

**Project:** Precinct 15 – Altona North  
Sustainability Plan

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# 1 Executive Summary

ESD initiatives that are recommended in the development of the site will focus on the following items:

Energy initiatives to reduce the energy consumption and carbon emissions of the development;

- Provision of a thermally efficient building and thermally broken facades.
- Passive design features to reduce heat gain in summer and maximise heat gain in winter
- Provision of energy efficient building services.

Indoor Environmental Quality (IEQ) to increase occupant's satisfaction and general wellbeing

- Maximise natural ventilation and outside air through building design.
- Maximised daylight and external views.
- Improvement of indoor environment quality by using non-toxic, low VOC and low formaldehyde products.

Sustainable water management to minimise the water consumption;

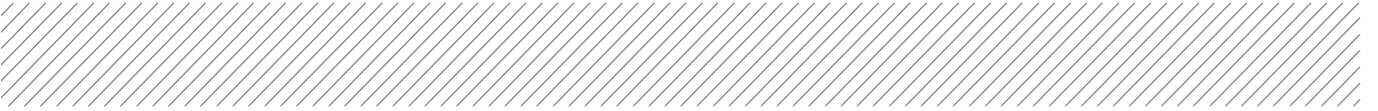
- Provision of water efficient fixtures.
- Consideration to be given to provision of a Third Pipe to allow recycled water to be distributed within the precinct (subject to further investigation).

Material selections to minimise embodied energy and construction waste;

- Provision of recycling space during construction and for ongoing use.
- Minimisation of construction materials
- Use materials with reduced embodied energy.
- Implementation of a Waste Management Plan

Sustainable transport by providing bicycle parking/storage and promote public transport use.

- Provision of bicycle parking/storage facilities for occupants.
- Provide access safe access to existing cycle routes.
- Promote and support the use of existing public transport facilities.



#### Social aspects to encourage the integration in the neighbourhood

- Located close to day to day amenities, such as schools, shopping centres, childcare and public transport
- Located close to nearby industrial and employment precincts.
- Promote local economy



## 2 Introduction

### 2.1 Project Description

Aurecon has been engaged to provide ESD consultancy services in relation to the proposed structure plan of Precinct 15 in Altona North.

The Precinct 15 Structure Plan seeks to optimise its sustainability outcomes, during both the construction phase and ongoing operations. There are many ESD opportunities that could be incorporated into the potential development of this site, which seeks to meet “good practice” benchmarks for residential sustainable development.

This report outlines the requirements and considerations that should be considered with regards to Sustainability and Climate Change.

### 2.2 Definitions

In this document **ESD** means “**Environmentally Sustainable Design**” interpreted as the design of the building and development of the site in a manner that seeks to minimise resource use during construction and subsequent operation such as water, energy and materials, as well as enhancing occupant comfort and livability.

### 2.3 Objectives

The ESD strategy for the Precinct 15 Structure Plan covers the following:


- A statement of key ESD targets and initiatives encouraged for the development;
- Identification of strategies for implementation of the proposed ESD initiatives
- The design of the precinct in response to ESD principles such as energy and water efficiency, indoor air quality, material reduction and sustainable transport.

Note that although a formal Green Star rating is not pursued the Green Star framework and other international frameworks such as One Planet Living have been considered.

### 2.4 Goals and targets

Sustainability targets have been proposed in response to regulatory requirements and aspirations for the precinct, giving consideration to the presence of site specific constraints, to ensure a quality outcome for the precinct. The ESD targets are to be reviewed at each project design stage, during construction and following building completion and occupation.

The targets proposed for this development are as follows:

- 
- 7 star NatHERS (National House Energy Rating Scheme) average for all apartments and each apartment to be a minimum of 5 star NatHERS. Refer to section 6 of this report for initiatives that may help to achieve this target.
  - Potable water design target of less than 125 litres of potable water per person. Refer to section 6, 7 and 8 of this report for initiatives that may help to achieve this target.
  - The use of the Green Star Multi-Unit Residential tool as a guideline for the design and construction of the residential buildings.
  - Development of ESD Construction guidelines for each of the precincts within the Precinct 15 to ensure that individual lots, and the development as a whole, are designed within a sustainable design framework.

The Green Star Communities tool has been considered for this precinct. However, given the multi-ownership nature of this precinct with multiple small parcels, the implementation of most of its principles appears to be unpractical or extremely challenging. However, the ESD plan for the site has been based on Green Star principles, mainly from the Multi-unit residential tool, including those Green Star Communities credits that provide practical sustainability.

## 2.5 Disclaimer

As the authors of this ESD report Aurecon cannot provide any guarantee or warranty of the implementation of the initiatives. This is considered the responsibility of the developer, design team and building contractor. The proposed ESD initiatives of the development are based on the Green Star Multi Unit Residential v1 tool. However no official Green Star rating is to be undertaken.





