NORTHROP

SSDA ESD REPORT

311 South Street

311 South Street, Marsden Park, NSW 2765

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

Ref: SY213190

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SSDA ESD Report

Revision Schedule

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1. Introduction

This Ecologically Sustainable Design (ESD) and Greenhouse Gas Assessment has been prepared on behalf of DEXUS for the proposed development, located on 311 South Street, Marsden Park, NSW 2765.

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
Ecologically Sustainable Development	Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation) are incorporated in the design 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
	Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	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 5
	Demonstrate how the development minimises greenhouse gas emissions reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	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.	Section 3.1, 3.2 & 3.4

1.2 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.

2. The Proposal

2.1 Project Details

Component	Description
Site Name	311 South Street, Marsden Park
Address and Legal Description	311 South Street, Marsden Park, NSW 2765 Lot 31, DP262886
Site Area	Total area of 102,445 m^2 (Approximate)
Current Use	The current operations on the site are agricultural and residential

The site is in Marsden Park, 50km west of the Sydney CBD and 30km from Parramatta. The site affords road linkages to South Street, Richmond Road, The Northern Road, the M4 Western Motorway and the Westlink M7.

2.2 Proposed Development – Stage 1

The proposed development comprises the works outlined in the following table:

Element	Proposed
Site Preparation	▪ Bulk earthworks involving pond dewatering, cut and fill works and pad construction. ▪ 6-lot Torren's title subdivision with areas ranging from 4,650 m^2 to 15,950 m^2
Development summary	▪ Construction of internal public road, and connection to existing and future local roads ▪ Infrastructure comprising civil works and utilities servicing ▪ Construction of two warehouses, to be separated into 6 units
Hours of Operation	▪ It has been assumed that the facilities will operate 24 hours per day, seven days per week

Table 1 - Overview of Proposed Development

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 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.

3.1.1 Natural Ventilation of Tertiary Spaces

The project incorporates significant logistic areas, and areas for circulation and vehicles, these spaces will, where possible, 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.

3.1.2 Improved building fabric and glazing performance

The building envelope comprises several different façade types, with the proposed scheme looking to implement a combination of 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.

3.1.3 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.

3.1.4 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. The refrigerated and frozen storage areas will also maximise efficiency of cooling plant equipment to reduce energy consumption.

3.1.5 Energy Metering and Monitoring

An energy metering and monitoring strategy will be implemented 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.

3.1.6 Improved Outdoor Air Provision

The project will 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.

3.1.7 Highly efficient lighting system

The installation of efficient 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.

3.1.8 Electric-Only Building

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

3.1.9 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

3.1.10 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

3.2 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.

3.3 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:

3.3.1 Daylight Access

The design of the project will aim to allow good daylight penetration into both internal and external spaces. Daylighting will look to be achieved within the warehouse spaces through translucent sheeting used for circa 10% of the warehouse roof area. This access to daylight throughout the building will both minimise energy used for lighting and will improve occupant connection to their external environment.

3.3.2 Interior noise level control

Internal noise levels are actively considered in 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.

3.3.3 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.

3.4 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.

3.4.1 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 3WELS

3.4.2 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 is targeting, and has achieved in preliminary modelling, the following pollution reduction targets.

Type of Pollutant	Reduction Targeted (%)
Total Suspended Solids (kg/year)	85%
Total Phosphorous (kg/year)	65%
Total Nitrogen (kg/year)	53.7%
Gross Pollutants (kg/year)	95%

The site will also incorporate a trunk stormwater bio-retention system, which will increase green space within the estate.

3.4.3 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. The site will provide two rainwater capture tanks, totaling 220 kL, used to service irrigated areas and toilets on the site.

3.5 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. 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.

3.6 Waste Management

Effective waste management throughout 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.

3.6.1 Waste Management Plan

A Waste Management Plan has 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.

3.6.2 Separated Waste and Recycling Streams

The provision of separated waste and recycling streams will 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.

3.6.3 Construction Waste Minimisation

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

3.7 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. Industry Best Practice

The project also aims to meet and exceed industry best practice sustainability requirements within its design as part of the sustainability commitments associated with construction and operation. As such we provide the below summary of how the project is incorporating best practice in line with the nine categories identified in the Green Building Council of Australia's benchmarking tool.

5.1 Management

The management category promotes the adoption of environmental principals in project inception, design, and construction phases, through to commissioning, tuning and operation of the building. The following initiatives are currently proposed.

