

Malmsbury Botanic Garden

DRAFT Landscape Masterplan




October 2020



Acknowledgement of Country

We acknowledge that Macedon Ranges Shire Council is on Dja Dja Wurrung, Taungurung and Wurundjeri Country whose ancestors and their descendants are the traditional owners of this Country. We acknowledge that they have been custodians for many centuries and continue to perform age-old ceremonies of celebration, initiation and renewal. We acknowledge their living culture and their unique role in the life of this region.



General Acknowledgements

GbLA would like to acknowledge the assistance of the following people and organisations in the development of this masterplan. It is a testament to the efforts over the years of Macedon Ranges Shire Council, horticultural staff and the local community that the Malmsbury Botanic Garden inspires such goodwill, generosity of spirit and sharing of knowledge that made our work on this project so enjoyable -
GbLA Project Team

Macedon Shire Ranges Council

- Lisa Ryan - Senior Team Leader Horticulture
- Justin Lee - team Leader Horticulture
- Scott Gilchrist - Coordinator Parks and Gardens
- Siân Bloom - Landscape Assessment Officer

Friends of the Malmsbury Gardens and Environs (FOMGE)

- Rob Newton (President)
- Paula Needham (Secretary)
- The Friends of the Malmsbury Gardens and Environs Committee

GbLA Project Team

- Ashley Sheldrick (Director)
- Annette Warner (Project Lead)
- Casey Dunmall (Graduate Landscape Architect)

GbLA Sub-Consultant Team

- Stephen Fitzgerald Arboriculture Pty Ltd - Arboriculture
- Bruce Cartwright - LIS (Irrigation and WSUD)
- Dr Claire Ellis - Claire Ellis Consulting (Tourism)
- Declan McDonald - SESL (Soil Testing)
- Olivier Kowald - Studio Unfold (Signage and Wayfinding)
- Fiona Erskine, Bryce Raworth Heritage Consultants (Architectural Heritage)

Individuals, Authorities and Organisations

- Dja Dja Wurrung Clans Aboriginal Corporation - Jon Marshallsay, Program Manager - Cultural Heritage, Ronn Kerr Jr and Jackson Dunnolly_Lee
- Heritage Victoria - Jessica Hood, Heritage Officer - Permits
- Coliban Water - Stephen Healy, Manager of Urban Liveability
- Malmsbury Historical Society
- Malmsbury Advance Association
- Stephen Ryan - Dicksonia Rare Plants
- Teena Lindberg
- Garden Plant Conservation Association of Australia Incorporated (Plant Trust GPCAA Inc) - Don Journet, Secretary
- Royal Botanic Gardens Victoria, Maggie McNamara - Wayfinding & Signage Officer

Images, Figures and Tables

Table of Images, Figures and Tables

Images

- Image 1. Corner of historic Town Hall and Botanic Garden precinct.
- Image 2. Major entry point, Mollison Street.
- Image 3. Town Hall and asphalt forecourt.
- Image 4. Toilet entry on Ellesmere Place.
- Image 5. Entry and screening shrubs.
- Image 6. Play area.
- Image 7. BBQ area.
- Image 8. Lake levels.
- Image 9. Fountain.
- Image 10. Bluestone drinking fountain.
- Image 11. Additional minor entry points.
- Image 12. Narrow paths and dense shrubs.
- Image 13. New Bridge.
- Image 14. *Eucalyptus muelleriana*, commemorative planting.
- Image 15. Riparian vegetation and Coliban / Botanic Garden edge.
- Image 16. Existing shelter.
- Image 17. Signage.
- Image 18. Connection to Viaduct and Coliban.
- Image 19. Many sign styles are evident throughout the Garden.
- Image 20. *Daffodils* Poem placed by Neeta Lindberg (c 1990's).
- Image 21. Flora for Victoria, commemorative plaque.
- Image 22. Fish Hatchery.
- Image 23. Tennis Pavilion.
- Image 24. Tennis Court hit-up wall, chain mesh fence.
- Image 24. Pump House and tank within security fencing.
- Image 25. Tennis Courts with hit-up wall and pavilion in background.
- Image 26. Pump House and tank within security fencing.
- Image 27. Subtle pathways and surface enhance woodland forest feel.
- Image 28. Pinetum at southern end of the Garden.
- Image 29. Poplar Avenue at northern end of the Garden.
- Image 30. Deciduous Oak in centre of Garden.
- Image 31. Bluestone wall screened by vegetation.
- Image 32. *Taxodium mucronatum* (Montezuma Cypress).
- Image 33. Turf bridge connection between Ornamental Lake and Billabong Chain.
- Image 34. View of Islands from western-most island.
- Image 35. *Arbutus unedo* (Irish Strawberry Tree).
- Image 36. *Quercus palustris* (Pin Oak) trees on Ellesmere Place (eastern boundary).
- Image 37. Eastern view across Ornamental Lake towards Malmsbury township.
- Image 38. Northern view toward Mollison Street from central lawn.
- Image 39. Northern View from tennis courts over the Billabong Chain.
- Image 40. Southern view from the Garden.
- Image 41. View through to the Coliban River and the picnic area west of the river.
- Image 42. Southern view towards viaduct.
- Image 43. View south toward viaduct on west bank of Coliban River.
- Image 44. View east toward Botanic Garden from west bank of Coliban River
- Image 45. Viaduct (c 1865)

Images, Figures and Tables (cont.)

Table of Images, Figures and Tables

Images

- Image 46. The Memorial Gate in front of the Town Hall is unveiled 17th April, 1922.
- Image 47. Malmsbury Town Hall in 1949 prior to demolition of the façade.
- Image 48. c. 1913. The Malmsbury Town Hall showing previous timber gate.
- Image 49. Detail showing the c. 1913 timber gate and arrangement.
- Image 50. Equipment Shed behind Town Hall, 1940.
- Image 51. The Hon. Minister for Conservation Forests and Lands, Joan Kirner.
- Image 52. The Hon. Minister for Conservation Forests and Lands, Joan Kirner.
- Image 53. Removal of large Conifer between Fish Hatchery and Ellesmere Place.
- Image 54. Kodak postcard Coliban Bridge Malmsbury, c.1920. Mrs Beyer
- Image 55. Coliban River Bridge Malmsbury n.d.
- Image 56. Aerial view of the Malmsbury Botanic Garden looking south west
- Image 57. View over the Billabong Chain
- Image 58. Old tennis court at 'Buda', Castlemaine
- Image 59. View toward Viaduct from the bank of the Coliban River
- Image 60. *Eucalyptus muelleriana*
- Image 61. Planting *E. muelleriana*, Joan Kirner
- Image 62. Botanical Gardens, Malmsbury (Dec. 1953)
- Image 63. Botanical Gardens, Malmsbury Rose Stereograph Co.
- Image 64. Botanical Gardens, Malmsbury (Dec. 1953)
- Image 65. Billabong Chain granite weir.
- Image 66. Plant Label, Kyneton Botanic Garden
- Image 67. Neeta Lindberg with Daffodils poem and Kyneton Councillors
- Image 68. Procession in Ellesmere Place, with Botanic Gardens in background.
- Image 69. Town Hall with Council Members, 1902 with Botanic Gardens behind.
- Image 70. Mollison Memorial, (1987.) located on the west side of the Town Hall.
- Image 71. Basalt stone carving, Mirambeena Park.
- Image 72. MRSC Woodend Nursery, growing area available for Friends groups

Images, Figures and Tables (cont.)

Figures

- Cover Figure. Collage '1878-2020' with Poplar Avenue
- Figure 1. Malmsbury Botanic Garden Context Plan
- Figure 2. Malmsbury Zoning Plan
- Figure 3. Malmsbury Botanic Garden Views & Itinerary Analysis Plan
- Figure 4. Trio Historic Plans of Malmsbury Village
- Figure 5. ES04 Overlay Plan
- Figure 6. EM01 Overlay Plan
- Figure 7. LSIO Land Subject to Inundation Overlay Plan
- Figure 8. HO253 Overlay Plan
- Figure 9. Malmsbury Botanic Garden Masterplan
- Figure 10. Key Plan 1
- Figure 11. Key Plan 2
- Figure 12. Masterplan Detail Plan Ellesmere Place Town Hall and Entry Precinct
- Figure 13. Masterplan Detail Plan old Tennis Court and relocated Pavilion
- Figure 14. Timber picket fence detail redrawn from hand sketch
- Figure 15. Significant Trees, Heritage Victoria Database Report
- Figure 16. Tree Species Origin
- Figure 17. Tree Species Diversity
- Figure 18. Age Categories
- Figure 19. Tree Risk Assessment
- Figure 20. Planting Opportunities
- Figure 21. Trees to be Mulched
- Figure 22. Living Collections
- Figure 23. Path Hierarchy
- Figure 24. Illustrative Section Elevation Taxodium Island looking north
- Figure 25. Stormwater Catchment and Water Sensitive Design Strategy
- Figure 26. Illustrative Section Elevation, Conifer Tree House

Tables

- Table 1. Priority Action Plan and Estimates.

Key Recommendations

The following Key Recommendations are provided adjacent to the Masterplan. They are derived from the conclusions of each report section.

- *Balance the botanical purpose of the garden with existing landscape qualities through maintaining accurate records of existing plants within the garden, including accurate identification information, including highlighting the scientific basis of botanical nomenclature through plant labels, in a way that respects aesthetic values.*
- *Develop a flexible event and recreational space for use by community groups in conjunction with policies aimed at protecting plant collections, reducing compaction and other infrastructure.*
- *Formalise the path linkage under Mollison Street bridge to Malmsbury Common. Retain the semi-rural character of paths surrounding the Garden beyond the Mollison Street/Ellesmere Place Town Hall Precinct. Improve path widths and levels adjacent to the Town Hall to alleviate problems with standing water and to improve circulation. Facilitate better links with Malmsbury Railway Station through formalising the network and incorporating a signage strategy.*
- *Retain existing number of pedestrian entry and exit points. Reduce the number of controlled vehicle access points to Ellesmere Place only. Create a new Botanic Garden Gateway and Entry Precinct behind the Town Hall accommodating new signage, gathering space and facilities. Reconfigure formal parking arrangements adjacent to the Town Hall and new Garden Entry Forecourt and provide better disabled parking facilities. Maintain bicycle parking adjacent to the new Garden Gateway and facilitate bus parking in informal car park areas in Ellesmere Place.*
- *Retain existing unpainted timber post and wire fence along eastern and southern extension of Ellesmere Place. Replace existing wire fence along Mollison Street with unpainted timber picket fence, using old photography to ascertain profile and estimate dimensions as closely as possible. Maintain the vegetation along the Coliban River as an important habitat area that also makes an important contribution to the aesthetic appreciation of the views to the Viaduct and surrounding rural landscape. Develop a committee of management with stakeholders including Coliban Water and the Dja Dja Wurrung people. Maintain extant botanic garden planting along the west bank of the Coliban River as an important screen.*
- *Consolidate existing plant collections to address the broad categories of taxonomic, geographical, ornamental and ecological themes and consider a new cultural theme in consultation with Dja Dja Wurrung people.*
- *Maintain good records of tree species trialed in the Garden including ongoing assessment of their establishment and performance within the Garden. Continue to trial new species that supplement existing genera contributing to the diversity of evergreen, coniferous and deciduous tree canopy. Retain Salix sp. in important key locations around the Ornamental Lake and Billabong Chain and*

Key Recommendations (cont.)

prioritise trialling of additional species such as Taxodium sp. in these locations. Introduce new genera such as Callitris and Juniperus species and cultivars to expand locations for demonstration of the diversity of conifers.

- *Establish a collection of cool climate palms that demonstrate this unique plant form co-located with existing Trachycarpus fortunei.*
- *Develop a detailed tree succession plan as part of a wholistic approach to tree canopy management that considers a staged planting strategy toward developing a mixed-age canopy as an ongoing program. This could be done in partnership with Heritage Victoria.*
- *Develop a detailed tree removal plan as part of a tree succession strategy plan. Ensure tree removals are staged and tree planting takes place as soon as possible after tree removal to lessen the impact on the Garden landscape.*
- *Monitor existing identified vulnerable tree species and maintain tree health using horticultural best-practice techniques.*
- *Develop a program of tree trialling to expand the diversity of species anticipated to do well in the Malmsbury Botanic Garden. Develop a system of monitoring tree growth to determine performance success or failure using the general criteria as a starting point. Information collected as part of this ongoing study could be used to inform future open space and street tree planting within the Shire.*
- *Replace ad hoc planting at base of Eucalyptus muelleriana with more considered plant palette to reinforce Coliban River corridor planting. Consider how future management of the Coliban River landscape may impact tree health.*
- *Develop a management plan with key stakeholders to preserve and maintain the landscape and extant tree collection on the west bank of the Coliban River. Propagate and replant important species from this area into the Botanic Gardens proper.*
- *Locate, identify and record existing shrub species within the Garden.*
- *Focus on developing a shrub palette that will bring seasonal colour and interest to the Garden. Themes for shrub selection could include species that will tolerate dryer conditions, such as Ceanothus and Cistus - genera that were available during the late nineteenth and early twentieth centuries. Consider expanding shrub selection to include cultivars that demonstrate a period in the history of horticulture and links to the Malmsbury Botanic Garden, such as Syringa and Crataegus. Expand the demonstration of ornamental horticulture and conifers to include examples of Juniperus to address the gap in other types of conifers that could be grown at Malmsbury and as an opportunity to grow a collection in an area not previously considered as a site for growing collections such as Ellesmere Place and the Town Hall curtilage.*

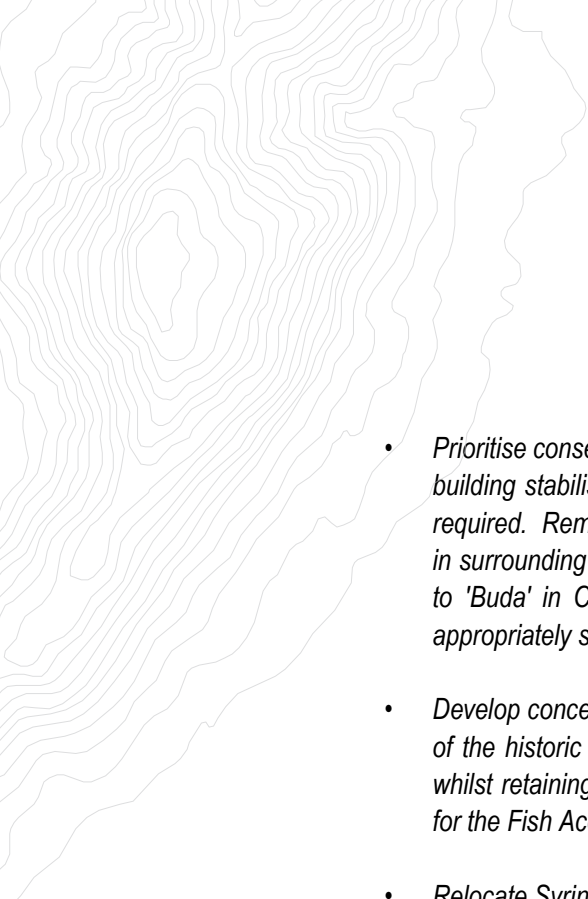
Key Recommendations (cont.)

- *Develop a bulb and rhizome collection that distinguishes the Malmsbury Botanic Garden from other Botanic Gardens in the region. Establish links with Plant Societies such as the Iris Society of Australia to develop an Iris collection that demonstrates the development of this highly ornamental plant in cultivation. If possible, source important cultivars that demonstrate the development of this plant in the late eighteenth and early nineteenth centuries. Locate bulbs and rhizomes around the Ornamental Lake and in the more open lawn areas where they may flower without being mown, or adjust mowing regimes during growth and flowering.*
- *Development of an aquatic collection is desirable if Lake water levels can be managed in the future. A focus on rushes and reeds or other ornamental grasses on the margins of Islands and the Ornamental Lake will provide additional interest.*
- *Develop a revegetation and management strategy for the Coliban River Corridor that links to the revegetation work being undertaken at the Malmsbury Common. Manage the vegetation of the Coliban River Corridor to enhance the indigenous nature of this landscape and as a frame for the exotic nature of the Botanic Garden,*
- *Develop the Botanic Garden collections in the general locations nominated.*
- *Develop the planting style of the Malmsbury Botanic Garden going forward taking into account, existing design principles developed over time within the Garden, general stylistic principles of the gardenesque and picturesque and precedence based on other botanic gardens such as the Royal Botanic Gardens, Melbourne.*
- *Retain existing path surfaces and construct timber boardwalk with kick rails to the west of the Billabong Chain. Construct a legible path hierarchy of 2.5m main paths at 1.8m wide secondary paths. The existing timber bridge should be painted a dark grey and bridge abutments planted out to assist in reducing the visual impact of this element.*
- *Maintain the Ornamental Lake to improve water quality and remove introduced fish species. Maintain Fountain island for habitat purposes. Remove tree stumps on small island and restore dimensions and retain with basalt boulders to support future tree planting. Retain a void in the centre of the small island to allow for access and viewing across the lake.*
- *Undertake more detailed study of potential for WSUD capturing stormwater and treatment within the Ornamental Lake and Billabong Chain. Reconnect the Lake to the Billabong Chain to maintain Lake levels and investigate additional water storage options including an integrated approach to irrigation management.*
- *No additional seating be provided within the Garden. New seating arrangement is recommended at the Garden Entry for workshops and amenity. Retain current Shire of Macedon Ranges picnic settings and ensure consistency of design and materials is maintained in the future. New water*

Key Recommendations (cont.)

fountains in a more sympathetic style that replicates materials and colours of MRSC picnic settings. Location and design of rubbish bins to be less intrusive and relocated out of main path of travel at Garden entry.

- Remove and relocate existing pavilion near Viaduct. Provide a new gable-roofed, open-sided picnic pavilion in the bbq area adjacent to Ellesmere Place that reflects the proportions of the existing heritage buildings on site such as the Fish Hatchery and Tennis Pavilion and constructed from natural materials.*
- Renovate existing play area and install new Conifer Tree House and rope/climbing net play in a garden setting for additional play interest. Natural materials and colours take precedence over bright colours and plastic. Connect the playground to the new Garden Entry and also to the bbq picnic area to facilitate access to amenities. Provide new fully accessible bbq with wash up facility.*
- Render and paint the external facade of the pumphouse so as to be more sympathetic with the Town Hall and reinforce Botanic Garden architectural values. Install screening plants using species from the proposed Crataegus collection to screen the tank and pump house from the Garden. Remove existing weeds from inside the fence and pave with gravel to match pathways.*
- Develop a Design Style Guide for plant labels, wayfinding and interpretative signs, that incorporates existing plant label design incorporating colour, proportions and material elements. Develop a more detailed Wayfinding and Interpretation policy that incorporates Garden entrance identification, directional signage for the Botanic Garden and linking to other significant sites within Malmsbury and environs. Develop use of technology such as a Plant Trail App to be considered in conjunction with plant signage and interpretation. Relocate the Engineering Heritage National Landmark sign near the Viaduct closer to the path to maintain clear view lines. Adopt black and white signage for all planting within the Malmsbury Botanic Garden that is consistent with MRSC signage policy. Adapt plant labels for trees and affix to trees if the tree is mature, otherwise signs are to be placed at the base of the tree, in the ground. Restore and relocate Neeta Lindberg's 'Daffodil' commemorative sign closer to the Ornamental Lake and the Daffodils.*
- Restore the façade of the Town Hall and improve landscape in the immediate environs by addressing levels, drainage, finishes and planting. Demolish the existing red brick extension and construct new high-quality community and amenity space in a reduced building footprint.*
- Further investigation into original finishes and colours of the wrought iron fence be undertaken and the timber posts assessed further for structural issues. The gate function to be restored for presentation and ceremonial purposes.*
- Undertake further investigation into the design of the fountain prior to restoration and relocation and recommissioning.*

- 
- *Prioritise conservation work on the Tennis Pavilion, including removal of overhanging vegetation and building stabilisation. Follow-up works include preservation, restoration and reconstruction where required. Remove asphalt, masonry hit up wall and chain mesh fencing. Remove weed vegetation in surrounding areas and prepare new garden bed areas for planting. Install gravel surface similar to 'Buda' in Castlemaine and ensure new infrastructure to facilitate event use of this space is appropriately sited and recessive.*
 - *Develop concepts for adaptive reuse of the Fish Hatchery for Fish Acclimatisation Museum and use of the historic tank for indigenous aquatic plant cultivation. Develop concept for light penetration whilst retaining as much of the original building fabric as possible. Develop interpretation strategy for the Fish Acclimatisation Museum as part of the Garden Interpretation and Wayfinding Strategy.*
 - *Relocate Syringa cv's and continue to maintain existing topography associated with bowling green.*
 - *Relocate the Mollison Memorial and bluestone plinth closer to the path as part of regrading works to the west area of the Town Hall and establishment of new plant collection. Reinstall the plough as part of the restoration of the Memorial and develop concept design for protection of the plough and visitors that references the materials of the Memorial and its location.*
 - *Develop briefs and secure funding for community art projects for the Malmsbury Botanic Garden. Develop concepts for the adaptive reuse of Garden heritage structures and places to support art and performance.*

Contents

	Acknowledgements	
	Index of Images, Drawings and Tables	
	Key Recommendations	
	Table of Contents	
1	Introduction	11
	Scope	
	Vision and Objectives	
	Methodology	
2	Context	16
	Context Description	
	Site Description	
	Synopsis of the History of the Malmsbury Botanic Garden	
	Planning,	
	Dja Dja Wurrung Culture	
3	Masterplan Drawings and Key Statements	34
4	Summary of Masterplan Outcomes	36
	Facilities, Amenity and Access	
	Heritage Values	
	Botanic Garden Role	
	Water Sensitive Urban Design	
	Community and Management	
5	Use and Access	39
	Balancing Botanic Role and Recreation	
	Private and Public Use	
	Circulation and Connections	
	Entries, Exits and Parking	
	Boundary Treatments and External Views	
6	Vegetation Management	46
	Living Collections	
	Collection Themes	
	Understanding Existing Tree Species	
	Palms	
	Tree Age	
	Tree Removal	
	Climate Impacts	
	Possible Future Tree Species	
	Commemorative Trees	
	Extant Collection - west bank	
	Shrubs	
	Possible Future Shrubs and Small Trees Species	
	Bulbs, Corms and Rhizomes	
	Aquatics and Ornamental Grasses	
	Coliban River Corridor	
	Planting Design	
7	Built Environment	71
	Paths, Boardwalks and Bridges,	
	Ornamental Lake, Islands, Billabong Chain,	
	Water Sensitive Urban Design (WSUD) and Irrigation	
	Garden Furnishings	
	Pavilions	
	Playground and Picnic Area	
	Tank and Pumphouse	
	Signage, Interpretation and Wayfinding	

Contents (cont.)

8	Cultural Heritage.....	86
	Town Hall, Memorial Gate and Wrought-iron Fence Drinking Fountain Bluestone Fountain Tennis Pavilion Fish Hatchery Bowling Green Mollison Memorial Art	
9	Management and Funding	91
	Friends Groups Tourism and Marketing Priority Action Plan and Costings	
10	Masterplan Review	94
	References	
	Glossary	
	Appendix 1 - Community Consultation Summary of Outcomes	
	Appendix 2 - Malmsbury Botanic Garden Soil Survey and Analysis	
	Appendix 3 - Statement of Significance (September 12, 2002)	
	Appendix 4 - Landscape Development Concept - 1988	
	Appendix 5 - Stormwater: Challenges matching to sustainable irrigated landscapes	

1. Introduction

Introduction

GbLA Landscape Consultants were engaged by Macedon Ranges Shire Council to prepare a Masterplan for the Malmsbury Botanic Garden. The brief, developed by Macedon Ranges Shire Council in conjunction with the Friends of the Malmsbury Gardens and Environs called for the development of a vision and objectives to guide ongoing management and development of this unique and significant Garden for the next 15-20 years. This masterplan expands on and extends the initial work undertaken by Francine Gilfedder in her 1988 reports to consider in more detail, the development of collections, landscape design and the synergies and opportunities that might occur through examining the nature and role of the Garden's relationship to the Town Hall and wider Malmsbury township. The masterplan is also a strategic document that will assist with funding applications, budget proposals and works priorities.

A project working group was established including key Council personnel, Lisa Ryan - Senior Team Leader Horticulture and Justin Lee - Team Leader Horticulture. The GbLA landscape consultant team included Ashley Sheldrick, Director, Annette Warner - Senior Landscape Architect (Project Lead) and Casey Dunmall - Graduate Landscape Architect. Additional sub-consultant expertise was provided by Stephen Fitzgerald, (Arboriculture), Bruce Cartwright (Irrigation and WSUD), Dr Claire Ellis (Tourism), Declan McDonald (Soil Testing & Analysis), Olivier Kowald (Signage and Wayfinding) and Fiona Erskine (Architectural Heritage).

The masterplan is informed by a number of strategic documents and reports including :

- Macedon Ranges Shire Council, *Council Plan 2017 - 2017 (Year Three 2019-2020)*.
- Macedon Ranges Shire Council, *Community Consultation Framework* December 2014.
- *Macedon Ranges Tourism Strategic Plan*, Urban Enterprise, June 2011.
- *Macedon Ranges Visitor Economy Strategy, 2019-2029*.
- Macedon Ranges Shire Council, *Open Space Strategy, 2013*.
- Macedon Ranges Planning Scheme
- *Malmsbury Botanic Gardens, Part One, Conservation Analysis and Policies*, Francine Gilfedder, Department of Conservation Forests and Lands, 1988.
- *Malmsbury Botanic Gardens, Part Two, Management Plan*, Francine Gilfedder, Department of Conservation Forests and Lands, 1988.
- Victorian Heritage Council of Victoria, *Malmsbury Botanic Gardens and Town Hall Report*.
- *Malmsbury Town Hall Conservation Management Plan*, Heritage Alliance, August 2009.
- *Malmsbury Common Master Plan*, Landcare Malmsbury District, March 2018.
- *Malmsbury Botanic Garden*, Brochure, Macedon Ranges Shire Council,
- *Kyneton Botanic Gardens Masterplan*, Laidlaw & Laidlaw Design, July 2011.
- *Master Plan, Gisborne Botanic Gardens*, Michael Smith and Associates, October 2017.
- *Castlemaine Botanical Gardens Conservation Management Plan*, John Patrick, March, 2019.
- *Urban Forest Diversity Guidelines, Tree Species Selection for the City of Melbourne*, Aspect Studios and Treelogic, 2011.
- *Royal Botanic Gardens Victoria Landscape Succession Strategy - Melbourne Gardens 2016-2036*, 2016.
- Coliban Water, *Strategy 2030*, July 2019
- *Dhelkunya Dja*, Dja Dja Wurrung Country Plan, 2014-2024, Dja Dja Wurrung Clans Aboriginal Corporation, 2017.
- *The Burra Charter, The Australia ICOMOS Charter for Places of Cultural Significance*, 2013, Australia ICOMOS Incorporated - International Council on Monuments and Sites.

1. Introduction

Scope

The masterplan is to provide direction and advice for the management and development of the Malmsbury Botanic Garden. It considers the heritage, environmental, topographical and cultural contexts that may influence the direction of these outcomes. Whilst the brief focused on the Botanic Garden proper, it soon became important to consider the Garden in conjunction with the Town Hall and *vice versa* given they are jointly listed on the Victorian Heritage Register (VHR No. H1993) and also in the Macedon Ranges Planning Scheme under Heritage Overlay HO253.

It is not within the scope of this work to replicate knowledge of the history of the Malmsbury Botanic Garden, as this is covered extensively in Gilfedder's *Conservation Analysis*. An extract from Part One Appendix 1 indicates that the '*Documentation of Garden's history is complete...*'¹ Where additional historical material is available it has been included in this report and the Chronological Dates of Significance² updated where possible. In addition, the history of the Town Hall is considered in the *Malmsbury Town Hall Conservation Management Plan* completed in 2009 by Heritage Alliance³.

This masterplan does not replicate policy notes, already covered in the Gilfedder reports. However a revised Statement of Significance (2002) may be found in Appendix 3. This has been extracted from the Victorian Heritage Database Report VHR H1993 and any additional references to the Macedon Ranges Planning Scheme are made where appropriate.

This masterplan extends traditional approaches to a Botanic Garden masterplan and their tendency to focus internally to consider potential connections with the surrounding landscape and broader context, which also includes the Town Hall, Coliban River, Malmsbury Common and the Malmsbury Township.

Plans, sections, tables and photographs are provided to assist in developing the vision and achieving the objectives stated in the following section.



Image 1. Billabong Chain with Fish Hatchery in the background. c 1980's (Kevin Walsh, courtesy of Malmsbury Historical Society)

1 Gilfedder F, *Malmsbury Botanic Gardens Part One, Conservation Analysis and Policies*, Department of Conservation Forests and Lands, 1988. p66

2 Op cit. p73

3 Mackenzie J, Zahra S, and Wixted D, *Malmsbury Town Hall Conservation Management Plan*, Heritage Alliance, August 2009..

1. Introduction

The following Vision and Objectives were developed in response to a community 'drop-in' morning located at Malmsbury Town Hall and consideration of the results of an on-line survey hosted on the Macedon Ranges Shire Council website. The 'drop-in' morning was a wonderful opportunity to meet residents and people interested in the future of the Garden. Many ideas were exchanged and comments made, and these were recorded either as notes on large posters or by a series of 'dots' which people could place against those images that interested them most. The summary of community engagement and consultation outcomes may be found in Appendix 1.

Vision

Our vision acknowledges the significant history of our heritage landscape and the exotic trees and plants that contribute to the experience of this unique Garden. The Botanic Garden will continue to be a place of beauty, inspiration and education on plants and horticulture to future generations.

Objectives

- Provide a beautiful destination and place of shade through diverse tree plantings.
- Maintain important heritage features for current and future generations.
- Expand current exotic species diversity within the Garden through succession planning and consideration of climate change impacts.
- Encourage community engagement through learning workshops, Friend's groups, nature play, activities, interpretation and wayfinding.
- Encourage community involvement in the Garden by providing an attractive and enjoyable venue for a range of appropriate Community events".
- Establish connections to the broader regional, national and global Botanic Garden community through establishment of a well-articulated collections policy, strategic plans, record keeping, plant labelling and membership and registration with relevant organisations.
- Enhance the beauty of the local area and maintain accessibility.
- Recognise the Djaara responsibility to Care for Country as it is the living essence that is shared between people and place. It is vital for maintaining culture.

The following methodology outlines the process and philosophy of approach to developing the vision and objectives presented above.



Image 2. Autumn, internal view looking east

1. Introduction

Methodology

The Landscape Development Concept Plan - Malmesbury⁴ (1988) provided the basis for an initial assessment of design outcomes for the Malmesbury Botanic Garden over the last thirty-two years. With a few exceptions, it was found that most of the recommendations proposed in the 1988 report have not been implemented, or were changed from the original proposal. The plan included in the 1988 report has been annotated to provide an indication of which recommendations were implemented, or partially implemented and may be found in Appendix 4.

In conjunction with the community engagement and consultation activities, additional site analysis of the Garden was undertaken to further understand existing site conditions including important views, the condition of heritage structures, tree diversity and health, location of other plant types, signage, and infrastructure. These activities were carried out by the consultant team according to their area of expertise.

This information was collated and they are presented below as a summary of main issues and opportunities.

Main Issues identified include:

- Existing heritage buildings and structures in a poor or dilapidated condition, including the bluestone island fountain and bluestone drinking fountain.
- Boundaries such as the northern wire-fenced area along Mollison Street have lost their original timber picket fencing and are poorly presented.
- Town Hall and Memorial Gate gathering area is steep and does not comply with current requirements around inclusive access.
- Ellesmere Place entry dominated by existing red brick toilet block, rubbish bins and screening shrubs.
- More recent architecture is not designed sympathetically with existing heritage character of the gardens or is poorly sited, such as the red brick extension to the Town Hall and shelter near the Viaduct.
- Facilities and amenity areas such as the Playground and BBQ are inadequate.
- Some areas within the Garden are inaccessible and poorly maintained, such as the old tennis courts.
- Flooding of paths in high rainfall events.
- Water retention is restricted to a shallow Ornamental Lake and ephemeral Billabong Chain.
- Overflowing of the Billabong Chain due to low storage capacity of the Ornamental Lake and Chain and lack of Water Sensitive Urban Design Strategy (WSUD).
- Removal of trees without a clear succession plan or collection policy.
- Overcrowding of trees in some areas, particularly in the Pinetum.
- Lack of planting design direction.
- Low diversity in tree species due to the predominance of *Pinus radiata* (Monterey Pine) and *Ulmus procera* (English Elm) in the collection.
- No wayfinding and signage strategy
- Poorly implemented scientific and interpretative signage,

⁴ Gilfedder F, Malmesbury Botanic Gardens Part One, Conservation Analysis and Policies, Department of Conservation Forests and Lands, 1988

1. Introduction

The main issues highlighted can be addressed through identifying opportunities that aim to support the heritage character of the Garden provide appropriate guidance and be achievable.

Main Opportunities include:

- Restore and repurpose heritage buildings and structures.
- Improve northern boundary and presentation to the street including Town Hall curtilage and Memorial Gate entry.
- Create a new entry from Ellesmere Place, including new sympathetically-designed architecture for community.
- Remove or relocate more recent architecture such as the Viaduct shelter and improve façade and environs of Pump House.
- Upgrade play area and BBQ facilities to increase appeal.
- Design more attractive and inclusive multipurpose areas for community events that are accessible from the Garden.
- Design and locate structures to provide accessibility in high rainfall events.
- Investigate opportunities to increase water storage on site.
- Investigate opportunities to treat stormwater runoff from the adjacent township within the Garden and increase the ability and capacity of the Ornamental Lake and Billabong Chain to treat and hold water.
- Develop a succession plan for tree removal and replacement strategy.
- Identify opportunities for additional tree planting.
- Identify new species to increase species diversity including understorey.

There appeared to be broad consensus across the main issues with the general concern, that the Garden and heritage buildings needed to be revitalised and developed, plant collections and level of maintenance to be improved and for new facilities such as a new playground BBQ;s and shelter. Some additional suggestions called for the tennis court area to be renovated to contemporary standards and for this type of recreation to be reinstated. There were also opinions expressed that the Garden should remain as it is.

Balancing improvements and development whilst retaining the essential character of the Malmsbury Botanic Garden would be the challenge.



Image 3. Overland flow and path flooding west of Ornamental Lake



Figure 1. Malsbury Botanic Garden Context Plan

Context Description

The context plan was a useful tool in the Community Engagement activity. Participants generously talked about the areas that they were interested in and it contributed to the understanding of just how central the Botanic Garden is to the cultural and recreational life of the Malsbury community and its visitors. In addition it highlights the diversity in environment, from the indigenous and rural nature to the north in the Common and along the Coliban River and the predominance of the exotic around the Garden itself.

Recreational trails were mapped and these showed links to places of interest such as the Malsbury railway station and viaduct, mill, Coliban water channel and reservoir, shops, cemetery, and Ellis Falls in the distance.

The Botanic Garden is within walking distance of the local primary school and Church and the Youth Justice Centre on the outskirts of the township.

The Malsbury Botanic Garden is well-served by road and rail infrastructure and there is scope for further development and consolidation of walking trails that strengthen the connections between the Garden and its immediate environs, particularly paths to the viaduct.

LANDSCAPE KEY

- Public Space
- Private Land
- Town Centre
- Primary Pedestrian Routes
- Primary Cycling Routes
- Preferred on-road cycling routes between towns
- Walking Trail

Reference

Walking and Cycling Strategy 2014, Macedon Ranges Shire Council
<https://www.alltrails.com/explore/recording/malsbury-walk-2--2>

2. Context

Site Description

The site of present Malmsbury Botanic Garden was reserved for public use in 1855 and approved for the use of a Botanic Garden in 1857, this included approximately three hectares to the west of the Coliban. The western portion was excised in 1857 for water supply purposes. The Malmsbury Botanic Garden remains at approximately six hectares, as indicated in the Gilfedder report. The current western boundary remains the western boundary and the northern boundary of the Calder Highway referred to in the 1988 report is now the Old Calder Highway or Mollison Street, due to the Calder Highway bypass works that took place in 1995. The eastern and southern boundaries remain respectively Ellesmere Place and its extension towards the railway viaduct.

Since the 1988 report there has been further developments in the surrounding area to include a new, masterplanned precinct called the Malmsbury Common (Zone PPRZ), focusing on indigenous plants. A new arboretum and food forest near the recreational precinct and a new restaurant across from the Garden in Ellesmere Place completes the main development areas.

The zoning plan from the Macedon Ranges Planning Scheme shows the Garden occupying a unique position as a Public Conservation and Resource Zone (PCRZ), with the Public Park and Recreation Zone to the north and west of the Garden. It is important to acknowledge that trees that may have been planted prior to the excise of this portion in 1857, such as the *Cryptomeria japonica* or Japanese Cedar are still growing to the west of the Coliban River in an unkempt picnic area. Some of these trees could now conceivably be approximately 163 years old. The 1988 report called for the re-inclusion of this land into the Botanic Garden proper.

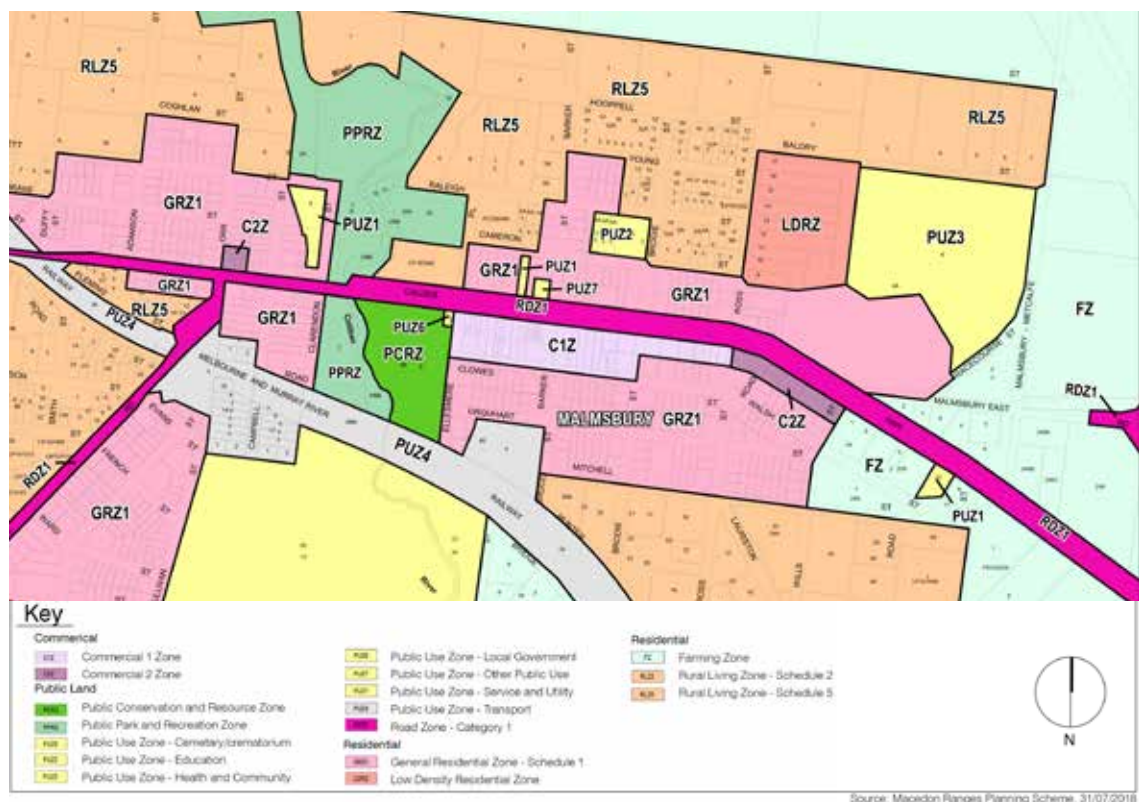


Figure 2. Malmsbury Zoning Plan

2. Context

Site Description

The following photo thumbnails and analysis plan focus on initial observations. This work was done in conjunction with the community engagement and survey and is also a visual record of the Garden at this point in time.



Image 1. Corner of historic Town Hall and Botanic Garden precinct unattractive and dominated by signage



Image 2. Major entry point, but steep grades and poor presentation to Mollison Street



Image 3. Town Hall appears underutilised and asphalt forecourt unattractive



Image 4. Toilet impedes view to existing garden entry on Ellesmere Place



Image 5. Entry dominated by fencing, toilet block and screening shrubs



Image 6. Play area



Image 7. BBQ area



Image 8. Lake levels unable to be maintained



Image 9. Fountain requires repair, possible habitat opportunities on island

2. Context

Site Description (cont.)



Image 10. Bluestone drinking fountain



Image 11. Additional minor entry points facilitate access to other areas of the Garden



Image 12. Narrow paths and dense shrubs hinder views and is inconsistent with Garden character



Image 13. New Bridge dominates landscape, island in poor condition



Image 14. *Eucalyptus muelleriana*, commemorative planting, some additional native planting at base



Image 15. Riparian vegetation and important part of Coliban / Botanic Garden edge



Image 16. Existing shelter detracts from picturesque views



Image 17. Review location and type of signage to maintain important viewlines



Image 18. Poorly maintained connection to Viaduct and Coliban viewlines

2. Context

Site Description (cont.)

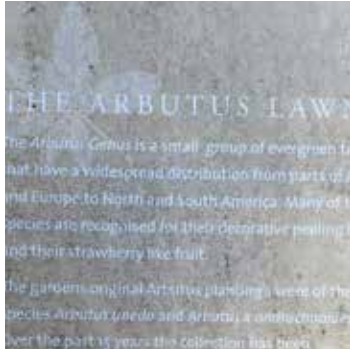


Image 19. Many sign styles are evident throughout the Garden



Image 20. Incidental signage the *Daffodils* Poem placed here by Neeta Lindberg (c 1990's)



Image 21. Flora for Victoria 1996, commemorative plaque

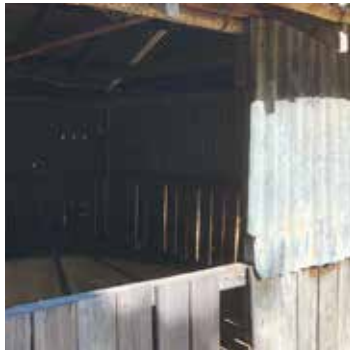


Image 22. Fish Hatchery



Image 23. Tennis Pavilion



Image 24. Tennis Court hit-up wall, chain mesh fence are unsightly and impede access



Image 25. Tennis Courts with hit-up wall and pavilion in background



Image 26. Pump House and tank within security fencing



Image 27. Subtle pathways and surface enhance woodland forest feel

2. Context

Site Description (cont.)



Image 28. Pinetum at southern end of the Garden



Image 29. Poplar Avenue at northern end of the Garden



Image 30. Deciduous Oak in centre of Garden



Image 31. Bluestone wall of Town Hall screened by vegetation



Image 32. *Taxodium mucronatum* (Montezuma Bald Cypress)



Image 33. Turf bridge over connection between Ornamental Lake and Billabong Chain



Image 34. *Cryptomeria japonica* (Japanese Cedar), west side of Coliban River

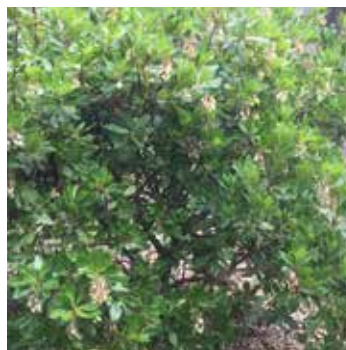


Image 35. *Arbutus unedo* (Irish Strawberry Tree)



Image 36. *Quercus palustris* planting on Ellesmere Place (eastern boundary)

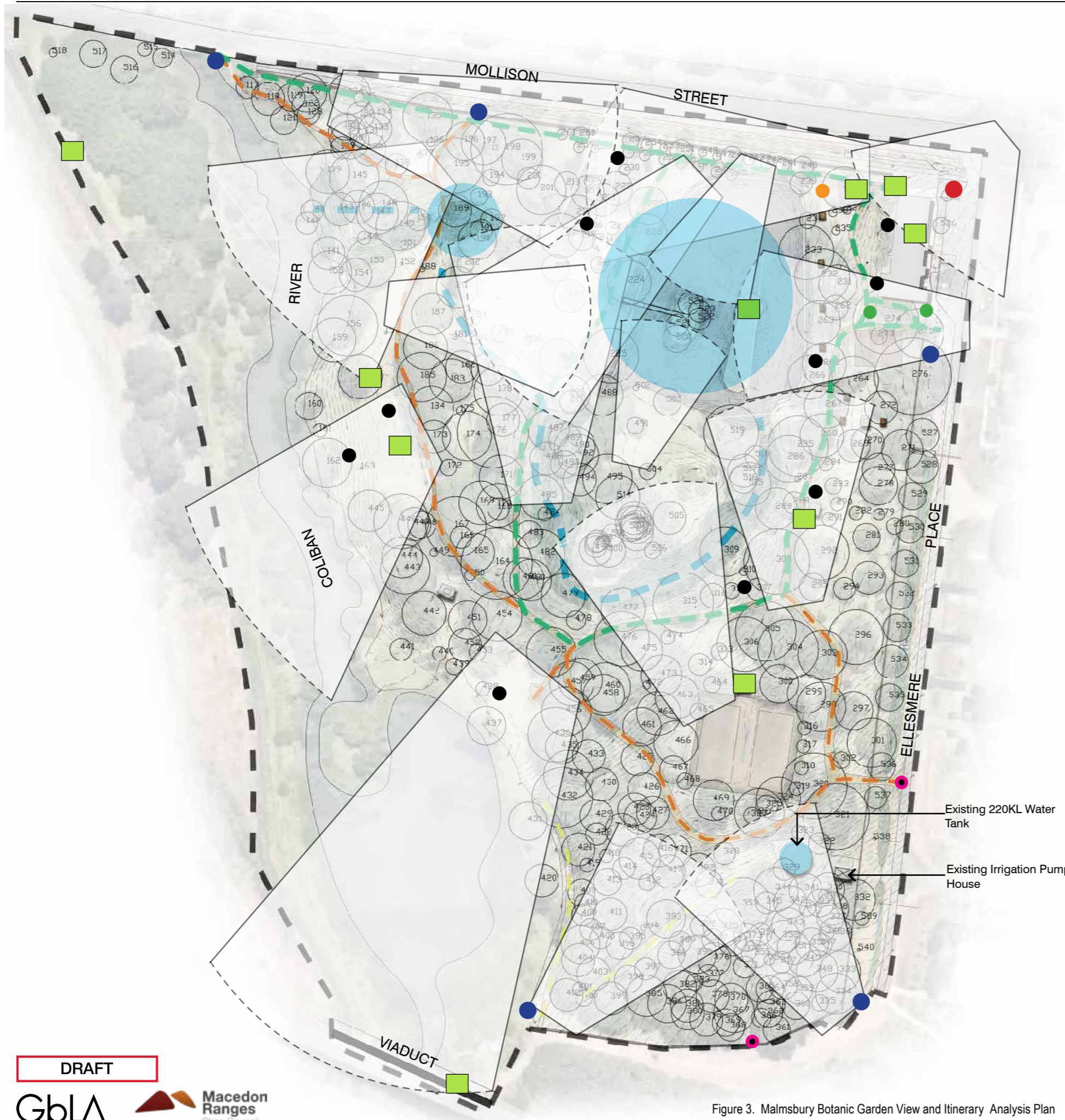
Views and Itinerary Analysis

The views and itinerary analysis approaches the site as a visitor might. The plan overlays the main internal and external views with the current path system, entry points and tree location relative to topographical features such as the Ornamental Lake, Billabong Chain, Coliban River and heritage objects, structure or other installation.

