Urban Ecology Strategy
Draft consultation March 2014

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Executive Summary

The City of Moonee Valley is pleased to be a leader in supporting urban ecology in our suburbs. We are committed to finding new and improved ways to support more flora and fauna in our buildings, streets and landscapes. Cities traditionally have lots of grey infrastructure, and with their rapid expansion across the world, it is time to match it with the green infrastructure of a healthy urban forest that supports a wide range of urban ecology.

The Draft Urban Ecology Strategy has been developed to guide Council in enhancing our local natural environment and to provide a basis for the supporting our annual urban ecology implementation plans.

Our Vision

The community of Moonee Valley set a vision for 2035 that “Moonee Valley will be a city of clean, green and beautiful, vibrant, diverse and sustainable community that people experience as friendly and safe to live in”.

This vision was further refined in the City Sustainability Strategy 2013 which strives for ‘Moonee Valley to be home to a thriving urban ecology integrating public and private spaces and providing habitat, food and shelter for flora and fauna, while improving liveability and wellness of our community’.

Urban ecology encapsulates the diversity of flora and fauna and their inter-relationships with the land, air and water and its people all set in the fabric of our urban environment.

Goals

Protection of remnant vegetation remains our highest urban ecology priority.

Beyond this, we are committed to supporting more vegetation in general by creating an urban forest across our whole municipality. This means putting a value on new, novel landscapes including those containing exotic species.

Council proposes four key goals to drive the Strategy’s implementation.

- **Protect our Urban Ecology** - Council is committed to protecting urban ecosystems
- **Enhance our Urban Ecology** - Council is committed to enhancing urban ecosystems
- **Lead Change** - Council is committed to being an urban ecology leader
- **Connect with Community** - Council will draw on the urban ecology skills and desires of the community

Increasing our urban ecology is our goal and we will apply holistic urban forest management to achieve this.

Some ideas for urban ecology in the ground...

| More natural understorey planting in our parks | Trickle streams, frog bogs and wetlands | Pop-up planter boxes for community use | Continued increase in street trees especially on walking corridors |
| Some ‘no-mow’ park areas with native grasses | More fruit trees or shade trees in front yards | More community ‘ownership’ of green spaces | Engineering solutions eg undergrounding powerlines |
| Natural play environments for kids | Herbs by barbeques | More interpretation about cultural and natural sites | Healthier remnant vegetation within conservation areas |

Policy Context

This is the first Urban Ecology Strategy that Moonee Valley City Council has prepared. By planning for our urban ecology, we are helping to meet multiple environmental, social and economic objectives for our community as set out in Moonee Valley Next Generation 2035: Council Plan 2013-2017, Health and Wellbeing Plan 2013-2017, Draft Municipal Planning Scheme, Water Strategy 2011, Open Space Strategy 2011 and many more. The Draft Urban Ecology Strategy also support regional initiatives including Greening the West.


The Strategy also considers urban ecology trends beyond Moonee Valley such as innovative projects, research and modelling being undertaken particularly by local governments and research bodies.

Working Together

Implementing the principles set out in the Draft Urban Ecology Strategy will require a holistic approach and partnerships with our community and stakeholders. Communication is central to connecting and engaging with people. It will ensure the success of our policies and help to enable great ideas, knowledge and opportunities.

To meet our goals we need more information, better planning, demonstration projects and leadership.
PART 1

1. What is urban ecology?

For Moonee Valley City Council, the term urban ecology encapsulates the diversity of flora and fauna and their inter-relationships with the land, air and water and its people all set in the fabric of our urban environment.

It may be surprising, but the ecology of urbanised areas like Moonee Valley can be relatively rich despite limitations such as reduced space for vegetation, fragmentation of remaining remnant vegetation and the very high demands on the land, air and water from the dominant species, humans.

Despite such pressures and limitations, natural elements still persist; including pre-European (remnant) vegetation, extensive plantings of exotic trees, shrubs and flowers, native and non native animals, fungi and microscopic organisms.

Our cities are providing new and novel habitats and niches that may be quite different from our pre-European ecosystems. Cities now support a variety of species including non-native species that best suit these urban conditions. Ecosystems change, and we are working with this fact, rather than solely trying to recreate historical ecosystems.

We use the term ‘novel’ to describe any landscaping that is not attempting to recreate our indigenous landscapes. Instead, novel landscapes and ecosystems are human constructed and recognise the value of all nature including exotic species, how they fit together and the services that it provides to our community.

This ranges from formal parks to household gardens to green walls and street trees.

While urban ecology protection and enhancement is our goal, urban forestry is our holistic management approach. This way we value the full range of benefits provided by our vegetation including services to support our existence such as pollination, seed dispersal, cycling of nutrients, recreation, community cohesion, increased property values, provision of food and water, the regulation of temperature, pollution, noise and carbon and many more.
How does urban ecology improve the health of our community?

“How everyone needs beauty as well as bread, places to play and pray, where nature heals and give strength to body and soul alike.”  John Muir 1838-1914

Although it’s not a new concept, recent research has reinforced the link between nature and health. When the city’s parks were first designed in the 19th century, city officials strongly believed in the health benefits of nearby open space. Specifically they hoped parks would reduce disease, crime and social unrest as well as providing ‘green lungs’ for the city. In fact, Walter Burley Griffin designed areas in East Keilor with communal open space surrounded by residential blocks with the intention of creating spaces for community gathering and activity. Research is suggesting that there are at least four elements to consider when planning open spaces to ensure they are providing these health restoring benefits to the park users. These elements are summarised as;

- **Fascination** – an involuntary form of attention requiring effortless interest or curiosity
- **A sense of being away** – temporary escape from one’s usual setting or situation
- **Extent or scope** – a sense of being part of a larger whole
- **Compatibility with an individual’s inclinations** – the setting satisfies the individual’s purposes

Current research is also confirming that nature is good for our health. The following points are a sample of just some of this research;

- Contact with nature positively impacts mental health, blood pressure, cholesterol, outlook on life and stress-reduction
- Too much artificial stimulation and an existence spent in purely human environments leads to a loss of vitality and health
- People accessing nearby natural settings found to be healthier overall than other individuals, including less allergic conditions
- The longer term benefits of ‘nearby nature’ include increased levels of satisfaction with one’s home, job and life in general
- Contact with nature in parks and gardens improves sense of neighbourhood, and reduces graffiti and violence.
- Access to nature in the workplace is related to lower levels of perceived job stress and higher levels of job satisfaction

Why do we need an Urban Ecology Strategy?

