Liverpool Civic Place Phase B BtR

ESD Report

52 Scott Street, Liverpool NSW

Project No.	P00983
Revision	4
Issued	16 April 2024
Client	Built Development Group Pty Ltd

E-LAB Consulting

Where science and engineering inspire design.

DOCUMENT QA AND REVISIONS

ISSUE	DATE	COMMENTS	ENGINEER	REVIEWER
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3	16/04/2024	Issue for SSDA	GB	GB

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Authorised by:

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Sustainability

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EXECUTIVE SUMMARY

Engineering Lab Pty Ltd (E-LAB Consulting) has been commissioned by Built Development Group Pty Ltd to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application (SSD-62367962) for the proposed build-to-rent development at 52 Scott Street, Liverpool NSW.

This report presents a summary of the ESD strategies proposed and commitments made for the development. The developer is aiming to deliver a high-quality build to rent development to cater for the significant increase in demand for residential dwellings.

As part of its commitment to sustainability, the development has committed to the following:

- Exceeding with **BASIX Energy, Water and Thermal Comfort Targets**
  - 61% Energy (Target 61%)
  - 41% Water (Target 40%)
- A **5 Star Green Star Design & As Built v1.3 certified rating**
- Provision of substantial **communal space** for occupant amenity

The strategies and initiatives presented in this report demonstrate a strong commitment to sustainability in line with the Liverpool City Council development guidelines and SEARS requirements and are to be further developed during subsequent stages of the project.

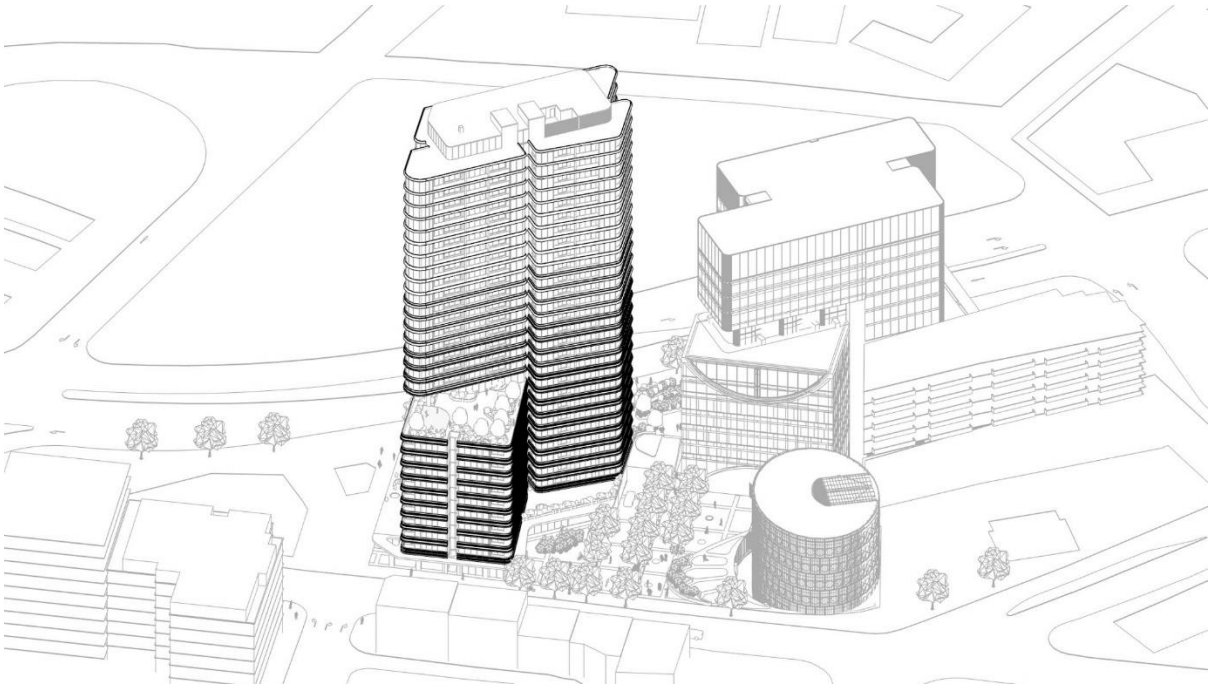


Figure 1: Proposed Development Axonometric (source: Scott Carver)

1 INTRODUCTION

This ESD Report is submitted to the Department of Planning, Housing and Infrastructure (DPHI) on behalf of Built Development Group (Built) in support of a State Significant Development Application (SSDA) for a build-to-rent residential development within Phase B of the Liverpool Civic Place development located at 52 Scott Street, Liverpool. It follows the lodgement of a concurrent Amending DA (DA-72/2024) that seeks to allow for residential flat buildings and shop top housing uses to be permitted in the Phase B envelope through amending the approved Concept DA (DA-585/2019) which establishes the land uses, building envelopes, public domain and a multi-level common basement across the site.

The full Liverpool Civic Place site subject to the Concept DA is shown in Figure 2, however the scope of this SSDA is limited to Phase B, which is illustrated in Figure 2.

