Sustainability at The Commons
Urban developments built now and into the future will have a lasting effect on the sustainability of our cities. They can also influence how comfortable, convenient, safe and affordable our lives are. Creating a great place to live that is sustainable and affordable was a key ambition at The Commons, and the project will demonstrate a new approach to urban development.

The Moreland Energy Foundation Limited (MEFL) has worked with The Commons to look at how the project will deliver sustainability, from design right through to ongoing operation.

Using MEFL’s Sustainable Urban Development Framework this document describes how the project is working towards best practice in five key areas. In each area the project has identified opportunities in design, construction and ongoing operation.

**Principles**

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**Contacts**

**The Commons**
Small Giants
11 Princess St
St Kilda VIC 3182
T: 8434 8002
E: adam@smallgiants.com.au

**Moreland Energy Foundation**
Level 1, 233 Sydney Rd
Brunswick VIC 3056
T: 9385 8585
E: Info@mefl.com.au
www.mefl.com.au
Energy efficiency is one of the most cost-effective ways of reducing greenhouse gas emissions, and is often relatively easy to implement. Subtle changes in design, materials, and the systems that are incorporated into a building can have large efficiency gains, and in many cases, these adjustments have a minimal impact on the cost of the build, particularly if they are made early in the design process. They can also lead to big ongoing savings on energy bills.

Energy efficiency concepts

**Thermal performance** refers to a building’s ability to maintain a relatively stable internal temperature. Thermal performance is affected by many factors including building orientation, location and size of windows and eves, use of natural ventilation, and construction materials, insulation and draught sealing.

**Energy efficient appliances** include both fixed and non-fixed devices such as lighting (private and public domain), whitegoods and heating / cooling systems. When considering the relative energy efficiency of one system compared to another, it is important to also consider the carbon intensity of the fuel source (e.g., electricity versus natural gas).

**Urban heat island effect** occurs in urban areas where buildings, roads, and non-natural forms absorb and retain heat. Heat islands can increase summertime peak energy demand, air conditioning costs, air pollution, greenhouse gas emissions, and heat-related illness. Measures to reduce urban heat island effect include increasing vegetation, and large scale green roofs and walls, and using light coloured cladding and finishes.

A **green roof or wall** helps to regulate internal building temperature by reducing heat retention and acting as insulation. They can also improve local air quality, enhance biodiversity, reduce the impact of stormwater runoff, provide a relaxed space for residents and reduce the urban heat island effect.

**Building management systems** control the active systems within a multi-unit or commercial development to optimise management for energy efficiency.

The Commons context

The Commons has capitalised on the opportunity to showcase highly efficient building design and technologies.

The Commons target of 8-star energy efficiency represents leading practice in Australia, and has the potential to reduce heating and cooling energy consumption by up to 90%.

While some energy will be generated at the site, its key opportunity to reduce energy consumption - and subsequently end use costs and emissions - is through energy efficiency.

The residents and businesses at The Commons will also be supported in reducing their energy use through the provision of tools and information they need to make smarter energy choices.
### Energy efficiency

**Actions**

<table>
<thead>
<tr>
<th>Actions</th>
<th>Potential impact</th>
<th>Challenges and considerations</th>
<th>Strategy and innovations to be delivered at The Commons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximise thermal performance</strong></td>
<td>Seven-star houses require an average of 45% less heating and cooling when compared to a five-star rated house. The Commons target of 8 stars goes even further, and could lead to up to 90% reduction in energy for heating and cooling.</td>
<td>Early action: The greatest potential to maximise thermal performance is at the concept and design phase – The Commons prioritised these measures very early on. Cost: Building efficiently can lead to some increases in construction costs. Slightly smaller apartments, reduction in materials and improvement in construction efficiencies can offset this. In addition to this, any additional upfront cost is far outweighed by the ongoing cost savings from lower energy costs. Industry education: Supply chain training may be required to improve Insulation and draught sealing competencies to ensure buildings meet desired performance levels.</td>
<td>• Apartments will achieve an average 8 star energy rating - leading practice for Australia. This is supported by various measures including high levels of wall and ceiling insulation, appropriate glazing ratios and double glazing. • Deep balconies on the north and limited glazing to the east and west will help deal with unwanted sun and glare. • Central voids have been introduced to promote better daylight penetration and ventilation. • The building has been set-back on the western side to allow for better natural climate control in the west facing ground floor tenancies. • Apartments have been carefully designed to include significant openable areas to promote high levels of cross-flow ventilation. • Apartments and commercial spaces will be naturally ventilated. • Lobbies and the stairwell will be naturally ventilated, subject to fire engineering requirements. • Detailing of building components around openings, overhangs, soffits, balconies, above roof and between changes of use to eliminate thermal bridging will be pursued.</td>
</tr>
<tr>
<td><strong>Use of energy efficient appliances in premises</strong></td>
<td>Fixed (include water heaters) and non-fixed appliances account for on average up to 40% of household energy use. No or low cost energy efficiency improvement action.</td>
<td>Cost: Additional up-front cost and split incentive. End user responsibility: Portable appliances, such as fridges and TV, are usually supplied by owner occupier or tenant. The Commons will help residents to choose appliances that lower energy use and bills.</td>
<td>• Motion and daylight sensors in common areas will reduce the electrical lighting demands. • No air conditioning will be specified in the dwellings or the tenancies as passive cooling will be integrated into the design. • Heating will be provided with low energy hydronic radiant heating panels. • The central location and open nature of the stairs will encourage residents to use them instead of the lift. • All residents have access to external clothes line. No clothes-dryers will be provided. • A shared laundry with highly efficient and well maintained machines will be provided for residents • Residents will be provided with important information on appliance selection prior to moving in, allowing them to choose the most efficient and cost-saving models.</td>
</tr>
<tr>
<td><strong>Reducing urban heat island effect</strong></td>
<td>The urban heat island effect can increase localised temperatures by up to 7°C in urban areas.</td>
<td>Finding balance: The need for higher density development must be balanced against the potential for an increased heat island effect that can result from higher density.</td>
<td>• The rooftop garden and additional green spaces at the west of the site will contribute to local plant-life, leading to some offset of the urban heat island effects.</td>
</tr>
<tr>
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</table>
| Green roofs and walls          | Green roofs can reduce heat absorption by 10-22°C. Can provide additional insulation to the building, reducing the impact of external temperature on occupant comfort.                                                                                                                                                                                                 | **Construction and cost impacts:** May need greater structural support, leading to additional cost, although this is less likely if incorporated early in the design process. **Maintenance:** Ongoing maintenance and management is required. | • The rooftop garden will provide residents with a recreation space as well as onsite food production and composting facilities.  
• The trafficable nature of the rooftop means maintenance will be much more easily undertaken.  
• Planter boxes on balconies will provide a green curtain along the northern façade of the building. |
| Building management systems (BMS) | BMS that control lighting alone can save up to 70% of associated energy costs. Extends the operational life of equipment and systems through reduced loads and operating hours.                                                                                                                                                                                                                      | **Cost:** May incur additional upfront costs, although these are likely to be offset by ongoing cost savings through efficiency of operation. **Target tracking:** High quality data can verify achievement of targets and predicted savings. | • All apartments and retail tenancies will be fitted with a 'kill switch', allowing all non-critical appliances to be switched off when leaving the building.  
• Building services will be fine-tuned quarterly during first 12 months of occupation in accordance with the best practice requirements outlined in the Green Star rating tool. |
| Energy efficient common area lighting | Lighting for common areas often runs 24 hours a day, 365 days a year - even though most of the time no one is around. While each light may have relatively small energy needs, when run constantly they add up to be a significant energy consumer.                                                                 | **Getting it right the first time:** The payback period for installing energy efficient lighting upfront is much less than for retrofitting. | • The Commons is investing in high quality, low energy light infrastructure now, to maximise cost savings to residents over the life of the project.  
• Lobbies, stairs and other back of house spaces (waste store and bicycle store) will have occupancy sensors and timer switches on lighting. |

