NORTHROP

SSDA ESD REPORT

Huntlee

North Rothbury, Hunter Valley Region, NSW

PREPARED FOR
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Hexham NSW 2322

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SSDA ESD Report

Revision Schedule

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1. Introduction

This Ecologically Sustainable Design (ESD) report has been prepared on behalf of Huntlee Pty Ltd for the proposed Huntlee New Town Stage 2 development, located in North Rothbury within the Hunter Valley Wine Region of NSW.

This report supports the Environmental Impact Statement and State Significant Development Application (SSDA) that seeks consent for the Huntlee New Town Stage 2 development. The Stage 2 concept development comprises of sites including Villages 2 and 3, the land off Old North Road, and the detailed development for the central and southern areas of Village 2. The proposal represents the next phase of an extensive planning, assessment and consultation process completed to date for the development of the Huntlee New Town site.

Specifically, the project proposes, but is not limited to, the following key ESD measures to support the overall achievement of the desired sustainability outcomes:

On an individual scale:

- Best practice building fabric and glazing for each home.
- Considered site layout and design to enable residents to have private recreation space.
- Each home will have the ability to install Solar PV
- Efficient lighting and appliances with incentives to improve beyond the minimums required in the code.
- Water efficient fixtures and fittings
- Non-toxic construction materials that promote a healthy home environment

At a cluster level:

- Design for walking and cycling to promote healthy active transport.
- Private and communal space to encourage a sense of local community.
- Native and endemic landscaping to promote connection to nature and site biodiversity.
- Electric vehicles provisioning and allowance for car share vehicles to reduce reliance on combustion-based transport.
- Incorporation of collector road network capable of supporting public bus routes that will provide bus stops in close proximity to all residents.
- Cluster community development through the development of the remaining town centre, parks, sport centres and Villages 1 and 2.

For the precinct:

- Recycled water supply throughout the precinct
- Site wide approach to Water Sensitive Urban Design
- Transport planning and connection with the broader region and intercity train network
- Design for walking and cycling
- Riparian corridors to protect the connectivity of the green and blue grids across the greater region.
- Solar energy capacity to reduce the load that the precinct will place on the broader energy network.
- Promotion of positive land use and biodiversity outside the project site (780 hectares and 4900 hectares of conservation area locally and remotely respectively offsite).
- Onsite sewer treatment integrated within water cycle management scheme.

- Integrate footpaths, shared paths, on and off-road cycle ways, and recreation trails into a Masterplan that connects public open spaces, local community facilities, and commercial centres.
- Civil design is intended to minimise earthworks and total cut/fill volumes where feasible. The layout of the masterplan has been influenced by site topography and current stormwater patterns to support this objective.
- Utilization of site won material where possible during construction to minimise transportation.
- Locally sourced materials are encouraged and used where practical over imported i.e., fill, road base, concrete, and asphalt.

Through the implementation of the initiatives noted in this report, the proposed development addresses, and endeavours to mitigate against negative environmental, social, and economic impacts associated with the site, demonstrating alignment with the Secretary's Environmental Assessment Requirements (SEARs).

1.1 Response to Secretaries Environmental Assessment Requirements (SEARs)

This report addresses how the proposed precinct 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 precinct aims to address ESD Principles and their incorporation into the design and ongoing operation of the precinct.	**Section 3**
	Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	The developer has set design standards for all homes that enable them to exceed the requirements of BASIX. These measures are confirmed and nominated within this ESD report.	**Section 4**
	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 precinct will include substantial energy, water, and material efficiency measures to minimise the precinct's greenhouse gas and carbon emissions, water consumption and material use. Additionally, the precinct does not provide reticulated gas and promotes the use of all electric systems in alignment with the net zero emissions trajectory within the Government's policy.	**Section 3.1, 3.2, 3.4 & 3.7**

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

This ESD report supports the Environmental Impact Statement and State Significant Development Application (SSDA) that seeks consent for the Huntlee New Town Stage 2 development, comprising the concept development for the Stage 2 sites including Villages 2 and 3, land off Old North Road and the Town Centre North area, and the detailed development for the central and southern areas of Village 2 The proposal represents the next phase of an extensive planning, assessment and consultation process completed to date for the development of the Huntlee New Town site.