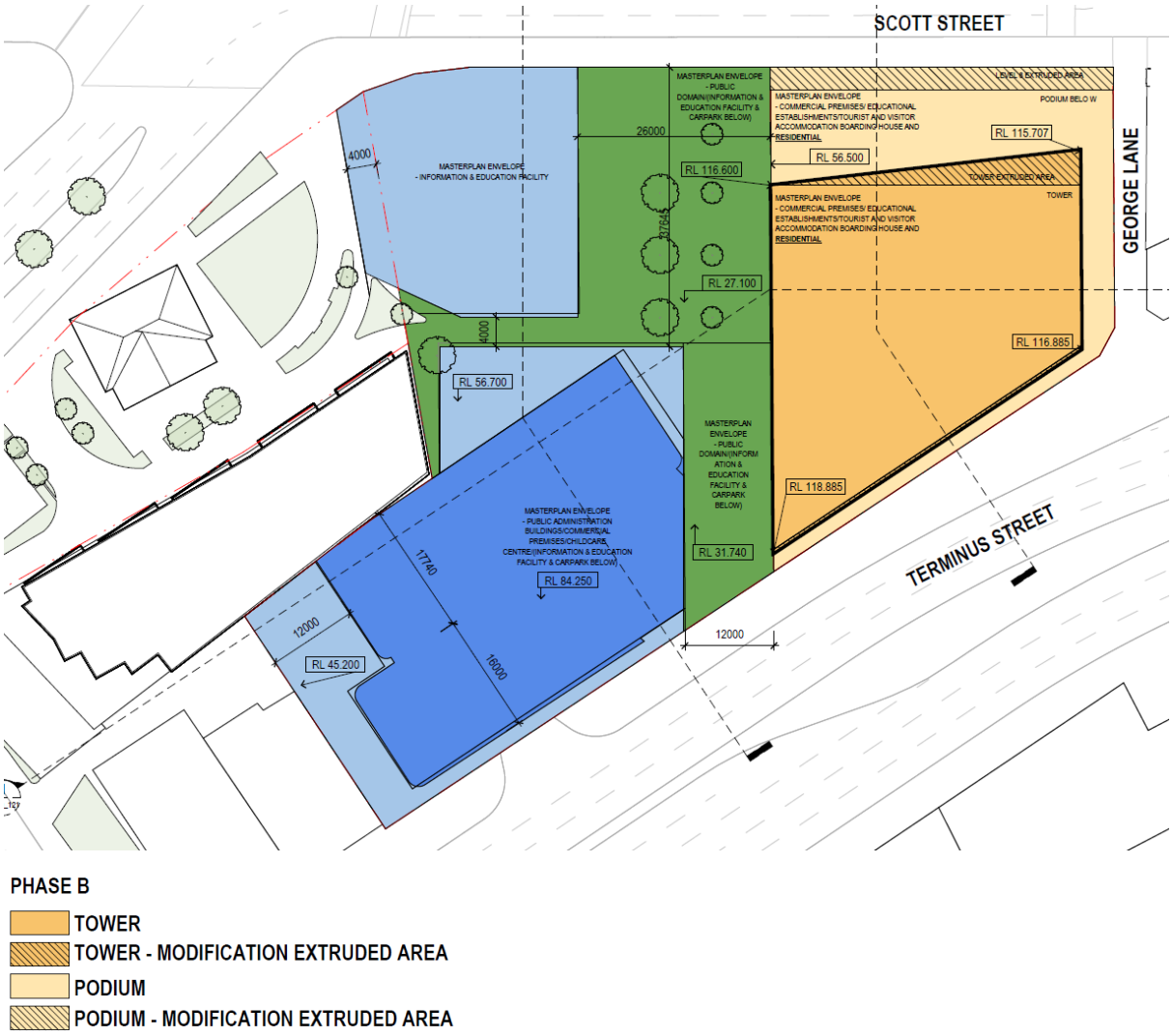


Figure 2: Liverpool Civic Place Master Plan site (as proposed to be amended by DA-72/2024) (source: Scott Carver)

This SSDA seeks approval for:

- Construction and use of a 29 storey build-to-rent residential development, comprising:
  - 320 dwellings;
  - ground floor lobby and retail tenancies;
  - internal amenity spaces throughout the building to service the build-to-rent residential use; and
  - Upper ground, level 9 podium rooftop and tower rooftop communal open spaces.

- Construction and use of three basement levels;
- Landscaping and public domain works; and
- Extension and augmentation of services and infrastructure as required.

This DA reflects the staged planning approval pathway for the Liverpool Civic Place redevelopment which has included four previously approved DAs and one DA currently under assessment, as outlined below:

Concept DA (DA-585/2019)

The planning approval pathway for the Liverpool Civic Place development commenced in 2019, with the submission of a Concept DA for the Liverpool Civic Place master plan. On 31 August 2020, the Concept DA (DA-585/2019) was approved by the Sydney Western City Planning Panel. The Concept DA consent sets out the future development concept of the site, including the approved land uses, building envelopes, an expanse of public domain and a common basement. The Concept Proposal / Stage 1 DA did not approve any physical works.

Amending DA (DA-72/2024)

An Amending DA has recently been submitted to Council and is currently under assessment. This Amending DA seeks consent to allow for residential flat buildings and shop top housing uses to be permitted in the Phase B envelope, as well as to slightly extend the Phase B envelope to allow for residential development to be accommodated in the envelope. The aforementioned proposed development will result in corresponding modifications to the abovementioned Concept DA Consent (DA-585/2019). The DA was submitted as the approved uses under DA-1080/2020 detailed under the relevant subheading below were determined to be unviable due to changed market conditions.

Early Works DA (DA-906/2019)

DA-906/2019 was approved by the Sydney Western City Planning Panel on 29 June 2020. The development consent relates to demolition of all structures, select tree removal and bulk earthworks including shoring through the use of piles. This involves approval to undertake earthworks and excavation of land at 52 Scott Street to a maximum depth of RL 10.35 to accommodate the required basement levels. The approved early works have been completed for Phase A of Liverpool Civic Place and are yet to commence for Phase B.

Phase A Detailed DA (DA-836/2020)

Development consent DA-836/2020 was granted by the Sydney Western City Planning Panel on 28 August 2021 for a detailed DA for the 'Phase A' part of the overall site. The proposed development relates to Phase A of the Liverpool Civic Place redevelopment for the construction and use of a public library, as well as a mixed use building containing commercial office floor space, and public administration floor space to be occupied by Council. The proposal also comprises significant public domain works, including a public plaza and part of the site's five level common basement. All the abovementioned works have been completed for this development and the buildings received an Occupation Certificate in October 2023.

Phase B/C Detailed DA (DA-1080/2020)

Development consent (DA-1080/2020) was granted on 5 May 2022 for a detailed development on the Phase B site, including the construction and use of a 27 storey commercial office building, and a 9 storey co-living building, comprising ground level retail floor space, a four level basement, and landscaping and public domain works. This consent has not been activated as none of the aforementioned works have been undertaken. Further, the approved uses under this development consent have been determined to be unviable due to changed market conditions.

1.1 SITE ANALYSIS

The site is located at 52 Scott Street, Liverpool within the Liverpool City Council Local Government Area (LGA), as illustrated in Figure 3. The site is located approximately 300m south west of Liverpool Railway Station and is also in the vicinity of a number of regionally significant land uses and features including Liverpool Hospital, Westfield Liverpool, Western Sydney University Liverpool Campus, the Georges River and Biggie Park public open space as illustrated in Figure 3.

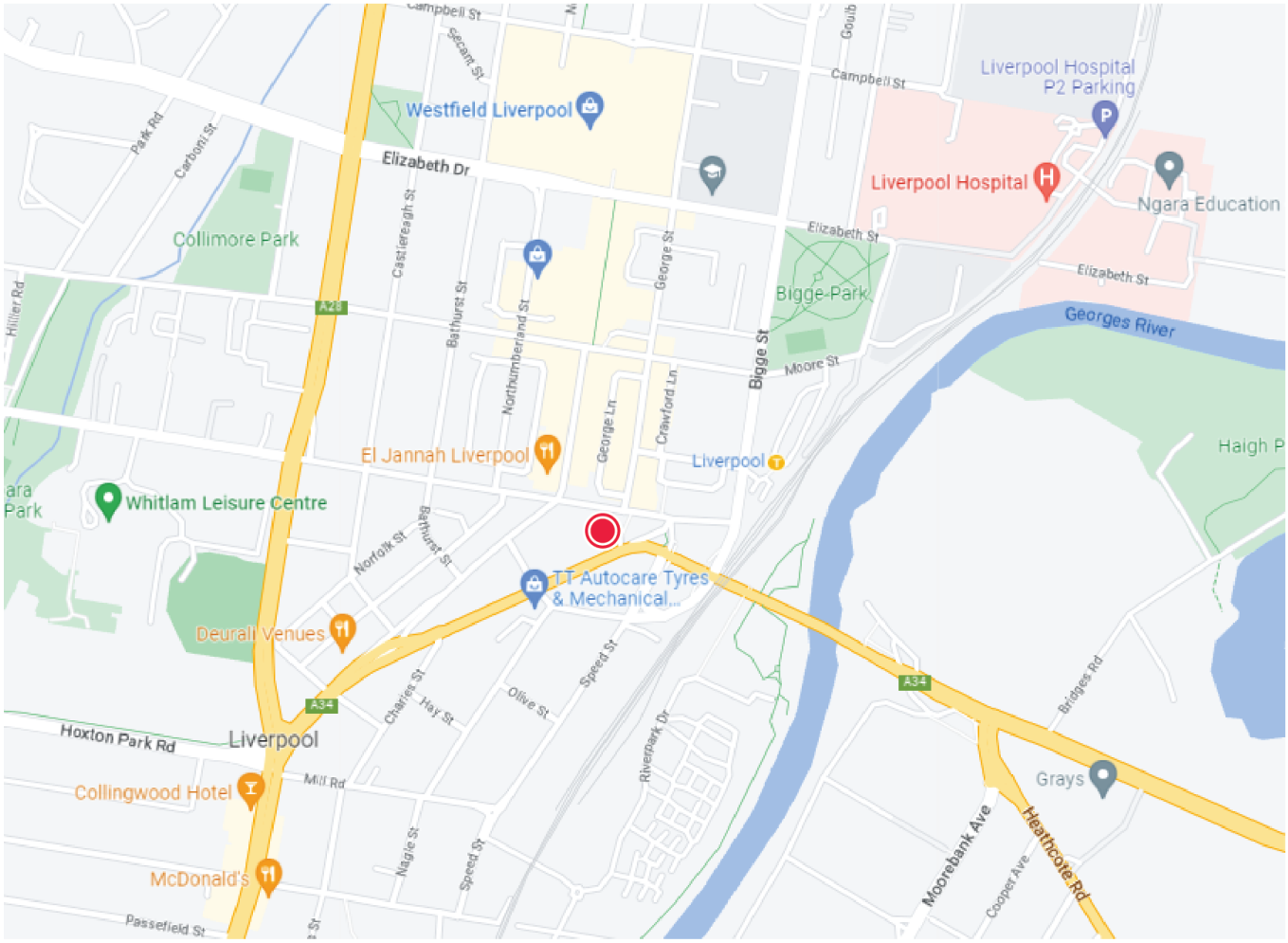


Figure 3: Site Location (source: Google Maps)

