

# Sustainability Management Plan

PLANS AND DOCUMENTS  
referred to in the PDA  
DEVELOPMENT APPROVAL

Approval no: DEV2024/1488/8

Date: 04/04/2025



Address: 67-69 Shore St East Cleveland  
Date Created: March 2025  
Developed By: Ecolateral Pty Ltd  
Version: 3

## Project information

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Planning Reference	
Dev reference number	DEV2024/1488
Permit Reference Number(s)	DABW412763021; DAMC412763221.
Relevant Clause 34	<p>Sustainability -Compliance Assessment.</p> <p>a) Submit to DA for Compliance Assessment, a detailed Sustainability Report, prepared by a suitably qualified person, in accordance with the approved Sustainability Report -Report for Compliance with the PDA requirements 5.4 The detailed sustainability report is to:</p> <ol style="list-style-type: none"> <li>i. detail how the sustainability initiatives will be achieved;</li> <li>ii. provide updated drawings showing location of infrastructure proposed as part of the sustainability initiatives (eg. Rainwater tanks, solar panels)</li> <li>iii. Provide modelling outputs demonstrating the proposed has               <ol style="list-style-type: none"> <li>1. A 10% reduction in embodied carbon.</li> <li>2. The energy demand for the common areas of the building are net zero emissions</li> <li>3. The thermal efficiency exceed the minimum NatHERS requirements.</li> </ol> </li> </ol> <p>b) Submit to EDQ IS evidence that a requirement of part a) of this condition have been met.</p>

The site	
Address	67-69 Shore St East Cleveland Qld
Development type	Residential Class 2
Number of storeys	Seven
Car parking	63 on ground floor
Number of dwellings	30
Number of non-residential spaces	nil

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Date: 24/03/2025



Details	
Basement	nil
Ground floor	Parking
1 <sup>st</sup> floors	4 Apartments plus common area including pool
2 <sup>nd</sup> – 7 <sup>th</sup>	6 Apartments
3 <sup>rd</sup> Floor	5 Apartments
4 <sup>th</sup> Floor	5 Apartments
5 <sup>th</sup> Floor	5 Apartments
6 <sup>th</sup> Floor	5 Apartments
Roof	Plant , Some recreational areas and Approx 48 x 455W solar panels. ( production approx. 105 kWh/day
Total site area	2,226 sqm
Gross floor area non-residential	215m
Gross Floor Area residential	10,479m <sup>2</sup>

**Sustainability Management Plan (SMP)**

This SMP is intended to demonstrate the approach that has and will continue be taken to the planning and construction of 67-69 Shore St East Cleveland. It demonstrates the inclusions, high level objectives and targets that will form the focus of the design and delivery.

Design development and documentation has undergone scrutiny and comment by Ecolateral, to ensure the inclusion of sustainable initiatives that focus on the natural capital of the land, a high level of passive design and the natural benefits offered by orientation and shading. As an extension to this, the SMP focuses on the more granular aspects of the construction, in particular, focusing on the impact of the materials, construction methodology and overall approach to the site waste and operational consumption.

A more detailed description of the initiatives that will respond to the objectives has been attached in the appendix. A.

Ecolateral will remain engaged throughout the project to act as a referral point and to ensure that the builder delivers as many of the initiatives as possible. At PC a final report will be prepared testifying to those initiatives achieved and to the extent of their achievement.

Evidence to be submitted as per Condition 34b) iii)



## 1. DEMOLITION

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Re-purpose and reuse of existing demolished structure

*Objective.*

Maximize the salvage material for reuse on site or off-site thus minimizing the material going to land fill.

*Target.*

Minimize the landfill contribution through an 80% reuse or re-purpose of any on-site structure or materials.

## 2. WATER

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Stormwater.

*Objectives.*

Manage stormwater so that the post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak ARI event discharge.

*Target areas.*

- Landscape irrigation
- Efficient fixtures
- Rainwater collection and reuse
- Water consumption of fire system testing

## 3. ENERGY

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Operational Energy

*Objectives*

- Use energy efficiently.
- Minimize total operating greenhouse emissions.
- Minimize energy peak demand through design including the use of, shading glazed surfaces, optimizing glazing to exposed surfaces, allocating space for solar panels
- Minimize associated energy costs.



