



# City Forest & Habitat Strategy 2018-2040

Annexes

## Contents

Appendix 1 - BOBIT Design Principles .....	3
Appendix 2 - Future Conservation Reserve Sites .....	4
Appendix 3 - Indigenous, Native and Exotic Species Selection .....	5
Appendix 4 - Proposed Tree Selection Matrix Species List .....	6
Appendix 5 - Tree Management Standards .....	7
Appendix 6 - Tree Valuation .....	11
Appendix 7 - Governance Arrangements of Significant Tree Register ....	12
Appendix 8 - Management of Traditional Owner Heritage During Revegetation Works .....	14
Appendix 9 - Tree Canopy Baseline and Methods.....	15
Appendix 10 - Boulevard and Avenue Concept Plan .....	17
Appendix 11 - Urban Heat Island Map .....	21
Appendix 12 - List of All Actions and Targets .....	25



## Appendix 1 - BOBIT Design Principles

Wyndham's growing population has resulted in our natural habitats becoming increasingly fragmented across the urban landscape. This can cause difficulties for our native animals as they attempt to traverse urban areas that lack places where they can rest, feed and breed in safety. While our waterways such as the Werribee River and Skeleton Creek and wetlands provide some patches and corridors for wildlife to live and move around safely, urban areas provide significant obstructions to their passage between these patches.

Wyndham houses a large array of urban open spaces, including sporting fields, reserves, parks and playgrounds. These urban spaces are often highly modified, having formerly been cultivated for agricultural purposes prior to the encroachment of urban development. These areas provide significant opportunity to provide stepping stones of habitat that can increase the connectivity between existing patches and corridors of habitat in the landscape.

'Bits of Bush in the Suburbs', or 'BOBITS', will focus on the creation and optimisation of native habitat within highly modified, urban open spaces, with an aim to create habitat that can support a wide range of native animals, including birds, lizards and insects. These BOBITS will be designed as low maintenance bush-style plantings that incorporate trees, shrubs and understorey plantings that provide shelter and food for wildlife. Habitat structures such as rocks, logs and nest boxes will also be incorporated as appropriate. These BOBITS will be planted within our open spaces as appropriate to complement the purpose of the open space, with consideration of CPTED principles (refer to strategy Section 4.2).

BOBITS also provide a unique opportunity for residents to access and interact with nature close to home, including opportunities for informal nature play and environmental education.

The adjacent example shows how BOBITS may be incorporated into an open space (Loyola Road Park):



Potential BOBITS planting sites within a park  
-enhancing existing vegetation

## Appendix 2 - Future Conservation Reserve Sites

The following table outlines existing and future conservation reserves where Wyndham City will consider becoming the future reserve manager. The table outlines our reasoning in relation to different reserves, considering impacts on Council resources against the potential community and environmental outcomes.

Reserve Description	Wyndham offer of reserve management?	Comments
Metropolitan Strategic Assessment (MSA) Conservation Areas		
CA13 - Ballan Road - 59 ha	No	Site is very large, requiring complex fire management and high maintenance costs, more suited to management by State Government.
CA14 - Growling Grass Frog Reserve Werribee River and Davis Creek Lollypop - 372 ha	No	Site is very large, requiring substantial rehabilitation, more suited to management by State Government.
CA10 - Truganina Cemetery - 15 ha	Conditional Offer	Area contains high value habitat and significant existing community value. A State contribution to maintenance costs would be required. Offer excludes buffer area to be rehabilitated.
CA12 - Sewells Road - 1.5 ha	Conditional Offer	Area contains high value habitat and abuts Council managed reserves. A State contribution to maintenance costs would be required.
Truganina South Golden Sun Moth Reserve - 38 ha	No	Site is very large, requiring complex fire management and high maintenance costs, more suited to management by State Government
CA11 - Woods Road - 22 ha	No	Site is located adjacent to Truganina South Golden Sun Moth Reserve and will benefit from integrated management by one agency.
Other Existing and Future Reserves		
Cunningham's Swamp and Lincoln Heath South > 92 ha	For consideration	Subject to a future Precinct Structure Plan. Depends on final design protecting the hydrology of the swamp and habitat connectivity between the swamp and heathland. Given its size a substantial State contribution to maintenance costs and installation of infrastructure (e.g. boardwalks) would be essential to ensure the reserve is an integrated community asset. Council already manages part of the swamp.
Williams Landing wetlands and grasslands offset site, currently in private management	For consideration	A high value conservation site that would benefit from additional maintenance and integration as a community asset (e.g. boardwalks, educational signage). Subject to discussions with the private land manager on suitable working arrangements, cost sharing and state/federal approvals.
Small offset sites currently in private management (multiple) < 2 ha total area	Conditional Offer	Small offset sites will be accepted that can be improved by Council management for community benefit (e.g. reduced weeds, environmental education) and/or adjoin existing Council reserves. Subject to negotiation with private land managers on acceptable lease arrangements.

## Appendix 3 - Indigenous, Native and Exotic Species Selection

The following table provides guidance on tree selection to identify the most suitable trees – from indigenous, native and exotic – for the right locations and to ensure we promote habitat connectivity and/or reduce impacts on existing natural habitat.

Location	Locally Indigenous	Native (Victoria)	Native (Australian)	Exotic (overseas)
Streets -nature strips and median strips	<ul style="list-style-type: none"> <li>Limited suitable trees</li> <li>Use where appropriate for street character and habitat zones</li> <li>Can be used to create habitat in wide median strips</li> </ul>	<ul style="list-style-type: none"> <li>Limited suitable trees</li> <li>Use where appropriate for street character and habitat zones</li> <li>Can be used to create habitat in wide median strips</li> </ul>	<ul style="list-style-type: none"> <li>Use where appropriate for street character</li> <li>Flowering trees preferred (food source) in habitat zones</li> <li>Avoid invasive species</li> </ul>	<ul style="list-style-type: none"> <li>Limit use in habitat zones, except where appropriate for street character</li> <li>Flowering trees preferred (food) in habitat zones</li> <li>Avoid invasive species</li> </ul>
Rural roads (assess grassland quality prior to planting)	<ul style="list-style-type: none"> <li>Use to match existing trees</li> <li>Space widely with shrubs to reduce impacts on adjacent natural grasslands</li> </ul>	<ul style="list-style-type: none"> <li>Use to match existing trees</li> <li>Space widely with shrubs to reduce impacts on adjacent natural grasslands</li> </ul>	<ul style="list-style-type: none"> <li>Use to match existing trees</li> <li>Space widely with shrubs to reduce impacts on adjacent natural grasslands</li> <li>Avoid invasive species</li> </ul>	<ul style="list-style-type: none"> <li>Only use where necessary to retain neighbourhood character</li> <li>Avoid species with invasive potential</li> </ul>
Drainage and other general reserves	<ul style="list-style-type: none"> <li>Use where trees can create contiguous habitat</li> </ul>	<ul style="list-style-type: none"> <li>Use where trees can create contiguous habitat</li> </ul>	<ul style="list-style-type: none"> <li>Use to match existing character and where trees can create contiguous habitat</li> </ul>	<ul style="list-style-type: none"> <li>Limit use except to match existing character</li> <li>Flowering trees preferred (food source)</li> <li>Avoid invasive species</li> </ul>
Natural waterway or wetland	<ul style="list-style-type: none"> <li>Use in most cases</li> </ul>	<ul style="list-style-type: none"> <li>Use to match existing character and along paths</li> </ul>	<ul style="list-style-type: none"> <li>Use to match existing character and along paths</li> </ul>	<ul style="list-style-type: none"> <li>Undesirable in most cases</li> </ul>
Constructed parks and ornamental water bodies	<ul style="list-style-type: none"> <li>As recommended for park character</li> </ul>	<ul style="list-style-type: none"> <li>As recommended for park character</li> </ul>	<ul style="list-style-type: none"> <li>As recommended for park character</li> <li>Avoid invasive species</li> </ul>	<ul style="list-style-type: none"> <li>Flowering trees preferred (food source)</li> <li>Avoid invasive species</li> </ul>



# Appendix 4 - Proposed Tree Selection Matrix Species List

The right tree in the right place' is the mantra by which all tree selection will take place. Our mandate is to select trees which have a manageable interaction with property or other infrastructure, while providing the most benefit to the community. Life expectancy and maintenance requirements should be taken into consideration especially as Wyndham City will manage more and more trees into the future. Selecting the largest canopy tree that is suitable for the location will be fundamental to providing these benefits while reducing costs and risks. The future of uncertain climate change will be taken into account with susceptibility to drought and a range of pests and diseases.

The Tree Selection Matrix includes a list of trees suitable for our different soils and climatic regions. Different trees will suit different treatments such as under power lines, within narrow nature strips or adjacent to main roads. The Tree Selection Matrix will also be used as Council's guideline for residents planting trees on private property.