1.2 RESPONSE TO THE SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEARS)

This report outlines how the development will address the SEARs as part of the Environmental Impact Statement in support of the State Significant Development Application (SSD-62367962. These are:

REQUIREMENT	RESPONSE
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.	Refer to Section 3.1 for the projects response to the principles of the EPA regulation.
Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	Refer to Section 2.3 and the preliminary Green Star pathway demonstrating the development will achieve a 5 Star Green Star Design & As-Built level. Refer to the BASIX report by E-LAB Consulting for details of the developments BASIX performance targets and the exceedance.
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.	Refer to Section 3.10 for details on reduction of greenhouse gas emissions and net zero goal. Refer to Section 3.2, 3.3 and 3.4 for details on energy, water and materials. Additionally, refer to preliminary Green Star pathway depicting additional strategies in place.

2 SUSTAINABILITY FRAMEWORKS

The proposed development's sustainability outcomes are influenced by the following key frameworks:

- Liverpool Development Control Plan (DCP) 2008 & Liverpool Local Environment Plan (LEP) 2008
- State Environmental Planning Policy - Sustainable Buildings (SEPP) 2022
- To have energy efficiency in the design and operation of development proposals. This is done by:
  - Promoting the use of energy efficient principles in the design of a facility; and
  - Ensuring the ongoing operations of the facility incorporates energy minimisation measures.

This development aligns with the values outlined in the following:

- BASIX Energy, Water and Thermal Comfort Targets
- Green Star Design & As Built v1.3

2.1 LIVERPOOL DEVELOPMENT CONTROL PLAN (DCP) 2008

The Liverpool DCP 2008 outlines the multiple objectives for new developments in the Liverpool Council LGA along with sustainable development objectives that must be considered. The following listed objectives are specific objectives from the DCP and is not limited to the following list:

- To collect and use rainwater from roof tops to reduce town water consumption.
- To minimise erosion and reduce the volume of waste water entering waterways.
- Assist in improving the climate of the local environment.
- To maintain and enhance the biodiversity and natural ecology of Liverpool.
- Ensure that proposed developments or changes of land use will not increase the risk to human health or the environment.
- To reduce the necessity for mechanical heating and cooling.
- To minimise greenhouse gas emissions.
- To provide thermal comfort by minimising temperature variations within buildings.
- To restrict the reflection of sunlight from buildings to surrounding areas and buildings.
- To minimise waste produced during demolition and construction of new development and maximise resource recovery.
- To ensure waste management for the end use of the development is designed to provide satisfactory amenity for occupants and provide appropriately designed collection systems.
- To minimise ongoing waste to landfill and maximise recycling of ongoing waste.

2.2 STATE ENVIRONMENTAL PLANNING POLICY (SUSTAINABLE BUILDINGS) 2022

The NSW Government has introduced the State Environmental Planning Policy (Sustainable Buildings) 2022 to ensure new and renovated buildings are sustainable and resilient for future climate and bring NSW towards net zero emissions. As part of the SEPP the following is required to be addressed for this development as minimum:

COMPONENT	REQUIREMENT
Residential	BASIX Energy Target 61% BASIX Water Target 40% BASIX Thermal Comfort • Individual dwellings: Heating: 34.4, Cooling: 21.4, Total: 38.0 • Average all dwellings: Heating: 28.1, Cooling: 20.0, Total: 30.0 Embodied Emissions reporting via BASIX materials inputs The above requirements will be covered in the BASIX report by E-LAB Consulting

Refer to the following table for the project responses to each SEPP requirement.

REQUIREMENT	RESPONSE
General Sustainability – reporting on general performance, including water conservation, waste minimization and use of renewable energy.	The report outlines the general sustainability principles and design responses that are included. Refer to Section 3.1 and the Green Star pathway to confirm the overall sustainability practices. Refer to Section 3.3 for water conservation, refer to Section 3.4 for waste minimization, refer to Section 3.2 for energy. Refer to Section 3.10 for additional information.
Embodied Emissions Reporting – disclose at development application and construction certificate the quantities of materials and associated emissions. Describe how embodied emissions are minimised (by re-used or recycled content and low emissions construction technologies).	The development will declare materials for embodied emissions reporting through the BASIX tool and the Embodied Emissions Reporting Form. Once this benchmarking has occurred, the project team will investigate further methods of reducing embodied emissions through materials selections during design development. Refer to Section 3.4 for preliminary strategies in place to reduce emissions.
The minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials.	Refer to Section 3.4 which outlines minimisation of waste.
A reduction in peak demand for electricity, including through the use of energy efficient technology.	Refer to Section 3.2 which discusses reduction in electricity and energy through efficient strategies, systems and monitoring. Refer to Section 3.10 for additional information.
A reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design.	Refer to Section 3.2, 3.5 and 3.6 which outlines the design responses to reduce reliance on artificial lighting and mechanical systems to achieve visual and thermal comfort and reduce requirement of heating and cooling. Refer to Section 3.10 for additional information.
The generation and storage of renewable energy.	Refer to Section 3.2 which discusses the provision of a PV system and its associated generation and storage. Refer to Section 3.10 for additional information.

The metering and monitoring of energy consumption.	Refer to Section 3.2 which discusses energy metering and monitoring. Additionally, refer to Green Star pathway which depicts above and beyond metering and monitoring strategies.
The minimisation of consumption of potable water.	Refer to Section 3.3 which discusses the efficient systems in place to minimise water use and the strategies in place to recycle and re-use water throughout the development. Additionally, refer to Green Star pathway which depicts additional performance targets of minimisation of water consumption.

2.3 GREEN STAR DESIGN & AS BUILT V1.3

The development 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. The development will be targeting 5 Star Green Star Design & As Built v1.3 rating, by achieving ESD strategies in the nine categories identified in the Green Building Council of Australia's benchmarking tool:

- **Management** – Assesses the policies, procedures, targets, and strategies put in place to ensure buildings operate to their fullest sustainable potential.
- **Indoor Environmental Quality** – Creation of high quality indoor environments to increase productivity and occupant satisfaction.
- **Energy** – Implementation of strategies and actions to measure and reduce a building's operational energy use, reliance on grid energy supply, and the greenhouse gas emissions associated with grid energy consumption.
- **Transport** – Discouragement of single-occupant vehicle use and encouragement of the use of sustainable transportation modes such as public transport, walking, or cycling.
- **Water** – Reductions in potable water use through the efficient design of building services, water reuse and substitution with non-potable water sources such as rainwater or greywater.
- **Materials** – Consideration of issues such as sustainable procurement and purchasing (materials in) and the management of waste (materials out).
- **Land Use and Ecology** – Address the ongoing impact of building operations on local ecosystems by discouraging degradation and encouraging the restoration of natural environments whenever possible. Improvement of biodiversity through policies and management practices.
- **Emissions** – Minimise point source pollution from buildings and building services to the atmosphere and local waterways. Manage and minimise emissions from stormwater, light pollution, and refrigeration.
- **Innovation** – Use creativity and the pioneering application of new ideas and approaches in order to facilitate the progression of the facilities management sector towards more sustainable outcomes.

