

The Bacchus Marsh Avenue of Honour

PRESERVATION PLAN 2023



**Manage.
Conserve.
Enhance.**

Acknowledgement of Country

Council respectfully acknowledges the Traditional Owners of the land which includes the Wurundjeri Woi Wurrung, Wadawurrung and Dja Dja Wurrung people. We pay our respects to the Elders past, present and emerging.



Acknowledgements

This document has been prepared by Moorabool Shire Council in conjunction with the following:

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Ryder Arboriculture & Environment
- Craig Lockens**
Nuleaf Tree Services
- Annabel Neylon**
Plan Heritage

The assistance and/or information from the following groups or organisations is also recognised:

- Heritage Victoria
- The Bacchus Marsh RSL Sub Branch
- Bacchus Marsh Historical Society

The photographs contained within this report were sourced from varying groups and organisations.



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Executive Summary

This Preservation Plan covers the Bacchus Marsh Avenue of Honour consisting of:



40

sites between Pearce and Fiskin Streets dating to the 1880s **(the western approach)**



281

sites between Pearce Street and the flag poles dating to 1918 **(the dedicated avenue)**



39

sites between the flag poles and the Lerderderg River dating to the 1960s **(the eastern approach)**

The Bacchus Marsh Avenue of Honour (BMAOH) is of historical, aesthetic and scientific significance and is listed on the Victorian Heritage Register.

A detailed assessment was made of the various issues that may affect the heritage significance of the avenue; focussing on the integrity of the Avenue; the health and longevity of the trees, future climate predictions, the critical connection between the trees and individual service persons, infrastructure and development conflicts and ongoing maintenance regimes.

The objectives Are to ensure the Avenue of Honour is effectively managed, conserved and enhanced in perpetuity as a living memorial, commemorating the soldiers of the Bacchus Marsh district.

The plan will be reviewed every five years, with the overarching Bacchus Marsh Avenue of Honour Management Strategy being reviewed as required.

Management of the Avenue



Arboricultural Works

Moorabool Shire Council has invested heavily in the management of the Avenue of Honour. Pruning works are undertaken to limit the risk to public safety and extend the life of the trees within the Avenue of Honour.

Moorabool Shire Council has invested heavily in the management of the Avenue of Honour. Pruning works are undertaken to limit the risk to public safety and extend the life of the trees within the Avenue of Honour. Extensive remedial pruning work has been undertaken in the past 12 years in order to reduce the incidence of limb failures and mitigate risk. Where required for health and safety reasons, some trees have also been removed and replaced. The local community is notified that these pruning works will occur.

Prior to the recent management regime, Bacchus Marsh Road was often closed for a day or two following a large storm while fallen debris was cleared from the road. Typically a small number of branch failures are now experienced following a similar storm.

As part of the 3-yearly assessments, works are recommended to maintain tree health, minimise potential for tree failure, manage risk and identify any trees requiring removal.

Various works are specified for the trees and may include:

- Deadwood removal
- Canopy lift pruning
- Canopy, branch or stem reduction
- Cable installation/inspection
- Epicormic shoot management
- Broken/defective branch removal

- Young tree maintenance
- Decay detection and assessment
- Tree removal

All pruning and removal works are completed by qualified arborists with a minimum of Certificate III in arboriculture (or equivalent) in accordance with AS4373-2007 *Pruning of Amenity Trees*.

Reactive Tree Removal

Tree conditions can change quickly, as a result of wind/storm damage and or rapid deterioration, and Council undertakes proactive and reactive inspections to ensure risk is appropriately managed. This process may identify trees for unexpected removal.

Unless the tree is imminently hazardous and removal is required immediately, all trees proposed for removal due to poor condition or risk that are not identified for removal in the management plan may be subject to peer review by an independent arborist. The peer review may include more detailed testing including root collar investigations, sonic tomography or aerial inspections to fully ascertain the tree's requirement for removal. Options for retention will be supplied where appropriate.

Pest & Disease Control

Pest and disease control is an important part of the management of the Avenue of Honour. Without this, the Avenue could be exposed to pathogens which may contribute to a decline in tree health and longevity. Appendix 1 contains further detail regarding pest and disease control.

Regular Elm Leaf Beetle control is completed to help maintain the vigour of the Avenue. Each tree is treated with an insecticide (active ingredient imidacloprid) every two years. A soil drench is applied along both sides of the road for half the length of the Avenue of Honour on an annual basis. This management program has been effective in controlling Elm Leaf Beetle. Given the age and significance of the trees, the continued on-label use of soil drench, rather than stem injection for Elm Leaf Beetle control is recommended for the trees' protection.

Tree Assessment Review & Discussion

Site Inspection

The Avenue of Honour trees are regularly inspected. In recent times, a full audit of the trees was completed in 2008, 2014,

2019 and 2020. There have been changes over time to data collection attributes and definitions, subsequently only some comparison can be made.

Tree Assessment Methodology

All trees are visually assessed from the ground with the tree's physical attributes recorded including tree condition, physical attributes, recommended works and a risk assessment. Moorabool Shire Council has adopted the Quantified Tree Risk Assessment (QTRA) methodology (Ellison 2005, QTRA 2015).

Western and Eastern Approaches

There is a high proportion of vacant sites (14) and no recent replacement planting has been undertaken due to insufficient planting space and/or potential conflict with civil infrastructure.