The table below outlines the key factors and process for selecting trees in Wyndham. As a prerequisite, the tree must be suitable to the broad environmental conditions of Wyndham. The tree diversity and tree population is than considered holistically. The site conditions are vital to tree performance and the aesthetic guide is not a primary factor for most tree selection.

Factor	Prerequisites	Species Diversity	Site Conditions	Aesthetics guide
Canopy width			•	•
Suited to Soil type	•		•	
Tree Height			•	•
Deciduous/evergreen			•	•
Power lines			•	•
Infrastructure setbacks and clearances			•	
Climate Change resilience	•	•		
Irrigation requirements	•		•	•
Indigenous/Native(Vic/Aus)/Exotic		•	•	•
Maintenance and/or invasive	•		•	
Design/form/colour				•
Family/Genus/Species		•	•	•





## Appendix 5 - Tree Management Standards

### Intent and Purpose of the Standards

All trees on public land including parks, reserves or within streetscapes that are owned or managed by Wyndham City Council are subject to the Tree Management Standards ('the standards') within this document.

Effective tree management is based on an understanding of the dynamic nature of the living resource, its safety requirements, the visual aesthetic benefits in providing a sense of place to the community along with its perceived and realised environmental and economic benefits. The costs of replacing and regrowing tree assets that are removed or damaged must also be considered.

The standards provide a framework for how Wyndham City will manage a number of different situations regarding the protection and management of tree assets within Wyndham.

### Governance of the Standards

Wyndham City has a number of stakeholders across varying departments which are responsible for the implementation of the standards.

Wyndham City's Urban Forest Planner and the Environment and Water Department are responsible for ensuring that the standards remain current and relevant for all other Council departments.

This document will be reviewed at a minimum every 5 years for alignment with current best practice and standards (Australian Standards) and current Council policy.

### Reference Documents

The following external standards and references are referred to:

- Australian Standard AS4373-2007-Pruning of Amenity Trees (AS4373)
- Australian Standard AS4970-2009-Protection of Trees on Development Sites (AS4970)

The following internal reference documents and policies are referred to:

- Council Tree Policy
- Wyndham Tree Risk Strategy

### Activities Requiring Tree Protection

All trees on Council owned or managed land will be protected in accordance with the Australian Standard AS4970-2009-Protection of Trees on Development Sites (AS4970) at the discretion of the Responsible Authority. Protection requirements will be required when any buildings or works are to be undertaken within the tree protection zone of any tree. Buildings and works include but are not limited to (Adapted from AS4970):

- The use for the land for festivals or events that may result in damage to a tree or trees
- The installation (excavation or construction) to install services (underground and overhead)
- Road, crossover, infrastructure and Drainage works
- The demolition and or construction of a building
- The subdivision of land
- Any other works that may result in damage to a trees' above or below ground structures such as bulk earthworks, soil amelioration

Tree protection measures may include:

- The erection of a fence, temporary or permanent barrier to limit access into an identified tree protection zone or area
- Ground protection measures to reduce compaction during a festival or event
- Trunk or branch protection to minimise physical damage to a tree
- Non-destructive excavation works or directional boring within the tree protection zone



### Determining the Tree Protection Zone (TPZ)

Based on the Australian Standard AS4970-2009-Protection of Trees on Development Sites, the Tree Protection Zone (TPZ) is calculated by multiplying the trunk or stem diameter at 1.4 metres from natural ground level by 12. This will determine the tree protection radius from the centre of the trunk. The trunk or stem diameter used in the calculation may be from a single stemmed tree or a multiple stemmed tree. Determination of the total stem diameter of a multiple trunked tree may be complex as it involves calculating the cross-sectional area of each stem and combining these measurements to then calculate the trunk diameter based on the total area of each stem. As a general guide, the trunk diameter may be measured at the lowest point beneath the multiple stems and this measurement is multiplied by 12 to determine the approximate tree protection zone.

Tree protection in the urban environment may be complex and there are many circumstances where the tree protection zone can be modified. The Australian Standard AS4970 sets out the framework for management of trees in complex situations. In determining the tree protection measures required, Council and its delegated officers may set out the specific requirements for tree protection.

Where a planning permit is required for the works it is recommended that the proponent seeks the advice of a qualified independent arborist (AQF Level 5 or higher) to help with determining the TPZ and other protection requirements.

### General Tree Protection Guidelines

There are a number of principle tree protection guidelines that should be considered to manage trees prior to, during and post construction or works. Wyndham City Council uses the guidelines within Australian Standard AS4970-2009-Protection of Trees on Development Sites to determine and guide tree management activities. These guidelines will be applied for any relevant public works and will be used to protect any Council owned or managed trees affected by private works such as construction on private properties and the construction of new vehicle crossovers.

### Construction and Reinstatement of Vehicle Crossovers

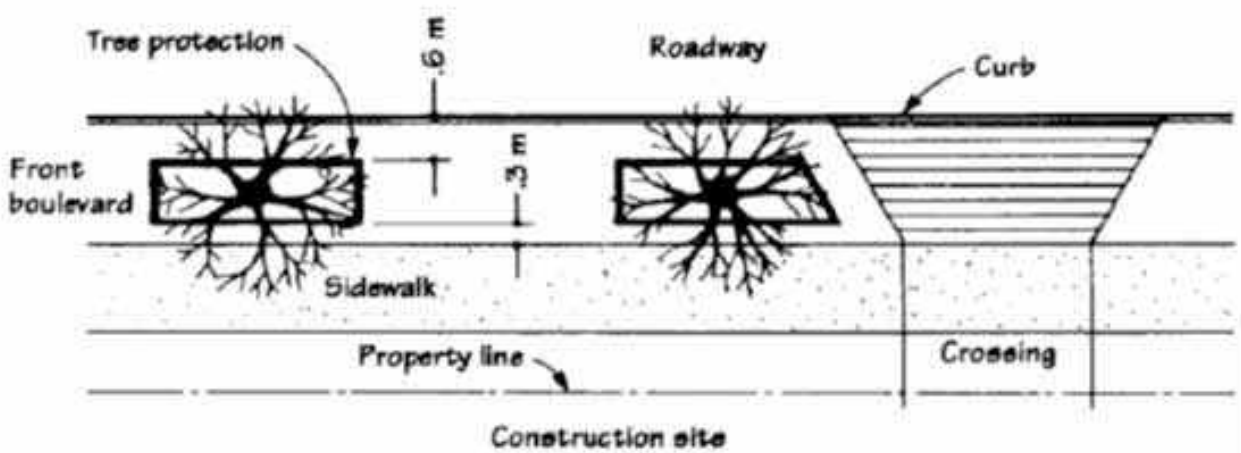
Protection of Council's public street trees is of paramount importance to the management of the Urban Forest in Wyndham. In the past construction of new or expanded crossovers (driveways) into properties has resulted in loss or damage to Council street trees and a standardised approach is required to protect these trees in future. All costs required to meet the standard shall be incurred by the private land owner or responsible person for the works.

In determining the suitability of a new or reinstated crossover, Council will in the first instance, determine the suitable setback distance from any tree to the edge of the proposed works based on the condition of the tree and its identified tree protection zone. As a general rule:

- Any new crossover should be located at least 3 metres from any identified public tree.
- Council's delegated officers will determine the impact to any public tree based on the trees physical characteristics and the calculated tree protection zone.
- In instances where a public tree may require removal for the installation of a new vehicle crossover or where a tree may be severely impacted, Council may require a compensatory payment to be made based on the Monetary Valuation of the Tree (Appendix 6).
- If new works will result in a high level of encroachment into a tree protection zone, Council may require that a non-destructive root investigation is undertaken through hydro (water) or pneumatic (pressurised air) excavation.
- If Council determines that a new vehicle crossover is acceptable, Council may require tree protection conditions as part of any new vehicle crossing permit, asset protection or Statutory Planning permit.







### Removal of Public Trees

Council receives request to remove public trees for a variety of reasons. Council also removes trees where the tree is unhealthy, poses a safety risk or will be impacted by construction work.

Trees of high importance and community value may require consultation prior to tree removal. If emergency works are needed for safety reasons, then no consultation may be possible.

Only Council trees identified for removal in a planning permit may be removed or destroyed by an agency other than Council. No earthworks, compaction or modification of existing drainage patterns may be undertaken which represent a risk to any Council managed tree where a permit has not been obtained to remove the tree(s).

### Customer Requests

Customers requesting tree removal should lodge a request through Council's Customer Service System and it will be assessed by qualified Council staff.

For safety reasons Council will not permit residents to remove trees, all tree removal will be conducted by Council staff or nominated contractor.

In general Wyndham City's preference will be to retain healthy public realm trees wherever possible. As such Wyndham City may decline tree removal requests where there is limited benefit from tree removal –this may include request for additional (secondary) property crossovers where a functional primary access is already in place.