The project has been registered with the Green Building Council of Australia:

Project	Location	Status	Green Star Rating*	Final Score*	Date Certified	Rating Tool
GS-7356DA 44 Scott at Liverpool Civic Place	Liverpool NSW 2170	REGISTERED				Design & As Built v1.3

Figure 4: Project Registration with GBCA

A 5 Star Green Star Design & As Built v1.3 pathway has been developed for the development. A summary of the points targeted is presented in the table below.

CATEGORY	POINTS AVAILABLE	5 STAR POINTS TARGETED
Management	14	12
Indoor Environment Quality	16	9
Energy	22	7
Transport	10	10
Water	12	5
Materials	14	12
Land Use & Ecology	6	3.5
Emissions	5	4
Innovation	10	5
Total	**109**	**68.1**

Please refer to the Green Star Design & As Built Pathway for more detail into the credit requirements and responsible parties.

3 PROJECT DESIGN RESPONSE

3.1 EPA PRINCIPLES

The proposed development will follow the golden standard in sustainability principles throughout the development. This includes the design, construction, and operational elements of the project. The key overarching principles are aligned with the definition of Ecologically Sustainable Development as defined in Section 193 of the Environmental Planning and Assessment Regulation 2021. These include:

The Precautionary Principle:

Philosophy: Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Project Response: The project is committed to incorporating elements to minimise impacts on the environment, as outlined below in this section of this report. A commitment to improvement on minimum benchmarks demonstrates the development's commitment to sustainability with additional commitments to third party certification schemes to capture strategies that will prevent environmental degradation and serious or irreversible damage.

The Principle of Inter-generational Equity:

Philosophy: The present generation should ensure that the health, diversity, and productivity of the environment is maintained or enhanced for the benefit of future generations.

Project Response: The project is committed to incorporating careful selections into the project design. The design team will address key elements such as energy, potable water, and material consumption to do what is within the project's control to allow each following generation to have an opportunity for ecological equality.

The Principle of the conservation of biological diversity and ecological integrity:

Philosophy: Conservation of biological diversity and ecological integrity should be a fundamental consideration

Project Response: The project is committed to planting native vegetation and using integrated landscaping to enhance the overall ecological and biodiversity of the site. Rainwater and stormwater will be carefully managed and controlled to minimise impacts on surroundings. Additionally, through third party certifications the project will be able to utilise the strategies to improve biological and ecological standards.

Principles relating to improved valuation, pricing, and incentive mechanisms:

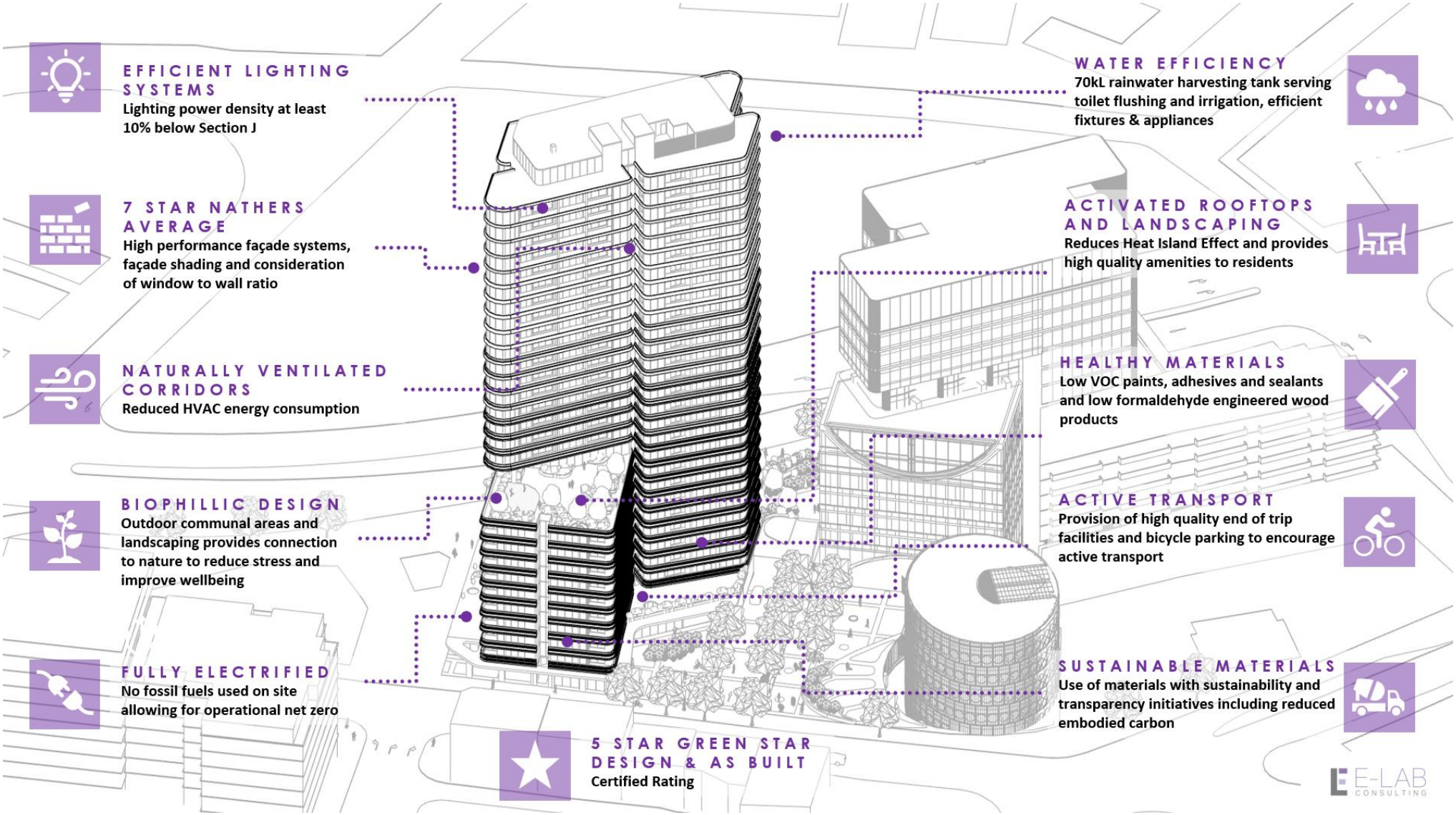
Philosophy: Environmental factors should be included in the valuation of assets and services. The users of goods and services should pay prices based on the full life cycle costs of providing goods and service.

Project Response: The project will target a construction waste diversion target of 90%, as well as develop specific project waste management strategies. These combine to ensure the project pays for the waste and damage it creates. Further, it is designed to be low-energy and low-water consumption, which provides an incentive for residents through lower utility bills.

The Principle of Waste Minimisation:

Philosophy: All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.

Project Response: The project will target a construction waste diversion target of 90%, as well as develop specific project waste management strategies. Construction materials are chosen to be low impact in their manufacture, including best practice PVC and FSC/PeFC timber throughout where possible. This impacts waste both created by the site, as well as upstream and downstream waste categories.