The Western and Eastern approaches of the Bacchus Marsh Avenue are dominated by Dutch Elms (Table 2).

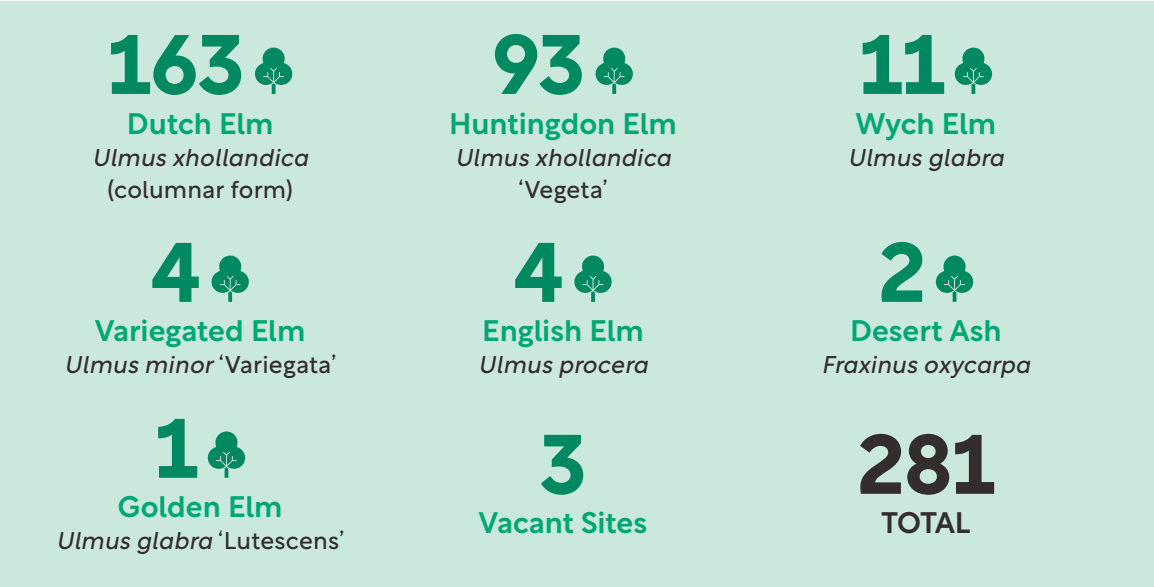


TABLE 1: Summary of tree species within the Bacchus Marsh Avenue of Honour (2023 data).



TABLE 2: Species within the Western and Eastern Approaches of the Bacchus Marsh Avenue (2019 data)

Avenue of Honour

The Avenue of Honour consists predominantly of Dutch Elms, of which many of these were planted in 1918 (Table 1). Two distinct forms of Dutch Elm were planted although there does not seem to be any pattern to the planting of these two types:

- *Ulmus xhollandica* 'Vegeta' (columnar form), referred to as Type 1 in earlier reports.
- *Ulmus xhollandica* 'Hollandica' which has a round spreading form and was referred to as Type 2 in earlier reports

Dutch Elms were commonly planted in Victorian streets and parks from the late 1800s to the early 1900s.

Over time a number of elm species (other than Dutch Elms) and Desert Ash have been planted as replacement trees.

Age Class

The age class distribution for the whole avenue is heavily skewed towards mature and over mature, less than 20% are young or semi-mature. This aligns with most trees being approximately 105 years old. At this stage, the only trees that have been replaced have been those that have failed, died or been removed for a reason.

Health and Structure

Avenue of Honour

Only the dedicated Avenue will be discussed as this is the only section where multiple data sets are available.

The health of the Avenue of Honour trees is generally good. The trees typically have relatively dense canopies and adequate shoot elongation. Age related decline, physical damage to the trunk or roots (vehicle collision and underground service installation) and compacted soils are the most likely factors that have contributed to tree decline.

Figure 1 shows that the condition of the trees in 2008 was poorer than in subsequent inspections. This is likely to have been due to the millennium drought.

Subsequent improvements over time are likely to be as a result of a commitment by Council towards a proactive management of the avenue and investment of additional resources. In recent years, the condition has started to decline as the trees have continued to age. The preservation strategy aims to limit the number of trees in the poor health category at any one time. Due to tree numbers fluctuating over time, only percentages are shown.

Tree structure is slowly declining over time. From 2014 to 2023, there has been a significant drop in the good structure ratings with a shift to poor and very poor (Figure 210). This data was not collected in 2008. Significant works completed after the 2021 storms meant that some trees with poor structure failed and the defective parts removed, reducing the number of trees in this category.