## 3 General Principles

### 3.1 Overview

The design team will consider a broad spectrum of sustainability initiatives, which will resolve their suitability as the design of each element of the development enters the appropriate stages.

The Precinct 15 development will be designed to meet the sustainability requirements of the Hobson City Council's STEPS program. STEPS has been developed by local government to assess environmental performance at the planning application stage and will be used to guide developers in the design of new buildings in the municipality. STEPS is a computer based tool, that provides a simple way of identifying whether the proposed development meets standards of environmental performance and also to show ways to improve your design.<sup>1</sup>

As each development progresses through the design stage, an ESD checklist is to be used as a basis for Council's approval of future permit applications. The ESD checklist will be consistent with the initiative outlined in this report.

The constraints of the brownfield sites limit WSUD opportunities due to the nature of this type of site (potential for residual below surface soil and groundwater contamination). Stormwater/WSUD will be resolved between council and the infrastructure engineers with consideration to any relevant Statement of Environmental Audit conditions.

Green Star Communities has been considered as a potential framework for this development, however given the Green Star Communities (GSC) tool is very difficult to achieve given the multi-ownership nature of this precinct and some of the requirements for the GSC tool. This will be explained in the report.

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<sup>1</sup> [http://www.hobsonsabay.vic.gov.au/Planning\\_and\\_Building/Environmental\\_Sustainable\\_Design\\_ESD](http://www.hobsonsabay.vic.gov.au/Planning_and_Building/Environmental_Sustainable_Design_ESD)

# 4 Development Outline

## 4.1 Site Description

The Precinct 15 site area is approximately 67 hectares. The site as it stands primarily consists of industrial and vacant former industrial land. It sits south of the Western Freeway, and has the potential to provide a significant economic, social and environment stimulus to the Altona North area.



Figure 1 Land Use Plan (Source: Tract)

The proposal comprises the following different land uses:

- Residential – comprising of a mixture of housing typologies with a range of densities
- Mixed Use Area – adjacent to the activity centre, providing a transition between surrounding residential and commercial uses

- Activity Centre – located adjacent to external major transport routes, ensuring both external and internal usage
- Open Space – comprising three main types of open space, these being passive for recreation, linear for landscaping and to provide links and a town square

## 4.2 Supporting Information

The following plans have been developed and used to inform the proposed sustainability opportunities.

### 4.2.1 Land Use Plan

The master plan defines some of the key sustainability elements of Precinct 15. Some of these areas include how the precinct will be connected to the surrounded areas, the extent of open spaces and common areas (i.e activity centre), proposed amenities for the precinct, preliminary potential for built form and it will form the basis for a liveable community.

### 4.2.2 Transport Assessment

This assessment outlines the anticipated traffic and transport implications of Precinct 15 including considerations of the existing road network and traffic conditions, accessibility to the site, road hierarchies and existing and future sustainable transport options.

This plan should be referred to for all detailed transportation information.

### 4.2.3 Landscape Plan

The Landscape Plan details some of the aspects outlined in the environmental and ecology section of this report. Areas that the Landscape Plan explains include street tree planting, public open spaces, native draught tolerant species.


### 4.2.4 Documentation Requirements for Subsequent Phases

This section outlines documentation that will be required and will feed into the Sustainability Plan and is typically provided at a later stage in the development due to the lack of information for these documents to be generated at this stage. The documentation that will feed into the Sustainability Plan comprises the following:

Document	Expected Timeline
■ Water Sensitive Urban Design Report	Townplanning stage
■ Building materials and finishes schedule	Design-tender stage
■ Operational Waste Management plans	Design stage
■ Construction and Demolition Management Plans	Concept design stage
■ Sustainable Transport Plan	Townplanning stage
■ STEPS and SDS Assessments	Townplanning stage
■ Detailed ESD initiatives and prescriptive targets	Concept-design stage

## 4.3 Community Feedback

A community information session was held at the Paxton Street Community Centre on Monday 2nd July 2012 and attended by more than 100 community members.



Key issues identified by the community included:

- Traffic management including peak hour traffic control, increased pressure on existing infrastructure (such as main roads) and speed limits;
- Public transport that is easy to access;
- The impacts of redevelopment on parking around the Precinct and in the broader context (e.g. at Spotswood Train Station);
- Noise from land uses like the West Gate Freeway, the Freight Rail Line and future construction as part of the redevelopment of the Precinct;
- How the redeveloped Precinct will fit in with its surrounds. This includes encouraging connectivity, respecting existing neighbourhood character at the interfaces (such as New Street and Kyle Road);
- Long term planning for the redevelopment of the Precinct to consider environmental and social matters, safe street design, green community spaces, a mix of housing types, walking and cycling tracks that link into existing networks and landscaped public areas;
- Community services and facilities including community centres, aged care facilities, sports facilities, medical services, childcare, kindergartens and educational facilities for the Precinct;
- Open space areas including playgrounds, picnic areas, parks and shared pedestrian and cycling paths for the Precinct;
- Retail components such as shops or cafes for the Precinct; and
- Recognising and considering the heritage past of the Precinct.