- Engagement of an ESD professional to advise DEXUS and the Project team throughout the project design and construction.
- Review of the project design to ensure maintenance and access provisions are incorporated at the early stages of design.
- Commitment to commissioning and tuning the building.
- Integration of measures to accommodate risks posed to the site due to expected alterations in climate.
- Provision of detailed Operations and Maintenance information and hand over to support ongoing operations.
- Metering of the main building elements and installation of a monitoring system to support reporting and optimisation of the project systems in operation.
- Implementation of a site-specific Environmental Management Plan certified to ISO140001.
- Consideration of the operational waste requirements for the site and integration of support for this within the space layouts.

5.2 Indoor Environment Quality

The Indoor Environment Quality category aims to enhance the comfort and wellbeing of building occupants. The following proposed initiatives relate to building's HVAC system, lighting, indoor air pollutant monitoring systems as well as other building attributes:

- Building services noise levels to be managed to achieve acoustically comfortable spaces.
- Low irritant materials and coatings to be used.
- High quality LED lamps are proposed throughout the development.
- A variable lighting system to allow building users to control the light levels key spaces.
- A mechanical system that promotes good thermal comfort in the conditioned spaces.

5.3 Energy

The energy category rewards projects for reducing energy consumption and greenhouse gas emissions through more efficient building fabrics and systems as well as on site energy generation. The following initiatives are proposed:

- Energy modelling will be completed to demonstrate that the proposed building has a greenhouse gas emissions reduction compared to a reference building as defined by the minimum requirements of the National Construction Code 2019.

- Inclusion of solar arrays as part of the building design.
- Incorporation of an efficient heating and cooling system.
- Building fabrics that exceed the requirements of the construction code.
- Design of an efficient lighting power density across the project.

5.4 Transport

The transport category awards points for projects which make provisions for reduced greenhouse gas emissions arising from occupant travel to and from a building. The following initiates are proposed for implementation:

- Inclusion of electric vehicle parking on site.
- Creation of connection between the building and nearby facilities such as public transport.

5.5 Water

This category rewards projects which reduce the amount of potable water consumed on-site through the design of efficient systems, rainwater collection and reuse. The following initiatives are proposed for the project.

- Inclusion of highly efficient fixtures and fittings
- Recirculation and capture of the sites fire system test water for reuse on site.

5.6 Materials

The materials category focuses on reducing the consumption of resources through selection and reuse of products, and efficient management practices. The following initiates are proposed within the building:

- A commitment to the use of ecologically sensitive cleaning materials onsite.
- The provision of a dedicated storage area for the separation and collection of recyclable waste.
- The use of structural materials that declare their environmental impacts
- All PVC used on the project to be Best Practice Certified.
- At least 90% of the project construction waste is reused or recycled.

5.7 Land Use and Ecology

The Land Use and Ecology category promotes initiatives to improve or reduce impacts on ecological systems and biodiversity. The following initiates are currently proposed:

- Any contamination from Asbestos, lead or PCBs will be removed from site or have an in-situ management plan implemented.
- The reduction of heat islanding in the area through the inclusion of vegetation, solar panels, green rooves or be light coloured with a solar reflectivity of at least 64.

5.8 Emissions

The emissions category targets building emissions relating to watercourse pollution, light pollution, ozone depletion, global warming, Legionella, and sewage. The follow initiatives are currently proposed:

- All thermal insulants in the project will avoid the use of ozone depleting substances in both its manufacture and composition.
- Stormwater discharge from the site will not increase from the predevelopment peak and will meet a high level of water quality through onsite treatment to remove pollutants.
- To reduce light pollution, no direct light generated inside or outside the building will face directly upward into the sky.

5.9 Innovation

The innovation category is included in Green Star to encourage, recognise, and reward the spread of innovative technology, design, and processes for building applications. The following initiatives have been proposed for this project.

- The use of onsite renewables to meet a portion of the sites predicted energy needs.
- Consideration of the maintenance and operation of the tenant systems as part of the building commissioning and maintainability review processes.
- Incorporation of an operational waste minimisation strategy to reduce waste production from refit works.

6. Conclusion

This report has addressed the ESD and Greenhouse Gas requirements to support the SSDA for the Development located on 311 South Street, Marsden Park NSW 2765.

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.
- Alignment of Sustainability Strategy to Industry Best Practice rating tools.

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.