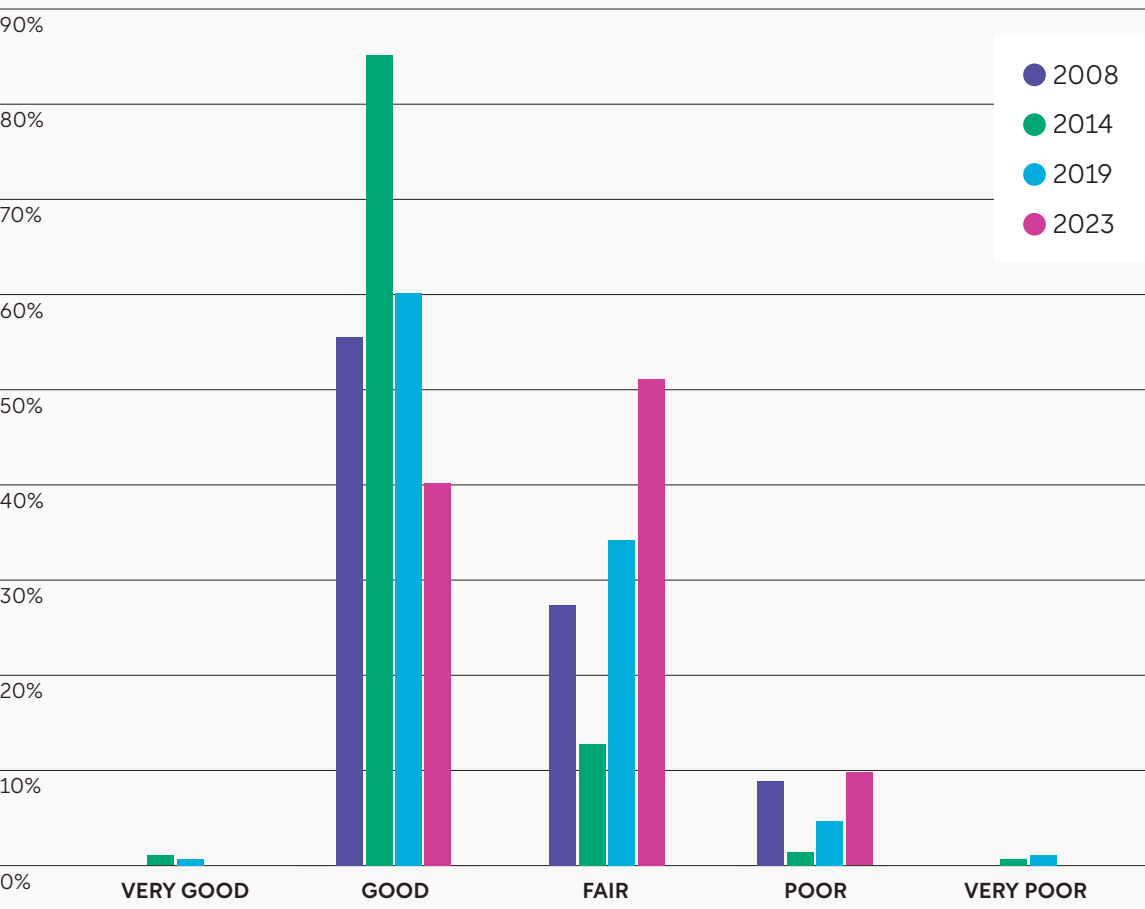


FIGURE 1: Change in health over time.

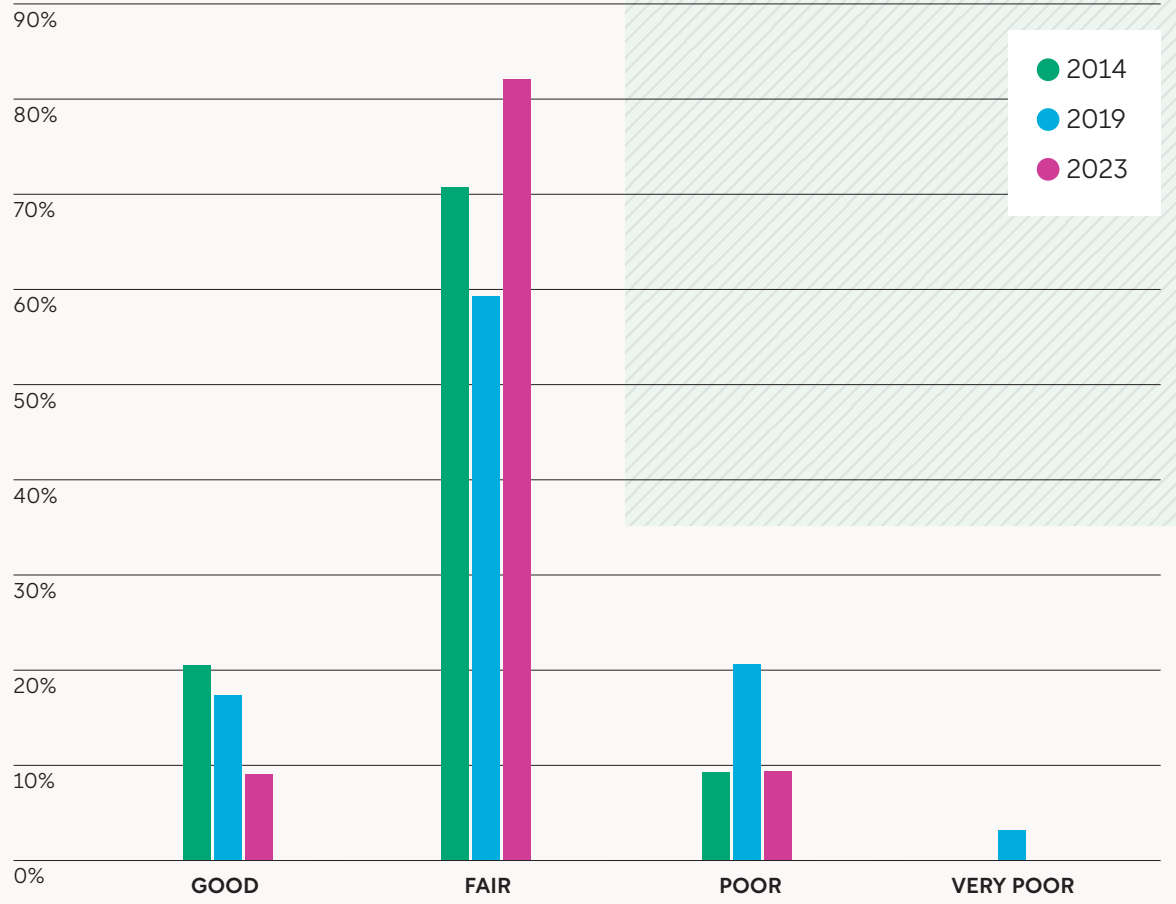


FIGURE 2: Change in structure over time.

