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Glebe Mid-rise Housing

Sustainability Planning Proposal Report

FINAL
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**Sustainable
Environments**
INTEGRAL GROUP

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1. INTRODUCTION

1.1 ACKNOWLEDGEMENT OF COUNTRY

This project acknowledges the Gadigal People of the Eora Nation as the traditional owners of land at the site. It acknowledges their elders, past, present and emerging.

1.2 PROJECT DESCRIPTION

The NSW Land and Housing Corporation mid-rise development in Glebe is a housing development of social, affordable and market housing.

The South site includes terraces and apartments for market housing (39 dwellings).

The North site includes apartments for social housing (35 dwellings).

1.3 PURPOSE OF THIS REPORT

This report describes a range of building design and urban infrastructure opportunities for the project to embed the principles of sustainability and give effect to the global, state and local policy relating to amenity, climate change and biodiversity.

It responds to the ESD objectives of the City of Sydney DCP 2012.

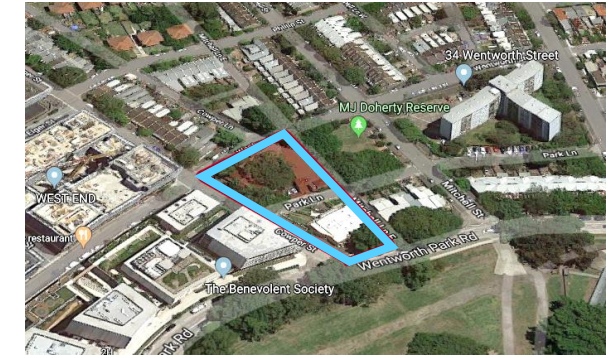
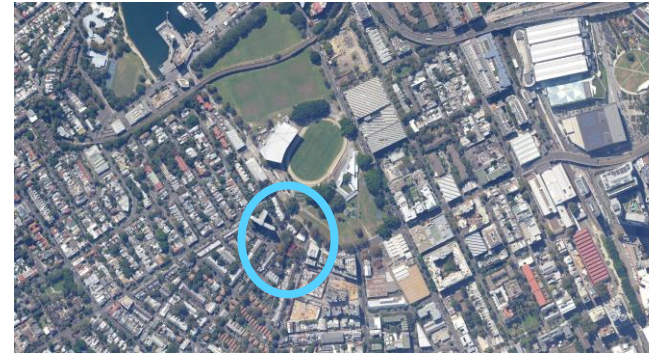


Figure 1 – Glebe Mid-rise Location (top right) and Site Plan (above)

1. INTRODUCTION

1.4 LAND AND HOUSING CORPORATION VISION

NSW Land and Housing Corporation (LAHC) is here to serve the people of New South Wales by developing well-connected communities, preserving our environment, supporting our industries and contributing to a strong economy.

The Department of Planning, Industry and Environment brings together specialists in urban and regional planning, natural resources, industry, environment, Aboriginal and social housing and regional New South Wales. LAHC shares a common goal to maximise the long-term wellbeing of New South Wales. they do this by protecting and improving:

- Prosperity
- Environmental sustainability
- Safety and security
- Social inclusion and cohesion, and
- Attractiveness as a place for recreation and relaxation

They strive to be a global leader in the planning and management of resources, environmental and socio-economic security, financial affordability, land use and carbon emissions.

Department of Planning, industry and Environment cluster is responsible for delivering:

- A strong and liveable New South Wales
- Maximum community benefit from government land and property
- Resilient and sustainable environment and energy
- Sustainable and productive regional industries and communities
- Sustainable and secure water resources.

1.5 PROJECT OBJECTIVES

The ongoing challenges of increasing urban density, housing affordability and climate change mean we all share the responsibility to improve the liveability of our towns and cities and minimise the impacts of development on our natural environment.

The project will aim to achieve a high level of environmental performance for both the precinct and individual buildings through its design and materials. By doing this, the project will improve sustainability by reducing water usage and energy costs for residents.