With the exception of the Poplar Walk and the corresponding path on the northern boundary parallel to Mollison Street the interplay between mass (trees/planting) and void (lawn/paths/water) is dynamic. The itinerary of the Garden may be understood as a sequence of composed views, whether open or partially screened that are unique because of the existing topographical features, culminating in the view of the Viaduct with the rural landscape beyond. It is a Garden that is visually connected to it's surrounding landscape and in turn those qualities of the surrounding landscape influence the experience of the Garden within.

The path network composed of simple loops with undefined edges and diverse surfaces of gravel, grass, leaves and pine needles, contribute to the woodland feel of the landscape, and assists in differentiating this Garden from more developed botanic gardens of the era.

It is also evident through this analysis that water plays a central role in this Garden and that the story of water, from the Ornamental Lake to the Coliban and the relationship of the Garden to the Township should be the focus of a separate study within this report.



LANDSCAPE KEY

- Major Internal Pathway
- External or perimeter Pathway
- Informal Pathway
- Macedon Ranges Shire Council municipal sign
- Secondary entrance/exit
- Daffodil Poem
- Interpretive signage or plaque
- Botanic Garden information or entry sign
- Vehicular entrance/exit
- Heritage object, structure or installation
- Major internal viewlines
- On site Water body
- Billabong Chain

Reference
 Malsbury Botanic Garden Signage and Wayfinding Analysis, July 2019, Studio Unfold.
 Malsbury Botanic Garden CAD Tree Locations, August 2019, Stephen Fitzgerald
 Arboriculture.
 Feature Survey Rev B, March 2020, Macedon Ranges Shire Council.

DRAFT

Figure 3. Malsbury Botanic Garden View and Itinerary Analysis Plan

2. Context



Image 37. Eastern view across Ornamental Lake towards Malmsbury township. The footbridge is a dominant feature and the island undeveloped as a destination. Screened views of the township possible in autumn and winter.



Image 38. Northern view toward Mollison Street (old Calder Highway) from central lawn. Glimpses of the bridge and Ornamental Lake are possible and the township screened. The central lawn area is an important destination within the Garden, where the emphasis on exotic and seasonal qualities of vegetation can be most appreciated.



Image 39. Northern View from tennis courts over the Billabong Chain. The tennis courts occupy the important 'middle ground' within the Garden and facilitate more elevated views through the trees to the landscape and lower topography beyond.



Image 40. Southern view from the Garden offers the opportunity to appreciate the Garden setting in relation to the Coliban River and the historic bluestone railway viaduct.



Image 41. View through to the Coliban River and the picnic area west of the river. The picnic area on the opposite bank of the river was once part of the Garden assists in maintaining a sense of the original Garden landscape and setting.



Image 42. Southern view towards viaduct, the open area to the right is one of the few clearings within the Garden, emphasising the contrast in mass (planting) and void (clearing) that is an important landscape character of the Garden.

DRAFT

2. Context

Synopsis of the History of the Malmsbury Botanic Garden

An synopsis of the history of the Malmsbury Botanic Gardens is provided in this masterplan as additional background and has been substantially informed by Part One and Two of the Gilfedder reports (1988). Additional photographs, both contemporary and historical are included to provide clarity on historical development of the Garden adjacent to understanding of the current situation. The Chronological Dates of Significance⁵ are restated and updated from the 1988 report at the conclusion of this section.

The Malmsbury Botanic Garden has undergone a number of phases since 1863 when land was formally reserved for its development. The completion of other major projects in the area including construction of the railway viaduct (1859 - 1862) and the Town Hall (1868) would have contributed to a general increase in interest in the precinct and it's improvement. It was recorded at the time that activity in the Garden focused on '...ornamenting and otherwise improving the Gardens'⁶ through a program of fencing with a major tree planting period in the decade between 1865 - 1875. This appears to have included planting on the western side of the Coliban River, at least until 1866, when this portion of the Botanic Garden reservation was annexed for water supply purposes leaving approximately six-and-half hectares as the remaining portion for development of a Botanic Garden. It is conceivable that the very large trees including *Cryptomeria japonica* (Japanese Cedar), *Quercus canariensis* (Algerian Oak) and *Pinus radiata* (Monterey Pine), currently growing on the west bank, date back to this time.

The ongoing management of this portion appears unresolved with many weed species including Gorse or Furze (*Ulex eruropaeus*) still present. It was suggested in 1988 that a 'committee of management' be formed to collectively manage this site such that the '...gardens would resume the visual appearance of their original size...and the source of weed infestation could be managed.'⁷ This area is still of importance today, given the proximity to the Garden and the potential age of the existing trees, which must be some of the oldest specimens in Victoria.



Image 43 View south toward viaduct on west bank of Coliban River



Image 44 View east toward Botanic Garden from west bank of Coliban River

5 Gilfedder F, Malmsbury Botanic Gardens Part One, Conservation Analysis and Policies, Department of Conservation Forests and Lands, 1988. p4

6 Caldwell in Gilfedder F, Malmsbury Botanic Gardens Part One, Conservation Analysis and Policies, Department of Conservation Forests and Lands, 1988. p4.

7 Gilfedder F, Malmsbury Botanic Gardens Part Two, Conservation Analysis and Policies, Department of Conservation Forests and Lands, 1988. p10

2. Context

The years 1875 - 1900 are understood to be the period of growth and maturity of trees planted prior to 1875. There are few records relating to planting in these years, as reporting appear to focus on the establishment of recreation areas within the Garden such as the Tennis Court, Croquet and Bowling Green. Other activities like picnicking in the summer months were very popular and area adjacent to the Coliban was also accessible for recreation.



Image 45 Viaduct c 1865.
C. Fitzsimons on Vicnet.
<http://home.vicnet.net.au/~malmsbot/oldpictureslarge/1-viaduct1865.htm>

The period (1900-1955) has been designated the senescent phase, with activities focused on the removal of trees reaching that would be almost one-hundred years old and less on planting and renewal of additional trees and shrubs.

During the war and inter-war years between WWI (1914 - 1918) and WWII (1939 - 1945) the program of tree removals continued with some concern expressed in 1941 on the extent of this activity. The approvals appear to be balanced with some additional planting taking place in the second half of 1941. The WWI Memorial Gate was constructed and opened in 1922.



Image 46 The Memorial Gate in front of the Town Hall is unveiled 17th April, 1922.
Malmsbury Historical Society



Image 47 Malmsbury Town Hall in 1949 prior to demolition of the façade.
State Library of Victoria

2. Context



Image 48 c. 1913. The Malmsbury Town Hall showing previous timber gate arrangement prior to the Memorial Gate being built.

Photograph E. Boddy, Malmsbury Historical Society



Image 49 Detail showing the c. 1913 timber gate and arrangement with adjacent timber picket fence along Mollison street.

Malmsbury Historical Society.

The previous timber gateway arrangement was demolished as part of the construction of the new Memorial, but at least one photograph of this gate survives and shows the arrangement with the adjacent timber picket fence along Mollison Street.

Recreation within the Garden was again, a focus for the years between 1955 - 1960's. A change in the designation of the garden from a reserve for a botanic garden (1866) to a public garden and recreation reserve occurred in 1955. Recreation included provision of tennis courts and a children's playground. At this point the Shire of Kyneton was appointed as the Committee of Management under the provisions of the Land Act. It is unclear what other activities to support the development of the Garden occurred in this period separate to the focus on developing more opportunities for active recreation.

In contrast to the previous period, The years 1970's - 1980's focused on the rejuvenation of the Garden '...after decades of restricted funding, the lack of an essential water supply, and a general deterioration in maintenance standards.'⁸ In 1971 Kyneton Council accepted the offer from the Mansion Community, a local religious society, to restore and maintain the Garden over a period of six to eight years. At the Reverend Wood's instigation, rubbish bins, a lawn mower and drainage for the septic tank were obtained. In 1972, the east, north and western edges of the Ornamental Lake were lined with bluestone, with clearing works to remove Elm suckers occurring a decade later during the 1980's drought. Local enthusiasm for the rejuvenation effort was raised and it was agreed at a meeting to erect notices banning horses and bicycles and disapproval of any sort of vandalism in the Garden.

Responsibility for the management of the Garden shifted again in 1983 when under the immediate direction of the Provincial Botanic Gardens Committee (in 1988 this was the Botanic and Public Gardens Advisory Committee) became the joint responsibility of the Kyneton Council and the Department of Conservation Forests and Lands.

At the time of Victoria's sesquicentenary (1984 - 85), thirty-five thousand dollars (approximately \$110,000 in today's terms) was allocated for Garden rejuvenation. The funding allowed for the following (1984 - 1985):

⁸ Gilfedder F, Malmsbury Botanic Gardens Part One, Conservation Analysis and Policies, Department of Conservation Forests and Lands, 1988. p9

2. Context

- Employment for one year of a full-time gardener (Mr Kevin Walsh),
- Identification and labelling for trees,
- Tree surgery, removal and replanting,
- Dredging of the billabong,'
- Grading of land adjacent to the Town Hall (50mm depth) and north of the pump shed adjacent to the existing (at the time) Hawthorn hedge,
- Installation of infrastructure including two new taps and restoration of the drinking fountain,
- Installation of pipes between Ellesmere Place and the Ornamental Lake to replace the open drain,
- Cleaning and grading of the circular pond adjacent to the Coliban River for ease of maintenance,
- Removal of pine seedlings, Cape Broom (*Genista monspessulana*), Blackberry, Elm and Hawthorn suckers were also removed,
- Demolition of the galvanised iron shed near the children's playground,
- Replanting with *Acacia melanoxylon* and *Eucalyptus ovata* along the Coliban River frontage,
- Painting, using a dark green colour, of the wrought-iron and timber gate posts of the Memorial Gate, seats and rubbish bins; and
- Improvements to the playground (1987)
- Improvements to the timber picket gates on Ellesmere Place near the Town Hall and the tennis courts to discourage vehicles from entering the Garden was planned (1988).



Image 50 Equipment Shed behind Town Hall, 1940.
Malmsbury Historical Society

Clearer records of what was planted at this time indicate the introduction of species not previously grown in the Garden. This included the procurement of three cultivars of Lilac (*Syringa vulgaris* CV's), including 'Woolerii' [sic], *Syringa* X *Hyacinthiflora* 'Ester Stanley'[sic] and an Unknown cultivar. A search of known lilac cultivar registration does not acknowledge 'Woolerii' or 'Ester Stanley', but the species *Syringa wolfii* was found, along with *Syringa* X *Hyacinthiflora* 'Ester Staley'. Over 2000 cultivars of Lilac exist today with registration of cultivars held at Royal Botanical Gardens, Hamilton, Ontario Canada, home of the Katie Osborne Lilac Collection, inclusive of over 745 plants

2. Context

A comparison between records of existing plants and those recently accessed during this period reveal an attempt to increase overall species diversity by fifty species, with only fourteen of these new species surviving to the current day. Of particular interest are the genera and species *Widdringtonia schwarzii* (Baviaanskloof Mountains, South Africa), *Pinus patula* (Mexican Highlands), *Pinus sylvestris* (Europe, Asia), *Pinus contorta* var. *contorta* (Western North America) and *Pinus muricata* (California), that were donated by Creswick. It is unclear in the report what is meant by 'Creswick', but it may be a reference to the Old State Nursery, managed by the Forests Commission that was located in Creswick. None of these species appear in the current tree survey.

The planting of *Eucalyptus muelleriana* by the Hon Joan Kirner took place on 17th of November, 1985 to commemorate Victoria's sesquicentenary and Baron Ferdinand von Mueller's (1825 - 1896) contribution to horticulture.



Left Image 51 The Hon. Minister for Conservation Forests and Lands, Joan Kirner, planting *Eucalyptus muelleriana*, 17 November, 1985. Kevin Walsh is third from the right



Right Image 52 The Hon. Minister for Conservation Forests and Lands, Joan Kirner, attending the unveiling of an acknowledgement board, 17 November, 1985.

Both Photographs Kevin Walsh Archive Gardens rejuvenation tree planting ceremony, courtesy of Malmesbury Historical Society.



Image 53 Removal of large Conifer between Fish Hatchery and Ellesmere Place. c. 1980's
Kevin Walsh Archive courtesy of Malmesbury Historical Society.

2. Context

The chronological dates of significance were originally included in Appendix II of the conservation analysis report. The chronology is updated and represented here.

Chronological Dates of Significance (amended)

1855	Malmsbury Botanic Garden site reserved for public use.
1859	Survey of Malmsbury township delineated the reserve for a botanic garden.
1859 - 1862	Railway viaduct constructed.
1861	Township of Malmsbury declared a Municipality and first elections held.
1863	Works commenced in the Garden. Reservation of Malmsbury Botanic Garden land gazetted Works commenced on Malmsbury Reservoir. Annexation of the west bank area from Malmsbury Botanic Garden.
1868	Construction of Town Hall in north-eastern corner of Malmsbury Botanic Garden.
1915	Amalgamation of the Borough of Malmsbury with the Shire of Kyneton.
1955	Malmsbury Botanic Garden legislation amended to include provision of public recreation.
1970's - 1980's	Rejuvenation of Malmsbury Botanic Garden. Management of the Garden becomes the joint responsibility of the Shire of Kyneton and the Department of Conservation Forests and Lands. Grant received from Victoria's 150th Committee for the rejuvenation of the Malmsbury Botanic Garden.
1988	Completion of Malmsbury Botanic Garden Conservation Analysis and Policies (Part One) and Management Plan (Part Two) for Malmsbury Botanic Garden.
1995	Shire of Macedon Ranges formed from amalgamation of Shires of Romsey, Gisborne, Newham, Woodend and Kyneton. The Shire is now the Manager of the Malmsbury Botanic Garden.
1996	Flora For Victoria 1996, Malmsbury receives donation of plants from the Royal Botanic Gardens, Melbourne, celebrating the Gardens' 150th Anniversary and centenary of the death of its first Director Baron Ferdinand von Mueller (1825 - 1896).
2002	Malmsbury Botanic Garden is included in the Victorian Heritage Register.
2009	Completion of Town Hall Conservation Management Plan. Calder Freeway bypass between Melbourne and Bendigo is completed.
2019 - 2020	Malmsbury Botanic Garden Landscape Masterplan.

c 1850's



c 1878



c 1894



Figure 4. Trio of Historic Plans of Malmsbury Village

Refer final page for References. Plans are details from the State Library of Victoria collection.

2. Context

Planning Controls

A number of state and local planning controls apply to the Botanic Garden site. These include the *Heritage Act 2017* and also the Macedon Ranges Planning Scheme.

Any proposals for works will be considered within the broad ambit of considerations under the *Heritage Act 2017*, which are intended to support the cultural heritage of places and also take into account economic impacts. The following extract is provided for information:-

101 Determination of permit applications (Extract)

(a) the extent to which the application if approved, would affect the cultural heritage significance of the registered place or registered object;

(b) the extent to which the application if refused would affect the reasonable or economic use of the registered place or registered object.

Any works within the registered land area (Ref no H1574), particularly those elements that inform the Statement of Significance will require a permit from Heritage Victoria, as the responsible guiding authority. The Statement of Significance that accompanied heritage registration in 2002 is provided in Appendix 3.

A number of relevant overlays are included in this report as a result of the Gardens location and proximity to an important water supply and river corridor. These need to be considered in relation to landscape works and they have also influenced the design and recommendations of the masterplan outlined in the next section of the report.

Shire of Macedon Ranges Planning Scheme overlays relevant to the botanic garden site include



Figure 5. Required to protect and maintain water quality and yield in the Eppalock Proclaimed Catchment.



Figure 6. A Soil and Water Report is required for works in this zone addressing how soil and water impacts will be managed so that water quality of the Malmesbury Reservoir is not affected.

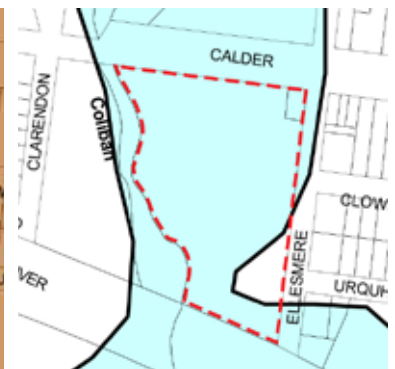


Figure 7. LSIO - Land Subject to Inundation - identifies land in a flood storage or flood fringe area affected by the 1 in 100 year flood. Development needs to maintain or improve river and wetland health, waterway protection and flood plain health.

2. Context

In addition to the above overlays from the Macedon Ranges Planning Scheme, the botanic garden site is subject to a local heritage overlay.

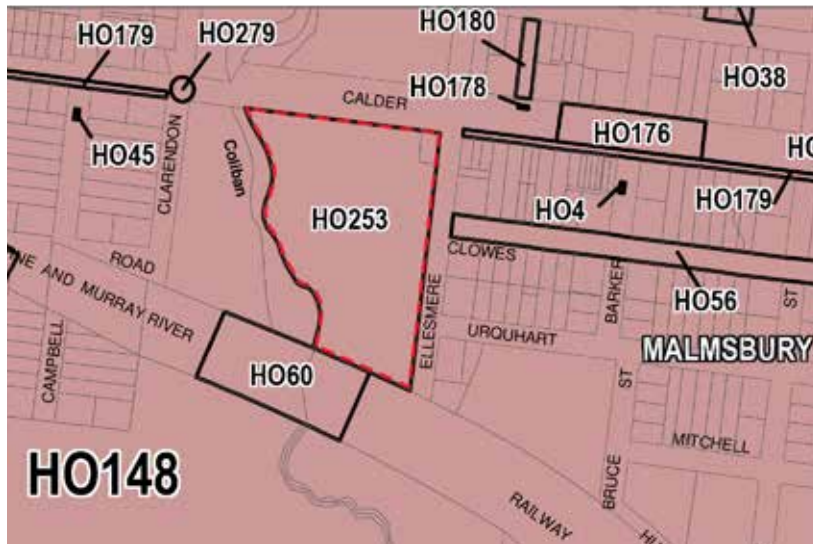


Figure 8. Heritage Overlay Plan showing proximity of the Malmsbury Botanic Garden to other heritage sites within Malmsbury.

The above reference in the Macedon Ranges Planning Scheme identifies that the botanic garden site is not an Aboriginal heritage place. Nevertheless it is important to acknowledge that the Planning Scheme may not be the only source of information on Aboriginal cultural heritage.



Image 54. Kodak postcard Coliban Bridge Malmsbury, c.1920. Mrs Beyer Malmsbury Historical Society

2. Context

Dja Dja Wurrung Culture

As a result of further consultation with Dja Dja Wurrung Clans we understand that there is a two-hundred metre Zone of Cultural Sensitivity co-inciding with the Coliban River corridor. This overlay applies to land within the Botanic Garden precinct and also to land on the west bank of the Coliban River including the extant collection. The Zone of Cultural Sensitivity defined under the *Aboriginal Heritage Act 2006* applies to all named waterways indicating areas of potential cultural heritage.

A statement of significance from Dja Dja Wurrung People is offered below:

'Dja Dja Wurrung People have lived on our traditional lands and cared for our Country over many thousands of years. For us, Country is more than just the landscape, it is more than what is visible to the eye - it is a living entity, which holds the stories of creation and histories that cannot be erased. We feel an affinity with the land when we're on Dja Dja Wurrung Country; the ancestor's spirit is in the rock, the tree, within the earth and sometimes in the wind and rain clouds. There is an inner peace that runs through us, a feeling of recognition and belonging. As the Dja Dja Wurrung are gardening the environment, we are pleased the Malmsbury community cherish the Botanic Gardens. We will all maintain this strong physical relationship with Dja Dja Wurrung Country by continuing to access it, looking after it and by using its natural resources like this Garden. - Dja Dja Wurrung Clans.

Dja Dja Wurrung country extends from Mount Franklin, Creswick and Daylesford in the south to Castlemaine, Maldon and Bendigo in the west, Boort in the north and Donald in the west and includes the Loddon and Avoca River watersheds⁹.



Image 55. Coliban River Bridge Malmsbury n.d.
Malmsbury Historical Society

⁹ *Dhelkunya Dja*, Dja Dja Wurrung Country Plan, 2014-2024, Dja Dja Wurrung Clans Aboriginal Corporation, 2017.

3. Masterplan Drawing and Key Statements

The following masterplan has considered the historical, physical and cultural context of the Malmsbury Botanic Garden in its design. The approach seeks to emphasise the subtle qualities of the Garden and to maintain these qualities for the future.

The consultation process, including the many conversations and feedback received has been very influential. In the approach to design, all aspects were considered and incorporated wherever possible.

This approach is mindful of the work completed previously by F. Gilfedder, D. Caldwell and C. Fitzsimons; and some aspects of this masterplan reference these design approaches, where relevant. The boundaries of the Garden; their physical and cultural nature means that some recommendations include references to dialogue with Aboriginal people, community groups and administrative managers of adjacent land. This has meant that some aspects of the masterplan focus on changing the physical environment both within and on the margins of the Garden to solve problems - such as water supply and management; also touching on re establishing connections with other Botanic Gardens that might benefit the Malmsbury Botanic Garden in the longer term.

Inspired by site, the environment, seasons, people and plants, this masterplan aims to provide a place where these connections can be felt and stories told, thereby helping to achieve the visionary aims and objectives developed collectively for the Malmsbury Botanic Garden.

The following sections of the report provides information on the design intent, implementation and recommendations.



Image 56. Aerial view of the Malmsbury Botanic Garden looking south west encompassing the Viaduct, Reservoir and Malmsbury Railway Station.



KEY

- 1 **Town Hall & Ellesmere Place**
The important, historic Town Hall façade is renovated and new architecture provides better community spaces and stronger, more transparent links with the Garden.
- 2 **Ellesmere Place Garden Gateway & Forecourt**
The current informal entry to the Garden becomes a major entry point and connection to the Play area.
- 3 **Playground & Tree house**
The existing playground will include a new climbable Tree House in a garden setting.
- 4 **Pedestrian Path Network**
The pedestrian path network includes a system of primary, secondary paths that are surfaced with gravel sourced from the Malmsbury region.
- 5 **Ornamental Lake, Billabong Chain & Water Sensitive Urban Design (WSUD) System**
Central to the landscape experience of the Garden, Stormwater is treated and stored in the system as part of a future water retention strategy.
- 6 **Fountain Island & Habitat**
The historic bluestone fountain is restored and the island revegetated to demonstrate indigenous aquatic plants for habitat.
- 7 **Taxodium Island & Taxodium collection**
The island is renovated and edges reinforced and defined with large bluestone boulders. The existing Poplars are retained and a new collection of *Taxodium* established over time.
- 8 **Picnic & BBQ Area, *Brachychiton* collection**
A new gable-roof, open-sided pavilion, covers two table settings. A new *Brachychiton* collection is planted adjacent to the picnic area.
- 9 **Fish Hatchery & Fish Acclimatisation Museum**
The Fish Hatchery is adapted for use as a small Acclimatisation Museum.
- 10 **Tennis Pavilion, Courts, *Arbutus*, *Syringa*, *Cistus* & *Ceanothus* Collections.**
The existing pavilion is restored and adapted for re-use. *Arbutus*, *Syringa*, *Cistus* and *Ceanothus* collections provide additional seasonal interest.
- 11 **Pump House, Tank & *Crataegus* collection**
The existing building is retained, rendered and painted to match external colours of the Town Hall. A new *Crataegus* collection screens internal views.
- 12 **Secondary Pedestrian & Vehicle Entry**
Small un-gated entries provide a system of secondary access points into the garden. The main vehicle access point is on Ellesmere Place between Urquhart Street and Clowes Street, providing direct connections to the Tennis Pavilion.
- 13 **Pinetum Collection**
The *Pinus* collection is retained in this area and augmented with additional species, to increase species diversity and collection interest.
- 14 **Malmsbury Viaduct**
The Malmsbury viaduct continues to be a key destination for visitors to the Botanic Garden.
- 15 **Viaduct Views**
Key areas are maintained to support uninterrupted picturesque views to the Viaduct from within the Garden. These views highlight the contrast between Garden and Landscape and are unique to the Malmsbury Botanic Garden.
- 16 **Aboriginal Culture, Coliban River Biodiversity & Commemorative Planting**
The Coliban River becomes key to further understanding of Aboriginal culture. The establishment of a precinct acknowledging the importance of Dja Dja Wurrung culture and their relationship with the river landscape will be important.
- 17 **Bowling Green & Plaque**
A green folly, the historic bowling green is preserved for its unique form and is a reference to the importance of this type of recreation in the past.
- 18 **Coliban River Linking Path**
The Coliban River linking path diverts under the Bridge at Mollison Street to continue toward Malmsbury Common, facilitating experience of both exotic and indigenous collections of plants grown in the Malmsbury area
- 19 **Remnant Plant Collection & Picnic Area**
This important area was once part of the Botanic Garden. Views are opened to the gardens from the small picnic area and a maintenance agreement developed with Coliban Water.
- 20 **Deciduous Oak Lawns & Bulb Collections**
The balance between deciduous and evergreen canopies is a key landscape feature of the Malmsbury Botanic Garden. Inter-planting of deciduous Oaks amongst the existing frame of surrounding evergreen trees will keep lawns open. A collection of *Narcissus* and other bulbs provides seasonal interest. A new *Iris* collection is established between the Lake edge and Poplar Walk.
- 21 **Poplar Walk**
The Poplar Walk is maintained as a key historical planting that is appreciated from within the Garden and also externally as an important part of the Malmsbury streetscape. The *Iris* collection adds another layer of seasonal interest.
- 22 **Picket Fence**
The new, unpainted timber picket fence will reintroduce elements of this historic feature back into the Garden and improve the existing interface with Mollison Street.
- 23 **Drinking Fountain**
The historic bluestone drinking fountain is restored and recommissioned. The fountain will be relocated to the new Garden Entry Forecourt to deter further vandalism.
- 24 **WWI Memorial Gate**
An important memorial associated with WWI, the historic gate and fence is retained and restored within a new landscape setting that seeks to resolve levels and access associated with Town Hall curtilage works.
- 25 **Palmetum & Mollison Memorial Plaque**
A new Palmetum will focus on cool climate species such as *Brahea*, *Butia*, *Jubea*, *Parajubea*, *Chamaerops* and *Livistona*. The Mollison Memorial is relocated within this bed.

DRAFT

GbLA

Macedon Ranges
Shire Council

Project No: 19018

Malmsbury Botanic Garden
LANDSCAPE MASTERPLAN
GbLA.COM.AU

1 : 750 @ A1 | 0 | 7.5m | 22.5m | June 2020
1 : 1500 @ A3



MP 37



Figure 10 : Key Plan 1
Malmesbury Botanic Garden Masterplan

The key statements, expand on elements identified in the masterplan. These elements will form the basis of a staged, prioritised work schedule to be included in the Masterplan Report.

KEY STATEMENTS

1 Town Hall & Ellesmere Place

The important, historic Town Hall façade is renovated and new architecture provides better community spaces and stronger, more transparent links with the garden. The Town Hall is pivotal to the Botanic Garden entry experience.

Works to this important building include partial reconstruction of the front and side façades, restoration to the interior and replacement of the existing red brick extension at the rear of Town Hall with new architecture. A new extension within a reduced footprint at the rear of the Town Hall in Ellesmere Place provides new accommodation for a variety of community programs such as a meeting room, exhibitions, public programs and visitor facilities accessible from the new Garden forecourt. Works to be carried out in accordance with the Malmesbury Town Hall CMP.

Works to the Town Hall curtilage include re-levelling of adjacent ground and drainage in accordance with the CMP. Town Hall access, parking - including new DDA parking arrangements, planting and pavement materials will also form part of these works. The existing, external red brick wall of the Town Hall kitchen is to be retained. New planting to 'green' the wall facing Ellesmere Place, will lessen the impact of this material adjacent to the heritage bluestone and contribute to greening the entry to the Garden.

Grass nature-strips are removed in Ellesmere place adjacent to the Town Hall. This strategy will reduce maintenance and tie into the new planting proposal for the feature garden bed on the corner of Mollison Street and Ellesmere Place. The existing *Quercus palustris* street tree planting is extended toward Mollison Street, creating a green canopy and additional shade for the street area. The corner garden bed located at the intersection of Mollison Street and Ellesmere Place will be newly planted to showcase new collections for Malmesbury Botanic Garden such as *Juniperus* CV's (prostrate forms) and *Callitris* sp.

Macedon Ranges Shire Council precinct and entry signs will be located at the corner of Mollison Street and also at the new Garden entry forecourt on Ellesmere Place, informing visitors about these important locations.

2 Ellesmere Place Garden Gateway & Forecourt

The existing informal entry from Ellesmere Place is transformed into a major entry point to the Garden. The new Garden Gateway and entry Forecourt is a multi-purpose space bounded by new community facilities to the north and a re-imagined children's playground to the south. The Gateway includes a paved area for unobstructed access to the new Town Hall and extends into Ellesmere Place, emphasising this precinct as an important entry point into the Garden. New parking arrangements keep this entry clear.

The historic drinking fountain, currently located near the WWI Memorial Gate is relocated to the Garden Gateway and recommissioned. It emphasises the historic links with bluestone craftsmanship associated with Malmesbury and it is hoped relocation could reduce vandalism of this important artefact.

New facilities for visitors such as toilets are accessible from the Forecourt. Seating is designed into this threshold space to assist with workshops or other programs before visitors move into the Garden proper. No rubbish bins have been provided except within this area and they are located so as not to interrupt important viewlines.

Garden signs located in the Gateway area include an interpretative map and historical information to assist with wayfinding and background information. Signs should be placed to ensure clear views through the Elms across Fountain Island to the new *Taxodium* collection on Taxodium Island and draw visitors into the Garden.

3 Playground & Tree house

The existing playground has been re-imagined in a garden setting to include a new climbable Tree House and playful sculpture for children focusing on the interaction between people and plants. Swings, a slide and a small challenge course has been integrated into the playground garden where resilient plants such as *Lomandra* 'Tanika', soften the outlines of large basalt boulders. The playground is fenced with unpainted timber palings and connects to both the Entry Forecourt and BBQ Picnic Area. Drinking fountains are located adjacent to the entries.

4 Pedestrian Path Network

The pedestrian path network includes a system of primary and secondary paths surfaced with gravel sourced from the Malmesbury or central goldfields region. The primary path system assists in defining the main itineraries around the lake, to the viaduct, along the river to the Pinetum and back towards Ellesmere Place. The network includes an informal system of natural-surface paths located in the Pinetum. This system provides informal access to the Garden from the two secondary entrances located in the higher southern portion of the Garden and reinforces the forest-like qualities of this important landscape.

5 Ornamental Lake, Billabong Chain & Water Sensitive Urban Design (WSUD) System

The Ornamental Lake and Billabongs, are a central focus of the Malmesbury Botanic Garden landscape. The Lake and Billabong system can play a key role in WSUD for the adjacent area of Malmesbury. There is a significant catchment area associated with the higher adjacent topography to the east of Ellesmere Place that includes commercial and residential landuses. It is envisaged that any future system will retain existing drainage infrastructure feeding into the Lake, the Chain of Billabongs, Weir and small overflow pond. An additional piped connection at the end of the Billabong Chain will feed water back into the Ornamental Lake and close the loop for this precious resource. This system will also assist in maintaining water levels in the Lake. Further design development of this strategy will identify additional requirements and works to the Ornamental Lake and Chain of Billabongs in terms of treatment capability, infrastructure, levels, capacity and associated planting. Existing collections in this area include the genus *Taxodium*, *Salix* and could include a new collection of Indigenous aquatics.

A new, unpainted hardwood timber boardwalk integrated into the adjacent existing path will bridge the small overflow channel in times of flood. The overland flow path is maintained and the connection between the small pond and Coliban River formalised with ephemeral wetland edge planting. The interface with the Coliban River is improved through rock placement and additional planting with Indigenous riparian species.

6 Fountain Island & Habitat

The historic bluestone fountain and associated structures are restored and the island revegetated to demonstrate indigenous aquatic plants for habitat. The islands are an important historic and landscape feature of the Ornamental Lake. This island is not accessible to the public.

7 Taxodium Island & *Taxodium* collection

The island is renovated and edges reinforced and defined with large bluestone boulders. The existing Poplars are retained and a new collection of *Taxodium* established over time. The footbridge is painted a dark grey so that this element is more visually recessive in the landscape, supporting the focus on tree form in the Garden. Additional tree planting on the edge of the Ornamental Lake adjacent to the footbridge will further assist in blending this structure into the landscape. A small central gravel seating area is created on the island.

8 Picnic & BBQ Area, *Brachychiton* collection

A new gable-roofed, open-sided pavilion, covers two table settings. It is located away from important viewlines, adjacent to the new double-BBQ and reflects the architectural style of other small buildings in the Garden such as the tennis pavilion and nearby Fish Hatchery. The BBQ is upgraded to a double, wheelchair accessible system inclusive of washup sink. The new *Brachychiton* collection is located in this precinct.

9 Fish Hatchery & Fish Acclimatisation Museum

The Fish Hatchery is adapted for use as a small Acclimatisation Museum. The Fish Hatchery building fabric will be modified to allow light into the building. A new interpretation strategy communicating the story of fish acclimatisation in central Victoria is associated with this development. The central tank is filled with recirculating water providing a home for a small collection of important indigenous aquatic plant species. The aquatic plant collection surrounds a new fish sculpture that could be commissioned through a Community Art Grant program.

10 Tennis Pavilion, Courts, *Arbutus*, *Syringa*, *Cistus* & *Ceanothus* Collections.

The existing pavilion is restored and adapted for reuse as a Garden Museum with changing seasonal displays or locked and only accessible during functions. *Arbutus*, *Syringa*, *Cistus* and *Ceanothus* collections provide additional seasonal interest. In addition, the court area is upgraded to include removal of the masonry hit-up wall, surrounding chain-mesh fence, asphalt and central turf area. The courts have a new compacted gravel surface, similar to the one at 'Buda' in Castlemaine, to support ball games such as bocce, boules or pétanque. New garden beds holding collections of *Cistus* sp. (Rock Rose) and *Ceanothus* sp. (Californian Lilac) mark the edges of the old courts and grow on the banks, providing colour almost all year around. The courts are visually permeable to the surrounding Garden and accessible from Ellesmere Place, via a gate. Services such as water and 3-phase power are provided to cater for daytime, evening or night functions such as open-air concerts, plants sales or markets. Private functions such as garden weddings or other alfresco community and private events also take place here. Planting of new species of *Arbutus* to reinforce the existing collection will occur on the perimeter of the Court area. The *Syringa* collection is relocated adjacent to the pavilion. Ideally the pavilion is relocated to a more central position in relation to the courts.

11 Pump House, Tank & *Crataegus* collection

The existing building is retained, rendered and painted to match external colours of the Town Hall. The perimeter fence is retained around the pump house and tank. The existing turf areas within the fenced area are removed and resurfaced with fine crushed rock (FCR) or similar material to the path system. A new *Crataegus* collection located in this area assists with screening of the fence and tank from the Garden, composed of a mix of shrub and small tree species, highlighting the importance of these plants to the central goldfields area and historic gardens in general. Species selected should be non-weedy.

12 Secondary Pedestrian & Vehicle Entry

Small ungated entries provide a system of secondary access points into the garden. The main vehicle access point is from Ellesmere Place between Urquhart Street and Clowes Street and should be gated. This provides access to maintenance vehicles and those need to access the Tennis Pavilion or for other Garden events.

13 Pinetum Collection

The *Pinus* collection is retained in this area and augmented with additional species, to increase species diversity and collection interest. The collection could focus on Californian *Pinus* to complement the predominance of *Pinus radiata* in this areas. The useful life expectancy (ULE) is used to map future locations for planting.



Figure 11 : Key Plan 2
Malmesbury Botanic Garden Masterplan

KEY STATEMENTS (cont.)

14 Malmesbury Viaduct

The Malmesbury viaduct continues to be a key destination for visitors to the Botanic Garden. It is one of the most significant 19th Century bluestone structures in Australia. The Malmesbury viaduct is a key destination for visitors to the Botanic Garden. Beside maintaining viewing access, Physical access to the Viaduct could be facilitated using the existing road that skirts the southern boundary of the Garden. This should be retained, and upgraded to resolve erosion and drainage issues. The existing pump house adjacent to the Coliban River is an eyesore and should either be demolished or restored sympathetically with regard to the view.

15 Viaduct Views

Key areas within the Garden are maintained to support important, uninterrupted picturesque views to the Viaduct and to the landscape beyond. These views highlight the contrast between the Garden and surrounding landscape and are unique to the Malmesbury Botanic Garden.

Views should be framed by trees and the foreground kept uncluttered by removing signs, furniture or other structures. The contrast between the 'Gardenesque' design approach and its emphasis on plant diversity and the 'horticultural' specimen with the Picturesque point of view is unique to the Malmesbury landscape and may be appreciated from this location. The view composition may be summarised as the foreground of mown turf with its framing of trees, the reedy middle ground of the Coliban River and the Viaduct framing the background of rolling hills clothed in long grass. A sensitive approach to the Picturesque aesthetic that emphasises contrasts in colour of foreground, middle ground and background vegetation and also texture in the ruggedness of the rocks of the Coliban River in the vicinity of the Viaduct should be clearly maintained.

16 Aboriginal Culture, Coliban River Biodiversity & Commemorative Planting

The Coliban River becomes key to further understanding of Aboriginal culture. The establishment of a precinct acknowledging the importance of Dja Dja Wurrung culture and their relationship with the river landscape will be important.

The river is an important link between the Malmesbury Common to the north and Malmesbury Reservoir to the south, drawing people to wander along its banks. The River is also critical to Aboriginal culture. The Dja Dja Wurrung people are the key custodians of this culture and could be invited to develop revegetation and maintenance plans for the River and also any associated interpretative elements.

The location of significant trees such as the commemorative *Eucalyptus muelleriana*, planted by the Hon. Joan Kirner and evergreen Oaks such as *Quercus ilex* (?) along the Coliban River further highlight the nature of this interface. Planting along the top-most banks of the Coliban should retain a mix of Australian tree species and evergreen Oaks.

A stronger relationship could be developed between Coliban Water, Dja Dja Wurrung people and MRSC to maintain the Coliban River and immediate environs.

17 Bowling Green & Plaque

A green folly, the historic bowling green is preserved for its unique form and is a reference to the importance of this type of recreation in the past.

18 Coliban River Linking Path

The Coliban River linking path diverts under the Bridge at Mollison Street and continues toward Malmesbury Common and Arboretum, facilitating an experience of both exotic and indigenous collections of plants grown in the Malmesbury area. This route is important as it provides a direct connection between precincts that emphasise Australian and Indigenous plant biodiversity on the one hand and the acclimatised exotic nature of the historic botanic garden. The environs of the linking path could be made more attractive and interesting with better placement of stones, planting immediately adjacent to the River, and a community art work forming part of an interpretative layer associated with Dja Dja Wurrung culture. The artwork could be applied to the supporting structures of the Bridge overhead.

19 Remnant Plant Collection & Picnic Area

This important area was once part of the Botanic Garden. Views should be opened to the gardens from the small picnic area and a maintenance agreement developed with Coliban Water. The current position of this landscape is important with respect to the continuation of a diverse and mature tree canopy that appears to extend the Botanic Garden beyond its current borders. Consistency in furniture and signage will be important in understanding this site as a previous part of the Garden. Remnant important trees such as the *Cryptomeria japonica* (Japanese Cedar or Sugi) should be propagated and grown on the Botanic Garden proper.

20 Deciduous Oak Lawns & Bulb Collections

The balance between deciduous and evergreen canopies is a key landscape feature of the Malmesbury Botanic Garden. The Oak Lawns are kept open with inter-planting of deciduous Oaks amongst the existing frame of surrounding evergreen trees. A collection of *Narcissus* and other bulbs provides seasonal interest.

Open canopies are particularly appreciated in winter. Where light may penetrate to the ground. These lawns form an important open area within the Garden and planting approaches should maintain the existing evergreen tree canopy as a frame to the east with new tree planting focusing on deciduous Oak species, whilst maintaining a sense of clearing.

The Ornamental Lake overflow path through the Oak Lawn is an interesting landscape element connecting the Billabong Chain with the Coliban River. The flow path could be enhanced and support a planting mix of low indigenous rushes, sedges and reeds adapted for ephemeral wetland edges. A mixture of winter and spring flowering bulbs would add further landscape value in this location.

21 Poplar Walk

The Poplar Walk is maintained as a key historic planting that is appreciated from within the Garden. The Poplars are an additional example of historical plantings contributing to the character of the Garden. The impact of the Poplars on the views into and out of the Malmesbury Township cannot be overstated as they form one of the key visual elements of the streetscape. The Walk should be augmented with supplementary tree planting along the Garden boundary to achieve a mixed-aged canopy, ensuring this upright form remains an important part of the Garden and streetscape. The Walk could be extended beyond the existing *Cedrus* and further semi-advanced specimens interplanted in the remaining voids. This path would also validate the connection of the Coliban River Linking Path to the Malmesbury Common and Arboretum as an alternative access route across Mollison Street. The existing 'Daffodil Sign' is relocated to the side of the Poplar Walk to maintain clear sight lines back to the WWI Memorial Gate. Additional plantings of *Narcissus* amongst the trees of the Poplar Walk and Elms adjacent to the Ornamental Lake would add further interest to the landscape in this area and tie into the collections planted in the Deciduous Oak Lawn. The establishment of a new *Iris* collection between the Lake edge and Poplar Walk would increase the diversity of collection type and contribute to horticultural, seasonal and visual interest of the Garden landscape.

22 Picket Fence

The new, unpainted timber picket fence will reintroduce elements of this historic feature back into the Garden and improve the existing interface with Mollison Street. The adjacent Poplar Walk, appreciated on a more urban scale, reinforces the more intimate experience of the garden boundary by enclosing this view. The new picket fence will further define and improve the existing interface with Mollison Street for the pedestrian. The natural timber of the fence will grey over time, and this element will remain visually recessive in the landscape, focusing attention on the adjacent historic Town Hall and beautiful tree plantings of the Malmesbury Botanic Garden, whilst still providing an attractive interface. The height of the picket fence should be the same as the adjacent historic, wrought-iron fence associated with the WWI Memorial Gate.

23 Drinking Fountain

The historic bluestone drinking fountain is fully restored. To protect the newly restored fountain and deter vandalism, the fountain will be relocated to the new Garden Entry Forecourt and recommissioned. The newly restored fountain will be a centrepiece of the Garden Forecourt area, co-located with other public amenity features.

24 WWI Memorial Gateway

An important memorial associated with WWI, the historic gateway is retained and restored within a new landscape setting that seeks to resolve levels and access associated with Town Hall curtilage works. A new garden bed adjacent to the footpath on Mollison Street frames the gateway view from the Town Hall forecourt when viewed parallel to Mollison Street. The garden provides some separation from the adjoining footpath and further protects the historic fence. The wrought-iron fence and gate associated with the memorial is restored.

25 Palmetum & Mollison Memorial Plaque

A new Palmetum will focus on cool climate species such as *Brahea*, *Butia*, *Jubea*, *Parajubea*, *Chamaerops* and *Livistona*. The Mollison Memorial is relocated within this bed. The Palmetum is located immediately adjacent to the Town Hall and extends toward the Ornamental Lake to include the existing *Trachycarpus fortunei*. There is the potential to further extend the Palmetum toward the childrens' playground framing a new view back through the Garden Gateway out to Ellesmere Place.

The trialling of cool climate species such as *Brahea*, *Butia*, *Jubea*, *Parajubea*, *Chamaerops* and *Livistona*, could take place in conjunction with a new collection focusing on prostrate *Juniperus* CV's and *Callitris*. Both *Juniperus* and *Callitris* are under-represented within the Malmesbury conifer collection. The lawn area is regraded as part of the Town Hall curtilage works and replaced with garden bed planting of prostrate Junipers such as *Juniperus* 'Blue Rug'. This understorey introduces a new conifer type into the Garden whilst reinforcing the existing conifer theme. The new planting and garden area provides contrasting foliage colour and texture and Palms would be protected whilst they are establishing.

The Mollison Memorial Plaque and associated bluestone plinth is relocated closer to the front of the new garden bed adjacent to the path. The plow should be reinstated on the plinth and a sculptural approach taken to provide protection to visitors and the plow.

4. Summary of Masterplan Outcomes

This section presents a summary of the main strategic outcomes of the masterplan in relation to site design, heritage and botanical function of the Malmsbury Botanic Garden

Facilities, Amenity and Access

The masterplan enhances the enjoyable use of the Garden, as a fully accessible, public space through the provision of upgraded facilities and amenities for the visitor in a number of ways:

- Provision of a new designed Garden entry from Ellesmere Place.
- Identifying the location and role of new architecture to provide space for Friends - of groups, community meetings, workshops and public programs, exhibition and gathering.
- Improvement to bathroom facilities for the Garden and Town Hall.
- Improved Town Hall surrounds to address drainage, accessibility and grading issues.
- Improved Town Hall forecourt and access through the WWI Memorial Gate.
- Creation of a path hierarchy to improve connections, access and movement including formalising alternative access adjacent to the Coliban River under the Mollison Street bridge and construction of a boardwalk.
- Increasing play opportunities through design and installation of a Conifer Tree house and garden for children.
- Improved facilities through location of a new pavilion, picnic settings and fully accessible BBQ adjacent to the children's play area and providing access between the two.
- Retaining existing picnic settings around the Ornamental Lake and Garden and making provision for additional seating in the new Ellesmere Place entry forecourt inclusive of water fountains and rubbish bins.
- Maintaining the number of pedestrian access points in the northern, eastern and southern boundaries.
- Reducing the number of vehicle-only access points and restricting this to the existing entry from Ellesmere Place, adjacent to the pump house and old tennis courts.
- Retention of visual permeability into and out of the Garden facilitating passive surveillance where possible, particularly around Ellesmere Place and the children's play area.
- Reconsideration of the use of the old tennis courts toward a more attractive and accessible destination, supportive of a wider range of activities.