Public Liability & Risk

Managing the risk of the Avenue trees is a significant and ongoing issue. The canopies overhang the road, car park areas, buildings and footpaths. Moorabool Shire Council has undertaken extensive pruning works in the last 15 years to manage and mitigate risk associated with branch and tree failure.

The following measures are recommended to manage tree risk:

- Undertake arboricultural works guided by proactive tree inspections
- Timely removal and replacement of defective trees that are considered to pose an unacceptable risk

- Peer review of tree assessments for all trees recommended for removal (not part of the preservation strategy)
- Continued funding for an ongoing tree pruning program to remove defective tree parts
- Where possible and practicable in areas of unacceptable levels of risk, exclude targets from underneath the tree canopies (Figure 3). This could be in the form of bollards, boulders etc. In many cases it may not be feasible to prevent cars from parking under the entire canopy however, store owners should be encouraged to adopt the plan.



FIGURE 3: Risk could be reduced and tree health improved if vehicles were prevented from parking underneath canopies.

Tree Longevity

Avenue of Honour

There has been a decline in Useful Life Expectancy (ULE) between 2014 and 2023. Whilst many of the categories have stayed similar, there is a marked decline in the 20-40 and 40+ years category, with an increase in those in the 5-10 and 10-20 year categories. There has been

little change in the very short ULE categories as these are the trees that have been targeted for removal or have failed in storms (Figure 4). This is expected and demonstrates that the trees are in a process of decline.

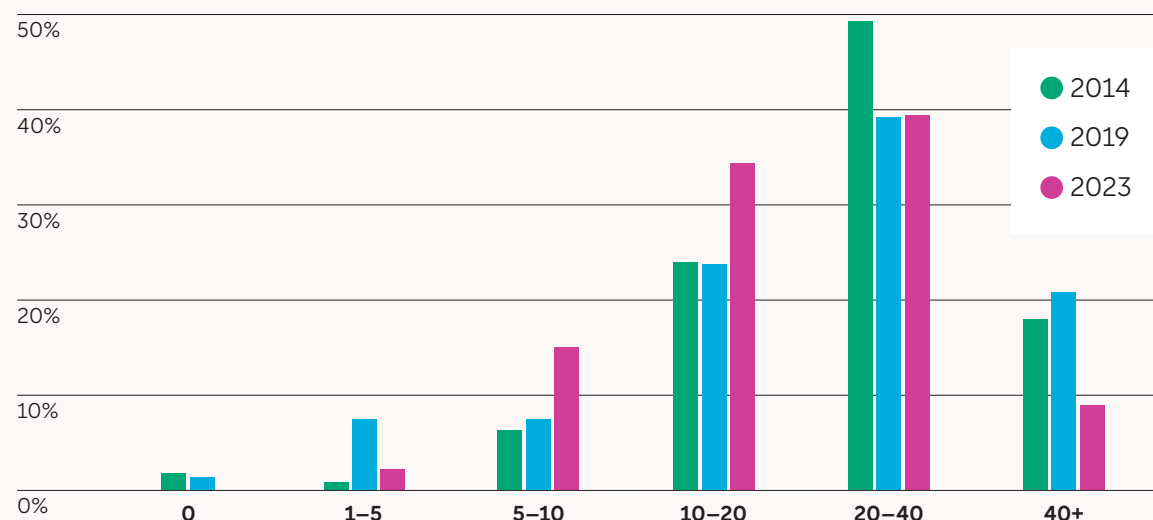


FIGURE 4: Change in ULE ratings

Tree Replacement Strategy

The Bacchus Marsh Avenue of Honour is one of several heritage listed avenues, being of historical, aesthetic and scientific significance to the State of Victoria. The original trees are approximately 100 years old and many are declining. The replacement of the Avenue of Honour trees cannot be deferred indefinitely and the focus must be on retaining the sense and integrity of the significant memorial landscape in perpetuity.

The transition process and avenue replacement is essential to ensure the ongoing commemoration of the soldiers who served in World War I. It is acknowledged that opinions regarding Avenues of Honour can be very emotive and that this process is likely to be difficult. The continued engagement between Moorabool Shire Council and relevant stakeholders in relation to the replacement strategy will be important.

Key Considerations

The key considerations of the replacement strategy are as follows:

- Acknowledge that the original Avenue of Honour trees are aging and for the most part will probably need to be replaced within the next 10-20 years.
- Engage with the local community and relevant stakeholders to ensure that they are aware of future changes
- Manage the 1918 planted trees, where possible to protect their heritage value and prolong their useful life, while also continuing the transition to the next generation of trees.
- Maintain an Avenue of Honour at an acceptable level of risk. Trees that present an unacceptable level of risk will be removed and replaced.
- Maintain the character of the Avenue of Honour as a memorial as much as possible during the transition. Unless imminently dangerous, trees will be removed only when replacement trees

are available to plant within the next growing season.