Specifically, this SSDA proposes the following works for the Huntlee New Town:

- A Concept Masterplan for the Stage 2 site, comprising:
  - Overall Stage 2 development footprint, including:
    - The remaining Town Centre North area,
    - Villages 2 and 3, and
    - A large lot residential area located to the south of the site on Old North Road;
  - Proposed land use and development yield, including the provision for residential subdivision of approximately 5,000 lots;
  - Associated new road network and required upgrades to existing network
  - Site-wide open space and riparian areas;

- Detailed development of Village 2 Central and South and eastern connection to the Town Centre, comprising:
  - Demolition and clearing of existing built form structures;
  - Clearing of existing vegetation within proposed development footprints;
  - Open space, recreation, community, and riparian areas;
  - Construction of road and access infrastructure;
  - Bulk earthworks such as:
    - Disturbed ground stabilisation through mulch and topsoil distribution;
    - Earthwork balance fill;
    - Rocks for rip-rap scour protection;
  - Stormwater and drainage works;
  - Utilities and services, including:
    - Sewer and potable water reticulation;
    - Electricity and communications infrastructure;
  - Subdivision to facilitate approximately 1,750 lots across the Village 2 Central and South areas and Town Centre development lots, comprising approximately 1,730 residential lots, eight (8) medium density super lots, two (2) commercial/mixed use lots and open space areas; and
  - Select clearing and grading to establish temporary Asset Protection Zones where development interfaces with the Concept Master plan area.

Figure 1 demonstrates the location of the Stage 2 Concept and Detailed areas, in the context of the surrounding development.

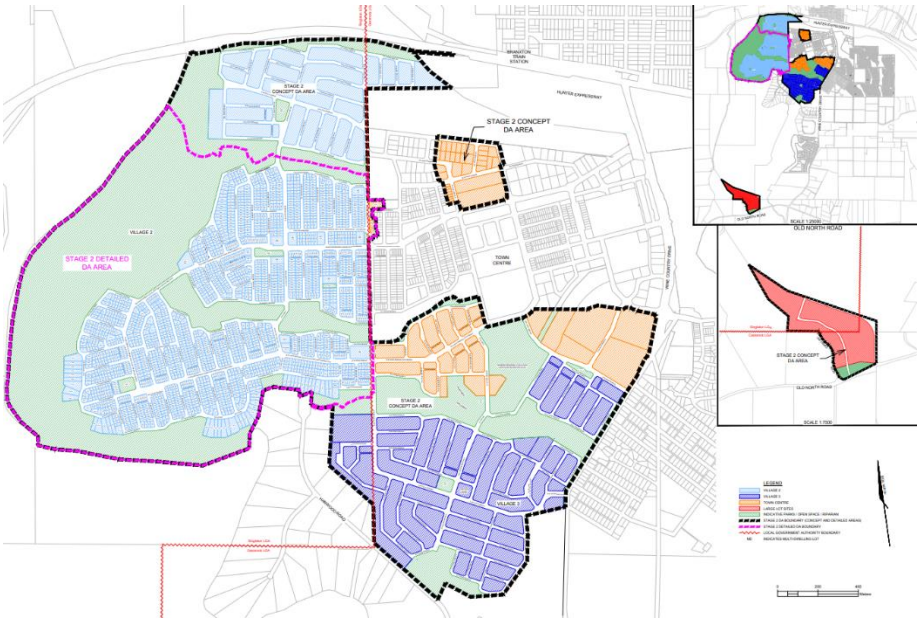

Figure 1 Proposed Concept and Detailed Area layout

Source: Daly Smith
Note: refer to Subdivision Plans for higher resolution plan

2.1 The Site

The subject site forms a large component of the 1,622-hectare Huntlee New Town, situated to the south of Branxton in the Hunter Valley. It is located approximately 20km north of Cessnock, 23km south-east of Singleton, and 55km north-west of Newcastle.