Moonee Valley’s Draft Urban Ecology Strategy brings together numerous existing Council documents to guide the way that Council and its community will value, support and manage its natural assets into the future.

The Strategy will guide us to create an ecologically diverse city with a human population that is connected to nature.

It will provide Council with the direction required to make Moonee Valley a place of thriving urban ecology by protecting existing ecological values and enhancing novel new urban ecology. This in turn will improve the liveability and wellness of our community.

The Strategy will help to mitigate the pressures and threats such as climate change and urbanisation on urban ecology to ensure that these values persist for current and future generations to appreciate.

Increasing urbanisation and pressure on urban ecology is mirrored across the world’s cities. The health of our planet needs to be addressed globally but the best way to make a start is to act locally. Respecting and fostering our local ecology through understanding, protecting and enhancing are the starting points from which we as individuals and local communities can make a difference.

Many of Council’s existing strategies are echoing the message that human health and wellbeing is improved, supported and depends upon healthy and accessible green open spaces including:

- MV Next Generation 2035 – Community Vision
- Council Plan 2013-2017
- Municipal Public Health and Wellbeing Plan 2013
- City Sustainability Policy 2013
- Municipal Strategic Statement
- Open Space Strategy 2011
- Tree Management Strategy 2013
- Playspace Plan 2013

There are a number of organisations and alliances responsible for management of the natural environment at a regional perspective. Council is an active partner in many of these where their aims and goals align with our own and provide us with an opportunity to fit into a regional context. Some of these strategies include:

- Melbourne Water – “vegetation management, environmental flows, habitat enhancement and working with communities to achieve healthy waterways” (River Health Strategy)
- Port Phillip and Westernport Catchment Management Authority – “strengthen the health and resilience of our region’s natural environment” (Regional Catchment Strategy)
- City West Water – helps plan for parks and gardens to be watered from non-potable water sources into the future. (Water Security Plan)

Our city’s ecology is complex; being made up of many components, influenced by numerous factors and managed in various ways by various parties.

We know that urbanisation will continue but with sensitive planning, integrated urban forestry management, and taking advantage of opportunities to design with urban ecology principles, there can be a positive influence on ecology with the creation of novel ecosystems, habitat diversification, species introductions and ongoing good management.
2. What is the policy basis for this *Draft Urban Ecology Strategy*?

The community of Moonee Valley set a vision for 2035 that “Moonee Valley will be a city of clean, green and beautiful, vibrant, diverse and sustainable community that people experience as friendly and safe to live in”.

In November 2013, Council adopted its *City Sustainability Policy* with a commitment to reducing the negative impact that Council has on the environment and to ensure that the things we enjoy today are still around for our children, our grandchildren and generations to come. This policy identified four themes that were important to local residents; one of these four themes was urban ecology.

The *Draft Urban Ecology Strategy* is a detailed strategy applying technical concepts. The bigger picture explanation of urban ecology is set out in our higher level *City Sustainability Policy*.
Putting a Financial Value on our Vegetation – A Flemington Case Study

The Flemington Precinct is one of Moonee Valley’s prime streetscapes. In many streets, uniform avenues of fully mature plane trees arch towards the centre of the roads, often forming a complete leafy canopy for the pleasure of pedestrians, bike riders and car users. These streets are noticeably cooler in summer, and property values are considerably higher than for treeless streets nearby. Other parts of the precinct have less mature and often mixed species plantings.

In 2012, we worked out the environmental and financial value of 418 trees located in the Flemington between Wellington, Farnham, Canterbury, Dover, and Norwood Streets just north of Newmarket Station. This was done using the iTree Eco V5 tool.

A Case Study of the Use and Value of iTree Eco V5

- Total of 418 trees within the Flemington residential precinct
- 95% of trees are non-native. Many exotics are highly valued as street trees for the deep shade they provide
- 95% of trees are in “good” condition.
- Average tree height of 11 metres, and average crown width of 10.5m
- Currently a total 421t of carbon being stored within the trees
- The population is sequestering 21kg carbon annually through the leaves
- 122m³ of rainfall intercepted annually. This helps to reduce damaging, fast and “flashy” flows to Moonee Ponds Creek.
- Total tree value for the precinct came to $4,472,000
- 177 kg of air pollution is removed by trees
- 71% are of one species, and 92% come from just 2 plant families. This reduces the disease-resilience of the population.
3. What are current urban ecology trends?

Across the world, cities are putting significantly more effort into creating greener cities for a range of social, environmental and economic reasons.

In the 1960’s Singapore set out to establish a clean and green environment. Their challenge is in the limited space and the already dense and growing population. So to achieve their goals, they are ‘adding more sophistication to our greenery plan, conserving our natural heritage and involving the community’\(^1\). As a result they have managed to increase their green cover from 35.7 per cent to 46.5 per cent. Singapore has succeeded in increasing building stock while at the same time increasing green spaces. This is the ideal that Moonee Valley is also committed to.

One of the ‘sophisticated’ methods that Singapore has adopted is green roofs. Across the world green roofs are increasing in popularity and their benefits are being evaluated by many research bodies. In the US, green roofs increased by more than 35 per cent between 2007 and 2008\(^2\) and more than 12 per cent of flat roofs in Germany are green. Toronto, Canada has adopted a bylaw that requires and governs the construction of green roofs. The bylaw applies to all new development applications made after January 31, 2010 with a gross floor area of 2000 m\(^2\) or greater, with the exception of industrial buildings. To date there are over 160 green roofs in the City of Toronto with an additional 71 in the planning stages as required by the Green Roof Bylaw\(^3\).

Closer to home, the City of Melbourne, has adopted its Urban Forestry Strategy 2012-2032. Its vision; “The City of Melbourne’s urban forest will be resilient, healthy and diverse and will contribute to the health and wellbeing of our community and to the creation of a liveable city” was a product of a collaborative process, developed with a large number of stakeholders including local and international academics, interest groups and the broader community. The Strategy uses extensive research and modelling to show the changes forecast for the urban forest which indicates that almost 40 per cent of the existing tree population will have reached the end of their useful life within 20 years.

Backyard examples of small scale urban ecology projects are becoming increasingly popular and are often achieving more than one sustainability principle simultaneously. Constructing insect hotels, vegie patches, green walls and frog bogs often from recycled materials is providing habitat for wildlife, food for human consumption and feeds the curiosity of children and adults alike.

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3. [www.toronto.ca/greenroofs](http://www.toronto.ca/greenroofs)
The groundswell of urban ecology projects is creating partnerships particularly between local governments, industry associations, research institutes and community groups. These networks encourage dialogue about theories and possibilities often leading to proposals for novel projects, funding and enthusiasm within the community.