NatHERS 6.5 star average

### Target areas

- NatHERS: ~~6 Star~~ average with 5-star minimum apartment performance
- Plug loads and other energy consumption
- Efficient onsite electricity generation
- Ceiling fans
- High insulation levels
- Owner education
- Solar array

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Date: 28/03/2025



## 4. INDOOR ENVIRONMENT

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### Indoor Environmental Quality

#### Objectives.

- To achieve a healthy indoor environment quality (IEQ) for building occupants using fresh air intake, cross ventilation, and natural daylight.
- To achieve maximum thermal comfort with minimal mechanical heating, ventilation and cooling.
- To reduce indoor air pollution by using low-toxic materials.
- To minimize reliance on mechanical heating, ventilation, cooling and lighting systems.

#### Target areas

- Maximise the opportunity for cross ventilation through good design
- Well-built structure, effectively sealed windows and doors, high performing plant, owner recitation of the heating and cooling daily cycle.
- Low Voc paints carpets, adhesives and sealants.
- Low formaldehyde engineered timber where present
- Condensation management encourages drying through the structure.

## 5. BUILDING MATERIALS

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### Sustainable Material

#### *Objectives.*

- To minimize environmental impact by using materials with a favorable lifecycle assessment.

#### *Target areas.*

- Reuse of materials and other recycled materials
- Embodied energy of materials – for example, concrete, steel, aluminium.
- Sustainable timber
- Design for disassembly
- Transport to and from site
- Suitability and fit for purpose
- Maintenance/durability

## 6. TRANSPORT

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### Low Energy Transport

#### *Objectives*

- To encourage walking, cycling and public transport (in that order) with supportive built environments.
- To minimize car dependency.
- To promote low-to-zero-emission-vehicle technologies and infrastructure

#### *Target areas.*

- Minimizing car parks for conventional vehicles
- providing bike storage
- car sharing where possible
- electric car charging
- improving pedestrian spaces.

## 7. WASTE MANAGEMENT

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*Manage waste generation and disposal*

*Objectives.*

- To minimise waste and encourage reuse and recycling during design, construction and operation.
- To ensure long-term reusability of building materials.
- To allow sufficient space for future waste management changes, including (where possible) composting and green waste facilities.

*Target areas.*

- Plans for construction waste management and operations waste management
- Access and storage for recycling and green waste
- Section 3/4 of the NSW Environmental Management Systems Guidelines 1998 or 2007
- ISO14001 Environmental Management System

## 8. URBAN ECOLOGY

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*Create a healthy and mindful space*

*Objectives*

- To protect and enhance biodiversity within the municipality.
- To provide environmentally sustainable landscapes and natural habitats, while minimising the urban heat island effect.
- To retain significant trees.
- To encourage planting of indigenous vegetation.
- To create space for productive gardens, particularly in larger residential developments.

*Target areas.*

- Green Spaces
- Biodiversity
- Minimize concrete exposed to unshaded sun
- Repurpose materials where available

## 9. BUILDING MANAGEMENT

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### *Objectives*

- To achieve best practice in building management by integrating sustainability from concept design through to occupation.
- To give future occupants the information they need to be able to run their buildings in the most efficient way.

### *Target areas.*

- All facets of the design and construction disciplines
- Contractor, Subcontractors Consults to focus on responsible design and execution and work cooperatively to minimise unnecessary waste or rework.
- Include owner's manual focusing on operational methodology

## 10. IMPLEMENTATION

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### *Engage with all parties to deliver a sustainable solution*

#### *Objective*

- To ensure a clear direction and plan to delivery sustainable outcomes is part of the planning
- Engage all the contributing companies and individuals in delivering a better performing building
- Implement what was planned
- Customise the inclusion to meet the need and desires of the resident s and community
- Delivery a resilient and fit for purpose building with a life cycle of 50 years minimum.
- Deliver evidence post construction of delivery

#### *Target Areas.*

- Construction management
- Value management changes
- Material use reduction
- Local product use where possible
- Minimisation of waste
- Maximisation of innovative approaches
- Engaged staff, contractors and subcontractors.