The subject Site comprises a number of allotments located in both Cessnock and Singleton Local Government Areas (LGAs). It has a combined area of approximately 541.71 hectares, is irregular in shape and is generally extended to the west and south of the approved Huntlee Town Centre. The site is bound to the west by the Black Creek and floodplain. An aerial photo of the site is provided at **Figure 2**.

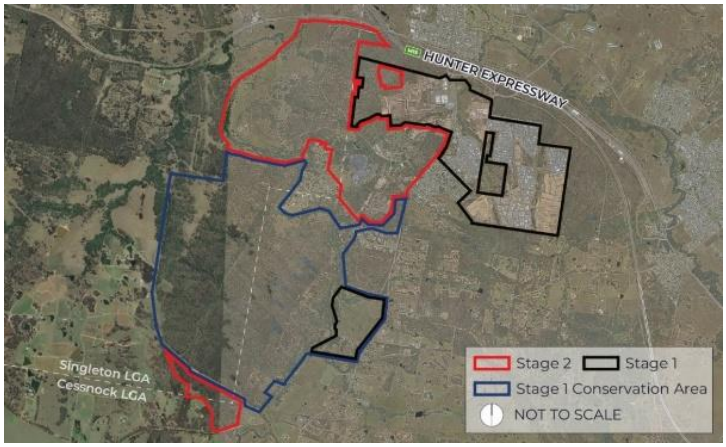

Figure 2 Site aerial

Source: Nearmap and Ethos Urban

3. Ecologically Sustainable Development

The following section describes how ESD principals (as defined within clause 193 of the Environmental Planning and Assessment Regulation 2021) are being incorporated in the design, construction, and operation phases of the precinct project. These initiatives illustrate how the project addresses the following;

- The precautionary principle – through the implementation of environmental management and an assessment of the precinct's operational growth and adaptability, the precinct management attempts to incorporate resilience, and future-focus into the town design. The concept behind the precautionary principle is to create features in the precinct that can both; adapt to changes, which may eventuate in the future, and avoid the risk of serious or irreversible damage to the environment. The inclusion of clear riparian protection zones and significant conservation zones demonstrates the precinct's commitment to preserving the sites environmental integrity.

- 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 during the design of services, best practice PVC for pipes and low impact housing materials within the project design standards, conservation of land and wildlife, alongside a focus on providing greater endemic native vegetation to support the precinct's connection with nature. The precinct demonstrates a strong commitment to the preservation of environmental health, diversity, and productivity as well as the health and wellbeing of residents of the local area. Furthermore, accessibility is accounted for in the Huntlee community with the provision of a shared path connection that will provide access to open space areas.

- Conservation of biological diversity and ecological integrity – through the planting of endemic native throughout open space and road reserve areas, vegetation, design of water cycle pathways through the development to include filtration and Water Sensitive Urban Design measures, and the provision of parkland and conservation areas, the precinct will act to improve, conserve, and support the local biological diversity and integrity.

- Improved valuation, pricing, and incentive mechanisms - the design process should incorporate these to ensure that the precinct stays within budget and thoughtfully considers environmental factors across the design options. Furthermore, the precinct will look at the maintainability and long-term operational costs associated with the overall design of the precinct.

Through the inclusion of the above and the sustainability initiative outlined within this report the precinct clearly addresses the ESD Principles into the design, construction and operation of the town as defined within clause 193 of the Environmental Planning and Assessment Regulation 2021. Further details of the general sustainability initiatives is outlined below.

3.1 Energy Efficiency

Energy efficiency is considered throughout the design development process with the following improvements. When purchasing land, design guidelines, restrictive covenants and special conditions outline and reflect provisions for energy efficiency. Solar accessibility has been prioritised, and the proposed lot is designed to accommodate this consideration in future provisions. The measures outlined in the following section demonstrate how the nominated design elements will significantly reduce the development's grid electricity demands.

3.1.1 Improved housing fabric and glazing performance

The design guidelines outline several façade types to promote more energy-considerate practices, with homes within the precinct required to implement a combination of light-coloured metal finishes whilst limiting heavier, carbon intensive, and high thermal mass elements like face brick. Good daylighting and passive design are promoted throughout dwelling design, with requirements of shading devices depending on the direction a room or space faces.