Three leading urban forestry examples for which Moonee Valley City Council has been founding members include:

- **CRC for Water Sensitive Cities**

  An international first, the *Cooperative Research Centre for Water Sensitive Cities* investigates ways we can reform our urban water management to transform cities into liveable, resilient, sustainable and productive cities. By better planning and using water, we can support our urban forests and its ecology.

- **National Urban Forest Alliance**

  A national first, the National Urban Forest Alliance (NUFA) brings together a nationwide range of industry specialists to “promote a thriving, sustainable and diverse Australian Urban Forest”. Currently, NUFA is running a communication forum 202020Vision enabling any project manager to upload their urban forest project to share their lessons learnt. At the same time, this information is tracking towards the increased canopy cover target and identifying gaps and patterns that lead to useful research and projects.

- **Greening the West**

  A regional first, Greening the West brings together a range of local, state and industry specialist across Melbourne’s West to “positively impact the health status, climate and environment of Melbourne’s west by increasing the tree canopy cover and vegetation through its suburbs”.

Evidence-based decision making is our priority wherever the data is available. The CRC for Water Sensitive Cities, and the Australian Research Centre for Urban Ecology, both Melbourne based, are pulling together interdisciplinary research to revolutionise water management and ecological restoration and management respectively, specifically in urban areas. Using a number of project sites that are local and worldwide, including Moonee Valley, they are developing case studies, putting values, financial, social and environmental on environmental projects and providing the industry with training and knowledge sharing forums.

Moonee Valley is certainly not alone in its quest to become a clean, green and beautiful city. It is a worldwide trend and we can benefit from this ground swell of information and case studies. We can join in and be a significant contributor to the global urban ecology movement by implementing this Strategy.
4. What urban ecology can be found in Moonee Valley?

There is no doubt that the urbanisation of our city has led to significant and irreversible changes to the ecology that existed here before European settlement. There has been significant loss of flora and fauna, introduction of weeds, changes in the microclimate, increased impervious surfaces, increased water run-off and air, water and soil pollution. Land managers, both public and residential, have removed indigenous vegetation and replaced it with exotic vegetation, led many species to extinction (in our local area) and irreversibly changed the way energy, nutrients and water cycles through the environment.

Despite these impacts Moonee Valley still has a relatively high diversity of flora and fauna. This is because we have:

• a home on the **Victorian Volcanic Plains** which has a naturally high species richness
• the reservation of large **waterway corridors** of vegetation such as the Maribyrnong River Parklands, Moonee Ponds Creek and Steele Creek Corridors
• a **variety of landscapes** each with a unique suite of species including; estuarine river, fresh water creeks, ephemeral creeks, grasslands, woodlands and escarpments
• a **diverse palette of plantings** both on public and private land over the past decades. This then provides a food source attracting a diverse range of native fauna.
• **floristically diverse backyards** which support native and non native fauna due to low density housing, large residential blocks and diverse nationalities
• permanent **fresh water features** such as ornamental lakes and wetlands
• an **environmentally engaged community** supporting community gardens, conservation plantings and the preservation of open space.

### The Victorian Volcanic Plains

The City of Moonee Valley is situated within the Victorian Volcanic Plain bioregion which formed over the last 6 million years and creates an extensive undulating volcanic plain covering 2.3 million hectares between Portland and Craigieburn.

This bioregion is characterised by a volcanic plain vegetated by native grasses, herbs, wildflowers, some woodlands and many natural wetlands. The high species diversity is due to the rich soil, generally small nature of the species, sparse overstorey and regular disturbance by grazing animals or fire.

Only 4.5% still has a cover of native vegetation, and less than 1.2% is in formal reserves. Eleven species of indigenous flora and fauna are extinct, whilst of the remaining species, 171 are considered threatened including 90 plants and 81 animals.
Open space within Moonee Valley can be grouped according to unique urban ecology feel:

**Conservation Reserves**

Since European settlement pockets of remnant natural vegetation have survived in Moonee Valley, however they had become degraded, fragmented and isolated leading to their increased fragility.

Since 2009, Council has worked with local community groups to identify and manage more than 17 hectares of remnant vegetation within a total of 30 hectares of conservation area.

This includes management of several threatened species and vegetation types.

**Parks and Gardens**

The City of Moonee Valley has approximately 220 open space reserves covering 528 hectares which equates to 12.5 per cent of the municipality. Ninety-three hectares of this is managed by other authorities such as Parks Victoria and Melbourne Water. This open space network is diverse ranging from large linear waterway reserves along Maribyrnong River and Steele Creek, large sporting reserves, formal gardens such as Queens Park and small neighbourhood parks. Within these reserves, is a population of native and exotic trees in excess of 40,000. Some parks have also been enhanced with ground and shrub layer plantings for aesthetic and habitat values. These plantings are generally native species, however there are some examples of exotic plantings.

Moonee Valley’s flagship park, Queens Park, was originally a swamp. Whilst no longer swampy, the park features an extensive plant collection of 124 species, including rare and unique species, mature tree specimens and a wide diversity of resident and visiting bird species as well as historical and recreational assets.

Throughout the municipality the recent construction of wetlands for stormwater quality improvement and water harvesting has increased species diversity in parks by introducing an entirely new landscape type with its own suite of unique species. Wetlands are being introduced in large developments and open spaces and are seen as a valuable asset for increasing property values. Sites include; Valley Lake Estate in East Keilor, Ascot Chase Estate in Ascot Vale and Afton Street Conservation Park in Aberfeldie.

**Waterway corridors**

Moonee Valley enjoys four waterways: Maribyrnong River, Steele Creek, Moonee Ponds Creek, and Five Mile Creek.

The waterway corridors provide us with an open space asset that is significant in size, amenity value and habitat value, in total there is more than 40km of linear corridor within Moonee Valley and it is connected to many more kilometres up and down stream of our boundaries.

These waterways were a rich source of food, shelter and spiritual gathering places used by local aboriginal clans. The waterway itself provided fish, shellfish, water birds, and the surrounding land was rich with useful and edible plants and fauna such as wallabies, possums and wombats. Still today wallabies reside in the Maribyrnong River corridor all the way down to Afton Street Conservation Reserve along with many bird species, possums, bats and aquatic animals.

During early European settlement the local waterways became important as drains to quickly convey stormwater away from residential and commercial property. Although this attitude has changed significantly and waterways are valued as a significant open space asset for people and fauna to appreciate, there are some historical impacts such as barrel drains, concrete lining, vegetation removal and invasive species that land managers are still grappling with.