- Strategically maintain the Avenue of Honour to ensure canopy cover is maintained as far as possible. A balanced approach is required.
- Continue with an infill replacement strategy, with the selective removal and replacement of individual trees over an extended period of time.
- Re-create a single species Avenue of Honour. Species other than Dutch Elms will be removed preferentially and replaced with true to type elms (*Ulmus xhollandica* 'Vegeta' and *Ulmus xhollandica*).

Consultation

There are a number of key stakeholders and community groups with an interest in the long-term management of the Avenue of Honour. These include:

- Heritage Victoria
- Bacchus Marsh sub-branch of the RSL
- Adjacent property owners
- Family of the servicepersons commemorated by the Avenue of Honour
- Broader community of Bacchus Marsh
- Local historical society and community groups with connections to the Avenue

We acknowledge the importance of community consultation and notification relating to the replacement and maintenance of the trees in the Avenue.

Replacement strategy

Replacement strategies for significant Avenues generally follow one of three approaches: infill, block or complete renewal. Table 3 details pros and cons of each replacement type. The current Council position is to continue with an infill strategy and replace individual trees as required, rather than block or complete renewal replanting. This approach has proven successful, with the recently

planted infill trees establishing well amongst the existing mature trees. Where trees are to be proactively replaced, small groups of trees may be removed to provide better conditions for the replacements. This will ensure that the process is completed over the next 20 years.

The historical, aesthetic and scientific significance of the avenue to Victoria justifies the significant and ongoing input of resources associated with an infill renewal program that is spread across an extended period of time.

A 20 year tree replacement program has been developed as part of this Preservation Plan. Mature trees have been allocated into 4 replacement time frames (0-5 years, 6-10 years, 11-15 years and 16-20 years). The future health and condition

of the trees will vary based on environmental conditions, adjacent land use activities and the genetic response of trees to stress. The proposed strategy will therefore require ongoing review and amendment. It is recommended that the replacement strategy is reviewed every 5 years.

The replacement program for the Avenue of Honour has been mapped to allow an assessment of the extent and spatial distribution of the recommended tree removals. Five time periods are proposed:

- Current Avenue of Honour
- within 5 years (2028)
- In 10 years (2033)
- In 15 years (2038)
- In 20 years (2043)



TABLE 3: Replacement strategies comparison

Replacement strategy	Advantages	Disadvantages
Infill – the selective removal and replacement of individual trees over an extended period of time.	<ul style="list-style-type: none"> • Minimal impact on the landscape • If advanced nursery stock is pre-ordered, landscape impact is minimised 	<ul style="list-style-type: none"> • Difficult to establish replacement trees • Retained trees require ongoing management and maintenance. Management becomes increasingly difficult as the trees age and decline • Replacement avenue can often have an unbalanced appearance because of varying tree ages • Renewal program takes an extended period of time
Block – the removal of a section of the avenue leaving a portion intact. Once the replacement specimens are contributing to the landscape, another block of the avenue is removed and replaced.	<ul style="list-style-type: none"> • Costs for renewal are split into stages • Landscape impact can be reduced by planting advanced tree stock 	<ul style="list-style-type: none"> • Significant impact on the landscape in the area where tree removal occurs • Ongoing resources are required to manage the retained trees • The replacement avenue can have a 2 tiered appearance until all the trees reach maturity
Complete renewal – the complete removal and replacement of the avenue.	<ul style="list-style-type: none"> • Replacement takes place within a very short period of time • The replacement avenue grows with an even appearance • Some economies of scale can be achieved with the cost of operations (Tree removal, tree planting and tree maintenance) 	<ul style="list-style-type: none"> • Substantial impact on the landscape • Significant short term cost for tree removal, replacement and maintenance • Issues with replacement will be a problem in another 100 years

Recommended short-term replacements (within 5 years)

50 trees have been recommended for replacement within the next 5 years due to poor tree condition (hazardous or declining) or a strategic replacement of the Avenue of Honour trees. This has been further broken down into 2 sub-categories, 0-2.5 years and 2.5-5 years

A number of trees in fair or good condition have been recommended for removal for strategic reasons (incorrect species and inappropriate location). The Avenue of Honour contains approximately 20 trees that are not Dutch Elms. To strengthen the integrity of the Avenue of Honour, the preference is to remove these otherwise healthy trees in the short to medium-term and replace them with the correct species (except for Tree N53, Desert Ash Fraxinus oxycarpa, that should be retained for as long as possible due to being an original planting).

In addition, there is a Desert Ash planted in between Tree S44 and S46. This is not part of the dedicated avenue of honour and it should be targeted for early removal.

The proposed timing of tree removal is to minimise the abrupt loss in canopy cover when many of the original trees will need to be removed due to senescence. The staggered and planned removal of trees in the short to medium term, despite their condition, will enable the continued establishment of the next generation of true-to-type Dutch Elms.