### Tree Removal Fee

If tree removal is approved for private benefit (i.e. construction or access) then a tree valuation charge will apply (Appendix 6).

Similarly these charges will be applied to illegal vandalism, damage or unapproved tree removal, in addition to fines and penalties.

Wyndham City will also consider complimentary or alternative contributions where appropriate such as offset planting with a significant net gain to the tree population or translocation of mature trees where it is viable to do so.

Fees may be adjusted or payment plans developed where the applicant is a concession card holder or experiencing financial hardship and Council has agreed that tree removal is necessary. Any reduction in standard charges will be dependant on individual circumstances and will require approval by the Manager Environment and Water at Wyndham City.

### Process for repurposing tree material after removal

Trees after removal still have value to the community and the environment including vital habitat. Repurposing tree material also helps retain carbon in the landscape.

For larger trees Councils first priority will be to consider retaining the structure as a 'habitat tree'. This involves removing all limbs that pose a risk of falling and creating roosting and nesting spaces within the trunk and larger limbs of a dead tree. If a habitat tree is not a viable option Council will require the removed material to be delivered to a Council depot or other suitable location for reuse. Wyndham City's reuse priorities are described below.



Priority for use:

- 1. ART:** If of significant historical or social value the trees may be considered for carving or sculptures.
- 2. LANDSCAPE FURNITURE:** If timber is reasonably intact (limited hollow or decay in heart wood), of appropriate species (cypress, pine, oak, ash, grevillea and some gums) and are of length and diameter (400cm DBH (Diameter at breast height or 1.4m above base of tree)) they should be considered for landscape furniture.
- 3. HABITAT STRUCTURES:** If decayed or > 400mm and timber may be considered for habitat structures in conservation areas. These habitat structures are to be left as long as possible (minimum 3.5m) and branching structures if possible.
- 4. MULCH:** When trees must be mulched.

All trees with a DBH (diameter at breast height as per AS4970) equal to or greater than 400mm permitted to be removed will in most cases be required to be transported to the Wyndham Refuse Disposal Facility (RDF) for milling and reuse.

Sections are to be transported into as long lengths as possible and none shorter than 2.5m.

The RDF is to be contacted and the number plate(s) given along with an estimate of number of trips required. Upon entrance to the RDF the driver is to report to the site office for location details. Photographs of the material once delivered are to be taken and sent to [mail@wyndham.vic.gov.au](mailto:mail@wyndham.vic.gov.au).



## Appendix 6 - Tree Valuation

### Monetary Valuation of a Public Tree

Maintaining trees in the public realm often requires substantial costs. However, the long term environmental, social and economic benefits of maintaining a healthy and effective Urban Forest outweigh the overall costs involved. Unlike most physical assets such as a building, the value of a tree may appreciate rather than depreciate over time. There is much research throughout the world that has quantified the increasing benefits of trees as they age, including the economic benefits.

There are numerous tree valuation methods that are used by municipalities within Australia. Such methods are based around systems such as the Revised Burnley Method (2005), the Thyer Tree Valuation Method (1996) and the City of Melbourne – Amenity Value Formula (2006). Such methods are often subjective as they rely on an assessors interpretation of the benefits that a tree or trees are providing. Watson (2002) has identified that there can be much variation between assessors using such methods as they rely on qualitative assessment.

Council has taken such methods into account and has devised a Monetary Valuation of a tree based on the costs of removal and replacement of a tree combined with a value relating to the average economic benefits of a tree based on a trees' height. The benefits of the tree are then multiplied by a simple factor that is based around the fact that an average tree (a tree in fair condition) will provide a standard economic and social benefit. The overall value of the tree may increase or decrease based on its health and structure characteristics.

The intent of this valuation method is that a value can quickly and easily be applied to the tree population through a tree inventory.

The costs involved with the removal of a tree can be varied and may often include other external costs such as the costs of community consultation, traffic management, underground service investigations and power line shut down costs. The replacement cost of the tree includes the supply of the advanced tree stock, the installation (including stakes and ties/ water wells/ mulch etc.) and the costs of monitoring, formative pruning, watering and fertilisation over a 2-year maintenance period.

### Tree Valuation Method

Modifier	Value	Categories
Tree DBH (cm)	Base removal cost	<15, 15-30, 30-50, 50-70, 70+ cm
Replanting cost	Fixed fee	N/A
Tree Height	Value per meter	Meters
Health Value	Value multiplier	Very good, Good, Fair, Poor, Hazardous
Structure Value	Value multiplier	Very good, Good, Fair, Poor, Hazardous



## Appendix 7 - Governance Arrangements of Significant Tree Register

Trees make a substantial contribution to the liveable amenity in Wyndham and the benefits of trees within the urban environment include amenity, environmental, social and economic values. Trees make a substantial contribution to the aesthetic value of the built environment and are an essential component of any modern urban design.

Many trees within Wyndham are considered significant for reasons of scientific, social, historic or amenity value and it is the purpose of this significant tree register to provide a framework within which significant trees within the municipality can be identified, assessed and protected.

Trees within Wyndham can be nominated for inclusion on Wyndham City's Significant Tree Register by interested parties. Nominated trees will be assessed by a qualified arborist (AQF Level 5 or higher) experienced in assessing significant trees based on defined selection criteria. Independent expert advice may be sought on matters relating to historic, scientific or cultural significance.

The inclusion of a tree on the Council's Significant Tree Register will only occur if they meet one or more of the criteria outlined below. The criteria for inclusion are based on the National Trust's selection criteria with a focus on local identity.

With urban growth, some significant trees are likely to come under pressure from development. With the implementation of a Significant Tree Register, Wyndham City Council aims to identify and protect trees of significance located on land owned or managed by the Council. Any tree listed on the Significant Tree Register will require a permit for removal or major works and will be subjected to a higher frequency regime of inspection and maintenance.

Nominated indigenous, native or exotic trees that display characteristics that conform to the selection criteria will be protected under the Planning Scheme through a vegetation

protection overlay (VPO). The Significant Tree Register will be a continually evolving entity as trees die, or are removed and new trees are added. It is intended that the VPO will be revised at least once every 4 years. Trees accepted on the register but not yet included in the planning overlay will still be afforded protection through Council planning and works approval processes.

Some trees may be retained on Council's register but not made publicly available or incorporated into a planning overlay. For example, trees of cultural significance that Traditional Owners have requested not to be publicised.


### Selection Criteria

For a tree to qualify for inclusion on the Significant Tree Register it must conform to one or more of the attributes as set out in the predefined criteria which are:

#### Scientific

- Horticultural or genetic value;
- Important source of seed or propagating stock;
- Particularly resistant to disease or exposure;
- Rarity of species or of a localised distribution;
- Locally indigenous remnant vegetation;
- Of exemplary size;
- An exceptional example of the species.

#### Social

- Unique location;
  - Makes a significant contribution to the landscape;
  - Has an association with the activities of Indigenous Australians;
  - Is an important landmark;
  - Has a spiritual or religious association;
  - Has a contemporary association with the community;
- 

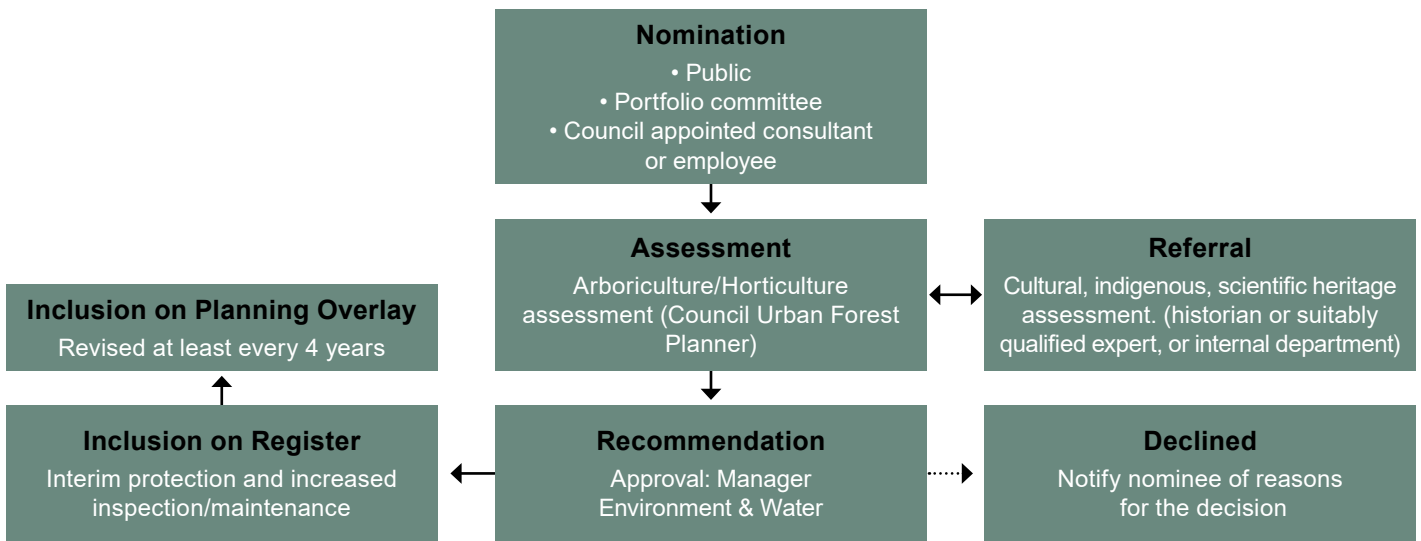
**Historic**

- Part of a historic park, garden or town;
- Commemorative planting;
- Associated with an important person, group or institution;