**Streetscapes**

Moonee Valley City Council has a street tree population of 46,000 trees composed of a variety of species both exotic and Australian native often reflecting the popular species of the era in which they were planted.

Street trees provide habitat for insects, birds, possums and bats and where the canopy of these trees interconnects they can provide a corridor from park to park, or creek to creek. In most cases, however, there are gaps in these corridors and for smaller or flightless animals that means having to come to ground where contact with domestic animals, cars or humans can be deadly. Where residents have increased their naturestrip vegetation beyond street trees and mown grass they have greatly improved the likelihood of successful fauna passage and created more habitat in general.
Pockets of vegetation in traffic islands, roundabouts, shopping plazas and nature strips all contribute to the urban ecology of our city. Species diversity in the past may have been limited to a few hardy species. There are now opportunities to increase the diversity of plantings in these traditionally concrete spaces, making them more valuable to insects and birds. This is due to the development of many new cultivars which are tending towards lower water requirements and improved methods of site preparation, including the use of organic material in soils, mulching and water sensitive urban design.

Water Sensitive Urban Design (WSUD) treatments have introduced water loving plants to environments that were previously concrete, bitumen or mown grass. Their benefits are more extensive than simply treating storm water and improving water quality of our local waterways. They can also increasing our floristic diversity, their vigorous plants produce oxygen and sequester carbon, return moisture to surrounding soils and provide habitat for small fauna such as insects and in turn they become a food source for insectivorous birds.

**Residential**

Residential and community agriculture is experiencing a resurgence in popularity. Many Moonee Valley residents are growing food including, fruit trees, herbs and vegetables in their backyards or in community gardens. This may be due to an increased awareness of urban food security and a preference for personal control of food production in particular organic food production and the development of community connections.

As a result of this urban ecology is boosted in a number of ways including increased plant diversity, preference towards flowering and edible fruiting trees and shrubs, encouragement of bees and other insects for both pollination and natural pest control and good soil management.

Good soil management consists of a number of aspects which are well represented in these situations. It is common practice in residential gardens to return nutrients to soils through composting and mulching which increases the organic material in the soil and in turn reduces water use and increases microbial activity. This helps plants to develop better levels of pest and disease resistance, and therefore reduces the need for chemical pesticides and herbicides that can have a damaging impact on the environment.

**How does ‘urban agriculture’ help with ‘urban ecology’?**

Moonee Valley’s community has shown great interest in urban agriculture as shown by our thriving community gardens and high participation in Council’s My Smart Garden program.

Urban agriculture is about growing food locally. It also supports broader urban ecology goals by:

- encouraging pollinator species and beneficial insects which aids pollination and provides food for birds
- increasing the diversity of flora as many of these species can only exist in a managed environment
- Improving soil moisture and soil carbon content.
- turning otherwise ecologically poor land where weeds thrive into land with a higher diversity of flora and insect fauna
- involving our community in healthy living practices and social networking

The Millennium Ecosystem Assessment estimates between 60,000-100,000 plant species are threatened with extinction- that’s around one quarter of all known plants. Currently we depend on fewer than 12 of the world’s 300,000 flowering plants for around 80% of the food we eat. Natural disasters or disease outbreaks are a real threat to existing food crops.

It is important we grow food in many different places, we try different food types, and we support pollinator health.

Similarly we have an important role in helping to protect our soils. We need lots of fertile soils to support our hidden underground ecosystems, and to feed our population into the future. Soils are under threat as they are being degraded at a rapid rate. We can work to address the causes: contamination and pollution, erosion, sealing of soils by concrete, climate change, invasive plants and animals and the decline of organic matter.

It is important that we find ways to limit removal of leaf litter and coarse woody debris from parks and gardens to avoid changes to the community of decomposers, with subsequent changes to the nutrient cycling within those systems. We also need to prevent soil compaction where possible and compost our green waste for use in improving our soils. This soil care will help with natural plant regeneration, carbon sequestration, soil moisture, and soil fungi, bacteria and fauna.
Snapshot of indigenous (local) flora and fauna

Preliminary indigenous flora and fauna records for the Moonee Valley indicate a rich palette of species despite the urban setting. To date 181 indigenous plant species have been recorded in Moonee Valley, including several significant species:

Spiny Rice Flower (nationally significant), Pale Swamp Everlasting (state significant) and Hairy Solenogyne (regionally significant).

To date 93 bird, 12 mammal, 8 reptile and 3 frog indigenous species have been recorded in Moonee Valley, including several significant species:

Grey Headed Flying Fox (nationally significant), Powerful Owl (nationally significant) and Buff-banded Rail (state significant).

Snapshot of native (Australian) flora and fauna

Popular Australian Native plants have been used throughout the municipality often selected for their floral display such as Bottle Brush, large canopy such as Morton Bay Fig or resilience such as Sugar Gums.

Bottle Brush, Morton Bay Fig, Sugar Gum

A number of Australian native fauna species have been able to take advantage of urban gardens and open spaces becoming common in our city, for example Rainbow Lorikeets have moved south with the extensive planting of flowering street trees.

Rainbow lorikeet, Ringtail and Brushtail possums, Long-billed Corella
**Snapshot of introduced flora and fauna**

Public landscapes and resident yards have been planted with a huge variety of non-native plants, sourced from all over the world. Although these species are not native, many of them provide habitat for native fauna species and contribute to canopy cover and cooling of our urban environment. For instance, Lavender attracts many nectarivorous insects, elms develop hollows and the cones of conifers are eaten by cockatoos.

Lavender, English Elms, Conifers

Although not native to Australia, there are a number of fauna species that provide us with significant contributions to our daily lives without having significant negative impacts on urban ecology. In the past, fauna introductions have been disastrous such as the Cane Toad, but with extensive research some are providing essential weed control services such as the Bridal Creeper Leaf Hopper.

European Honey Bees, European Gold Finch, Bridal Creeper Leaf Hopper

**Snapshot of invasive flora and fauna**

Preliminary records for the municipality’s weed species indicate that there are a number of significant threats to our native flora and fauna. To date 176 weed species have been recorded in Moonee Valley, including several weeds of national significance;

African Boxthorn, Chilean Needle Grass and Bridal Creeper

Common pest species recorded in Moonee Valley include several significant species;

Red Fox, European Rabbit and Indian Myna
5. What are the threats to urban ecology?

There are many threats to our urban ecology and the success of this strategy will depend on their early identification and prompt implementation of appropriate management.

The primary threats can be grouped into the following broad topics.