Trees proposed for removal within the next 2.5 years includes:

- 27 Huntingdon Elms *Ulmus xhollandica* ‘Vegeta’ (N03, N17, N19, N41, N47, N49, N63, N65, N101, N103, N105, N109, N111, N115, N157, N167, N169, S32, S36, S90, S92, S94 S110, S118, S146, S150, S152, S280,)
- 2 Dutch Elm *Ulmus xhollandica* ‘Hollandica’ (N171 & W34)
- 1 English Oak *Quercus robur* (W20)

Trees proposed to be removed within the next 2.5-5 years includes:

- 9 Huntingdon Elms *Ulmus xhollandica* ‘Vegeta’ (N05, N09, N11, N25, N231, N237, N239, S162 & S164)
- 10 Dutch Elm *Ulmus xhollandica* ‘Hollandica’ (N27, S218, S222, S224, S242, S278, W05, W09, W31, W32)
- 1 Desert Ash *Fraxinus oxycarpa* (S112)

Unless imminently hazardous, an Avenue of Honour tree must not be removed until a replacement tree is available for planting within the same season. The replacement strategy beyond this five year timeframe should be reviewed again in 2025.

Recommended future replacements (6-20 years)

Individual Avenue of Honour trees have been recommended for removal and replacement until 2043. Averaged across this time, the strategy suggests the removal of approximately 10-12 trees each year. This strategy has been indicatively divided in to four time intervals and it should be reviewed on an ongoing basis (every five years). The actual numbers proposed for removal are to be reviewed and modified as required closer to the time depending on tree condition.

TABLE 4: Tree Replacements proposed as part of the Preservation Plan over the next 5-20 years.

Removal timeframe	Species	Tree Numbers	Total Trees
6-10 years	<i>Ulmus xhollandica</i> ‘Hollandica’	E14, N13, N77, N247, N249, N251, N269, N271, S04, S40, S180, S208, S220, S238, S240, S248, S250, S252, S254, S270, S272, S274, S276, W03, W06, W25, W33, W36, W42	29
	<i>Ulmus xhollandica</i> ‘Vegeta’	N01, N19, N23, N43, N67, N73, N75, N83, N91, N93, N123, N135, N137, N143, N145, N151, N153, N155, N173, N205, N207, N209, N213, N215, N217, S22, S24, S86, S88, S100, S124, S130, S144, S168, S202	35
	Other <i>Ulmus spp.</i>	N187, S44, S58, S60, W-	5
	<i>Fraxinus oxycarpa</i>	N53, S138	2
		TOTAL	71
10-15 years	<i>Ulmus xhollandica</i> ‘Hollandica’	E30, E36, N107, N141, N175, N227, N263, N265, N267, S38, S148, S184, S186, S188, S190, S204, S206, S210, S230, S232, W07, W14, W23, W27, W29	25
	<i>Ulmus xhollandica</i> ‘Vegeta’	N07, N57, N59, N61, N81, N117, N139, N147, N149, N159, N165, N197, N199, N219, N221, N223, S08, S34, S42, S62, S68, S70, S72, S80, S84, S106, S14, S142, S166, S172, S174, S200, S264,	33
	Other <i>Ulmus spp.</i>	N189, N191, S46, S48, S50, W08	6
	<i>Fraxinus oxycarpa</i>	E04, E34	2
		TOTAL	66

Removal timeframe	Species	Tree Numbers	Total Trees
15-20 years	<i>Ulmus xhollandica</i> 'Hollandica'	E06, E09, E10, E11, E12, E13, N71, N121, N179, N211, N229, N233, N235, N241, N243, N253, N255, N257, N261, N273, N275, N277, N279, S194, S196, S214, S216, S244, S246, S256, S258, S262, S268, S282, W04, W13, W16, W26, W28, W30, W38	41
	<i>Ulmus xhollandica</i> 'Vegeta'	N125, N131, N201, N225, N79, N97, S10, S102, S12, S132, S136, S158, S16, S20, S266, S66, S74, S76, S78, S96, W11	21
	Other <i>Ulmus spp.</i>	N181, N183, N185, S98, S156	5
	<i>Platanus xacerifolia</i>	W10	1
		TOTAL	68

Other Trees

A number of other trees exist within the avenue that will not form part of the 20 years replacement program. This includes:

1. 55 trees assessed as juvenile or semi mature. They have been planted over the past 10-20 years and have significant longevity. They do not need to be replaced as part of the main program (N15, N21, N29, N31, N33, N35, N37, N39, N51, N55, N69, N85, N87, N89, N95, N99, N113, N119, N127, N129, N133, N163, N177, N193, N195, N203, N245, N259, S06, S18, S26, S28, S30, S52, S54, S56, S64, S108, S114, S116, S120, S126, S128, S134, S154, S170, S176, S178, S182, S212, S226, S228, S234, S236, S260, S284).

2. 3 sites are vacant (N161, S160, S161)

3. 36 mature trees are not forming part of the replacement strategy. The majority of these are at the eastern approach and do not require replacement. There are also several River Red Gums and other species that do not form part of the replacement consideration (E-, E-, E-, E01, E02, E03, E05, E07, E08, E15, E16, E17, E18, E19, E20, E21, E22, E23, E24, E25, E26, E27, E28, E29, E31, E32, E33, E38, N45, S-, S02, S104, S122, S140, S198, S82)

Tree Planting

Sourcing Stock

Replacement trees are to be propagated from bud material collected from the existing Avenue of Honour trees. This ensures all replacement trees are true to type and have a connection to the original trees. It takes approximately 3-4 years to produce a tree ready to be planted. Council staff are to inspect the stock at the nursery and again at the time of delivery to ensure they meet the specification of a good quality tree.

