and operation of two (2) warehouse buildings for warehouse and distribution uses pursuant to Schedule 1 Clause 12 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP), bulk earthworks and retaining walls, stormwater and associated works, internal roads, associated carparking, signage, landscaping and a riparian zone.

Consent is sought for the following development:

- Demolition of existing dwellings and associated buildings.
- Bulk and detailed earthworks including cut and fill, export of excess material off site, dam dewatering and construction of benched pads with associated retaining walls.
- Battering to the north and south subject to timing of the neighbouring works.
- Realignment of the existing E2 riparian corridor.
- Subdivision of the land.
- Construction of internal public estate roads which will ultimately connect the proposed developments to the north and south, and temporary road access to Aldington Road.
- Aldington Road widening works.
- Stormwater and drainage work including stormwater detention and bio-retention system.
- Landscaping of bio-retention basins and street verges.
- Provision of site servicing infrastructure to allow the operation of the industrial unit for warehouse and distribution industries.
- Construction and use of two (2) warehouses distribution centres (Warehouses 1 and 2), which will operate 24/7. Associated carparking and heavy vehicle hardstand areas, vehicle crossings/driveways, soft and hard landscaping, perimeter security fencing.
- Estate signage, directional and tenant building signage.

3. Ecologically Sustainable Development

The following section describes how ESD principals (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) are being incorporated in the design, construction, and operation phases of the project. These initiatives illustrate how the project addresses the following.

- The precautionary principle – through the implementation of environmental management and an assessment of the building's operational maintainability, the project attempts to incorporate adaptability and resilience into the project design. The concept behind the precautionary principle is to create spaces that can both; accommodate for changes, which may eventuate in the future, and avoid the risk of serious or irreversible damage to the environment.
- Inter-generational equity to ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations – through the inclusion of zero ozone depleting refrigerants, best practice PVC and low impact paints, sealants and adhesives, alongside a focus on providing greater vegetation and support for the buildings connection with nature, the project demonstrates a strong commitment to the preservation of environmental health, diversity and productivity of the local area.
- Conservation of biological diversity and ecological integrity – through the planting of native vegetation, improvement of stormwater runoff from the site and use of integrated landscaping, the project will act to improve, conserve and support the local biological diversity and integrity.
- Improved valuation, pricing and incentive mechanisms - the design process should involve significant input from the Quantity Surveyor who will be involved ensure that the project both remains on budget and effectively considers environmental factors in the valuation of assets and services. Furthermore, the project will look at maintainability and the operational costs associated with individual design initiatives and the overall design.

Through the inclusion of the above and the sustainability initiative outlined within this report the project clearly addresses the ESD Principles into the design, construction and operation of the building as defined in clause 7(4) of schedule 2 of the Environmental Planning and Assessment Regulation 2000. Further detail of the general sustainability initiatives is outlined below.

3.1 Energy Use Assessment

The calculation guidelines of the Green Building Council of Australia for unconditioned warehouse spaces indicate that energy consumption for the initial development on Lots 1 & 2 can be estimated at circa 0.76 GWh a year assuming 24/7 operation. This energy usage will be reduced significantly with suggested inclusion of on-site Solar PV, which is discussed within this report.

Warehouse	Lot Area (m2)	Office Space (m2)	Warehouse Space (m2)	Energy Usage (GWh)	Grid Emissions (Tonnes CO2-e)
1	88,350	900	51,100	1.57	1,273
2	34,320	1000	19,000	0.73	592
Total	**122,670**	**1,900**	**70,100**	**2.30**	**1,865**

Table 1 – Energy Use Assessment

3.2 Energy Efficiency:

Energy efficiency will be considered throughout the design development process with the following improvements to be considered by the design team. It is expected that the measures outlined in the following section, alongside a large solar array, will significantly reduce the site's grid electricity demands when compared to a standard practice building.

3.2.1 Natural Ventilation of Tertiary Spaces

The project incorporates significant logistic areas, and areas for circulation and vehicles, these spaces will, where achievable, be naturally ventilated or open air in the case of truck loading areas. These areas will be able to operate as naturally ventilated spaces exploiting the buoyancy of air to draw ventilation through the space. Central circulation spaces such as bathrooms and stairs should also look to incorporate natural ventilation and the use of spill air from adjacent spaces to provide passive temperature control.

3.2.2 Improved building fabric and glazing performance

The building envelope comprises several different façade types, with the proposed scheme looking to implement a combination of light-coloured metal finishes, prefabricated concrete and low-e glazing to lower heat gains throughout summer while maintaining good daylighting throughout of the building.

The use of well-designed glazing and building materials will also assist the projects targets for energy efficiency, acoustic performance, and thermal comfort.