**Aesthetic**

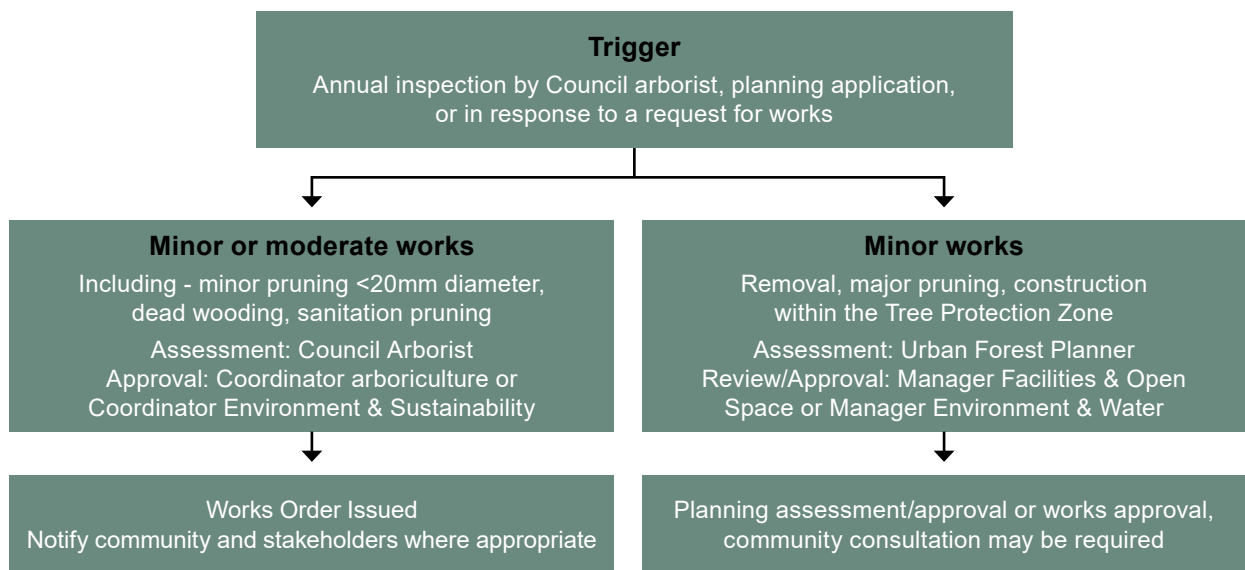
- A tree of high amenity value;
- Exhibits curious growth form or unusual physical features;
- Is an exceptional example of the species;
- The nomination of trees for inclusion on the Significant Tree Register on a local level;

Tree nomination process for Significant Tree Register



Tree management governance process for significant trees

The following excludes emergency works for safety.





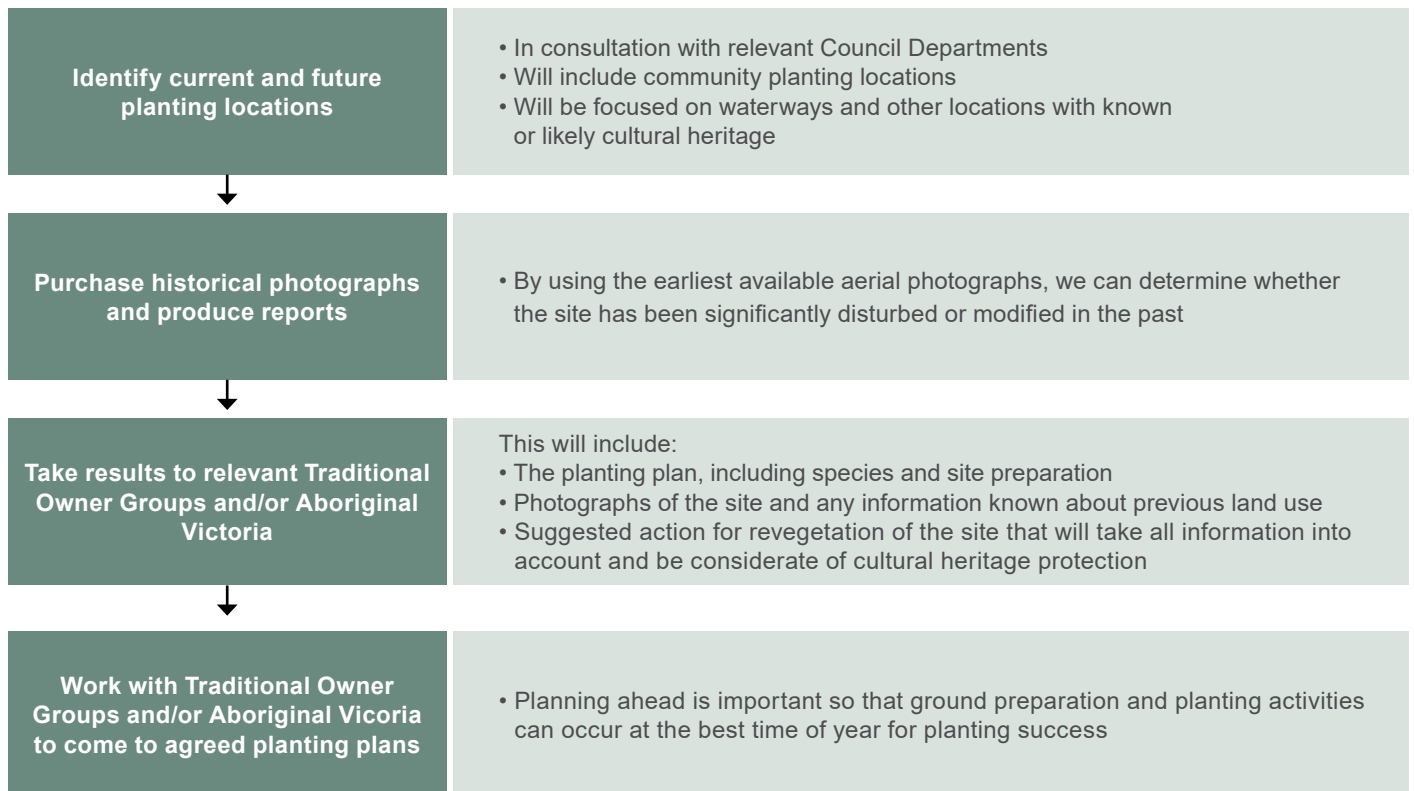
# Appendix 8 - Management of Traditional Owner Heritage During Revegetation Works

For tens of thousands of years, the Werribee River and other freshwater sources have been significant places for Aboriginal people to build community and use or exchange resources. During that time, the people living or visiting these areas left physical evidence of their activities that now survive as cultural heritage places and objects. Aboriginal places and objects can be found all over Australia and are often near major food sources such as rivers, lakes, swamps and the coast.

Wyndham City is committed to restoring the natural vegetation, especially along our natural waterways, however, precautions are required to ensure that site preparation does not destroy or damage any cultural heritage in the process.

The following flow chart outlines the process Council will take in ensuring that site preparation is suitable and sympathetic to each particular planting location along our waterways and reserves.

If artefacts are uncovered during planting work Wyndham City will apply standard identification and stop work methods to protect cultural heritage. These will be notified to the relevant traditional owners and/or Aboriginal Victoria.



## Appendix 9 – Tree Canopy Baseline and Methods

Urban tree cover (UTC) is a good indicator and benchmark for the overall benefits gained from trees. It is often expressed as a percentage of overall tree canopy cover as seen from an aerial image but does not account for total canopy volume in terms of vertical canopy. In 2014 a study was published (using Google imagery often at least a year old) that identified Wyndham City as having the lowest canopy cover in greater Melbourne at 3.1%, significantly lower than our neighbouring municipalities.