Figure 12: Masterplan Detail Plan - Ellesmere Place Town Hall and Entry

4. Summary of Masterplan Outcomes

Heritage Values

Addresses heritage considerations by:

- Improving the presentation and interface of the Garden and Town Hall as a gateway experience to this historic precinct through consideration of levels, garden and planting design, pavement materials, connections between the Town Hall and Garden through built form and reinstatement of the Town Hall Façade.
- Improving the presentation of the Garden, through replacement of the existing chain mesh fence on the Mollison Street boundary with a timber picket fence, informed by historical photographs.
- Adaptive re-use strategies for historic structures in the Garden such as the tennis pavilion and fish hatchery, and the inclusion of the requirement for power and water to the renovated tennis pavilion.
- Improving accessibility and use of the old tennis courts including removal of existing fence and installation of a new surface to be used as a flexible event or recreational space.
- Restoration of the bluestone fountain in the lake and enhancement of the surrounds as a habitat zone linking the Coliban River corridor to the Ornamental Lake.
- Restoration and relocation of the historic, bluestone drinking fountain.
- Planning for tree succession of heritage-listed groupings or individuals.
- Protection of main view lines to the Railway Viaduct and maintaining accessibility.



Figure 13: Masterplan Detail Plan over old tennis courts and relocated Pavilion

Botanic Garden Role

Developing the Botanic role of the Garden by:

- Identifying extent of existing species diversity of the existing tree collection.
- Nominating new tree species for trial planting as part of climate change response and to increase species diversity.
- Improving presentation of existing plant collections through relocation and planting design.
- Identifying and trialling new species to increase diversity of other plant types and increase horticultural interest within the Garden collection.

4. Summary of Masterplan Outcomes

- Emphasising the exotic nature of the botanical collection adjacent to an appreciation of the natural environment along the Coliban River and opportunities for connection to the Malmsbury Common.
- Identifying locations for new plant collections whilst respecting the character of the existing planting arrangement, particularly around the concept of the open woodland, plant massing and protection of existing open areas and view lines.
- Identifying organisations associated with collections such as the Garden Plan Conservation Association of Australia Inc (GPCAA) located at the Royal Botanic Garden, Melbourne.
- Developing guidelines on plant botanical signage and interpretation.

Water Sensitive Urban Design

Improving site capability for water sensitive urban design strategies by:

- Connecting the township to the Coliban through clarifying the role of the Ornamental Lake and Billabong Chain as part of a broader agenda for water sensitive urban design.
- Drawing attention to the potential for additional on-site storage of water and water management regimes.

Community and Management

Establish connections to the wider community and other organisations by:

- Identifying possible future relationship opportunities with Dja Dja Wurrung people about opportunities for collaboration on cultural matters including developing interpretation themes and ideas as part of a broader interpretative strategy for the Garden.
- Identifying possible future relationships with Coliban Water and Dja Dja Wurrung people to co-manage the Coliban River interface and extant tree collection on the west bank.
- Identifying location and scope of new facilities to support the Friends of Malmsbury Botanic Garden and Environs and other community groups to develop programs and workshops within the Botanic Garden.
- Providing improved event spaces to support the use of the Garden for events, festivals and markets.



Image 57 : View over the Billabong Chain

5. Use and Access

Balancing Botanic Roles and Recreation

This section aims to identify the extent to which the Malmsbury Botanic Garden meets the objectives of a traditional botanic garden; its scientific, educative and cultural purpose and how the masterplan might assist in meeting its other obligations; that is to provide an attractive place for recreation and relaxation. This section also raises the possible expansion of the definition of 'use' to include landscape processes linking the Malmsbury Township development with the Coliban River. A blended perspective is possible, and this approach has proved to be successful in other Botanic Gardens, such as the Royal Botanic Gardens, Victoria in South Yarra, where the presentation of the designed landscape is balanced with its scientific and recreational purposes.

The Victorian Planning Provisions identify the Malmsbury Garden area as (PCRZ) or Public Conservation and Resource Zone as indicated in Section 1. of this report. Interestingly the stated purpose under a PCRZ designation is primarily:

*'To protect and conserve the natural environment and natural processes for their historic, scientific, landscape, habitat or cultural values and to provide facilities which assists public education and interpretation of the natural environment with minimal degradation of the natural environment or natural processes.'*¹⁰

This compares favourably with the Royal Botanic Gardens Victoria, which is designated as a Public Park and Recreation Zone (PPRZ), coincidentally, the same designation as the Malmsbury Common. The activities that are currently supported and take place within the Garden do align with PCRZ designation and the vision and objectives presented at the beginning of this report support this to a higher degree.

What formally constituted 'recreation' in 1955, when the designation of the main purpose of the site from a 'Botanic Garden' shifted to one which allowed public recreation to take place appears to have shifted again, particularly when considered against the derelict nature of the tennis courts. This is despite the Garden historically allowing activities such as tennis, lawn bowls and croquet activities to occur. The outcry that occurred in later years against 'types' of recreation such as horse and bicycle riding in the Garden may still be considered inappropriate today, although the designation of the Garden has remained unchanged. In a general sense, the 'Botanic Garden' is once again valued as a cultural precinct where an appreciation of history, setting and the opportunity to connect to plants receives wider support over more active recreational pursuits.

The recent community survey supports this shift with nearly fifty-percent of respondents saying they liked to walk in the Garden compared to fifteen percent of respondents who used the Garden for running or cycling. A high number of respondents, between thirty-five and forty percent came to the Garden to look, picnic or use the playground.

The survey also highlighted those qualities that were most appreciated by visitors with many commenting on the qualities of tranquillity, beauty, shade in addition to an appreciation of views, heritage, plants and the grandeur of the large trees.

It is evident that the Malmsbury Garden is at a significant point in its development where its heritage - listed structures and presentation of botanical values are at risk of being lost or diluted within the physical landscape.

¹⁰ https://planning-schemes.delwp.vic.gov.au/schemes/vpps/36_03.pdf

5. Use and Access

The scientific purpose of the Garden is not well developed and is mainly expressed through botanical signage and individual labels. This important aspect will be addressed separately in the report. In addition to the lack of plant information, there is little information on the provenance or origin of existing trees within the collection, and some doubt on the accuracy of tree identification. These basic elements of a scientific approach to managing a plant collection will assist with future decisions on collection policy and acquisition and also facilitate communication with adjacent organisations such as other regional botanic gardens.

Recommendation

Balance the botanical purpose of the garden with existing landscape qualities through maintaining accurate records of existing plants within the garden, including accurate identification information, including highlighting the scientific basis of botanical nomenclature through plant labels, in a way that respects aesthetic values.

Public & Private Use

The picturesque scenery, walks, wooded areas, open glades and proximity to the Ornamental Lake and river provide a very attractive setting for a range of events and functions, from informal bbq's and picnicking clustered around the facilities provided to more formal private events such as weddings, which generally take place in the open lawn areas.

The Garden also supports larger gatherings such as the Malmsbury Fayre, where thousands may fill the entire Garden and additional areas around the Town Hall. The Garden is also a popular location for photography, particularly of the Viaduct and a popular destination for smaller gatherings such as school groups focusing on tree identification, what trees do or activities associated with the river. Guided walks are also offered by The Friends of Malmsbury Botanic Gardens and Environs.

Whilst the Garden can accommodate small or moderate events and gatherings easily and large events on an annual basis, the addition of an attractive space that may also function as an informal recreation area catering to those events that may attract 400-500 people fills the gap in the type of event space that the Garden currently supports. These events could include seated evening performances or plant sales that might take place during the day and could be run in conjunction with developing policies that prioritise the preservation of plants, minimises compaction of surfaces and protects other infrastructure such as underground services.

The redevelopment of the old tennis court at the historic property 'Buda' in Castlemaine is an example of an adaptive reuse of a historic area and purpose more consistent with less active recreational agenda. The adjacent pavilion functions as a garden information room and weddings take place under the shade of the old Oak tree. The gravel surface, whilst compacted still functions as a permeable surface and attractive planting on the margins delineates the space from the surrounding garden whilst also providing an attractive frame.

Recommendation

Develop a flexible event and recreational space for use by community groups in conjunction with policies aimed at protecting plant collections, reducing compaction and other infrastructure.

5. Use and Access



Image 58 : Old tennis court at 'Buda', Castlemaine. The pavilion is now a garden information room.

Circulation and Connections

The Garden is well-served with internal pathways, but some linkages could be improved. The Malmsbury Common and Recreation Area are also significant precincts within the Malmsbury Township, but the width of the former Calder Highway is a barrier for pedestrians. An alternative route could be made from within the Garden that loops under the Mollison Street bridge. This would assist in providing a continuous path network along the eastern side of the Coliban River, connecting major areas of interest, including to Ellis Falls to the north.

Connections to the Garden are facilitated by asphalt and concrete footpaths along Mollison Street (Old Calder Highway) and in Ellesmere Place adjacent to the Town Hall, but access to other areas around the Garden are mainly via informal path networks; highlighting the semi-rural nature of the Garden setting.

Path widths and levels around the Town Hall are problematic, and have been identified as contributing to the issue of standing water in the Town Hall basement. Path grades adjacent to the Memorial Gate are currently less than the recommended grades for public areas.

A more generous path width adjacent to the Town Hall would provide a better setting for the historic building as well as facilitating better access and gathering space for future Town Hall functions. Path widening could be considered in conjunction with works to the rear of the Town Hall, providing clear visual cues as the location of the main entrance to the Garden. The current asphalt surface is not attractive and could be replaced with a local bluestone, building on the qualities of place.

More evident connections to Malmsbury Railway Station and other sites of interest in proximity to the Garden could be made more evident and supported by better signage.

Recommendation

Formalise the path linkage under Mollison Street bridge to Malmsbury Common. Retain the semi-rural character of paths surrounding the Garden beyond the Mollison Street/Ellesmere Place Town Hall Precinct.

5. Use and Access

Improve path widths and levels adjacent to the Town Hall to alleviate problems with standing water and to improve circulation. Facilitate better link with Malmsbury Railway Station through formalising the network and incorporating a signage strategy.

Entries, Exits and Parking

The main pedestrian entry points are through the Memorial Gate on the corner of Mollison Street and also from Ellesmere Place behind the Town Hall. A number of minor entries along the northern, eastern and southern boundaries also exist as openings within the boundary fence. The current number of pedestrian entry points appears sufficient and well-spaced.

The main entry point behind the Town Hall is popular as it is adjacent to the toilet and bathroom facilities, playground and car parking. The presentation of this entry is poor and not befitting a regional botanic garden as rubbish bins, screening plants and poorly located signage impede views and access into the Garden. There is a wonderful opportunity to create a new gateway and entry precinct to the Garden from Ellesmere Place. This would not diminish the value of the entry from Mollison Street but should be considered in addition to the more ceremonial function of the Memorial Gate.

The importance of the Memorial Gate and Town Hall frontage is not acknowledged in its present state. The ceremonial functions of the Memorial Gate and the importance of the Town Hall to the history of Malmsbury should be acknowledged and made more legible and attractive through the creation of a combined area Forecourt that provides some additional separation from the adjoining footpath. Again, the asphalt surface is not attractive and could be finished in local bluestone.

Vehicle entry into the Garden is currently from Ellesmere Place near the pump house and also from the south through the Pinetum. Due to the unformed nature of the southern access point vehicle access should be restricted to Ellesmere Place. Entry to vehicles other than maintenance vehicles or prior arrangement should be discouraged through locked access.

Formal car parking arrangements are currently provided adjacent to the Town Hall in Ellesmere Place including the provision of one disabled parking bay. The current car parking layout and arrangement of disabled parking both impedes important access way to the Town Hall side doors and is inadequate.

Informal parking is available on both sides of Ellesmere Place and further south behind the Pinetum. The majority of respondents to the survey, indicated that they walked (60%) to the Garden and whilst this may suggest that provision of parking is generally sufficient for day-to-day use, the requirement for car parking increases substantially during events such as the Malmsbury Fayre. In this instance creating better access and grading of surfaces to the south of the Garden toward the railway line would assist in this instance. Overflow parking may also be possible in the Recreation Area, but access to the Garden is hampered by having to cross Mollison Street.

Whilst there is no formal bus parking, buses are able to be accommodated in the informal parking areas along Ellesmere Place.

Approximately thirty percent (30%) of respondents indicated that they walked or cycled to the Garden. Existing bicycle parking provisions appear to be adequate and this should be maintained and incorporated into any future formal Garden Gateway.

5. Use and Access

Recommendation

Retain existing number of pedestrian entry and exit points. Reduce the number of controlled vehicle access points to Ellesmere Place only. Create a new Botanic Garden Gateway and Entry Precinct behind the Town Hall accommodating new signage, gathering space and facilities. Reconfigure formal parking arrangements adjacent to the Town Hall and new Garden Entry Forecourt and provide better disabled parking facilities. Maintain bicycle parking adjacent to the new Garden Gateway and facilitate bus parking in informal car park areas in Ellesmere Place.

Boundary Treatments and External Views

The boundary treatments generally support the semi-rural nature of the botanic garden setting. From this perspective the existing timber post and wire treatment along the Ellesmere boundaries in the east and south provides an edge that is in keeping with this nature. The edges are softened by tree planting both within the Garden and along Ellesmere Place, which also provides needed shade in summer. Low shrub plantings within the Garden do little to add interest and in most cases detract from the visual permeability afforded by mature trees and the old fence posts. This fence type appears to be a later addition to the suite of boundary treatments of the gardens, the original treatment possibly being timber picket fence. This is mentioned in the Gilfedder reports and a hand sketch provided. Figure 14 presents a drafted version of Gilfedders sketch provided in 1988. No remnants of the existing fence remain.

The existing wire fence along Mollison Street in front of the Poplar Walk is not in keeping with the prevailing fence treatment along Ellesmere Place and should be removed. Attempts at disguising this fence with hedge planting has not been successful and contributes additional impetus to change the fence treatment along this boundary. Early photos sourced from the Malmesbury Historical Society show one type of fence profile prior to its demolition. A comparison between the profile shown in Figure 14 and early photos of the Mollison Street fence reveal the difference in profiles. A strategic solution may be found in replicating the profile as shown in early photography as closely as possible, but retaining the unpainted timber finish. This will tie in with existing fencing in Ellesmere Place and other proposed timber finishes in the Garden. The new fenceline should be kept clear of shrub planting to maintain views into the Garden.

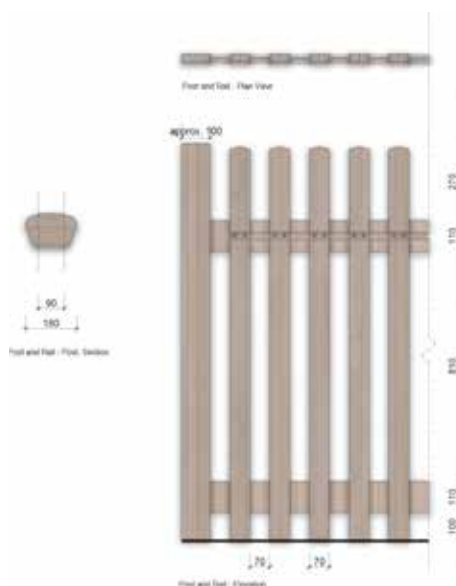


Figure 14: Timber picket fence detail redrawn from hand sketch provided by Francine Gilfedder

5. Use and Access

The Coliban River forms a significant boundary to the Garden and River here is sometimes used for swimming. The indigenous vegetation is an important part of this landscape but is not currently managed in a way that facilitate access to the River, or for conservation purposes. The management of River frontage is a unique opportunity to develop key relationships with stakeholders such as Coliban River and the Dja Dja Wurrung people. Unlike timber fence posts or wire, the Coliban River is a living boundary and presents additional opportunities for future interpretation as well as additional constraints and challenges.

In addition to the exotic plants held within the Garden, the extant collection on the west bank of the Coliban forms an important screen for the Garden and a sense of enclosure. Whilst it is advantageous to screen the views of the Old Calder Highway when viewing out from the Garden at this point, other views south along the Coliban to the surrounding rural landscape and Viaduct are critical and need to be maintained as the Coliban frames important picturesque views highlighting the contrasting difference of the exotic nature of the Garden.

Recommendation

Retain existing unpainted timber post and wire fence along eastern and southern extension of Ellesmere Place. Replace existing wire fence along Mollison Street with unpainted timber picket fence, using old photography to ascertain profile and estimate dimensions as closely as possible. Maintain the vegetation along the Coliban River as an important habitat area that also makes an important contribution to the aesthetic appreciation of the views to the Viaduct and surrounding rural landscape. Develop a committee of management with stakeholders including Coliban Water and the Dja Dja Wurrung people. Maintain extant botanic garden planting along the west bank of the Coliban River as an important screen.



Image 59 : View toward Viaduct from the bank of the Coliban River

6. Vegetation Management

Living Collections

Collection Themes

One of the main purposes of a Botanic Garden is the management of groups of plants for conservation, education or ornamental display, and that they are accurately identified, documented and labelled. The current collections of the Malmsbury Botanic Garden include plants that may be categorised within taxonomic, conservation, ornamental and cultural themes. These categories have previously been defined by the Royal Botanic Gardens, Melbourne (at the time) in their 1999 Master Plan (page 80) and have been adapted here for Malmsbury Botanic Garden:

- Taxonomic/Evolutionary - Gondwanan biogeography, evolutionary adaptations and the use of modern techniques in defining evolutionary relationships. This definition is a useful starting point, but does not make clear that broad representations of families may also be included here such as the family Araucariaceae or Pinaceae, more suited to the Malmsbury collection.
- Ecological - Habitats of the Coliban River including aquatic and riparian habitats.
- Ornamental - A seasonal progression of ornamental displays. These could include flowering bulbs and shrub displays.
- Geographical - Australian and Californian conifers and associated plants. For example *Quercus agrifolia* (Coast Live Oak) and *Arbutus menziesii* (Pacific Madrone) two co occurring species from the central coast region of California have been known to show little water stress during drought conditions (in that climate),¹¹ showing the possibility of using current genera that are doing well in the Malmsbury Garden as cues or prompts for future possible collection opportunities.

It is possible to assign all planting within the Malmsbury garden to one of these categories, however within these themes representation does vary and should not limit thinking on possible new categories or themes for collection and interpretation. For example a possible new category could include:

- Cultural - Themes which explore past and contemporary responses to different cultures, concentrating on Coliban River and Dja Dja Wurrung peoples attitudes to plants and their uses.

In addition, *The Statement of Significance* for the Malmsbury Botanic Garden notes 'The Malmsbury Botanic Gardens have scientific (botanical) significance for their collection of plants characteristic of late nineteenth century Victorian gardens, as well as some outstanding individual specimens.'¹² The location of these significant plantings is shown in Figure 15. Mature conifers, Elms, Willows and Poplars are also specifically mentioned.

As previously noted in the Gilfedder report, plant acquisition in the early nineteen-eighties occurred somewhat opportunistically and species not well-recorded or maintained, with some of the more interesting genera no longer evident within the Garden. This section will focus on opportunities to develop these themes through further analysis of the existing tree species and will highlight some opportunities with respect to potential tree removals and further management required.

Recommendation

Consolidate existing plant collections to address the broad categories of taxonomic, geographical, ornamental and ecological themes and consider a new cultural theme in consultation with Dja Dja Wurrung people.

¹¹ Chacon AI, Baer A, Wheeler JK, Pettermann J (2020) Two coastal Pacific evergreens, *Arbutus menziesii* and *Quercus agrifolia* show little water stress during California's exceptional drought. PLoS ONE 15(4):

¹² Victorian Heritage Database Report, Malmsbury Botanic Gardens and Town Hall, Victorian Heritage Council, 2002.



LANDSCAPE KEY

- T1 T1 *Crataegus coccinoides* (#136) The current tree survey does not identify this species. There is a *C. monogyna* located in the approximate position on the plan.
- T2 T2 *Arbutus andrachnoides* (#478) The current tree survey does not identify this species. There is a *A. unedo* identified located in the approximate position on the plan.
- T3 T3 *Arbutus menziesii* (#291)
- T4 T4 *Arbutus xalapensis* (#279) The current tree survey does not identify this species. There is a *A. menziesii* identified in the approximate position on the plan.
- T5 T5 *Ulmus americana* The current survey does not identify this species. A cross has been placed in the location corresponding to the plan in the Victorian Heritage Database (VHD).
- T6 T6 *Eucalyptus muelleriana*. Commemorative planting, Victoria's sesquicentenary.
- A *Araucaria bidwillii*, listed on the register of significant trees of Victoria (T11795)
- S *Sequoiadendron giganteum*
- C *Cedrus atlantica* f. *glauca*
- P *Picea smithiana*
- Q *Sequoia sempervirens*



National Trust signage for registered trees *Araucaria bidwillii* near the tennis pavilion

Reference
 Victorian Heritage Database Report (accessed 17/6/2019), *Malmsbury Botanic Gardens and Town Hall*, Heritage Council of Victoria.
 Malmsbury Botanic Garden Tree Species List, August 2019, Stephen Fitzgerald Arboriculture
 Malmsbury Botanic Garden CAD Tree Locations, August 2019, Stephen Fitzgerald Arboriculture
 Feature Survey Rev B, March 2020, Macedon Ranges Shire Council.

DRAFT

6. Vegetation Management

Understanding Existing Tree Species

Through this analysis process, a mapping of existing tree species was the starting point for understanding the location of existing tree species, identifying possible future tree planting opportunities and also possible future location of collections. For example Figure 16 locates those trees that are of indigenous, Australian or exotic origin. Trees of exotic origin are evenly dispersed throughout the Garden. Indigenous tree species are predominantly located along the Coliban River and Australian tree species are clustered, but have dispersed representation with no single consolidated location evident. This supports the observation that a predominantly exotic tree canopy is of huge significance to the landscape character of the Garden, supported by interspersed plantings of Australian tree species with the landscape character of the Coliban River corridor informed by both the indigenous and the exotic.

Further investigation of tree species was undertaken to determine if there were particular genera contributing to the Garden landscape. This study focused on genera that had more than one species represented, with an exception made for *Araucaria*, *Sequoia* and *Sequoiadendron*. Figure 17 presents the main findings here. It is possible to see that *Pinus radiata* (Monterey Cypress) is by far the most highly represented evergreen species and *Ulmus procera* (English Elm) the most represented deciduous species. This mapping of diversity also highlights the clustered nature of some species, for example *Salix* and *Taxodium* near the Billabong Chain and Ornamental Lake, and *Pinus* and other conifers predominantly to the south and west of the Garden. This indicates that there is a solid basis of particular genera to inform a future focus for collections. These may include:

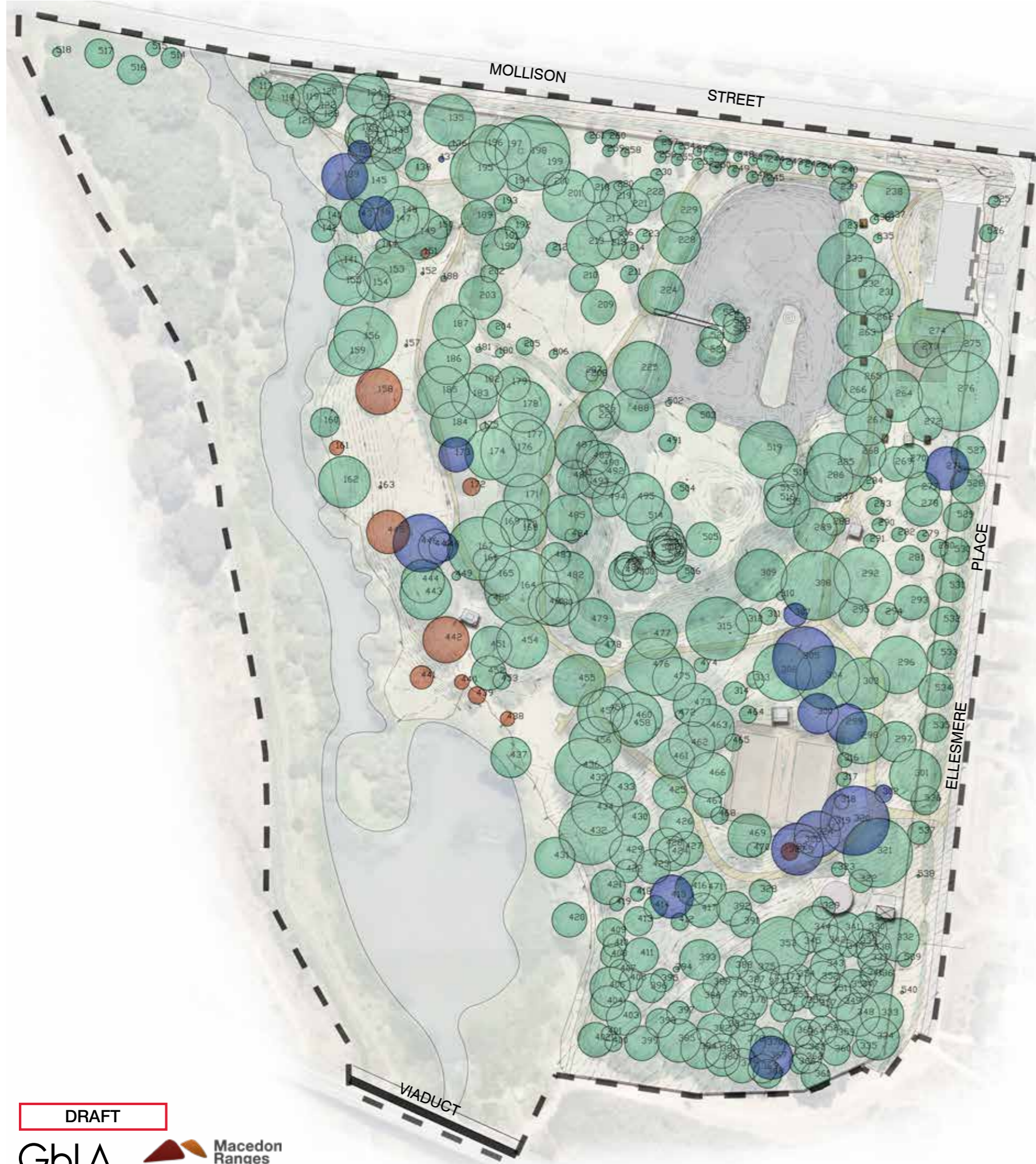
- *Pinus*
- *Arbutus*
- *Fraxinus*
- *Populus*
- *Hesperocyparis*
- *Salix*

The above does not suggest in any way that only these species should be focus. For example, important Australian conifers including additional species of *Araucaria* along with *Callitris* could be included. Additional exotic conifer species in the genus *Taxodium* could be acquired and a significant ornamental genus *Juniperus*, of which there are many prostrate cultivars is not evident at all.

Recent acquisitions not represented on the plans include the following:

- Acer
- Aesculus
- Aextoxicon
- Araucaria
- Brachychiton
- Calocedrus
- Castanea
- Catalpa
- Cedrus
- Cornus
- Corylus
- Dovyalis
- Eriobotrya
- Ginkgo
- Gleditsea
- Idesia
- Juglans
- Laburnum
- Larix
- Liquidamber
- Liriodendron
- Metasequoia
- Magnolia
- Brachychiton
- Nyssa
- Paulownia
- Parotia
- Platanus
- Podocarpus
- Pseudocydonia
- Quercus
- Sorbus
- Syringa
- Tilia
- Toona

Tree Species Origin Figure 16:



LANDSCAPE KEY

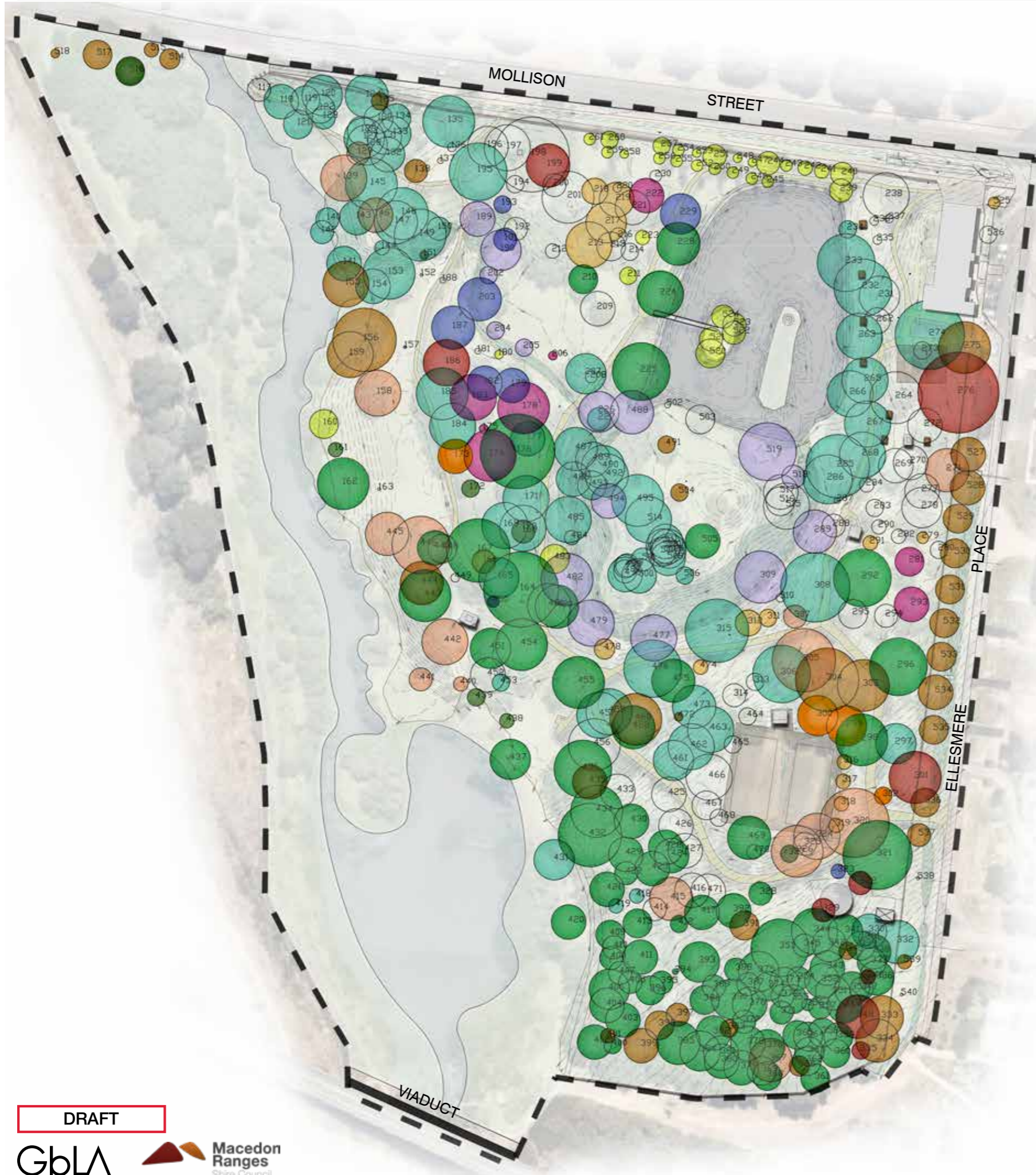
- Indigenous Tree Species
- Australian Tree Species
- Exotic Tree Species

The majority of trees within the Garden are of exotic origin with a scattering of Indigenous tree species closer to the Coliban River and some representation of other Australian species around the old Tennis Court area.

Reference
 MBG Tree Species List, August 2019, Stephen Fitzgerald Arboriculture Pty Ltd.
 MBG CAD Tree Locations, August 2019, Stephen Fitzgerald Arboriculture Pty Ltd.
 Feature Survey Rev B, March 2020, Macedon Ranges Shire Council.

DRAFT





LANDSCAPE KEY

- Acacia*
- Arbutus*
- Araucaria*
- Hesperocyparis*
- Eucalyptus*
- Fraxinus*
- Quercus*
- Pinus*
- Populus*
- Sequoia and Sequoiadendron*
- Salix*
- Ulmus*

Plan showing tree species diversity and their representation across the Garden. Conifers in the genus *Pinus radiata* form the majority of evergreen canopy and *Ulmus procera* the majority of deciduous canopy. TRAQ category refers to tree risk assessment outcome.

TREE SPECIES DIVERSITY AND REPRESENTATION

No. of	Botanical	Common Name	Planning	Tree Age	Tree Health	Tree Structure	TRAQ Category	Priority
2	<i>Acacia mearnsii</i>	Black Wattle	Indigenous	Mature	Poor	Poor	Low	Low
5	<i>Acacia melanoxylon</i>	Blackwood	Indigenous	Mature	Fair	Fair	Low	Low
6	<i>Arbutus menziesii</i>	Pacific Madrone	Exotic	Mature	Good	Good	Low	None
10	<i>Arbutus unedo</i>	Irish Strawberry Tree	Exotic	Mature	Good	Fair	Low	None
5	<i>Eucalyptus botryoides</i>	Southern Mahogany	Native	Mature	Fair	Fair	Low	Moderate
1	<i>Eucalyptus camaldulensis</i>	River Red Gum	Indigenous	Semi mature	Good	Fair	Low	None
2	<i>Eucalyptus cladocalyx</i>	Sugar Gum	Native	Over mature	Fair	Poor	Moderate	High
4	<i>Eucalyptus globulus</i>	Blue Gum	Native	Mature	Good	Fair	Low	Moderate
1	<i>Eucalyptus melliodora</i>	Yellow Box	Indigenous	Mature	Good	Fair	Low	Moderate
1	<i>Eucalyptus muelleriana</i>	Yellow Stringybark	Indigenous	Mature	Good	Fair	Low	None
1	<i>Eucalyptus ovata</i>	Swamp Gum	Indigenous	Mature	Dead	Poor	Low	Moderate
1	<i>Eucalyptus sideroxylon</i>	Red Ironbark	Native	Mature	Fair	Poor	Low	Moderate
1	<i>Eucalyptus viminalis</i>	Manna Gum	Indigenous	Mature	Good	Fair	Low	None
2	<i>Fraxinus americana</i>	White Ash	Exotic	Semi mature	Good	Very poor	Low	High
2	<i>Fraxinus angustifolia</i>	Narrow Leaf Ash	Exotic	Mature	Good	Fair	Low	Moderate
4	<i>Fraxinus ornus</i>	Manna Ash	Exotic	Mature	Fair	Fair	Low	None
2	<i>Fraxinus pennsylvanica</i>	Green Ash	Exotic	Semi mature	Good	Good	Low	None
2	<i>Hesperocyparis lusitanica</i>	Mexican Cypress	Exotic	Mature	Good	Fair	Low	None
8	<i>Hesperocyparis macrocarpa</i>	Monterey Cypress	Exotic	Mature	Fair	Fair	Low	High
2	<i>Pinus brutia</i>	Calabrian Pine	Exotic	Semi mature	Good	Low	Low	Low
104	<i>Pinus radiata</i>	Monterey Pine	Exotic	Mature	Fair	Fair	Low	None
27	<i>Populus nigra 'Italica'</i>	Lombardy Poplar	Exotic	Mature	Good	Fair	Low	None
6	<i>Populus Xcanadensis</i>	Canadian Poplar	Exotic	Over mature	Poor	Poor	Moderate	High
1	<i>Quercus bicolor</i>	Swamp White Oak	Exotic	Semi mature	Good	Good	Low	None
8	<i>Quercus canariensis</i>	Algerian Oak	Exotic	Mature	Good	Good	Low	None
1	<i>Quercus castaneifolia</i>	Chestnut-leaved Oak	Exotic	Semi mature	Good	Good	Low	None
1	<i>Quercus cerris</i>	Turkey Oak	Exotic	Semi mature	Good	Good	Low	None
1	<i>Quercus ilex</i>	Holm Oak	Exotic	Mature	Good	Fair	Low	None
1	<i>Quercus laurifolia</i>	Laurel Oak	Exotic	Semi mature	Good	Fair	Low	None
12	<i>Quercus palustris</i>	Pin Oak	Exotic	Mature	Good	Good	Low	None
16	<i>Quercus robur</i>	English Oak	Exotic	Mature	Good	Fair	Low	None
8	<i>Salix babylonica</i>	Weeping Willow	Exotic	Mature	Fair	Fair	Low	None
1	<i>Salix discolor</i>	Pussy Willow	Exotic	Mature	Fair	Poor	Low	Moderate
6	<i>Salix fragilis</i>	Crack Willow	Exotic	Mature	Fair	Fair	Low	None
5	<i>Sequoiadendron giganteum</i>	Giant Redwood	Exotic	Mature	Poor	Fair	Low	High
3	<i>Sequoia sempervirens</i>	Coast Redwood	Exotic	Mature	Good	Good	Low	None
3	<i>Ulmus minor</i>	Smooth-leaved Elm	Exotic	Semi mature	Good	Good	Low	None
1	<i>Ulmus parvifolia</i>	Chinese Elm	Exotic	Semi mature	Good	Good	Low	None
89	<i>Ulmus procera</i>	English Elm	Exotic	Mature	Good	Fair	Low	Moderate

Reference
 MBG Tree Species List, August 2019, Stephen Fitzgerald Arboriculture Pty Ltd.
 MBG CAD Tree Locations, August 2019, Stephen Fitzgerald Arboriculture Pty Ltd.
 Feature Survey Rev B, March 2020, Macedon Ranges Shire Council.

DRAFT



6. Vegetation Management

Recommendation

Maintain good records of tree species trialled in the Garden including ongoing assessment of their establishment and performance within the Garden. Continue to trial new species that supplement existing genera contributing to the diversity of evergreen, coniferous and deciduous tree canopy. Retain Salix sp. in important key locations around the Ornamental Lake and Billabong Chain and prioritise trialling of additional species such as Taxodium sp. in these locations. Introduce new genera such as Callitris and Juniperus species and cultivars to expand locations for demonstration of the diversity of conifers.

Palms

The range presented above is eclectic and interesting and contributes positively to the idea of a botanic garden being a place for experimenting with horticulture of a wider range of species. Tracking these plantings will contribute to the success of any future tree replacement strategy and inform possible future directions.

There has been some experimentation with cool-climate palms in addition to the existing *Trachycarpus fortunei*. These are currently doing well and present opportunities to emphasise a collection of these in the future. Palms currently being grown in the Garden include:

- *Trachycarpus fortunei*
- *Livistona australis*
- *Livistona chinensis*
- *Phoenix canariensis*
- *Phoenix reclinata*
- *Sabal minor*

Recommendation

Establish a collection of cool climate palms that demonstrate this unique plant form co-located with existing Trachycarpus fortunei.

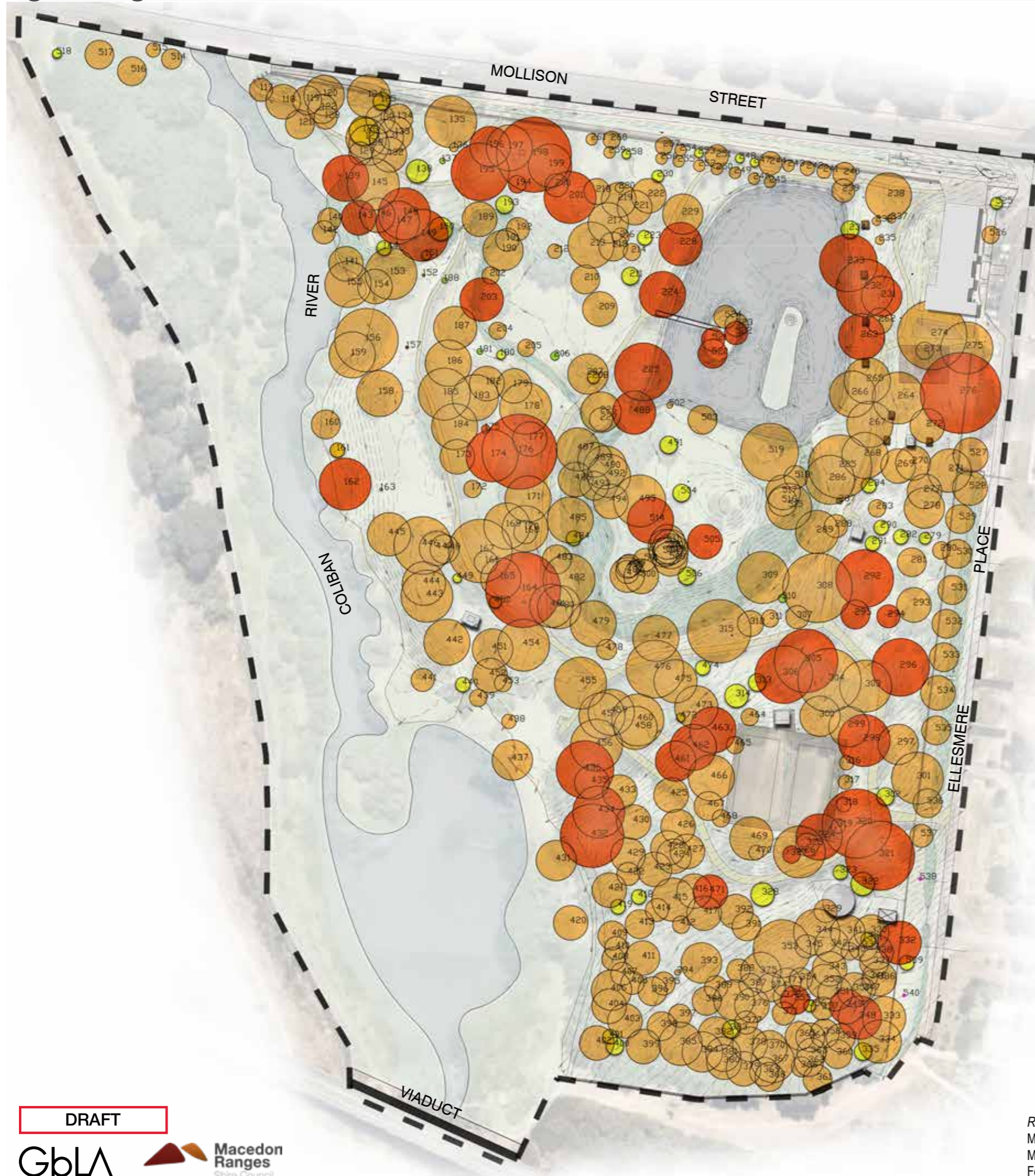
Tree Age

In addition to understanding the extent and location of species currently growing in the Malmsbury Botanic Garden a plan (Figure 18) showing age categories was developed in conjunction with a risk assessment (Figure 19) to understand possible future planting opportunities. The tree population is almost entirely mature (75%) to overmature (11%). Around half the current tree population may be gone within the next twenty years. Current arborist estimates 5% of trees dead, 9% past their useful life expectancy (ULE) within ten years and 40% within twenty years. The spread of 'overmature' canopy across the Garden is relatively even and the impact of tree removals may be lessened if removals are considered holistically across the site, without undue emphasis on a particular area. This assists planning to take place so that suitable species may be identified and procured to replace any trees being removed. In conjunction with this strategy a tree succession plan should be developed in more detail, where the location of new plantings needs to be considered in conjunction with creating a mix-age canopy of trees and a mix of evergreen and deciduous canopy species to maintain the essential character of the Garden.

Recommendation

Develop a detailed tree succession plan as part of a holistic approach to tree canopy management that considers a staged planting strategy toward developing a mixed-age canopy as an ongoing program. This could be done in partnership with Heritage Victoria.

Figure 18:



LANDSCAPE KEY

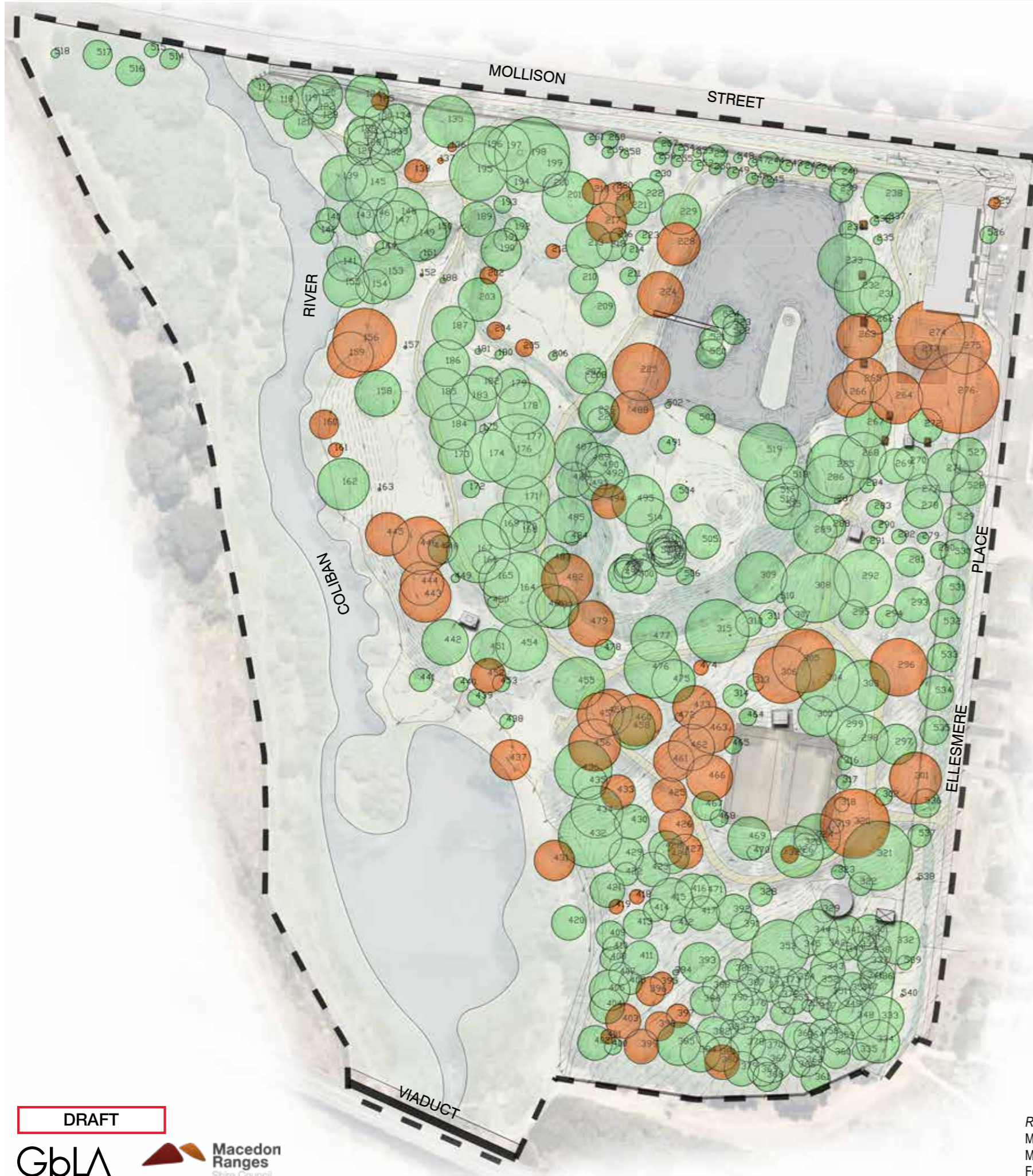
- Young
- Juvenile
- Semi-Mature
- Mature
- Over Mature

The spread of 'overmature' canopy across the Garden is fairly even and indicates possible future planting opportunities. The impact of tree removals may be lessened if considered wholistically, without undue emphasis on a particular area. This would necessitate planned, staged removals in the future.