Many of the initiatives detailed in the following sections of this report respond directly to these key issues identified by the community.

# 5 Transport

The improvement of sustainable transportation seeks to tackle two of Australia's key issues. Firstly, Australia's dependence on personal cars and secondly, Australia's increasing obesity epidemic. These issues need to be addressed from the federal level right down to the local government level.

Within the domestic sector, the automobile accounts for 54% of the total greenhouse gas emissions with 80% of all adults using personal cars to commute to work.<sup>2</sup> Setting up sufficient public transportation networks and safe pathways for pedestrians and cyclists is critical in encouraging the general public to use alternative means of transport.

In Australia, 17 million (out of 25 million) people are considered to be in the overweight range. Encouraging the use of alternative modes of transport is seen as an initiative to aid Australia's obesity epidemic.

The Precinct 15 Development seeks to provide an interconnected link between the proposed development and the existing surrounding infrastructure.

## 5.1 Public Transportation

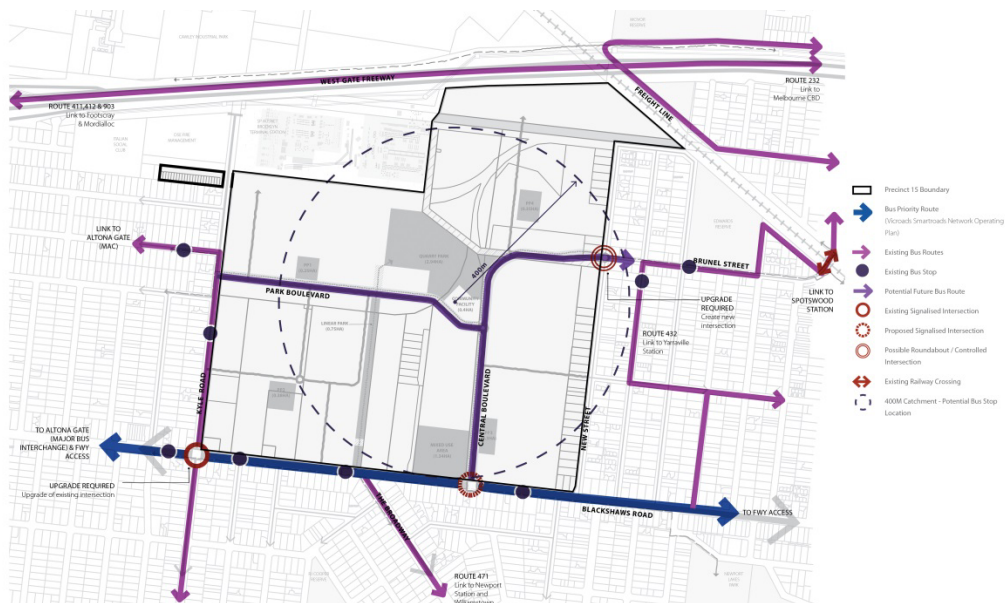
The likely layout of the Precinct 15 development will allow sufficient access for local bus routes to potentially be redirected through the site allowing for direct access to all residential areas within the precinct.

The site currently has good access to bus routes along Blackshaws Rd that connect the site to commercial and industrial areas within the local area as well as to Melbourne CBD (bus route 232). The activity centre will likely be located adjacent to existing bus routes on Blackshaws Rd.

Subject to Council and Department of Transport approval, the development presents an opportunity to re-route bus route 432 through the centre of the development to provide access to Yarraville Station.

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<sup>2</sup> Green Star Multi unit Residential v1, 2009.