**How we compare**

Minimum new build energy efficiency standard

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<tbody>
<tr>
<td><strong>Low</strong></td>
<td><strong>Moderate</strong></td>
<td><strong>High</strong></td>
<td><strong>The Commons (Melbourne, Australia, 2012). 8 star average</strong></td>
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</tr>
</tbody>
</table>

**Implementation time frame**

- **Concept**
  Developer set target of 'best practice', leading to all energy efficiency opportunities being explored fully.
- **Masterplanning**
  Building massing focused on maximising thermal performance.
- **Design**
  Detailed design focused on thermal performance, specification of efficient active systems.
- **Construct**
  Ensure detailing and finishing is highest quality, to minimise thermal bridging and maximise air-tightness.
- **Operate**
  Appliance selection will have a significant influence on overall performance. Maintenance of the building fabric and active systems to ensure ongoing performance.
On-site energy generation

Victoria has a centralised electricity system, meaning the vast majority of Victoria’s electricity generation facilities are located a significant distance from the end point of use. This system sees up to 70% of the fuel’s potential energy lost during generation, transmission to urban areas and distribution within towns and cities.

On-site energy generation addresses the issue of transmission losses, by being located close to the final point of electricity use. Additionally, on-site generation that uses low-carbon or renewable resources can significantly reduce emissions from energy generation.

On-site energy generation concepts

Solar water heating systems use solar radiation to heat water. When there is insufficient solar radiation systems have either gas or electric boosters to heat water.

Photovoltaic (PV) panels convert solar radiation into electricity without producing any emissions. PV panels have long life times and require almost no ongoing maintenance.

The Commons context

Despite its relatively small size and physical constraints, The Commons will deliver significant onsite generation through a solar hot water heating system, and a roof mounted photovoltaic array, which are predicted to produce around 10% of the site’s energy needs. These systems will provide residents and businesses at the site with long-term cost savings and reduce the overall carbon footprint of the building considerably.
## On-site energy generation

### Actions

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Solar water heating</td>
<td>Water heating accounts for approximately 20% of energy use in both the residential and commercial sectors.</td>
<td><strong>Physical constraints:</strong> Availability of suitable roof-space and correct orientation are vital to an efficient system. <strong>Administration:</strong> The shared ownership arrangements of roof-space in multi-apartment buildings can complicate administration of infrastructure installed on this space.</td>
<td>• Domestic hot water will be provided via a centralised system warmed by solar hot water panels and boosted with gas. It is estimated that around 25% of the energy will be provided by the solar panels across an average year.</td>
</tr>
<tr>
<td>Photovoltaic (PV) panels</td>
<td>Peak solar radiation occurs in summer during the afternoon which coincides with peak electricity demand. Increased use of PV reduces the need for upgraded grid infrastructure and associated upward pressure on electricity prices.</td>
<td><strong>Cost:</strong> upfront cost and ability of developer to recoup this through sale of dwellings. Large scale developments may encounter electricity grid connection and administrative issues. <strong>Physical constraints:</strong> Varying solar radiation throughout the year and roof space usually prevents generation of 100% of electricity requirements from onsite solar. <strong>Administration:</strong> Ownership of common property roof space presents similar issues to solar hot water. Access to incentives, such as the Victorian feed-in tariff, can also be influenced by system size and ownership.</td>
<td>• A 4.9kW grid connected Photo Voltaic array will be installed at The Commons. The energy supplied by this will be used to power common area lighting and other building services, reducing the carbon footprint and ongoing energy costs of the owners corporation. The photovoltaic array will generate surplus energy above that required by the Owners Corporation and will be a source of revenue for the Owners Corporation. • The costs of this system are absorbed into the overall construction costs. The system will offer some protection for the owners corporation (and subsequently individual owners, through reduced levies) against rising energy costs.</td>
</tr>
</tbody>
</table>

### How we compare

Proportion of energy that is sourced from renewable or low carbon sources

**Current practice:**
- Average Victorian residential apartment development (2010) 3%
- Malmo, (Sweden, 2003, residential) 100%
- One Brighton (UK, 2009, residential) 67%
- Vauban (Freiburg, Germany, 2006, mixed use) 66%
- The Commons (Melbourne, Victoria 2012, mixed use), 10%

**The Commons target:** Percentage of energy obtained from on-site zero or low carbon sources

<table>
<thead>
<tr>
<th>Proportion (%)</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
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<tbody>
<tr>
<td>0</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
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<tr>
<td>40%</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>80%</td>
<td>90%</td>
<td>100%</td>
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</tbody>
</table>

### Implementation time frame

**Concept**
- Despite physical constraints, onsite generation identified as a key element of a sustainable approach to energy.

**Masterplanning**
- Building massing shaped to allow roof space for panels for solar hot water and solar electricity.

**Design**
- Design and space requirements of centralised solar hot water system.
- Sizing and cost analysis of solar hot water and solar photovoltaic (electricity).

**Construct**
- Grid connection of onsite generators.

**Operate**
- Regular maintenance required.
It is often not practical or cost-efficient for developments to attempt to achieve ‘zero carbon’ or ‘carbon neutrality’ via on-site actions only. A range of issues mean that some energy needs and residual emissions are better addressed through other mechanisms, such as GreenPower and carbon offsets.

Critical in this is ensuring that the environmental credentials of any offsite mechanisms are carefully verified, to ensure the development can be confident in any claims made. This section describes two actions that can be taken in order to address any residual emissions.

**Options to address residual emissions**

**GreenPower** is a government-accredited scheme for electricity generated from renewable sources. Purchasing GreenPower ensures the equivalent percentage of annual electricity consumption is sourced from zero net emission sources, such as wind power.