Over Mature Planting

ID Number	Botanical	Common Name	Tree Age	DBH	Tree Health
224	Pinus radiata	Monterey Pine	Over mature	86	Poor
225	Pinus radiata	Monterey Pine	Over mature	82	Poor
520	Populus Xcanadensis	Canadian Poplar	Over mature	48	Poor
147	Ulmus procera	English Elm	Over mature	75	Poor
522	Populus Xcanadensis	Canadian Poplar	Over mature	48	Poor
296	Pinus radiata	Monterey Pine	Over mature	95	Very poor
327	Acacia mearnsii	Black Wattle	Over mature	18	Very poor
228	Pinus radiata	Monterey Pine	Over mature	88	Very poor
306	Ulmus procera	English Elm	Over mature	78	Very poor
521	Populus Xcanadensis	Canadian Poplar	Over mature	46	Very poor

DRAFT



LANDSCAPE KEY

- Low Risk
- Moderate Risk

Assessment of Trees utilising the TRAQ (Tree Risk Assessment Qualification) category, reinforces possible tree removals and opportunities for planting.

TRAQ Risk, High & Moderate Priority Trees

ID Number	Botanical	Common Name	Tree Health	Tree Structure	TRAQ Category	Works Required	Priority
127	Ulmus procera	English Elm	Fair	Very poor	Moderate	Removal	High
228	Pinus radiata	Monterey Pine	Very poor	Very poor	Moderate	Removal	High
263	Ulmus procera	English Elm	Fair	Poor	Moderate	Exclude/Move target, Mulch required, Deadwood removal, Risk reduction pruning, 30% volume, max cut 100mm DIA	High
264	Cedrus deodara	Deodar Cedar	Poor	Fair	Moderate	Exclude/Move target, Mulch required, Deadwood removal	High
265	Ulmus procera	English Elm	Fair	Poor	Moderate	Exclude/Move target, Risk reduction pruning, 30% volume, max cut 100mm DIA, Deadwood removal	High
266	Ulmus procera	English Elm	Fair	Fair	Moderate	Risk reduction pruning, 20% volume, max cut 70mm DIA, Deadwood removal	High
274	Ulmus procera	English Elm	Fair	Poor	Moderate	Annual inspection, Mulch required, Risk reduction pruning, 30% volume, max cut 100mm DIA, Deadwood removal	High
275	Quercus robur	English Oak	Poor	Good	Moderate	Deadwood removal, Canopy lift	High
276	Hesperocyparis macrocarpa	Monterey Cypress	Fair	Fair	Moderate	Broken branch, Mulch required, Deadwood removal, Canopy lift	High
305	Eucalyptus cladocalyx	Sugar Gum	Fair	Very poor	Moderate	Removal	High
320	Eucalyptus cladocalyx	Sugar Gum	Fair	Poor	Moderate	Removal	High
380	Pinus radiata	Monterey Pine	Fair	Very poor	Moderate	Removal	High
520	Populus Xcanadensis	Canadian Poplar	Poor	Poor	Moderate	Removal	High
521	Populus Xcanadensis	Canadian Poplar	Very poor	Very poor	Moderate	Removal	High
522	Populus Xcanadensis	Canadian Poplar	Poor	Very poor	Moderate	Removal	High
224	Pinus radiata	Monterey Pine	Poor	Poor	Moderate	Removal	Moderate
225	Pinus radiata	Monterey Pine	Poor	Poor	Moderate	Removal	Moderate

DRAFT

6. Vegetation Management

Tree Removal

Specific trees for removal have also been identified (Figure 20), and at the time of writing this report, some removals have already taken place. This is likely to be a sensitive issue in such a well-loved landscape and appropriate consultation and communication should be undertaken to ensure that the reasons for removal are understood. New species to be planted as part of a tree replacement strategy should be identified, where possible, prior to removal of any trees. It may not be appropriate to replace like-with-like, particularly in relation to *Pinus radiata* or *Ulmus procera*, and alternative species, with possibly similar characteristics could be explored. Tree removals should take place in a staged manner and over a period of time.

Recommendation

Develop a more detailed tree removal plan as part of a tree succession strategy plan. Ensure tree removals are staged and tree planting takes place as soon as possible after tree removal to lessen the impact on the Garden landscape.

Climate Impacts on Trees

The potential impact of climate change on tree growth and selection continues to be an important current research topic. Research in the area of assessing the possible impacts on tree canopies in botanic gardens has been carried out as recently as 2017 by Dr David Kendal and Alison Farrar¹³. This study identified trees across a range of the most common species held within the Royal Botanic Gardens, Victoria that were most vulnerable to increases in temperature. The species of interest to Malmsbury Botanic Garden include *Ulmus procera* (highly vulnerable) and *Ginkgo biloba* (moderately vulnerable). This concern could also extend to include *Ulmus x hollandica* (highly vulnerable), a significant avenue species within the Malmsbury Garden. It has been suggested that the Malmsbury Botanic Garden environment may offer some moderation of temperature extremes due to the presence of water in the Ornamental Lake and Coliban, lack of hard surfaces and protected canopy microclimate. A slightly wider range of tree species may be able to be grown.

Species most at risk from rising temperatures have been identified as:

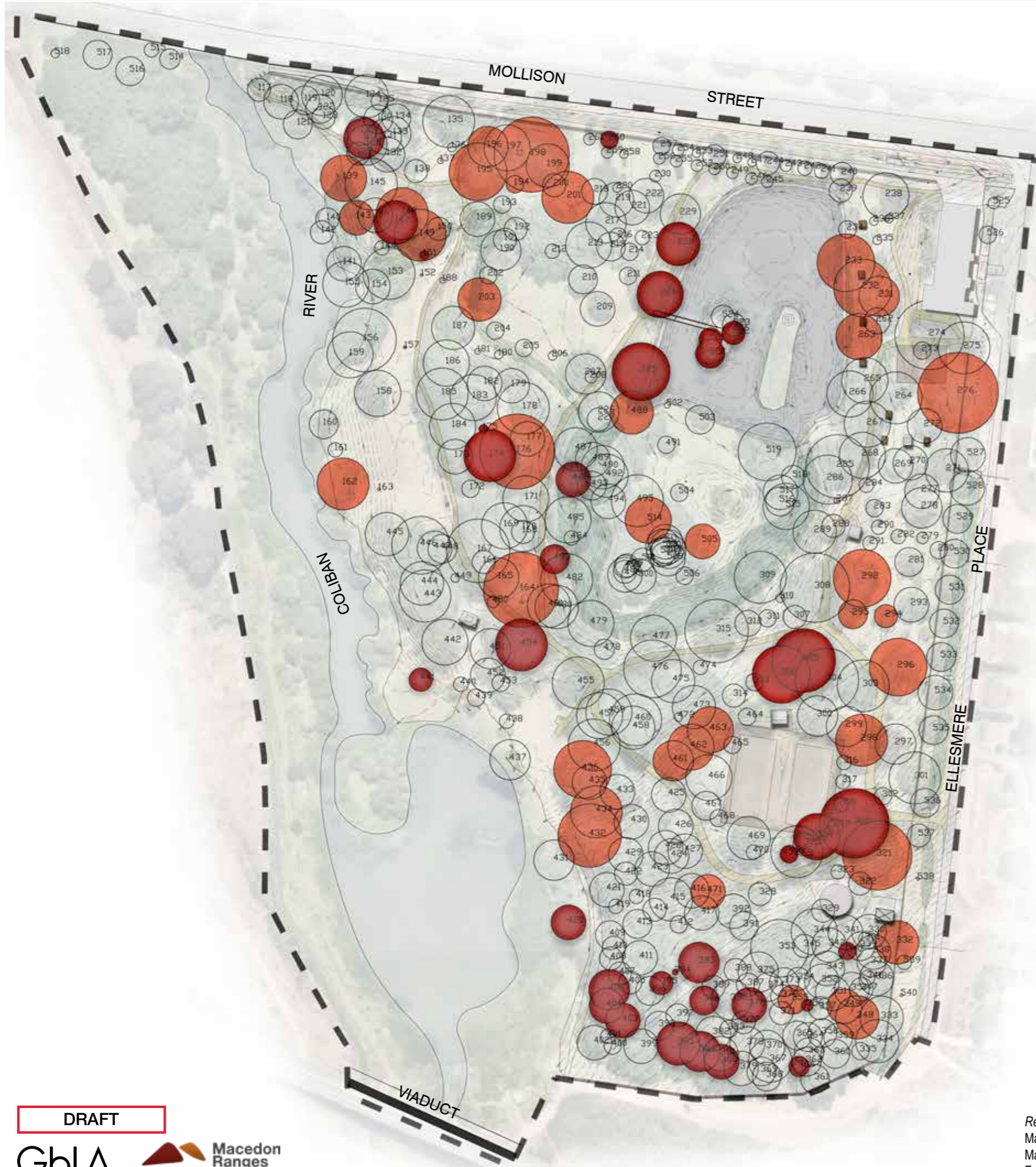
- *Ulmus* sp. (European species)
- *Quercus robur*
- *Arbutus unedo* (and other species from temperate climates)
- *Sequoiadendron giganteum*

It should be noted that it is yet unknown how climate change may shift the timing of cold events and unseasonal cold snaps may expose seasonally unhardened plants to damaging temperatures, or the exact timing of these impacts on tree health.

Recommendation

Monitor existing identified vulnerable tree species and maintain tree health using horticultural best-practice techniques.

¹³ David Kendal and Alison Farrar, Assessment of the climate change risk to the living plant collections in the Melbourne Botanic Gardens, Royal Botanic Gardens, Victoria, University of Melbourne & Royal Botanic Gardens, Victoria, 2017.



LANDSCAPE KEY

- Identified to be removed
- Over Mature

A consideration of trees identified to be removed in conjunction with those identified as 'overmature' allows for a staged and managed approach to succession planning for the Garden canopy.

Trees identified to be removed

ID Number	Botanical	Common Name	Tree Health	Tree Structure	Works Required	Priority
127	Ulmus procera	English Elm	Fair	Very poor	Removal	High
147	Ulmus procera	English Elm	Poor	Very poor	Removal	High
168	Acacia melanoxylon	Blackwood	Very poor	Very poor	Removal	High
174	Sequoiadendron giganteum	Giant Redwood	Dead	Poor	Removal	High
175	Sequoiadendron giganteum	Giant Redwood	Dead	Poor	Removal	High
228	Pinus radiata	Monterey Pine	Very poor	Very poor	Removal	High
260	Populus nigra 'Italica'	Lombardy Poplar	Poor	Poor	Removal	High
305	Eucalyptus cladocalyx	Sugar Gum	Fair	Very poor	Removal	High
306	Ulmus procera	English Elm	Very poor	Very poor	Removal	High
320	Eucalyptus cladocalyx	Sugar Gum	Fair	Poor	Removal	High
380	Pinus radiata	Monterey Pine	Fair	Very poor	Removal	High
393	Pinus radiata	Monterey Pine	Fair	Poor	Removal	High
406	Pinus radiata	Monterey Pine	Fair	Very poor	Removal	High
471	Quercus robur	English Oak	Fair	Very poor	Removal	High
486	Ulmus procera	English Elm	Dead	Poor	Removal	High
520	Populus Xcanadensis	Canadian Poplar	Poor	Poor	Removal	High
521	Populus Xcanadensis	Canadian Poplar	Very poor	Very poor	Removal	High
522	Populus Xcanadensis	Canadian Poplar	Poor	Very poor	Removal	High
224	Pinus radiata	Monterey Pine	Poor	Poor	Removal	Moderate
225	Pinus radiata	Monterey Pine	Poor	Poor	Removal	Moderate
324	Eucalyptus botryoides	Southern Mahogany	Fair	Poor	Removal	Moderate
327	Acacia mearnsii	Black Wattle	Very poor	Poor	Removal	Moderate
376	Pinus radiata	Monterey Pine	Fair	Very poor	Removal	Moderate
384	Pinus radiata	Monterey Pine	Fair	Poor	Removal	Moderate
385	Pinus radiata	Monterey Pine	Fair	Poor	Removal	Moderate
395	Pinus radiata	Monterey Pine	Very poor	Poor	Removal	Moderate
403	Pinus radiata	Monterey Pine	Fair	Poor	Removal	Moderate
404	Pinus radiata	Monterey Pine	Fair	Very poor	Removal	Moderate
420	Pinus radiata	Monterey Pine	Fair	Poor	Removal	Moderate
441	Eucalyptus ovata	Swamp Gum	Dead	Poor	Removal	Moderate
454	Pinus radiata	Monterey Pine	Very poor	Fair	Removal	Moderate
151	Acacia melanoxylon	Blackwood	Dead	Poor	Removal	Low
340	Quercus robur	English Oak	Very poor	Very poor	Removal	Low
356	Pinus radiata	Monterey Pine	Poor	Poor	Removal	Low
366	Quercus robur	English Oak	Poor	Poor	Removal	Low
386	Pinus radiata	Monterey Pine	Fair	Poor	Removal	Low
394	Pinus radiata	Monterey Pine	Dead	Poor	Removal	Low
483	Populus nigra 'Italica'	Lombardy Poplar	Fair	Poor	Removal	Low

Reference
 Malmesbury Botanic Garden Tree Species List, August 2019, Stephen Fitzgerald Arboriculture
 Malmesbury Botanic Garden CAD Tree Locations, August 2019, Stephen Fitzgerald Arboriculture
 Feature Survey Rev B, March 2020, Macedon Ranges Shire Council.

Project No: 19018

Malmesbury Botanic Garden
 LANDSCAPE MASTERPLAN
 GbLA.COM.AU



MP 58

1 : 750 @ A1 | 0 | 7.5m | 22.5m | June 2020
 1 : 1500 @ A3

DRAFT

6. Vegetation Management

Possible Future Tree Species

In developing a possible future tree species list for Malmsbury Botanic Garden, species were taken from a variety of local government areas including Canberra, with Ballarat being the closest area in the study to Malmsbury.

Possible tree species that may do well in Malmsbury under future climate scenario where higher temperatures are experienced include:

- *Acer buergerianum* Trident Maple
- *Afrocarpus falcatus* YellowWood
- *Agathis robusta* Queensland Kauri
- *Araucaria cunninghamii* Moreton Bay Pine
- *Brachychiton acerifolius* Flame Bottletree
- *Brachychiton* spp. & hybrids Brachychiton
- *Callitris* spp. Cypress-pine species
- *Calocedrus decurrens* Incense Cedar
- *Carpinus caroliniana* American Hornbeam
- *Catalpa bignonioides* Southern Catalpa
- *Cedrus deodara* Deodar Cedar
- *Celtis sinensis* Chinese Hackberry
- *Chamaerops humilis* European Fan Palm
- *Citharexylum spinosum* Spiny Fiddlewood
- *Cupressus lusitanica* Mexican White Cedar
- *Cupressus sempervirens* Italian Cypress
- *Cupressus torulosa* Himalayan Cypress
- *Fraxinus velutina* Velvet Ash
- *Hesperocyparis goveniana* Gowen Cypress
- *Jubaea chilensis* Chile Cocopalm
- *Juglans nigra* Black Walnut
- *Lagerstroemia indica* Crepe Myrtle
- *Livistona chinensis* Fountain Palm
- *Livistona mariae* Red Cabbage Palm
- *Maclura pomifera* Osage-orange
- *Magnolia grandiflora* Southern Magnolia
- *Metasequoia glyptostroboides* Dawn Redwood
- *Parrotia persica* Persian Ironwood
- *Phoenix canariensis* Canary Island Date Palm
- *Pinus attenuata* Knobcone Pine
- *Pinus brutia* Calabrian Pine
- *Pinus canariensis* Canary Island Pine
- *Pinus contorta* Lodgepole Pine
- *Pinus coulteri* Coulter Pine
- *Pinus gerardiana* Chilghoza Pine
- *Pinus halepensis* Aleppo Pine
- *Pinus jeffreyi* Jeffrey Pine
- *Pinus palustris* Longleaf Pine
- *Pinus patula* Mexican weeping Pine
- *Pinus ponderosa* Ponderosa Pine

6. Vegetation Management

• <i>Pinus quadrifolia</i>	Parry pinyon
• <i>Pinus radiata</i> var. <i>binata</i>	Guadalupe Island Pine
• <i>Pinus roxburghii</i>	Longleaf Indian Pine
• <i>Pinus sabiniana</i>	California foothill Pine
• <i>Pinus taeda</i>	Loblolly Pine
• <i>Pinus torreyana</i>	Torrey Pine
• <i>Pinus wallichiana</i>	Bhutan Pine
• <i>Platanus orientalis</i>	Oriental Plane Tree
• <i>Podocarpus elatus</i>	Plum Pine
• <i>Podocarpus lawrencei</i>	mountain plum-pine
• <i>Pyrus calleryana</i>	Callery Pear
• <i>Quercus bicolor</i>	Swamp White Oak
• <i>Quercus douglasii</i>	Blue Oak
• <i>Quercus ilex</i>	Holly Oak
• <i>Quercus lobata</i>	Valley Oak
• <i>Quercus lusitanica</i>	Lusitanian Oak
• <i>Quercus macrocarpa</i>	Bur Oak
• <i>Quercus phellos</i>	Willow Oak
• <i>Styphnolobium japonicum</i>	Japanese Pagoda Tree
• <i>Taxodium huegelii</i>	Montezuma Bald Cypress
• <i>Tilia tomentosa</i>	Silver Linden
• <i>Tipuana tipu</i>	Tipa
• <i>Ulmus parvifolia</i>	Chinese Elm
• <i>Washingtonia filifera</i>	California Fan Palm
• <i>Washingtonia robusta</i>	Washington Fan Palm

In addition to managing tree canopy replacement over the longer term. A number of trees have been identified for more immediate management. These have been highlighted in Figure 21. Mulching as a tree management strategy has a number of benefits. It assists in reducing compaction, weed competition and assists with maintaining soil moisture levels by reducing soil moisture evaporation by as much as 20%.¹⁴

Factors contributing to tree selection criteria could include:

- Drought tolerance
- Heat tolerance
- Wind tolerance
- Longevity
- Pollution tolerance
- Pathogen and pest susceptibility
- Potential allergen
- Shade cast
- Maintenance required, and
- Tree litter
- Tolerance to waterlogging
- Tolerance to soil compaction

¹⁴ Stelli S, Hoy L, Hendrick R and Taylor M, Effects of different mulch types on soil moisture content in potted shrubs, *Water SA*, Vol 44 No.3 July 2018.

Trees To Be Mulched

Figure 21:



DRAFT

6. Vegetation Management

The above criteria have been informed by the *Urban Forest Diversity Guidelines - Tree Species Selection Guidelines for the City of Melbourne*, but are still relevant as a general checklist for regional situations.

Recommendation

Develop a program of tree trialling to expand the diversity of species anticipated to do well in the Malmsbury Botanic Garden. Develop a system of monitoring tree growth to determine performance success or failure using the general criteria as a starting point. Information collected as part of this ongoing study could be used to inform future open space and street tree planting within the Shire.

Commemorative Trees

There is only one commemorative tree within the Malmsbury Botanic Garden - *Eucalyptus muelleriana* (Yellow Stringbark) planted in 1985 by the Hon Joan Kirner, Minister for Conservation Forests and Lands and later Premier of Victoria and listed on the Victorian Heritage Register.

The tree is currently mulched, with some additional planting of Australian species within this zone. Planting of this nature within the tree protection zone (TPZ) of this tree is not recommended, unless undertaken by horticultural staff due to the risk of disturbance of the root zone and potential introduction of pathogens. Current horticultural information¹⁵ about this species indicates it may be susceptible to Powdery Mildew in winter, Myrtle Rust and *Phytophthora cinnamomi*, a soil-borne fungal disease. Any future landscape works to the Coliban River Precinct that may involve planting or adjustment to soil levels would need to consider the impact on this significant tree.



Image 60 : *Eucalyptus muelleriana*
Stephen Fitzgerald, 2019.



Image 61: Planting *E. muelleriana*, Joan Kirner
Kevin Walsh 1985 courtesy Malmsbury Historical Society
(original photo edited 2020)

Recommendation

*Replace ad hoc planting at base of *Eucalyptus muelleriana* with more considered plant palette to reinforce Coliban River corridor planting. Consider how future management of the Coliban River landscape may impact tree health.*

¹⁵ <https://www.treeproject.org.au/seedling-database/eucalyptus-muelleriana>

6. Vegetation Management

Extant Tree Collection - West Bank

As previously mentioned there are a number of trees on the west bank of the Coliban River. It is presumed that this area was planted prior to annexation of the areas. These trees could conceivably be at least 163 years old, making these specimens some of the oldest of their type in Victoria. Of particular interest are the *Quercus* sp. and *Cryptomeria japonica*. The management of these trees and this landscape is important for its contribution to a sense of enclosure for the Botanic Garden, to screen views of Mollison Street and for their preservation.

Propagation of the *Cryptomeria japonica* and other species of similar age in this precinct, in conjunction with a replanting program in the Garden proper, will ensure conservation of these significant trees in the future.

Recommendation

Develop a management plan with key stakeholders to preserve and maintain the landscape and extant tree collection on the west bank of the Coliban River. Propagate and replant important species from this area into the Botanic Gardens proper.

Shrubs

The previous discussion has emphasised tree collections within the Malmsbury Botanic Garden. Existing shrubs and other plant types also contribute to the Garden landscape, but are not currently supported or developed adequately, despite some attempts to establish them in the mid nineteen-eighties.



Image 62: H91.330/3562 Botanical Gardens, Malmsbury (Dec. 1953)
Victorian Railways, photographer, State Library of Victoria

6. Vegetation Management

There is a predominance of *Viburnum tinus* within the Garden, the majority of which appear to be self-sown with larger specimens possibly dating from donations made by the Royal Botanic Garden, Melbourne, as part of a sesquicentenary planting. The majority of *V. tinus* could be removed to open new views through the existing trees. *Spirea* sp. may also date from this period along with various *Syringa* cultivars, although these appear to have been replaced with more contemporary plantings. A single *Rosa* sp. of possible interest should be retained, identified and propagated to ensure additional material is available for future planting. These species augment the existing *Arbutus* shrub species.

Arbutus species currently represented in the Garden include:

- *A. unedo*
- *A. xalapensis*
- *A. canariensis*
- *A. 'Pink Pearl'*
- *A. x andrachnoides*

A. menziesii, was previously located adjacent to Ellesmere Place.

A review of the 1988 species list report the presence of the following species:

- *Viburnum opulus* 'Sterile'
- *Abelia x grandiflora*
- *Buddleja globosa*
- *Spirea cantoniensis* 'Lanceolata'
- *Crataegus monogyna*
- *Viburnum tinus*
- *Acacia howittii*
- *Coprosma robusta*
- *Ilex aquifolium*
- *Cordyline australis*
- *Hebe* sp.
- *Nerium oleander* cv.
- *Crataegus coccinoides*
- *Myrtus communis*
- *Syringa vulgaris*
- *Syringa vulgaris* cv x 4
- *Euonymus japonica*
- *Ribes sanguineum*
- *Spartium junceum*
- *Mahonia repens*
- *Lonicera fragrantissima*
- *Ligustrum vulgare*
- *Photinia serrulata*
- *Callistemon rugulosus*
- *Genista linifolia*
- *Callistemon citrinus*
- *Magnolia liliflora*
- *Prunus lusitanica*
- *Taxus baccata*

Unlike the existing tree species, shrub species within the Garden lack distinction or purpose, although there is some emphasis on New Zealand species through representation of *Cordyline* sp., *Coprosma* sp., *Hebe* sp. and *Phormium* sp.- this genera does not appear on any records but is grown in the Garden. Establishment of shrubs is difficult due to competition for light and nutrients. It may be that shrubs existed in greater numbers than current records indicate. Since heritage listing, a number of *Crataegus* sp. have since been lost and not replaced.

6. Vegetation Management

Recommendation

Locate, identify and record existing shrub species within the Garden.

Possible Future Shrub and Small Tree Species

Early images of the Garden that show a distinctive shrub layer appear to be rare, but a written account of the delights of the Malmsbury Botanic Garden were reported by the *Kyneton Observer* in 1876 -

'A stranger passing through Malmsbury would be agreeably surprised at the appearance of these gardens. They were first planted in the year 1865, and are now to be seen in their highest perfection. The bright clusters of roses and other beautiful flowers, contrasted with the rich green trees and shrubs, present a scene at once joyous and beautiful - seldom equalled and not surpassed by any gardens of the sort out of Melbourne. Along the south side is planted a row of poplars of large size, now nearly full grown, forming a cool and shady avenue, particularly welcome during these hot summer months. Near this is a lagoon containing a small island tastefully planted with willows and affording a retreat for myriads of small birds, whose song forms by no means the least of attractive features of the place. These gardens are under the care of Mr Hubbard, who, by the name of 'Old Hubbard', is as well-known to the inhabitants of Malmsbury as the gardens themselves or the Mother Hubbard of our youthful reminiscences. The energy and painstaking of this old man (who is now, I believe, 64 years of age) the present flourishing appearance of the gardens is mainly attributable. A visit will amply repay the curious, and the sceptical may convince themselves of the truth of our statement in a manner at once pleasant and satisfactory. Together with the reservoir they render this small township a picturesque spot, which, without them, would be a wilderness indeed...' BY OUR TRAVELLING CONTRIBUTOR (*Kyneton Observer* Sat 2 Dec 1876 page 2).

Whilst the '*clusters of roses*' do not appear integral to the character of the Malmsbury Garden now, the original observation of '*other beautiful flowers, contrasted with the rich green trees and shrubs*', is aspirational. As no early plans of the Malmsbury Garden exist and the areas suitable for the cultivation of shrubs and beautiful flowers is limited, other opportunities need to be explored for their cultivation adjacent to the development of a planting palette.

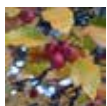
Within the VHD *Statement of Significance*, references to *Crataegus* and *Arbutus* can inform a species palette including a more colourful shrub palette. Suitable species of *Crataegus* could include:



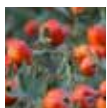
- *C. azorolus* Azerole (Mediterranean)



- *C. crus-galli* var *pyracanthifolia* Cockspur Hawthorn (North America)



- *C. x smithiana* Red Mexican Hawthorn (Garden Origin - Yarralumla Nursery)



- *C. tanacetifolia* Tansy-leaved Thorn (Turkey)



- *C. x lavalleei* Lavallée's Hawthorn (Garden Origin - France)

6. Vegetation Management



- *C. lavalleei* 'Carrierei' Hybrid Cockspur 'Carrierei' (Garden Origin)



- *C. mexicanus* Mexican Hawthorn (Mexico)



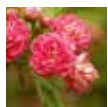
- *C. pinnatifida* 'Major' Mountain Haw (China)



- *C. phaenopyrum* Washington Hawthorn (North America)



- *Crataemespilis. x grandiflora* (Garden Origin)

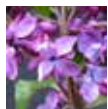


- *C. laevigata* 'Paul's Scarlet' Paul's Scarlet Hawthorn (Garden Origin - UK)



- *C. laevigata*. 'Rosea Flore Pleno' Double Pink Flowering Hawthorn (Garden Origin - UK)

In addition to the Hawthorns, a number of *Syringa* (Lilac) species were donated to the Garden in the mid nineteen-eighties. To augment this collection suitable hybrids of the highly perfumed *Syringa vulgaris*,¹⁶ the French Lilac, may be grown - of which there are many. A focus for this collection could include those that may have been available in the late nineteenth or early twentieth centuries. *Syringa* are in the family Oleaceae.



- *S.* 'Adelaide Dunbar' (1916)



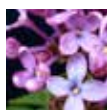
- *S.* 'Louvois' (1921)



- *S.* 'Belle de Nancy' (1891)



- *S.* 'Lucie Baltet' (<1888)



- *S.* 'Capitaine Baltet' (1919)



- *S.* 'Marechal Lannes' (1910)



- *S.* 'Charles Joly' (1896)



- *S.* 'Marie Finon' (1923)



- *S.* 'Emil Lemoine' (1889)



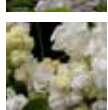
- *S.* 'Monge' (1913)



- *S.* 'Jacques Callot' (1876)



- *S.* 'Mme. Antoine Buchner' (1909)



- *S.* 'Mm. Lemoine' (1890)



- *S.* 'Mme. Casimir Perier' (1894)



- *S.* 'Le Notre' (1922)



- *S.* 'Mme. F. Morel' (1892)

6. Vegetation Management

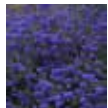
Focusing on hardy shrubs and reinforcing the Californian and Lilac theme another collection focus could include *Ceanothus*¹⁷ (family Rhamnaceae), a genera also available in the late nineteenth century¹⁸: *Ceanothus* may be found on dry, sunny hillsides, coastal scrub to open forest clearings with distribution from British Columbia to coastal ranges of California.



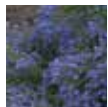
- *C.* 'Trewithen Blue'



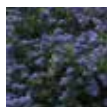
- *C.* 'Concha'



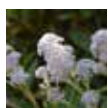
- *C.* 'Blue Sapphire'



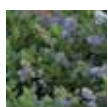
- *C.* 'Blue Cushion'



- *C.* 'Yankee Point'



- *C.* 'Gloire de Versailles'



- *C.* 'Blueblossom'



- *C.* 'Joyce Coulter'



- *C. gloriosus*



- *C. x pallidus* 'Perle Rose'



- *C.* 'Blue Pacific'



- *C. x delilianus* 'Marie Simon'



- *C. x cuneatus* 'Snowball'

Another late nineteenth century hardy shrub were the *Cistus*¹⁹ or Rock Roses in the family Cistaceae. These plants are native to the Mediterranean regions of France, Italy, Spain and Canary Islands. They are drought-tolerant and evergreen. Species and cultivars to consider include:



- *C. salvifolia* 'Prostratus'



- *C. Cistus parviflorus* 'Tmolos'



- *C.* 'Alan Fradd'



- *C. monsepeleensis*



- *C.* 'Snow White'



- *C.* 'Grayswood Pink'



- *C. palhinhae*



- *C. ladanifer*

¹⁷ *Ceanothus* images <https://lambley.com.au/search/content/ceanothus>

¹⁸ *Planting c. 1850-1900, A Guide to the Restoration, Conservation and Rehabilitation of Early Style Australian Gardens and Man-Made Landscapes*, Technical Bulletin 4.1, Australian Council of National Trusts, Dec 1982.

¹⁹ *Cistus* images <https://lambley.com.au/search/content/cistus>

6. Vegetation Management

Areas for dedicated shrub and small tree planting should not impact on the woodland forest feel of the Garden, in addition, the creation of dedicated beds as features in lawn areas is discouraged as there is little current or past precedent for this type of planting. Sites that best support the inclusion of shrub or small tree planting, without affecting existing landscape values include areas adjacent to built form or those that are already disturbed in some way and where the addition of new planting may improve the existing condition. These areas include the embankments around the old Tennis Courts and Pavilion, the perimeter of the Pump House and Water Tank, Fish Hatchery, playground and to the west of the Town Hall.

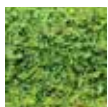
There are also opportunities to enhance and improve the approach to the historic Garden and Town Hall precinct from Mollison Street and Ellesmere Place including planting on the street corner and replacing naturestrip grass with hardy, drought-tolerant, low shrub planting. Species that could be considered for these situations include the prostrate Junipers, for example. The inclusion of *Juniperus* species and cultivars would contribute to the diversity of the Garden's conifer collection in a meaningful way in addition to improving the building setting for the historic Town Hall. Species and cultivars that could be considered include:



- *J. wiltonii* 'Blue Rug'



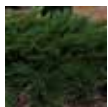
- *J. x-media* 'Gold Start'



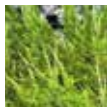
- *J. taxifolia* var *lutchuensis*



- *J. squamata* 'Blue Carpet'



- *J. sabina*



- *J. sabina* 'Buffalo'

Recommendation

Focus on developing a shrub palette that will bring seasonal colour and interest to the Garden. Themes for shrub selection could include species that will tolerate dryer conditions, such as *Ceanothus* and *Cistus* - genera that were available during the late nineteenth and early twentieth centuries. Consider expanding shrub selection to include cultivars that demonstrate a period in the history of horticulture and links to the Malmsbury Botanic Garden, such as *Syringa* and *Crataegus*. Expand the demonstration of ornamental horticulture and conifers to include examples of *Juniperus* to address the gap in other types of conifers that could be grown at Malmsbury and as an opportunity to grow a collection in an area not previously considered as a site for growing collections such as Ellesmere Place and the Town Hall curtilage.

6. Vegetation Management



Bearded Iris

Iris x 'Sandra Ross'
<https://www.rainbowridgenursery.com.au/cultural-notes/bearded-iris>



Louisiana Iris

Iris 'Mauve' <https://www.bambooland.com.au/louisiana-iris>



Siberian Iris

Iris siberica <https://www.cloverhillrareplants.com.au/product-page/iris-siberica>

Bulbs, Corms and Rhizomes

Bulbs such as *Narcissus* and *Freesia* have naturalised in some parts of the Garden and this should be encouraged where possible, particularly in areas where they are able to flower without being mown constantly. Groupings of bulbs at the base of trees for example may assist in reducing compaction at times of the year when they are flowering. Bulbs reinforce the essential woodland character of the Malmsbury Garden and provide seasonal interest when flowering. Extending the flowering period and also diversity of flowers could include a consideration of other attractive deciduous or semi-deciduous genera such as *Iris*. These also provide a point of difference to the seasonal offerings at the nearby Kyneton Botanic Garden and civic plantings of Daffodils *en masse*.

The history of the cultivation of *Iris* is not well understood in Australia, despite its popularity as a garden plant, the society being more developed in the United States. The following notes have been informed by the The American Iris Society *Iris Encyclopaedia*, available online²⁰. *Iris* have been in cultivation since at least the sixteenth century, where they appear in Gerarde's Herbal of 1597, with a period of intense experimentation and breeding in the mid-seventeenth century and again in the late nineteenth century, particularly in the period 1870-1920. Early examples of *Iris* in commerce were grown by the Society in their test plot in the New York Botanic Garden. *Iris germanica*, for example is thought to be the parent of most modern bearded iris cultivars.²¹ The origin is uncertain but the species is thought to be native to southern Europe and the Mediterranean area. Cultivars (*Iris x germanica* cv) can be miniature dwarf (20cm or less), standard (21-40cm), intermediate (41-70cm), border (41-70cm) tall (56-95cm).

The Iris Society of Australia Handbook for Judges (2010) list distinctiveness, beauty and garden appeal as main characteristics of successful cultivation of *Iris*, with an emphasis on charm and personality and an overall appearance of grace, balance and beauty.²² They prefer full sun with a dry summer and cold winter.

Louisiana Iris from the Mississippi region of the United States are grown in aquatic, bog or normal garden bed situations in Australia, as they are adaptable. The rhizomes could also be grown on the margins of the Ornamental Lake or Islands alongside other rushes or reeds.

Iris siberica originates from Siberia, Turkey and northern Italy. It was collected and planted in Monastic gardens during the Middle Ages and is able to be grown in a variety of conditions. It is a hardy plant with deciduous foliage in winter. They do best in light shade and the rhizomes are planted deeper than other *Iris* and prefers winter cold.

Recommendation

Develop a bulb and rhizome collection that distinguishes the Malmsbury Botanic Garden from other Botanic Gardens in the region. Establish links with Plant Societies such as the Iris Society of Australia to develop an Iris collection that demonstrates the development of this highly ornamental plant in cultivation. If possible, source important cultivars that demonstrate the development of this plant in the late eighteenth and early nineteenth centuries. Locate bulbs and rhizomes around the Ornamental Lake and in the more open lawn areas where they may flower without being mown, or adjust mowing regimes during growth and flowering.

20 American Iris Society, wiki, <https://wiki.irises.org/Hist/HistoryOfIrisDevelopment>

21 Missouri Botanic Garden

22 The Iris Society of Australia Handbook for Judges, First Edition, 2010.

6. Vegetation Management

Aquatics & Ornamental Grasses

The aquatic layers of the Malmsbury Botanic Garden are not well understood, and there is no current record or survey of them. Currently the margins of Fountain Island within the Ornamental Lake support fringing reeds with some also scattered on the margins of the Lake edges. The presence of surface vegetation in Image 63 indicates there may have been some aquatic plants within the lake, but these have been removed over time; Possibly when the lake was cleared and the bluestone edging installed in the nineteen seventies. It is also not clear what the surface vegetation is comprised of, but cultivars of *Nymphaea* were popular in gardens of this era.

Tall, ornamental grasses were also popular in late eighteenth century gardens and one of the characteristics of Malmsbury Botanic Garden, was the tall plumes of *Cortaderia selloana* (Pampas Grass). This species provided dramatic interest to the lake margins and gave the impression of lushness to the Garden with its exuberant growth (Image 64). Alternative species could include representatives from the genus *Miscanthus* or *Carex*. Alternative possibilities to introduced species could include indigenous species, and these have been planted on Fountain Island, where managing their spread is an ongoing issue.

Recommendation

Development of an aquatic collection is desirable if Lake water levels can be managed in the future. A focus on rushes and reeds or other ornamental grasses on the margins of Islands and the Ornamental Lake will provide additional interest.



Image 63: Botanical Gardens, Malmsbury Rose Stereograph Co. (c 1920 - 1954) State Library of Victoria



Image 64: H91.330/3562 Botanical Gardens, Malmsbury (Dec. 1953) Victorian Railways, photographer, State Library of Victoria

Coliban River Corridor

The riparian nature of the planting along the Coliban River should be developed and maintained. Species planted should reflect local environmental vegetation classes (EVC) and provide a seamless link to revegetation efforts further north towards the Malmsbury Common. The juxtaposition of the indigenous with the Australian and exotic plantings are a key focus of the Malmsbury Botanic Garden, highlighting the exotic nature within. Development of relationships with key stakeholders such as Coliban Water and Dja Dja Wurrung people will be important for the success of this strategy.

Recommendation

Develop a revegetation and management strategy for the Coliban River Corridor that links to the revegetation work being undertaken at the Malmsbury Common. Manage the vegetation of the Coliban River Corridor to enhance the indigenous nature of this landscape and as a frame for the exotic nature of the Botanic Garden,

6. Vegetation Management

Collection Location

The Living Collection plan, Figure 22 indicates the main areas for the proposed living collections for the Malmsbury Botanic Garden. The aim of the plan was to build on the location of existing trees and significant groups and develop a spatial understanding of the how existing and future living plant collections may be organised. The following criteria were considered:

- Existing tree species and location.
- Topography and microclimate.
- Opportunities for development through planting.
- Existing heritage structures and built form.
- Location of pathways and other edges to assist with management zoning.
- Location of pathways for access, maintenance and viewing.
- Consideration of existing and proposed itineraries for visitors.

It is important to acknowledge that these zones are indicative and provide general guidance, Part of the charm of the Malmsbury Botanic Garden is the interplay between evergreen and deciduous canopies. Planting design in conjunction with comments made previously about maintaining viewlines and open lawn areas will assist also.

Recommendation

Develop the Botanic Garden collections in the general locations nominated.

Planting Design

A review of design principles for the Malmsbury Botanic Garden have been informed by the unique character of the site, the general principles relating to the gardenesque and picturesque as noted in *A Guide to the Restoration, Conservation and Rehabilitation of Early Style Australian Gardens and Man-Made Landscapes*. (1982) and precedence as demonstrated in the Royal Botanic Gardens, Victoria.

As mentioned before, maintaining key viewlines and a dynamic interplay between mass and void will be key. Knowledge of the anticipated dimensions, form and growth rate of trees and understorey plants needs to be understood so that the desired effect can be achieved. The following general principles have been developed for the Malmsbury Botanic Garden:

- Tree planting to consider the predominant qualities of deciduous woodland in the more northern portion of the Garden,
- Tree planting to consider the predominant qualities of evergreen forest in the more southern portion of the Garden,
- Maintain open lawn areas by grouping trees loosely to the edges
- Maintain existing Avenues by where possible, such as the Poplar Avenue by interplanting to increase density and reinforce the linearity of the Avenue and to provide additional screening of Mollison Street from within the Garden
- Remove large shrubs where a thick grouping occurs adjacent to paths so maintain sightlines,
- Develop understorey plantings of bulbs, corms and rhizomes adjacent to trees where they may be protected from mowing

Figure 22:



COLLECTION LOCATION KEY

- ① *Populus nigra* 'Italica'
- ② *Callitris* spp. & *Juniperus* CV (prostrate)
- ③ *Juniperus* CV (prostrate) & *Quercus palustris*
- ④ Palmetum & *Juniperus* CV (prostrate)
- ⑤ Ulmaceae & *Narcissus* spp. or CV's
- ⑥ Australian Conifers
- ⑦ Quercetum (Evergreen)
- ⑧ Quercetum (Deciduous) & *Narcissus* spp. or CV's
- ⑨ Coliban River Interface - Riparian EVC
- ⑩ *Crataegus* spp.
- ⑪ Extant, Botanic Garden Collection
- ⑫ *Syringa* spp. or CV's & *Muscari* sp. or CV's
- ⑬ *Taxodium* spp. or hybrids
- ⑭ *Metasequoia* sp. & *Sequoiadendron* sp.
- ⑮ Pinetum
- ⑯ *Arbutus* spp.
- ⑰ *Brachychiton* spp. or CV's
- ⑱ *Ceanothus* spp. or CV's & *Cistus* spp. or CV's
- ⑲ *Iris* spp. CV's (Louisiana, Siberian, Bearded)

DRAFT



6. Vegetation Management

- Refrain from planting in straight lines, apart from adjacent to a building or within an Avenue,
- Plant shrubs and other understorey plants in groups or clusters, in asymmetrical arrangement to ensure diversity in mixed planting areas and that ground coverage is high
- Where Palms or small trees are planted, consider taking a layered approach to planting to form a group,
- Aim for contrasting heights, form and texture and colour in composition at all levels of planting,
- Consider effect of seasonality on planting at different times of the year,
- Place feature trees in corners of serpentine paths so it appears the path is responding to the placement of the tree,

Recommendation

Develop the planting style of the Malmsbury Botanic Garden using existing character cues developed over time within the Garden, general stylistic principles of the gardenesque and picturesque and precedence based on other botanic gardens such as the Royal Botanic Gardens, Melbourne.

7. Built Environment

Paths, Boardwalks and Bridges

Features and points of interest including the Viaduct, heritage elements and significant trees inform the itinerary of the Garden. The path network has essentially evolved over time to link these elements together and is in the process of becoming more formalised over time with the addition of compacted gravel surface finishes, particularly in the northern section of the Garden and around the Ornamental Lake. This represents a gradual shift to a more developed concept of path linkages, away from the original rustic concept of the path. This still exists to some degree in the southern, higher section of the Garden in the Pinetum, contributing to a hierarchy with the path network system.

The qualities of these surfaces contribute to the charm of the Garden and to the different aesthetic experiences depending on the time of year; where the effect of walking on pine needles in summer or winter or fallen leaves in autumn is most highlighted. In addition to surface, edge treatments differ amongst regional botanic gardens in Victoria where asphalt, gravel or stone pavement predominate. Path edges vary from concrete kerbing, timber, steel or planting. Path edges are predominantly mown grass, and this also adds to the unique experience within the Garden.

Path grading varies across the site according to adjacent topographies. This is most problematic on the west side of the Billabong Chain where water may overflow. A simple timber boardwalk that spans this section can contribute in a positive way to the variety of surfaces that may be experienced in the garden without introducing a substantially different material.

Path widths also vary, and this can be made more consistent, contributing to a more legible path hierarchy. A primary system of 2.5m wide paths is suggested from the main itineraries around the lake with secondary paths maintained at 1.8m wide as indicated in Figure 23.

The existing footbridge is a relatively new timber structure providing a link to the small island in the Ornamental Lake. It is recommended that this bridge be retained, but painted a dark grey to reduce its visual impact in the landscape. There are also opportunities on both the island and the adjoining bank to plant adjacent to the bridge abutments to assist with the bridge setting.

Recommendation

Retain existing path surfaces and construct timber boardwalk with kick rails to the west of the Billabong Chain. Construct a legible path hierarchy of 2.5m main paths at 1.8m wide secondary paths. The existing timber bridge should be painted a dark grey and bridge abutments planted out to assist in reducing the visual impact of this element.

Ornamental Lake, Island and Billabong Chain

The Ornamental Lake currently receives stormwater from the adjacent township of Malmsbury. The water is held depending on the volume of rainfall before moving through to the Billabong Chain. If the flows are substantial water overflows the small weir and overland to the Coliban River. This is an exciting process to experience and is unique to the Malmsbury Garden landscape.

The current condition of the base of the Ornamental Lake is unknown, but is presumed to contain any discharged material from stormwater events such as silt. It is understood that European Carp (*Cyprinus carpio*), an introduced species of fish may also be present, contributing to the low water quality.



LANDSCAPE KEY

- Major Pathways 2.5m
- Minor Pathways 1.8m
- Natural Surface Pathways

DRAFT



7. Built Environment

The bluestone edge does not contribute to the rustic qualities of the lake edge but forms a serviceable maintenance boundary. The current extent of the bluestone edging is satisfactory, as some retention of the natural outlines is desirable.

The Islands within the Ornamental Lake are both currently planted. The existing vegetation on Fountain Island should be reduced to reveal the bluestone construction and the extent of *Phragmites australis* reduced to preserve the delineation of the island and maintain open water as a contrast. Due to its inaccessibility maintenance tasks are limited and any planting should be resilient. It is also an opportunity to develop habitat for water birds and other water animals.

To the west of Fountain Island is the small island (Figure which is currently planted with Poplars and retains stumps of trees previously removed. Once stumps are removed to allow for replanting, the island dimensions should be reinstated and retained with boulder rockwork to prevent erosion and allow for plant establishment. The character of this island should be a contrast to Fountain Island, but bear some similarity in its planting approach. It is suggested that some reeds are planted on the margins of this island and that the existing Poplars retained until they deteriorate. The island is an opportunity to establish a new collection of *Taxodium* in conjunction with other Mississippi flora such as Louisiana Iris. An open area leading from the bridge could have a natural surface such as grass or gravel. Views across the Lake through trees could be maintained.