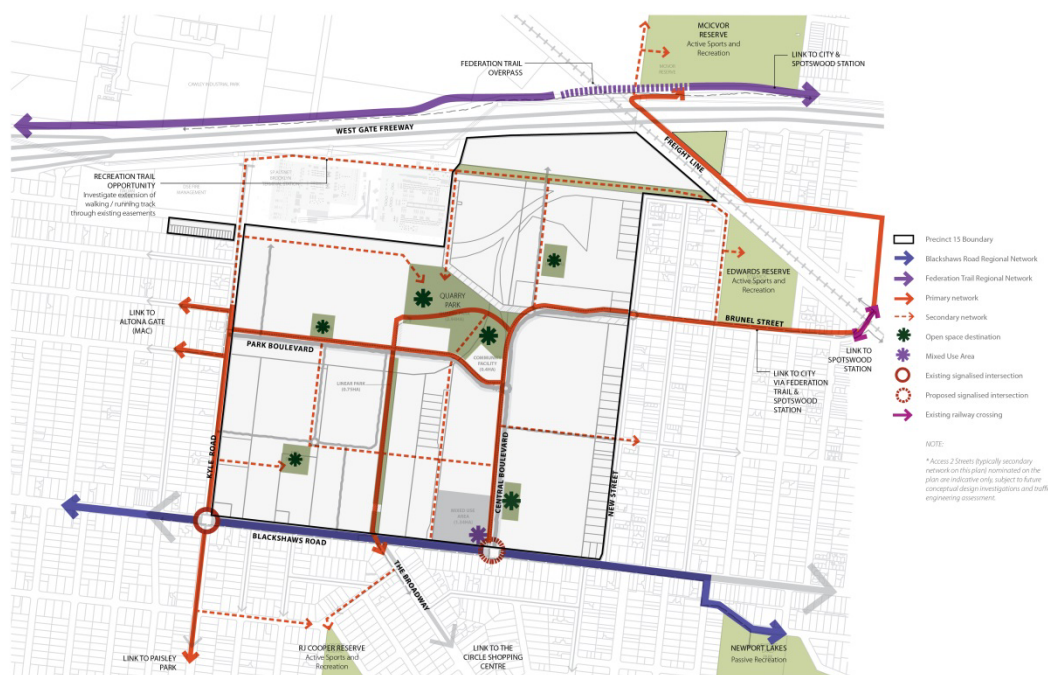


## 5.2 Cyclist and Pedestrian Routes

A series of interconnected pedestrian pathways will be integrated into the proposed concept plan to allow for good and safe access throughout the site and onto existing pedestrian links and pathways.

One of the key considerations to be taken into account is the connection to the surrounding areas. Of particular importance is providing access to the principle bicycle network which provides a cycle link to the CBD and off road leisure trail. The site is also proposed to have bicycle routes throughout the site and numerous bicycle parking zones at key areas of the precinct.

Figure 3 illustrates some key cycling connections to the neighbouring areas.



**Figure 3: Pedestrian / cycling plan. Source: Transport Engineer report**



### 5.3 Recommended Initiatives

As part of the on-going development of the site, the following initiatives and policies may be employed to improve the public transportation network and access through and off the site.

Design Principle	Intent	Recommended Initiative
Walkable/Cycle-able Streets	Promote cycling and walking within, and in/out of, precinct in order to encourage uptake of non-motorised modes of transport and recreational physical activity.	<ul style="list-style-type: none"> <li>All main entrances to buildings are to be connected by sidewalks and footpaths.</li> <li>Non-motorised rights of way are to be provided at road crossings. i.e. motor vehicles are to give right of way to either bicycles or pedestrians.</li> <li>Dedicated pedestrian and cyclist links to open community spaces.</li> <li>Generally in accordance with Clause 52.34 of HBCC Planning Scheme.</li> <li>All streets to have footpaths on both sides of the street to ensure connected suburbs</li> <li>All major connector streets to have adequate space or marked on road cycleways.</li> <li>Any signalised intersection or roundabout should have best practice cycleway markings</li> </ul>
Public/Shared Transport	The dependency of car travel to, from, and around the precinct should be minimised in order to reduce fuel use and its associated air and water pollution.	<ul style="list-style-type: none"> <li>Car parking is to be provided generally in accordance with the Hobson Bay Planning Scheme, Clause 52.06.</li> <li>Provision of undercover shelter should be encouraged for bus stops on routes 432, 431, 471 and 232. These stops have been nominated as they fall on the boundary of the proposed development.</li> <li>All developments fall within 1000m of a bus routes which provides access to Altona Gate Shopping Centre, Brooklyn Industrial Estate, Footscray Train Station and Melbourne CBD. This meets the distance requirements for access to public transport in accordance with the Green Star Multi-Unit Residential V1 tool and as such does not prompt the need for re-routing an existing public transport line.</li> <li>The development will consider opportunities to introduce a car share program to be located in a central location and adjacent to high-density areas.</li> </ul>
Mixed Use Development	Encourage diverse land uses across the precinct to reduce daily car travel needs of residents and also encourage sustainable modes of transport such as walking and cycling.	<ul style="list-style-type: none"> <li>Encourage a mix of uses within the precinct.</li> </ul>
Connectivity	Provide an internal street, bicycle, and sidewalk network that facilitates high levels of internal connectivity, as well as permeability to public transport networks and the greater neighbourhood community.	<ul style="list-style-type: none"> <li>The development aims to create a network of cyclist routes and pedestrian links to key services on and off site.</li> <li>Good proximity to nearby industrial and employment precincts.</li> <li>Bus route to service the site, bicycle routes, bicycle parking, opportunity to include car-share spaces.</li> </ul>

# 6 Built Form

People spend up to 90% of their lives indoors.<sup>3</sup> Consideration must be given to both the quality of the indoor environment as well as the impact of the built environment on climate change.