## APPENDIX A

Evidence to be submitted as per Condition 34b) iii)

## SUSTAINABILITY INITIATIVES 67 -69 SHORE ST EAST CLEVELAND





February 2025

Item	Element	Sustainability Initiative	Response	Responsibility	Stage	Check	Mapped to.	Benefits	Status	Carbon Reduction	SGC Goals Delivery
<b>Site Characteristics</b>											
1	Initial concept planning.	Brown field sites consider 1. On site structures 2. Existing established flora 3. Hard Stand	Reuse (on or off site) Recycle (on or off site) curbing, transport etc.	Developer/Architect/ planner	Pre Da.	Phase Select	5.4 PDA Construction waste reduction and Materials	Saving of materials, costs of replacement and reduction in natural capital use.	Complete	Y	
2	Community footprint. Special provision spaces.	Can the building accommodate the changing nature of human occupancy?	<ul style="list-style-type: none"> <li>• Accessibility requirements.</li> <li>• Community enhancement through cooperative initiatives.</li> <li>• Transport options</li> </ul>	Developer/Architect/ Marketer	Early	Phase Select	5.4 PDA Accessible Housing	Building provides internal amenities and some future proofing for the changing lifestyles a future climate.	Complete		
3	Stormwater	Minimise stormwater discharge through the following: + Water pervious hardcapping + Retain / re-estate vegetation, particularly deep-rooted trees + Implement water sensitive urban design principles + Consider the impact of climate change on stormwater discharge.	Manage stormwater so that the post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak ARI event discharge.	Architect / landscape Architect / Civil Engineer	Early	Phase Select		Stormwater can cause problems downstream when peak events cause flooding. It can also be a source of pollution when litter, sediment, nutrients and chemicals are washed into waterways.  Stormwater can be a valuable resource reducing water bills and improving	Complete	Y	
<b>Carbon/Energy</b>											
4	Embodied Carbon	<ul style="list-style-type: none"> <li>• Reused materials</li> <li>• Materials with recycled content</li> <li>• Materials with waste products</li> <li>• FSC / PEFC Certified timber</li> <li>• Climate Active Carbon Neutral Certification</li> </ul>	<ul style="list-style-type: none"> <li>1. Portland cement reduction across all concrete uses in the project.</li> <li>2. Minimize the use of steel reinforcement compared to a standard building</li> <li>3. FSC/PEFC Certified timber to be specified as preferred</li> </ul>	Architect / Structural Engineer / Interior Designer	Planning/ Design	Phase Select	5.4 PDA Materials choice  SEE APPENDIX A & B	Carbon emissions of a building are highest during the use phase, however as buildings become more efficient, the impact of the embodied carbon is becoming more significant. Materials with high embodied carbon include concrete, steel, bricks etc.	Included	Y	
5	Construction Management	<ul style="list-style-type: none"> <li>• 4. Construction Waste Management plan is implemented</li> <li>• Metering and monitoring of energy and water use (at a minimum) is implemented in the building.</li> <li>• Responsible construction practices are implemented</li> </ul>	<ul style="list-style-type: none"> <li>• Site to have an environmental management plan</li> <li>• Direct at least 80% of construction and demolition waste from landfill</li> </ul>	Contractor	Planning/ Design	Phase Select	5.4 PDA Construction waste reduction	The builder's construction practices have the potential to reduce project and provide opportunities for improved environmental and social outcomes. If site waste is not split on site then a waste management company who provides monthly reporting on separation and recycle of waste removed from site should be engaged to manage building waste.	Included	Y	
<b>Appliances/ Energy Generation</b>											
6	On-site Generation	On-site generation through PV system capable of providing off set for community power demands.	PV System capable of covering communal power use provided	Electrical Engineer	Planning/ Design	Phase Select	5.4 PDA Energy use reduction.		Included	Y	