All trees should be grown by reputable nurseries and inspected prior to delivery. Tree growth systems and the supplied stock are to be in accordance with AS2303-2018 *Tree Stock for Landscape Use*.

Species selection

The Avenue of Honour must be replanted with the two true to type Dutch Elm clones from the 1918 planting. The largely single species avenue forms a striking landscape element with a strong sense of uniformity despite the different shape of the Dutch Elm types.

A few trees of each clone have been selected by Heritage Victoria and Moorabool Shire as suitable parent trees. This decision was based on health, vigour and desirable form. The propagation program must continue along with the assessment of performance and establishment.

The Western Approach of the Bacchus Marsh Avenue contains several vacant sites. This section of the avenue should be replanted with the more spreading Dutch Elm clone (*Ulmus xhollandica* 'Hollandica').

Tree planting and establishment

Each tree in the Avenue of Honour is highly significant as it is dedicated to an individual service person. The regular spacing of the Dutch Elms is symbolic and forms an important element in the visual appeal of the Avenue of Honour. The trees are marching in pairs.

To maintain the integrity of the Avenue of Honour, trees that are removed will be replaced as soon as possible and within the next planting season. The tree preservation strategy should assist Moorabool Shire Council with the nursery supply program. A considerable lead in time is required for the trees to be propagated from bud material and grown on for planting.

Trees are to be planted in the Avenue of Honour between April and September as per detail in Figure 5. Native soil is recommended as backfill for the planting hole. An organic mulch ring of a minimum 2m diameter is to be applied on the soil surface. Plastic water wells or soil berms are to be installed to ensure effective watering of the newly planted trees.

Good post-planting practices are important to ensuring rapid tree establishment. Irrigation is typically the most critical aspect of post-planting maintenance. To avoid drought stress, frequent and regular irrigation will be required until the tree's root system has established.