The project will seek to deliver new dwellings with high levels of residential amenity and which also reduce living costs through water and energy efficiency:

- **To minimize resultant carbon emissions in both the delivery and operation of the building;**
- **To substantially reduce the water usage in both the delivery and operation of the building;**
- **To improve building efficiency and reduce operational costs;**
- **To create a healthy and resilient environment for the community to live and work in, well into the future;**
- **To demonstrate leadership in sustainable development for social and affordable housing in New South Wales through sustainability measurement tools and policy; and**
- **To demonstrate effective use of materials to minimise waste in construction and lifestyle.**

1.6 DCP OBJECTIVES

The City of Sydney DCP (2012 Section 3.6) identifies the ecologically sustainable development objectives for the City:

- (a) Apply principles and processes that contribute to ecologically sustainable development (ESD).
- (b) Reduce the impacts from development on the environment.
- (c) Reduce the use of resources in development and by development over its effective life.
- (d) Reduce the cause and impacts of the urban heat island effect.
- (e) Increase the resilience of development to the effects of climate change.
- (f) Ensure that greenhouse gas emissions will be reduced.
- (g) Increase the use of cogeneration and tri-generation systems.
- (h) Replace intensive carbon power sources with low carbon and renewable energy.
- (i) Reduce the use of potable water.
- (j) Ensure that development can adapt to climate change.
- (k) Ensure that waste will be reduced.
- (l) Increase the use of products from recycled sources.
- (m) Improve indoor environmental quality.
- (n) Reduce the environmental impact from building materials through reduction, re-use and recycling of materials, resources and building components.
- (o) Improve the biodiversity.

This report identifies the opportunities under consideration in addressing these objectives for the Glebe Mid-rise Housing Program.

1. INTRODUCTION

1.7 APPLICABLE AND ASPIRATIONAL RATING SCHEMES

BASIX – APPLICABLE

BASIX applies to all residential dwelling types (Class 1, 2 and Part 4) and is an integral part of the development application process in NSW, implemented under the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) and State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 (the BASIX SEPP).

The BASIX assessment tool analyses data relating to the design of proposed dwellings. It assesses the anticipated water consumption and greenhouse gas emissions levels to determine how this scores against water and energy targets. The expected thermal performance of each dwelling is also assessed via the Nationwide House Energy Rating Scheme (NatHERS) and is included in the BASIX assessment.

The project will meet the following water, energy and thermal comfort targets set under BASIX:

Section	Target
Water	40
Energy – Units	25
Energy – Terraces	50
Thermal Comfort – Heating	≤ 40 MJ/m ² /a
Thermal Comfort – Cooling	≤ 26 MJ/m ² /a

GREEN STAR – ASPIRATIONAL

The project is investigating the opportunity of achieving a **5-star** Green Star Design and As-Built rating for each separate building

Green Star is a comprehensive environmental rating system for buildings and communities. Green Star separately evaluates the environmental initiatives of design, projects and/or buildings based on several criteria, including energy and water efficiency, indoor environmental quality and resource conservations.

The Green Star environmental rating system for buildings was created for the property industry in order to:

- Establish a common language;
- Set a standard of measurement for green buildings;
- Promote integrated, whole-building design;
- Recognise environmental leadership;
- Identify building life-cycle impacts; and
- Raise awareness of green building benefits.

NABERS FOR APARTMENTS – ASPIRATIONAL

NABERS for Apartment Buildings rates the energy and water usage (paid for by the owners corporation) within the common property areas of a building. This includes (but is not limited to):

- Lifts and lobby areas
- Car Parks
- Gyms
- Pools
- Water features

The project is investigating the opportunity of achieving a **5.5 star** rating for NABERS Energy