**Carbon offset** programs invest in measures that compensate for emissions such as renewable energy generation, energy efficiency, methane reduction and forestry. Developments promoting themselves as ‘zero carbon’ or ‘carbon neutral’ need to consider independently certified or accredited offsets.

**The Commons context**

The relatively small scale of The Commons, along with its limited opportunities for significant onsite energy generation, mean that alternative mechanisms will be important in moving towards a target of carbon neutrality.

The owners corporation will work with the future community at the site to explore key opportunities to bridge the gap to carbon neutrality. The residents and their ability to function as a community will be a key asset in this, and the developer Small Giants is committed to working to foster a unique sense of community and cooperation at The Commons.
## Actions

### Actions for closing the gap at The Commons

<table>
<thead>
<tr>
<th>Action</th>
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<tbody>
<tr>
<td>GreenPower</td>
<td>Encourages investment in new renewable energy sources which helps to lower the overall emissions intensity of grid electricity. Purchasing 100% accredited GreenPower would save an average Australian home approximately 7 tonnes of emissions per year - equivalent to removing almost two cars from the road.</td>
<td><strong>Cost:</strong> GreenPower does pose an additional cost to residents. <strong>End user:</strong> Owners/tenants are free to choose their own electricity retailers and products hence purchase of GreenPower may need to be incentivised.</td>
<td>• Small Giants and Moreland Energy Foundation (MEFL) to assist residents with a “bulk purchase” of GreenPower for individual electricity accounts, if commercially viable.</td>
</tr>
</tbody>
</table>

### Carbon offsetting

Can compensate for all emissions associated with a specific activity or all aspects of the development and the lifestyle of its residents. Carbon offsets can also support important initiatives including tree planting, renewable energy generation and large-scale energy efficiency programs.

**Administration:** Periodic emissions calculations would be required to allocate the cost of carbon offsets across residents on an equitable basis. Concerns exist with the integrity of some offsets marketed, and confirming the integrity of these can be difficult.

• MEFL will work with the developer, owners corporation and residents to evaluate offsetting options, providing support in decision making and offset purchasing.

## Implementation time frame

<table>
<thead>
<tr>
<th>Concept</th>
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<tbody>
<tr>
<td>Following consideration of on-site energy generation, opportunities to source green energy offsite considered.</td>
<td>Bulk purchase of GreenPower identified as a means to ensure 100% renewable power to the site.</td>
<td>Owners corporation and Moreland Energy Foundation to explore opportunities for bulk purchase of GreenPower by residents.</td>
<td>GreenPower purchased by residents wherever possible. Additional offsetting opportunities explore to offset residual emissions.</td>
<td></td>
</tr>
</tbody>
</table>
Demolition and construction concepts

**Design for sustainability** in this context includes actions such as designing for longevity and deconstruction, designing to standard material sizes to avoid excess and incorporating recycled and recyclable materials.

**Waste management plans** for demolition and construction contractors include targets for resource recovery, identification of the destination of material types, and reused and recycled materials quotas.

Project context

The development of The Commons will necessitate the removal of an existing brick factory building. The waste from this process will be carefully managed to ensure materials are reused wherever possible, and other waste is processed appropriately to allow for recycling. The bricks from the existing factory will be reused in construction of the apartment building.

The building has been designed to reduce construction waste wherever possible, and will be built for a long life.

Over 75% of waste generated during demolition and construction is clean excavated material, concrete, bricks and timber which are all highly recyclable.

Reduction of construction waste is an opportunity to significantly increase project efficiency and reduce project costs.
### Demolition and construction

#### Actions

**Actions for efficiency in demolition and construction**

<table>
<thead>
<tr>
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<tr>
<td><strong>Design for sustainability</strong></td>
<td>Reduced material and waste disposal costs. 80% of environmental impacts are locked in at the design stage - it represents the key opportunity for change.</td>
<td><strong>Time and expertise:</strong> Additional time and expertise may be required at the design stage.</td>
<td>• Early commitment from the designer, Breathe Architecture, meant that sustainable design was a key consideration throughout the process, reducing need to make costly design revisions.</td>
</tr>
<tr>
<td><strong>Waste management plans</strong></td>
<td>Recycling and reusing materials reduces can reduce material purchase costs, landfill disposal costs and can even generate revenue. On average material waste accounts for 10% of total project costs.</td>
<td><strong>Time and expertise:</strong> Additional time and expertise may be required at design stage. <strong>Contractual:</strong> Contractors and sub-contractors can be required to participate in a waste minimisation program as a condition of their contract. Should specifically address recycling of expandable polystyrene (EPS) as is not available through mainstream programs.</td>
<td>• Part of the builder’s contract at The Commons will be to deliver an Environmental Management Plan, in keeping with best practices outlined in the Green Star rating tool. This plan includes waste management. • The builder will also be contractually obliged to achieve a minimum of 60% construction waste recycling.</td>
</tr>
</tbody>
</table>

#### How we compare

Construction and demolition waste (by weight) recycled or reused

**Current practice:**

- **Elizabeth Mitchell Drive** (Thurgoona, NSW, 2009), 80%
- **Victorian average** (2007), 71%
- **Aurora** (Melbourne, Australia, 2025), 85%
- **The Commons** (Melbourne, Australia, 2012), 60% minimum

**Implementation time frame**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Establish waste reduction, recycling and reuse targets.</td>
<td>Consider standard material lengths in early concept design.</td>
<td>Incorporate principles of Design for Sustainability into detailed design process. Material specification to consider longevity.</td>
<td>Careful waste management and recycling included in contract as part of Environmental Management plan.</td>
<td>Contractual obligation to achieve recycling target.</td>
</tr>
</tbody>
</table>
Waste avoidance and recycling

The household sector in Australia generates almost 12 million tonnes of solid waste every year, and only 38% of this waste is recycled.

Over one third of household waste is organic including, food and garden waste. When organic material breaks down in landfill methane emissions are released which account for 3% to 4% of Australia’s greenhouse gas emissions. Diverting food waste away from landfill reduces greenhouse emissions and can create valuable resources, such as compost.

Waste avoidance

Waste management infrastructure refers to the inclusion of facilities so that the development can maximise good waste separation and management. Examples include providing space in apartments for multiple bins, and providing separate garbage and recycling chutes in high density buildings.

Small scale resource recovery includes composting hubs or worm farms for the onsite treatment of organic materials such as kitchen scraps.

Non-standard recycling services can be introduced for products or materials that are not recyclable through the kerbside collection service, such as batteries and household appliances. The need for these services should be determined with reference to the recycling services provided by local councils via hard waste collections and at resource recovery centres.

Product sharing involves households and businesses sharing infrequently used items, such as tools or appliances. Environmental benefits arise from reducing the amount of goods that each household needs to purchase, and ultimately dispose of. This can be undertaken through formal schemes such as The Sharehood, or informally between neighbours.