The Billabong Chain and weir currently functions as an ephemeral landscape with overflow levels set by the weir. From this the water overflows the path and continues down to the circular pool and Coliban River. Some erosion was observed between the circular pool and the Coliban and this water path could be paved in a way as to appear rustic, without impeding flow or stopping its trajectory. An alternative erosion control measure would be to formalise this pathway with basalt stone and plant on the margins with low-growing riparian plants to reduce effects of erosion.

Current planting in the Billabong Chain includes *Salix fragilis* (Crack Willow), which could be removed. Bank stabilisation could be maintained using an indigenous riparian planting palette.

Recommendation

Maintain the Ornamental Lake to improve water quality and remove introduced fish species. Maintain Fountain island for habitat purposes. Remove tree stumps on small island and restore dimensions and retain with basalt boulders to support future tree planting. Retain a void in the centre of the small island to allow for access and viewing across the lake.

Water Sensitive Urban Design and Irrigation

Conserving natural processes as mentioned previously, has not been addressed to any substantial effect and there is huge opportunity to expand or formalise the role of the Garden to engage with the larger story of how water from the Malmsbury Township to the east moves through the Garden and is used. This strategy surpasses public or private use and could be termed 'community' use. Over time, as the Garden and township developed, the flow of water between the town and the river has been interrupted. Whilst water has been considered necessary to maintain plants and to keep the Lake full, it is also perceived sometimes as a nuisance, and recommendations to hide and 'underground' this resource were recommended in the 1988 reports. The land is also subject to flooding from the opposite direction.



Context Plan



← Deciduous Oak Lawn | 2.5m shared pathway | Deciduous Elm edge | Reed & Rush Vegetation | Existing bridge over Ornamental Lake with Poplar Avenue in the background. Bridge is painted a darker grey to focus attention on trees and other vegetation. Vegetation screens the bridge ends | Taxodium Island with central lawn area and new *Taxodium* planting | Fountain Island and Ellesmere Place →

7. Built Environment

Through design, there is an opportunity to address water flow from the township and how it is utilised and becomes a resource to achieve the vision and objectives of the masterplan. In order to achieve this vision, a strategy that addresses, capture, storage and use is proposed.

An initial study highlighted the potential catchment area for water entering the Garden through the stormwater system. Figure 24 indicates this diagrammatically and is based on existing topographical maps. Stormwater travels to the Garden via underground pipes and there is some overland flow as well. It is not clear whether the drainage connection from Mollison Street into the Garden is still functional - it is possible that this is now diverted to the Recreation Area opposite.

Given that the Ornamental Lake frequently overflows it is difficult to understand the exact volumes of water that are passing through this system, as water is discharged directly to the Coliban via overland flow. A future strategy that considers investigating the condition of the lake base and possible dredging to create additional storage volume and depth should be the subject of a more detailed study. This study could also take into consideration capturing roof run-off from the adjacent Town Hall. Water path of travel needs to be confirmed for discharge into the Ornamental Lake, also the volume of water that is being captured and the potential depths required for meaningful storage and treatment.

A study of early maps of the Garden reveal that the original condition of the site included the Lake and Billabong Chain, although this has been somewhat modified over time. It is anticipated that the Billabong Chain will be considered part of the treatment and storage system for water and that excavation of the Chain should also take place. Within the Billabong Chain a Lake overflow pit with pump could be considered that can potentially recharge on site water storage for later use.

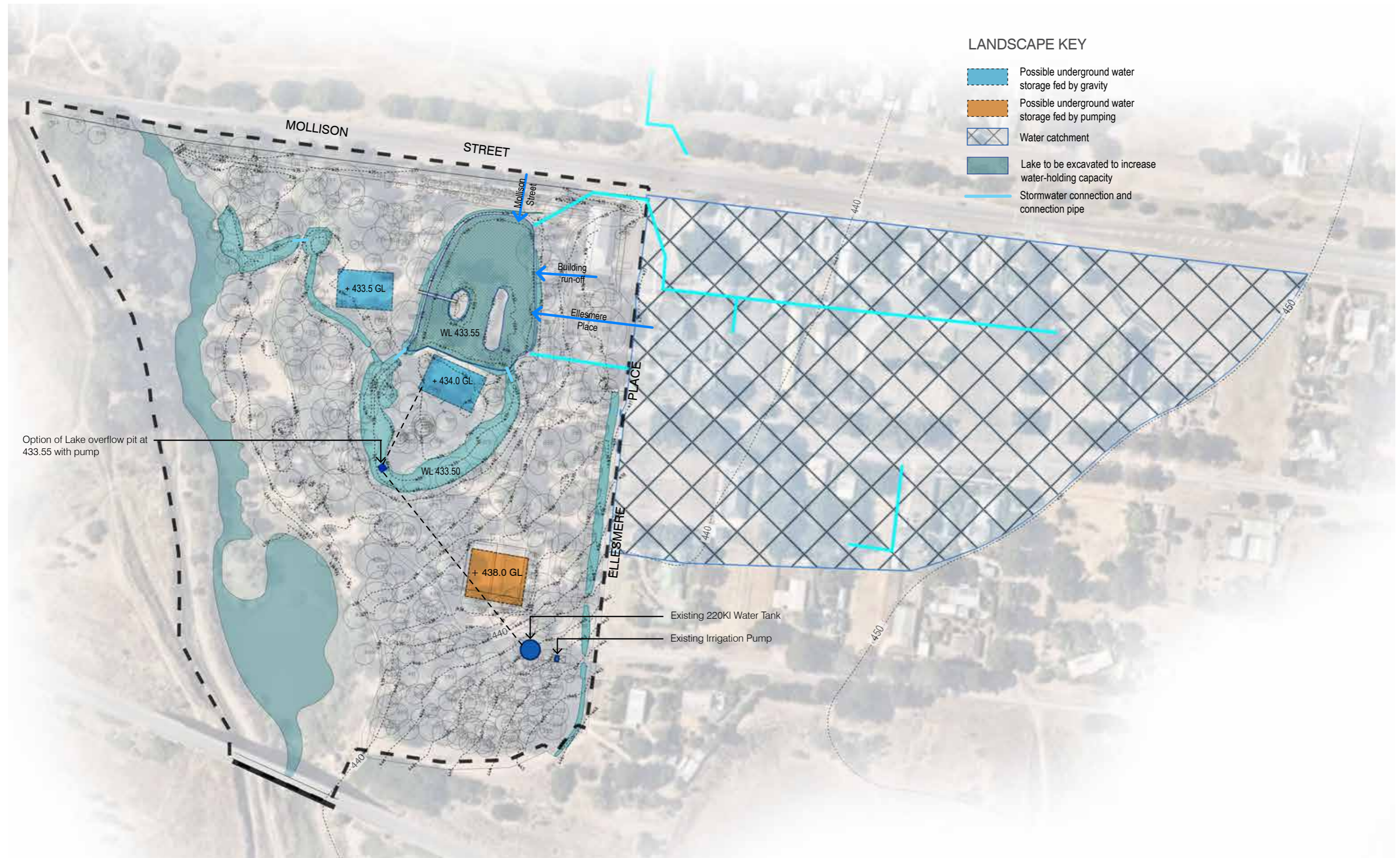
The Billabong Chain weir functions well as a passive diversion system. This needs to be understood in the context of water flow at this point as there is no return pipe into the Lake system, so once levels are reached water simply flows over the top.

One possible solution is that a connection is made back into the Lake and pipes balanced to ensure that levels within the Lake are maintained as high as possible. Any excess water could be diverted to underground storage via gravity means, or depending on the location via a pump system. This would effectively provide additional water for the Ornamental Lake in time of dryness or it could be used for irrigation purposes as recycled water.

In this scenario risk management approaches to minimise algal blooms would be required as part of the constructed wetland system. This could be considered in conjunction with setting limits on draw-down so that large amounts of sediment are not exposed.



Image 64: Billabong Chain granite weir.



7. Built Environment

Irrigation is also tied to a WSUD strategy for the Garden. The volume of water required needs to be determined before the system can be designed. This would be for the peak irrigation demand period (summer) to maintain plant health and condition.

Water banking or deep soil storage is another strategy that could be considered for the Malmsbury Botanic Garden. Winter-collected water is stored in the soil profile for use by mature trees over the Summer period. Preliminary studies done by Geoff Connellan and Peter Symes discuss the approach to soil water storage or water banking in landscape soils²³ where an initial comparison of soil types reveals that those soils that contained higher amounts of organic matter had increased water holding capacities.

It was also estimated through modelling that if trees with deep root systems were able to access soil moisture up to 1000mm soil depth then they could potentially subsist for about ninety days over summer with no supplementary watering or precipitation. This entails an ongoing commitment to improving overall soil management and quality and retaining as much water on site as possible.

The following strategies are suggested by Connellan and Symes for matching stormwater with sustainable irrigated landscapes:

- Use stormwater when available to irrigate, this may mean schedule irrigation events at times to maximise stormwater use to recharge soil water.
- Consider the needs of flora and match plants with availability.
- Consider stormwater delivery in relation to climate change impacts.
- Develop a monitoring program for assessing optimum soil and water quality.
- Develop and maintain a soil quality management program.
- Approach irrigation using a mixed-method or integrated approach which might alternate between potable and non-potable supply.
- Enhance hydraulic performance of the irrigation system to maximise stormwater delivery when it is available.
- Recognise that landscape water management requires a holistic approach to total water management incorporating landscape irrigation, water quality, ecosystem protections, climate adaptation and plant selection and soil health.
- Commit to ongoing investment in staff training in integrated water management.
- Incorporate turf types that can recover quickly after precipitation is applied, for example Kikuyu.

In addition to the above, an automatic off-site controlled irrigation system would be recommended with drip irrigation for trees and garden planted areas and spray irrigation for turf, this would allow for selective turf irrigation of high-used passive recreation areas rather than the entire site.

Recommendation

Undertake more detailed study of potential for WSUD capturing stormwater and treatment within the Ornamental Lake and Billabong Chain. Reconnect the Lake to the Billabong Chain to maintain Lake levels and investigate additional water storage options including an integrated approach to irrigation management.

23 Connellan G & Symes P, *Stormwater: Challenges in matching to sustainable irrigated landscapes*, *STORMWATER 12, 2nd National Conference on Urban Water Management 15th-19th October 2012- Melbourne, Australia*

7. Built Environment

Garden Furnishings

The appropriate number of seats appears to be appropriate, with additional picnic settings located adjacent to the lake. Some additional settings located near Mollison Street and the Viaduct provide opportunities for seating away from the Ellesmere Place interface. No additional seating is recommended within the Garden proper except for new settings in the picnic area, due to the nature of the fixings and the visual intrusion upon the landscape.

Additional seating should be provided near the proposed new Garden Entry Forecourt for workshop programs, and for amenity.

New water fountains that are more sympathetic to the heritage style of the gardens could be installed.

Rubbish bins should be relocated out of the main path of travel and should be less visually intrusive, for example enclosed within a cabinet.

Recommendation

No additional seating be provided within the Garden. New seating arrangement is recommended at the Garden Entry for workshops and amenity. Retain current Shire of Macedon Ranges picnic settings and ensure consistency of design and materials is maintained in the future. New water fountains in a more sympathetic style that replicates materials and colours of MRSC picnic settings. Location and design of rubbish bins to be less intrusive and relocated out of main path of travel at Garden entry.

Pavilions

The pavilion near the viaduct is visually intrusive and should be removed and relocated outside of the Malmsbury Botanic Garden.

A new picnic pavilion adjacent to the BBQ areas would provide shelter for two new picnic settings, and must be designed sympathetically and take into consideration existing heritage structures such as the Fish Hatchery and Tennis Pavilion.

Recommendation

Remove and relocate existing pavilion near Viaduct. Provide a new picnic pavilion in the BBQ area adjacent to Ellesmere Place that is sympathetic to the existing heritage building buildings on site such as the Fish Hatchery and Tennis Pavilion.

Playground and Picnic Area

The existing playground could be reinvigorated with new equipment, made from natural materials and play opportunities in a garden setting that encourages children to enjoy the Garden and surrounds. A new Conifer Tree House (Figure 26) provides alternative play spaces with a mini rope challenge beneath. The new playground is fenced with unpainted pickets replicating the new fence along Mollison Street. New garden planting assists with integrating the new play area with the rest of the Garden. Gates between the new Garden Entry and BBQ area facilitate connections between facilities for children and carers.



Context Plan



7. Built Environment

The picnic area is upgraded to include a new picnic pavilion, picnic settings and a new fully accessible bbq and wash up facility.

Recommendation

Renovate existing play area and install new Conifer Tree House and rope/climbing net play in a garden setting for additional play interest. Natural materials and colours take precedence over bright colours and plastic. Connect the playground to the new Garden Entry and also to the bbq picnic area to facilitate access to amenities. Provide new fully accessible bbq with wash up facility.

Pavilions

The pavilion near the viaduct is visually intrusive and should be removed and relocated outside of the Malmsbury Botanic Garden.

A new gable-roofed, open-sided picnic pavilion adjacent to the bbq areas would provide shelter for two new picnic settings, and would be designed to be as low as possible in the landscape, reflect the proportions of the existing heritage structures such as the Fish Hatchery and Tennis Pavilion and be constructed from natural materials.

Recommendation

Remove and relocate existing pavilion near Viaduct. Provide a new gable-roofed, open-sided picnic pavilion in the bbq area adjacent to Ellesmere Place that reflects the proportions of the existing heritage buildings on site such as the Fish Hatchery and Tennis Pavilion and constructed from natural materials.

Tank and Pumphouse

The pumphouse and tank area is an essential facility but detracts from an appreciation of the Garden at that location. It is also located in a direct line of site when viewed from Urquhart Street. The pumphouse could be rendered and painted to match Town Hall colours and perimeter planting installed to assist with screening. The ground surface inside the wire fence could be refinished with a gravel to match paths and kept weed free.

Recommendation

Render and paint the external facade of the pumphouse so as to be more sympathetic with the Town Hall and reinforce Botanic Garden architectural values. Install screening plants using species from the proposed Crataegus collection to screen the tank and pump house from the Garden. Remove existing weeds from inside the fence and pave with gravel to match pathways.

Signage, Interpretation & Wayfinding

The types of signage identified at the Malmsbury Botanic Garden include:

- Identification signage, near Town Hall at entrance from car park
- Welcome signage near toilet block along footpath
- Interpretative signage throughout the Botanic Garden
- Precinct identification off Mollison Street

7. Built Environment

- Prohibition signage off Mollison Street
- Memorial signage at entrance area in corner garden bed
- Heritage signage such as for Engineering Heritage

Observations include:

- No clear site entrance
- No clear wayfinding signage at entry points
- Site orientation (map for pedestrians) missing at entry points
- Lack of urban scale signage at site entries means the site feels unidentified and its parts dislocated
- Visitor paths unclear
- Signage looks out of date and neglected, partly damaged, paint peeling off and rusting
- Inconsistent appearance - scale materials and colours
- No Aboriginal content or stories or language used throughout the Garden
- Too many different signs, typefaces and materials used'
- Poor quality of signage materiality and legibility
- Signage clutter
- No site identification visible

General recommendations include:

- Better and clearer site entrance identification
- Wayfinding signage and directional map at Garden boundary
- Multiple wayfinding signs for better navigation
- Materiality should be considered, reflective of surroundings and is engaging
- Length of content to be considered
- Signage forms could be tall and slim to allow for good circulation and clear visibility
- Reduce different kinds of signs and unify
- Prominent areas could be used to enhance the site, experience and orientation
- Acknowledge Dja Dja Wurrung people
- Old signage to be removed
- Establish a clear sign hierarchy
- Placement of signage to prioritise and maintain views within the Garden



Image 66: Macedon Ranges Shire Council Plant label, Kyneton Botanic Garden

The eclectic nature of signage and approach to interpretation of the Garden could be improved. Both signage and interpretation needs to be considered wholistically so that outcomes are visually appropriate, and communicate the main themes and ideas. Location of signage whether botanical or interpretative will be important so that signs do not detract from an appreciation of the Garden. The development of signage can include the following elements and processes.

A design style guide that addresses the following palette of signs:

- Plant Labels - The issue of plant labels should be addressed immediately and the black and white plant label used at the Kyneton Botanic Gardens adopted for Malmsbury Botanic Garden. The proposed signage is legible and robust. Plant labels should be placed discretely so as not to detract from the appreciation of the plants. Labels should be adapted for trees and fixed directly to trunks at an appropriate height where possible. Plant labels for young trees should be placed in the ground. Consider 'collective' sign maps in similar style and colour for interpreting complex planting patterns or planting themes in the same location.

7. Built Environment

- Interpretative - Signage is to be developed that reflects the colour, proportions or material of the plant label in some way, so that the plant labels appear part of the same ongoing signage suite. The recommendations above should be considered in developing the brief for an interpretative sign strategy.
- Directional and Wayfinding - Directional signage at major entry points could include a map function as well. This needs to be urban in scale at entry points for legibility. A hierarchy of signs needs to be developed so that signs within the Garden do not dominate the landscape.
- Commemorative - The eclectic nature of existing commemorative signage should remain unchanged, however the mountings used, such as stone or boulders should be placed in a matter sympathetic to the surrounding Garden context. A clear policy and design for future commemorative signage could be developed.

A unique commemorative sign within the Malmsbury Garden illustrates the poem '*I Wandered Lonely as a Cloud*' (1804) by William Wordsworth (1770 - 1850) an English Romantic poet. The sign was designed, constructed and placed in the Garden by Neeta Lindberg in the 1990's to commemorate and celebrate the Daffodils within the Garden. The sign should be restored, with a more permanent rendition of the poem included, and the sign relocated away from the major sightline that links the views within the Poplar Avenue to the War Memorial. The sign could be relocated closer to the Ornamental Lake and Daffodils.

Recommendation

Develop a Design Style Guide for plant labels, wayfinding and interpretative signs, that incorporates existing plant label design incorporating colour, proportions and material elements. Develop a more detailed Wayfinding and Interpretation policy that incorporates Garden entrance identification, directional signage for the Botanic Garden and linking to other significant sites within Malmsbury and environs. Develop use of technology such as a Plant Trail App to be considered in conjunction with plant signage and interpretation. Relocate the Engineering Heritage National Landmark sign near the Viaduct closer to the path to maintain clear view lines. Adopt black and white signage for all planting within the Malmsbury Botanic Garden that is consistent with MRSC signage policy. Adapt plant labels for trees and affix to trees if the tree is



Image 67: Neeta Lindberg with a copy of Wordsworth's poem and Kyneton Councillors. c 1990's.
Courtesy of Teena Lindberg

8. Cultural Heritage

mature, otherwise signs are to be placed at the base of the tree, in the ground. Restore and relocate Neeta Lindberg's 'Daffodil' commemorative sign closer to the Ornamental Lake and the Daffodils.

Town Hall

The Town Hall is a significant landmark within the Township of Malmesbury and is potentially a key contributor to Heritage values of the Botanic Garden precinct. The Town Hall is the subject of a separate Conservation Management Plan (CMP)²⁴ undertaken by Heritage Alliance in 2009.

In the CMP it is noted that the original design had architectural significance at the State level, but this was compromised when the façade was demolished and unsympathetically rebuilt in 1949. Importantly, it is noted that *'There is the potential to recover the architectural significance of the building through a correctly detailed reconstruction of the façade...and its contribution to the streetscape, would be greatly enhanced if the original façade were reinstated.'*



Image 68: Procession in Ellesmere Place, with Botanic Gardens in background. c. 1930
Malmesbury Historical Society



Image 69: Town Hall with Council Members, 1902 with Botanic Gardens behind.
Malmesbury Historical Society

The photographs above show the Town Hall prior to the demolition of façade and also the original levels of the curtilage and Ellesmere Place in relation to the Town Hall. The Town Hall CMP notes that the current road level in Ellesmere Place is now higher than the Town Hall and water is directed to the Town Hall instead of to the stormwater system.

²⁴ Malmesbury Town Hall Conservation Management Plan, Heritage Alliance, August 2009.

8. Cultural Heritage

In addition to recommendations relating to the architectural fabric, the CMP also makes the following comments:

- Undertake groundworks to lower the level of asphalt and paving against the east elevation of the Town Hall in conjunction with stormwater drainage.
- Level out nearby grassed areas in Ellesmere Place to prevent ponding.
- Paving around the building and adjacent to Mollison Street to be more uniform.
- Reduce soil levels on the west side of the Town Hall to reveal any sub floor vents if extant and grade soil away from the building.
- Remove plant near buttress on the west side of the building.

The masterplan addresses the works recommended for the Town Hall in order to deliver better outcomes. The above recommendations have been addressed as part of this masterplan as they influence works to be conducted in the Garden proper. Improvements to the Town Hall will improve the heritage setting of the Garden and make a positive contribution to the Malmsbury streetscape.

In addition to the works outlined above, there is an opportunity to provide a functional space for the community. The current red brick extension to the Town Hall is not sympathetic with the proportions, material or scale of the original building.

The masterplan proposes a new architecturally designed building in a reduced footprint that will consider and deliver the following outcomes:

- High quality design that does not diminish or dominate views to the Town Hall
- Provides shared bathroom and toilet amenity for visitors to the Garden and use by Town Hall patrons.
- Responsive in its materials, siting and proportions.
- Provide shared community space including for Friends of the Malmsbury Botanic Garden and Environs.
- Provide small multi-functional space that could be publicly accessible gallery or exhibition space.
- Provide space for workshops or similar.

Recommendation

Restore the façade of the Town Hall and improve landscape in the immediate environs by addressing levels, drainage, finishes and planting. Demolish the existing red brick extension and construct new high-quality community and amenity space in a reduced building footprint.

Memorial Gate and Wrought Iron Fence

The Memorial Gate and Wrought Iron Fence appears to be in good condition. Restoration of the wrought iron inclusive of further investigation into original colours should be undertaken. The timber posts should be assessed further and restored where possible, in conjunction with proposed replacement of the existing wire fence on the Garden boundary along Mollison Street.

The wrought iron gate is currently fixed open and padlocked. This should be reviewed and the gate function restored as part of the presentation of the War Memorial for ceremonial purposes.

The flagpole is also located adjacent to the Memorial Gate and represents a structure of significance.

Recommendation

Further investigation into original finishes and colours of the wrought iron fence be undertaken and the timber posts assessed further for structural issues. The gate function to be restored for presentation and ceremonial purposes.

Bluestone Drinking Fountain (c 1860's)

The bluestone fountain is identified in the extent of registration for the Malmsbury Botanic Garden and the proposal to relocate and undertake conservation works to this structure would be subject to a heritage permit. A qualified conservator would need to be involved in these works. The fountain is in very poor condition and reconstruction of the missing pieces would be necessary with reconstruction informed by any available evidence. There is little visual evidence regarding the design of the fountain, but previous commentary in Malmsbury Botanic Gardens Part One Conservation Analysis and Policies, states

'The bluestone drinking fountain, thought to date from the late nineteenth century, was found in a wood shed (demolished in 1985) near the children's play area (J. Hawker 1988 pers comm). It was reassembled in 1985 and sited on what is believed to be its original location immediately to the west of the Town Hall.'

Recommendation

Undertake further investigation into the design of the fountain prior to restoration and relocation and recommissioning.

Tennis Pavilion

The Tennis Pavilion (c. 1880) was originally located near the bowling green and moved to its current location (c. 1890). Both the Pavilion and courts are specifically identified in the Victorian Heritage Register (VHR) listing. Whilst the masterplan proposes relocating this structure to align with the existing court arrangement, as part of the restoration process, priority works associated with its conservation, *in-situ*, take priority. Adaptive reuse of the Tennis Pavilion for a Garden Museum or function space is not contingent on its relocation.

Recommendation

Prioritise conservation work on the Tennis Pavilion, including removal of overhanging vegetation and building stabilisation. Follow-up works include preservation, restoration and reconstruction where required. Remove asphalt, masonry hit up wall and chainmesh fencing. Remove weed vegetation in surrounding areas and prepare new garden bed areas for planting. Install gravel surface similar to 'Buda' in Castlemaine and ensure new infrastructure to facilitate event use of this space is appropriately sited and recessive.

Fish Hatchery

The Fish Hatchery (c. 1959) is no longer used and a new use needs to be found for the building. The Fish Hatchery and building is specifically mentioned in the Victorian Heritage Register (VHR) as located within a timber and corrugated iron shed. It represents an interesting use of a Botanic Garden in the nineteen sixties. It is proposed that the tank is adapted for use for growing indigenous aquatic plants and the building

8. Cultural Heritage

to support a Fish Acclimatisation Museum. As the VHR specifically identifies corrugated iron as a feature of the Fish Hatchery removal of all of this material is not likely to be supported.

Recommendation

Develop concepts for adaptive reuse of the Fish Hatchery for Fish Acclimatisation Museum and use of the historic tank for indigenous aquatic plant cultivation. Develop concept for light penetration whilst retaining as much of the original building fabric as possible. Develop interpretation strategy for the Fish Acclimatisation Museum as part of the Garden Interpretation and Wayfinding Strategy.

Bowling Green

The Bowling Green dates from c 1890 and was originally constructed as a three-rink green hosting competitions with other city and country clubs. The current site of the bowling green is currently preserved and the relocation of the adjacent cv's will assist in preserving the integrity and maintain visual connectivity with this area.

Recommendation

Relocate Syringa cv's and continue to maintain existing topography associated with bowling green.

Mollison Memorial

The Mollison Memorial is a relatively recent addition to the Botanic Garden. It commemorates Alexander Fullerton Mollison who settled in Malmesbury on the 6th December 1837. The plaque is mounted on bluestone and there is a bluestone plinth behind it that originally supported a plough that was removed for safety reasons.

Recommendation

Relocate the Mollison Memorial and bluestone plinth closer to the path as part of regrading works to the west area of the Town Hall and establishment of new plant collection. Reinstall the plough as part of the restoration of the Memorial and develop concept design for protection of the plough and visitors that references the materials of the Memorial and its location.



Image 70: Mollison Memorial, (1987.) located on the west side of the Town Hall.

8. Cultural Heritage

Art

The notion of Art in the Malmsbury Botanic Garden has not been considered in previous reports. The decision to provide opportunities for incorporating art as part of the masterplan at a strategic level is to ensure that this aspect of cultural life be considered in relation to the Garden. Whilst not strictly 'heritage' in the way it has been interpreted in past and present documents there is scope to consider how it might extend our knowledge of design in Malmsbury Botanic Garden. A number of locations have been identified where an artist approach would be valued. These include:

- The connecting path between the Botanic Garden and Malmsbury Common
- The Fish Hatchery

It is also envisaged that by progressing the development and adaptive reuse of heritage elements within the Malmsbury Botanic Garden that these may facilitate creative activities, exhibitions and promotion of the performance of art in the beautiful setting of the Garden. These areas include:

- The old Tennis Courts and Pavilion
- The new architectural pavilion behind the Town Hall
- The new Garden Gateway from Ellesmere Place

Recommendation

Develop briefs and secure funding for community art projects for the Malmsbury Botanic Garden. Develop concepts for the adaptive reuse of Garden heritage structures and places to support art and performance.



Image 71: Basalt stone carving, Mirambeena Park.

9. Management and Funding

Friends

The Friends of the Malmsbury Botanic Garden and Environs will occupy a critical role in the future management, promotion and development of the Garden through their activities and affiliations with Not-For-Profit organisations such as The Australian Association of Friends of Botanic Gardens (AAFBG), which hosts a collaborative on line space promoting membership, networking, Botanic Gardens news and events such as representation at BGANZ conferences as part of a thriving culture around Botanic Gardens.

The following are suggestions for that may be interest in developing this culture:

- Fundraising for a projects.
- Providing information about Malmsbury Botanic Garden through guided walks.
- Sharing knowledge about Malmsbury Botanic Garden and the Malmsbury environment through development of a workshop program that could also be designed for children.
- Propagating and selling plants through annual plant sales.
- Promoting the Malmsbury Botanic Garden through AAFBG and BGANZ conferences.
- Collaborating with other Friends groups within the region on collective projects.
- Assisting with Botanic Garden Open Days within the region.
- Researching information on plant collections for contribution to a Friend's Garden Notes that would be available online and in hard copy.
- Developing ideas for community engagement through plant-based activities in the Garden.
- Assisting with plant identification and development of an on-line database of plant species in the Malmsbury Botanic Garden.
- Assisting with development of a Malmsbury Botanic Garden website and social media presence through Facebook and Instagram.
- Researching and developing botanic-themed art projects and temporary installations.
- Developing a program of seasonal events and happenings in the Garden and Environs of Malmsbury such as walks and talks with invited experts.
- Develop a program of subjects for an interpretation trail App in conjunction with Macedon Ranges Shire Council based on the plants of the Malmsbury Botanic Gardens and Environs.
- Develop a garden archive curated by membership in consultation with the Malmsbury Historical Society that is also digitised.
- Assist in the development of 'botanic-themed' nature-based tourism.



Image 72: MRSC Woodend Nursery, growing area available for Botanic Garden Friends groups. Photo Lisa Ryan

9. Management and Funding

A thriving culture around plants and botanic gardens could be supported by Macedon Ranges Shire Council in a number of ways:

- Developing the Malmsbury Botanic Garden through implementation of the masterplan, particularly around improvements to community facilities, adaptive re use of heritage buildings within the Garden and collections area.
- Provide ongoing support to all Botanic Gardens in the MRSC local government area through commitment to increasing staffing levels in the area of community outreach and botanical garden horticultural expertise.
- Continue to support the Friends plant propagation and growing activities with access to facilities.
- Grant funding for specific projects related to improvement or interpretation of the Garden.
- Assistance with developing an on-line presence and providing 'space' on MRSC webpage for Friends activities.

Tourism and Marketing

Malmsbury Botanic Garden with its focus on plants and environment is well placed to develop to develop nature-based or environment-based tourism. Improving facilities and amenities that will benefit local groups and communities is a sustainable way of approaching tourism. Developing a Heritage Precinct inclusive of the Malmsbury Town Hall and Botanic Garden as a gateway to the Malmsbury Township will provide benefits to the local community and to visitors.

Other tourism-based offerings start in the virtual space. Programs that are tied to climate change for example such as earthwatch Australia's ClimateWatch Citizen Science program around community transects and long term vegetation climate change transects. These are increasing in numbers and visitors and locals can keep adding data. Use this link to explore [Climate Watch Trails around Australia](#).

Another initiative that has potential benefits for local communities and regional tourism is the Low Carbon Living program. It first ran as pilot in the Blue Mountains, New South Wales and was supported by hotels, restaurants and experience providers. [Low Carbon Living](#).

The Malmsbury Botanic Garden brochure self-guided walk provides brief information on the key heritage elements and plants of the Garden. The brochure promotes all three botanic Gardens and also promotes connections to the Arboretum. Connections to further information via the Macedon Ranges website could also be included or could be augmented by a digital trail App which could also include other interesting sites around Malmsbury and environs.

The following priority action plan and costings identifies the main areas of the masterplan to be developed

Priority Action Plan & Estimates

Category	MRSC Section	Short (0-1 Yrs)	Medium (1-5Yrs)	Long (5-10Yrs)	Cost Estimate inclusive Consultancy & Project Management	Procurement Strategy / Approach	Potential Funding Source
People							
Botanic Gardens Officer/Curator					\$ 90,000		MRSC - ongoing
Horticulturalist (Qualified)					\$ 72,000		MRSC - ongoing
Town Hall Precinct							
Major Capital Works		Design & Documentation of new architecture to rear of Town Hall	Demolition and Construction of new architecture to rear of Town Hall		\$ 450,000	Appoint Architect with engineering sub consultancy	MRSC - New Capital Works budget
Major Capital Works		Design & Documentation of Town Hall surrounds, new Entry Forecourt and Treehouse Play Area	Demolition and Construction of Town Hall surrounds, new Entry Forecourt and Playground including play elements, paving and furniture		\$ 450,000	Appoint Landscape Architect with engineering sub consultancy	MRSC - New Capital Works budget and DELWP Parks Revitalisation Grant Funding. https://www.environment.vic.gov.au/suburban-parks/creating-new-parkland-across-victoria/local-parks
Major Capital Works		Documentation of existing, Design and Documentation of Proposed Replacement Works to Town Hall Façade	Demolition and Construction of Façade Works to Town Hall as per Town hall CMP recommendations		\$ 350,000	Appoint Heritage and Architectural Consultant with engineering sub consultancy	Grant Funding - DELWP (HV) Living Heritage Program https://www.heritage.vic.gov.au/grants/living-heritage-program
WSUD							
Planning Document		Feasibility Study, WSUD Strategy			\$ -	MRSC Internal	MRSC New Capital Works budget
Major Capital Works		Design and Construction of WSUD system including Town Hall roof harvesting, works to Ornamental Lake, aquatic establishment, Billabong Chain where required and connection between Billabong Chain and Ornamental Lake. Formalise overflow path to circular pool and overflow to Coliban River. Development of irrigation system using harvested water.			\$ 150,000	WSUD - Appoint Landscape Architect with engineering sub consultancy. Irrigation - Design & Construct?	Grant Funding - DELWP (HV) Growing Victoria's Botanic Gardens https://www.forestsandreserves.vic.gov.au/grants/growing-victorias-botanic-gardens-grants-program + Coliban Water sponsorship program https://s3-ap-southeast-2.amazonaws.com/grantguru/MpHjXJ5Mq/V3aSd74RQL_Guidelines-(2019).pdf
BBQ and Picnic Area							
Minor Capital Works		Demolish existing BBQ. Design and Construct new picnic pavilion over picnic settings. Install new accessible double-BBQ with wash-up sink			\$ 60,000	Appoint Landscape Architect	MRSC New Capital Works budget + Friends Fundraising for new picnic pavilion. DELWP Parks Revitalisation Grants Program
Fish Hatchery and Fish Acclimatisation Museum							
Minor Capital Works		Document and partially remove roof and top portion of wall. Replace part roof with transparent material or widely-space timber battens	Recommission well in centre including tanking, water connections, pump and filter. Restock with indigenous water plants, Fish sculpture and Interpretation Strategy. Redesign building surrounds.		\$ 50,000	Appoint Landscape Architect with Heritage Interpretation sub consultancy. Make available Community Arts Grant for Fish Sculpture.	MRSC + Grant Funding - DELWP (HV) Living Heritage Program https://www.heritage.vic.gov.au/grants/living-heritage-program + Creative Victoria Arts Grant https://creative.vic.gov.au/grants-and-support/programs/vicarts-grants
Minor Capital Works			Provide path access and area around Fish Hatchery building		\$ -	Appoint Landscape Architect	MRSC Maintenance budget
Minor Capital Works		Document. Remove existing wire fence, masonry hit-up wall, asphalt and turf surface.	Relocate Tennis Courts to Recreation Precinct north of Cricket Oval.		No cost to MBG	Appoint Landscape Architect	MRSC Maintenance budget
Major Capital Works			Document, Demolish, Relocate and Rebuild Tennis Pavilion, provision of services, such as potable water, electricity. Resurface Court area with compacted gravel surface. Establish garden areas adjacent to court and upgrade access from Ellesmere Place.		\$ 250,000	Appoint Heritage and Architectural consultant and Landscape Architect	Grant Funding - DELWP (HV) Living Heritage Program https://www.heritage.vic.gov.au/grants/living-heritage-program
Tank and Pump House							
Minor Capital Works		Maintain area inside Tank and Pumphouse fenceline. Resurface with gravel to match tennis court	Render and Repaint external Façade to Tank and Pumphouse		\$ 8,000	Coliban Water / Appoint Contractor	Coliban Water Maintenance or Grant Funding
Signage and Interpretation							
Planning & Minor Capital Works		Develop and Design Style Guide/ Plan for the Gardens. Include scientific (plant labels) interpretative, directional, commemorative and incidental signage (such as the Daffodil Poem). Include new MRSC Corporate signage at Main entry points. Relocate Daffodil sign. --			\$ 50,000	MRSC / Appoint graphics and interpretation consultant. Consult MRSC signage policy	MRSC Internal Grant / Grant Funding - DELWP (HV) Growing Victoria's Botanic Gardens https://www.forestsandreserves.vic.gov.au/grants/growing-victorias-botanic-gardens-grants-program
Collections Management							
Planning & Minor Capital Works		Procure Collection Management System (CMS) Software such as IrisBG-Collection Management. Potential funding collaboration with Kyneton and Gisborne Friends Groups.			\$ 10,000	MRSC / Friends of MBG	Friends MBG Fundraising
Bluestone Fountain on Island							
Minor Capital Works		Document, Restore and Replace bluestone elements to fountain and adjacent bluestone structure as required			\$ 35,000	Appoint Contractor	Friends MBG Fundraising
		Remove weeds and Reduce <i>Phragmites</i> and other aquatic species. Replant with additional Indigenous plants.	Maintain at 5-years	Maintain at 10-years	\$ -	MRSC / Friends of MBG	MRSC Maintenance budget
Bluestone Drinking Fountain							
Minor Capital Works		Restore and Replace bluestone where required. Relocate to Entry Forecourt area and commission			\$ 5,000	Appoint Specialist Restorer	Friends MBG Fundraising + Grant Funding - DELWP (HV) Living Heritage Program https://www.heritage.vic.gov.au/grants/living-heritage-program
Taxodium Island							
Minor Capital Works		Remove stumps from Island, Reshape edges and retain soil with semi-submerged stone batter with indigenous reed planting. Resurface centre of island with compacted gravel and leaf mulch or retain mown turf surface. Replant with <i>Taxodium</i> sp. on island edges.	Paint bridge access to island.		\$ 150,000	MRSC	MRSC Maintenance budget
Timber Boardwalk							
Minor Capital Works		Design and Construct new hardwood timber boardwalk to path west of weir.			\$ 25,000	Appoint Landscape Architecture Consultant	MRSC Maintenance budget
Demolition of pavilion adjacent to Coliban River near Viaduct							
Minor Capital Works		Demolish and Remove or Relocate Shelter, Reduce concrete slab around picnic setting			\$ 5,000	Appoint Contractor	MRSC Maintenance budget
Gravel Paths							
Minor Capital Works		Widen primary gravel path to 2.5m wide. Ensure secondary gravel paths minimum 1.8m width. Resurface with regionally-sourced gravel. Extend pathways where indicated. (approx. 3750m2)			\$ 187,500	MRSC	MRSC Maintenance budget
Coliban River Frontage							
Minor Capital Works		Remove weeds, stabilise banks and revegetate	Maintain at 5-years	Maintain at 10-years	\$ 35,000	MRSC/Dja Dja Wurrung/Coliban Water	Coliban Water Maintenance budget or new Capital Works budget
Improvement Works under Bridge							
Minor Capital Works		Remove weeds, stabilise banks and revegetate. Location for Art and Interpretation	Maintain at 5-years	Maintain at 10-years	\$ 20,000	MRSC/Dja Dja Wurrung Aboriginal Corporation /Coliban Water / Community Arts Grant	Coliban Water Maintenance budget or new Capital Works budget + Creative Victoria Arts Grant https://creative.vic.gov.au/grants-and-support/programs/vicarts-grants
Timber Picket Fence							
Major Capital Works		Demolish existing steel mesh fence and install Unpainted hardwood Timber Picket Fence, concealed fence posts, 1.4-1.5m high to match existing wrought-iron fence, gate.			\$ 150,000	Appoint contractor	MRSC New Capital Works budget + Friends MBG
Memorial Gate							
Minor Capital Works		Restore wrought-iron fence to both side of Memorial Gate. Repair and Maintain WWI Memorial.			\$ 10,000	Appoint Specialist Contractor	MRSC New Capital Works budget + Friends MBG + Grant Funding - DELWP (HV) Living Heritage Program https://www.heritage.vic.gov.au/grants/living-heritage-program + Veterans Affairs Grant program https://www.communitygrants.gov.au/grants/saluting-their-service-commemorative-grants-program
Relocation of Mollison Memorial							
Minor Capital Works		Relocate Mollison Memorial in new garden bed adjacent to Town Hall. Design and Construct sculptural solution to reduce risk of injury to visitors			\$ 2,500	MRSC	MRSC Maintenance budget +MRSC Community Arts Grant
Tree Removals							
Minor Capital Works		Remove Trees according to Tree Removal Plan	Remove Trees according to Tree Removal Plan		\$ 36,000	Appoint Contractor	MRSC Maintenance budget
Plant Relocation							
Minor Capital Works		Relocate plants where practical within the gardens (e.g. palm species)			-	MRSC	MRSC Maintenance budget
Minor Capital Works		Procure known provenance plant material where possible from collectors / specialist nurseries / exchange with other botanic gardens			\$ 10,000	Exchange / Wholesale	Annual MRSC Maintenance budget + Friends MBG
TOTAL					\$ 2,499,000		

The DRAFT Priority Action Plan identifies and prioritises actions nominated within the masterplan. Short, medium and long term priorities are identified including associated cost estimates.

The procurement strategy aims to assist in identifying the most relevant discipline areas required to achieve the actions within the scope of the masterplan. An annual budget for plant procurement has been included.

Funding sources have also been identified to assist with procurement, and these include:

- Grant funding - Living Heritage Program, Growing Victoria's Botanic Gardens, Creative Victoria Arts Grants, Coliban Water Grants, Park Rejuvenation Grants and Veterans Affairs Grants for Memorials.
- Macedon Ranges Shire Council (MRSC) Maintenance budget – for minor works such as – pathway improvement, plant relocation, early works on the tennis court for example.
- Fundraising – by the Friends of the Malmsbury Botanic Gardens, and contributions from the Fayre.
- New Council funding – for Major Capital Works and larger budget items where grant funding is unlikely to eventuate, or to supplement grant funding.

Actions which call for inter-organisational collaborative approaches such as with Coliban Water may also affect timing.

DRAFT



Project No: 19018

Malmsbury Botanic Garden
LANDSCAPE MASTERPLAN
GbLA.COM.AU



1 : 750 @ A1 | 0 | 7.5m | 22.5m | June 2020
1 : 1500 @ A3

10. Masterplan Review

The Malmsbury Botanic Garden Masterplan has been shaped by the Garden's site and heritage context, community aspirations for development and management of its plant collections and conservation of existing heritage built form. Connections have been made with Dja Dja Wurrung people, Coliban Water and Heritage Victoria and it is hoped that these relationships continue to strengthen and develop to ensure the long term sustainability of the Garden to meet community expectations and fulfil its potential as a significant regional botanic garden for Macedon Shire Ranges Council and Victoria as a whole.

The historic plantings are important in framing contemporary views within the Garden and to the surrounding landscape. The arrangement and the species grown are indicators of cultural values and environmental conditions and any impacts on future growth and species diversity as a result of climate or other changing circumstances will need to be actively managed in the years to come.

Alongside the priority action plan for works, the view that the masterplan is a 'living' document will assist with meeting community and stakeholder expectations. The following processes may be implemented to align with the short, medium and long term priority actions to ensure that the actions remains relevant for the duration of the masterplan. It is envisaged that the Committee of Management, comprised of key stakeholders including representation from the Friends of Malmsbury Botanic Garden and Environs could be involved in the implementation and review process of priority works plan and review of the master plan

Review period and actions:

The review period for the Masterplan has been generally aligned with implementation period, with further review periods nominated at approximate half-way points to facilitate a 'recalibration' of priorities and undertake assessment of the success, or not, of any works previously implemented.

The following are suggested review periods for the Malmsbury Botanic Garden:

- Review at 12 months to assess implementation of short term (0-1 year) work priorities, funding opportunities and costings and plan for following implementation period.
- Review at 30 months to assess implementation of medium term (1-5 years) priorities including costings and funding opportunities with a further review at 60 months to plan for the following implementation period.
- Review at 84 months to assess implementation of long term (5-10 years) priorities including costings and funding opportunities with a further review at 120 months.

Part of the 'living' document approach to this master plan could involve updating plans, improved recording keeping for collections, particularly around tree removal and planting and establishment of an archive system for the Garden that ensures information about the Garden is maintained in perpetuity. This will ensure continuity of cultural as well as historical information to enrich future masterplan for Malmsbury Botanic Garden.

References

In addition to the Reports already acknowledged in the Introduction, the following work and references are also acknowledged:

- *Ceanothus* images <https://lambley.com.au/search/content/ceanothus>.
- *Cistus* images <https://lambley.com.au/search/content/cistus>.
- Feature Survey RevB, March 2020, Macedon Ranges Shire Council.
- <https://www.alltrails.com/explore/recording/malmsbury-walk-2--2>.
- https://planning-schemes.delwp.vic.gov.au/schemes/vpps/36_03.pdf
- <https://www.treeproject.org.au/seedling-database/eucalyptus-muelleriana>
- Malmsbury Botanic Garden CAD Tree Locations, August 2019, Stephen Fitzgerald Arboriculture.
- Malmsbury Botanic Garden Signage and Wayfinding Analysis, July 2019, Studio Unfold.
- Malmsbury Botanic Garden Underground Storage Options, July 2019, Bruce Cartwright, LIS.
- *Planting c. 1850-1900, A Guide to the Restoration, Conservation and Rehabilitation of Early Style Australian Gardens and Man-Made Landscapes*, Technical Bulletin 4.1, Australian Council of National Trusts, Dec 1982.
- *Syringa* Images <https://www.lottah.com/lilacs/imagesV.htm>

Appendix 3 - Glossary of Terms

The following terms have been adapted from Advisory Note #16 *The Heritage Overlay Guidelines, Glossary of Terms* (Heritage Victoria)

Adaptation

Modifying a place to suit extended use or a proposed use.

Additions

New works including detached and attached structures.

Alterations

Works that change the existing building fabric.

Building Fabric

All the physical material of the place, including finishes and fixtures.

Conservation

All the processes of looking after a place so as to retain its Cultural Heritage Significance.

Conservation Management Plan

A detailed plan of the methods by which the Cultural Heritage Significance of a Heritage Place will be conserved and enhanced, including Maintenance, use, changes and alterations.

Contributory Element

Elements that contribute to the significance of a Heritage Place.

Cultural Heritage Significance

Aesthetic, historic, scientific, spiritual or social value or other special value for the present community and future generations of Australians.

Facadism

When only the facade of a building is retained and the side walls, floor and/or roof are demolished to varying degrees.

Form

The shape, proportions and size of a building.

Heritage Area or Precinct

All land covered by an Area Heritage Overlay.

Heritage Overlay (HO)

Applied to a Heritage Place to conserve its cultural heritage values. The Heritage Overlay provisions are found at Clause 43.01 of planning schemes.

Heritage Place

A Heritage Place can be a building, structure, features, private garden or public park, single or group of trees, group of buildings or sites, landscape, habitat or other place of natural or Cultural Heritage Significance and its associated land.

Maintenance

The continuous, protective care of the Building Fabric, and Setting of a Heritage Place, and is to be distinguished from repair. Repair involves Restoration or Reconstruction.

Reconstruction

Means returning the Fabric of a place to a known earlier state including the introduction of new material into the Fabric.

Restoration

Means returning the existing Fabric of place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.