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7	Energy use / Greenhouse Gas Emissions (Use phase)	<p>Low Energy Water heating (high efficiency electric instantaneous or heat pump) Provide a Home User Guide* to each apartment (VJ) Encouraging consistent with PDA requirements. Low Energy Appliances Block parking is provided for each apartment</p> <p>1. <b>High energy star rated appliances:</b>          Refrigerator - 4.5 star Energy Rating          Dishwasher - 4.5 Star Energy Rating          Dryer - 6 Star Energy Rating          2. <b>Pool pump(s)</b> should be 120% capable and run through out maximum irradiation times.          3. PV's ( see initiative 6)          4. <b>EV Charging capabilities.</b> Provide electrical board allocation for capability of every space to have 10A supply (visitor spaces included)          Provide conduit / cable trays to accommodate the electrification of 25% of the spaces          5. <b>Users Guide</b> ( see initiative 21)          6. <b>HWS</b> High Efficiency electronic instantaneous          7. <b>Encourage tenants</b> to purchase new or replacement appliances to meet energy star rating above if not provided by builder.</p>	Electrical Engineer / Architect	Planning / Design	Please Select	5.4 PDA Energy use reduction.	Buildings are currently responsible for 39% of Global energy / related carbon emissions, from energy needed to heat, cool and power buildings and the remaining 11% from materials and construction. Current industry trends are aiming for all new buildings to be net zero carbon in operation.  Electrification is the direction in which the property industry is moving as it is one of the most important tactics for decarbonising the building sector. Major industry players such as Landlease and Australia's GPT Group have electrification high on their agendas.  None split cycle AC where included should be •Peak Smart/ •R32 gas/ •ER 3.3.5.5	Included	Y		
<b>Comfort</b>											
<b>Thermal Comfort</b>											
8	Thermal Modelling	<p>Achieve unassisted 1 star above mandated NABERS rating for all apartments including but not limited to          • installing ceiling fans to all bedrooms where required          • installing suitable window systems that reduce heat gain and loss          • Management of air filtration through good building practices and air tightness testing.</p> <p><b>Average NABERS 6.5 stars</b></p>	Architect / NABERS Assessor / Head Contractor	Planning / Design	Please Select	5.4 PDA Energy use reduction.	Australia is the driest inhabited continent on earth, yet per capita is amongst the highest consumers of water. The impacts of climate change on rainfall will mean longer periods of drought and a reduction in rainfall in highly populated areas such as Eastern and Southern Australia, with an increase of intense rain periods and extreme rain events.	Included	Y		
<b>Water</b>											
<b>Potable Water Minimisation.</b>											
9	Water Use	<p>Select high WELS rated fixtures.</p> <p>The building will reach at least a 20% reduction in potable water usage through high efficiency fittings. (Benchmarked against BAU requirements). The following WELS ratings will be provided as a minimum and surpassed where viable and available:          •Taps (Kitchen) – 4 stars with a maximum flow rate of 7.5L/min          •Taps (Laundry &amp; Bathroom) – 5 stars with a maximum flow rate of 6L/min          •Toilets – 4-star dual flush with a maximum flow rate 3.5L/flush          •Showers – 4 stars with a maximum flow rate of 6L/min  <b>Appliances:</b>          •Washing machine – 4 stars (where supplied)          •Dishwasher – 5 Stars (where supplied)</p>	Architect / Hydraulic Engineer / Fire engineer / Landscape Architect	Planning / Design	Please Select	5.4 PDA Water Conservation	Australia is the driest inhabited continent on earth, yet per capita is amongst the highest consumers of water. The impacts of climate change on rainfall will mean longer periods of drought and a reduction in rainfall in highly populated areas such as Eastern and Southern Australia, with an increase of intense rain periods and extreme rain events.	Included	Y		
10	Storage	<p>Water storage on site for collection and reuse. Read with Item 3 above.</p> <p><b>Rainwater tank and connection to irrigation infrastructure to be shown on submitted landscape plans under Condition 31.</b></p>	<p>Install appropriately sized rainwater tanks for landscape irrigation (roof drip feed) and where possible collect and save fire test water for reuse.</p>	Hydraulics Engineer	Planning / Design	PDA 5.4 Water Conservation PDA 5.4	Black bitumen and dark roofs compound hot days by creating a heat island effect, where heat is absorbed during the day and radiated back at night increasing surrounding air temperatures. It is estimated that on ground temperatures can be as high as 55 degrees C in the sun. Creating a micro-climate around the building can reduce the urban heat island effect, reducing the need for cooling and therefore creating less carbon emissions	Included	Y		
<b>IEQ</b>											
<b>Indoor Air</b>											