The Commons context

Creating the conditions for residents to live a sustainable life is a key focus of the development approach at The Commons.

Medium density living can present challenges in waste management, however the design of The Commons overcomes these. Tenants will be provided with all the necessary infrastructure and knowledge to reduce their overall waste generation, and to manage the remainder sustainably.

Purpose built recycling, composting and sharing facilities will be integrated into The Commons development.
### Waste avoidance and recycling

#### Actions

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Waste management infrastructure</td>
<td>Convenient infrastructure can significantly increase the portion of waste that is recycled, and the quality of waste separation.</td>
<td>Physical limitations: Additional waste management infrastructure may marginally reduce land or floor area available for higher value uses. Adequate access for waste collection vehicles.</td>
<td>• Kitchens in all apartments will be fitted with in-built separated bins for all waste streams, making it easy and convenient to recycle and compost. • The Commons will provide a dedicated storage area for waste handling and recycling, ensuring residents can conveniently separate their waste streams.</td>
</tr>
<tr>
<td>Onsite small scale resource recovery</td>
<td>Reduces fuel consumption and GHG emissions associated with the collection of waste. Resource recovery of the food component can reduce waste disposed to landfill by approximately 40%.</td>
<td>Maintenance: Requires ongoing management and maintenance. Education: Requires education to ensure correct usage and minimise contamination.</td>
<td>• A communal composting facility will be provided as part of the rooftop garden at The Commons, allowing residents to compost all food and garden waste. • The composting facility will create valuable nutrient-rich soil for use on the rooftop garden. Ongoing maintenance will be managed by the owners corporation. • The owners corporation will investigate working with Moreland City Council to organise regular collection of non-standard recyclables.</td>
</tr>
<tr>
<td>Non-standard recycling services</td>
<td>Can assist householders, local and state governments to achieve waste reduction and recycling growth targets. Can reduce incidence of large items such as TVs from being abandoned on kerbside.</td>
<td>Physical limitations: Adequate onsite space can be challenging, particularly in higher density developments.</td>
<td></td>
</tr>
<tr>
<td>Product sharing</td>
<td>Reduces the need to purchase items for ‘one-off’ or irregular use, and can foster community interaction.</td>
<td>Sharing mechanism: Requires some sort of mechanism to link individuals to products.</td>
<td>• The owners corporation will investigate a function on the community website to allow products listed and potential users to be ‘matched’. • Alternatively, sharing could be encouraged by linking neighbours via web sites like Sharehood.</td>
</tr>
</tbody>
</table>

#### How we compare

Reduction of waste to landfill post construction

<table>
<thead>
<tr>
<th>Current practice:</th>
<th>The Commons (Melbourne, Australia, 2012, residential), 40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCS Maranoa Retirement Villages (Alstonville and Lismore, NSW, 2005, residential), 25%</td>
<td>Hammarby (Stockholm, Sweden, 2010, mixed use), 90%</td>
</tr>
<tr>
<td>Vikke (Helsinki, Finland, 2004, mixed use), 20%</td>
<td></td>
</tr>
</tbody>
</table>

#### Implementation time frame

- **Concept**: Establish post construction waste reduction, composting, recycling and reuse targets.
- **Masterplanning**: Opportunities for onsite recovery identified, with a shared compost system most feasible.
- **Design**: Apartment design includes provision for separate bins for waste streams. Convenient waste management infrastructure specified for common areas.
- **Construct**: Owners corporation management schedule to include compost system maintenance. Work with local council for collection of non-standard recyclable items.
Reducing the need to travel

Many daily travel needs are created by the separation of residential areas from land uses that support jobs, shops, key services, schools and recreation. By creating areas that support multiple uses, or locating new additional residential development close to existing services and infrastructure, the need to travel can be reduced significantly.

Key concepts

**Mixed use developments** are those that combine residential, commercial, recreational and/or community amenities on or in close proximity to the development.

**Small office or home office** residences offer both residential and office amenities such that people may work where they live, including the ability to meet with clients.

**Recreational facilities** include parks, barbeques, gyms, pools and tennis courts.

**Key services** include offices, postal, banking, medical, childcare services, shops and cinemas.

**Communal facilities** can comprise of a combination of recreational and commercial amenities. For example a communal facility may be a meeting room.

The Commons context

The Commons achieves a 92 out of 100 on Walkscore.com, meaning that it is considered a “Walkers Paradise”.

The Commons is located very close to the hub of Sydney Road in Brunswick. Shops, employment opportunities, key community services, recreation facilities and schools are all located close to the site, reducing the overall need for future residents to travel significant distances. The location of a cafe within the development will also give residents another reason to stay close to home.
### Actions for reducing the need to travel

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</thead>
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<tr>
<td><strong>Mixed use development</strong></td>
<td>Trips related to work, shopping, personal business and recreation comprise over 70% of total trips made in Melbourne. Locating houses and apartments close to jobs, shops and recreation can significantly reduce this need to travel. A mixture of uses can foster a sense of community and collaboration.</td>
<td><strong>Physical limitations:</strong> It can be challenging to meet the needs of residential, business and community uses in close proximity.</td>
<td>• The Commons, while too small to include significant commercial or retail uses, will include space for small ‘convenience retail’ and artist studios. The location of the project makes it part of a broader mixed use precinct, with key employment opportunities, shopping and services provided in very close proximity.</td>
</tr>
<tr>
<td><strong>Recreational facilities</strong></td>
<td>Trips related to recreation comprises 25% of total trips made in Melbourne.</td>
<td><strong>Physical limitations:</strong> Inner-city sites can be restricted in their ability to include recreational facilities, in particular open space.</td>
<td>• The location of The Commons means that residents will have a broad range of recreation opportunities within walking and cycling distance. • The communal rooftop garden will provide an area for gardening and community interaction.</td>
</tr>
</tbody>
</table>

### How we compare

#### % trips less than 6km

**Current practice:**

- Inner city Melbourne (Victoria, Australia). 80% (2007 data)
- Middle suburban Melbourne (Victoria, Australia). 67% (2007 data)
- Vauban (Freiburg, Germany, 2006). 84% (2006 data)

**The Commons target:**

- The Commons (Melbourne, Australia), 80%

### Implementation time frame

<table>
<thead>
<tr>
<th>Concept</th>
<th>Masterplanning</th>
<th>Design</th>
<th>Construct</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land and floor area uses identified in planning applications, including some provision of retail space and artist studios onsite.</td>
<td>Integration of rooftop garden into masterplan, creating communal space onsite.</td>
<td>Consideration given to potential for apartments to be used as home offices.</td>
<td>Owners corporation to maintain communal areas. Materials to support residents access to essential services in the local area.</td>
<td></td>
</tr>
</tbody>
</table>
Reducing private vehicle use

Cars now dominate most Australian cities. While they can provide valuable mobility for some needs, they can also reduce the quality of life in our cities, and the ability to get around using other means. For many daily transport needs, cars are not the best option.