The use of well-designed glazing and building materials for the houses will also assist the overall precinct's targets for energy efficiency, embodied carbon, acoustic performance, and thermal comfort.

3.1.2 Integration of Cool roofs

To address the potential for increased urban heat island effects across the site and greater area, the precinct design will incorporate cool roofing systems to minimise the buildup of heat within the building materials and therefore, reduce the energy demands on the HVAC systems. This is intended to be accomplished by utilizing products with roof colours exhibiting a Solar Absorptance (SA) less than 0.65, equivalent to a Building Code of Australia (BCA) classification of light or medium.

3.1.3 Electric-Only Precinct

All systems and appliances in the development will be electric, this commitment ensures that the precinct is future-ready and aligned with the NSW Government's commitment to carbon neutrality by 2050. Moreover, energy storage units across the site will alleviate strain on centralized power systems, contributing to grid stability and overall enhancing the resilience of the precinct.

3.1.4 Environmentally Friendly Refrigerants

All mechanical systems across the precinct will use Environmentally friendly refrigerants to minimise global warming potential and ozone depletion potential. The use of refrigerants, such as hydrofluorocarbons (HFC's), are used in refrigeration and air conditioning systems, absorbing, and releasing heat to allow for spaces or substances to cool.

3.1.5 Low Impact

The project aims to minimise embodied energy by avoiding unnecessary use of materials and procuring materials with a low carbon footprint where appropriate. The project design guides promote the use of lower carbon impact products, such as colourbond roofing and timber are promoted in the project design guides. During construction works there will also be focus on optimizing the use of on-site available materials to reduce transportation needs. In cases where the necessity arises for imported materials, preference will be given to locally sourced options where feasible.

3.1.6 Energy and Water Efficient Equipment

The project design guides nominate a preference for energy and water equipment and services. The use of heat pumps for hot water, higher star rated refrigerators, clothes washers and dryers, dishwashers and other major equipment will directly reduce the site's energy demand. The use of higher WELS rated fixtures and fittings will indirectly reduce energy demand through reducing hot water demand and use throughout the precinct. On a precinct scale, the presence of onsite sewerage treatment integrated into Huntlee's water management scheme offers several advantages. It enables localized treatment of wastewater, leading to benefits in terms of cost-effectiveness, resource recovery, and scalability to meet the specific needs of the community. The independence of these systems also provides a source of resilience for the community, ensuring continued functionality even in the face of external disruptions or challenges. This approach aligns with a more sustainable and adaptable model of wastewater management for a community or precinct.

3.2 Energy Generation

With the above energy efficiency measures, the energy load of the precinct development will be significantly reduced. Each of the site's dwellings will have potential for renewable energy generation from a PV array, with design guidelines that specify the inclusion of at least 12 square metres of roof area, oriented towards the north to be available for future installation of solar panels. This is in the interests of improving the precinct's resilience for energy provisions and future community growth in the area.

In combination, these provisions will contribute to both offset the site's energy use and minimise the site's daytime peak demand from the grid.

It is noted that more than a quarter of homes within Stage 1 of the Huntlee development have included rooftop solar in their initial construction as can be seen within the below (**Figure 3**) satellite image of the completed stages.

Figure 3 satellite image marked up to highlight installed solar systems

3.3 Indoor Environment Quality

Indoor environment quality is always an important consideration in homes and the precinct layout has looked to create scenarios where solar access, prevailing wind directions and precooling of air can help to foster the creation of comfortable spaces. The following considerations have been included as part of the dwelling design:

3.3.1 Daylight Access

Daylighting systems are integrated throughout the internal and external areas as outlined by the design guidelines, to support the admission of natural light and direct sunlight throughout. This is achieved using awning features and promotion of shaped ceilings and skylights. An integrated daylight approach improves the wellbeing of the residents by creating a visually stimulating and productive environment. Additionally, the provision of daylight reduces the overall energy consumption of a Huntlee house, as the natural light will alleviate the need for artificial lighting whilst the direct sunlight will enhance thermal comfort during cooler months.