Table 5: Victoria - tabulated results sorted by Canopy Cover (%)

LGA	Percentage (%)				Land Cover (km <sup>2</sup> )			
	HS	T	S	G/BG	HS	T	S	G/BG
Wyndham, City of	12.9	3.1	2.7	81.3	70.0	16.8	14.7	441.5
Brimbank, City of	41.5	6.2	2.8	49.5	51.3	7.66	3.46	61.2
Melton, City of	6.0	6.3	2.7	85	31.7	33.3	14.3	449.2
Maribyrnong, City of	58.2	7.4	3.6	30.8	18.2	2.31	1.13	9.63
Hobsons Bay, City of	44.0	7.6	2.9	45.5	28.3	4.89	1.87	29.3
Hume, City of	11.7	7.9	3.1	77.3	59.1	39.9	15.6	390.1
Greater Dandenong, City of	39.4	8.2	2.6	49.8	51.1	10.6	3.37	64.6
Greater Geelong*, City of	9.5	10.9	5.3	74.3	118.7	136.2	66.2	928.7

Figure 1 Jacob et al. Where are all the trees  
([http://202020vision.com.au/media/7141/benchmarking\\_australias\\_urban\\_tree\\_canopy.pdf](http://202020vision.com.au/media/7141/benchmarking_australias_urban_tree_canopy.pdf))

More recently unpublished data derived using similar methodology has found the following. It is important to note that the study is a random point sample that includes a small error margin.

Tree Coverage for all of Wyndham (including outside the UGB)		
2005	2013	2017
3.7%	3.1%	4.3%

The context of Wyndham City is that much of the area is covered by endangered grassland and is unsuitable for tree planting and never naturally grew many trees. For these reasons, it is appropriate to use the area inside the urban growth boundary to estimate UTC for our City Forest and Habitat Strategy baseline for percentage canopy cover. The following has been derived from unpublished data using a similar methodology as the original study. It shows:

Urban Tree Coverage of area within the 2010 Urban Growth Boundary	
2005	2017
6.4%	9%

Notes:

- When the built environment reaches to the more recent Urban Growth Boundary we will need to reassess our UTC area.
- Indigenous grasslands will not be planted with dense canopy vegetation







## Appendix 10 - Boulevard and Avenue Concept Plan

### Introduction

The development of a coherent plan for Wyndham City's Boulevards and Avenues is an action incorporated into the City Forest and Habitat Strategy. A network of tree lined major roads will create an aesthetically pleasing entrance into the City and major activity areas, while also providing shade and cooling, contributing to our canopy cover targets and enhancing habitat connectivity.

Wyndham City already boasts a number of well established boulevard style streets, some with significant heritage values, and we will look to enhance and protect, as far as possible, those street scapes. However there is ample opportunity to extend boulevard style street plantings in both old and new areas of the City.

Given the location of boulevard plantings, we will need to work closely with stakeholders including VicRoads, Melbourne Water, private developers and others who own or have services within roadside areas.

The full Boulevard and Avenue Plan will be developed as described below.

#### Definitions:

**Boulevards:** tend to be wide streets separated with a median with one or more rows of trees

**Avenue:** normally wider than normal streets with canopy trees

### Objectives

- Nominate our priority avenues and boulevards for enhancement
- Create a planting design and ongoing care plan for each nominated road
- Identify landscape and heritage planning protection requirements for significant avenues
- Set expectations for developers and other agencies responsible for extending or modifying existing avenues and boulevards

### Scope

- Define the selection criteria for nominating an avenue or boulevard
- Identify key stakeholders/landowners (roads, utilities etc) that need to be involved, including aligning plans with neighbouring Council's
- Areas where Council maintains the vegetation (not private land)
- Stands of trees or increased landscape treatment at key intersections

#### For existing plantings:

- Outline of appropriate planning protections (such as a Vegetation Protection Overlay, Heritage Overlay or similar) and management requirements
- Outline of management regimes to enhance amenity
- Identified need for infill planting and replacement where trees are in poor health
- Development of succession plans to replace trees as they reach the end of their life

#### For new plantings:

- The timing and sequencing of new Boulevard development
  - Identifying planting styles for new planting sites
  - Determining management and treatment regimes
  - Where relevant, entering into agreements with Vic Roads as the road manager
- 

### Guiding Criteria for Selecting Boulevards and Avenues

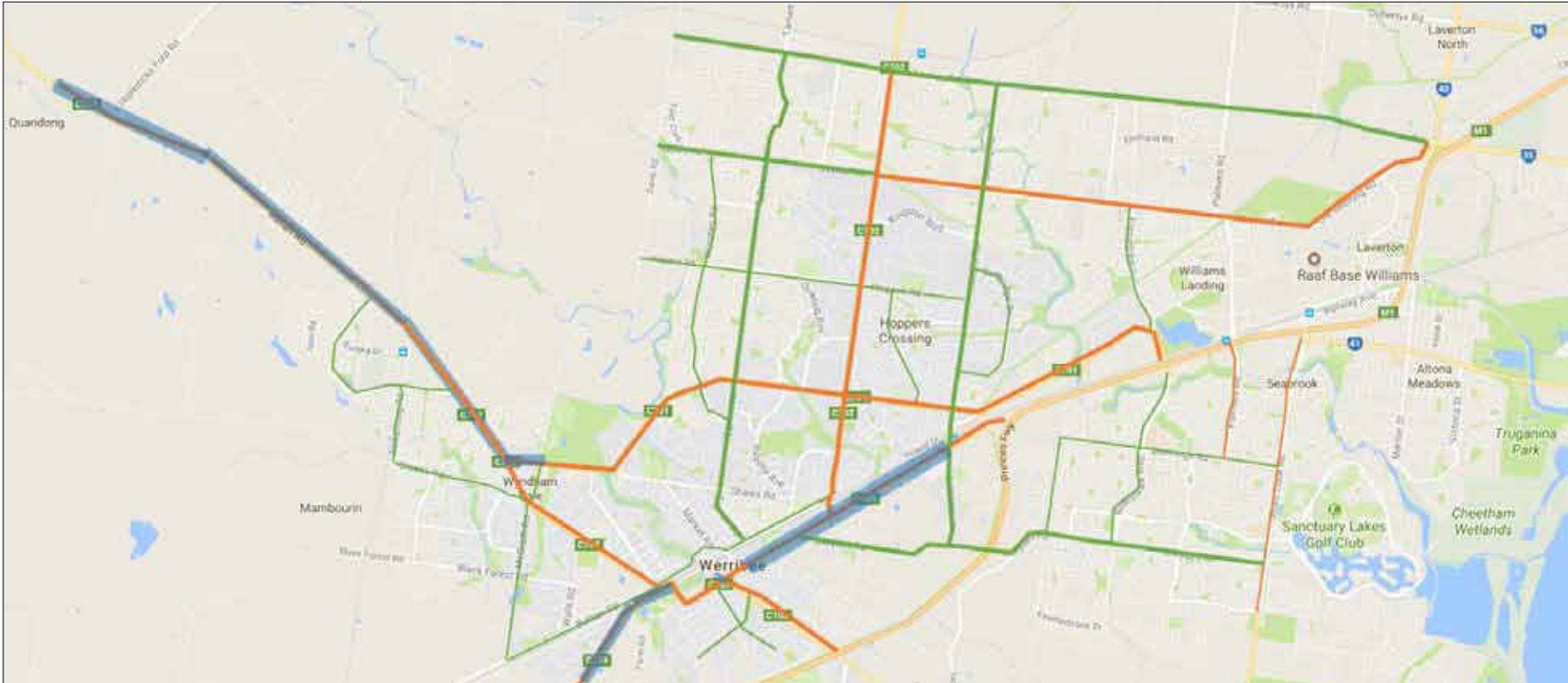
- Planting in central medians
- Gateways/entrances to Wyndham
- Main roads with service roads with additional planting room
- Wide nature strips or areas connecting to open space
- Lack of powerlines, high powerlines or ability to aerial bundle or underground
- Existing consistent large and healthy trees
- High vehicle movement (increases amenity)
- Adjacent to railway lines (increases amenity)
- Significant trees (e.g. heritage planting)

### Key Issues to Consider

- Cost/benefit of growing larger trees around powerlines (or undergrounding power)
- OSAR and other road widening/realignment projects impacting existing trees and or preventing planting in the near future
- Underground services with setbacks for tree planting
  - limiting space
- Land ownership and Council's ability to protect or manage the trees
- Native grasslands - places where we can't plant trees (e.g. parts of Ballan Road)
- Need to review and update the plan as development occurs to the north and west
- We intend to work with stakeholders to enhance planting along the freeway, rail reserves and the federation trail through the City Forest and Habitat Strategy but they are not in this plan as we do not currently maintain or control these areas.