EFFICIENT LIGHTING SYSTEMS
Lighting power density at least 10% below Section J
7 STAR NATHERS AVERAGE
High performance façade systems, façade shading and consideration of window to wall ratio
NATURALLY VENTILATED CORRIDORS
Reduced HVAC energy consumption
BIOPHILLIC DESIGN
Outdoor communal areas and landscaping provides connection to nature to reduce stress and improve wellbeing
FULLY ELECTRIFIED
No fossil fuels used on site allowing for operational net zero
5 STAR GREEN STAR DESIGN & AS BUILT
Certified Rating
WATER EFFICIENCY
70kL rainwater harvesting tank serving toilet flushing and irrigation, efficient fixtures & appliances
ACTIVATED ROOFTOPS AND LANDSCAPING
Reduces Heat Island Effect and provides high quality amenities to residents
HEALTHY MATERIALS
Low VOC paints, adhesives and sealants and low formaldehyde engineered wood products
ACTIVE TRANSPORT
Provision of high quality end of trip facilities and bicycle parking to encourage active transport
SUSTAINABLE MATERIALS
Use of materials with sustainability and transparency initiatives including reduced embodied carbon
E-LAB CONSULTING

3.2 ENERGY

The only path to a low carbon economy and achieving a “2°C world”, where the average global temperature is kept to less than 2°C above pre-industrial levels, is through comprehensive and complete consideration of how the development consumes resources, including energy, water, and material efficiency.

The energy efficiency strategy generally follows the energy efficiency pyramid of design in Figure. In the first instance demand for greenhouse gases should be reduced. Consideration should be to remove the need for energy to be consumed where possible. Beyond this, energy can be more efficient, through efficient lighting, mechanical systems, and appropriate services.

Once the system has reduced all available energy-consuming elements and made the remaining systems as efficient as possible, renewable energy sources will be considered. Only after all the above steps have been completed should offsets be used to close the gap and achieve neutrality.

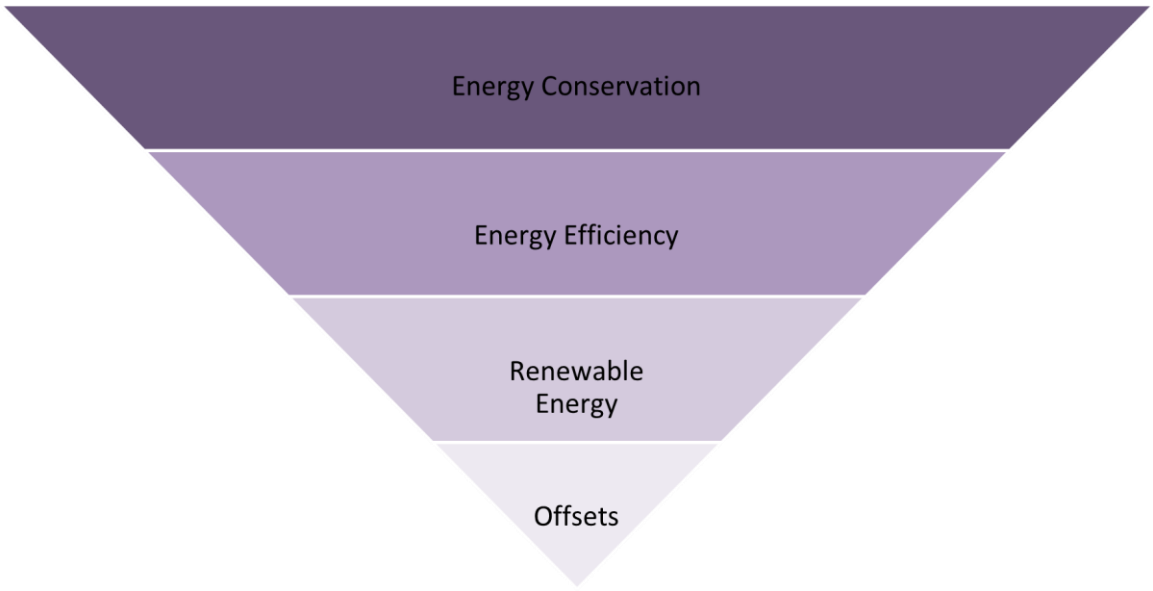
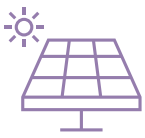


Figure 5: Energy efficiency pyramid: pathway to carbon neutrality.

To achieve the above, the following initiatives are proposed:



Renewable Energy – The roof area provides an excellent opportunity for installation of a solar photovoltaic system. The sizeable system will generate renewable electricity to offset grid use and minimise stress on the grid at peak times. PV will be installed at a rate that maximises the coverage of the non-trafficable roof area. This system size will be confirmed during design development.

Efficient Lighting Systems – High efficiency LED lighting throughout, including in common areas with efficiency controls to meet the requirements of BASIX and Green Star. Controls will include motion sensors, time clocks and zoned switching which will help reduce consumption of energy. Lighting power density to be at least 10% below Section J.

Controls, Energy Metering and Monitoring – Energy meters and monitoring systems will be provided to comply with NCC 2022 Section J Part J8 and Green Star requirements. Preference for natural ventilation and comfort through adaptive cooling and shading. Additional, metering and monitoring stringency will

be applied through Green Star to ensure occupants and building managers are able to understand how energy and water is consumed.

Facade – façade systems and shading systems will reduce load on the HVAC system with selection of insulation and glazing through new BASIX requirements. Aiming for 7 Star NatHERS average with consideration of window to wall ratio.

Hot Water – Hot water is likely to be provided by energy efficient heat pump systems. These systems are highly efficient which will allow occupants utilise systems often with reduced energy consumption.

Appliances & Equipment – Apartment appliances and equipment will be selected with high energy rating to ensure reduced consumption which will be in line with BASIX energy targets and Green Star requirements. Additionally, site will be fully electric with no gas combustion for ovens and cooktops allowing for operational net zero.

3.3 WATER CONSUMPTION

To achieve responsible water consumption and water sensitive urban design, best practice water-saving initiatives will need to be implemented throughout the project. The following initiatives will be explored to achieve the potable water targets:

Sanitary Fixtures – By implementing low-flow water fixtures, the consumption will be significantly reduced. All sanitary fixtures are to be provided with the minimum WELS ratings identified below:

Taps – 6 Star WELS

Toilets – 4 Star WELS

Showers – 4 Star WELS (<7.5 L/min)

Refer to the BASIX report by E-LAB Consulting for further details on residential water consumption measures.

Landscape Irrigation – Efficient irrigation systems will be considered, including underground surface drip systems, moisture sensors, and the use of native plants in the landscaping plan. Native plants have evolved to thrive in the Australian environment and are typically more resilient than their exotic counterparts. They typically require less water and are more likely to survive the predicted increase in extreme drought conditions due to climate change. Native vegetation also stores a significant amount of carbon, helping to mitigate climate change. The project will aim to use these strategies in the communal spaces with gardens and landscaping.

Recycled water and rainwater – the development will supply most of the irrigation needs and toilet flushing from an on-site rainwater tank with a provision of 70kL storage. Rainwater will be captured from the roof of the building to reduce potable water demand.

The development's design is deliberately working to reduce potable water consumption by in the first instance reducing water use, then offsetting it through rainwater tanks. The rainwater tanks are designed to meet as much of the site irrigation needs as possible.

3.4 MATERIALS

In line with the principals of sustainability outlined in the EPA, the project will have a significant focus on materiality which will be verified through the certified 5 Star Green Star Design & As Built rating. The scope of consideration includes the following action items within the project response:

- **Construction Waste** – 90% of construction and demolition waste is to be diverted from landfill. This diverts and ensures reuse or recycling of a high portion of site waste.
- **Low VOC and Low Formaldehyde Materials** – paints, adhesives, sealants, floor coverings, carpets and engineered wood will be selected appropriately to provide a healthier and low-impact environment. Such efforts provide a cleaner and better environment for all. Additionally, the project will aim to utilise ultra-low VOC paints.
- **Best-Practice PVC** – cables, pipes, flooring, and blinds will be selected and specified to be Best Practice PVC. This ensures upstream performance will be met and has significant benefit for the overall environment during the construction process.
- **Best Practice Steel** – Where possible, steel will come from a sustainable steel manufacturer, who has an action plan. Steel supplied will aim to have energy reducing processes in manufacturing and recycled content.
- **Sustainable Products** – Where possible, products selected for the project will be sustainable which are verified through recycled content, re-use, environmental product declarations, certifications and more. This will ensure reduced toxicity and improve environmental quality while reducing waste.
- **Waste Management Plan** – Development of an ongoing Waste Management Plan so waste can be sorted, separated, and recycled. This will assist ongoing diversion from landfill for the development. Inclusion of sufficient bins and appropriate separation systems to ensure waste is minimised and effective recycling.