Reducing private vehicle use has many benefits including financial savings for individuals, reduced congestion, reduced noise pollution, reduction in required parking spaces, increased safety and reduced greenhouse emissions.

Strategies to reduce vehicle use

**Car share schemes** provide members with access to a vehicle without some of the major costs of owning one. This means people can access a well maintained car on the irregular occasions they need one, without having to pay high registration, insurance and servicing costs.

**Encouraging public transport use** through the provision of information, incentives and linking infrastructure can make public transport an attractive alternative for a significant majority of trips.

The Commons context

The location of The Commons and the multitude of high quality public and active transport options in the vicinity had allowed for a new approach to transport considerations and infrastructure. The Commons will not provide any onsite car parking, and residents at the site will not be eligible for on-street parking permits. This will allow construction costs to be significantly reduced, the savings from which will be redirected into other features such as solar panels and the rooftop garden, adding considerable ongoing value to owners and tenants.

Residents will benefit from the cost savings of not owning a car, and enjoy great mobility options and the health benefits of active transport.
## Reducing private vehicle use

### Actions

<table>
<thead>
<tr>
<th>Actions</th>
<th>Potential impact</th>
<th>Challenges and considerations</th>
<th>Strategy and innovations to be delivered at The Commons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Car share schemes</strong></td>
<td>Every car share vehicle can remove the equivalent of between nine to thirteen private vehicles from the road.</td>
<td><strong>Physical limitation:</strong> Requires dedicated onsite car parking. <strong>Context:</strong> At present generally more viable in inner city locations with good access to public transport, where parking is limited and vehicle ownership levels are below average. <strong>Future consideration:</strong> Could enable provision of electric vehicles.</td>
<td>• The site will have a dedicated space for a share car located on the street adjacent the development (subject to Council approval), with ongoing operation, including bookings, managed by the commercial operator. To support the use of this, each apartment will be provided with an annual membership to the service, paid for by the owners corporation.</td>
</tr>
<tr>
<td><strong>Encouraging public transport use</strong></td>
<td>Aside from walking and cycling, public transport modes are the most efficient and cost effective ways to get around.</td>
<td><strong>New responsibility:</strong> Not generally seen as the role of a developer or owners corporation. <strong>Administration:</strong> May require ongoing administration.</td>
<td>• The Commons’ owners corporation will provide residents with information on all public transport options as part of their welcome pack. • The owners corporation agreement will include provision for two annual metcards to each two bedroom apartment and one metcard to each single bedroom apartment. • The site’s location next to Anstey train station will ensure that train travel is a particularly convenient option for residents.</td>
</tr>
</tbody>
</table>

### How we compare

#### Households without cars

**Current practice:**

<table>
<thead>
<tr>
<th>City of Moreland (Victoria, Australia), 16% (2006 data)</th>
<th>Hammarby Sjöstad (Stockholm, Sweden, 2015), 33% (2005 data)</th>
</tr>
</thead>
</table>

**The Commons target:**

- 100% (Melbourne, Australia)

### Implementation time frame

- **Concept:** The Commons was based on a ‘car-free’ concept from a very early stage.
- **Masterplanning:** Sound justification for car parking dispensation vital as part of planning permission.
- **Design:** Design without car parking, using freed up space and resources more productively.
- **Construct:**
- **Operate:** Residents supported to reduce car use through provision of share car and annual public transport tickets.
Active transportation

Greater adoption of active forms of transportation, including bicycling and walking, is beneficial for both the environment and for the health of individuals. Active forms of transport can also reduce traffic congestion and demand for limited parking.

Giving pedestrians and cyclists the highest priority in the design process will encourage active forms of transportation within and around a site as it moves into operation.

Strategies to foster active transport habits

- **Sustainable travel planning** is a process that facilitates individuals or communities to find more sustainable ways to get to and from their destinations.
- **End-of-trip facilities** provide bicycle riders or walkers with secure storage, shower and changing facilities at their destination.
- **Safe and conducive environments** encourage walking and cycling.
- **Mode interconnection** refers to being easily able to change between rail, bus, tram and bike. It requires a focus on proximity, safe and clear connection between modes, facilities and timetable coordination.

The Commons context

The Commons is located close to excellent active transport infrastructure. The Upfield cycling and walking path provides an efficient link to the CBD as well as the north of the municipality. The area around the site also features good opportunities to walk and cycle to various destinations.

Bicycles are expected to be a feature of many residents' daily transport, and the site will include ample secure storage for bicycles.
## Active transportation

### Actions

**Active transportation opportunities at The Commons**

<table>
<thead>
<tr>
<th>Action</th>
<th>Potential impact</th>
<th>Challenges and considerations</th>
<th>Strategy and innovations to be delivered at The Commons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure bicycle storage</td>
<td>Removes barriers to bike ownership and regular use, including fear of theft, convenience and space.</td>
<td>Physical limitation: Adequate space can be difficult in higher density development.</td>
<td>• The Commons is a car-free development, meaning additional space that would have been used to provide car parking can be dedicated to more productive uses. This includes providing 70 secure bicycle parking spaces on the ground floor, enabling residents to secure their bikes without taking up valuable space in their apartments.</td>
</tr>
<tr>
<td>Provision of safe and conducive environments</td>
<td>62% of Australians would consider riding a bike for many of their daily needs, but don’t due to safety fears.</td>
<td>Public perception: Community perception about the ‘rights’ of cars as the primary mode of transport can be difficult to shift. Context: Needs to be supported by those agencies responsible for road design and maintenance.</td>
<td>• The location of the site in Florence street, which is a ‘dead-end’ street and subsequently not used as a vehicle thoroughfare, provides a safe environment for cycling and walking. • A direct link to the Upfield bike path also means that commuters can access the city without any major ‘gaps’ in safe cycling environments on the way.</td>
</tr>
</tbody>
</table>

### How we compare

**Total trips using walking, cycling and public transport**

**Current practice:**

- City of Moreland (Victoria, Australia), 39.7% (2007 data)
- Hammarby Sjöstad (Stockholm, Sweden, 2015), 66% (2005 data)
- Vauban (Freiburg, Germany, 2006), 66% (2005 data)
- City of Moreland (Victoria, Australia), 39.7% (2007 data)

**The Commons target:**

- 95% target

<table>
<thead>
<tr>
<th>0</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
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<tr>
<td>Low</td>
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</tbody>
</table>

### Implementation time frame

- **Concept:** The Commons was committed to car free development early on, allowing energy to be focused on active transport.
- **Masterplanning:** Significant secure bicycle storage incorporated into high level design. Link to adjacent cycling and walking infrastructure.
- **Design:** Exact location and space requirements of secure bicycle storage.
- **Construct:** Links to Upfield shared bicycle and walking path delivered. Bicycle storage delivered with careful finishing.
- **Operate:** Maintenance to ensure amenity of bicycle storage area. Residents provided with information on cycling and walking in the area.
The use of sustainable construction materials can dramatically reduce the “embodied” environmental impact of a development, that is, the resources that are needed to manufacture and transport materials to market.