Buildings contribute to about half the world's carbon emissions<sup>4</sup>. It is thought that the built environment has the single biggest potential to substantially reduce the world's annual carbon emissions through building designs that address energy use within buildings, embodied energy within the building materials and source of energy<sup>5</sup>.

## 6.1 Minimum Development Requirements

As part of the Hobson Bay City Council requirements, all Precinct 15 developments will be required to comply with the Council's ESD Policy. They also need to comply with either the Sustainable Tool for Environmental Performance Strategy (STEPS) or the Sustainable Design Scorecard (SDS). Strategies for complying with these requirements are outlined below.

## 6.2 Recommended Initiatives

As part of the on-going development of the site, the following initiatives and policies can be employed to improve building design, to reduce its environmental impact and improve the indoor environmental quality.

Design Principle	Intent	Recommended Initiative
Construction Environmental Management	Encourage the adoption of environmental management practices during construction that is in line with established guidelines and standards.	<ul style="list-style-type: none"><li>All principal development contractors for high density developments are encouraged to implement an Environmental Management Plan in accordance with section 4 of the NSW Environmental Management System Guidelines 1998.</li><li>All principal development contractors are encouraged to implement a waste management plan to recycle 60% of all demolition and construction waste<sup>6</sup>.</li></ul>

<sup>3</sup> Olesen, Bjarne. Productivity and Indoor Air Quality. International Center for Indoor Environment and Energy Technical University of Denmark.

<sup>4</sup> US Green Building Council. 2007. Building Design Leaders Collaborating on Carbon-Neutral Buildings by 2030.

<sup>5</sup> <http://www.usgbc.org/News/PressReleaseDetails.aspx?ID=3124>

<sup>6</sup> Intergovernmental Panel on Climate Change (IPCC) "Working Group III contribution to the IPCC Fourth Assessment Report" (2007)

<sup>6</sup> Green Building Council of Australia, Green Star Office Design Version 3 Technical Manual



Design Principle	Intent	Recommended Initiative
Building Energy Efficiency	Encourage the design and construction of energy-efficient buildings that reduce air, water, and land pollution and adverse environmental effects from energy production and consumption.	<ul style="list-style-type: none"> <li>All developments are to comply with the BCA Section J requirements for energy efficiency.</li> <li>All residential developments will have a minimum NatHERS rating of 5 and aim for an average of 7.</li> <li>A preliminary NatHERS (First Rate 5) analysis of the proposed residential built form to be undertaken at Planning Permit Stage</li> <li>Where appliances are provided, they should be within 1 energy star rating of the best available at the time.</li> <li>All residential developments shall provide a STEPS Assessment, and all other developments are required to provide a SDS score card.</li> <li>Consideration of good architectural principles to enhance indoor air quality. This includes solar shading allowing passive solar heat gain in winter, passive cross ventilation, high performance insulation and exposed thermal mass.</li> <li>High efficiency glazing and external shading devices where appropriate</li> <li>Consideration of optimum building orientation to maximise passive solar design.</li> <li>Use of energy efficient light fittings in conjunction with optimum daylight penetration</li> <li>Use of low energy appliances and passive clothes drying (outside, where possible)</li> <li>Installation of smart meters and electricity saving shutdown switches at each dwelling</li> <li>Use of instantaneous gas hot water systems with solar pre-heat.</li> <li>Maximise opportunities for roof spaces considering the inclusion of solar hot-water and/or photovoltaic systems.</li> </ul>
Water Efficiency	Encourage building design that minimises potable water consumption.	<ul style="list-style-type: none"> <li>All fixtures and fittings installed are to be within 1 WELS star of the best available fixture or fitting at the time of design.</li> <li>Where appliances are provided, they are to be within 1 WELS star rating of the best available at the time.</li> <li>All residential developments shall provide a STEPS Assessment, and all other developments are required to provide a SDS score card.</li> <li>Consider rainwater collection tanks and consider the use of grey water systems (where possible)</li> </ul>
Indoor Environmental Quality	Encourage building design that creates healthy indoor environments through: <ul style="list-style-type: none"> <li>Provision of natural ventilation</li> <li>High levels of natural light</li> <li>Thermal comfort (through material selection and insulation)</li> <li>Use of low VOC paints, sealants, adhesives, carpets</li> <li>Use of low formaldehyde wood products</li> </ul>	<ul style="list-style-type: none"> <li>Where possible, habitable spaces to provide access to a window.</li> <li>All developments are encouraged to use low VOC paints, sealants, adhesives and carpets in accordance with the Green Star requirements as developed by the Green Building Council of Australia.</li> <li>All engineered wood products are to comply with the Green Star requirements, as developed by the Green Building Council, for low formaldehyde emissions.</li> <li>Opportunity for site layouts with good solar penetration and minimum overshadowing.</li> </ul>