3.5 COMFORT AND QUALITY

To ensure the best quality for users and visitors inside the space, the development will commit to the following key initiatives, in line with and certified to Green Star requirements:

- **Visual Comfort** – Maximising high-quality light into the living spaces, with views to the sky and nature where possible.
- **Indoor Air Quality** – Ventilation to be easily cleaned and elimination of pollutants to improve air quality within internal spaces.
- **Acoustic Excellence** – Designing the building layout to be protected from noise from external sources. Delicate material selection, acoustic attenuation, and designing the shape of the building and openings accordingly achieves the performance.
- **Thermal Comfort** – Appropriate mix of vernacular design, overhangs, adaptive comfort and high levels of insulation in the roof and facades.
- **Lighting Comfort** – Use of high colour rendering index (CRI > 80) LED lighting throughout the entire development. Low-glare lighting with baffles or louvres to limit UGR.
- **Generous Natural Planting –** Greenery through natural planting throughout the development assists in a connection to nature for users and passers-by. It also has a cooling effect, reducing the Urban Heat Island burden on the project. This will be applied in the communal spaces.

The above combine to ensure the development is responsible, efficient, beautiful, and in the best interest of not just the developers, but the residents, community, and society as a whole.

3.6 URBAN HEAT ISLAND MITIGATION

The site experiences the urban heat island much hotter than Sydney's baseline, so reducing heat at the local scale is critical.

The site's baseline heatwave temperature experiences peaks approximately 10.06°C above the baseline, as defined by the NSW government for Urban Heat Island Effect (https://geo.seed.nsw.gov.au/Public_Viewer). This is considered the hottest category which will have negative impacts to the development.

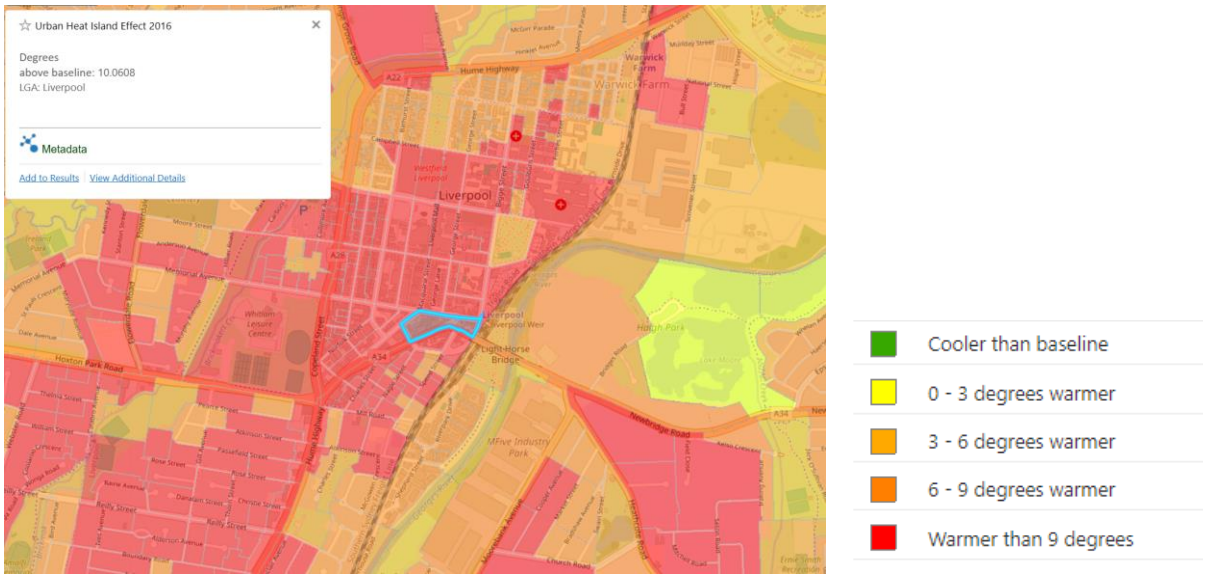


Figure 6: Urban heat island effect at the site. (Source: SEED Database)

To minimise the urban heat island effect and provide a more comfortable environment for occupants, the development has incorporated the following initiatives:

- Retention and additional planting of trees providing tree canopy.
- Outdoor communal spaces with landscaping, gardens and lawns to provide additional vegetation.
- Light coloured materials selected for roofs and facades where possible.
- Introduction of architectural elements and shading where possible.

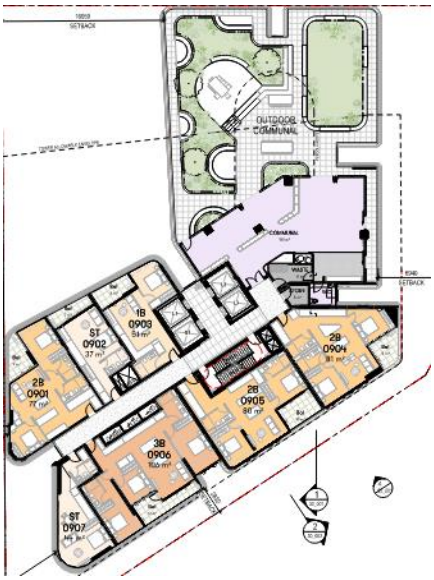


Figure 5: Upper Ground Level (source: Scott Carver)

3.7 BASIX

The proposed apartments and residential communal spaces will be subject to compliance with the Building Sustainability Index (BASIX) which applies to all residential dwelling types within NSW. This planning measure applies stringent requirements on building envelope, water consumption and energy consumption.

The project will demonstrate compliance through a variety of strategies as listed within this report. The BASIX assessment along with thermal comfort modelling will be undertaken and reported within the BASIX Report by E-LAB Consulting. The development is currently achieving the following BASIX outcomes:

- 61% Energy (Target 61%)
- 41% Water (Target 40%)

3.8 SECTION J

The proposed retail areas of the development will be subject to compliance with Section J under the NCC 2022 code. This code places strict environmental performance requirements on the building envelope and services within the building.

The project will demonstrate compliance via verification method J1V3 – verification using a reference building (energy modelling). The design of the building fabric will need to demonstrate compliance with this clause through dynamic modelling of the building against a reference case. This report will be developed when necessary and indicate the building fabric requirements.

3.9 SUSTAINABLE TRANSPORT

The development provides easy access to the bus network with bus stops located close by, additionally, the Liverpool Station is a short walk away providing rail and bus route options connecting to Sydney's extensive public transport network. Scott Street where the development's frontage is, is a bike friendly road which leads to dedicated bike lanes and other paths. The development is also electric vehicle infrastructure ready which will be applied once demand is required.

The development is located within close proximity to amenities such as:

- Grocery stores including Woolworths and Coles
- Abundant dining and café options
- Banks
- Newsagents and post office
- Medical centres, chemists and hospitals
- Local parks and green spaces
- Etc

3.10 NSW NET ZERO GOAL

The development is actively aiming to adhere to the Government's goal of net zero emissions by 2050 through a range of strategies discussed above. The approach to minimising greenhouse gas emissions should always follow a reduction first – outcomes-based approach to decarbonisation which in turn will provide an approach to net zero emissions. This approach generally involves:

- Avoid: Identify carbon intensive activities and sources that can be avoided or eliminated from the development.
- Reduce: Reduce the carbon intensity of activities and sources through improved technology or process.
- Transition: Transition to renewable electricity.