Map 1 - Proposed Boulevards and Avenues - Wyndham Wide



- Avenue (Council)
  - Boulevard (Council)
- Avenue (VicRoads)
  - Boulevard (VicRoads)
- Known Potential heritage avenues

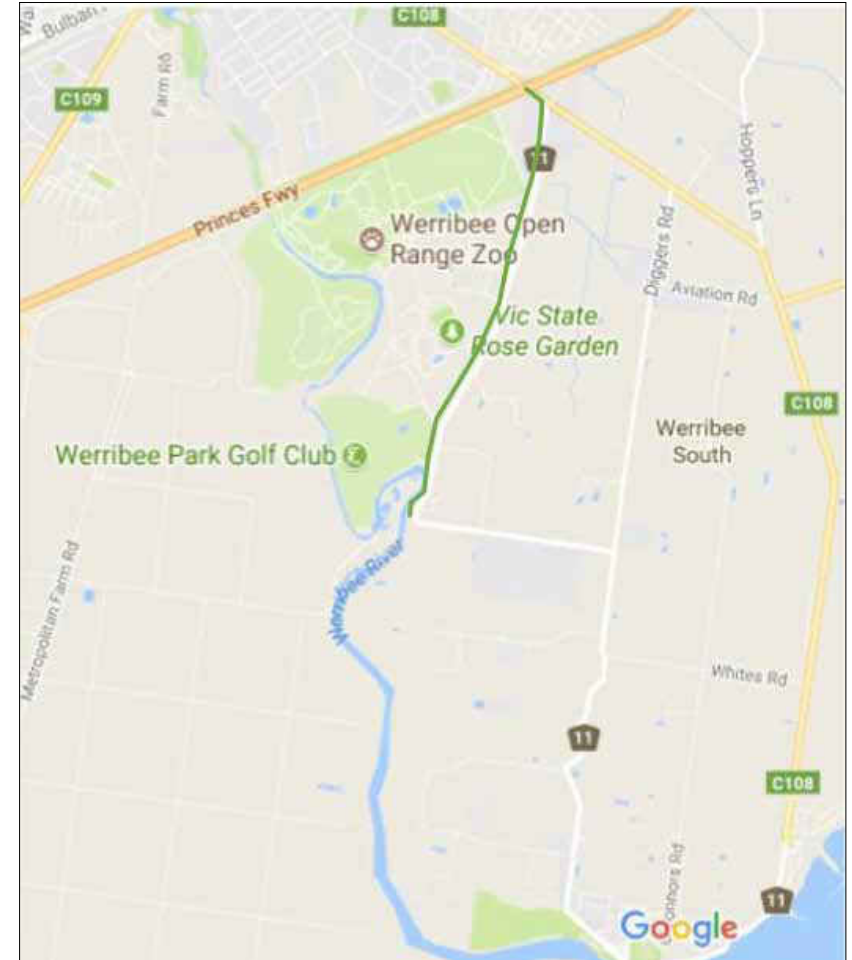


Map 2 - Proposed Boulevards and Avenues - Little River



— Avenue (Council)

Map 3 - Proposed Boulevards and Avenues - Werribee South

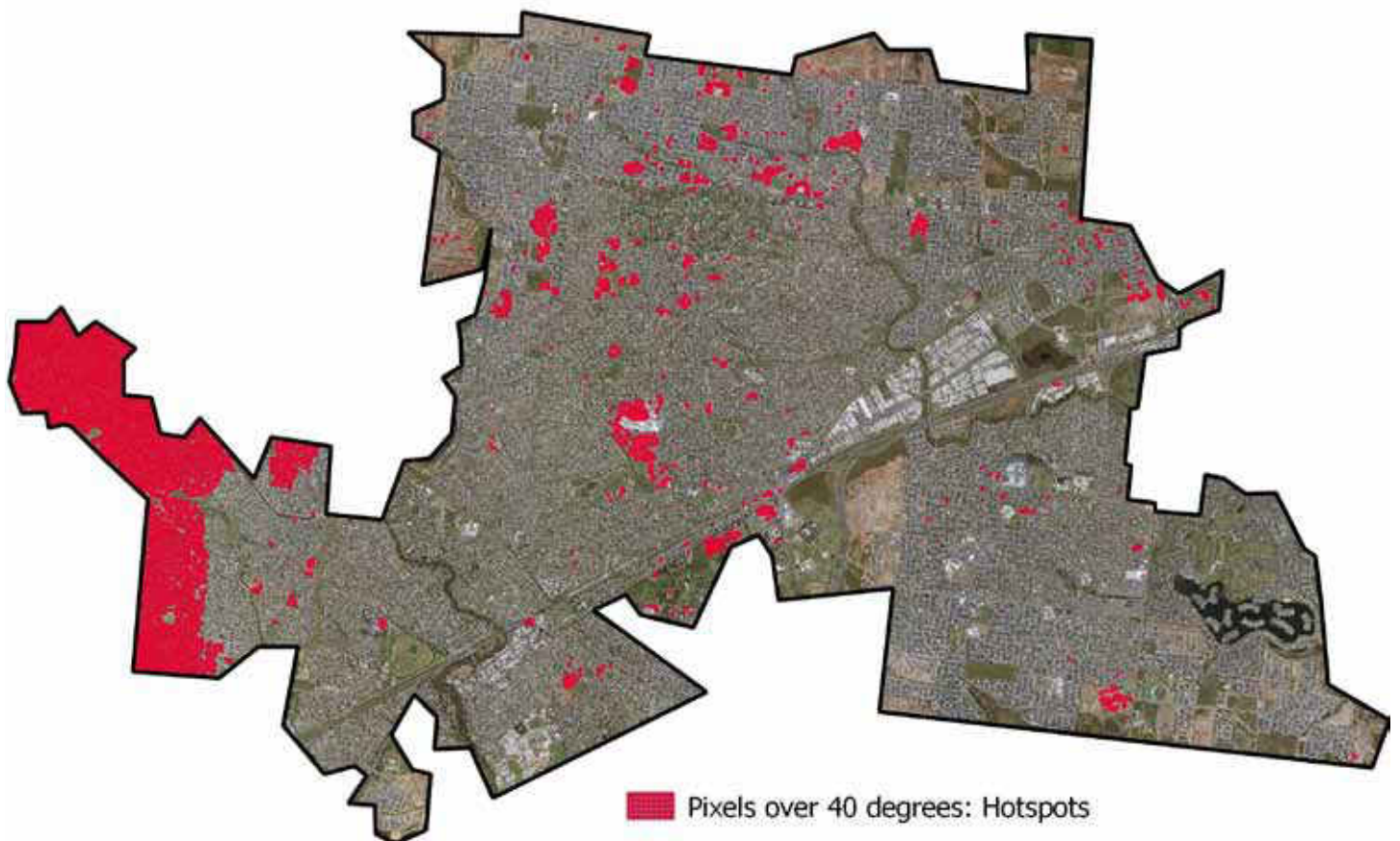


## Appendix 11 - Urban Heat Island Map

The maps below identify Urban Heat Island hotspots across Wyndham, in our industrial areas in Laverton North and the bicycle network that crosses Wyndham. These hotspots are a priority for tree planting.

Hotspots have been identified from Satellite Thermal images acquired from the LANDSAT 8 satellite, which captures images every 16 days at approximately 10:30am in the morning. These images were captured during a hot summer, on the 12/12/2016.