Appendices

Appendix 1 - Results of Online-Survey

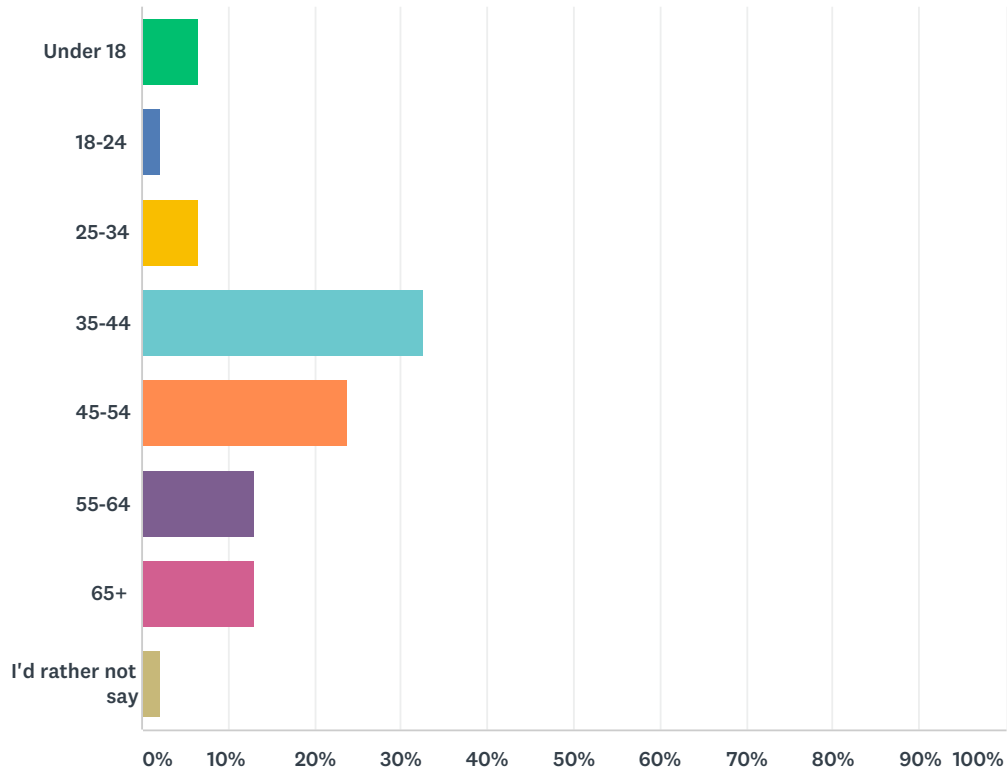
Q1 What's the postcode where you live?

Answered: 36 Skipped: 10

#	RESPONSES	DATE
1	3446	9/10/2019 8:19 AM
2	3446	9/9/2019 11:11 PM
3	3446	9/8/2019 3:50 PM
4	3446	9/4/2019 6:01 AM
5	3446	9/3/2019 8:20 PM
6	3437	8/31/2019 4:53 AM
7	3446	8/30/2019 1:55 AM
8	3446	8/30/2019 1:49 AM
9	3446	8/30/2019 1:43 AM
10	3446	8/30/2019 1:15 AM
11	3446	8/30/2019 1:04 AM
12	3083	8/29/2019 2:06 AM
13	3446	8/29/2019 1:31 AM
14	3446	8/27/2019 12:29 AM
15	3446	8/26/2019 11:22 PM
16	3446	8/26/2019 11:12 PM
17	3446	8/26/2019 10:40 PM
18	3446	8/26/2019 9:49 PM
19	Malmsbury 3446	8/26/2019 9:25 PM
20	3446	8/25/2019 11:29 PM
21	3446	8/25/2019 6:39 PM
22	3461	8/24/2019 9:25 PM
23	3446	8/24/2019 8:10 PM
24	3446	8/24/2019 4:18 AM
25	3446	8/21/2019 11:09 PM
26	3442	8/21/2019 10:02 PM
27	3446	8/21/2019 9:57 PM
28	3446	8/19/2019 11:56 PM
29	3434	8/19/2019 11:49 PM
30	3442	8/19/2019 11:34 PM
31	3444	8/19/2019 10:03 PM
32	3442	8/19/2019 8:39 PM
33	3446	8/19/2019 8:38 PM
34	3434	8/19/2019 6:59 PM
35	3446	8/19/2019 6:50 PM
36	3434	8/14/2019 5:21 PM

Q2 How old are you?

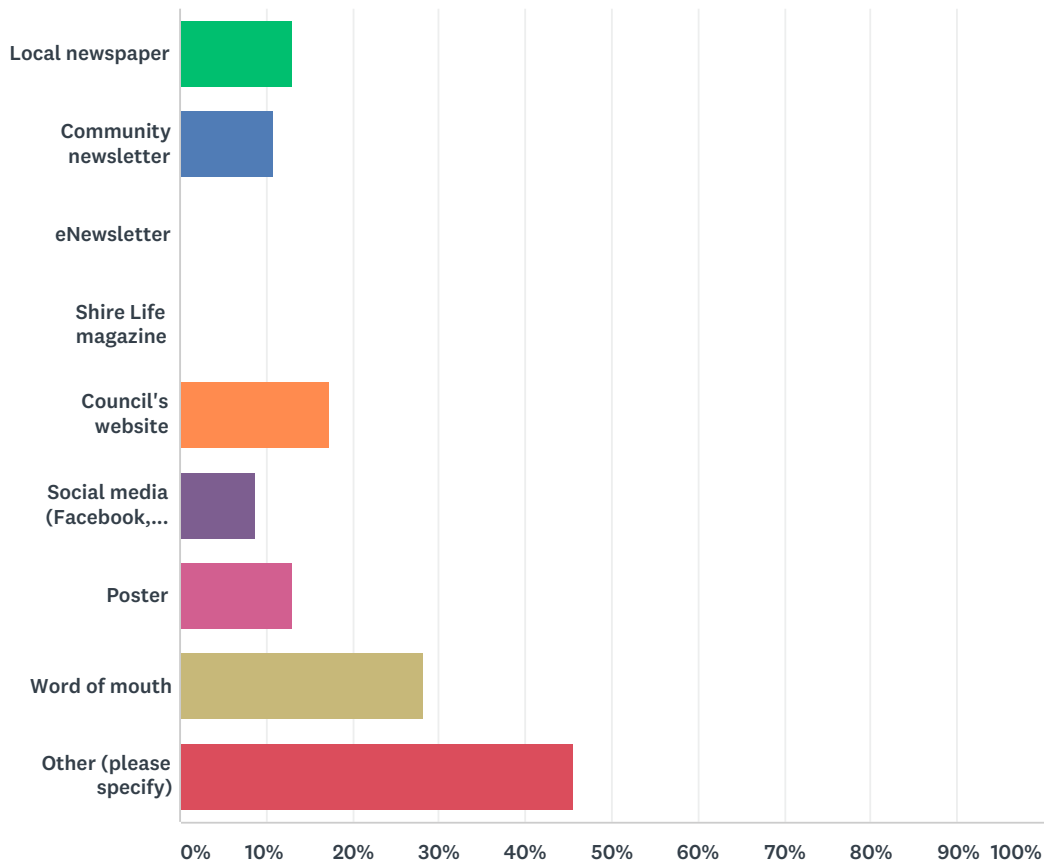
Answered: 46 Skipped: 0



ANSWER CHOICES	RESPONSES	
Under 18	6.52%	3
18-24	2.17%	1
25-34	6.52%	3
35-44	32.61%	15
45-54	23.91%	11
55-64	13.04%	6
65+	13.04%	6
I'd rather not say	2.17%	1
TOTAL		46

Q3 How did you find out about this?

Answered: 46 Skipped: 0



ANSWER CHOICES	RESPONSES
Local newspaper	13.04% 6
Community newsletter	10.87% 5
eNewsletter	0.00% 0
Shire Life magazine	0.00% 0
Council's website	17.39% 8
Social media (Facebook, Twitter, Instagram, LinkedIn)	8.70% 4
Poster	13.04% 6
Word of mouth	28.26% 13
Other (please specify)	45.65% 21
Total Respondents: 46	

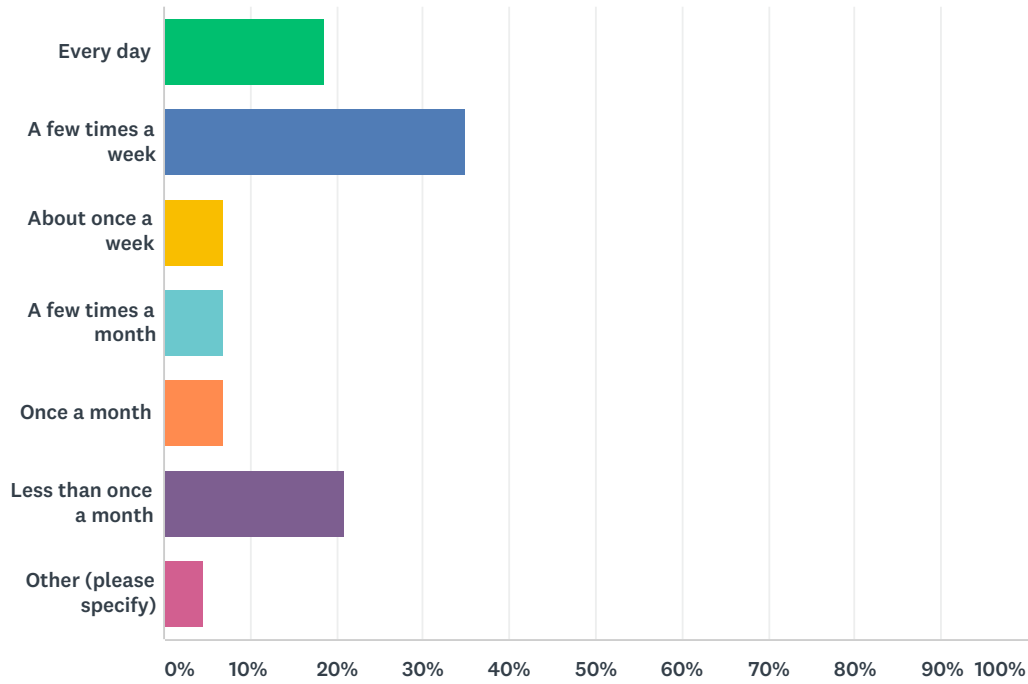
#	OTHER (PLEASE SPECIFY)	DATE
1	Friends of Malmsbury gardens and on email	9/10/2019 8:19 AM
2	MRSC Mail-out	9/4/2019 6:01 AM
3	letter from council	9/2/2019 7:02 PM
4	FOMG POST	8/30/2019 1:49 AM
5	More	8/30/2019 1:43 AM

Help develop Malmsbury Botanic Gardens Master Plan

6	Council letter	8/27/2019 12:29 AM
7	Passing by after walk in the gardens.	8/26/2019 11:12 PM
8	FOMGE E/mail	8/26/2019 10:40 PM
9	Member-Friends of Gardens.	8/26/2019 9:49 PM
10	Letter	8/26/2019 9:25 PM
11	Letter to residents from mrsc	8/26/2019 7:19 AM
12	Letter sent to my home	8/25/2019 11:29 PM
13	Letter to us from council	8/25/2019 6:39 PM
14	letter from council	8/24/2019 8:10 PM
15	Letter in mail	8/24/2019 4:18 AM
16	Council letter	8/22/2019 8:53 PM
17	Letter from council	8/21/2019 11:09 PM
18	Letter	8/21/2019 9:57 PM
19	internal comms - work at the shire	8/19/2019 8:39 PM
20	internal email	8/19/2019 8:38 PM
21	Through work	8/19/2019 6:50 PM

Q4 How often do you visit the Malmsbury Botanic Gardens?

Answered: 43 Skipped: 3

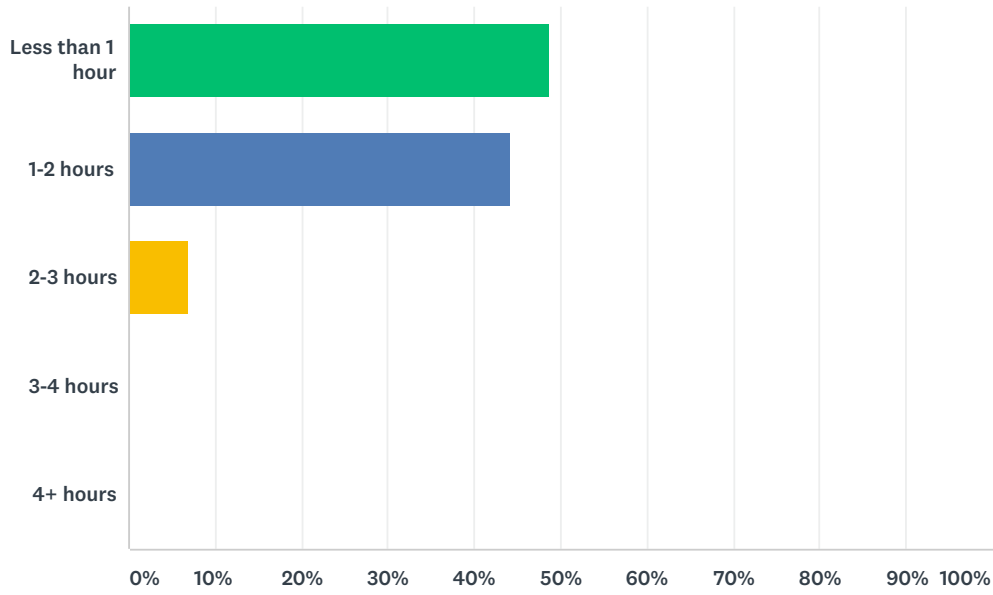


ANSWER CHOICES	RESPONSES
Every day	18.60% 8
A few times a week	34.88% 15
About once a week	6.98% 3
A few times a month	6.98% 3
Once a month	6.98% 3
Less than once a month	20.93% 9
Other (please specify)	4.65% 2
TOTAL	43

#	OTHER (PLEASE SPECIFY)	DATE
1	For family or comunity gatherings.	8/26/2019 9:29 PM
2	once a year or less	8/20/2019 1:43 AM

Q5 How long do you typically visit for?

Answered: 43 Skipped: 3



ANSWER CHOICES	RESPONSES	
Less than 1 hour	48.84%	21
1-2 hours	44.19%	19
2-3 hours	6.98%	3
3-4 hours	0.00%	0
4+ hours	0.00%	0
TOTAL		43

Q6 What do you like to do when you visit?

Answered: 40 Skipped: 6

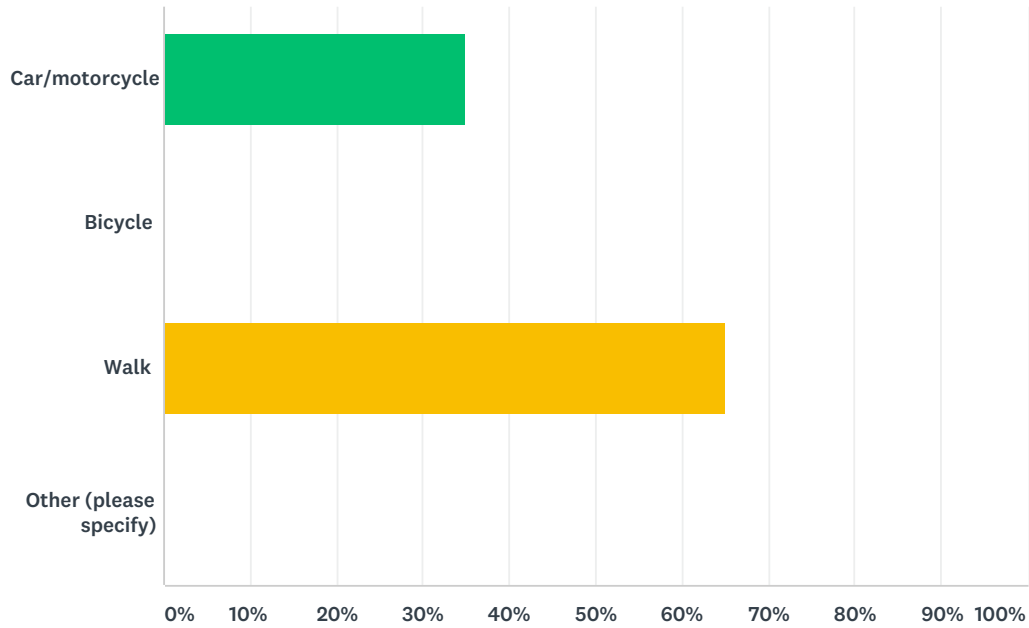
#	RESPONSES	DATE
1	Walk around and look at the trees, viaduct and everything else. Walk the dog too. Occasional barbecue. Look for platypus.	9/10/2019 8:24 AM
2	Walk dogs and take our daughter to the park. We often go 2 even 3 times a day.	9/8/2019 3:51 PM
3	use the park facilities walk around the garden	9/6/2019 1:43 AM
4	Walk through the gardens. Sit and have coffee. Kids playground	9/4/2019 6:02 AM
5	Walk through the gardens, play in the playground with my children.	9/3/2019 8:21 PM
6	The tree plantings, Tranquillity, Views of the Viaduct, The Lake, The Geese	9/3/2019 7:37 PM
7	run or walk through; visit with the children for activities; bike riding	9/2/2019 7:03 PM
8	Playground, walking, geese watching and Motobean cafe	8/31/2019 4:54 AM
9	Play on the park and see the animals	8/30/2019 1:56 AM
10	WHOLE GARDEN	8/30/2019 1:49 AM
11	site seat Wonder	8/30/2019 1:44 AM
12	The Peace The country settings The Botanic Trees The River walk	8/30/2019 1:16 AM
13	Gess,freinds,PlayGround,Duck,and the walk around the pond	8/30/2019 1:06 AM
14	Enjoy the peace and quiet, sit under the trees and love the geese.	8/29/2019 9:09 PM
15	Walk the dog	8/29/2019 1:31 AM
16	Walk around the gardens with dogs and play at the playground	8/27/2019 12:29 AM
17	walk,observe,	8/26/2019 11:24 PM
18	Walk sit relax	8/26/2019 11:12 PM
19	Look at the trees & viaduct & lake & river. Sometimes sit & eat lunch or morning or afternoon snack	8/26/2019 10:42 PM
20	-Trees -"work" with Primary School students as part of River Detectives. (Taxonomy, tree identification etc.)	8/26/2019 9:50 PM
21	Not when it's cold and wet.	8/26/2019 9:29 PM
22	Walk dog, picnics, kids practice cycling and running, swim in river, family and friend bbqs, use playground equipment, attend festivals (easter egg hunt, Malmsbury fayre, fundraisers, community xmas lunches, anzac day, town hall celebrations) pick olives for preserving, eat lunch at picnic tables, meet locals I haven't chatted with before. Admire the beautiful gardens! Amazing asset for our town!	8/26/2019 7:24 AM
23	Walk around the track, look at the lake.	8/25/2019 11:30 PM
24	Walk	8/25/2019 6:39 PM
25	Walk around, enjoy the trees and the views, admire the geese, bring visitors to see the gardens.	8/24/2019 9:27 PM
26	Playground usually or picnic w kids walk around the lake show visitors the viaduct	8/24/2019 8:10 PM
27	Walk through the gardens. Play tennis. Sit and eat food.	8/24/2019 4:18 AM
28	Picnic Walk Watch the ducks	8/22/2019 8:54 PM
29	Walk around the viaduct and the pond/lake	8/21/2019 11:10 PM
30	Picnic, look at the water birds	8/21/2019 10:03 PM
31	Walking dogs	8/21/2019 9:57 PM
32	Walk around the paths	8/20/2019 1:43 AM
33	Walk my dog Have community get-togethers	8/20/2019 1:08 AM
34	I take our kids to the playground, wander around	8/19/2019 11:56 PM

Help develop Malmsbury Botanic Gardens Master Plan

35	We love wandering around the lake enjoying the views and the island where the geese and ducks are. We also like the flat land part near the old bluestone bridge. My children like to play in the playground too.	8/19/2019 11:35 PM
36	walk around	8/19/2019 10:03 PM
37	Walk, feed the ducks, look at the viaduct, have a picnic	8/19/2019 8:40 PM
38	Picnic, children play in park, walk	8/19/2019 8:39 PM
39	Look at the lake and contemplate existence	8/19/2019 7:00 PM
40	tranquility of the space	8/19/2019 6:51 PM

Q7 When you last visited, how did you get there?

Answered: 43 Skipped: 3

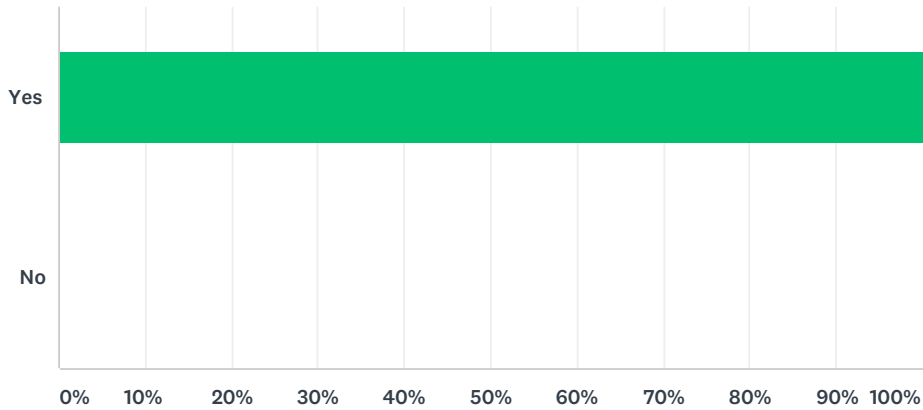


ANSWER CHOICES	RESPONSES
Car/motorcycle	34.88% 15
Bicycle	0.00% 0
Walk	65.12% 28
Other (please specify)	0.00% 0
TOTAL	43

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q8 Was there sufficient car/bicycle parking available?

Answered: 16 Skipped: 30



ANSWER CHOICES	RESPONSES	
Yes	100.00%	16
No	0.00%	0
TOTAL		16

#	COMMENTS	DATE
1	Usually OK, but not enough for special events.	8/26/2019 10:42 PM
2	But need more when there are events. Suggest cover drain up the side of park.	8/26/2019 9:30 PM
3	Most times we go there is always somewhere close by the park if there is nothing available right at the gardens.	8/19/2019 11:36 PM

Q9 What do you like about the Malmsbury Botanic Gardens?

Answered: 43 Skipped: 3

#	RESPONSES	DATE
1	tranquillity, beauty, shade and coolness on hot days, quiet green space, place to enjoy a festival or wedding, haven for animals and birds. Great place for children to play in nature, history, have barbecues, picnics, meet others, perfect for concerts..	9/10/2019 8:58 AM
2	The grandeur of the big old trees, the vista of the lake and the fact it feels like a secret garden with hidden gems around the walkways such as stumbling upon the view to the viaduct. I also love the bird life and the proximity to The common and cricket grounds.	9/8/2019 3:57 PM
3	beautiful trees/plants/ landscape shady in summer great place to take children	9/6/2019 1:47 AM
4	Mostly the ambience and that the gardens exist for all to enjoy.	9/4/2019 6:03 AM
5	The open space, heritage trees and the public amenity.	9/3/2019 8:25 PM
6	Large Established Trees views of the River and Viaduct. The lake and the geese and the ducks It is a peaceful quiet place	9/3/2019 7:42 PM
7	the mature trees; the water spaces; the heritage; the views to the viaduct; access to the common green under the bridge	9/2/2019 7:11 PM
8	Beautiful views. Convenient cafe. Playground and toilets for the kids.	8/31/2019 4:56 AM
9	The layout and the heritage trees!	8/31/2019 3:17 AM
10	the animals the TREES and the land	8/30/2019 1:58 AM
11	LAKE	8/30/2019 1:49 AM
12	EVERYTHING!!	8/30/2019 1:45 AM
13	the Peacefullness the Pond with the ducks fountain	8/30/2019 1:27 AM
14	everything	8/30/2019 1:07 AM
15	That it feels natural, not overdeveloped or crowded during the week. I rarely go on weekends, unless taking out of town visitors to look at the Viaduct.	8/29/2019 9:11 PM
16	The layout, beauty,natural aspect.	8/29/2019 2:08 AM
17	Its historic importance, tranquility and its a cool space on hot days. The viaduct is a visual delight.	8/29/2019 1:36 AM
18	Openness and the water	8/27/2019 12:30 AM
19	green space/ picnic area stop off/rest area	8/26/2019 11:31 PM
20	The calm atmosphere-natural setting. no cement paths not too many sighns etc.	8/26/2019 11:14 PM
21	Sense of history, tranquility & display (diverse) of trees & shrubs from around the world	8/26/2019 10:44 PM
22	Trees Tranquility	8/26/2019 9:52 PM
23	The water features and river, bbq restful park walks or the variety of botanical (unusual to area & Aust) plants & trees.	8/26/2019 9:33 PM
24	It is a commons - all residents own it equally and can enjoy its bounty.	8/26/2019 7:31 AM
25	The old trees and views to the viaduct.	8/25/2019 11:31 PM
26	The walk by the viaduct and the areas between the 'lake' and the southern ring of water and between the viaduct and tennis courts are very peaceful.	8/25/2019 6:59 PM
27	The river The geese and ducks The somewhat wild feeling to the gardens Informations signs	8/25/2019 6:48 PM
28	The beautiful old shady trees, the geese, the view of the viaduct.	8/24/2019 9:29 PM
29	Beautiful big old trees	8/24/2019 8:12 PM
30	I like the ducks and walking around the lake	8/24/2019 4:20 AM
31	Beauty History Community heart for the town	8/22/2019 8:59 PM

Help develop Malmsbury Botanic Gardens Master Plan

32	I love that there are options for being amongst the community but also some more private walks.	8/21/2019 11:13 PM
33	It's peaceful, it's convenient, the lake and weird fountain are interesting	8/21/2019 10:04 PM
34	Natural vegetation	8/21/2019 9:58 PM
35	The natural beauty, the aesthetics of the space. The shade provided by the trees in summer. The centrality of the space in the town and the ability of the community to use it as a space to come together for informal gatherings or formal gatherings like the Malmsbury Fayre Play park	8/20/2019 1:48 AM
36	The old trees and the view of the viaduct	8/20/2019 1:44 AM
37	Shady beautiful trees, playground in shade is good	8/19/2019 11:57 PM
38	The lake, the beautiful trees and depending on the time of year the magical memories made with the amazing colors. the new bridge ins great and the walking paths and in great condition.	8/19/2019 11:48 PM
39	peaceful and i love the viaduct	8/19/2019 10:04 PM
40	calm, quiet, pretty	8/19/2019 8:41 PM
41	Attractive trees, pond, birds	8/19/2019 8:40 PM
42	The lake and plants	8/19/2019 7:28 PM
43	walking track	8/19/2019 6:51 PM

Q10 What do you think could be improved at the Malmsbury Botanic Gardens?

Answered: 40 Skipped: 6

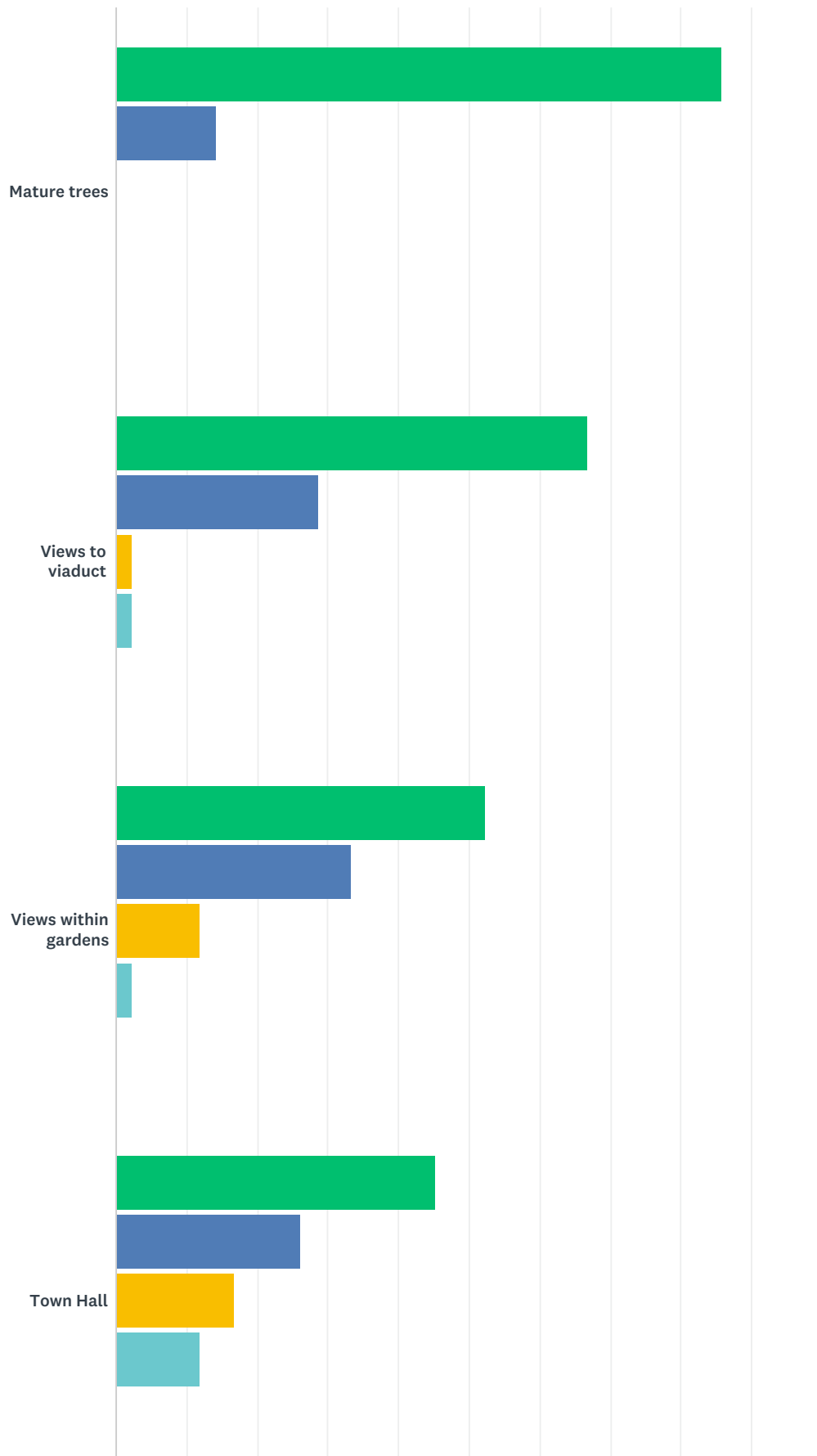
#	RESPONSES	DATE
1	More celebration of indigenous people who would have lived there long before Europeans arrived to plant trees from other places. River banks need replanting with native plants and keep weeds at bay however the use of glyphosate to be banned. Improve water harvesting to keep lake and billabongs with water. Improve water quality with using plants, Tennis court to be improved. Tennis pavilion to be rebuilt and used. Have a special place for the Friends group to meet and grow seedlings. Improve toilets as they are used a lot by visitors. Living hedge all along fence line. Introduce a maze or labyrinth, Labyrinth is when you can walk along a pathway to meditate and is not hard to follow whereas a maze you have to work out where to go to get outside of the pattern.	9/10/2019 8:58 AM
2	I would like to see: - A much more engaging playground like Taradale with equipment for different age groups. Our daughter is 18 months old and can really only use the slide and harness swing. - Street appeal: better fences and more designed entrances like Kyneton Botanic Gardens - Signage: more signage and more engaging and accurate information - Heritage style picnic areas (that ugly picnic rotunda on the far side is rarely used and not in keeping with the style of the gardens) perhaps it could be relocated to The Common reserve? - Better signposting of the viaduct, can not believe how many people do not know it's just a short walk through the gardens - The viaduct area more landscaped and utilised for tourists - Connection to the Common Flora & Fauna reserve with signage and info - The tennis courts! Restore them Or make it a dog off lead area, that's fully enclosed. Something that is really no where else in the region (we have two dogs that run off and plenty of other people do too it would be so good to have a completely enclosed dog offlead area)	9/8/2019 3:57 PM
3	- improve the playground needs to be bigger - fix the tennis court - re home the geese	9/6/2019 1:47 AM
4	Linkages between the Botanic Gardens and other attractions/facilities. In particular the reservoir, Malmsbury common, etc. Improve the pathways (wider, smoother, more robust).	9/4/2019 6:03 AM
5	Improved landscaping, future-proofing tree selection for a changing climate while respecting the original garden plans, updating infrastructure to improve aesthetics (e.g. the fencing along Mollison St), removal of weedy shrubs, better botanical signage and historical information, improved amenities to encourage people to visit and utilise different parts of the gardens (e.g. reinstate the bowling green as a petanque pitch, repair the tennis courts for use). The landscaping would benefit from using garden beds to create better-defined spaces for people to use and the charm of limited vistas, rather than the very open, clear vista.	9/3/2019 8:25 PM
6	Branches and Waste lying around needs to be cleaned up on a regular basis A large pile of garden refuse is lying in the Garden on the river bank side. If the Tennis Court was utilised to set up a work area for friends of the Malmsbury Gardens to propagate plants and mulch garden waste it would improve the appearance of the gardens. The paths are in poor repair and some trees need attention to remove dead branches.	9/3/2019 7:42 PM
7	tennis courts to be functioning, currently are an eyesore; improve the playground to be more exciting for the children; design points of interest to engage older children; way finding / signage to local walking tracks; collaborate with Coliban water to encourage walk/ cycle paths between the botanical gardens and the reservoir, ensure they are regularly mowed and weeded to allow safe access; look to develop other walk and cycle paths	9/2/2019 7:11 PM
8	Playground could be bigger and more modern. Or add adventure type play around the gardens. Cafe open all week would be great.	8/31/2019 4:56 AM
9	The tennis courts need to be upgraded the BBQ area needs a shelter to enable use in all weather.	8/31/2019 3:17 AM
10	the park being bigger and more swings more bbqs swings being fixed clean tolets	8/30/2019 1:58 AM
11	FLOWERING TREES	8/30/2019 1:49 AM
12	Put Back the oreganle Trees	8/30/2019 1:45 AM

Help develop Malmsbury Botanic Gardens Master Plan

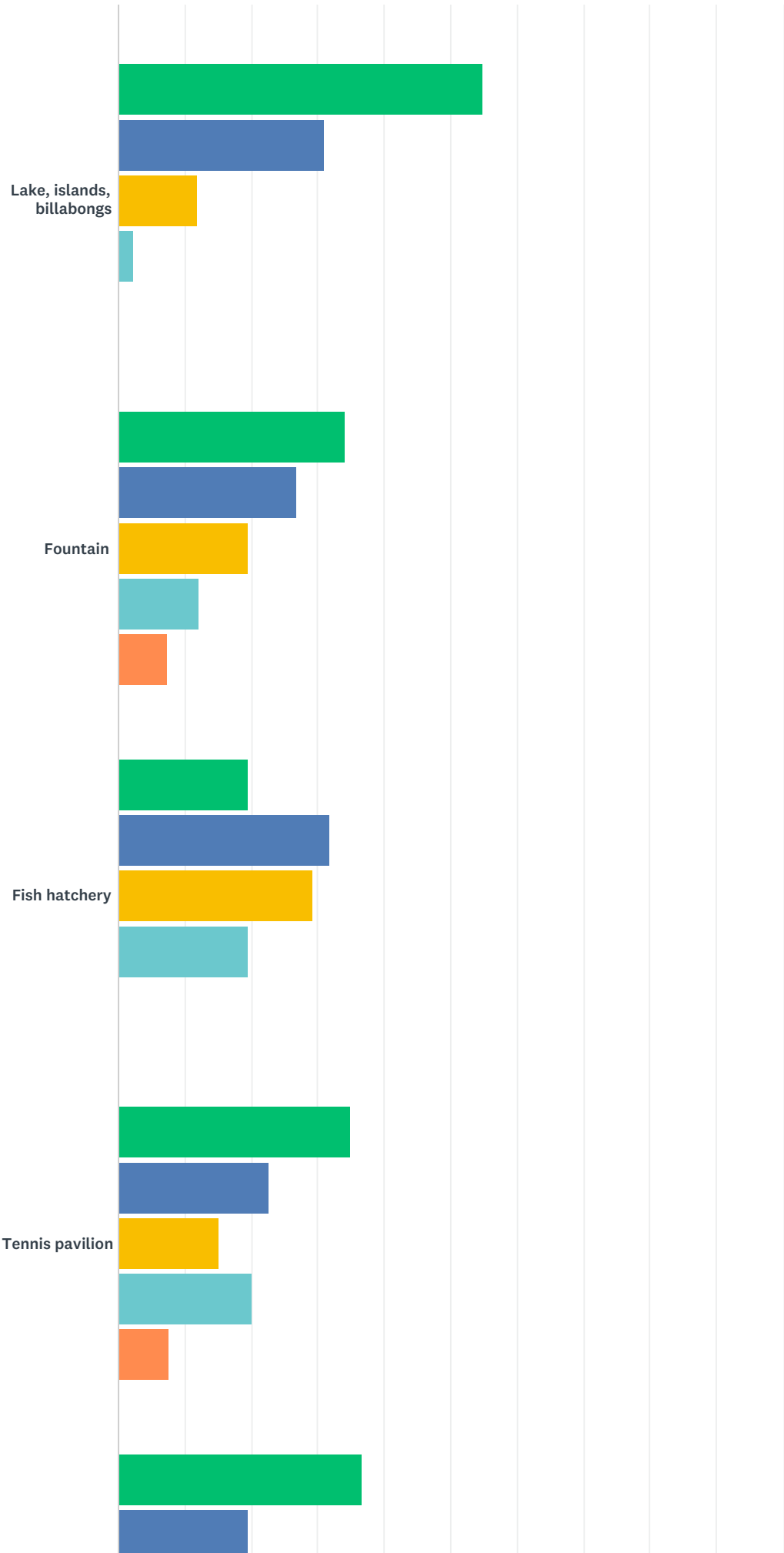
13	Need more B.B.Q more seating need a gate Put into PlayGround facing the B.B.Q area Need the tenise courts fixed up so they can be used Need area's for cricet, Foot Ball, etc... More Botanic Tree's to be Planted if a tree gets cut Down get a wood Carver in to Carve something of Past times. Need Better sign's to show Dog's to be on lead's	8/30/2019 1:27 AM
14	Tenise corts More Play Ground more B.B.Q more seats	8/30/2019 1:07 AM
15	Plant signs/information Historical info	8/29/2019 2:08 AM
16	A better tree managment plan. Trees seem to be cut out too redily when old.	8/29/2019 1:36 AM
17	More walking tracks around the gardens. Give more options, maybe a big one around the perimeter	8/27/2019 12:30 AM
18	Toilets RemovAl of geese.	8/26/2019 11:31 PM
19	Maybe the lake could be made a bit more tidy? Otherwise perfect as is!	8/26/2019 11:14 PM
20	(see notes at Q13)	8/26/2019 10:44 PM
21	-Tree labelling. -well designed paths.	8/26/2019 9:52 PM
22	More maintanance & funding & local consultation	8/26/2019 9:33 PM
23	Get rid of the stinky, poo covered, aggressive geese! Two geese were dumped in the duckpond 5 years ago (by a cavalier local who didn't want them anymore) and now there are twenty! The are aggressive to people and dogs - but especially problematic around small children (bullying them and stealing food out of their hands if they are having a picnic near the duckpond). The geese have destroyed the amenity of the gardens - they eat the grass in summer - leaving only dust, mud and poo. In winter the poo becomes a stinky sludge that never seems to break down - growing crazy fungus and fowling the picknic benches, tables, banks of the river and pond, and shoes and paws of any who use the park.	8/26/2019 7:31 AM
24	More communal spaces and improved playground like they did at Kyneton Botanical gardens.	8/25/2019 11:31 PM
25	Refurbish the tennis courts, please.	8/25/2019 6:59 PM
26	Clean up alongside river While I do like the wild feeling of the gardens. Parts of it feel entirely neglected. The tennis courts, the historical buildings, some areas of the garden. More picnic tables.	8/25/2019 6:48 PM
27	Nothing	8/24/2019 9:29 PM
28	Playground could be better - bigger, more equipment and some interesting equip like Taradale Fountain could be prettier Ducks could be fed a healthier diet (they just eat bread)	8/24/2019 8:12 PM
29	1. More of green-screen from the main road such as hedges or trees. 2. The Tennis Court upgrade 3. A few more seats for sitting throughout, especially on the West side. 4. More signage on plants and history	8/22/2019 8:59 PM
30	The kids park could really be improved - we take our kids to Taradale just for their amazing park and we often end up spending money in Taradale businesses. Also the Tennis courts. they're completely run down and derelict. Either do them up or remove them.	8/21/2019 11:13 PM
31	Management of water levels in the park in summer, access to bbqs etc.....	8/21/2019 10:04 PM
32	More picnic tables	8/21/2019 9:58 PM
33	More native plantings Doing something with the tennis court area More acknowledgement of the Traditional Owners (Dja Dja Wurrung)	8/20/2019 1:48 AM
34	The playground and picnic facilities	8/20/2019 1:44 AM
35	The playground could definitely be improved	8/19/2019 11:57 PM
36	A few more seating areas. Perhaps a picnic area and some BBQ's more separated from the main BBQ area. I like to picnic or BBQ with my family and friends and would like an area away from others. The garden area is always well looked after but could be better if there were a few more staff to look after these precious historical gardens. I have noticed that some garden areas could do with some new plantings and things but figured this was due to staffing levels. Considering this shire has 3 botanical gardens - I'm not surprised!! A newer playground or perhaps another playground area would be great. The smaller playground that is there can be quite busy and there is not a lot of equipment.	8/19/2019 11:48 PM
37	Better grass maintenance, maybe more of a lawn as opposed to a reserve?	8/19/2019 10:04 PM
38	the playground is a bit limited for kids - could be improved similar to Woodend children's park or kyneton community gardens	8/19/2019 8:41 PM
39	Seating, toilets	8/19/2019 8:40 PM

Q11 How important are the following heritage values and characteristics to you?

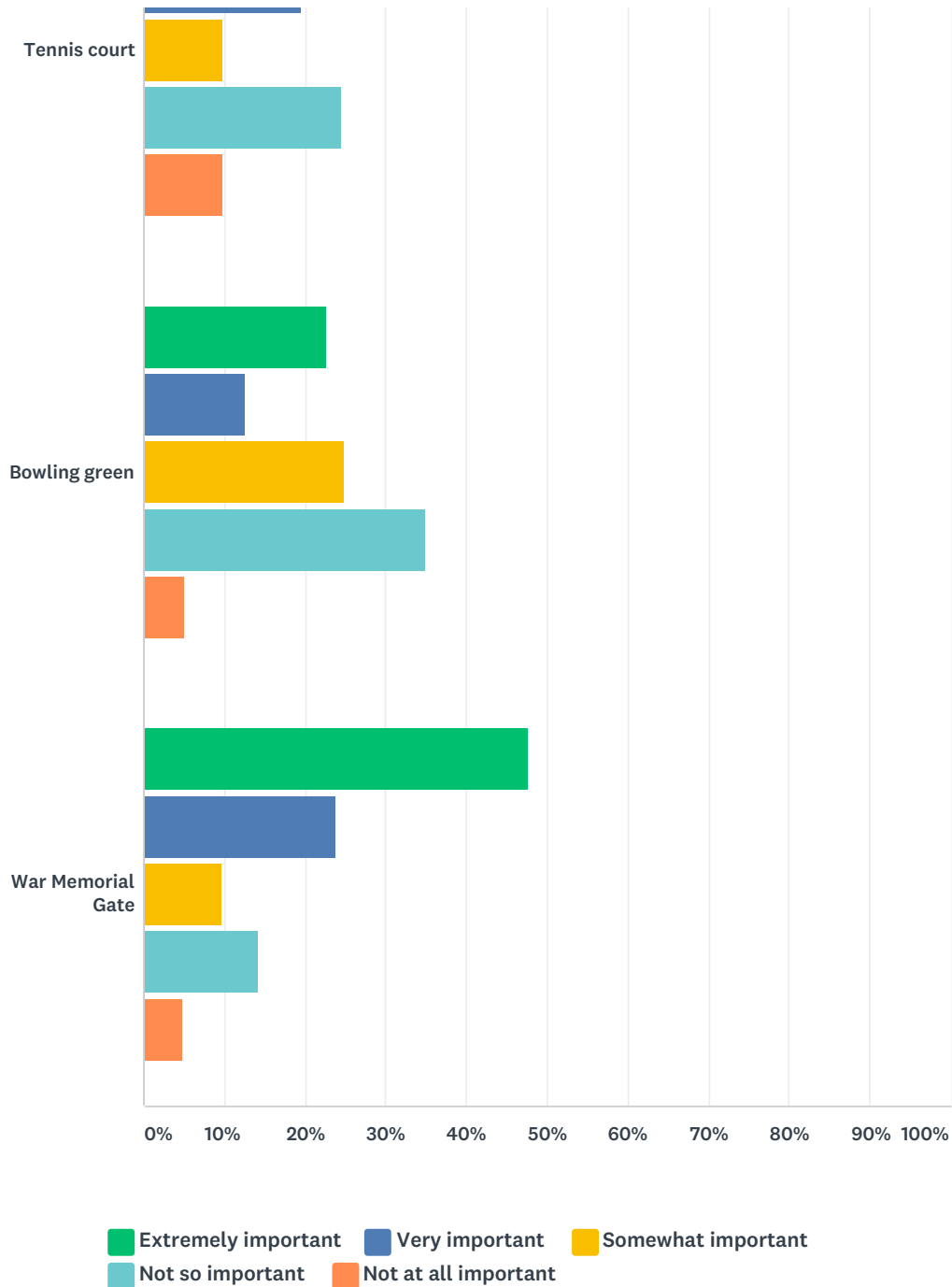
Answered: 42 Skipped: 4



Help develop Malmsbury Botanic Gardens Master Plan



Help develop Malmsbury Botanic Gardens Master Plan



■ Extremely important
 ■ Very important
 ■ Somewhat important
■ Not so important
 ■ Not at all important

	EXTREMELY IMPORTANT	VERY IMPORTANT	SOMEWHAT IMPORTANT	NOT SO IMPORTANT	NOT AT ALL IMPORTANT	TOTAL
Mature trees	85.71% 36	14.29% 6	0.00% 0	0.00% 0	0.00% 0	42
Views to viaduct	66.67% 28	28.57% 12	2.38% 1	2.38% 1	0.00% 0	42
Views within gardens	52.38% 22	33.33% 14	11.90% 5	2.38% 1	0.00% 0	42
Town Hall	45.24% 19	26.19% 11	16.67% 7	11.90% 5	0.00% 0	42
Lake, islands, billabongs	54.76% 23	30.95% 13	11.90% 5	2.38% 1	0.00% 0	42
Fountain	34.15% 14	26.83% 11	19.51% 8	12.20% 5	7.32% 3	41
Fish hatchery	19.51% 8	31.71% 13	29.27% 12	19.51% 8	0.00% 0	41

Help develop Malmsbury Botanic Gardens Master Plan

Tennis pavilion	35.00% 14	22.50% 9	15.00% 6	20.00% 8	7.50% 3	40
Tennis court	36.59% 15	19.51% 8	9.76% 4	24.39% 10	9.76% 4	41
Bowling green	22.50% 9	12.50% 5	25.00% 10	35.00% 14	5.00% 2	40
War Memorial Gate	47.62% 20	23.81% 10	9.52% 4	14.29% 6	4.76% 2	42

#	OTHER (PLEASE SPECIFY)	DATE
1	Hedge around fenceline. Part of it has been commenced by Friends group.	9/10/2019 9:03 AM
2	playground extremely important	9/6/2019 1:48 AM
3	Indigenous history	9/3/2019 8:28 PM
4	Tennis Court's need to be fixed	8/30/2019 1:29 AM
5	Have yet to findspots marked '?' 1	8/26/2019 11:16 PM
6	Seating & eating area.	8/26/2019 10:48 PM
7	Shrubs & bushes.	8/26/2019 9:35 PM
8	Heritage drinking fountain should be repaired.	8/26/2019 7:37 AM
9	playground	8/24/2019 8:13 PM
10	playground	8/19/2019 8:42 PM
11	Birds	8/19/2019 8:42 PM

Q12 Do you have any comments about the heritage values and characteristics?