Urbanisation

Moonee Valley’s population is projected to increase by 11 per cent by 2035 placing significant additional pressure on our public and private open space network. Issues arising from this include: an increase in grey infrastructure such as drains, powerlines, buildings, homes and roads further limiting available space for naturestrip trees, private and public vegetation. The reduction in open space, particularly in the private realm, will increase the usage pressure on the remaining green infrastructure, particularly in the public realm.

Climate

Melbourne’s climate is changing. It is predicted that days of extreme heat, increased average daily temperatures, lower rainfall and severe storm events will become more frequent. Climatic zones, migration patterns, genetic compositions, pest and disease ranges and species lifecycles are all shifting. All of these factors are impacting on the health of our urban forest. With increasing hard surfaces as a result of urbanisation, the urban heat island effect within our cities will become more pronounced.

Mismanagement

Nature is a delicate balance of many factors that are already under significant external pressures. Our actions can have serious deleterious and irreversible impacts on individual species or whole communities. Management interventions such as weed control, enhancement planting and biomass control need careful consideration so as to tip the balance in favour of the ‘good’ elements without causing alternative damage. Particular difficulty lies in supporting ecological processes and functions which are not necessarily obvious such as relationships between flora and fauna.

6. How can we enhance urban ecology in Moonee Valley?

Understanding Moonee Valley’s current and previous ecology combined with an understanding of the threats it faces as set out in Part One has helped to shape the principles and actions that are set out in Part Two of this Draft Urban Ecology Strategy.

Protection of remnant vegetation remains our highest urban ecology priority.

Beyond this, we are committed to supporting more vegetation in general by creating an urban forest across our whole municipality. This means putting a value on new, novel landscapes including exotic species.

A mix of exotic species, Australian natives and indigenous species creates a diverse environment which in turn supports a diversity of fauna to provide us with an interesting and varied environment to enjoy.

Many of the non indigenous species are better able to tolerate our urban environments and are therefore more likely to persist even after our climate has changed. Of course there are some negatives that potentially come along with this variety; invasive species in particular are a serious problem to our natural environment. But these are the exception, for the most part these novel species can be considered as ‘good weeds’.

There is an endless list of projects, treatments and ideas out there that Council can and will continue to investigate and implement throughout the coming years which will greatly enhance our urban ecology. Opportunities will arise through partnerships and new research which will adjust our approach in coming years.

For Moonee Valley City Council to continue as a leader in this field, then it will need to enact these or similar solutions, participate in industry discussions and trial projects and continue to identify novel solutions.
What can an ‘urban ecology’ scenario look like?

What would you do if you could redesign a park and you had unlimited budget, no public perceptions to consider and your only requirement was to enhance Urban Ecology?

We asked this hypothetical question, using Montgomery Park in Essendon as an example and came up with a range of small interventions, management changes and big budget project ideas. The value of this piece of work is that the scenario now forms a step in the development of future park designs by providing components and ideas that can be incorporated into any project at any site.

Some of the ideas included:

- Create **constructed sculptural habitat** such as insect holes and logs that shelter lizards
- Plant **herbs and food** in the bbq campfire areas. Handy rosemary to add to the lambchops.
- Create a **swale** with kid-friendly locks and hand pumps for moving water. This can also be used to guide ecological burns.
- Use **long natural grasses** with changing mowing for kicking a ball or creating maze tracks.
- Create wildlife habitat along **streetscapes** to link open spaces for wildlife.
- Design planting to reflect woodland, shrubland and grassland **ecological communities**
- **Natural play** spaces for games, experiences and education.
PART 2

7. Our four key goals of urban ecology

‘Moonee Valley is home to a thriving urban ecology integrating public and private spaces and providing habitat, food and shelter for flora and fauna, while improving liveability and wellness of our community’ (City Sustainability Policy 2013).

Moonee Valley is applying four key goals to deliver our urban ecology vision. The goals have been developed to guide the way Council undertakes its business particularly in relation to its management and development of open space as well as relationships within the industry and the Moonee Valley community.
Goal 1: Protect Ecology

Remnant Vegetation and Native Fauna

The City of Moonee Valley is committed to protecting remnant vegetation and native fauna to achieve:
- Increased protection measures preventing further loss of indigenous flora or fauna species
- Improved health of remnant vegetation and native fauna communities

Guiding Principles

To protect Moonee Valley’s remnant vegetation and native fauna, Council applies the following guiding principles:

1. **Council will value remnant ecosystems as precious living museums** of the environment prior to European settlement. The value of these remnant assets is in their uniqueness; genetic, aesthetic and educational. They are irreplaceable, if lost they cannot be recreated in their entirety as we are still not yet aware of all their ecological services, functions and relationships.

2. **Council will protect its conservation areas including sites of national, state and local significance.** Council will further enhance these areas with more flora species as per its relevant Ecological Vegetation Class, more fauna species, creating ‘buffers’ around significant vegetation, and recreating past landforms such as Gil Gaï’s.

3. **Council will manage remnant vegetation** in accordance with the ‘Approved Conservation Advice for the Natural Temperate Grasslands of the Victorian Volcanic Plain’, and Moonee Valley Remnant Vegetation Strategy. Council supports novel landscapes, however protection of remnant vegetation is our highest urban ecology priority.

4. **Council will manage significant species in accordance with relevant Action Statements (Department of Environment and Primary Industries).** Where possible remnant ecosystems should be enhanced with species that have been lost over time, particularly rare and threatened species. These can then be used as a source of genetic stock for future enhancement plantings.

5. **Council will increase its monitoring, mapping and surveying of remnant ecosystems to identify change.** These can be incorporated into site management plans to ensure programs are evaluated, adaptive and relevant. Policies and procedures adopted by Council will make it easier to achieve a consistent best practice approach, meet legislative requirements, secure funding and prioritise budgets. It also enables planning for succession, climate change, new threats and management adaptations.

6. **Council will continue to educate and engage community on their role to help achieve conservation goals.** This includes reducing the damaging impacts from cats, dogs and vehicles.

7. **Council will support flora and fauna corridors** to help provide a vegetation bridge for small animals and insects to avoid constructed surfaces such as mown lawn, concrete, roads and buildings. Moonee Valley’s remnant vegetation patches are physically isolated which limits the cross pollination important for survival and adaptation to new climate patterns. Further piloting and research for urban corridor design is supported.

Actions

1. **Develop base line data and monitoring programs for Moonee Valley’s remnant natural assets**
   This includes mapping, tracking and transparent communication on an ongoing basis

2. **Develop strategies, policies and guidelines that support our goal to protect ecology**
   These cover cultural heritage, remnant vegetation, weeds, pests, fire, habitat trees, planning controls

3. **Implement best practice land management projects**
   Projects within conservation areas that directly improve health and viability of flora and fauna

4. **Build capacity, knowledge and understanding of conservation issues**
   Staff and contractor training resulting in a change of daily management regimes to protect our ecosystems
   Actions to be implemented as detailed in an annual *Urban Ecology Implementation Plan.*
What is the value of a small grassland reserves tucked away in our suburbs?