Design Principle	Intent	Recommended Initiative
Material Use	Encourage design that minimises the consumption of resources through re-use of materials and the use of materials with a reduced environmental impact.	<ul style="list-style-type: none"> <li>• Developments are encouraged to source steel from an environmentally accredited steel supplier, when applicable.</li> <li>• Developments are to consider the recycled aggregate in concrete.</li> <li>• Encouragement of efficient construction techniques, with the recycling of construction waste where possible.</li> <li>• Where possible, ecologically sourced construction materials (e.g. FSC certified timber)</li> </ul>
Peak Energy Demand Reduction	To encourage and recognize design that reduces peak demand on electricity supply infrastructure.	<ul style="list-style-type: none"> <li>• Where individual split unit air-conditioning is provided, it should be within 1 star of the most energy efficient system at that time.</li> <li>• Solar hot water boosters are encouraged to be provided to developments.</li> </ul>

# 7 Infrastructure

To service future development within the precinct, efficient site infrastructure is critical in allowing and encouraging the use of carbon efficient sources of energy. Development within the precinct should consider the use of sustainable forms of energy and water.

## 7.1 Development Plan

Development should consider the use of electricity alternatives where possible including the use of a natural gas based system.

## 7.2 Heat Island Effect

The vegetated green space within the development will also help reduce the heat island in the precinct. Consideration has been given to development density and the spaces between buildings. Where possible, the development will also offset the heat island effect through the use of light coloured surfaces.

## 7.3 Third Pipe Recycled Water System - subject to further investigation

Consideration will be given to the provision of a third pipe recycled water system (subject to further investigation). It is possible that some site specific constraints will be a burden for its feasible implementation. Landowners may choose to explore this option at planning permit stage, at their discretion.

A third pipe system distributes Class A recycled water, which is collected and treated off site. The internal water demand for a typical household is as follows:

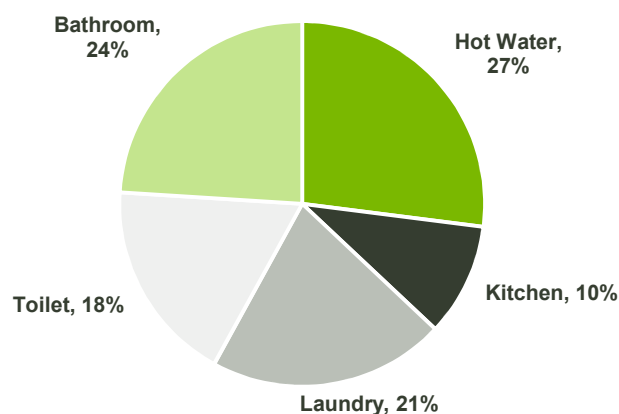


Figure 4 Internal Water Demand (154 kL/yr)

Class A Recycled Water is suitable for toilet flushing and laundry use. It can potentially reduce potable water demand by 39%. In addition external irrigation of the landscape within the development will further reduce potable water consumption.

Recycled water can be used for the following uses:

- agricultural irrigation
- industrial processing such as for cooling
- municipal uses such as watering parks and gardens
- domestic uses such as toilet flushing, car washing, and garden watering

The cost of Class A Recycled Water is cheaper, per kilolitre, than mains water. Given the potential nature of development at Precinct 15, there is an opportunity to provide a third pipe system for the uses listed above.

It is noted that the project team is coordinating the implementation of this initiative with City West Water. The project will be design no to adversely affect any pre-approved stormwater harvesting systems.

## 7.4 Recommended Initiatives

The below initiatives may be employed to reduce the precincts environmental footprint, and set-up a framework that encourages a higher level of environmental sustainability.