Answered: 17 Skipped: 29

#	RESPONSES	DATE
1	Important to maintain the mature trees as they are a big part of the Botanic Gardens. Important to find out about indigenous people who once lived in the area. Fountain could be replaced with another. Develop another collection of species of trees. Maintain the arbutus and increase its size.	9/10/2019 9:03 AM
2	It concerns me that the list above doesn't include any reference to pre-European heritage values and characteristics. I understand that MRSC is in the process of developing a Reconciliation Action Plan, and it should be considered absolutely fundamental to include recognition, celebration and education of Indigenous cultural and natural heritage in the Master Plan.	9/3/2019 8:28 PM
3	The Tennis courts are not viable and would be better utilised as a workspace and nursery similar to the area in the Wombat Hills Botanic Gardens This could aid in keeping the plants and garden environs in better repair if a mulcher and small trailer was kept on sight for the use of the Friends of the Malmsbury Gardens. The Fences on the Tennis Courts would provide security but need some repair.	9/3/2019 7:47 PM
4	KEEP UP WITH HERITAGE NO COMPROMISE	8/30/2019 1:51 AM
5	We need to keep Botanic Trees here and our Past to be seen our trees you cut down please get a wood carver in and carve something of our town	8/30/2019 1:29 AM
6	stop chopping down the trees.	8/30/2019 1:07 AM
7	The open spaces and paths, very old trees and the meandering aspects of the gardens appeal to me most. And the peace and quiet. The point of visiting gardens to me. I'd hate to see that lost by inappropriate development of the gardens.	8/29/2019 9:16 PM
8	This is a great example of the original Botanic Gardens of Victoria. Its historic design and integrity should be a prime purpose of its ongoing existence.	8/29/2019 1:38 AM
9	Important showcase of worldwide trees & shrubs, but big challenge of maintaining it as original 19C plantings mature.	8/26/2019 10:48 PM
10	Look at the reasons for originally developing the gardens & its planning & maintain & develop with changing community needs.	8/26/2019 9:35 PM
11	I love the history of the gardens. The fish hatchery is a bit spooky but with regular maintenance and better interpretation could be a drawcard. The tennis court and club house needs to be embraced and saved! If Drummond and Taradale can have excellent courts why can't we? I want my kids to have sporting facilities they can get to by bike rather than needing to drive to another town.	8/26/2019 7:37 AM
12	The fish hatchery is historical but it should be known to the public more. Town Hall is important.	8/25/2019 11:33 PM
13	Please respect the history and heritage value of the gardens.	8/24/2019 9:30 PM
14	Town Hall could be updated - repainted inside and the gable painted/rendered on main roadside	8/24/2019 8:13 PM
15	The heritage as a whole is important as it tells a story of the town, irrespective of it having any current value e.g. the hatchery	8/22/2019 9:00 PM
16	I love the older look of the entry and the gardens and the historical feature. There are just some areas that could do with a bit of an upgrade.	8/19/2019 11:49 PM
17	Very important to provide heritage information and keep the atmosphere	8/19/2019 8:42 PM

Q13 What facilities are important for the Malmsbury Botanic Gardens? e.g. a dedicated play space, public toilets etc.

Answered: 36 Skipped: 10

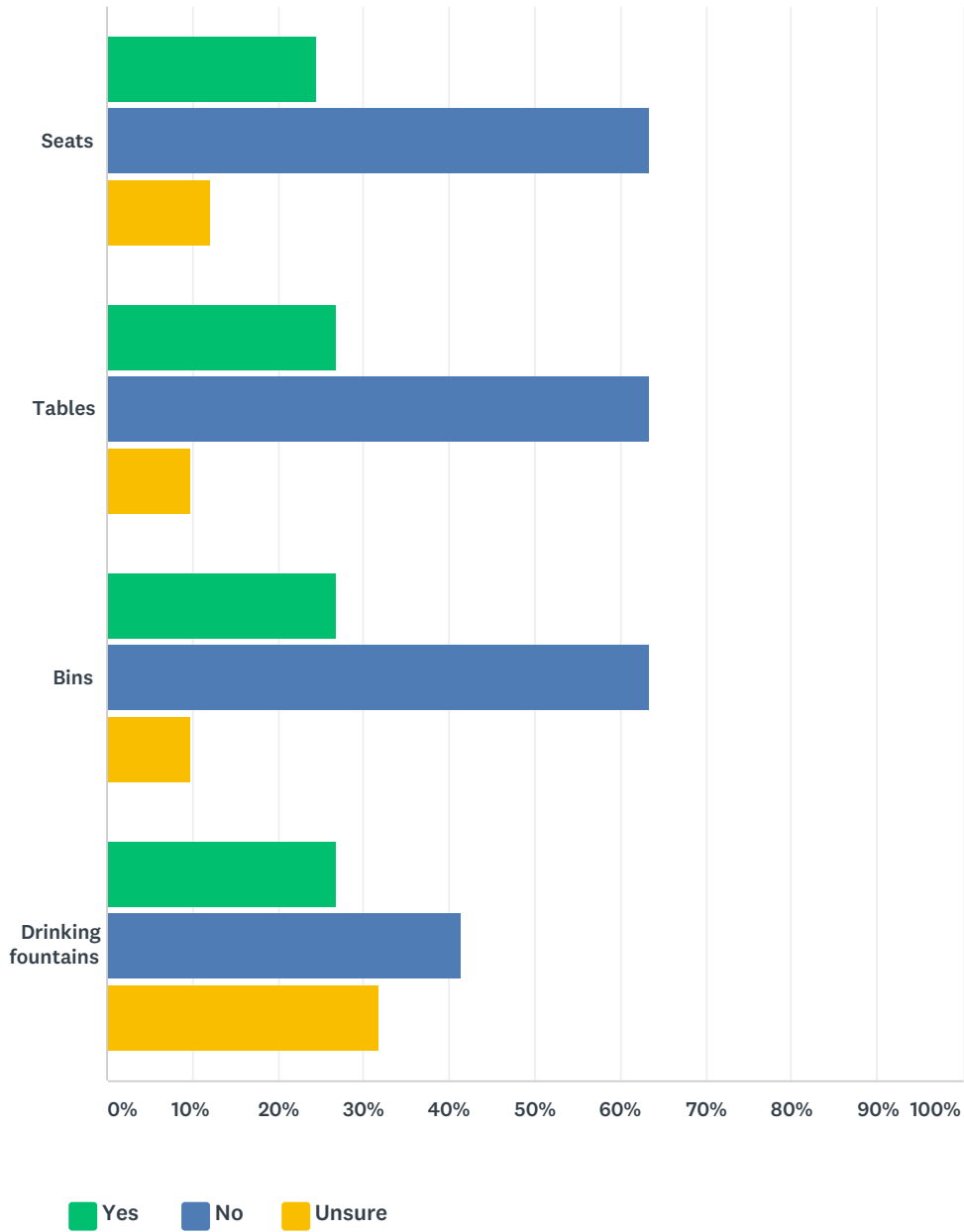
#	RESPONSES	DATE
1	dedicated play space is very important including a place so that children can learn about the nature around them.	9/10/2019 9:11 AM
2	dedicated play space public toilets	9/6/2019 1:49 AM
3	Public toilets. Seating/picnic areas. BBQ facilities. Playground.	9/4/2019 6:05 AM
4	A dedicated play space (it's great to have at least one fenced one), public toilets, bowling green, picnic tables.	9/3/2019 8:29 PM
5	Public Toilets, BBQ and Playground	9/3/2019 7:51 PM
6	Definitely playground and toilets for the kids. Perhaps more seating around gardens for resting and picnics beyond play area.	8/31/2019 4:57 AM
7	more play ground space clean toilets	8/30/2019 2:00 AM
8	TOILETS	8/30/2019 1:51 AM
9	Play Grounds / seats drinking fountains ect	8/30/2019 1:47 AM
10	Trees of Past, Toilets, Tennis courts, fountain,Pond,	8/30/2019 1:32 AM
11	Toilets,B.B.Q,Tenise corts,PlayGrounds,Table's Chairs town hall etc...	8/30/2019 1:11 AM
12	Playgrounds, tables and chairs, bbqs, rubbish bins.	8/29/2019 2:10 AM
13	Public toilets, the children park, general structure.	8/29/2019 1:39 AM
14	Public toilets, play area for children, picnic and seating areas, walking tracks for pets	8/27/2019 12:32 AM
15	Public Toilets,	8/26/2019 11:35 PM
16	public toilets-esp. for handicapped.	8/26/2019 11:17 PM
17	Eating area & BBQ (+shelter),toilets, play area + regularly spaced seatingalong designated walkway for those unable to walk long distance between stops.	8/26/2019 10:51 PM
18	Need playground. I question appropriateness of location.	8/26/2019 9:54 PM
19	Picnic & recreationareas for all ages & peaceful & relaxing atmosphere.	8/26/2019 9:37 PM
20	The playground is great but older kids have nothing to engage them. If we don't offer them activities they are more likely to sit around on screens all day or make mischief at the expense of rate payers. Refurbishing the tennis court and adding basket ball hoops would offer the older kids something to do after school and a chance to build some cross-generational community spirit. Kids will respect the town facilities more if they feel like they are values as community members. Since the football team was shut down kids have no organised sport in their own town! Despite having 80 kids at the primary school you rarely see them out in town because Malmsbury is built to service adults and increasingly the juvenile detention centre.	8/26/2019 7:48 AM
21	Public toilets are extremely important and should be well maintained and upgraded, a dedicated play space is needed for families. The one that they did in Kyneton is exceptional.	8/25/2019 11:35 PM
22	Toilets are pretty worn out. One toilet door smashed in men's toilets. And they never have any soap which is appalling.	8/25/2019 6:52 PM
23	playground - growing number of young families in malmsbury. Playgroup attendance has tripled since i first attended 1.5 years ago.	8/24/2019 8:15 PM
24	Public toilets, rubbish bins, play area	8/24/2019 4:22 AM
25	Picnic tables Rubbish and Recycling Bins Toilets	8/22/2019 9:01 PM
26	Childrens park Public toilets Picnic tables	8/21/2019 11:16 PM
27	Definitely a play space for children and public toilets, bbq facilities, cleanliness and litter pick up, activities for less formal games such as a potential petanque/bocce surface that's easily maintained	8/21/2019 10:07 PM

Help develop Malmsbury Botanic Gardens Master Plan

28	Picnic tables Toilet facilities Pathways for access including for the disabled	8/21/2019 10:00 PM
29	Play park Toilets	8/20/2019 1:49 AM
30	Playground, public toilets	8/20/2019 1:46 AM
31	Dedicated play space Bbqs Toilets Undercover areas	8/20/2019 12:00 AM
32	Playspace, toilet, picnic, seating and BBQ facilities. Maps with species information or information about the trees and their ages etc	8/19/2019 11:52 PM
33	Public toilets and bbq are always good for any public space. Keeping the history and making people aware of this rich history is very important to me.	8/19/2019 10:06 PM
34	All paths, picnic area, signage etc should be accessible for all, play space, public toilets , picnic area, paths, seating, information re plants and history.	8/19/2019 8:43 PM
35	play ground, decent public toilets	8/19/2019 8:42 PM
36	Recycling bins	8/19/2019 7:29 PM

Q14 Are there enough of the following?

Answered: 41 Skipped: 5



	YES	NO	UNSURE	TOTAL
Seats	24.39% 10	63.41% 26	12.20% 5	41
Tables	26.83% 11	63.41% 26	9.76% 4	41
Bins	26.83% 11	63.41% 26	9.76% 4	41
Drinking fountains	26.83% 11	41.46% 17	31.71% 13	41

Q15 Do you have any comments or feedback about any of these facilities?

Answered: 17 Skipped: 29

#	RESPONSES	DATE
1	Could have more seats for children to sit around a story tree but use natural resources like tree stumps. Use recycled plastic or wood for tables and chairs. And locally made. keep bins to a minimum - people should be encouraged to remove their own rubbish. One more drinking fountain would be good so reduce need for plastic bottles. Make it a plastic free garden.	9/10/2019 9:11 AM
2	I think additional picnic tables (and thus bins) closer to the river side of the gardens would invite people to use that space more, and thus wander through and enjoy the gardens more.	9/3/2019 8:29 PM
3	Could install more Bins Seats and BBQ in the area of the Gardens between the River and the Lake. BBQ and Bins near the table and chairs and structure recently built on the riverside would be worthwhile Also bins and black doggie bags for people working dogs in the bark similar to that supplied at Castlemaine Botanic Gardens and Malmsbury Reservoir	9/3/2019 7:51 PM
4	the laddys toilets are NOT CLEAN !!	8/30/2019 2:00 AM
5	The toilets are not that clean	8/30/2019 1:47 AM
6	We have one oldest Botanic Gardens around Please Keep it dont turn it into City living	8/30/2019 1:32 AM
7	Need more B.B.Q, seating. Need the tennis courts to Be fixed	8/30/2019 1:11 AM
8	Toilets are appalling, cannot cope with all the coach stop offs.	8/26/2019 11:35 PM
9	Need some shelterred seating near the BBQ.	8/26/2019 10:51 PM
10	Keep them clean & working!	8/26/2019 9:37 PM
11	Would be good to put a park bench on the island. At the moment we have a beautiful bridge the leads nowhere! All paths need a destination. The geese have left poo all over the bridge, the handrails and the island, making it an unpleasant destination! Less geese, more seats! We need a council bin at the entrance of the Malmsbury Cricket ground or the arboretium?	8/26/2019 7:48 AM
12	More drinking fountains and family areas needed.	8/25/2019 11:35 PM
13	Great little play ground.	8/25/2019 6:52 PM
14	The facilities are adequate for normal use. Larger attendances for events can be managed by using temporary toilets, bins etc.	8/24/2019 9:33 PM
15	n	8/24/2019 8:15 PM
16	Recycling bins for bottle and glass would be good here and throughout MRSC (along the lines of other councils).	8/22/2019 9:01 PM
17	It would be great to enhance the play spaces and areas for community gatherings	8/20/2019 12:00 AM

Q16 Do you have any feedback about the existing signage or suggestions for signage you would like to see?

Answered: 27 Skipped: 19

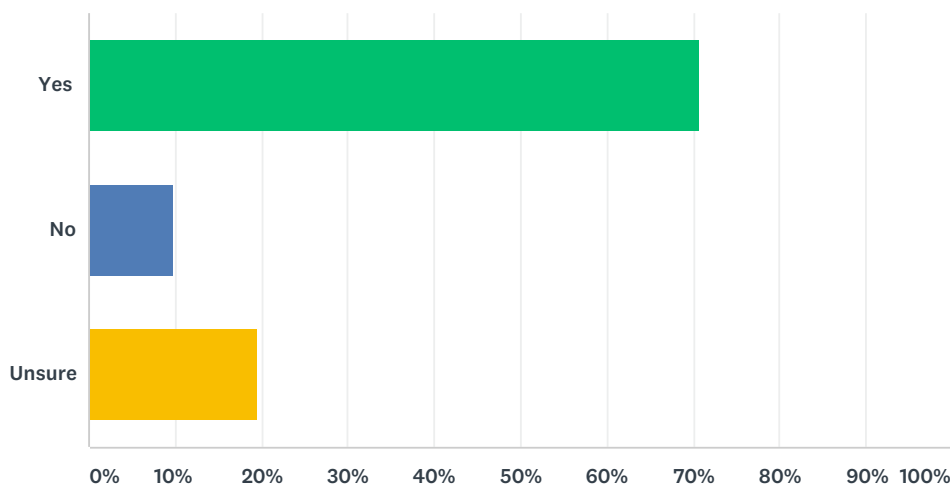
#	RESPONSES	DATE
1	More signage on trees and support the ones chosen by the Friends group. I would like to see signs saying that snakes live there too and should be left alone. I would like to see signs about what birds and furry animals you can find in the Botanic Gardens. An information sign about platypus.	9/10/2019 9:14 AM
2	The interpretive signage is okay, though it needs updating as much of it is hard to read. It really needs to address pre-European history, and to invite people to reflect on what it was like before becoming a colonial botanic gardens landscape; who used the area and how. I think an approach to interpretation that contains a mix of storytelling and inviting reflection would work well, and invite engagement with the gardens landscape and history on a personal level, rather than just as a list of facts.	9/3/2019 8:33 PM
3	Signs could be improved and replaced as they are in poor condition. The sign near the Ghost gum was damaged and has now disappeared. There is a memorial plaque under on Arbutus on the Ellsmere Place border of the gardens that was lying on the ground - not sure if it still there	9/3/2019 7:55 PM
4	signage required to local walking and cycle paths	9/2/2019 7:13 PM
5	I still see so many people feeding the geese bread. More prominent signage that this is unhealthy and perhaps suggest alternative (eg peas and corn) so as to better educate.	8/31/2019 4:59 AM
6	NO	8/30/2019 2:00 AM
7	Need more signs for Dog's on leads and Dont climb the trees.	8/30/2019 1:33 AM
8	The trees you chop down geta wood carver in and carve a heritidge pice out of them	8/30/2019 1:12 AM
9	There is very little historic information. This is a significant part of Victoria's heritage and you wouldn't know it.	8/29/2019 1:41 AM
10	More details on specimen trees.	8/26/2019 11:35 PM
11	Need more tree signage explaining common & scientific names and places of origin (as for signs on some trees)	8/26/2019 10:54 PM
12	Tree labels	8/26/2019 9:54 PM
13	More heritage information visitors & young peolpe are interested.	8/26/2019 9:37 PM
14	The town halls main entrance is ambiguous. Most people would assume it is the doors facing Mollison St. The self guided tour pamphlet is excellent. A "please dispose of dog poo" sign and bag dispenser would be good at the playground entrance and the Coliban River bridge entrance. A interpretive sign about Coliban River, its history and landcare's good works would be amazing.	8/26/2019 7:53 AM
15	The Gardens should have better signage for better access to visitors to the area.	8/25/2019 11:35 PM
16	Prefer no change.	8/24/2019 9:33 PM
17	signage about appropriate food for the ducks (e.g., peas and lettuce instead of bread)	8/24/2019 8:15 PM
18	I like the signs that explain the history of what you're looking at I e.g. the viaduct.	8/24/2019 4:23 AM
19	Limited signage currently. Could have a lot more signage on the plants and history.	8/22/2019 9:02 PM
20	Some increased signage about traditional owners would be interesting	8/21/2019 10:07 PM
21	I would like signage to restrict feeding the bird life bread, it's not nutritious in any respect and it's not good to make the bird life reliable on this feeding. Also a signage for wild life rescue should there be any injured or sick birds.	8/21/2019 10:03 PM
22	More acknowledgement of Traditional Owners	8/20/2019 1:49 AM
23	No	8/20/2019 12:00 AM
24	Yes signage would be fantastic. The older signage is still good but I'm sure it could use and upgrade and there must be new things in the gardens by now.	8/19/2019 11:53 PM

Help develop Malmsbury Botanic Gardens Master Plan

25	I would like to see more historical stories about certain areas or trees/landmarks.	8/19/2019 10:09 PM
26	Signage should be clear for all - use guidelines re visibility and accessibility of signage	8/19/2019 8:44 PM
27	We should have more public Recycling bins	8/19/2019 7:29 PM

Q17 Events such as the Annual Fayre are held at the Malmsbury Botanic Gardens. Would you like to see more events hosted there?

Answered: 41 Skipped: 5



ANSWER CHOICES	RESPONSES	
Yes	70.73%	29
No	9.76%	4
Unsure	19.51%	8
TOTAL		41

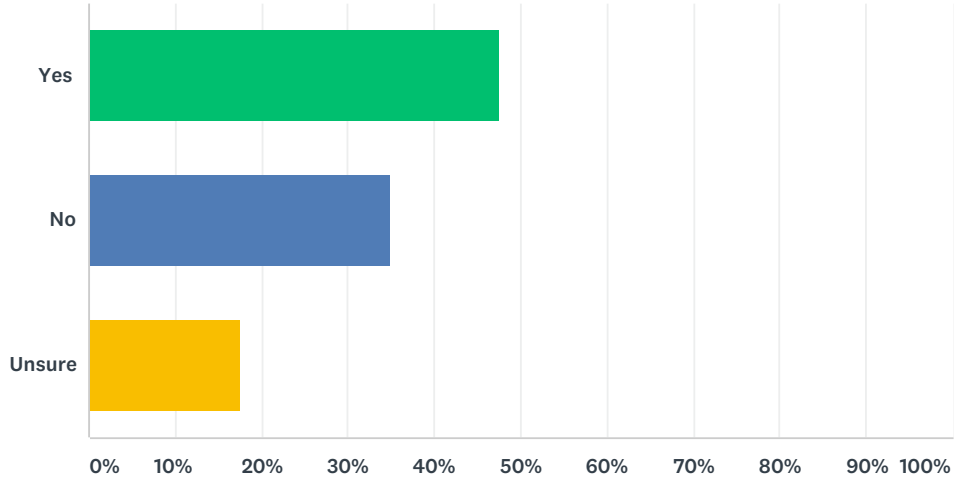
#	COMMENTS	DATE
1	It is a quiet space so I would not want to see too many events there.	9/10/2019 9:17 AM
2	If a percentage of the funds raised by these events or a charge for use of the Gardens can be returned to new plantings or upkeep of Gardens	9/3/2019 7:57 PM
3	Parking is an issue on Fayre day.	8/31/2019 5:00 AM
4	We would like the gardens limited to events such as Fayre and instead have smaller more targeted events that are held there including the Malmsbury Project Easter Egg Hunt fundraiser for Youth Mental Health as they use the space with minimal impact and highlight the gardens as a meeting point and community space with focus on locals and families. The Majority of locals don't attend and are unimpressed with the Fayre as they don't use local providers, they alienate local business, ignore the local needs in favour of tourism and have not been sympathetic to the gardens themselves in their placement of their set up and management of the space.	8/31/2019 3:37 AM
5	fares and events more then one time a year	8/30/2019 2:02 AM
6	Bring Back the Christmas events for all family's fun filled day of 30 odd years ago	8/30/2019 1:35 AM
7	Not many more. Maybe 2 or 3 events a year.	8/29/2019 1:43 AM
8	It's a great space for public to visit	8/26/2019 11:37 PM
9	Great meeting place for family reunions, etc.	8/26/2019 11:03 PM
10	These events bring our town to life. The locals love showing off the botanical gardens to visitors! Last years fayre was the best yet, despite having no funding from council community grants.	8/26/2019 7:57 AM
11	but could they feature less mass-produced junk and more community stalls?	8/25/2019 7:01 PM
12	Not unless they can be accommodated without significant changes.	8/24/2019 9:35 PM
13	outdoor theatre in summer	8/24/2019 8:15 PM
14	Yes and no. I like the quiet walks through the gardens in afternoons. But some weekends it would be nice to have an event to go to with lots of people around	8/24/2019 4:24 AM

Help develop Malmsbury Botanic Gardens Master Plan

15	It is not well suited to larger events and I would not want to see accomodation of those events through any changes. We do have the village green for such events.	8/22/2019 9:03 PM
16	The annual fayre is a wonderful family day however there are not enough food facilities. People were waiting over an hour to access the food vans. Also, not enough dedicated places to set up picnic rugs.	8/21/2019 11:18 PM
17	yes but no! It is hard to say yes then complain when an event is not appropriate in my eyes!	8/19/2019 10:10 PM
18	Community building, help local economy, make good use of a great facility	8/19/2019 8:45 PM
19	music events / festivals	8/19/2019 8:43 PM

Q18 Tree and plant collections are an important part of the Malmsbury Botanic Gardens. Do you feel it showcases its tree and plant collections well?

Answered: 40 Skipped: 6



ANSWER CHOICES	RESPONSES	
Yes	47.50%	19
No	35.00%	14
Unsure	17.50%	7
TOTAL		40

Q19 Do you have any ideas or suggestions about how this could be improved?

Answered: 25 Skipped: 21

#	RESPONSES	DATE
1	With better signage. Increase the number of arbutus plants and perhaps improve the collection of trees in the pinetum.	9/10/2019 9:17 AM
2	Large trees are predominantly pine trees and elm trees - these are not particularly attractive and are coming to the end of their life - Focus needs to be on replacing these with suitable, large-growing trees before there are no large trees remaining.	9/4/2019 6:07 AM
3	Appropriate signage, and a brochure providing a 'walking tour' of the gardens that addresses some of the interpretation ideas suggested in my response to the earlier question about signage, as well as information on tree selection (both historic and for the future). It would be wonderful if this could be also provided as an app for improved accessibility and interaction.	9/3/2019 8:35 PM
4	Improved signage on individual plants and better signage about Historic Plantings.	9/3/2019 7:57 PM
5	Signs about the trees and plants??	8/31/2019 5:00 AM
6	more play space a b-ball space football and soccer space.	8/30/2019 2:02 AM
7	need more Botanic Tree's Planted into the Gardens.	8/30/2019 1:35 AM
8	Need more Botanical Trees Planted	8/30/2019 1:13 AM
9	Better signage. More information in general.	8/29/2019 1:43 AM
10	More plantings	8/26/2019 11:37 PM
11	"Themed" areas/blocks around existing trees or groups of trees.eg, Mediterranean/Nth African, Nth & Sth America, Asian etc. Coniferous area could be a)reduced in size a little b)more diversity (Missing) Giant redwoods replaced with young ones.	8/26/2019 11:03 PM
12	Multi Purpose "building"-not enclosed but a roof -Citizen science/Botanical activities 9ie potting) -??? area -Garden History -"Home" meeting place for "Friends" (in fine weather)	8/26/2019 10:04 PM
13	Common names & explanation & groups of similar plants/trees.	8/26/2019 9:38 PM
14	Species identification plaques would be good - or a map that identifies trees, including the arboretium. It would be good to promote the two gardens as complementary experiences by beautifying the path under the bridge and adding the arboretium to the maps and pamphlets.	8/26/2019 7:57 AM
15	Some of the signs are old and you cannot tell what the trees should be.	8/25/2019 11:36 PM
16	More signage.	8/25/2019 6:53 PM
17	The gardens are wonderful as they are.	8/24/2019 9:35 PM
18	no	8/24/2019 8:15 PM
19	Additional plantings could be useful but I would defer to experts on that.	8/22/2019 9:03 PM
20	Signage, promotion, locals may even volunteer to answer questions of visitors	8/21/2019 11:18 PM
21	Keep to native vegetation and wild flowers	8/21/2019 10:04 PM
22	More native plants	8/20/2019 1:49 AM
23	A dedicated gardener	8/20/2019 1:46 AM
24	I'm not really concerned with specific collections. I don't have a passion for gardening but is a garden that is important to the local community etc. There are many gardening groups in Victoria and showcasing the Macedon Ranges and our 3 botanical gardens would be fantastic so anything that could benefit the great area would be great!	8/19/2019 11:55 PM
25	Good signage	8/19/2019 8:45 PM

Q20 Do you have any suggestions about programs or initiatives that the Malmsbury Botanic Gardens could support or offer? E.g. ClimateWatch Trails, guided tours etc.

Answered: 19 Skipped: 27

#	RESPONSES	DATE
1	Nature play for children should be encouraged. www.childrenandnature.org Increased visitation by the school children to do activities eg observing birds from a bird hide, observing platypus, Chris Bromley already does some of these things with the school children. Artists use the gardens a lot either painting or using photography. Encourage the children to help plan a nature playground such as the Kyneton community park. We have many artists living in Malmsbury who could provide sculpture for a sculpture park.	9/10/2019 9:47 AM
2	Guided tours and/or interactive apps for exploring the landscape. There are some fantastic landscape apps that use augmented reality to overlay historical imagery on contemporary landscapes to really invite visitors to engage with, connect to, and reflect upon the history of a site.	9/3/2019 8:38 PM
3	Establishment of a base for Friends of the Malmsbury Gardens and better signage could lead to the possibility of Guided Tours. New Brochures could include the Arboretum and the Common Could include exercise stations over the three areas similar to Parks in Melbourne	9/3/2019 8:03 PM
4	historical society walking tours monthly trails bike and cycle path between the reservoir and botanical gardens	9/2/2019 7:17 PM
5	guider tours, more entertainment for familys	8/30/2019 1:36 AM
6	trail Guides would Be good	8/30/2019 1:13 AM
7	Climate change watch sounds good. Guided tours essential. Childrens programs.	8/29/2019 1:45 AM
8	It's a great idea.	8/26/2019 11:39 PM
9	some open air music & theatre events would be lovely.	8/26/2019 11:18 PM
10	More guided tours & keep up supply of "do it yourself" brochure guides	8/26/2019 11:05 PM
11	-Part of Malmsbury Walking Trails. -Botanical "activities" (potting up plants./talks.self guided tours.	8/26/2019 10:38 PM
12	More comunity events will bring more comunity involvment.	8/26/2019 9:40 PM
13	Chris Bromley's river detectives program with the primary school kids is inspiring, as was the landcare platypus watch talk. Spotlight tours of nocturnal birds and animals (if there are any?) and more platypus / water rat spotting activities. Photography / plein air painting classes would be great. Weed identification tours discussing environmentally friendly ways to manage weeds in the goldfields.	8/26/2019 8:11 AM
14	Natural nature programs would be good. Weather station? Walking trail across the river.	8/25/2019 11:38 PM
15	Locals and visitors could be encouraged via social media to visit the botanic garden more often.	8/24/2019 9:38 PM
16	guided tours outdoor theatre	8/24/2019 8:16 PM
17	I think volunteer days would be great, or if they exist i dont know about them. It would be wonderful to help contribute to the space and learn about the heritage of the gardens	8/21/2019 11:19 PM
18	Good paths for access - walking, kids bikes, scooters etc	8/20/2019 12:01 AM
19	Tennis/Bowling/ Adventure trails, Education trails -especially for young people	8/19/2019 8:47 PM

Q21 The Coliban River borders the Malmsbury Botanic Gardens. Do you have any suggestions for how this area could be improved?

Answered: 27 Skipped: 19

#	RESPONSES	DATE
1	A lot of native plants along its banks and perhaps a pathway close to the river.	9/10/2019 9:47 AM
2	it could be better maintained	9/6/2019 2:01 AM
3	The swimming facilities could be improved. These are a major attraction for townspeople and encourage people to meet and socialise in the summer. Sympathetic planting of native plants suited to river habitat will encourage birds, fish and other animals.	9/4/2019 6:08 AM
4	Improved funding for weed management along the river. The bridge over the Coliban on Mollison St is very tired looking, and would be greatly improved by some maintenance work and a new fence alongside the footpath that is more attractive and more sympathetic to the bridge design.	9/3/2019 8:38 PM
5	Some areas of the Gardens are prone to flooding and standing water. The low areas could be built up to prevent flooding and resultant muddy areas on the lawns	9/3/2019 8:03 PM
6	the removal of the willows along the river has opened up the access to the river	9/2/2019 7:17 PM
7	need more seating around the Rivers shelter's B.B.Q	8/30/2019 1:36 AM
8	more seating around and shelter	8/30/2019 1:13 AM
9	Keep water flows at healthy levels.	8/29/2019 1:45 AM
10	cleaned up would help, protection of platypus habitat	8/26/2019 11:39 PM
11	Occasional "clean-up" Perhaps scope for additional riverine species to be planted.	8/26/2019 11:05 PM
12	Willows out. Riparian Planting/Banksia marginata/Blackwood	8/26/2019 10:38 PM
13	Picnic areas & scenic seating no blackberries!	8/26/2019 9:40 PM
14	Get more environmental water released into the Coliban river to flush out some of the reeds. The river is choking on silt and reeds and weeds! If we could add a pedestrian underpass to the birthday villa side of the coliban river bridge (linking the water race walk to the new malmsbury commons path) it would enable more varied walking routes and would make the river / more of a feature. Adding pedestrian fjord under the viaduct and a pedestrian bridge at the end of the malmsbury commons would create an amazing walking / cycling loop that could be enjoyed by kids, families and visitors. Linking up the Reservoir, Malmsbury common, Malmsbury cricket ground, arboretum and Botanical gardens with walking paths would create a more cohesive, more walking friendly town. Less blackberry, thistles, reeds and gorse would be great.	8/26/2019 8:11 AM
15	Some more information regarding the river would be good. Are there platypus there? Maybe build a jetty in the river.	8/25/2019 11:38 PM
16	A connecting walkway from the malmsbury commons to the botanic gardens is vital. At the moment you can walk under the bridge but you're on the wrong side of the river to access the other park.	8/25/2019 6:55 PM
17	Keep it a bit wild, as it currently is.	8/24/2019 9:38 PM
18	signage describing the wildlife etc	8/24/2019 8:16 PM
19	Just get rid of the really high weeds	8/24/2019 4:25 AM
20	The river itself is badly congested with trees at the bridge end and would benefit from clearing.	8/22/2019 9:04 PM
21	Make this accessible and more open	8/21/2019 11:19 PM
22	Fish stocks!!	8/21/2019 10:13 PM
23	Regular checks for possible waste removal	8/21/2019 10:05 PM
24	Better linkage to the gardens	8/20/2019 1:47 AM
25	No	8/20/2019 12:01 AM
26	fixing that road/lane between the gardens and the railway line. OR blocking it off completely.	8/19/2019 10:11 PM

Q22 Please share any other ideas or feedback you have about the Malmsbury Botanic Gardens.

Answered: 13 Skipped: 33

#	RESPONSES	DATE
1	The children's playground is not particularly exciting nor encourages learning through play. A more advanced/larger facility would be great for local children and visitors from outside the area.	9/4/2019 6:09 AM
2	I assume the Master Plan will reference the original plans for the Malmsbury Botanic Gardens, which are available at the Royal Botanic Gardens Melbourne Library, if MRSC does not have a copy (I am an employee at the RBGV, as well as a Malmsbury resident, so am happy to help facilitate this if that helps).	9/3/2019 8:40 PM
3	Please Bring Back our Heritage to our Gardens.	8/30/2019 1:37 AM
4	more Pay Ground.	8/30/2019 1:14 AM
5	We love it.	8/29/2019 2:11 AM
6	The Malmsbury historic drainage system is essential for keeping the lake in water. Must be preserved. P.S. We don't want our wild waterbirds removed!	8/29/2019 1:47 AM
7	Adventure playground. existing site inadequate needs to move.	8/26/2019 10:39 PM
8	Please remove the dumped geese! They are territorial pests and they scare the other birds (and people and dogs). The garden was so much nicer without them. Thanks for all the good work you have put into the gardens to date. We love them!	8/26/2019 8:13 AM
9	Lake up grade would be good. the excess pond that often doesn't have water in it could be cleaned up. Proper walking trails to be established.	8/25/2019 11:40 PM
10	Let the geese stay, retain the beautiful old trees, keep the character of the garden. It provides an interesting contrast with the indigenous planting area across the road and preserves elements of the history and heritage of the area.	8/24/2019 9:42 PM
11	we love them - thank you	8/24/2019 8:16 PM
12	We are recent residents and the Botanical Gardens are a real draw card for the ascetic of the village. It is remarkably well used by locals and visitors. While I am sure there is significant cost associated with maintenance and any development it provides the largest value add of Council (beyond basic services) to Malmsbury and as such should be strongly supported.	8/22/2019 9:07 PM
13	some water play areas maybe - for the summer months	8/19/2019 8:44 PM

Appendix 2 - Soil Test Results and Analysis

21 Shields St
Flemington, Vic 3031
5th August, 2019

GbLA Landscape Architects
Level 3, 248 Burwood Road,
Hawthorn
VIC 3122

Re: Malmsbury Botanic Gardens

Attn: Ms Annette Warner

SESL Australia has been asked to carry out a preliminary soil survey of the Malmsbury Botanic Gardens in advance of more detailed planning for the development of this important resource.

Background

Declan McDonald, SESL's Senior Soil and Horticultural Scientist, visited the site on Monday 15th July 2019. A walkover of the site identified areas of key interest, specifically the conifer section to the south, the central *Arbutus* lawn area, and the lower-lying garden zone to the north.

The gardens are located on Quaternary alluvial deposits associated with the Coliban river. The Coliban flows mainly through basalt geology which strongly influences soil development on the floodplain. As is common with alluvial lithology, soils are variable as will be discussed below.

The site walkover followed recent heavy rains and showed that soil drainage properties were generally good. This is a product of perennial plantings and a long period free of disturbance.

The site was sampled at ten locations as shown in figure 1. Brief descriptions follow:



Figure 1. Sampling map of Malmsbury Botanic Gardens

Points 1-3. Soils across the elevated conifer section to the south were overlain by a very dark, sometimes thick (c.50-200mm) organic layer which is a product of slowly decomposing pine needles. There was strong evidence of fungal activity which is not unexpected as these organisms are the primary agents driving decomposition and nutrient cycling under conifers. Below the organic layer, the mineral topsoil ranged from pale, very fine sandy clay loam to darker clay loam to light clay. The paler soil was slightly sticky which indicates some mineral imbalances. Topsoil depth was about 2-300mm over a heavy clay at 4-500mm.

Points 4 & 5. Topsoil depths were 4-500mm comprising sandy loam to sandy clay loams over sandy clay subsoils to >600mm.

Point 6. Topsoil depth was 400mm. Soil was a dark silty light clay overlying a dark medium clay to >600mm.

Point 7. Topsoil depth was 250mm. Soil was a dark sandy loam to loam overlying a sandy clay loam to >600mm.

Point 8. Topsoil depth was 400mm. Soil was a dark silty clay loam to light clay over plastic medium clay to >600mm.

Point 9. Topsoil depth was 200mm. Soil was a dark well-structured silty clay loam to light clay over a red-brown well-structured medium clay to >600mm.

Point 10. Topsoil depth was 300mm. Soil was a dark sandy loam to loam over a sandy clay to >600mm.

Phytophthora had been reported at a location roughly between points 9 and 10. However, no evidence of plant ill-health was observed on the day. No further investigation of Phytophthora was undertaken.

No laboratory soil testing was undertaken as part of this investigation. However, field pH testing was carried out at all locations on topsoil and subsoils. Results are shown in table 1.

Hole no.	1	2	3	4	5	6	7	8	9	10
Topsoil pH	5	5.5	7	7	6	6.5	6.5	7	7.5	7
Subsoil pH	5.5	6	8	6	7	7.5	7	7.5	7.5	7.5

Table 1. Soil pH values

Field pH testing utilised a colourimetric kit. These kits are normally accurate to 0.5pH point and provide a useful indication of field conditions. However, they should never be relied upon in place of calibrated pH measurement carried out in a NATA-accredited laboratory.

Nevertheless, the testing indicates relatively neutral conditions throughout apart from the south-east sedimentary rise which is strongly acidic. Understanding of the generally neutral pH conditions on site provides some guidance on plant selection and likely tolerances of different species to the conditions. As an example, rhododendrons would be expected to perform well in the cool conditions and clay loam soils (notwithstanding challenges from hot summers); however the neutral to slightly alkaline pH soils may result in some chlorosis due to issues with availability of iron and / or manganese.

Summary

Soils of the gardens are generally fine textured with medium to heavy clay subsoils. In many locations the heavy clay subsoils might be expected to negatively impact on soil hydraulic conductivity. However, in this location, the number of large trees and shrubs provides a diversity in root architecture which includes deep roots growing prolifically through the subsoils. This ensures that structure is maintained in subsoils and drainage is protected. This was confirmed on site by the lack of surface ponding and inspection of soil profiles that did not show evidence of waterlogging to the depth investigated (600mm+).

On a cautionary note, the soils in the garden are performing well due to the long-term stability of the site. If major works involving substantial soil movement are proposed, they would reveal a vulnerability to compaction. This risk is highly manageable, but awareness must be maintained at a high level so that appropriate soil handling and storage methods are developed and used.

The assessment of soil pH confirms the dominant geology of the site and the variability in soil textures encountered is also consistent with alluvial deposits. The generally dark colours of the soils also indicate high organic matter and this is further confirmed by the generally healthy appearance of vegetation and the quality of soil structure found at most locations.

More detailed investigations are recommended to more accurately confirm the findings of this preliminary report. Those investigations should include further chemical and physical analyses of soils, and further investigation of the possible presence of Phytophthora on site.

Please contact the undersigned if you have any questions.

Declan McDonald
Senior Soil Scientist



Appendix 3 - Statement of Significance

Victorian Heritage Database Report

Report generated 17/06/19



MALMSBURY BOTANIC GARDENS AND TOWN HALL



MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



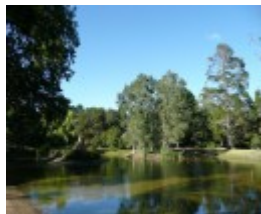
MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



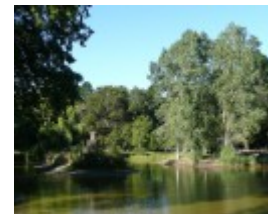
MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



MALMSBURY BOTANIC GARDENS AND TOWN HALL SOHE 2008



H01993 malmsbury botanic gardens1



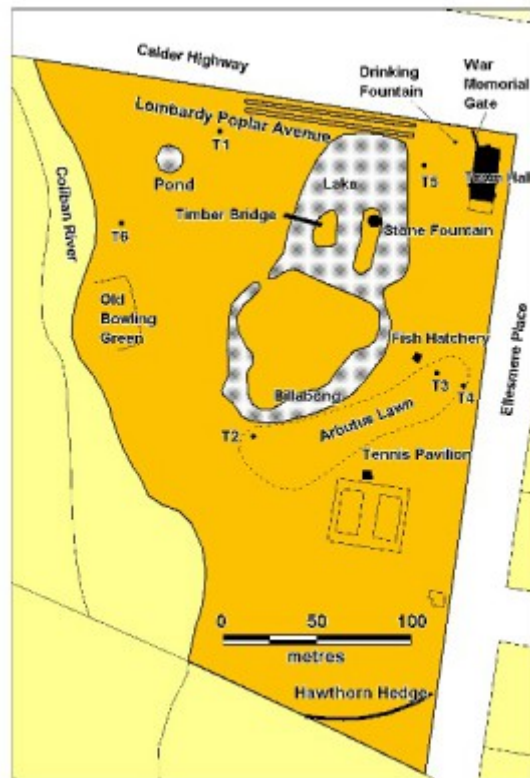
H01993 malmsbury botanic gardens avenue



H01993 malmsbury botanic gardens lake



H01993 malmsbury botanic gardens viaduct



H01993 malmsbury botanic gardens plan

Location

91-99 MOLLISON STREET MALMSBURY, MACEDON RANGES SHIRE

Municipality

MACEDON RANGES SHIRE

Level of significance

Registered

Victorian Heritage Register (VHR) Number

H1993

Heritage Overlay Numbers

HO253

VHR Registration

September 12, 2002

Heritage Listing

Victorian Heritage Register

Statement of Significance

Last updated on - September 12, 2002

What is significant?

The Malmsbury Botanic Gardens are bounded by the Calder Highway, Ellesmere Place and the Coliban River. The general form of the Gardens takes advantage of natural features including the topography and a billabong of the Coliban River flood plain has been transformed into a group of ornamental lakes, one with two islands. The northern boundary, adjacent to the Calder Highway, of the Gardens is lined with an avenue of Lombardy poplars, mostly replanted in 1985. The Gardens contain a fine collection of mature trees including, cedars, oaks, elms, and redwoods. A Monterey pine grove is planted in the south-east corner. An English Hawthorn hedge and picket fence remnants remain along the southern and part of the eastern boundary, and once enclosed all of the Gardens. North of the pinetum is a tennis court overlooked by a simple gable roofed timber pavilion, formerly located at the northern end of the bowling green. A fish hatchery (c.1959, and no longer used) is located within a timber and corrugated iron shed south east of the lake. A war memorial gate was constructed after World War I. The gardens were extensively restored as a Victorian sesquicentenary project.

The land which was prone to flooding was reserved for public use in 1855, and the 1857 Urquhart survey shows the area as a "Reserve for a Botanic Garden". The Gardens were first planted and permanently reserved in 1863. The initial design is attributed to Dr E Davy, a local councillor, under the influence of Dr Ferdinand von Mueller. The Malmsbury Town Hall on the edge of the Gardens is a civic building constructed in 1868 and forms a local landmark on the boundary of the Gardens. In the period 1880-1890, recreational facilities, including a bowling green, tennis court and croquet lawn, were added.

How is it significant?

The Malmsbury Botanic Gardens are of historical, aesthetic and scientific (botanical) significance to the State of Victoria.

Why is it significant?

The Malmsbury Botanic Gardens reserved in 1855 are historically significant as a representative example of a nineteenth century regional botanic garden. The Gardens are one of Victoria's earliest botanic gardens and are associated with the post-gold rush history of Victoria, when towns which had grown as a result of the gold discoveries aspired to become major provincial cities with art galleries, botanic gardens, schools of art and design and other cultural institutions befitting their status. One of the most important vistas from the Gardens is to the 1859 bluestone railway viaduct, part of the government infrastructure based on the wealth from gold.

The Botanic Gardens, Malmsbury are aesthetically significant as a focus for the town of Malmsbury, for the internal and external vistas, particularly to the Railway Viaduct. The Gardens are of outstanding landscape value

where natural water features have been landscaped to form lakes and islands. The mature conifers with their striking upright and dark green foliage have a dramatic landscape effect in the Gardens and broader landscape. These contrast with the evergreen and deciduous trees, especially elms, willows and poplars in autumn. The southern edge of the Gardens are bounded by the remains of an English Hawthorn hedge planted in 1877.