3.3.2 Indoor Air Quality

Maintaining adequate indoor air quality within the dwellings is vital to the health and wellbeing of all occupants. Natural ventilation is highly encouraged and promoted per the design guidelines.

3.3.3 Material selection

Materials selection aims to improve the internal environment of the precinct's houses with materials with low volatile organic compound and formaldehyde content preferred to help minimise respiratory issues for community residents.

3.4 Water Efficiency

Water efficiency has been addressed through an effective management plan within the development, which includes initiatives throughout aimed at lowering potable water demand and associated energy consumption. By integrating on-site systems, this will promote biodiversity as an additional benefit. Furthermore, the provision of a precinct recycled water system will ensure that the site is able to use non-potable water supplies for things like irrigation and toilet flushing preserving our water supplies during times of drought.

3.4.1 Water Sensitive Urban Design

This precinct design has a water sensitive urban design to reduce the demand on potable water, treat urban stormwater and redirect stormwater into the urban landscape to improve facilities. A bio-basin system will provide on-site treatment of stormwater and is designed as a protective measure for the environment. The advantages linked to this system include enhancing the well-being of local ecosystems through nutrient provision to plants, fostering biodiversity, reducing land erosion, and enhancing water quality by mitigating the influx of pollutants into water bodies. The system demonstrates climate resilience with more protection from extreme weather events like floods, promoting a forward-thinking approach, and can be a cost-effective solution. Additionally, Water Sensitive Urban Design can help maintain a sustainable groundwater supply for the community and its needs.

3.4.2 Rainwater and stormwater capture and reuse

This precinct will investigate a system to recycle rainwater through finding ways to collect, store, filter and distribute rainwater to offset most of the sites potable water usage throughout the precinct. This rainwater will then be repurposed for irrigation and sprinkling systems, use in toilets and for the washdown of vehicles and equipment, consequently reducing the demand on water-supply systems. As per the design guidelines, driveways in Huntlee will have stormwater pipes for an irrigation system which will protect the ecosystems and conserve the water resources in the precinct.

3.4.3 Improved Ecology

A well- designed precinct landscape featuring a selection of native grasses, shrubs and trees will promote the biodiversity of insects and native birds through the creation of wildlife corridors and habitat provisioning. This vegetation plan incorporates drought tolerant plants beneficial in minimizing water usage. Consequently, the design actively contributes to conservational efforts within the urban environment, encouraging positive interactions between people and nature whilst also minimizing the ongoing environmental impact of the precinct.

To preserve the existing creeks and their ecosystems, the precinct management has implemented riparian barriers. These barriers serve as a buffer zone between urban areas and natural waterways. Riparian barriers are known for their significant ecological benefits, as they create a natural filtration, protection, and stabilization system, ultimately fostering a more enriched corridor for aquatic wildlife and flora.

3.4.4 Conservation of land

Consideration has been given to promoting positive land use and biodiversity beyond the primary project site. The significance of preserving native flora in areas adjacent to the development zone, but external to the project site, has been acknowledged. This recognition is reflected in the creation of a responsive plan, designating 780 hectares as a conservation area. Comparatively, this is nearly four times the 200 hectares allocated to the town centre. A dedicated park for the Persoonia Pauciflora, a plant native to the Hunter Valley region and critically endangered, and a comprehensive management plan has been established to ensure ongoing maintenance efforts. These provisions safeguard the existing flora and fauna from ongoing and future developments, as the population and human activity increases in the precinct.

3.4.5 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 precinct. Currently, Huntlee's local council Cessnock aims to achieve a 70% diversion of waste from landfill. The precinct will investigate achieving a diversion rate at a higher level and ensure that the design guidelines specify a consistent rate to operate across both the Cessnock and Singleton LGAs. The following are being considered as part of the design process.

3.4.6 Waste Management Plan

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

1. To minimise the environmental impacts of the operations in the precinct, particularly within the commercial and community areas
2. To minimise the impact of the management of waste within the precinct
3. To ensure waste is managed to reduce the amount landfilled, diverting at least 70% from landfill and to minimise the overall quantity generated.