Not all materials have the same impact on the environment. Different types of steel, bricks and concrete have higher embodied energy depending on the levels of processing required for their production. However, alternative products, including recycled aggregate concrete, can make a significant dent in this impact.

**Construction and material strategies**

**Design for sustainability** in this context includes reducing consumption of resources by reducing house size, designing for durability and reusability, reducing reliance on scarce materials and incorporating materials with recycled content and low embodied energy. This approach is also discussed in the Zero Waste section of this document.

**Materials specification** includes defining principles for the selection of construction products. Sustainability principles include preferences for reused, recycled, low embodied-energy, and low toxicity materials as well as the use of materials from sustainable sources.

**The Commons context**

The Commons has been carefully designed to reduce the impact of construction materials. Where aesthetically possible, materials have been reduced through leaving some structural elements raw and exposed rather than concealing or cladding them. Saving materials not only reduces embodied energy, it also reduces construction costs.
## Construction and materials

### Actions

#### Actions in construction and material selection

<table>
<thead>
<tr>
<th>Action</th>
<th>Potential impact</th>
<th>Challenges and considerations</th>
<th>Delivery strategy and innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design for sustainability</strong></td>
<td>Reduced transportation, material and waste disposal costs and GHG emissions.</td>
<td><strong>Cost:</strong> Additional time and expertise may be required at the design stage. &lt;br&gt; <strong>Design:</strong> 80% of environmental impacts are locked in at the design stage, so it is important that full consideration to material options is given at this point.</td>
<td>• Finishes will be raw and exposed wherever possible to reduce the embodied energy of the building. At the same time the use of solid concrete structure and cladding will ensure the building has a long life. &lt;br&gt; • Apartments kitchens will be built using prefabricated modules, reducing material wastage. &lt;br&gt; • The bathroom to bedroom ratio ensures there is no more than one bathroom and toilet per 2 bedrooms, saving on space and materials.</td>
</tr>
<tr>
<td><strong>Materials specification</strong></td>
<td>Reuse of materials from the demolition site can achieve both cost and emission savings. Use of sustainable versions or alternatives to steel, bricks and concrete can substantially reduce embodied energy.</td>
<td><strong>Cost:</strong> Construction contractors may attach a risk premium to working with unfamiliar materials. Sustainable or low impact materials can be more expensive, however when costs are considered over the material’s full life any upfront premium is generally outweighed by durability and low disposal costs.</td>
<td>• Bricks from existing building will be retained and reused in the new building. &lt;br&gt; • Precast concrete walls, in situ floor and roof slabs, and concrete blocks will include significant recycled content or green alternative. &lt;br&gt; • The use of responsibly manufactured PVC will be specified. &lt;br&gt; • Only reused, recycled or EO rated particle board will be used. &lt;br&gt; • Certified wall lining and Forest Stewardship Council (FSC) certified or reused timber stud framing will be specified. &lt;br&gt; • Low VOC finishes, paints, sealants and adhesives will be used, reducing environmental impact and protecting the health of residents.</td>
</tr>
</tbody>
</table>

### Implementation time frame

<table>
<thead>
<tr>
<th>Concept</th>
<th>Masterplanning</th>
<th>Design</th>
<th>Construct</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project aimed for material reduction, efficient use of materials and low impact material selection. Used to guide broad design.</td>
<td>Criteria for the specification and selection of materials established and incorporated into design brief.</td>
<td>Key principles of material reduction and material selection utilised in design process.</td>
<td>Educate contractors regarding project sustainability targets and procurement objectives.</td>
<td>Ensure future works and maintenance are guided by sustainable material selection policy.</td>
</tr>
</tbody>
</table>
Building a sustainable development is just the beginning. Once the development is occupied, there are many everyday decisions that will affect the ongoing environmental outcomes achieved.

36% of Victoria’s ecological footprint is related to goods and services, and a further 28% is due to food consumption. Through minor changes to daily purchasing and consumption habits, consumers can significantly cut their ecological footprint, and in doing so support local traders and producers.

**Options to address residual emissions!**

**Access to sustainable goods and services** by exercising control over the type of retail and/or commercial services available within or used by the development (by the developer itself or through the owners corporation) assists tenants and residents in making sustainable decisions and purchases.

**Green contracts** require providers of services such as cleaning, gardening and maintenance to deliver their services in accordance with the environmental and social objectives of the development. For example, the cleaning contract may require the use of low toxicity or garden safe cleaning products.

**Green leases** require retail or commercial tenants to deliver their products or services in accordance with the environmental and social objectives of the development. These requirements typically address the internal operations of the tenant, such as energy and water use, and the products or services provided by the tenant, such as a requirement for cafes to supply fair trade coffee or use recyclable take away containers.

**Buying groups** can be established to facilitate the purchase of environmentally and socially responsible products and services such as low impact groceries, bicycle equipment and garden safe cleaning products. By establishing these groups (typically via the owners corporation), it can be easier for the occupiers to purchase products and services that are consistent with the environmental and social objectives of the development.

**The Commons context**

The Commons is located in one of Melbourne’s most diverse and vibrant communities, which retains a strong independant local economy. The surrounding area is also developing a reputation for awareness in environmental and social issues, and a strong trend towards “local living” and sustainable consumption is evident.

Residents at The Commons will be able to easily access many locally made goods, fresh fruit and vegetables, and become a part of this local economy. Services have emerged, such as organic food delivery, that allow even busy professionals to enjoy the benefits of local, organic produce.
### Sustainable consumption

**Actions to encourage sustainable consumption**

<table>
<thead>
<tr>
<th>Action</th>
<th>Potential impact</th>
<th>Challenges and considerations</th>
<th>Strategy and innovations to be delivered at The Commons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to sustainable goods and services</td>
<td>Reduction in GHG emissions associated with household goods and services.</td>
<td><strong>Limitation:</strong> Consumer choice is not something developers have a great deal of control over.</td>
<td>• The Commons is located close to many stores and markets, some with a distinct focus on organic food and sustainability.</td>
</tr>
<tr>
<td>Green contracts</td>
<td>Ensures those services procured directly by the owners corporation are aligned with the overall sustainability goals of the development.</td>
<td><strong>Education:</strong> Communicating to owners the value of procuring sustainable services is important, as other providers may offer similar ‘unsustainable’ services cheaper.</td>
<td>• The owners corporation will, wherever possible, lead by example. This will include preferencing maintenance contractors and equipment suppliers that address sustainability and social issues in their operations.</td>
</tr>
<tr>
<td>Green leases</td>
<td>Ensures ongoing environmental performance of development. The ACF 60L development use green leases for all tenants.</td>
<td><strong>Risk:</strong> May deter some potential tenants due to being a relative new concept. <strong>Education:</strong> Small businesses in particular may require technical assistance to comply.</td>
<td>• Retail leases at The Commons will include conditions regarding the sustainability of the businesses that locate there. • The owners corporation will have a focus on ensuring residents and businesses at the site are able to achieve best practice in operational sustainability. This will be supported by Moreland Energy Foundation, which will run workshops with residents, provide advice to retail tenants and provide assistance to the Green Caretaker.</td>
</tr>
</tbody>
</table>