The Malmsbury Botanic Gardens have scientific (botanical) significance for their collection of plants, characteristic of late nineteenth century Victorian gardens, as well as some outstanding individual specimens such as *Araucaria bidwillii*, stand of 3 large *Sequoiadendron giganteum*, *Cedrus atlantica* f. *glauca*, *Picea smithiana*, *Sequoia sempervirens*. The planting includes several rare plants; *Crataegus coccinoides*, *Arbutus x andrachnoides* (now regrowing from a stump) and planted in 1985, *Ulmus americana*, and a *Eucalyptus muelleriana*, planted by Hon. Joan Kirner, Minister for Conservation Forest and Lands, and later the Premier of Victoria. Since 1985 additional *Arbutus* species have been planted to establish an important collection of this genus, including *Arbutus menziesii* (pl. 1988), *A. xalapensis*, and *A. canariensis*.

Permit Exemptions

General Conditions: 1. All exempted alterations are to be planned and carried out in a manner which prevents damage to the fabric of the registered place or object.

General Conditions: 2. Should it become apparent during further inspection or the carrying out of alterations that original or previously hidden or inaccessible details of the place or object are revealed which relate to the significance of the place or object, then the exemption covering such alteration shall cease and the Executive Director shall be notified as soon as possible. General Conditions: 3. If there is a conservation policy and plan approved by the Executive Director, all works shall be in accordance with it. General Conditions: 4. Nothing in this declaration prevents the Executive Director from amending or rescinding all or any of the permit exemptions. General Conditions: 5. Nothing in this declaration exempts owners or their agents from the responsibility to seek relevant planning or building permits from the responsible authority where applicable.

Building Exterior:

- * Minor repairs and maintenance which replace like with like.
- * Painting of previously painted surfaces (but not signs), walls, posts, and roofing in the same colour.
- * Treatments to stabilise and protect timber, masonry and metal structures.

Building Interior:

- * Painting of previously painted walls and ceilings provided that preparation or painting does not remove evidence of the original paint or other decorative scheme.

- * Removal of paint from originally unpainted masonry.
- * Refurbishment of toilets including removal, installation or replacement of fixtures and piping

Landscape:

- * The process of gardening, mowing, hedge clipping, bedding displays, removal of dead plants, disease and weed control, emergency and safety works, and landscaping in accordance with the original concept.
- * The replanting of plant species to conserve the landscape character, conifer, elm, oak, poplar, arbutus and shrub plantings.
- * Management of trees in accordance with Australian Standard; Pruning of amenity trees AS 4373.
- * Vegetation protection and management of the possum population.
- * Removal of plants listed as noxious weeds in the Catchment and Land Protection Act 1994.
- * Repairs, conservation and maintenance to hard landscape elements, asphalt and gravel paths and roadways, drinking fountain fences and gates.
- * Installation, removal or replacement of garden watering and drainage systems beyond the canopy edge of listed trees.
- * Plant labels and interpretative signs.
- * Works to the playground to meet Australian safety standards.

Construction dates	1863,
Heritage Act Categories	Registered place,
Other Names	MALMSBURY BOTANICAL GARDENS,
Hermes Number	1863
Property Number	

History

Malmsbury

The town of Malmsbury was established as a crossing place on the Coliban River. It was shaped by the Mount Alexander Road (now known as the Calder Highway) as a stopping place on the road to the gold diggings in the 1850s.. It took eight days to walk from Melbourne to the Mount Alexander diggings. Malmsbury's abundant water and river flats provided a favoured camping area. In 1851 Malmsbury consisted of three tents and a timber hotel, which with a vast canvas addition, provided accommodation for two hundred people. The town grew with the business provided by travellers. Malmsbury was a stopping place for the Cobb and Co coaches which carried passengers to Bendigo and other centres, including three trips daily from Malmsbury to Daylesford. The town was surveyed by W S. Urquhart, District Surveyor in 1855. By 1856, 27 residents were registered voters, mostly in service industries such as baking, storekeeping, innkeeping, carting, and blacksmithing, associated with providing for gold diggers on their way to Mount Alexander. When gold was discovered in the area in 1858, Malmsbury expanded further The township was proclaimed a municipality by Sir Henry Barkly on 14 October 1861. Between 1859 and 1862 the railway viaduct over the Coliban River was constructed which now forms the southern boundary to the Gardens. In 1865, twenty-six mining companies were operating in the Malmsbury-Lauriston area. (C. Fitzsimons. Historical Resume Botanic gardens, Malmsbury. Draft. 1985 for the Provincial Botanic [Gardens] Rejuvenation Committee). By 1865, there was a brewery and a steam flour mill. Later, the town depended on farming and stone quarrying. The town had 830 residents in 1861 and 1357 in 1871, remaining at that level for the rest of the century. It declined in the 1890s, when six of the ten local hotels were closed and the mill plant and buildings were sold. (Shire of Kyneton Conservation (Heritage) Study. 1990)

Botanic Gardens

A botanic garden is a garden containing a scientifically ordered and maintained collection of plants, usually documented and labelled and open to the public for the purposes of recreation, education and research. (IUCN

Botanic Gardens Conservation strategy (1989).

The establishment of botanic gardens in Britain was a nineteenth century phenomenon and a response to the abundance of plant material introduced from all around the world. The majority were founded by private amateur botanical and horticultural societies. Their aim was to promote the study of botany and the practice of horticulture as a recreational pursuit. In Australia, botanic gardens were established in each state capital and in regional centres. In Victoria, there were twenty three regional botanic gardens in the nineteenth century. Regional botanic gardens were mainly initiated through public pressure groups requesting local and state governments for land reserved for botanic gardens. They tended to provide for recreation and leisure and to maintain a botanical collection but did not cater for scientific research.

The Botanic Gardens, Malmsbury were planted and permanently gazetted in 1863 as one of Victoria's provincial botanic gardens, supported by Dr Ferdinand Von Mueller, who supplied plants. The land had been initially reserved in 1855. The initial design is attributed to Dr Edward Davy, a local councillor, under the influence of von Mueller. Dr Davy (1806-1885) was an English medical practitioner, scientist and inventor, who was significantly involved in the development of electric telegraphy. He migrated to Australia in 1838 and continued to experiment in various scientific fields. He retired in 1854 to farm at Malmsbury, and practised there as a physician for the rest of his life. He was active in local affairs as councillor, mayor, justice of the peace and health officer and was on the committees for the Malmsbury Common School and the Botanic Gardens. (Australian Dictionary of Biography, 1788-1850, vol. 1, 1966) The site was temporarily reserved in August 1863 and a planting programme begun with Dr Davy authorised in February 1864 to obtain plants from the Botanic Gardens in Melbourne. The later introduction of curving paths and sweeping lawns has been attributed to William Guilfoyle. In the period 1880-1890, recreational facilities including a bowling green, tennis court and croquet lawn were added. The Victorian Municipal Directory of 1886 notes the bowling green and croquet lawn as components of the gardens.

A corner of the Botanic Gardens was set aside for the construction of a Mechanics Institute in Malmsbury. In 1867, it was resolved to build a Town Hall and Assembly Rooms, and the grant of land to the Mechanics Institute was rescinded to provide a site for the new hall. A grand ball was held in 1868 to mark the opening of the Town Hall. After the excision of the land west of the Coliban River for water supply purposes in 1866, and land for the Town Hall excised in 1868, the Gardens reached their current extent. (National Trust Classifications Report)

The Botanic Gardens, Malmsbury were neglected for most of the twentieth century but in the 1970s and 1980s much restorative work took place. In 1983 the Gardens became a joint responsibility of the Kyneton Council and the Provincial Botanic Gardens Rejuvenation Committee. In 1984 funding for works to the Malmsbury Gardens was granted to mark Victoria's sesquicentenary. Trees and plants were identified and labelled, tree surgery undertaken, replanting done, billabong dredged and landscaped and a full-time gardener employed for 12 months. This was intended as a model for the rejuvenation of other provincial botanic gardens. In 1985 an *Ulmus americana* was planted to commemorate the sesquicentenary and a *Eucalyptus muelleriana* was planted by the then Minister for Conservation, Joan Kirner in the same year. In 1987-88 a planting of an *Arbutus* collection was made, including *Arbutus menziesii*, *Arbutus xalapensis*, *Arbutus canariensis*, *Arbutus unedo*. (John Hawker pers.comm.)

Plaque Citation

First planted in 1863, this is one of Victoria's earliest botanic gardens. It is notable for its vistas, especially to the 1859 viaduct, its water features and its collection of plants. The town hall, a local landmark, was built in 1868.

Extent of Registration

1. All the buildings and structures listed below as shown on Diagram Number 1993 held by the Executive Director.

Town Hall (1868)

Tennis Pavilion (c.1880)

Fish Hatchery (c.1959)

War Memorial Gate and fence (c.1919)

Drinking Fountain (bluestone)

Fountain (bluestone)

2. All the landscape features listed below as shown on Diagram 1993 held by the Executive Director.

Lake and islands

Billabong
Pond

3. All the plants marked as follows on Diagram 1993 held by the Executive Director:

- T1 Crataegus coccinoides
- T2 Arbutus x andrachnoides
- T3 Arbutus menziesii
- T4 Arbutus xalapensis
- T5 Ulmus americana
- T6 Eucalyptus muelleriana

4. All the land known as the Malmsbury Botanic Gardens being Crown Reserve Rs 3956 [P143441], and Town Hall Crown Reserve 2736 [P143440] marked L1 on Diagram Number 1993 held by the Executive Director

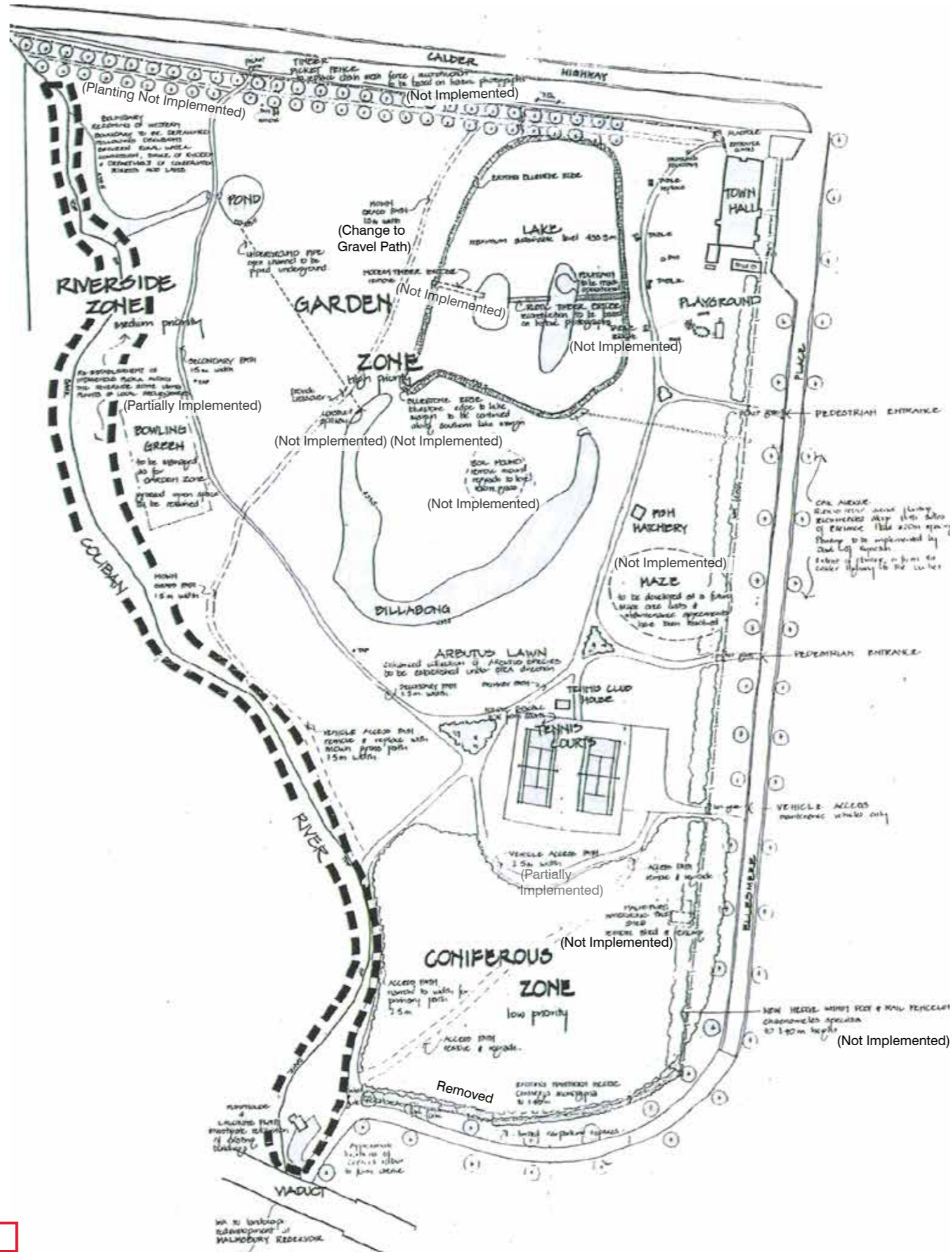
This place/object may be included in the Victorian Heritage Register pursuant to the Heritage Act 2017. Check the Victorian Heritage Database, selecting 'Heritage Victoria' as the place data owner.

For further details about Heritage Overlay places, contact the relevant local council or go to Planning Schemes Online <http://planningschemes.dpcd.vic.gov.au/>

Appendix 4 - Landscape Development Concept - 1988

Appendix - Landscape Development Concept Malmsbury

Plan Source: Francine Gilfedder, December 1988



Appendix 5 - Stormwater: Challenges matching to sustainable irrigated landscapes

Stormwater: Challenges in matching to sustainable irrigated landscapes

G. Connellan* and P. Symes**

**Principal, G&M Connellan Consultants, 372 Main Road, Lower Plenty, Vic, 3093,
Australia*

(E-mail: geoff.connellan@bigpond.com)

***Curator, Environmental Horticulture, Royal Botanic Gardens (RBG) Melbourne,
Birdwood Avenue, South Yarra, Vic, 3141. (E-mail: Peter.Symes@rbg.vic.gov.au)*

ABSTRACT

The output (water) of WSUD systems is often used to maintain urban landscape plantings. Trees, turf and gardens are now well recognised for the value they contribute to the urban environment through microclimate modification, provision of recreation facilities, habitat provision and conservation. In order for these landscapes to provide these valuable services, it is essential that these assets are managed to deliver the required outcomes and be kept in a healthy condition. In the landscape, sustainability is understood to refer to more than a reduction in water use and includes community wellbeing and other values as described. Landscape plantings have specific requirements in terms of the environment in which they will grow and prosper. Key areas include soil moisture and soil health. It is important that stormwater systems are designed and managed to meet these requirements.

Potential risks for urban plantings include low soil volumes, restricted root systems, compacted anaerobic soils, polluted soils, pH and nutrient imbalances, saline soils and low soil moisture. It is important that each of the potential risks are assessed and steps taken to eliminate or minimise. In terms of WSUD water supply, both the quantity and quality are critical. The experiences of RBG Melbourne have been used to illustrate the risks and mitigation strategies for urban landscape plantings.

KEY WORDS

Contamination; landscape coefficient; landscape planting; pollutant; risk;
stormwater; water quality

INTRODUCTION

The contribution of vegetation to the liveability of urban areas is now well recognised. A wide range of services, including microclimate modification, recreation and improved mental health are provided by green space. To deliver these valuable services, it is necessary for these plantings to be healthy and that they continue to provide these services during periods of low rainfall or drought.

Supporting urban green space, without dependence on potable mains, has become a priority in many cities. Hence, a strong interest in alternative water sources including recycled water, sewer mining, bore water, desalination water and stormwater. All of these sources present some level of risks for landscape sustainability. Water quantity, water supply security and water quality are factors.

The retention of rainfall harvested water (stormwater) within the locality through WSUD systems is gaining in popularity. Whilst these systems have many key benefits, there are also properties or characteristics of these systems that can impact on the sustainability of landscape plantings.

Characteristics of stormwater, used to supply irrigated landscapes, are:

- 1) Intermittent flow (variable supply).
- 2) Significant storage capacity required.
- 3) Water quality ranges/varies.

The risk, from stormwater sources, to irrigated landscapes and water storages include toxic organics (e.g. pesticides and herbicides), micro-organisms (plant diseases), heavy metals and (excess) nutrients. The potential urban sources of pollutants are outlined in *Urban Stormwater: Best Practice Environmental Guidelines* (CSIRO, 2006).

The requirements of landscape vegetation to deliver the required outcomes include:

- 1) plant species selection appropriate to the site, climate and required plant function.
- 2) planting site suited to selected species – including soil conditions.
- 3) resources, including water, provided to support healthy growth.
- 4) ongoing maintenance and care.

METHODS

The potential risks to sustainable landscape plantings have been identified. These risks are outlined in terms of water quantity and water quality.

Water quantity risks

The lack of available soil water is a major factor contributing to poor performing landscapes. The specific issues include:

- a. water demand, for healthy plant growth, is sometimes underestimated.
- b. water supply is unreliable (lack of security).
- c. storage volume inadequate/under sized.
- d. limited soil volume due to constrained root system.
- e. limited soil volume/water reservoir due to damaged root system.
- f. ineffective irrigation application (missing target area or root zone).
- g. soil not wetting (hydrophobic soil).

Water quality risk

The quality of water available from stormwater sources is determined by the nature and properties of the catchment. The potential impacts of low-quality water on each system component are presented.

Plants

The potential, impact of low-quality water on landscape plants include both above ground (aerial) material/vegetation and below ground (roots). The specific aspects include:

- a. foliage scorch or injury.
- b. reduced growth or damage due to salinity intolerance.
- c. toxicity due to contaminant levels above threshold.
- d. diseased plants due to pathogen infection.

Soil

The physical, chemical and biological properties of the soil may be altered to the degree that the sustainability of the landscape is threatened. The specific aspects include:

- a. toxic effects due to contamination above threshold values/levels.
- b. stability of soil structure diminished through chemically induced soil dispersion.
- c. reduced water availability due to elevated soil salinity.
- d. reduced growth or damage due to excess salinity/salinity intolerance.

- e. reduced availability of soil nutrients due to chemical imbalance e.g. increased phosphorous levels impact uptake of iron.
- f. reduced growth or damage due to pathogen (disease).

Water treatment

Whilst the role of the treatment process is to modify the properties of the water to suit the intended use, there are potentially some risks in the process. These include:

- a. process is ineffective in achieving required water quality parameter threshold values.
- b. failure or breakdown of treatment system.
- c. suspended material limits effectiveness of treatment process (e.g. chemical and optical treatments).
- d. suspended solids cause excessive build up/loading of filters.
- e. water handling (storage and piping) materials can contaminate/modify the quality of the water supply (e.g. concrete leaching that increases pH).

Water storage

The type of storage, open to the atmosphere, such as a pond, or closed, such as in a tank, is the major factor influencing risks associated with storages. These include for open storages:

- a. excessive algal and water growth if water body is eutrophic (nutrient rich).
- b. build-up of excessive algal and water plant growth from eutrophication for new water bodies if pollutant removal treatment is poorly sized and inadequate.
- c. pathogenic microbial contamination (human and plant diseases).

Irrigation system

The physical, chemical and biological properties of irrigation water can contribute to reduced efficacy and reduced reliability of irrigation systems. The specific issues include:

- a. blockage of microirrigation emitter pathways and orifices.
- b. blockage of fine orifices in solenoid valves.
- c. corrosion, due to acidity, of components.
- d. build up and blockage in pipework i.e. iron deposition and or calcification, if water quality not managed.

RESULTS AND DISCUSSION

The following outlines the experiences, observations, reports and RBG site results of risks to the sustainability of urban landscape plantings. The performance of water sources, including stormwater, the landscapes and irrigation system are presented.

Stormwater Scheme Design

Climate change considerations

Modelling of effective water supply from stormwater harvesting should consider a conservative approach. CSIRO have provided climatic change projections for the respective broader catchment areas of Victoria. For the Port Philip and Westernport catchment it is anticipated that an average 11% annual reduction in rainfall could occur by 2070 compared to historical averages (CSIRO 2008). In estimating the yield from the catchments for the RBG Working Wetlands scheme, the average annual rainfall of 528mm (about 80% of Melbourne's long term average) was calculated from the drier than average period of 1999-2008 (GHD 2009) and was used as a basis to calculate both the likely stormwater yield and irrigation demand as an analogue for future climatic change. On this basis, and modelling 100% irrigation demand, the lake was never completely emptied. However, with the current draw-down limits in place, current stormwater is expected to provide a 30-40% offset from potable water use (GHD 2009).

Plant health

Plant toxicity

Healthy plant growth is dependent on balanced amounts of nutrients and trace elements being available. Many soil properties, including soil pH, affect plant growth. Excess amounts of nitrogen and phosphorous are a risk. Phosphorous, for example, may be directly toxic to very sensitive species but also influence the availability of elements such as iron and manganese (Leake, S., Sydney Environmental Science Laboratory, 14 May 2012 *pers comm*). In the RBG, soil and plant tissue testing has found that high levels of phosphorous are already impacting the health of plant groups that are typically recognised at risk (such as Grevilleas, Banksias, etc.) to other Australian native genera such as *Acacia*, *Mirbelia*, *Pomaderris* and exotic plants such as *Abutilon*, *Camellia*, *Magnolia* and *Phoenix* (Palms).

Metals that are common urban pollutants are also a risk. Many soil test results for the RBG show high to excessive levels of zinc already present in the landscape soils. Zinc levels should be kept below 100mg/kg (sandy soil) to 200mg/kg (loamy soil). Zinc toxicity has been observed as low as 80 mg/kg in sandy acid soils on

Camellias which appear to be a sensitive species (Leake, S., Sydney Environmental Science Laboratory, 14 May 2012, *pers comm*). According to Ayers and Westcott (1994), the maximum concentration of trace element, zinc, in irrigation water should be 2.0 mg/L.

Leaf scorch/damage

The method of irrigation and sensitivity of the plant species both influence the risk level for foliar damage. The use of sprinklers and sprays, where the foliage is wet, presents a greater risk than drip irrigation. Both sodium and chloride are the risk elements in terms of leaf scorch. The preferred target range for these two elements, in irrigation water, that have been adopted as part of the Royal Botanic Garden, Melbourne Water Quality Parameters, are sodium 50 to 100 mg/L and chloride to 100 mg/L.

The risk is also greater in conditions of high evaporation when salts in the deposited water are concentrated. In assessing the suitability of saline water (EC) it is important to test for concentrations of sodium and chlorides.

Disease

Plants are potentially at risk due to pathogens carried in the irrigation water. The temperature of the water and the host conditions are conducive to water-borne diseases. The properties of the catchment supplying the stormwater are a consideration in terms of disease risk. Diseased plants may be in the catchment and the user or receiver of the stormwater will not be aware of the risk or be able to take preventative strategies at the source. The turbidity and/or suspended particles in the water also add to the risk of disease as a result of the capacity of these particles to act as hosts or carriers.

Disinfection of the irrigation water, using a technique such as UV treatment, is required to treat for water-borne pathogens such as both *Phytophthora* and *Fusarium*. Careful attention must be given to the UV intensity to ensure it is adequate to reduce plant pathogens to acceptable levels as these typically require higher UV levels for treatment compared to systems designed to treat human pathogens. To kill most pathogens, UV intensities need to be at least 500,000 $\mu\text{W}\cdot\text{s}\cdot\text{cm}^{-2}$ with UV transmission > 60% (43,000 $\mu\text{W}\cdot\text{s}\cdot\text{cm}^{-2}$ is adequate for *Phytophthora cinnamomi*) in comparison to 7,000 $\mu\text{W}\cdot\text{s}\cdot\text{cm}^{-2}$ being commonly used for disinfecting water for human use (Mebaldset *al* 1995).

Since 2000, RBG Melbourne has been dealing with a foliar and stem rotting *Phytophthora* –*Phytophthora* aff. *megasperma* (Cunnington et al. 2005) that has been particularly damaging on *Agave* and *Yucca* sp. Similar to other *Phytophthora* species, this disease is likely to be readily spread in water. It has been managed by quarantining infected areas and application of fungicides. Stormwater harvesting often includes large areas outside the management of the receiving land holder. Thus, biosecurity risks and appropriate treatment should be strongly considered for the protection of the valuable living assets of green open space.

Soil health

Soil chemistry

It is essential to have a thorough understanding of the proposed site's soil chemical and physical properties. This identifies any existing issues, particularly for urban soils where high phosphorous, elements from industrial and urban 'fallout' such as lead, zinc and iron may already exist. This chemical background may require a more conservative approach to storm water quality to avoid accumulation impacts. A comprehensive soil survey and continuing testing program is very valuable in both identifying target water quality parameters and managing into the future.

The accumulation of dissolved solids (salts) and potentially toxic elements, including heavy metals, in the soil is a risk with poor quality water. The mobility of the risk compound in the soil is an important consideration.

Some elements, such as zinc, are far less mobile and should concentrations reach threshold limits, there are few options other than removal of the contaminated soil volume. Also, oversupply of nutrients is a risk, particularly for Australian native plants but also for some exotics (Handreck and Black, 2005), for sites which have nutrient rich stormwater and the treatment systems do not remove these to acceptable levels. Removal of excess nutrients in the soil is very difficult.

Soil salinity

The build up of salts in the soil root zone is a potential risk for irrigated landscape plantings. However high salinity is generally not considered a significant issue for stormwater supplies. It is more likely with recycled water and some groundwaters.

Providing the soil has reasonable drainage properties, it is possible to flush salts, which are reasonably mobile, through the soil profile. Additional irrigation water, determined using the calculation of the Leaching Fraction (LF), needs to be applied.

Management strategies include reducing the concentration of salts through mixing the saline water with low salinity water such as rainwater or potable. A guide to the sensitivity plants to salinity is presented in Handreck and Black (2005).

Soil water properties

A key soil water property is the water holding capacity (WHC) of the soil. The value of the

WHC, in conjunction with the depth of root zone determine the size of the soil water storage. The amount of organic content in loam and sandy soils has a strong influence on the water holding capacity of the soil. Addition of organic material is therefore a sound water conservation management strategy. The following results (Table 1) demonstrate the benefit of organic content in soils tested at the Royal Botanic Gardens Melbourne.

Table 1. Comparison of Soil Types and Water Holding Capacities

Soil Type (0-100mm soil depth)	Soil (% WHC)	WHC (L per m ²)	WHC (L per Ha)	% Increase in WHC compared to general loam
General Loam	24%	2.4	24,000	0%
Fine Sandy Loam	27%	2.7	27,000	12.5%
*RBG Average Soil (organic, structured)	34%	3.4	34,000	41.7%
#RBG Loamy Gradational Soil (organic, structured)	38%	3.8	38,000	58.3%

Notes:

*High organic content, sandy loam to loam soils

#High organic content, well structured, loamy soil

Soil biota

The role of micro-organisms in the soil is important in terms of plant growth and plant health. These micro-organisms include bacteria, fungi, viruses, protozoa and mycorrhiza. Maintaining strong biological activity in the soil is beneficial in numerous ways including nutrient availability and soil water properties. The production of organic matter enhances the water holding capacity of the soil. Soil biota are at risk, and hence soil health, from toxic organic and inorganic compounds.

Hydrophobic soils

Soil water repellence can create drought conditions for landscapes as a result of the failure of rainfall and irrigation to reach the root zone target area. Sandy soils and extended dry periods are considered to contribute to the formation of wax (water repellent) type layers on soil particles. Wetting agents (surfactants) is one treatment technique.

The failure of garden bed soils to wet up has been demonstrated at the RBG Melbourne. Real time, multiple depth soil moisture monitoring shows no change in soil moisture levels, following irrigation, in the top soil layers of affected sites (Figure 1). Application of wetting agents (multiple treatments) showed increases in soil moisture levels, following irrigation.

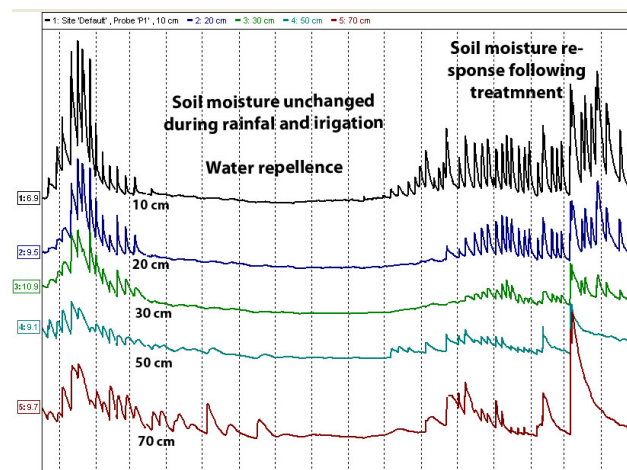


Figure 1. Soil moisture readings from *EnviroSCAN* capacitance probe in the Australian Forest Walk plant collection, RBG Melbourne. Traces are shown from top to bottom of the graph at respective soil depths from 10, 20, 30, 50, 70 cm.

Further details and soil moisture data are provided in the presentation; *Developments in soil moisture sensing for improved landscape water management* available at Royal Botanic Gardens, Melbourne website: www.rbg.vic.gov.au/horticulture/research-and-information/landscape-water-use

Sodium Adsorption Ratio (SAR)

The level of exchangeable sodium (Na^+) in the soil has an influence on soil properties and behaviour. Soils which have high exchangeable sodium and low total salts are referred to as sodic soils. In addition to potential toxic levels of sodium and

nutrient imbalance, there is a risk of soil particle dispersal. This results in breakdown of soil structure and reduced infiltration capacity as a result of small soil particle filling pore space in the soil.

The level of risk is expressed in the term Sodium Adsorption Ratio (SAR), which is a measure of the sodium to calcium (Ca^{++}) and magnesium (Mg^{++}) of the soil. Whilst SAR values below 6 are generally not a problem, it is necessary to analyse both soil and water to assess the potential risk at a site.

The following Table 2 provides a summary of average values in 2007-2008 analysed from water samples sourced from numerous depths and locations of the RBG Ornamental Lake. The SAR value of 4.0 is considered to present a slight to moderate risk of impacting the permeability of RBG clay subsoils.

Table 2. Water quality test results used to determine SAR at RBG Melbourne Ornamental Lake

Element tested	mg/L	Atomic Equivalent Mass	m.e./L (calculated)
Na ⁺	114	23	5.0
Ca ²⁺	29	20.05	1.4
Mg ²⁺	19	12.15	1.6
Calculated SAR	4.0		

Note: The RBG Ornamental lake was less than 50% capacity during the sampling events so when it is near full capacity the dilution factor is considered to reduce the SAR further to values well within acceptable limits.

Soil moisture

Water requirements of healthy plants

Maintaining soil moisture at levels that support landscape plants to deliver the required ecosystem outcomes is a critical requirement. Both the amount of water required and security of supply are essential. To achieve efficiency of water use it is necessary to know the water demands of plant species, plant performance/condition and the seasonal dependence characteristics. The technique used to estimate plant water demand is outlined in Costello and Jones (2000) uses the landscape coefficient K_L . Typical values used at RBG Melbourne are presented in Table 3.

Table 3. Seasonal Landscape coefficient (K_L) used at RBG Melbourne

Garden bed type – Mixed planting	Landscape coefficient (K_L) for various seasons			
	Spring	Summer	Autumn	Winter
High requirement	0.45	0.60	0.45	0.30
Medium requirement	0.30	0.40	0.30	0.20
Low requirement	0.25	0.30	0.25	0.15

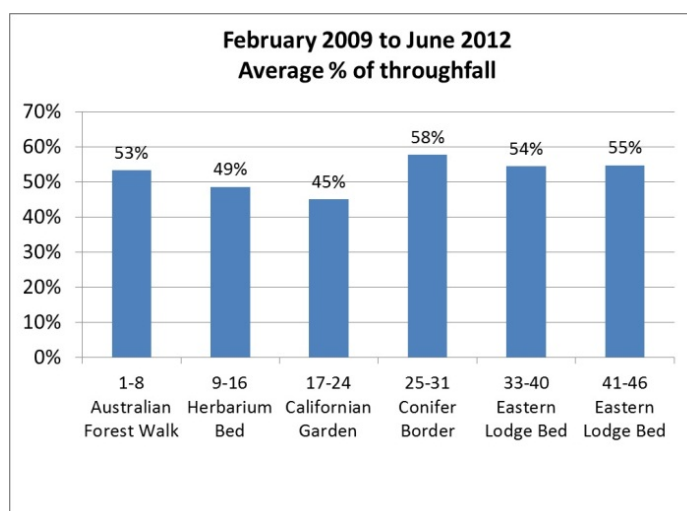
Due to the nature and role of the plant collection, high value heritage collection and scientific living plant collection, at the RBG it is imperative that reliability of supply is 100%. This means adopting an integrated water supply solution, including potable mains backup, for the irrigation.

Effective rainfall and irrigation

Optimising rainfall and efficient application of irrigation water both contribute to water use efficiency. In mature landscapes and gardens the interception of rainfall by trees and large shrubs can be a very significant source of rainfall not contributing to soil moisture level. In trials, carried out by School of Geography, Monash University, at the RBG Melbourne, the proportion of rainfall intercepted by trees, over a 3-year period, was in excess of 50%. Individual rainfall events experienced losses in excess of 80%. (Refer: www.rbg.vic.gov.au/horticulture/research-and-information)

The Table 4 shows the range of rainfall reaching the ground at several sites during the period 2009 to 2012.

Table 4. Rainfall reaching the ground (not soil) for selected garden bed sites at RBG Melbourne



In addition to these very significant amounts there is also the absorption of precipitation (rainfall and irrigation) by the mulch. It is advisable to use coarse (or mixed particle size material) rather than fine organic mulch so that any precipitation can more readily penetrate the mulch layer and enter the soil. Drip irrigation systems installed below the mulch have higher application efficiencies than sprinklers or sprays.

Water banking /deep soil storage

Large plants, such as trees, with deep root systems provide the opportunity to store water in the soil profile and optimised the storage capacity of the soil. In addition to providing a sizable storage of water, this approach potentially also allows greater utilisation of harvested stormwater supplies. Water harvested during the winter months can be applied to the tree/s in spring, for example, rather than the traditional scheduling approach of irrigating in the summer high demand periods (Figure 2).

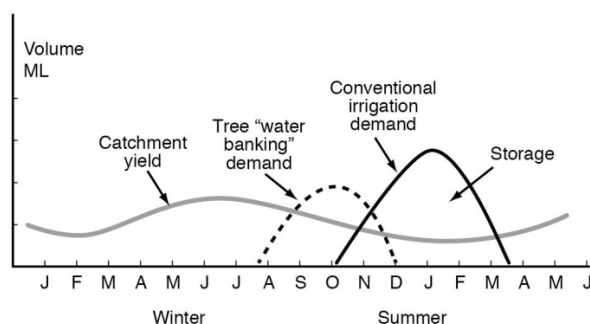


Figure 2. Stormwater can be used to store water in soil (water banking) prior to high water demand period.

For the Royal Botanic Garden (RBG) this approach is being contemplated to maximise offset of potable water use by stormwater. Trials are being undertaken for a 'split' irrigation scheduling/water balance regime. This means the turf zone could be managed at lower K_L values while the trees are using subsoil reserves thus saving potable water during summer. Based on the methodology described by Harris (1998) and Kopinga (1998), modelling of tree water needs in the RBG suggest that if soil moisture was at full capacity and accessible to 1000 mm soil depth, then the 'average' RBG Gardens tree could subsist for about 90 days in summer with no additional precipitation. This potentially extends to 150 days when considering species more adapted to drought conditions. This technique may also be applied to use of opportunistic stormwater harvesting in the hotter months

following storms. The rate of rainfall of these events can exceed the infiltration rate of landscape soils and readily run-off into storages. An efficient irrigation system can then 'recover' the water from the storage and apply it at rates below the soil infiltration capacity

Water storage management

Eutrophication

The development of algal blooms in urban water storages has multiple implications. In addition to the issue of physical removal of the algae, there are potentially human, and animal, health toxicity issues (e.g. some cyanobacteria) together with the reduced aesthetics of the storage when it is used as both an ornamental water feature and an irrigation source. The breakdown and decay of algae, and other plant material, can result in a significant increase in Biochemical Oxygen Demand (BOD) or anoxia of the storage water which in turn can impact the health of aquatic life.

Risk management approaches to minimise the occurrence of algal blooms is best addressed by carefully designed water treatment infrastructure such as constructed wetlands to ensure adequate treatment of incoming waters (Melbourne Water 2005; Melbourne Water 2012). The range of tolerance for acceptable levels of Nitrogen and particularly Phosphorous is quite low (Melbourne Water 2005) to reduce the risk of algal blooms. When these values are considered against Best Practice Environmental Management Guidelines (BPEMG) for target pollution removal of 45% reduction in Phosphorous from typical urban loads (CSIRO 2006, Melbourne Water 2012), this can still mean substantial amounts of this nutrient entering the storage, especially over time. Other strategies (applied by the RBG) to consider, include reducing the residence time of the water in the storage, ensuring healthy populations of water plants (macrophytes), astute management of fertiliser practices within the catchment and management of other potential nutrient inputs such as artificial feeding of the birdlife.

At the RBG Melbourne, an aim is to achieve a 100% nutrient reduction for both Total Nitrogen (TN) and Total Phosphorous (TP) of incoming stormwater (GHD 2009). In addition to traditional constructed wetlands, one innovative technique that has been adopted is the use of over 1000 m² total area of Floating Treatment Wetlands (FTW). These are typically floating raft-like structures planted with wetland plants. While plant growth does absorb nutrients from the water, it is the trailing roots of these plants descending down into the water column underneath the FTW that provides the relatively high surface treatment area. Some studies into treatment

performance of FTW's have found removal rates for TP ranging from 30 to 80% and TN from 30 to 90% (Headley and Tanner, 2006). There also seems to be potential for good performance in reducing levels of metals such as copper and zinc (Headey and Tanner, 2006)

Water level management

The use of an ornamental storage as an irrigation supply requires a balance in the management of the water levels to protect the aquatic life, water quality, aquatic and lake marginal plantings, and landscape amenity against maximising the volume of water that can be extracted from the storage. The RBG has allowed for a typical draw-down level of 300mm or 12,000 kL to a maximum of 500mm or 20,000 kL in the Ornamental Lake (capacity 55,000 kL) (GHD 2009) to ensure compliance with the balance above. The Ornamental Lake is highly variable in depth but reaches about 2 metres in some places. The draw-down limit prevents exposure of large areas of sediment in the shallower sections.

Suspended particles and sediments

The presence of high concentrations of sediment (suspended particles) within storage water influences a number of storage behaviour and treatment processes. Light attenuation reduces light available for macrophyte (water plant) plant growth which is beneficial in terms of suppressing algal blooms. Turbidity of storage necessitates treatment of water to achieve effective radiative (e.g. ultraviolet (RUV) disinfection.

The presence of suspended solids/particles increases the need for filtration to protect the water handling and irrigation equipment.

Irrigation system performance

Irrigation control

Effective integration of stormwater harvesting and storage for irrigation should include a sophisticated irrigation control system that is capable of multiple smart sensor inputs such as lake/storage levels, UV transmission, chlorine levels, pH, and wind speed that is capable of triggering a shutdown of the system and or providing an alarm if parameters are exceeded. As the irrigation of the RBG is weather-based, irrigation can often be scheduled over weekends and public holidays. This may present a risk if systems malfunction. The RBG has setup a system for remote control access by irrigation officers who will be rostered on during peak periods

System flow management

Optimisation of the irrigation pipe network to achieve high hydraulic performance (efficiency) is also important to reduce irrigation run times. This provides greater flexibility to make opportunistic use of rainfall events leading to significant stormwater harvest and the capacity to for earlier finish times to reduce water quality risk to visitors. Installation of additional and larger pipe connections, and fine-tuning of the flow manager software has provided considerable improvements in water distribution over shorter times. Daily time reductions of 10% (70% reduction over the course of a week) for 'all stations' program to 60% for problematic individual zones have been achieved to date. The use of a multi-stage pumping system is also expected to return better overall system pressure and sprinkler distribution uniformity. The potential water savings from improvements in sprinkler operating pressure are expected to significantly offset the electrical energy costs to operate the pumpset.

Emitter blockage

The presence of suspended matter in water can result in blockages, particularly the small pathways of drip emitters. Dripper design has advanced in terms of resisting clogging through the use of turbulent flow and auto flushing features or self-cleaning properties built into the emitter pathways and outlets.

Filtration to particle sizes one fifth or less of the small opening or orifice size are often recommended for drip emitters. Blockage can occur not only as a result of suspended particles but also as a result of the formation of precipitates, calcification and micro-organisms such as snails and larvae. The growth of slimes, such as iron bacterial slime, is another potential blockage risk in drip irrigation systems.

The following Table 5 provides a guide to the risk level for nominated water quality parameters.

Table 5. Water quality and risk of clogging of microirrigation (SDI) systems

Parameter	Symbol	Unit	Level of concern		
			Low	Moderate	High
pH			< 7.0	7.0 - 8.0	> 8.0
Bicarbonate	HCO ₃	meq/L	< 2.0	> 2.0	> 2.0
Iron	Fe	mg/L	< 0.2	0.2 - 1.5	> 1.5
Manganese	Mn	mg/L	< 0.1	0.1 – 1.5	> 1.5
Hydrogen sulphide	H ₂ S	mg/L	< 0.2	0.2 – 2.0	> 2.0
Total dissolved Solids	TDS	mg/L	< 500	500 - 2000	> 2000
Suspended solids	SS	mg/L	< 50	50 - 100	> 100
Bacteria count		No./L	< 10,000	10,000–50,000	> 50,000

Sediment and system maintenance

In addition to emitter blockage, suspended particles result in the need to maintain filters in effective operating condition through regular flushing or back-washing. The irrigation system needs to be designed to allow pipelines to be flushed at sufficient velocity to remove any sludge or build-up of sediment deposits. As a guide a flow rate that will deliver a flushing velocity of 0.3 to 0.5 m/s is recommended for drip (SDI) laterals (Harris, 2006).

Strategies for matching stormwater with sustainable irrigated landscapes:

- a. Maximise opportunistic scheduling of irrigation to use stormwater when available – this may require changes in the typical paradigm towards irrigation application.
- b. Select plants to match availability of stormwater supply i.e. Mediterranean flora that typically come from a winter rainfall dominated climate.
- c. Consider climate change impacts on stormwater delivery.
- d. Commit to and develop a comprehensive maintenance and monitoring program of systems against benchmarks for optimum soil and water quality.
- e. Develop and value a continuing sustainable soil management program.

- f. Integrate I irrigation control with stormwater supply and delivery – particularly where there is a need to shift between potable and non-potable supply.
- g. Enhance hydraulic performance of irrigation system to maximise stormwater delivery (flow rate) when it is available and available irrigation time windows.
- h. Recognise that landscape water management is no longer just about irrigation or stormwater disposal but managers need to adopt a holistic approach to total water management incorporating landscape irrigation, water quality, ecosystem protection, climate adaptation, etc.
- i. Commit to investment in continuing staff training in integrated water management – complete hydrological cycle (i.e. wetland /rainfall/irrigation/water quality/climate).
- j. Incorporate turf types that can recover quickly after precipitation is applied i.e. warm season grasses and in particular Kikuyu.

CONCLUSIONS

There are many factors that can impact on the sustainability of landscape plantings. Experiences with the urban landscapes, in the south east of Australia, demonstrate the importance of the following strategies:

- (1) Provision of adequate volumes of water to ensure healthy plants and security of supply to maintain plants during periods of low rainfall /drought
- (2) Establish or identify threshold values for water quality storage and water distribution/application and soil health
- (3) Implement thorough and regular monitoring of all elements/components of the landscape ecosystem including water storage, plants and soil
- (4) Regular maintenance of all systems and sub-systems is essential to achieve sustainable landscapes that deliver the desired outcomes.

REFERENCES

- Ayers, R. S. and Westcott, D. W. (1994) *Water quality for agriculture*, FAO Irrigation and Drainage Paper, FAO, Rome.
- Burt C.M. and Styles S.W. (1994) *Drip and Microirrigation for Trees, Vines and Row Crops*. Irrigation Training and Research Center, Cal Poly, San Louis Obispo, California.
- Costello L. R. and Jones K. S. (2000) *A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California – The Landscape Coefficient Method and WUCOLS III*, California Department of Water Resources, Sacramento, California.
- CSIRO (2006). *Urban Stormwater: Best Practice Environmental Management Guidelines, 2006*
- CSIRO (2008) *Climate Change in Victoria*. Department of Sustainability and Environment, The State of Victoria, Melbourne, June 2008. <http://www.climatechange.vic.gov.au>
- Accessed July 2012
- Handreck, K. *Phosphorus Needs of Some Australian Plants*, Accessed 1 July 2012 <http://anpsa.org.au/APOL8/dec97-4.html>
- Handreck and Black (2005) *Growing Media For Ornamental Plants and Turf*. Third edition. University of New South Wales Press, Kensington, New South Wales.
- Cunnington, J.H., de Alwis S., Pascoe I.G., Symes P. (2005). The 'asparagus' *Phytophthora* infecting members of the Agavaceae at the Royal Botanic Gardens, Melbourne. *Australasian Plant Pathology* 34, 413–414.
- GHD (2009) Melbourne Water and Royal Botanic Gardens, Report for Working Wetlands, Design Basis Report, October 2009 (internal report - non published)
- Harris, G. (2006) *Sub-surface Drip Irrigation (SDI) – System Maintenance*. Queensland Government Department of Primary Industries and Fisheries, Brisbane.
- Harris, R. 1998. *Irrigation of Newly Planted Street Trees*. In Proc. of conf. on The Landscape Below Ground 2, second International Workshop on Tree Root Development in Urban Soils 5-6 March 1998. San Francisco, California. International Society of Arboriculture: Champaign, USA.
- Headley T. and Tanner C. (2006) *Auckland Regional Council Technical Publication – Application of Floating Wetlands for Enhanced Stormwater Treatment: A Review*, prepared for Auckland Regional Council, National Institute of Water and Atmospheric Research, New Zealand
- Kopinga, J. 1998. *Evaporation and Water Requirements of Amenity Trees with Regard to the Construction of a Planting Site*. In Proc. of conf. on the Landscape Below Ground 2, second International Workshop on Tree Root Development in

Urban Soils 5-6 March 1998. San Francisco, California. International Society of Arboriculture: Champaign, USA.

Mebalds M., van der Linden A. and Beardsell, D. (1995) *Disinfestation of plant pathogens in recycled water using UV radiation and chlorine dioxide* HRDC Final Report No. NY320

Melbourne Water (2005) *Constructed Shallow Lake Systems Design Guidelines for Developers*

Version 2, November 2005 Accessed 31 July 2012

<http://wsud.melbournewater.com.au/content/guidelines/guidelines.asp>

Melbourne Water (2012) *Constructed Wetlands* Accessed 31 July 2012

<http://wsud.melbournewater.com.au/content/guidelines/guidelines.asp>