Moonee Valley is lucky to have some small tucked-away reserves that are forming windows to our past vegetation as they have been left relatively intact and protected from weed invasion. These ecologically very important reserves include Crossways South Reserve and Arcade Way Reserve in Avondale Heights and JH Allen Grassland Reserve in Keilor East.

Let’s look at Arcade Way Reserve in Avondale Heights as an example.

Arcade Way Reserve is home to no less than 32 indigenous species remain of which one is Nationally Significant and 12 are State or regionally significant. Most of Arcade Way Reserve is covered by Plains Grassland which is endangered within the Victorian Volcanic Plain bioregion. It is also a threatened community listed under the Flora and Fauna Guarantee Act 1988 and a critically endangered community listed under the Environment Protection and Biodiversity Act 1999.

Arcade Way Reserve is only 1.6 hectares leaving us to ask; at what point does a vegetation community cease to function ecologically and become a collection of plants not unlike a botanic garden or museum piece? And even if the reserve isn't functioning ecologically then is the collection of plants valuable in their own right?

Research shows that a collection of small reserves has the potential to outdo the species richness of one large reserve of equivalent size. This is because each of these small reserves displays components of the wider community.

We benefit from our smaller remnant vegetation as they provide:
- a nearby display of the natural vegetation common across this region prior to European settlement
- genetic diversity of local populations which can be used to expand on the genetics of rare species populations
- protection of keystone species that aid survival of other species. For example Wallaby Grass needed to sustain the Golden Sun Moth
- research opportunities such as Victoria University's current research into Moonee Valley’s Pimelea spinescens population. This will support future medical and genetic breakthroughs.
- diversity of open space experiences, nature exploration, wildflower walks for our community to enjoy.
- The delicate balance of ecological function and the unknown factors that may lead to the communities collapse.

The critical factor in maintaining and enhancing this species richness and function in small reserves is land management and managing community expectations.

Small reserves will have a greater edge ratio where negative impacts such as weeds and disturbance are threats. These small reserves are also generally located in developed precincts and are often under pressure from development or community expectation. Only four years ago Arcade Way Reserve was maintained as open space, mown every three weeks and the playground was a popular destination for local families. The local residents expectation of this reserve was that these conditions would, at minimum, continue or maybe in the future be enhanced through additional play equipment and picnic facilities.

Is bigger better? Yes, but small is still valuable as it can foster rare species and small scale ecological functions.
Goal 2: Enhance Ecology

New and Novel Vegetation

The City of Moonee Valley is committed to enhancing ecology in Moonee Valley to achieve an:

- Increase in volume and diversity of native and exotic species
- Increase the diversity of landscapes and human interaction experiences

Guiding Principles

To enhance Moonee Valley’s urban ecosystems, Council applies the following guiding principles

1. **Council will support additional dwellings coupled with extra green infrastructure in our suburbs.** This includes more vegetation in parks, gardens, streetscapes, water sensitive urban design, naturestrips, green walls and green roofs. Guidelines to support these designs include the *Moonee Valley Water Sensitive Urban Design Guidelines*, *Moonee Valley Draft Sustainable Building Guidelines*, *Draft Victorian Growing Green Guide for Green Roofs, Walls and Facades*.

2. **Council will progressively grow a healthy urban forest** through design, planning, education and controls. Urban Forest Precinct Planning will help set out the wisest plan for increasing and monitoring vegetation to help adapt to climate change, population increase and infrastructure pressures. Urban forests help reduce the impacts of heatwaves, droughts and more extreme storms by sequestering more carbon, transpiring more moisture into the atmosphere, breaking up wind flows, and shading more surfaces.

3. **Council will support biodiversity by planting faunal links** between reserves, waterways and existing patches of vegetation. These linked vegetation corridors will allow plants and animals to travel and find food, habitat and breeding opportunities that all contribute to healthier and more viable populations. This is also supported by applying bird friendly building design. Council will support soil health and enhancement as important habitat and nutrients for microorganism, and ultimately terrestrial organisms.

4. **Council supports ecological design in parks, gardens and streetscapes.** This includes applying site-scale ecological concepts, designing beyond the site, making it great for people and wildlife, allowing wilderness, and employing a design strategy. Direction for ecological design is provided in Council’s *Urban Ecology Park Scenario*.

5. **Council supports healthy waterways** via its commitment to water sensitive urban design to help slow down stormwater flows and remove pollutants to support aquatic health. Moonee Valley is committed to improving the amount and quality of local habitat along its waterway corridors.

6. **Council will support urban agriculture** by planting supporting pollinator species in public and private land as a way that will support local and regional food production. It also welcomes food growing initiatives.

7. **Council encourages well vegetated private gardens** as a form of restoration given the potential for gardens to contribute to urban ecology and to bring people closer to nature. Council will investigate offset arrangements for the removal of private vegetation where loss of localised habitat could be offset through revegetation programs at local parks or waterways, or through undergrounding of powerlines to allow street trees to develop a full canopy.

8. **Council is committed to continually building the skills** and information available to staff, contractors, volunteers and community is critical to avoid damaging management actions and keep up with current research and industry standards.

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*Draft Growing Green Guide - Victoria Guide for Green Roofs, Walls and Facades*
Actions

1. Develop base line data and monitoring programs for Moonee Valley’s green infrastructure
   This includes mapping, monitoring and sharing information on an ongoing basis

2. Develop strategies, policies and guidelines that support the goal to enhance ecology
   This includes guidance for urban forest, plant species, urban ecology design, sustainable building design, green
   leases, significant trees, urban agriculture, waterways, litter, land contamination, planning controls, local laws

3. Implement best practice land management projects
   Projects in parks, gardens, streetscapes and on buildings to increase flora and fauna. This includes plant
   diversity works, urban agriculture plots, waterway health, soil improvements, canopy expansion.

4. Build capacity, knowledge and understanding1 that supports urban ecology principles
   Staff and contractor training resulting in a change of daily management regimes to enhance our ecosystems
   with more plants, canopy and community-led initiatives.

Actions to be implemented as detailed in an annual Urban Ecology Implementation Plan.

What is an Urban Forest Precinct Plan?

As cities grow in population the importance of street trees, parks, and gardens also grows.