### Implementation time frame

<table>
<thead>
<tr>
<th>Concept</th>
<th>Masterplanning</th>
<th>Design</th>
<th>Construct</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify opportunities to require / encourage retail tenants to operate sustainably.</td>
<td></td>
<td></td>
<td></td>
<td>Create lease and fitout conditions aimed at ensuring retail tenants maintain sustainability principles into operation. Owners corporation service contracts to prioritise sustainability. Information on sustainable products and services.</td>
</tr>
</tbody>
</table>
Sustainable food

28% of Victoria's ecological footprint is due to food consumption - more than residential energy use and transport combined.

While awareness of the need to conserve water and reduce energy use is prevalent, the environmental impact associated with the production, processing, packaging, storage, transport and disposal of food are less well known. However, through minor changes to daily food purchase habits, consumers can significantly reduce this impact.

Options to address water consumption

Onsite food growing can be encouraged through the provision of garden allotments or planter boxes on balconies.

Low impact food produces fewer environmental impacts relative to other foods. The production process, packaging and transportation will generally vary from product to product, but generally, fresh foods and seasonal foods have a lower impact than processed and packaged foods, while animal products have a higher impact than non-animal based products.

Access to local fresh food amenities requires that there are sources of fresh food within the development or nearby, that can be accessed by residents without the need for private transportation.

Sustainable food waste management involves recovering the valuable resources that are embodied in food waste, rather than disposing of food waste to landfill. Options for sustainable management of the organic waste stream are discussed in the zero waste section.

The Commons context

The space constraints of apartment living can make onsite food production difficult. The Commons has overcome this limitation and maximised the available space by integrating a rooftop garden and shed, allowing residents to grow vegetables and herbs.

Local environment park CERES also offers a weekly delivery service of local, seasonal and organic fruit and vegetables, giving residents another local and sustainable food option.
### Sustainable food

#### Actions for sustainable food

<table>
<thead>
<tr>
<th>Action</th>
<th>Potential impact</th>
<th>Challenges and considerations</th>
<th>Strategy and innovations to be delivered at The Commons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Onsite food growing</strong></td>
<td>In many cases, food produced at the point of use is the most environmentally sustainable. Emissions from production, storage and transport are all reduced dramatically.</td>
<td><strong>Physical limitation:</strong> Space availability is the key constraint in higher density development.</td>
<td>• Providing residents with productive garden beds was a key ambition from the outset at The Commons. The rooftop garden will include 18 garden plots for use by the residents and a shed for storage of tools and other gardening products.</td>
</tr>
<tr>
<td><strong>Encourage low impact food</strong></td>
<td>Need for, and impacts of, transport and storage are minimised. Packaging materials are made from renewable resources, such as cardboard. Packaging waste is minimised.</td>
<td><strong>Risk:</strong> May not appeal to a mainstream audience. Participation in such programs is voluntary. <strong>Physical limitation:</strong> May require allocation of space for secure storage of food deliveries.</td>
<td>• Local resources, such as CERES environment park and Moreland Energy Foundation, will provide residents with information on sustainable food choices. • Residents will also be encouraged to consider CERES weekly organic fruit and vegetable delivery service. If enough interest is shown, The Commons may become a local collection point for the program.</td>
</tr>
<tr>
<td><strong>Access to local fresh food amenities</strong></td>
<td>Reduced GHG emissions related to private vehicle use for food transportation.</td>
<td><strong>Contextual:</strong> Can be beyond the developers control.</td>
<td>• The Commons is located less than 200 metres from Sydney road, which features an array of fresh food grocers, delis, butchers and supermarkets. This will provide residents with an excellent range of affordable fresh food options.</td>
</tr>
<tr>
<td><strong>Sustainable food waste management</strong></td>
<td>It is estimated that Victorians throw away $2.5 billion worth of food every year, mostly fruit and vegetables. Resource recovery of the food component can reduce waste disposed to landfill by approximately 40%. For every kg of food waste sent to landfill, about 1kg of GHG emissions is produced.</td>
<td><strong>End user:</strong> Requires tenants / residents to separate organic waste and developments to provide storage facilities for this waste. <strong>Scale:</strong> Offsite or onsite treatment of waste is possible and can be scaled to meet needs of specific development. Refer to the zero waste section for further details.</td>
<td>• The rooftop garden will include a communal composting system, allowing residents to divert significant volumes of waste away from landfill. The compost will also produce high quality soil for use in the garden allotments.</td>
</tr>
</tbody>
</table>

#### Implementation time frame

- **Concept:** Consideration of opportunities for onsite food growing. The Commons identified a productive garden as a key feature to foster both environmental sustainability and social interaction.
- **Masterplanning:** Consideration of issues such as space and solar access for food growing areas.
- **Design:** Allocate space to food growing areas, and considered structural support needs. Link garden to rainwater capture.
- **Construct:** Ensure ongoing management and maintenance of shared roof garden is incorporated into owners corporation maintenance program and contracts.
Reducing water consumption

The overall reduction of water use, and in particular potable water, is the primary opportunity in developing a sustainable approach to water.

Many measures, such as water efficient appliances and fittings, are becoming common in new developments. These, combined with minor behaviour changes, can make a significant difference to our use of this limited resource.

Options to address water consumption

**Water efficient appliances and fittings** use less water compared to similar products. Most appliances and fittings that use water are now labelled according to the Water Efficiency Labelling and Standards (WELS) scheme.

**Water efficient landscaping** and gardens can reduce watering and irrigation needs of individual households and the common areas. This can include selection of indigenous and drought tolerant plants, mulched garden beds rather than lawns and use of subsurface irrigation and soil conditioners to reduce watering needs.

The Commons context

The Commons has been designed to reduce resource consumption in operations wherever possible.