Design Principle	Intent	Recommended Initiatives
Stormwater management	Minimise peak stormwater flows and protect receiving waterways from pollutants during storm events. Provide for stormwater detention infrastructure	<ul style="list-style-type: none"> <li>• Vegetated area throughout the site can reduce the total quantity of site stormwater run-off during storm events.</li> <li>• Refer to SMEC report for details on stormwater management strategy</li> </ul>
Heat Island Minimisation	<p>Reduce the heat island effect of the development to minimise its effects on the microclimate and human and wildlife well-being and habitat. Ensure that hard surfaces are minimised and that vegetated areas (landscaped areas and tree-lined streets/paths) are maximised.</p> <p>Roads, sidewalks and roofs should be light coloured so that solar heat energy is reflected away from the development.</p>	<ul style="list-style-type: none"> <li>• Development should integrate a high level of vegetated area into the precinct.</li> <li>• All buildings will be encouraged to have a roof with an average SRI of less than 29.</li> <li>• Consideration to be given to all roads and sidewalks to reduce the heat island effect.</li> </ul>
Energy Efficient Infrastructure	Encourage the design and construction of energy-efficient infrastructure that reduces air, water, and land pollution and adverse environmental effects from energy production and consumption.	<ul style="list-style-type: none"> <li>• Capacity for a sufficient gas supply can be provided to all developments to encourage the use of gas systems rather than electrical systems.</li> <li>• Use of efficient street lighting methods, considering LED and hybrid lighting.</li> </ul>
Renewable Energy	Encourage on-site energy production to reduce the adverse environmental and economic effects associated with fossil fuel energy production and use.	<ul style="list-style-type: none"> <li>• Subject to Council and Authority Approval, developments will be encouraged to provide on-site electricity generation with excess capacity being exported back to the grid.</li> <li>• The activity centre may seek to provide a portion of its electricity usage via renewable energy i.e. solar PV.</li> </ul>

Design Principle	Intent	Recommended Initiatives
Recycled Content in Infrastructure	Encourage the use of recycled and reclaimed materials in major infrastructure to reduce the adverse environmental effects of extracting and processing virgin materials. Ensure that new infrastructure is made up of recycled content or in-place reclaimed materials.	<ul style="list-style-type: none"> <li>All infrastructure is encouraged to consider the reuse of recycled aggregate in concrete. A concrete technologist may be engaged to determine the appropriate concrete mixes.</li> </ul>

# 8 Waste & Emissions

## 8.1 Waste Management

A study of Victorian households showed that residential properties produced a total of 1.65 million tonnes of household waste, 885kg per household, 28% of which was recyclable waste. Of all municipal waste, 47% was found to be food and green waste, most of which could be composted or mulched.<sup>7</sup>

To address these issues, a waste management plan prepared by a suitably qualified consultant will be required to accommodate the precinct's specific waste management needs.

## 8.2 Ozone Depleting Materials

Emissions of substances such as Chlorofluorocarbons (CFCs) as well as Hydrochlorofluorocarbons (HCFCs), commonly used within insulating products and refrigerants, contain gases that contribute to the depletion of the ozone layer and global warming<sup>8</sup>.

All insulants and refrigerants used on site should have an Ozone Depletion Potential (ODP) of Zero in both manufacture and composition.

## 8.3 Recommended Initiatives

The below initiatives have been recommended to reduce the overall environmental foot print of the development with regards to waste and emissions.

Design Principle	Intent	Recommended Initiatives
Solid Waste Management	<p>Reduce waste deposited in landfills and promote the proper disposal and/or recycling of waste.</p> <p>Ensure that collection system sizes and frequencies match waste generation rates and that the community is informed about recycling opportunities on site through appropriate signage and education.</p>	<ul style="list-style-type: none"><li>• A waste management plan prepared by a suitably qualified consultant to accommodate the precinct's specific waste management needs.</li><li>• Recycling bins in public spaces (subject to council agreement and waste management plan).</li></ul>

<sup>7</sup> Green Star Multi Unit Residential Version 1, 2009.

<sup>8</sup> ChloroFluorocarbons, Ozone Hole Watch, [http://ozonewatch.gsfc.nasa.gov/facts/hole\\_SH.html](http://ozonewatch.gsfc.nasa.gov/facts/hole_SH.html)

External Light Pollution	Ensure that light pollution to the night sky is minimised through the avoidance of up-lighting and the use of motion/timer sensing for external lighting. Poorly designed lighting can have a detrimental impact on energy use and glare to neighbouring properties.	<ul style="list-style-type: none"> <li>• All external lights should not have an upward light ratio of 5% (other than when required for safety lighting)</li> <li>• All external lighting is to comply with AS 4284, where applicable.</li> </ul>
Refrigerant & Insulant ODP	Ensure that the types of refrigerants used in HVAC systems throughout the development have minimal potential to contribute to global warming in the event of their discharge by ensuring that they have an ODP of zero. With regards to thermal and acoustic insulants, ensure that no ozone depleting substances are used in either their manufacture or composition.	<ul style="list-style-type: none"> <li>• All developments are encouraged to provide insulants and refrigerants with an ODP of zero.</li> </ul>