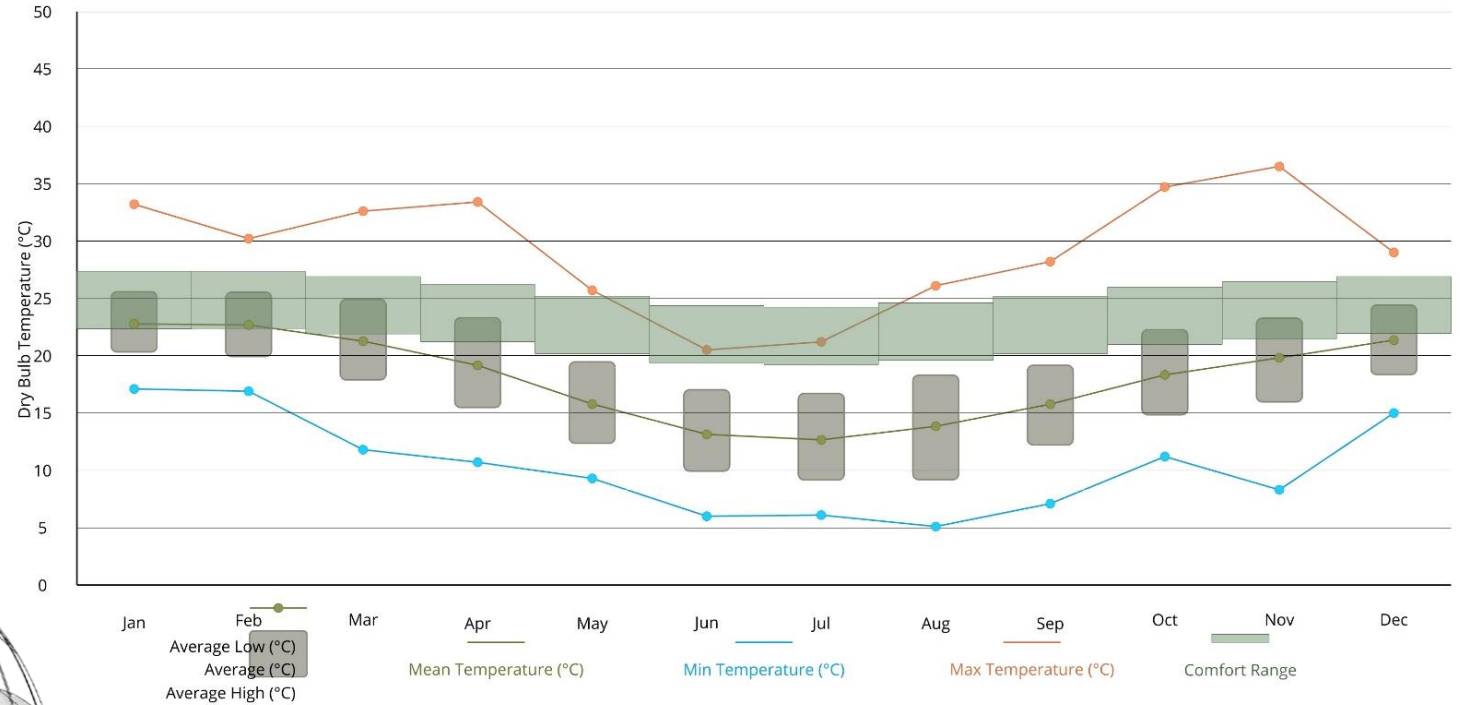