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11	<p><b>Indoor Comfort &amp; Amenity</b></p> <p><b>Internal Performance Levels</b></p> <ul style="list-style-type: none"> <li>+ Light quality artificial light should be provided throughout</li> <li>+ Low VOC paints / carpets / adhesives / sealants</li> <li>+ Low VOC finishes / carpets / adhesives / sealants</li> <li>+ Low formaldehyde engineered wood products</li> </ul>	<p>95% of all paints, carpets, adhesives and sealants are low VOC as defined by the Green Building Council of Australia.</p> <p>95% of engineered wood products are low formaldehyde as defined by the Green Building Council of Australia.</p>	<p>Architect / Interior Designer / Mechanical Engineer / Head Contractor / Acoustic Consultant</p>	<p>Planning/ Design</p>	<p>Please Select</p>	<p><b>5.4 PDA Material choices</b></p>	<p>Our homes impact our health and wellbeing. With 50% of our time spent indoors and two thirds of the time being spent at home, it is essential to provide high levels of indoor environmental quality. The most good ventilation and daylight, avoiding the build-up of moisture and reducing harmful emissions from materials used during construction.</p>	<p>Included</p>		
<b>External</b>										
<b>Landscaping / External lighting</b>										
12	<p><b>Water Resources</b></p> <p>Landscaping includes:</p> <ul style="list-style-type: none"> <li>+ A high proportion of indigenous planting species</li> <li>+ No invasive species</li> <li>+ A diversity of species / genus / is selected</li> <li>+ Flood watering from onsite water retention</li> <li>+ Kerbside planting where possible</li> </ul>	<p><b>External landscape in the building, horizontal and vertical, must be provided at a ratio of either 15% of the site area or at a ratio of 1500 of the GFA.</b></p> <p>Greater than 60% of plants should be indigenous and the site must include at least one significant (nesting) tree or equivalent habitat provision.</p>	<p>Lescaze Architect</p>	<p>Planning/ Design</p>	<p>Please Select</p>	<p><b>5.4 PDA Water initiatives</b></p>		<p>Included</p>		
13	<p><b>Urban Heat Island Effect</b></p> <ul style="list-style-type: none"> <li>+ Create a cooler microclimate around the building through the following: <ul style="list-style-type: none"> <li>• Light coloured roof (colourbond such as Surf mist or Whitehaven)</li> <li>• Light coloured paving (White concrete or equivalent)</li> <li>• Shading landscaping elements through overhanging vegetation or roof structures</li> <li>• Space for deep planting incl. shade trees, pergolas</li> </ul> </li> </ul>	<p>Minimum: 75% of whole site area to be a combination of heat reducing elements including light colours, vegetation, water bodies, low thermal mass, shading etc.</p>	<p>Architect</p>	<p>Planning/ Design</p>	<p>Please Select</p>	<p><b>5.4 PDA energy reduction strategies</b></p>		<p>Included</p>	<p>Y</p>	
<b>Owner Focus</b>										
14	<ul style="list-style-type: none"> <li>+ Provide a Home User Guide* to each apartment</li> </ul>	<p><b>Minimum:</b> Provide a Home User Guide* to each apartment to inform residents about the operational and maintenance requirements of the ESD initiatives in their homes.</p>	<p>Full team</p>		<p>Please Select</p>	<p><b>5.4 PDA energy reduction strategies</b></p>	<p>Australia's climate is changing. Four priority climate change impacts have been identified including extreme heat, drought and water scarcity, sea level rise, and extreme storm and flash flood. Climate change projections show that the occurrence of these events will increase, as well as the intensity.</p>	<p>Included</p>		
15	<p><b>Accessibility</b></p> <p>Apartment should be future proofed so that they are capable of catering for all age groups and the situations.</p>	<p>All apartments must be designed to comply with the ICC 2022 accessible housing. Usable housing guidelines certification is optional can be at varying levels and in varying numbers</p>		<p>Early Planning</p>	<p>Please Select</p>			<p>n/a</p>		

**Minimum area of landscaping as per approved architectural plans, drawing 1.4 Rev G3, prepared by RC design dated 08/08/2024**