## 9 Ecology and Landscape

The proposed development consists of a redevelopment of an existing brownfield site. The Hobson Bay City Council may experience many environmental, social and economic benefits from the redevelopment of a brownfield site including:

- Removal of actual and sources of land, water and air contamination
- Rediscover desirable locations, allowing for smarter growth through urban intensification
- Beautifies urban landscape
- Creation of quality public open space
- Revives older surrounding urban communities
- Locates new development in an area where better use can be made of existing municipal infrastructure and services (i.e. transit)
- Increase property assessment values and the resulting tax base, leading to increased revenue for government
- Reduce urban sprawl

### 9.1 Recreation Areas

Recreational areas not only encourage outdoor activity and help foster a sense of community, but also improve the air quality, reduce stormwater runoff and reduce the heat island effect within the local environment. The proposed concept plan will include a central open area within the precinct, as well as a mixed use zone located towards Blackshaws Rd.

Figure 5 illustrates some of the green open areas and also the main mixed use area for precinct 15.





Figure 5: Green Open Space and Landscape Plan

## 9.2 Recommended Initiatives

The below initiatives have been recommended to reduce the overall environmental foot print of the development with regards to landscape and ecology.

Design Principle	Intent	Recommended Initiatives
Landscape Water Efficiency	<p>Reduce the use of potable water for landscape irrigation. This can be achieved through the use of:</p> <ul style="list-style-type: none"> <li>Native draught tolerant planting</li> <li>Efficient irrigation systems</li> <li>Use of harvested/recycled water</li> </ul>	<ul style="list-style-type: none"> <li>Consider native drought tolerant species, consider species allowing summer shade and winter sunlight penetration into the built environment</li> </ul>
Recreation Areas	<p>Provide shared spaces that encourage outdoor activity and help to foster a sense of community..</p>	<ul style="list-style-type: none"> <li>The development concept plan proposes a large central open area within the development, as well as a mixed use zone located towards Blackshaws Rd.</li> <li>Safe design, ensuring all public areas are visible from at least one street</li> </ul>



# 10 Implementation

The previous sections of the Sustainability Plan provide principles for the Precinct as well as outlining a range of initiatives and targets based on the Green Star framework.

This section of the report outlines the proposed implementation of these systems to ensure that the development can be set up and managed effectively to achieve, maintain and monitor the sustainability initiatives and targets identified for the site.

The previous sections of this report provide an overview of the proposed ESD initiatives that aim to respond to ESD principles such as energy and water efficiency, indoor air quality, material reduction and sustainable transport. Further details on these initiatives will be provided at subsequent phases of the development as outlined in the implementation strategy below.

## 10.1 Preliminary considerations and planning

- Client brief confirmation and setting sustainability objectives for the project.
- Review any environmental/sustainability objectives for the project.
- Seek briefing input for the project and occupancy requirements to the extent that may affect the sustainability outcomes
- Review and comment on the sustainability plan and design documentation including input briefing presentations by the relevant disciplines to the developer
- Develop a summary return brief collating the findings from the foregoing investigations, outlining opportunities and constraints to achieve the desired targets
- Organise ESD workshops with the design team to review building sustainability objectives and targets and the means to achieve them
- Develop sustainability implementation plan for agreed strategies including targets to be achieved

## 10.2 Schematic design phase

- Undertake ESD workshop to evaluate design options and sustainability performance outcomes
- Determine modelling required to inform the decision making such as daylight, thermal, urban comfort and energy modelling
- Prepare a feasibility study for the main sustainability objectives that are to be implemented to see if they are ecologically, socially, economically and technically viable and feasible
- Agree upon sustainability improvements to be included as part of the site and building design by all consultants

- 
- Assess the link between sustainability objectives and targets

### **10.3 Detailed design and contract documentation phase**

- Review the sustainability objectives incorporated into the design
- Refine operational characteristics of the site and systems
- Review proposed commissioning approach and design configuration for long term operational performance
- Design team documentation, review to sustainability brief and targets
- Include sustainability initiatives as part of the main contract with the builder.
- Compare agreed sustainability initiatives to the set targets

### **10.4 Construction phase**

- Review proposed commissioning approach and system design configuration for long term operational performance
- Ensure the builder implements the sustainability initiatives during the construction process as intended in the design
- Compare implemented sustainability initiatives to the set targets

### **10.5 Occupancy phase**

- Develop a Community Guide; information relevant to the building users and is made available to the Building Owner.
- Ensure energy and water consumption are monitored and further improvement strategies are put in place.
- Review implemented sustainability initiatives to set targets



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