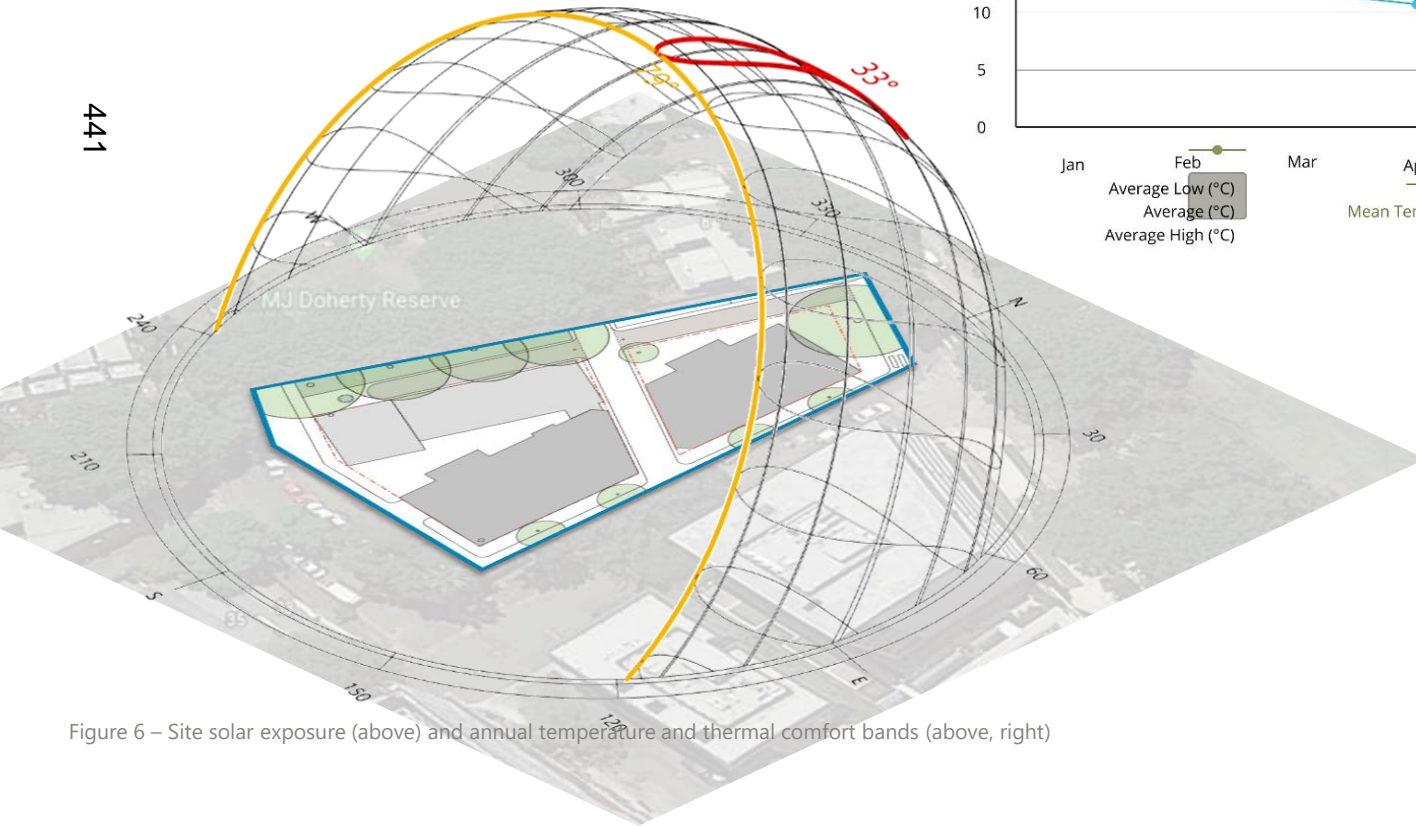