It is our urban forest that will help maintain our health and wellbeing by encouraging us to spend more time outside and active.
At the same time, more vegetation will help our community cope better with climate change, in particular heat waves and
storms.

Planning for an urban forest requires a shift from street tree planting to urban forest precinct planning.

Selecting priority urban forest precinct areas is based on:

- **Community vulnerability and connections** For example prioritising areas with low income, higher obesity rates, more
  elderly residents, higher interest levels

- **Existing vegetation** For example prioritising areas where there are no trees, or the trees are ageing, less healthy, lack
  diversity

- **Development links** For example aligning with new subdivisions, or aligning with other infrastructure works,

- **Urban heat island** For example target hotter areas of Moonee Valley based on satellite thermal imagery, width and
  orientation of street canopy5. Wide streets that run east-west are most exposed to the sun and a priority for reducing
  urban heat impacts. Thermal studies in Melbourne suggest that on average, a 10 per cent increase in urban green cover
  could reduce the daytime surface temperature during heatwaves in our cities by around 1°C.

- **Enhancing biodiversity** For example linking remnant habitats or creating pollinator pathways to support urban ecology
  goals.

Our future urban forest precinct plans should include:

- **Targets and vision** for increasing our green infrastructure to help focus our planning and planting.
  Moonee Valley City Council is aligning with Greening the West to seek a common methodology for our canopy, vegetation
  and species diversity targets. Monitoring, mapping and review processes will align with targets.

- **Community connections and priorities** to support local initiatives and opportunities for community to help Council staff
  protect and grow our urban forest with us

- **Planting priorities** to take into account suitability and resilience of species, diversity of species, sizing challenges

- **Integrated water planning** to support healthy vegetation and soils. This includes water sensitive urban design to capture
  and use rainfall, stormwater and wastewater. This will ensure planting best survives future droughts and water
  restrictions.

- **Urban ecology** links between existing and future habitats on both public and private land.

What kills 250 times more birds than wind turbines? Buildings do.

As cities around the world are growing, birds are starting to adapt to them. Research has shown that silvereyes that live in the city have developed a louder call than their country cousins to be heard over the traffic. And shorter winged swallows have evolved around highways to avoid collisions with cars.

And there are many things that we can do to also help the birds flourish.

**Bird Friendly Building Design**

An estimated 1 to 10 birds die per building per year as birds crash into glass or get trapped in alcoves. It is estimated that buildings kill five times more birds than powerlines, eight times more birds than cats, twelve times more birds than traffic, and 250 times more than wind turbines.

Moonee Valley has around 50,000 buildings which means over 1,000 birds are dying each week in our suburbs.

To help protect our birds into the future, bird-friendly building design is supported. This includes features such as:

- For tall buildings, making sure that the facades avoid transparent glass which reflects the sky or nearby trees.
  
  One study found that a 10% increase in the area of glass led to a 32% increase in bird deaths in autumn.

- For houses use screens, patterns and awnings on the windows that are most likely to confuse birds.

- Avoid passageways or courtyards that can trap birds.

- Shield outside lighting to minimise attraction to night-migrating birds.

- Install nest boxes, bird nesting bricks and bird baths in parts of your garden.

- Support green roofs, walls and facades as additional habitat for birds to enjoy.

- Reduce traffic noise through more sustainable transport use and noise barriers.


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Please don’t feed the birds

It’s important to let birds be birds and find their own way of gathering natural food in their habitat. Human food is simply bad for birds and most other wildlife. Bread has no nutrients and causes bird stomachs to swell giving them a false sense of fullness, leading to malnutrition. It can also lead to poorly developed bones and muscular tissue.

Even providing bird seed is not ideal as the birds become dependent on artificial food sources and may lose the ability to forage for themselves and teach their young how to do it. Food handouts cause aggression and stress amongst the birds. In backyards, bird seed attracts the large birds making your garden a more threatening place for small native birds.

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8. http://www.birdsinbackyards.net/places
Goal 3: Lead change
Trials, Advocacy and Research

The City of Moonee Valley is committed to being an urban ecology leader to achieve an:
- Increase in pilot projects to trial new ideas and methods and communicate success and challenges
- Greater unity and advocacy for systems and research that supports urban ecology

Guiding Principles

To lead change in urban ecology, Council applies the following guiding principles

1. Council will continue its leadership in the emerging issue of urban ecology. Leadership will be demonstrated by supporting solutions to urban forest issues that cross beyond our land boundaries via partnerships, integrated planning, knowledge sharing and communication.

2. Council will advocate for the changes needed to evolve from traditional tree and park management to a more holistic urban forestry approach that services multiple environmental, social and economic goals. Uniting our voice on issues facing our industry can achieve quicker or more powerful outcomes. Together we can reach a broader audience or a higher level of government.

3. Council will trial novel project and innovative ideas to explore their potential for wider application. Council will design holistic projects addressing a range of social, economic and environmental goals as they apply best practice and are likely to be more successful in finding partnership and funding. Case studies will be developed to provide visual consultation tools which often engage a wider audience.

4. Council will support projects that help research new theories or practices. Research institutes are essential in moving the urban ecology industry forward and Moonee Valley values these partnerships as they help to fill evidence gaps, and because they are also likely to be more successful in sourcing grant funding and partnerships.

Actions

1. Advocate for the changes needed to enable greater implementation of urban ecology
   This includes advocating for changes to outdated infrastructure and planning requirements, climate change action, more information sharing, more research, species protection, reduced bureaucracy.

2. Actively participate in regional and national alliances where their goals align with Council
   This includes community groups, industry bodies, not-for-profits and cross-government bodies. Our involvement is dependent on the impact and benefits of the alliance for advocacy and projects.

3. Show leadership by supporting pilots and research partnerships
   This includes trials and research projects providing more evidence for policy, guidelines and management. Research such as true-cost accounting of benefits of urban ecology. Trials such as community managed garden beds.

Actions to be implemented as detailed in an annual Urban Ecology Implementation Plan.
Trees and powerlines

Street trees under powerlines require extreme pruning to maintain a clearance from the wires.

This leads to reduced canopy, increased maintenance costs, aesthetically unattractive trees and increasing the risk of disease and pest impacting the trees.

There are a number of engineering solutions to minimise the conflict including increasing pole heights, insulating, bundling or undergrounding powerlines, or re-routing lines.

In addition to these solutions the location of streets trees and species selection can be modified to plant smaller species under powerlines and prioritise the planting of trees in central median strips away from powerlines.

Council is responsible for the trees, the power distributer is responsible for the power poles and lines and the state regulator is responsible for setting standards and ensuring they are met. These three parties need to work together to invest in these alternative solutions that both improves safety and minimises impact on environment and amenity.