**AMENDED IN RED**

By: **Joelyn Bowyer**

Date: **24/03/2025**



**Additional Considerations and Trends**



# Metrics

ESG

- Environmental**
  - Climate change
  - Resource depletion
  - Water
  - Pollution
  - Deforestation
- Social**
  - Human rights
  - Modern slavery
  - Child labour
  - Working conditions
  - Employee relations
- Governance**
  - Executive pay
  - Corruption and bribery
  - Board membership, diversity and relation

People	Planet	Profit
<b>Social measures</b> <ul style="list-style-type: none"> <li>Quality of life</li> <li>Unemployment rate</li> <li>Gender equality</li> <li>Income</li> <li>Relative poverty</li> <li>Higher education</li> <li>Average commute time</li> <li>Crime</li> <li>Life expectancy</li> </ul>	<b>Environmental measures</b> <ul style="list-style-type: none"> <li>Air and water quality</li> <li>Energy consumption</li> <li>Natural resources</li> <li>Solid and toxic waste</li> <li>Land use and land cover</li> </ul>	<b>Economic and financial measures</b> <ul style="list-style-type: none"> <li>Revenue and cost</li> <li>Efficiency and productivity</li> <li>Operational size and value</li> <li>Company growth</li> <li>Employment distribution by sector</li> <li>Percentage of firms in each sector</li> <li>Revenue by sector</li> <li>Profit margin</li> </ul>

3 P's

17 SDGs ( Sustainable Development Goals )

The global goals for sustainable development

- 1** No poverty
- 2** Zero hunger
- 3** Good health and well-being
- 4** Quality education
- 5** Gender equality
- 6** Clean water and sanitation
- 7** Affordable and clean energy
- 8** Decent work and economic growth
- 9** Industry, innovation and infrastructure
- 10** Reduced inequalities
- 11** Sustainable cities and communities
- 12** Responsible consumption and production
- 13** Climate action
- 14** Life below water
- 15** Life on land
- 16** Peace, justice and strong institutions
- 17** Partnerships for sustainable development

## **APPENDIX B**

### Embodied Carbon Reduction

Calculations for the reduction of up front carbon through reduced PC in concrete.

Shore St Project

**Hypothesis:** Concrete and steel are amongst the highest contributors to GWP in Modern Construction. A reduction in the amount of portland cement in concrete mixes can deliver significant reductions on CO<sub>2</sub>-e.

**Approach:** The project has a requirement to reduce its embodied carbon by 10%. This data below will determine if the reduction in the concrete is sufficient to meet the overall reduction.

**Qualifiers:** The quantity and mixes of concrete supplied by Builders. The use of Holcim concrete, the research into studies to establish the embodied energy in typical apartments of differing heights and sizes. Note the figures shown are for all elements of shell and core of the individual units. Fit out items are not included. Base case PC qualities of standard mixes published by GBCA.

Areas of concrete in Shore St project	Sq.m of floor area	Concrete Thickness		m <sup>3</sup> of concrete
		.25m	0.25	
Ground	1662	0.25	415.5	415.5
Level 1	1803	0.25	450.75	450.75
Level 2	1405	0.25	351.25	351.25
Level 3	1405	0.25	351.25	351.25
Level 4	1405	0.25	351.25	351.25
Level 5	1405	0.25	351.25	351.25
Level 6	1405	0.25	351.25	351.25
Roof	1442	0.25	360.5	360.5
Beam thickening /piers			1000	1000
	7680		3883	

Aus LCI Base case		GWP/ Kg CO <sub>2</sub> -e / m <sup>3</sup>	
N40		490	
N50		619	

Holcim Ecopac RM		GWP/ Kg CO <sub>2</sub> -e / m <sup>3</sup>	
Strength	Mix Code	Non post tension	Post Tension
N40	QE402E100	224	293
N50	QE502E100	294	



Comparison Aus LCI (BAU) to Holcim Ecopac ready mix.				Shore Street			
Kg of CO <sub>2</sub> -e per cubic metre.				Conc Qty m <sup>3</sup>	BAU Co <sub>2</sub> -e kg	QE402E100 Co <sub>2</sub> -e kg	Total Concrete Saving CO <sub>2</sub> -e Tonnes
Aus LCI Base Case	QE402E100	Saving	% Difference				
490	224	226	53%	3000	1,470,000	672,000	
	QE502E100					QE502E100	
619	294	325	53%	1000	619,000	294,000	
				TOTAL	2,089,000	941,000	941.1 (45% reduction in concrete emissions)

CO<sub>2</sub>-e Generated by construction of apartment buildings

Based on Aye et al 2011 study for standard apartment block over 8 storeys.