2. SITE ANALYSIS

2.1 SITE SOLAR ACCESS

The site stretches from North to West. The main façades of the project are facing therefore east and west and get exposed to low sun.

Depending on environmental shading factors, such as trees or buildings, a passive & active shading strategy might be necessary.



2.2 ADAPTIVE THERMAL COMFORT

The adaptive thermal comfort band shows which indoor temperature is expected to be comfortable depending on the outdoor temperature.

In the warmer months (Oct – Apr), the mean outdoor temperature is close to the comfort band, which means that the climate is suitable for natural ventilation.

However, high peak temperatures have to be taken into account and a shading strategy needs to be considered to prevent overheating of residential units.

Figure 6 – Site solar exposure (above) and annual temperature and thermal comfort bands (above, right)

3. DESIGN OPPORTUNITIES

3.1 PASSIVE DESIGN

There are a range of passive opportunities to reduce the resource consumption of the dwellings, provide healthy and comfortable homes for occupants and enable high-efficiency systems.

The Green Star framework provides some guidance for passive design; however the thermal comfort requirements for the project are set by the Nationwide House Energy Rating Scheme (NatHERS) and BASIX. This report identifies a level of performance based on NatHERS requirements.

Certification with the NatHERS will consider the following passive design principles.

- Natural ventilation
- Solar access
- Building fabric
- Shading

3.2 GREEN ROOFS AND WALLS

Roof-top greening has been considered alongside renewable energy for occupant amenity, building fabric performance and heat island mitigation

Greening the vertical plane has been considered adjacent to public realm to improve amenity and reduction of the urban heat island effect.

Rainwater harvesting has been considered for re-use in irrigation and washdown.

3.3 WASTE MANAGEMENT

Smart waste collection to improve separation, recycling and spatial efficiency and organic waste management have been considered.

3.4 EFFICIENT HVAC AND DHW SERVICES

The opportunities that have been explored for efficient building services include:

- Electrification; providing systems that reduce the future reliance of the project on fossil fuels.
- Efficient HVAC and advanced commissioning for heating/cooling with mechanical ventilation to mitigate condensation risk and filter external pollutants.
- Refrigerants in HVAC systems will minimize global warming and ozone-depleting potential.
- Domestic hot water (DHW) systems will efficient, zero fossil-fuels options.
- Occupant education with a building user guide for building occupants to support optimal use of efficient buildings systems

3.5 LIGHTING & ELECTRICAL SYSTEMS

- Direct/indirect lighting to include wall-washing and up-lighting in support of a healthier lit environment.
- Home automation and smart metering will be considered in the approach to home automation.
- Common area controls such as automated occupancy controls on common area lighting and ventilation.
- EV charging capability to all parking spaces.

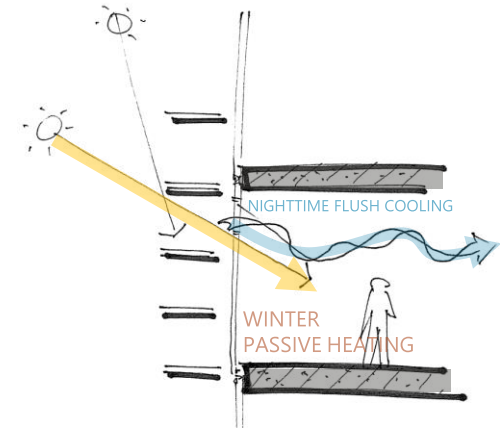


Figure 9 – Passive Design Strategies to create a comfortable environment.

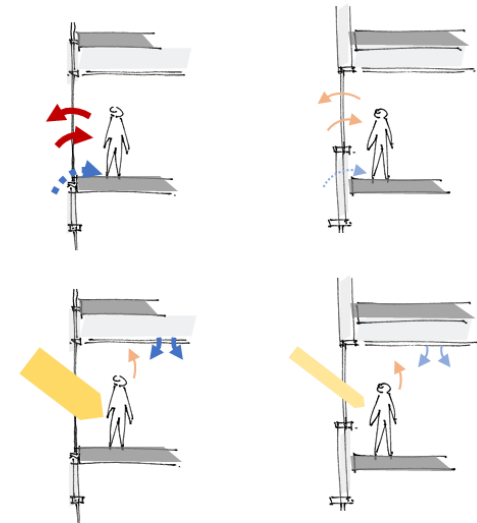


Figure 10 – Efficient Integrated systems on precinct

4. RENEWABLE ENERGY OPPORTUNITIES

4.1 RENEWABLE ENERGY AND STORAGE

On-site renewable energy generation through rooftop PV can provide the most cost-effective mitigation of GHG emissions and create a low-carbon utility grid.

Preliminary analysis indicates a plausible solar arrangement:

- **South Tower**
- **North Tower**

These would generate in the order of 15% of the annual electricity consumption.

Onsite renewable energy can support shared facilities, or with an embedded network operator can be operated allocated to residents too.

On-site battery storage can support the optimization of on-site solar and also improve the reliability of power for emergency purposes during any loss of power.