3.2.3 Integration of Cool roofs

To address heat islanding across the site and wider area, the site should incorporate cool roofing with a high Solar Reflectivity Index (SRI 82) which will minimise the buildup of heat within the material and reduce load on the HVAC system.

3.2.4 HVAC System Control

The proposed HVAC system incorporates individual area controls for thermal comfort conditions within the office spaces allowing building occupants to maintain comfort conditions suitable to the use and occupancy of spaces. This system assists in optimising the sites energy efficiency while maintaining comfortable conditions.

3.2.5 Energy Metering and Monitoring

An energy metering and monitoring strategy is to be considered to effectively monitor the main energy uses within the building, alongside the lighting and small power use. This aims to provide fault detection and monitoring of the different areas of the building.

3.2.6 Improved Outdoor Air Provision

The project will aim to improve the outdoor air provided to regularly occupied spaces. This will minimise CO2 build up within the office areas and improve comfort for the building occupants.

To address energy use concerns the design will also look to incorporate on an outdoor air economy cycle which will allow the building to exploit periods where the buildings external conditions can effectively provide thermal comfort in the space reducing the run times of the air-conditioning system.

3.2.7 Highly efficient lighting system

The installation of LED lighting throughout the building will assist in the minimisation of lighting energy use. Improved lighting energy also reduces the heat loads within conditioned spaces and therefore lowers the energy used to condition the building. The use of efficient controlled lighting within the warehouse areas will provide a significant improvement in energy use.

3.2.8 Electric-Only Building

All building systems and appliances will be electric, avoiding on-site use of gas.

3.2.9 Environmentally Friendly Refrigerants

Where required, the use of Environmentally friendly refrigerants, such as hydrofluorocarbons (HFC's), are targeted within the project to minimise global warming potential and ozone depletion potential

3.2.10 Low Impact

Embodied energy will be reduced by avoiding unnecessary use of materials and procuring materials with a low carbon footprint where appropriate options are available

3.3 Energy Generation:

With the above energy efficiency measures, the energy load of the facility will be reduced, allowing a large portion of the sites electrical energy demand to be met through the suggested inclusion of PV Solar Arrays, individual to each lot. This will assist to both offset the sites energy use and minimise the sites daytime peak demand from the grid.

3.4 Indoor Environment Quality

Indoor environment quality is always an important consideration in spaces that are regularly occupied such as the offices and ambient warehouse areas. The following considerations have been considered as part of the building design:

3.4.1 Daylight Access

The design of the extension should aim to allow good daylight penetration into both internal and external spaces. Daylighting can be achieved through skylights and other methods, whilst not sacrificing thermal transfer. This access to daylight throughout the building will both minimise energy used for lighting and will improve occupant connection to their external environment.

3.4.2 Interior noise level control

Internal noise levels will be actively considered with the building layout and systems design considering how noise will reverberate through the building. The use of acoustic insulation and sound isolation will ensure that interior noise levels to be maintained below acceptable limits.

3.4.3 Material selection

Materials selection for the project aims to improve the internal environment of the site with materials with low volatile organic compound and formaldehyde content preferred to help minimise respiratory issues for building occupants.

3.5 Sustainable Transport

3.5.1 End of Trip Facilities

End of trip facilities, including bicycle racks and showers, will be provided to encourage walking and cycling by staff.

3.6 Water Efficiency

A strong focus has been put on the effective management of water within the building with the following initiatives being included in the design in all areas throughout the project. It is expected that these initiatives will reduce the sites potable water demand by more than 50% compared to a standard practice building.

3.6.1 Water efficient fixtures and fittings

Water Efficient fixtures and fitting will reduce the water consumption of the site. As an indication, the following should be targeted:

- Wash hand basin taps 6-star WELS
- General taps 6-star WELS
- Toilets dual flush 4-star WELS
- Urinals 0.8 L per flush 6-star WELS
- Shower heads 7-9 L per minutes 3-star WELS

3.6.2 Water Sensitive Urban Design

The project will look to incorporate a strong focus on water sensitive urban design with the external landscape design assisting to minimise water use for irrigation. The inclusion of landscaped area will also assist in the reduction of site stormwater discharge and assist in the management of the projects broader impact on urban stormwater flows. The site will incorporate a trunk stormwater bio-retention system, which will increase green space within the estate.

3.6.3 Rainwater capture and reuse

A large rainwater capture and reuse system could be designed for installation to offset the sites water usage for washdown, site irrigation, and other facets of production. This system would have the ability to offset most of the sites potable water usage.