Map 1 - Wyndham Urban Area Hotspots



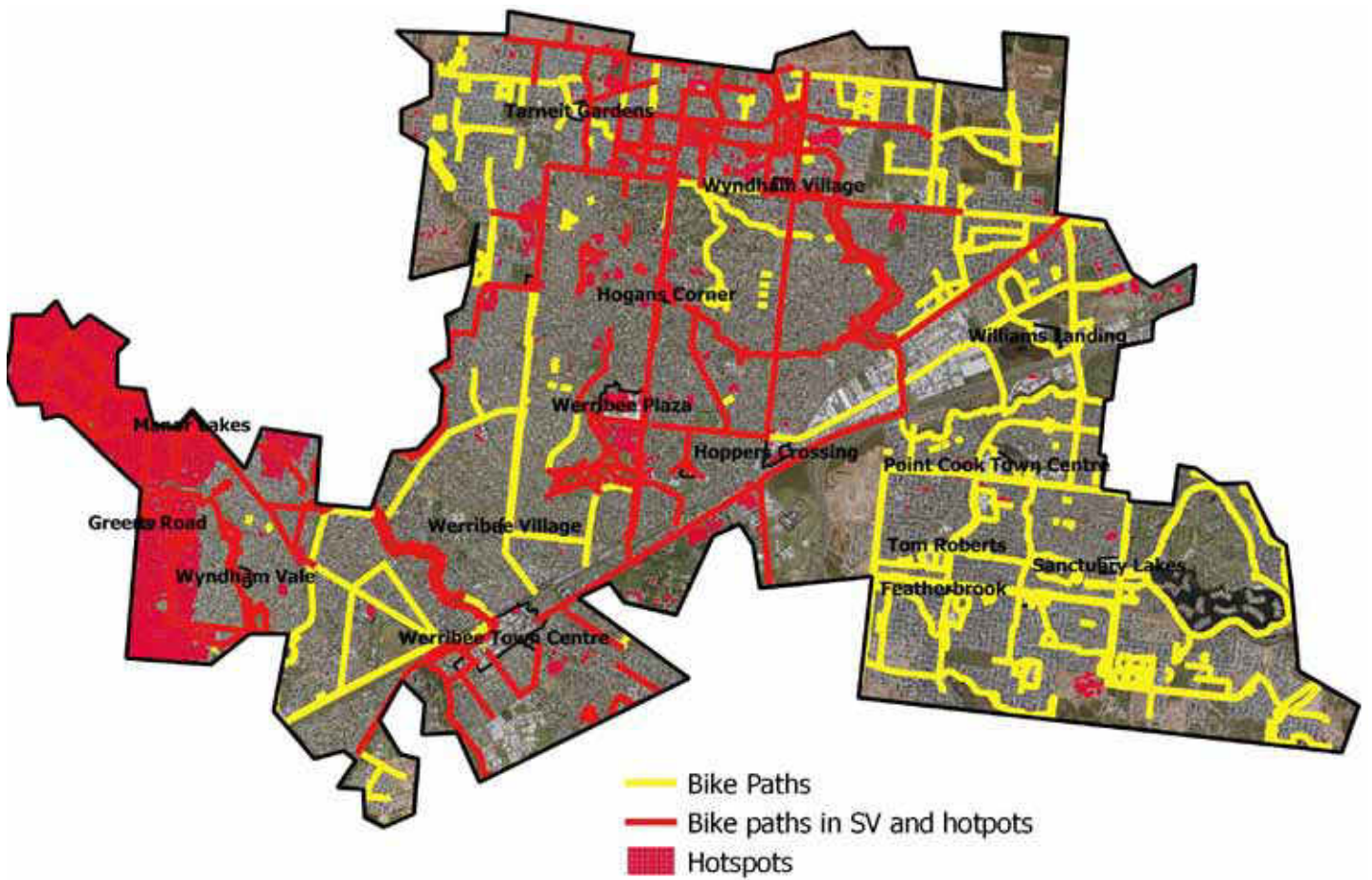
Map 2 - Wyndham Industrial Area Hotspots (Laverton North)



■ Pixels over 40 degrees: HOTSPOTS



Map 3 - Wyndham Bike Paths Needing Shade





## Appendix 12 - List of All Actions and Targets



Section	Objective	2022 Target	2040 Target	Action 1	Action 2	Action 3	Action 4
5.1.1a Werribee River	Habitat Connectivity	Increase recruitment of Werribee Blue Box, River Red Gum and other indigenous plants along the Werribee River	The southern and northern sections of the Western Grassland Reserve are connected by an established nature reserve along the Werribee River	Develop and implement a riparian corridor vegetation improvement program, in partnership with land managers in Wyndham and Melton (MAP A)	Enhance and/or plant at least 3.5 hectares of native and indigenous trees, shrubs, grasses in Council reserves along the Werribee River (MAP B)		
5.1.1b Werribee River	River Protection	The entire Werribee River corridor within Wyndham is protected by an appropriate planning control	The Werribee River corridor retains significant environmental values throughout Wyndham	Review baseline condition indicators and studies and undertake community consultation to assess the condition of the Werribee River and the need for planning protection	Subject to Action 1, develop statement of significance and local policy and apply for new or amended overlays in the planning scheme (MAP C)		
5.1.1c Werribee River	Fauna Connections	At least 2 barriers to fauna movement removed on the Werribee River	Significant fauna have unrestricted movement along the Werribee River	Review barriers to fauna movement and design solutions	Design and install 2 pilot fauna connections		
5.1.2a Little River	Habitat Connectivity	Habitat restoration works undertaken on at least 10 ha of private land along Little River	All significant barriers to fauna movement along Little River corridor are resolved	Develop and implement a riparian vegetation improvement program in partnership with land managers in Wyndham and Geelong (Map A)	Investigate and implement options to remove barriers to fauna movement along Little River		
5.1.2b	Habitat Connectivity	The Council conservation reserves adjacent to Little River, have at least 20% indigenous vegetation cover	The Council conservation reserves adjacent to Little River have at least 80% indigenous vegetation cover	At least 10 hectares of grassland vegetation subject to ecological burns	At least 100 new River Red Gums planted and established along the banks of the Little River	At least 50 Red Box planted and established in the You Yangs Reserve (or other locations where deemed suitable)	At least 26 cluster plantings of indigenous tree and shrub species established in riparian areas in Council conservation reserves
5.1.3a Volcanic Plains	Habitat Connectivity	At least 100 ha of high value habitat on private land actively managed for conservation	All high value habitat on rural private land actively managed for conservation	Develop and implement a habitat enhancement program under the Land Protection Grant Scheme	Develop a rural habitat education package for landowners	Revise the Weed Management Framework	Review opportunities for future native mammal reintroduction programs



Section	Objective	2022 Target	2040 Target	Action 1	Action 2	Action 3	Action 4
5.1.3b Volcanic Plains	Habitat Protection	All significant rural grasslands within Wyndham are protected by an appropriate planning control	All of Wyndham's native grasslands have high environmental values and integrity	Conduct background studies and community consultation on areas of significance	Develop statement of significance, and local policy and apply for new or amended overlays in the planning scheme (MAP C)	Install gates and consult with the community to prevent vehicle use and rubbish dumping on grassland areas	Assess options to connect the Western Grasslands Reserve to the Western Treatment Plant northern grasslands (Map A)
5.1.4a City Connection	Habitat Connectivity	At least 35 ha of native and indigenous trees, shrubs and grasses planted along priority urban waterways and drainage reserves (future and regenerating links) (Map B)	All priority urban waterways and habitat links have optimal native vegetation and/or canopy cover (Map B)	Develop and implement a planting plan to establish 25 ha of new native and indigenous plantings along priority urban waterways and drainage reserves on Council land (Map B)	Develop and implement a planting plan to establish 10 ha of new native and indigenous plantings on Melbourne Water, Vic Roads and Vic Track reserves along targeted links (Map B)	Complete naturalisation of at least one section of concrete drain	Enhance habitat values along Kayes Drain to strengthen William Angliss grasslands health, in partnership with government agencies
5.1.4b City Connection	New Fauna Habitat	All new and 20% of existing Council managed stormwater wetlands include habitat structures	All Council managed stormwater wetlands have habitat structures that are used by local indigenous fauna	Update the Council's Landscape Guidelines and Specifications to include wetland habitat and hydrology requirements (natural wetlands and stormwater treatment assets)	Develop and implement a habitat structure retrofit plan for targeted existing reserves and wetlands		
5.1.4c City Connection	Habitat Protection	The Aviators Field Precinct Structure Plan incorporates protection for the entire Cunningham's Swamp, including adjacent seasonal herbaceous wetlands, remnant Lignum and River Red Gums	Cunningham's Swamp and other conservation reserves remain as protected and healthy functioning ecosystems	Conduct a review of the extent of Cunningham's Swamp and adjacent native vegetation and hydrological requirements to retain its current environmental values	Advocate via the Precinct Structure Plan process to protect the Cunningham's Swamp and adjacent native vegetation	Develop statement of significance, and local policy and apply for new or amended overlays in the planning scheme for habitat areas of significance (MAP C)	



Section	Objective	2022 Target	2040 Target	Action 1	Action 2	Action 3	Action 4
5.1.4d	Habitat and Vegetation Protection	Wyndham City's planning controls provide protection of trees and native vegetation on public land	Existing trees and vegetation are considered valuable assets and retained within all developments	Develop habitat guidelines that outline standards for management of key habitat types, and incorporate into Council's Landscape Guidelines and Specifications	Update environmental assessment guidelines for all internal and external environmental planning referrals	Update the Wyndham Municipal Strategic Statement to incorporate the State Biodiversity Conservation Strategy Objectives	
5.2a Streetscape	Canopy Cover	At least 12.5% potential canopy cover and maximum stocking rates within streets	At least 25% potential canopy cover within streets across Wyndham	Develop and implement a 5 year street tree planting plan including a boulevards plan for Council streetscapes	Develop and implement council standards to minimise loss of street trees from secondary crossovers (Appendix 5)	Revise the Council's Landscape Guidelines and Specifications to specify improved soils, planting design and maintenance requirements on nature/median strips	Revise subdivision approval process to consider space for trees early in development designs
5.2b Streetscape	Tree Health and Resilience	At least 5 trials to improve street tree health and canopy cover	Innovative approaches to street tree performance incorporated in all suitable areas	Trial different irrigation regimes to understand benefits to tree health	Trial aerial bundling of power lines to allow larger trees to be grown	Trial road cut-outs/ structural soils and permeable pavement in low traffic established areas	Evaluate trials and develop an inventory of potential areas for further roll out
5.2c Streetscape	Habitat Connectivity	25% of the urban habitat zone has habitat vegetation (Map B)	50% of the urban habitat zone and riparian buffer zones have increased habitat values (Map B)	Develop planting guidance and resources for residents on nature strip habitat planting	Promote and support nature strip habitat planting with residents in targeted areas	Monitor and evaluate the success of treatments undertaken	
5.2d	Boulevards	Wyndham's key Boulevards and Avenues are identified, managed and have increased protection	All major entries into Wyndham and significant roads have healthy tree-lined boulevards	Develop a Boulevard and Avenue Plan, including criteria, management and succession planning (Appendix 10)	Map major boulevards and avenues	Implement management regime for identified boulevards and avenues	Develop landscape planning protections for significant boulevards and avenues