Batteries are increasingly important for grid stability and the firming of renewable generation.



Figure 13 – Rooftop Solar PV assessment

5. MOBILITY AND PUBLIC REALM OPPORTUNITIES

5.1 CLIMATE RISK

Climate risk mitigation related to heat is a necessity in Sydney.

Prolonged periods of time of extreme heat and drought will be more frequent in the future and affect health and wellbeing of the community.

Urban heat island mitigation will be supported with shading, green infrastructure and high SRI surfaces.

5.2 GREEN & BLUE INFRASTRUCTURE

Water sensitive urban design will contribute to measurable improvements to local air and water quality as well as thermal comfort in the public realm.

5.3 ACTIVE TRANSPORT

The approach to mobility will prioritize active transport options:

- Bicycles – end of trip facilities and secure storage
- Pedestrians – public spaces and intersections that are safe and amenable

5.4 FUTURE MOBILITY

The project will also consider the future of mobility:

- Electric vehicles
- Shared vehicles
- Connected & autonomous vehicles
- E-mobility.

5.5 LEVERAGING PUBLIC TRANSPORT

The project will supporting better transport connections between the precinct and the existing and proposed transport hubs.

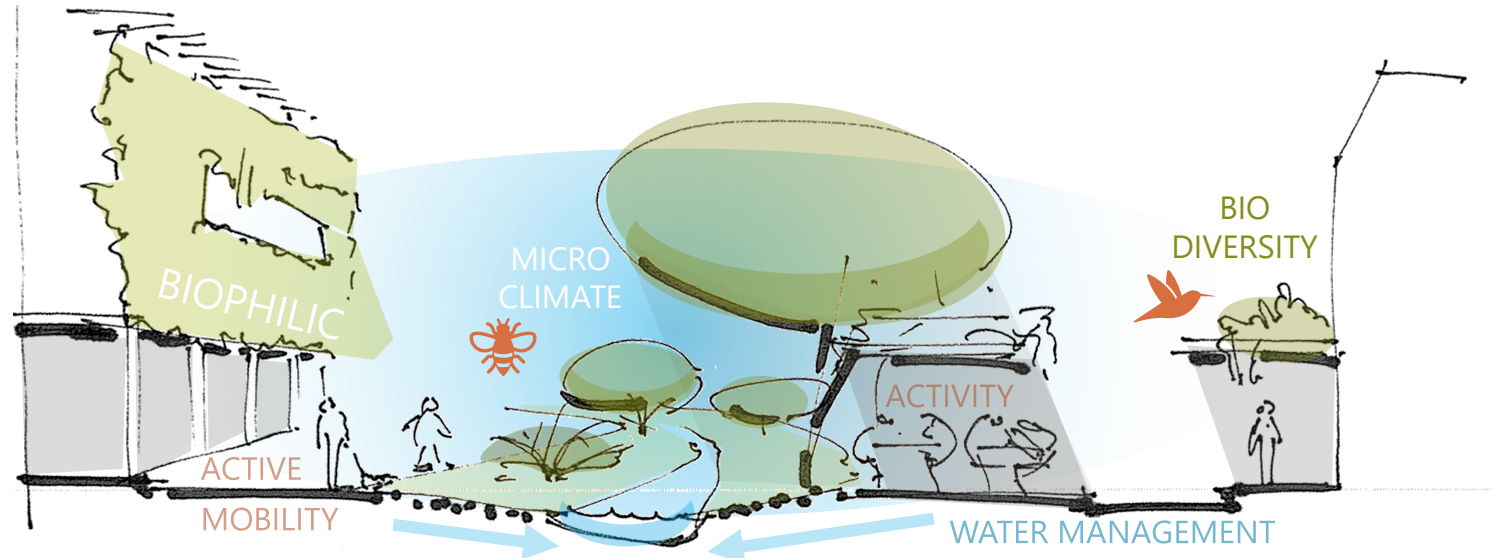


Figure 20 – Green and Blue spaces in the public realm for more comfort and biodiversity.