Following this structure the development has incorporated a range of strategies to minimise greenhouse gas emissions which involves:

- Elimination of gas combustion on site allowing the development to be fully electric. This will allow the development to be net zero ready for when the grid transitions or potential to run fully on renewable energy in the near future.
- HVAC systems to be considered with low impact refrigerant plants and equipment to reduce emissions to the atmosphere.
- Energy consumption reduction through passive design elements. These include architectural shading and projection elements allowing shading and reduced heat transfer through glazing, cross-ventilation introduced for natural cooling and additionally, naturally ventilated corridors and circulation spaces to reduce the need for mechanical ventilation and air-conditioning.
- High performing façade designs involving bespoke glazing and insulation selection allowing for apartments to be 7 Star NatHERS rated which in turn reduces energy consumed for heating and cooling of spaces.
- Efficient lighting systems and selections will reduce the consumption of energy through time clocks, zone switching, occupant sensor and more. Additional BMS controls for metering and monitoring will allow for active consumption monitoring allowing the development to adapt and implement strategies to reduce energy consumption during operation.
- Activated roof top with approximately 370 sqm of space for solar photovoltaic panels. This system will provide the development with renewable energy aiding the transition to renewable energy sources and be an active member in providing renewable energy.

4 CONCLUSION

This report developed by E-LAB Consulting for Built provides an outline of the proposed development's Ecologically Sustainable Design initiatives and commitments which responds to the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application (SSD-62367962). This development is the second stage of Liverpool Civic Place and is a proposed build-to-rent tower at 52 Scott Street, Liverpool NSW.

The ESD strategies proposed will assist the development in achieving high levels of sustainability and environmental performance. These strategies include:

- Compliance with BASIX Energy, Water and Thermal Comfort Targets
  - 70% Energy
  - 40% Water
- A 5 Star Green Star Design & As Built v1.3 certified rating
- Provision of substantial communal space for occupant amenity
- Commitment to meeting the new requirements of SEPP 2022
- Compliance with requirements for NCC/BCA Section J 2022
- Following a range of sustainability initiatives across the site spanning energy efficiency, thermal performance, indoor environment quality, waste management, and comfort

The strategies and initiatives presented in this report demonstrate a strong commitment to sustainability in line with the Liverpool City Council development guidelines and SEARS requirements and are to be further developed during subsequent stages of the project.

Appendix A **Green Star Pathway**

Green Star - Design & As Built Scorecard

Project:	LCP Build to Rent
Targeted Rating:	5 Star - Australian Excellence

16/04/2024

Core Points Available	Total Score Targeted 5 STAR
99	68.1

NA	CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED 5 STAR	RESPONSIBILITY	COMMENTS
	Management				14			
	Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.1	Accredited Professional	1	1	BDG	E-LAB engaged as GSAP
	Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets	-	Complies	ESD	A project specific Design Intent Report will be developed.
			2.1	Services and Maintainability Review	1	1	HEAD CONTRACTOR	Services and maintainability review to be led by Head Contractor
			2.2	Building Commissioning	1			Not targeted. Commissioning per CIBSE codes. Rquires air tightness testing for 10% of buildings total envelope area
			2.3	Building Systems Tuning	1	1	BDG	Rquires commitment to 12 month Building Tuning Period and included in Head Contractor engagement.
			2.4	Independent Commissioning Agent	1			Not targeted. ICA to be engaged from design phase through to construction completion.
	Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan	2	2	ESD	Climate Adaptation Plan to developed with stakeholder engagement. All high and extreme risks identified and actions taken.
	Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information	1	1	HEAD CONTRACTOR	All subcontractors to provide O&M information in line with GS requirements and provided to facilities management. Building Log Book to be developed in line with CIBSE TM31. Building Users Guide to be developed & to be provided to building users.
	Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance	1	1	BDG / OPERATOR	Operator must set and measure two environmental performance metrics e.g. energy and water
			5.2	End of Life Waste Performance	1	1	BDG / OPERATOR	Operator to commit to extening the life of interior fitout & finishes to at least 10 years via selection of high quality FF&E.
	Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering	-	Complies	ELECTRICAL HYDRAULIC MECHANICAL BMS	Metering for distinct uses and any items that exceed 5%/100kW of total energy use and 10% of water use. Meters to be commissioned to NABERS validation protocols and produce alerts if inaccuracies are found. Smart meters to individual apartments
			6.1	Monitoring Systems	1	1	BMS	Monitoring strategy to be developed and BMS to be able to read all meters, record data, produce alerts
			7.0	Environmental Management Plan	-	Complies	HEAD CONTRACTOR	Head Contractor to develop best practice Environmental Management Plan for the project.

Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.1	Environmental Management System	1	1	HEAD CONTRACTOR	Head Contractor to be ISO14001 certified
		7.2	High Quality Staff Support	1	1	HEAD CONTRACTOR	Head Contractor to provide mental and physical support to staff, provide training on core concepts of sustainability
Operational Waste	B. Prescriptive Pathway	8B	Prescriptive Pathway: Facilities	1	1	WASTE CONSULTANT	Operational Waste Management Plan to be developed by Waste Consultant and implemented in design. Elephants Foot engaged as waste consultant.
Total				**14**	**12**		

Indoor Environment Quality				**16**			
☐	**Indoor Air Quality**	To recognise projects that provide high air quality to occupants.	9.1 Ventilation System Attributes	1	1	MECHANICAL	Ventilation systems designed to ASHRAE 62.1, have adequate access to both sides of heating & cooling coils, humidifiers & filters. Ductwork to be covered on site. Per GBCA FAQ, FCUs can have access to one side only.
☐			9.2 Provision of Outdoor Air ☑ ☐ ☐	2			Not targeted.
☐			9.3 Exhaust or Elimination of Pollutants ☐ ☐	1	1	MECHANICAL	Any print/photocopy equipment to comply with GS emissions guidelines or located in enclosed room. F&B kitchens to be ventilated in accordance with AS 1668.2:2012 & provide dedicated exhaust riser to car park.
☐	**Acoustic Comfort**	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1 Internal Noise Levels	1	1	ACOUSTIC	Internal noise levels no more than 5dBA above lower figure in AS/NZ 2107:2016. Testing required at completion.
☑			10.2 Reverberation	0			Not applicable for residential projects
☐			10.3 Acoustic Separation	1			Not targeted
	Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0 Minimum Lighting Comfort	-	Complies	ELECTRICAL	Flicker free lighting & CRI >80% and 12-bit or greater resolution.
☐			11.1 General Illuminance and Glare Reduction: 11.1.1 General Illuminance ☑ ☐ / 11.1.2 Glare Reduction ☐ ☐ ☐	1	1	ELECTRICAL	Best pactice lighting levels in line with AS/NZS 1680.2 to be achieved. Isolux calcs to be provided. / All luminaires to have diffusers or meet UGR values of AS 1680.1
☐			11.2 Surface Illuminance ☐ ☐ ☐	1			Not targeted. Requires at least one wall in each living space, kitchen and bedroom to have wall washing or wall mounted fitting.
☐			11.3 Localised Lighting Control	1			Not targeted. Provision of sufficient power outlets for provision of future task lights/lamps and appropriate task lighting for kitchens, bathrooms etc.
	Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0 Glare Reduction ☑ ☐ ☐	-	Complies	ARCHITECT	Blinds, screens, shading to be provided to control glare. Blinds required to living areas only in apartments.
☐			12.1 Daylight ☐ ☑ ☐	2	1	ESD	40% of area to have high levels of daylight.
☐			12.2 Views	1	1	ESD	60% of area to have high quality views
☐	**Indoor Pollutants**	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets: 13.1.1 Paints, Adhesives and Sealants ☐ ☑ ☐ / 13.1.2 Carpets ☑ ☐ ☐	1	1	ARCHITECT HEAD CONTRACTOR	Paints, adhesives, sealants to comply with VOC limits. / Carpets to comply with VOC limits.
☐			13.2 Engineered Wood Products ☑ ☐	1	1	ARCHITECT HEAD CONTRACTOR	Engineered wood to comply with formaldehyde limits.

Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	☑	1	1	ESD ARCHITECT	7 Star average NatHERS rating required. Requirement as part of higher BASIX targets now.
		14.2	Advanced Thermal Comfort	☑	1			Not targeted. Requires 8 Star NatHERS rating.
Total					**16**	**9**		

Energy					**22**			
Greenhouse Gas Emissions	B. NatHERS Rating Pathway	15B.0	Conditional Requirement: NatHERS Pathway	-	Complies	ESD	Units must achieve 0.5 stars above minimum NatHERS rating	
		15B.1	Thermal and Energy Performance		6	1	ESD	10% Improvement in average MJ/m2 in NatHERS modelling.
		15B.2 Building Services and Appliances	15B.2.1 Lighting		1	1	ELECTRICAL	Lighting power density 10% below J6.2a. Independent switching to each area. Common areas to have lighting control system with occupant detection
			15B.2.2 Ventilation and Air Conditioning		2	2	MECHANICAL	Rated heating or cooling capacity does not exceed the design heating or cooling load by more than 15%.
			15B.2.3 Domestic Hot Water		2			Requires solar thermal DHW
			15B.2.4 Appliances & Equipment		1	1	ARCHITECT	Fridge/freezers, dishwashers, clothes washers and clothes dryers to be minimum 1 star below the maximum energy star rating available for that appliance type and capacity
			15B.2.5 Fuel Switching		1			No fossil fuels burned on site to generate electricity, heating or cooling. 15% of energy required by building to be generated by on site PV. Not targeted as outdoor communal area shown to roof.
			15B.2.6 On-Site Storage		1			Not targeted
			15B.2.7 Vertical Transportation		1	1	VERTICAL TRANSPORT	Requires lift energy efficicnecy to be class A or B (ISO 25745-2), lift idle and standby performance level is 1 (ISO 25745-2).
			15B.2.8 Passive Laundry Facilities		1	1	ARCHITECT	Each apartment provided with external drying balcony, already feature of design. Studios don't have balconies however will provide clotheslines to some to make up 95%.
			15B.2.9 Unoccupied Areas		1			Requires 95% of floor areas and car parks to be naturally ventilated
			15B.2.10 Off-Site Renewables		5			Not targeted. Requires GreenPower procurement for 50% of electricity for a period of 3 years. Note points are capped at 10 for this pathway
Peak Electricity Demand Reduction	A. Prescriptive Pathway	16A	Prescriptive Pathway: On-Site Energy Generation		1			Requires onsite PV to reduce peak electricity demand by at least 15% based on calculations according to AS/NZS 3000:2007. Not targeted as outdoor communal area shown to roof.
Total					**17**	**7**		

Transport				**10**			
Sustainable Transport	A. Performance Pathway	17A	Performance Pathway	10	10	TRANSPORT CONSULTANT	Green Travel Plan to be carried out for development based on Stage 1. Include bicycle facilities, EV chargers, location to public transport etc. PTC engaged as transport consultant, to be engaged to do GTP.
Total				**10**	**10**		

Water							
				12			
Potable Water	A. Performance Pathway	18A	Potable Water - Performance Pathway	12	5	HYDRALUC ARCHITECT	Efficient taps & showers, rainwater tank for toilet flushing and irrigation. Closed loop fire test water system
Total				**12**	**5**		

Materials							
				14			
Life Cycle Impacts	A. Performance Pathway - Life Cycle Assessment	19A.1	Comparative Life Cycle Assessment	6	3	ESD STRUCTURAL	70% cumulative impact reduction in life cycle emissions compared to reference design. Use of concrete with 30% portland cement replacement.
		19A.2	Additional Reporting	☑ ☐ ☐ 4	3	ESD	Additional reporting for LCA.
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	-	Complies	STRUCTURAL	Steel sourced from responsible steel maker
				☐ 1	1	STRUCTURAL	Steel sourced from responsible steel fabricator and at least 60% produced using energy reducing processes.
		20.2	Timber	☐ ☐ 1			Not targeted.
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1	ARCHITECT HYDRAULIC MECHANICAL ELECTRICAL	Formwork, pipes, blinds, flooring, cables to meet best practice guidelines for PVC or do not contain PVC.
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	☐ ☐ ☑ ☑ ☐ 3	3	ARCHITECT HEAD CONTRACTOR	Selection of sustainable products. Steel & paints with EPDs, certified GECA/GreenTAg plasterboard, ECS/GreenTag carpets, etc.
Construction and Demolition Waste	B. Percentage Benchmark	22.0	Reporting Accuracy	-	Complies	HEAD CONTRACTOR	Waste contractors and facilities to hold compliance verification summaries
		22B	Percentage Benchmark	1	1	HEAD CONTRACTOR	90% of construction waste to be diverted from landfill.
Total				**14**	**12**		

Land Use & Ecology							
				6			
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	-	Complies	ESD	No endangered species on site
		23.1	Ecological Value	3	1.5	LANDSCAPE	Improvement of ecological value of site with landscaping.
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24.0	Conditional Requirement	-	Complies	ESD	Pre-existing site
		24.1	Reuse of Land	1	1	ESD	Greater than 75% of site was previously used.
		24.2	Contamination and Hazardous Materials	☑ 1	1	BDG	Comprehensive hazardous materials survey to be carried out. Any asbestos, lead or PCBs identified to be stabilised or removed in

		24.2	Contamination and Hazardous Materials	1	1	BDC	asbestos, lead or PCBS identified to be stabilised or removed in accordance with best practice guidelines.
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.1	Heat Island Effect Reduction	1			Not targeted. Expected to be challenging with rooftop communal area
Total				**6**	**3.5**		

Emissions				**5**			
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge	1	1	CIVIL	Post development stormwater discharge does not exceed pre development discharge.
		26.2	Stormwater Pollution Targets	1	1	CIVIL	Stormwater pollution reduction targets to be in line with Column B (80% TSS, 90% GP, 45% TN, 60% TP, 90% TPH, 90% Free oils). One Innovation point targeted
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies	-	Complies	ELECTRICAL	External lighting design to comply with AS 4282:1997. Calculations required.
		27.1	Light Pollution to Night Sky	1	1	ELECTRICAL	No uplighting. ULOR of all external luminaires to be <5%.
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28	Legionella Impacts from Cooling Systems	1	1	MECHANICAL	Waterless heat rejection system propsed.
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	1			Reduced environmental impact of refrigerants. Not targeted due to cost implications.
Total				**5**	**4**		

Innovation				**10**			
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process				
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30B	Market Transformation				
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks	10	3		Stormwater targets in line with Column B (1) Ultra Low VOC paints (1) Product Transparency & Sustainability (1)
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge		2		High performance site offices (1) Inclusive Construction Practices (1)
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star rating tools.	30E	Global Sustainability				
Total				**10**	**5**		

TOTALS	**AVAILABLE**	**TARGETED 5 STAR**
CORE POINTS	**99**	**62.5**

CATEGORY PERCENTAGE SCORE		63.1
INNOVATION POINTS	10	5.0
TOTAL SCORE TARGETED		68.1