Averages are based on 10 buildings.

GWP tonnes / sqm	Total area of habitable floors at Shore St (sq.m.)	Tonnes of CO <sub>2</sub> -e
1.44	6,258	9,011

Comparison of Embodied Carbon (Co<sub>2</sub>-e) savings as a fraction of concrete in a typical Building

Based on finding in study by Aye et al 2011.

**SUMMARY**

**67-68 Shore St Cleveland**

Occupied Floor Area: 6258m<sup>2</sup>

Combined concrete and steel emissions per sqm: 1.44 Tonnes of CO<sub>2</sub>-e

Floor Area: 6258 \* 1.44 = 9,011 Tonnes of CO<sub>2</sub>-e

Carbon reduction using Holcim Ecopac: 941 Tonnes of CO<sub>2</sub>-e

Shore St with Ecopac concrete versus reference mix :  
**Reduction of CO<sub>2</sub>-e from concrete only in Shore street when compared to Concrete of reference : 45%**

Shore St with Ecopac concrete versus Case Study apartment building with concrete and steel emissions  
**Reduction of CO<sub>2</sub>-e from concrete only in Shore street when compared to Concrete and Steel : 10.5 %**

Summary of 6 studies of Class2 buildings

Study	Description	Area (m <sup>2</sup> )	GWP per m <sup>2</sup> (tonnes CO <sub>2</sub> -e)	GWP per dwelling (tonnes CO <sub>2</sub> -e)	Notes
<b>Apartments over four storeys</b>					
Crawford & Fuller 2011	3-5 storey	64	2.13*	136.3	
Randolph et al. 2006	4 storey	107*	1.20	128.4	Abbotsford
Randolph et al. 2006	5 storey	120*	1.14	136.8	Cobarita
Aye et al. 2011	8 storey	63	0.66	54.2	Steel
Aye et al. 2011	8 storey	63	0.58	36.5	Concrete
Aye et al. 2011	8 storey	63	0.63	39.7	Timber
Durlinger et al. 2013	9 storey	68	0.34	23.1	Forfe not including sequestration
Durlinger et al. 2013	9 storey	68	0.2	13.6	Forfe including sequestration
Durlinger et al. 2013	9 storey	68	0.38	25.8	Reference building
Crawford & Fuller 2011	20 storey	100	2.29*	228.6	