Section	Objective	2022 Target	2040 Target	Action 1	Action 2	Action 3	Action 4
5.3a Parks & Reserves	Canopy Cover	20% potential canopy cover in Council's open space (excluding grasslands)	35% potential canopy cover in Council's open space (excluding grasslands)	Develop and implement 5 year planting plan for existing open space sites	Trial a car park redevelopment to achieve a potential for 25% canopy cover		
5.3b Parks & Reserves	Nature and People	80 New bush style plantings: Bits Of Bush In The Suburbs (BOBITS) in existing parks and reserves (Appendix 1)	80% of suitable parks and reserve sites contain bush style plantings: Bits Of Bush In The Suburbs (BOBITS)	Develop BOBITS guidelines	Incorporate BOBITS into the Wyndham City's park upgrade planning and maintenance plans	Engage communities and develop education resources around targeted parks	Revise the Council's Landscape Guidelines and Specifications for tree planting and habitat requirements in parks and reserves
5.3c Parks & Reserves	Tree Health and Resilience	Complete at least 5 trials to improve tree health and utility of trees and habitat in parks and reserves	Successful trials implemented in all suitable areas	Trial different irrigation regimes to understand benefits to tree health	Assess and trial use of fruit tree plantings in select park areas	Trail installation of permeable pavement footpaths	Trial 0.5 Ha of direct seeding
5.3d Parks & Reserves	Habitat Protection and Resilience	All sites listed in Appendix 2 (owned by the State Government or offset providers) are implementing agreed site action plans	All Council managed conservation reserves have a measured improvement in condition	Develop agreements for future reserve management with relevant land owners and identify opportunities for additional planning protections (Map C)	Complete and implement site action plans for existing conservation reserves and develop a classification system based on habitat type/ significance	Develop and implement a biodiversity monitoring program	Develop Conservation Action Plans for locally significant species



Section	Objective	2022 Target	2040 Target	Action 1	Action 2	Action 3	Action 4
5.4a Private realm	Tree Protection	The coverage and value of existing private trees in Wyndham's urban area is recorded and quantified	All significant trees on private land in Wyndham are nominated and protected	Complete survey of private realm tree values in potential redevelopment areas	Establish criteria, resources and process required to implement private realm planning protections in Wyndham		
5.4b Private realm	Canopy Cover	Every property can obtain a new free tree each year	Private realm tree canopy is at least 15% in established areas (as at 2017) and 10% in new areas	Develop residents free tree program, including species selection, processes and monitoring of planting success	Establish an online tool for residents to request trees, including information on tree size, growth, care, and benefits	Supply display villages with information packages on private garden trees, native gardens and grasses	
5.4c Private realm	Tree Planning	All trees protected in Precinct Structure Plans are retained and incorporated into development	Existing trees are retained and provide an important contribution to the canopy cover of growth areas	Analyse developed Precinct Structure Plans areas for their intended and actual retention of trees and vegetation	Develop a process to monitor the health of trees identified for retention in Precinct Structure Plan	Pursue negotiations with land owners in existing Precinct Structure Plans development areas to retain existing trees and vegetation	Advocate via the Precinct Structure Plan process strengthen protections for existing trees and vegetation



Section	Objective	2022 Target	2040 Target	Action 1	Action 2	Action 3	Action 4
6.a Tools	Tree Selection	All new public realm trees are selected according to Council's Tree Selection Matrix	Our urban forest is diverse, healthy and resilient	Finalise tree selection matrix and publish an online tree selection tool (Appendix 4)	Update Council's Landscape Guidelines and Specifications to reflect tree selection requirements	Hold an annual workshop with nurseries and developers to update changes to species selection	
6.b Tools	Tree Management	The Tree Inventory contains all council managed tree assets and is the primary data source for all tree planning and management	Wyndham City tree management is supported by high quality tree data	Complete data collection of the Tree Inventory and establish systems and processes for its management and use	Analyse inventory data to inform tree planning and management	Publish basic tree inventory information online	
6.c Tools	Tree and Habitat Protection	Tree Management Plans meeting Australian Standard 4970 completed and enforced for all development/ construction that impacts on trees.	100% compliance with Tree Management Guidelines for all works near Council tree assets	Update and implement Tree Management Guidelines for works on and around Council trees in accordance with AS4970 (Appendix 5)	Develop and implement a compliance, enforcement and monitoring program for unauthorised works and damage to tree and habitat assets	Develop and apply tree valuation charges (Appendix 6) to applications for tree removal	
6.d Tools	Tree End of Life Management	All large scale approved tree removals retain or reuse tree material	All material from removed trees is reused within Wyndham	Establish systems and process for receiving, processing and reusing harvested trees	Create an inventory of all habitat trees installed and monitor for species use		
6.e Tools	Tree End of Life Management	All new plantings in subdivisions to comprise no more than 30% of a family 20% of a genus and 10% of a species (excluding conservation reserves)*	Entire tree inventory to have no more than 30% of a family 20% of a genus and 10% of a species (excluding conservation reserves)	Develop planting pattern guidelines that promote diversity and resilience	Update the tree selection matrix at least annually to reflect diversity targets	Revise Council's Landscape Guidelines and Specifications to ensure tree selection meets Council diversity targets	
6.f Tools	Significant Tree Protection	All significant trees in the public realm are identified and protected	All significant trees in Wyndham are identified and protected	Establish a Significant Tree Register, including the governance, criteria, management, and maintenance requirements (Appendix 6)	Undertake process to apply planning protections for registered significant trees in the public realm	Undertake process to apply planning protections to all public realm trees over 35cm Diameter at Breast Height (DBH)	



Section	Objective	2022 Target	2040 Target	Action 1	Action 2	Action 3	Action 4
7.1a Community	People and Nature	At least 320 residential properties and 20 schools, clubs and businesses incorporate habitat plantings on their properties	Private habitat plantings play a significant role in habitat connectivity	Expand Habitat Heroes programs targeting waterway corridors, wetlands and the urban habitat zone (Map B)	Expand Habitat Heroes program for schools, businesses and clubs		
7.1b Community	People and Parks	5 Council managed parks have a local community group involved in park care and management	30% of parks have a local community group involved in park care and management	Develop an 'adopt a park' program, including targeted parks, resources, support mechanisms and recruitment of local groups/residents	Work with existing/new groups and other stakeholder to identify annual activities and priorities in public open spaces for habitat and trees		
7.1c Community	Community Involvement	5 targeted sites have environmental data regularly collected by local community members and groups	Community members across Wyndham are providing critical data that feeds into the monitoring of our native flora and fauna populations	Develop a 'Citizen Science' program including data requirements, potential partners and locations	Develop and disseminate a Citizen Science resource support package	Recruit and support data collection volunteers and groups to engage in citizen science initiatives	
7.1d Community	Community Awareness	There is greater community awareness of the environmental values of public spaces	20% of community members have undertaken an activity to enhance Wyndham's habitat and/or urban forest	Undertake research to identify views and engagement on environmental issues across Wyndham.	Develop and implement a community information package for public spaces including signage, interactive features, brochures and online	Develop and implement a community engagement plan that links across all Strategy targets	Develop and disseminate a schools environmental education package
7.2a Traditional Owners	Learning and Education	All key staff responsible for parks and reserves management understand Wyndham's indigenous heritage and values	Increased community understanding and respect of the indigenous cultural significance of local natural areas and species	Facilitate training for key staff on local indigenous history and cultural significance in natural areas	Include indigenous history and cultural significance in relevant community educational materials		
7.2b Traditional Owners	Managing Council Land	Indigenous heritage is assessed and managed on all council planting sites	Indigenous heritage and knowledge is an integral part of Wyndham City's land management practices	Apply an indigenous heritage assessment process to all new planting sites in parks and reserves (Appendix 7)	Establish an indigenous food larder planting site (local species)	Engage with traditional owners in the management of environmental burns	Revise management plans for existing nature reserves to include indigenous heritage management