At a minimum, electricity infrastructure at the end of its lifecycle should be replaced with construction that will minimise impacts on amenity and environment. The MAV and councils have expressed their commitment to working cooperatively with the State regulator and the distribution businesses to mitigate bushfire risks arising from electricity assets but the amenity and environmental considerations are yet to be addressed.

There exists a need for an electric line clearance regulatory regime that, while prioritising safety, is empirically sound and genuinely values the very real environmental and social benefits of vegetation.

The upfront cost of alternative engineering solutions such as aerial bundling is often the reason why it is not considered as the first option as opposed to ongoing pruning which initially may be only a few hundred dollars. Over its lifetime the maintenance of a tree under powerlines has been estimated at an average of $18,000 per tree, this in most cases is significantly more than aerial bundling and even undergrounding.¹⁵

With the increasing densification of housing on private land, there is a reduction in private vegetation often leaving only a street tree as the only mature vegetation on a property. By investigating an offset arrangement for the removal of vegetation on private property, in particular mature trees, Council may be able to meet the additional investment required for Council to cover the vegetation needs that are currently not desired on private. For example, tree management and engineering solutions to reduce the conflict between remaining street trees and power lines to allow the remaining street trees to develop larger canopies.

Goal 4: Connect with Community

The City of Moonee Valley will draw on the urban ecology skills and desires of the community to achieve an:

♣ increase in fauna habitat on private properties to enhance wildlife corridors
♣ increase in diversity of urban ecology engagement programs

Guiding Principles
To increase community connections with urban ecology, Council applies the following guiding principles

1. Council highly values community knowledge, skills and passion on our local urban ecology. Environmental professionals, historians and ‘backyard’ researchers from within our community are keen to share their knowledge to create a better environment. Council will establish avenues to gather this knowledge and draw on the community to identify issues and changes in our local environment and provide ideas to problem solving.

2. Council welcomes ground up, safe community initiatives such as gardens and habitat enhancement projects on vacant land as agreed by the land manager. Council will support community led initiatives to improve urban ecology and help promote to the wider community. Where community initiatives are proposed for public land, Council will ensure the community good is maintained with design and timing to take into account impacts on general access, safety, amenity, and environment.

3. Council supports the use of crowd sourcing to shape urban ecology projects. This includes drawing on local knowledge for new project ideas, tracking flora and fauna, and even crowd-funding for additional projects. These can be led by Moonee Valley or via other organisations that we have partnered with. Citizen science is a form of crowd sourcing that can help Council develop our baseline data, our understanding of the local natural environment and increases awareness and sense of ownership and responsibility for the environment within the community.

4. Council will provide knowledge, guidelines and skills to foster community led urban ecology initiatives. Council will build an informed and empowered community that not only shares the goal of improving our urban ecology, but is able to drive its own initiatives and programs.

5. Council will educate the community on human behaviours that are potentially threatening to local ecology. Although the most serious behaviours are deterred by legislation (e.g. hunting), there are many seemingly harmless behaviours that have significant negative impacts at local scales such as feeding bread to the birds at the local lake.

Actions
1. Develop urban ecology educational programs
   This includes educational resources, potential eco-centre, train-the-trainer, tours

2. Promote, encourage and support community-led urban ecology initiatives
   This includes initiatives from community groups such as ‘Friends of’, community gardens, pop-up gardens

3. Implement community engagement programs
   Projects include planting and clean-up events, adopt-a-tree, junior rangers, grants, citizen science for flora and fauna watching, crowd-funding, My Smart Garden

Actions to be implemented as detailed in an annual Urban Ecology Implementation Plan.
How can community-managed garden beds work?

Here in Moonee Valley we are hearing more requests from our community for garden beds in open space for local people to grow plants and food in.

We think this is a great idea for bringing people together, eating healthy and greening up our neighbourhoods. One way we can support this is by installing temporary garden pods (these ones even have seating included).

Council believes these beds only remain a valuable community asset if they are continued to be maintained.

As Council maintenance staff are already committed to maintenance of our existing public parks and gardens, the community commitment to this partnership is an understanding that Council will need to remove the garden if local residents are not longer able to maintain their bed.

We’ll include a sign that says ‘This bed is gardened by local residents. If you would like to help out, chat to one of the gardeners or contact Council. In the event that the garden bed is no longer maintained, Council will relocate it to another interested community’.
Definitions

Ecology
Study of the interactions between organisms and between organisms and their environment.

Urban Ecology
The diversity of flora and fauna and their inter-relationships with the land, air and water and its people all set in the fabric of our urban environment.

Urban Forestry
The management of the urban trees and vegetation for the purpose of improving the urban environment particularly in public spaces.

Ecosystem
A community of living organisms and non living components of their environment interacting through the cycling of nutrients and energy.

Ecosystem Services
The benefits provided by ecosystems, including provisioning, such as the production of feed; regulating, such as the control of climate and disease; supporting, such as water cycles, nutrient cycles and crop pollination; and cultural, such as spiritual and recreational benefits.

Biodiversity
The variety of all life forms on earth; including all the different plants, animals and micro-organisms; their genes; and the terrestrial, marine and freshwater ecosystems that they exist in

Indigenous species
A species is indigenous to a given region if its presence in the region is the result of only natural processes, with no human intervention.

Invasive species
A non indigenous species that adversely affect the habitats they invade

Declared Noxious Species
An invasive species listed under the Catchment and Land Protection Act 1994 and requires management by the land owner.

Exotic species
A plant species which is growing outside of its naturally occurring area of distribution but generally not having a negative impact on the surrounding ecology.

Remnant Vegetation
Patches of the original, indigenous vegetation, which remain after the surrounding areas have been developed or disturbed for another purpose.

Ecological Vegetation Class
The basic mapping units used for biodiversity planning and conservation assessment at landscape, regional and broader scales in Victoria. They are based on the types of plant communities, ecological information relevant to the species that comprise the communities; and information that describes variation in the physical environment.

Green Infrastructure
The network of vegetation and landscaping elements in parks, reserves, streetscapes, building and homes including rain gardens, green roofs, wetlands, trees and vegetation

Novel Ecosystems
Human constructed ecosystems which contain new combinations of species, structures and designs. These are not naturally occurring.

Open Space
Areas of parks, green spaces and other open areas including playing fields, highly maintained environments and natural landscapes.

Street Tree
Trees planted within the Nature strip or Median strip of a road. These are usually planted and maintained by Council.

Streetscape
The landscaping and plants that make up the street environment including, nature strips, foot paths, road treatments, trees and plants.