Water-efficient appliances and fittings will be supported by information on how residents can reduce their water use. The site will also feature a shared laundry with high efficiency washing machines, making it easy for residents to address one of the major uses of potable water without high investment costs in their own machine.
### Actions for reducing water consumption

<table>
<thead>
<tr>
<th>Action</th>
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<th>Challenges and considerations</th>
<th>Strategy and innovations to be delivered at The Commons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water efficient appliances and fittings</strong></td>
<td>High efficiency fittings and appliances, such as shower heads, toilets and washing machines, can save a 3 person household upwards of 170 litres of water per day.</td>
<td><strong>Cost:</strong> There may be a small additional upfront cost. Developer bears cost, owner reaps water and energy savings. If development plans to harvest rainwater, use of water efficient appliances allows for reduced rainwater storage, saving space and cost.</td>
<td>• Significant demand reduction initiatives adopted including specification of low flow fixtures and fittings (highest water efficiency rating available).&lt;br&gt;• No water based heat rejection systems will be specified.&lt;br&gt;• Clothes washers in central laundry will have highest water efficiency rating available.</td>
</tr>
<tr>
<td><strong>Water efficient landscaping and gardens</strong></td>
<td>Used by the Forde residential development in Canberra as part of its strategy to reduce potable water consumption by 40% compared to similar sized developments.</td>
<td><strong>End user:</strong> For individual garden plots, difficult to ensure home owners retain water efficiency flora.</td>
<td>• The owners corporation rules will require the specification of drought tolerant plantings wherever possible in the communal garden.&lt;br&gt;• Sub surface irrigation for garden beds - supplied by rainwater tanks.</td>
</tr>
</tbody>
</table>

### How we compare

**Litres per person per day**

**Current practice:**

<table>
<thead>
<tr>
<th>Country</th>
<th>Average Water Consumption (Litres per person per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria (Australia, 2010, residential)</td>
<td>150L</td>
</tr>
<tr>
<td>Hammarby Sjöstad (Stockholm, Sweden, 2015, mixed use)</td>
<td>100L</td>
</tr>
<tr>
<td>The Commons (Melbourne, Australia, 2012, residential)</td>
<td>140L (target)</td>
</tr>
</tbody>
</table>

**The Commons target:** Litres per person per day (target)

### Implementation time frame

- **Concept**
  - Set potable water reduction targets.
  - Set water consumption targets.
- **Masterplanning**
  - Set WELS rating for water fittings.
  - Include use of water efficient landscaping.
- **Design**
  - Ensure landscaping and gardens incorporate use of water efficient plants.
  - Ensure owners corporation rules stipulate replacement plants must be water efficient.
  - Ensure location of wet areas minimises distance to water heating systems.
- **Construct**
  - Resident education and specification of water-efficient planting schedule for communal garden.
Sustainable urban development

Water reuse and stormwater

Onsite water collection and reuse can significantly reduce potable water consumption. Additionally, water reuse reduces demands on centralised water treatment facilities, reticulated potable supply and storm and sewage drains. It also reduces or avoids the need for infrastructure upgrades, saving significant costs over time.

Stormwater negatively impacts on receiving environments by transporting gross pollutants, suspended solids, nutrients and heavy metals to waterways. Site design can help to reduce this impact by reducing or slowing down runoff.

Options to address water reuse

Rainwater usage requires the installation of tanks to collect water runoff from roofs. Rainwater can be connected to toilets, laundry, showers or garden watering systems, or can be accessed manually via a tap for other outdoor uses such as car washing. Treatment of rainwater for these uses is generally not required.

Greywater treatment systems collect, treat and reuse wastewater from areas other than toilet-flushing. In this case, a simple system utilising shower water only will be installed.

Stormwater collects litter, sediments and pollutants as it travels and can have a negative impact on the waterways it enters. Porous surfaces, landscaping and water collection can all have a positive impact on stormwater quality and runoff speeds.

Green roofs are partially or completely covered with vegetation. The vegetation slows and reduces stormwater runoff. They can also regulate internal building temperature by reducing heat retention and acting as insulation.

Project context

Despite its relatively small size, The Commons will include onsite treatment of greywater, significantly reducing potable water use. Additionally, the project will collect rainwater that falls on the site, using this to replace potable water in toilet flushing and irrigation on the site.

The design of the building also means that stormwater runoff will be significantly reduced when compared to the site’s previous state.
## Water reuse and stormwater

### Actions

<table>
<thead>
<tr>
<th>Action</th>
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<th>Strategy and innovations to be delivered at The Commons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rainwater collection and reuse</strong></td>
<td>Can replace potable water in many applications, including toilet flushing, clothes washing and irrigation, which constitute a major part of daily domestic water use.</td>
<td>Cost: Additional up-front costs can be incurred, although now that rainwater tanks are required by regulation in many developments, these costs are absorbed into the total construction cost.</td>
<td>• The Commons will incorporate approximately 15,000 litres of rainwater storage. This water will be used primarily for landscape and rooftop garden irrigation.</td>
</tr>
<tr>
<td><strong>Greywater treatment and reuse</strong></td>
<td>The 1kL system is expected to provide enough water for all toilet flushing onsite. This will mean that rainwater collected can be directed to other uses including clothes washing and irrigation.</td>
<td>Regulation: Ensuring all relevant health and safety regulations are met.</td>
<td>• A 1kL greywater system, with a single day storage and treatment cycle using greywater from showers, will provide adequate water for all toilet flushing requirements onsite.</td>
</tr>
<tr>
<td><strong>Stormwater management</strong></td>
<td>Stormwater runoff can carry pollutants from roads and pavements to waterways, and is a major cause of contamination in rivers and streams.</td>
<td>Scale of impact: Small sites can have a limited ability to influence surrounding stormwater quality.</td>
<td>• Despite the small size of the development, The Commons will have a positive impact on local stormwater quality through a significant reduction in total runoff. The building footprint covers most of the site, and the rooftop garden and rainwater collection system will ensure runoff is minimal. Native plantings on the remaining land will also slow down any residual runoff significantly.</td>
</tr>
</tbody>
</table>

### How we compare

**Percentage of water for landscape irrigation that will be sourced from onsite rainwater collection or recycled site water**

<table>
<thead>
<tr>
<th>Current practice:</th>
<th>1 Bligh St (Sydney, Australia, 2010, office). 90%</th>
<th>1-25 Harbour St, Darling Quarter (Sydney, Australia, 2010, office). 90%</th>
<th>39 Hunter St (Sydney, Australia, 2008, office). 90%</th>
<th>The Commons (Melbourne, Australia, 2012, residential). 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td><strong>The Commons target:</strong></td>
<td><strong>Percentage of water for landscape irrigation that will be sourced from onsite rainwater collection or recycled site water</strong></td>
</tr>
</tbody>
</table>

### Implementation time frame

<table>
<thead>
<tr>
<th>Concept</th>
<th>Masterplanning</th>
<th>Design</th>
<th>Construct</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in potable water use identified as a key aim.</td>
<td>Concept design included investigation of onsite treatment options, as well as rainwater collection and reuse.</td>
<td>Design to specify third-pipe system for toilet flushing using rainwater. Rainwater tanks designed into building.</td>
<td>Ensure contractors understand system installation requirements.</td>
<td>Ongoing maintenance for rainwater collection system included in owners corporation management schedule. Residents educated about system requirements.</td>
</tr>
</tbody>
</table>