3.7 Improved Ecology

Through planting native vegetation and promoting improved interaction with the natural environment, the project will look to improve the site's ecology and minimise the ongoing environmental impact of the project. Lot 1 is a dedicated 18,335 m^2 E2 Environmental Conservation area. The project will also implement the following:

- Incorporation of a site vegetation.
- Minimisation of light spill from the facility which impacts on migratory animals and insects; and
- Reduced dissolved pollutants in stormwater discharged from the site.

3.8 Waste Management

Effective waste management throughout demolition, construction and operation of the site will help to promote resource efficiency and minimise the adverse environmental impacts of the project. The following are being considered as part of the design process.

3.8.1 Waste Management Plan

A Waste Management Plan will be prepared with the following key objectives:

1. To minimise the environmental impacts of the operations of the development
2. To minimise the impact of the management of waste within the development
3. To ensure waste is managed to reduce the amount landfilled and to minimise the overall quantity generated.

These objectives will be achieved through strategies such as the integration of recycling bins and back-of-house separation areas, which will encourage recycling and separation of cardboard/paper waste, glass, food waste and comingled recycling and general waste.

3.8.2 Separated Waste and Recycling Streams

The provision of separated waste and recycling streams could allow for more effective recycling of the project's operation waste. Providing separate bins for cardboard/paper waste, glass, food wastes, comingled recycling and general waste will improve the buildings operational efficiency and result in significant environmental benefits.

3.8.3 Construction and Demolition Waste Minimisation

The project should look to minimise the demolition and construction waste associated with the project and can aim to divert over 90% of waste from landfill to recycling or reuse facilities.

3.9 Green Infrastructure

Green infrastructure will be integrated into the project to provide urban cooling, slowing, and filtering of rainwater, climate resilience, strengthen biodiversity and improved community nature connection.

4. Climate Change Projections

As part of the design review the project has completed a risk assessment for the sites climate adaption risks based on the CSIRO climate change projections for Western Sydney. This risk assessment reviewed the following three elements:

- Consequence: what will be the effect of the development should the impact occur?
- Likelihood: how likely is it that the impact will occur?
- Risk Rating: what is the associated risk of the development when the likelihood of it happening is measured against the possible consequence of the impact?

Key risks posed to the site which will be addressed as part of this process and high-level issues are outlined below with comment on how these are addressed within the current design; further detail will be developed within the projects detailed design development stages.

- Changing Surface Temperatures should be addressed through the following.
    - Use of high reflectivity roofing to minimise heat gain and heat island effects.
    - Integration of solar panels to provide shading to areas of the roof and provide increased power to the site when peak energy use for cooling is required.
    - Incorporation of heating, ventilation, air conditioning (HVAC) systems designed to modulate in the event of changing outside air temperatures. Equipment will be rated to continue operating during higher temperatures.
- An increase in rainfall intensity should be managed through the following.
    - Inclusion of rainwater and stormwater storage systems to modulate flows exiting the site.
    - Ability to provide increased finished floor level (FFL) designed to be 0.50 m above freeboard requirement to account for increased flooding potential at the site.
    - Inclusion of awnings to the entry access points to promote allow continued operation during adverse conditions.
- An increase to wind speed intensity should be addressed through the following.
    - The metal roof design incorporating roof bracing to fasten the roof onto the building structure to account for increasingly strong winds on site and prevent damage to the roof due to prevailing winds.
    - Improved structural integrity to ensure that the building is not significantly impacted in the event of high intensity wind loads. This includes wind loading on loading dock awnings and doors.
- Decrease in humidity and increased drought conditions will be addressed through the following.
    - Increased capacity within the fire safety systems to assist in the management of bushfire risk associated with dryer conditions.
    - Additional non potable water supply for irrigation needs and the integration of native and drought tolerant vegetation.

Overall, the current design incorporates significant measures to address key projections for climate change in the near term. The project will incorporate further initiatives to address all high and extreme risks posed to the site.

5. Conclusion

This report has addressed the ESD and Greenhouse Gas requirements to support the SSDA for the Development located on Aldington Road, Kemps Creek NSW 2178.

Specific sustainability initiatives proposed for the building include, but are not limited to:

- Space efficient building layout.
- Water Sensitive urban design principles
- High Efficiency Electrical Systems
- Large scale on-site renewable energy generation
- Increased use of daylighting to reduce power usage
- Installation of a rainwater capture and reuse system for all buildings on-site
- Energy Efficient heating, ventilation and air conditioning including natural ventilation to open spaces.
- Waste Minimisation strategies.

Overall, through the implementation of the initiatives noted within this report the project clearly demonstrates the site's commitment to ESD principles throughout the design, construction, and operation. Additionally, the project design team has worked to optimise the sites energy performance, address key climate related risks posed to the site, and align to the NSW Government's commitment to carbon neutrality by 2050.