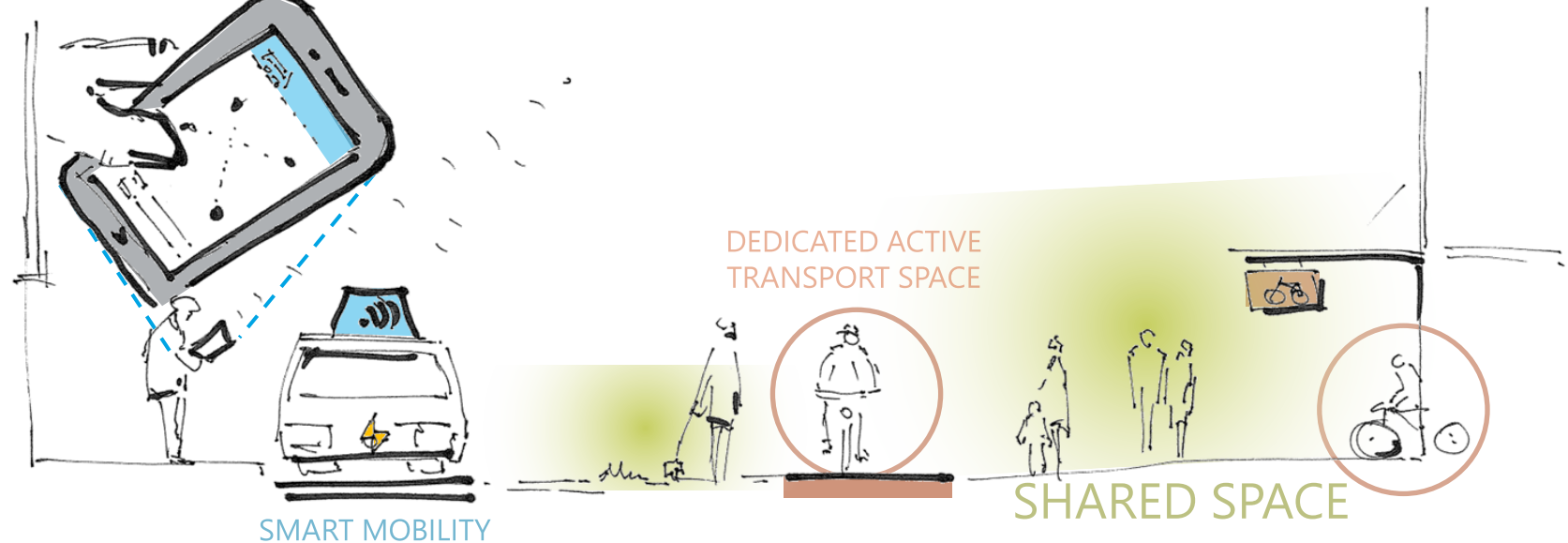


Figure 18 – Active Transport facilities combined with Smart Mobility to future-proof the public domain.

6. DCP OBJECTIVES

(a) Apply principles and processes that contribute to ecologically sustainable development (ESD).	✓
(b) Reduce the impacts from development on the environment.	✓
(c) Reduce the use of resources in development and by development over its effective life.	✓
(d) Reduce the cause and impacts of the urban heat island effect.	✓
(e) Increase the resilience of development to the effects of climate change.	✓
(f) Ensure that greenhouse gas emissions will be reduced.	✓
(g) Increase the use of cogeneration and tri-generation systems.	In line with current best practice we have targeted electrification in preference to on-site gas generation.
(h) Replace intensive carbon power sources with low carbon and renewable energy.	✓
(i) Reduce the use of potable water.	✓
(j) Ensure that development can adapt to climate change.	✓
(k) Ensure that waste will be reduced.	✓
(l) Increase the use of products from recycled sources.	✓
(m) Improve indoor environmental quality.	✓
(n) Reduce the environmental impact from building materials through reduction, re-use and recycling of materials, resources and building components.	✓
(o) Improve the biodiversity.	✓



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