## **APPENDIX C**

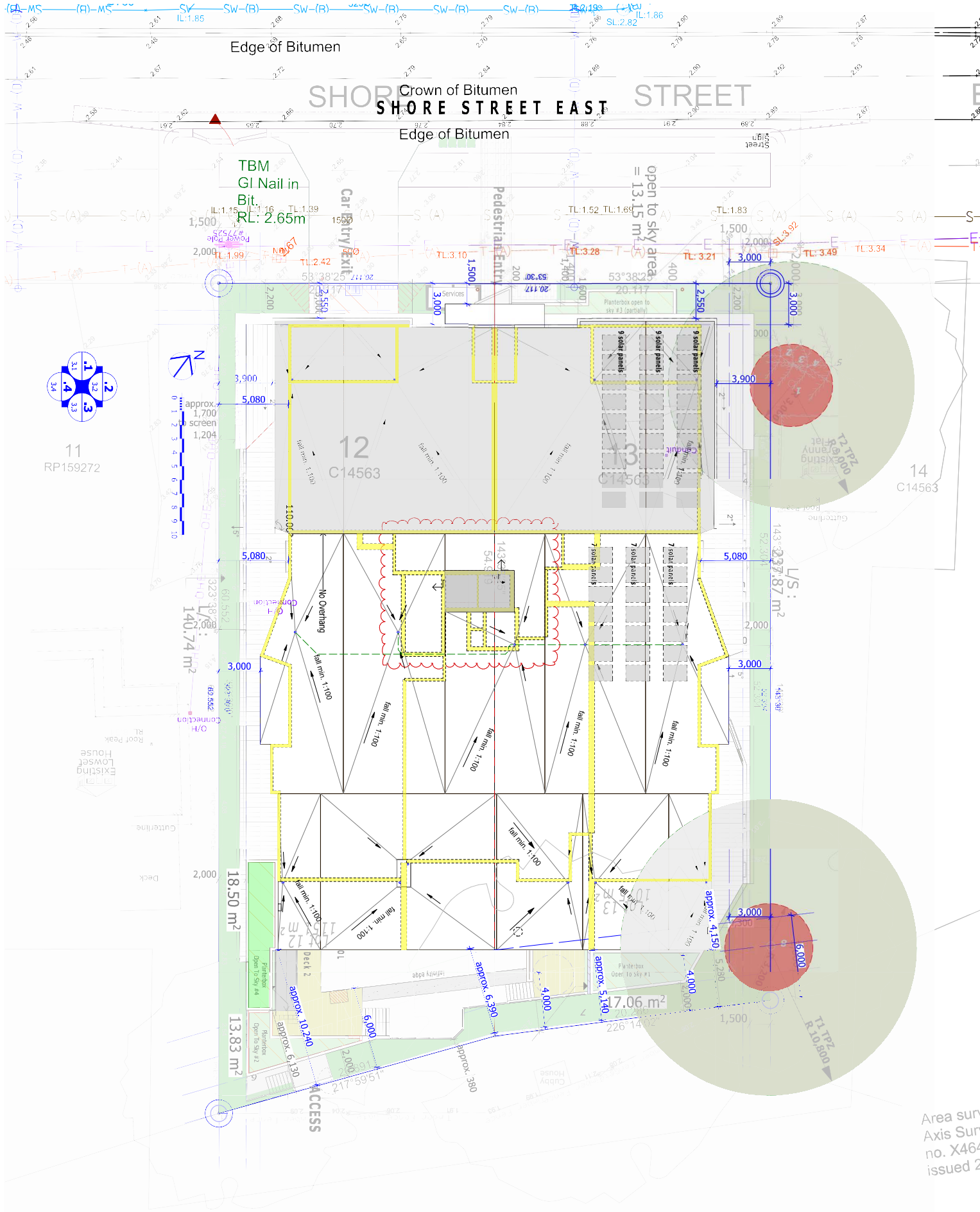
### Tank Position





## **APPENDIX D**

Solar Array



Area sun Axis Sun no. X462 issued 2

**TO BE UPDATED**

PRELIMINARY ISSUE - ISSUE K3 (18/FEB/2025)

	<b>LOCATION:</b> LOT 12 467 SHORE STREET EAST CLEVELAND REDLAND CITY, #Site Postcode	<b>CLIENT:</b> TBC	<b>DRAWING NAME:</b> Site Plan
	<b>SCALE:</b> 1:125 @A1 <b>JOB NO:</b> PPH <b>DRAWING:</b> BA.1.3 <b>ISSUE:</b> K3	<b>ISSUE:</b> PRELIMINARY ISSUE K3 (18/FEB/2025) K4 (20/FEB/2025) K5 (22/FEB/2025) K6 (24/FEB/2025) K7 (26/FEB/2025) K8 (28/FEB/2025) K9 (01/MAR/2025) K10 (03/MAR/2025) K11 (05/MAR/2025) K12 (07/MAR/2025) K13 (09/MAR/2025) K14 (11/MAR/2025) K15 (13/MAR/2025) K16 (15/MAR/2025) K17 (17/MAR/2025) K18 (19/MAR/2025) K19 (21/MAR/2025) K20 (23/MAR/2025)	<b>REVISIONS:</b> No. Description 1 Initial Issue 2 Final Issue 3 Final Issue 4 Final Issue 5 Final Issue 6 Final Issue 7 Final Issue 8 Final Issue 9 Final Issue 10 Final Issue 11 Final Issue 12 Final Issue 13 Final Issue 14 Final Issue 15 Final Issue 16 Final Issue 17 Final Issue 18 Final Issue 19 Final Issue 20 Final Issue

**A1 PAPER  
SIZE**