These objectives will be achieved through strategies such as the integration of recycling bins and waste separation areas, which will encourage recycling and separation of cardboard/paper waste, glass, food waste and comingled recycling and general waste. The precinct will also look at ways in which to encourage local recycling and reuse initiatives within the community.

3.4.7 Separated Waste and Recycling Streams

The provision of separated waste and recycling streams in open areas will allow for more effective recycling of the precinct's operation waste, particularly given the higher culpability of these areas, such as the town centre and education spaces. Providing separate bins for cardboard/paper waste, glass, food waste, comingled recycling and general waste improves the precinct's operational efficiency and results in significant environmental benefits.

3.5 Transportation Plan

As a new community, the precinct management will employ a Green Travel Plan to encourage public transport use via a bus connection strategy. This strategic approach aims to connect the wider community to recreational open spaces, local community facilities, and commercial centres. Additionally, the plan proposes accessible walking and cycling pathways throughout the town centre and parklands, reducing reliance on motorized transportation, enhancing community connectivity, and providing more recreational opportunities. This initiative also improves overall accessibility.

To encourage public transport use, bus routes within the precinct will be designed to have bus stops within a desirable walking distance, ranging from 400 to a maximum of 800 meters from each lot. These measures, coupled with integration into the existing Hunter Valley bus network, and plans to advocate

for increased passenger services and a direct link from Huntlee to the Branxton Station in the future, contribute to minimizing emissions from car usage and establishing connections with the broader region and intercity train network.

Furthermore, the precinct has provisions for electric power capability onsite, which will ensure the community is ready, and easily able, to adapt to Electric Vehicle charging stations in the future as it evolves, and its population grows. By doing so, the masterplan is actively working to minimise its contribution to fossil fuels, promoting a cleaner living environment.

3.6 Green Infrastructure

Green infrastructure is integrated into the precinct to provide urban cooling, slowing, and filtering of rainwater, climate resilience, strengthen biodiversity and improved community nature connection. As mentioned above, the implementation of a bio-basin system holds benefits beyond being a natural process of filtering stormwater. Bio-basins have been proven to be a versatile filtration system that provides a habitat for wildlife and is a simple way to introduce more nature into the precinct. Moreover, the preservation and establishment of natural corridors along riparian zones prove beneficial by connecting and harmonizing green and blue grid spaces. This connectivity not only supports ecological health but also enhances overall resilience within the region.

In addition to planting street trees throughout the estate, which help to combat the urban heat island effect and provide cleaner air, the precinct demonstrates considerate plant selection through its vegetation plan. These plants will not only be native, but endemic and drought-tolerant, allowing for less water usage and a readily adaptable environment.

4. Conclusion

This report has addressed the ESD to support the SSDA for the Town Development located in the Hunter Valley Region.

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

- High-performance dwellings with mindful building design and fabric selection for the approximate 5000 residential lots in Stage 2;
- Future capacity and anticipation of renewable energy sources through considerate dwelling roof area design with Solar PVC system capabilities;
- Future provisions for installation of EV charging around the town;
- Water usage meters and efficient plumbing fittings and fixtures within dwellings, commercial and educational buildings on-site;
- Promotion of native landscaping and site biodiversity;
- Promotion of green travel through local bus networks, walking and cycling pathways;
- Cluster community development through town centre parks and sport centres;
- Use of low to zero VOC content materials;
- Water efficiency targeted through WSUD which will additionally improve and maintain local ecology;
- Transport planning to connect the community with the broader region;
- Waste management and minimization strategies;
- Use of light-coloured roofing and roof material limitations to reduce the impact of the urban heat island effect for its dwellings.

Overall, through the implementation of the initiatives noted within this report clearly demonstrates the precinct's commitment to ESD principles throughout its design, construction, and operation as a whole. Additionally, the town's design team has worked to optimize the residential lot's energy performance, address key climate related risks posed to the site, aligning it to the NSW Government's commitment to carbon neutrality by 2050.