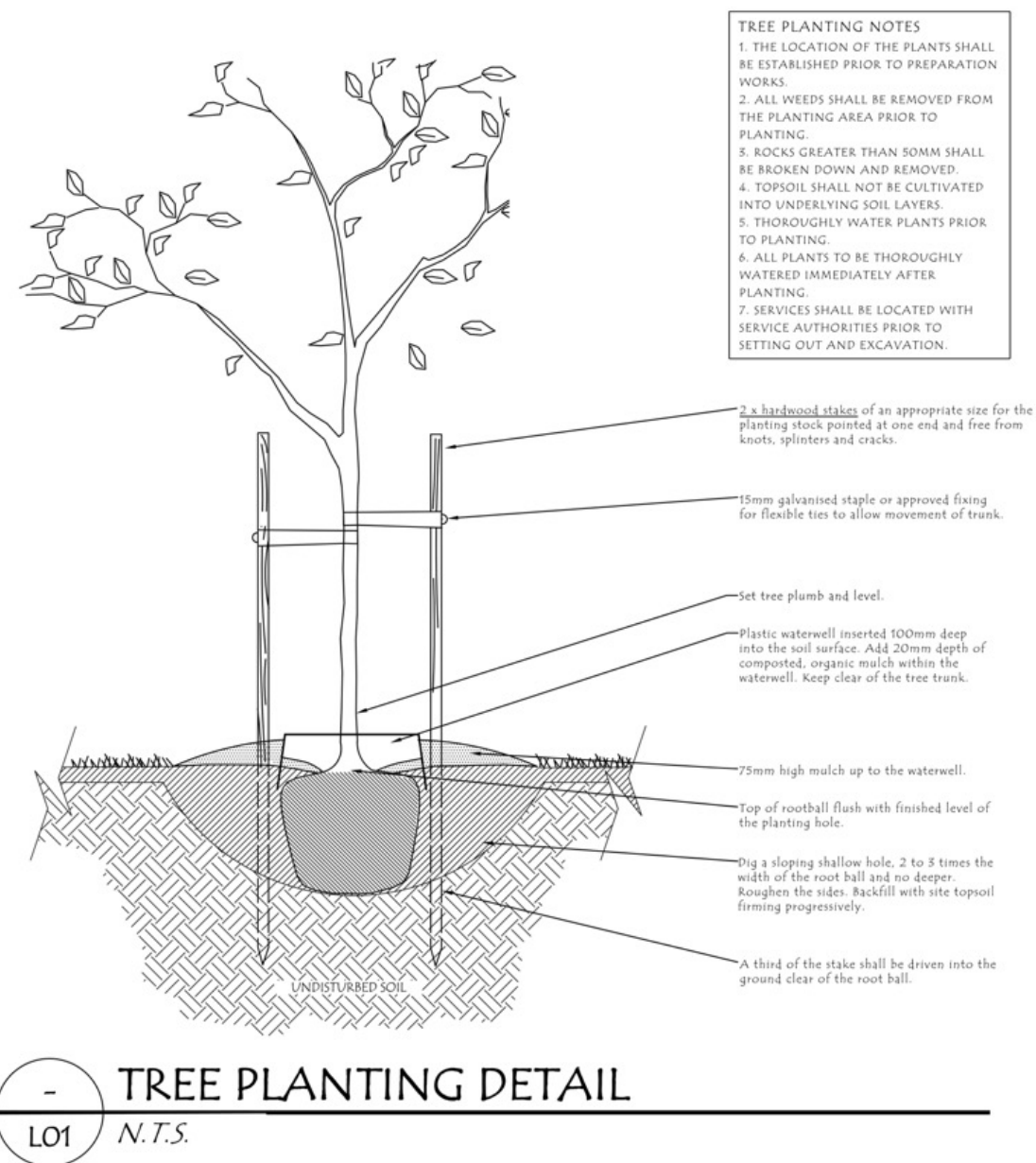


FIGURE 5: Tree planting detail

Tree replacement procedure and community engagement

This management plan recommends the removal of some trees that are in decline and replacement of the entire avenue over time. These sites will be replanted with true to type Dutch Elms to establish the second generation of the Avenue of Honour. Community planting events provide an opportunity to foster community engagement and allow people to be involved in the management of this significant landscape. A wide range of community members could be invited to take part in planting including:

- descendants of the soldiers to whom the trees are dedicated;
- local RSL members; and,
- local school students.

Council has a robust process in relation to Avenue of Honour tree removals and has good relationships with various stakeholders including the RSL.

The notification process prior to removing a tree is as follows:

- Notification to Heritage Victoria to advise them of the upcoming removal(s), in accordance with the endorsed preservation strategy or relevant exemption;
- Notification to Council management via email or briefing note;
- Notification to stakeholders such as the RSL – Bacchus Marsh Branch, and local landowners and businesses via letter;
- Notification to family members/relatives of the commemorated soldiers for the affected trees via the RSL offering attendance at tree replanting;
- Notification to The Department of Transport and Planning (DTP) and submission of a Traffic Management Plan as required;
- Notification to the community via media releases either on newspaper, social media and/or Council's website
- Deployment of variable messaging signs prior to works commencing; and,
- Notification to emergency services and local bus companies if a full road closure is required.

Tree Protection

There are two main permit triggers for protection of the Bacchus Marsh Avenue trees:

- the Victorian Heritage Register for the dedicated Avenue
- the Heritage Overlay (HO204 of the Moorabool Planning Scheme) for the eastern and western approaches.

The management and protection of the trees shall be in accordance with Australian Standard AS 4970 *Protection of Trees on Development Sites*. Any project arborist proposed to undertake or oversee development works, must have as a minimum AQF Level 5 Diploma Arboriculture and demonstrated experience working on heritage listed trees. The names of all arborists are to be submitted and approved by Moorabool Shire Council prior to works starting.

All underground service installation within TPZs must be directionally bored rather than open trench construction. All excavation works within TPZs are to be supervised by the project arborist (AS 4970-2009). The excavation technique used should minimise the potential impact to tree roots. When excavating within tree protection zones, the direction of excavation must aim to remove soil in line with the expected direction of tree roots, rather than excavating along the trench line which would be perpendicular to tree roots (Figure 14). This will reduce the potential for significant root damage.

The project arborist must undertake all root pruning at the time of excavation works. All roots greater than 20mm diameter must be pruned following excavation to the required extent. Root pruning is to be completed with sharp tools, in accordance with AS 4373-2007. This will help roots to regenerate and minimise decay and infection.

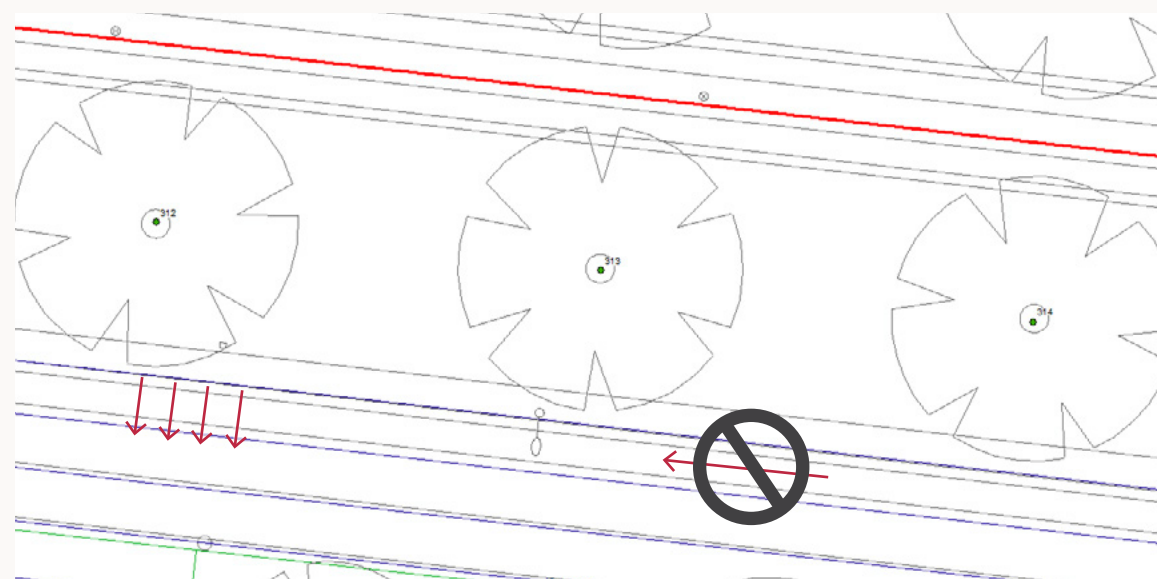


FIGURE 6: Proposed method of excavation, excavate away from the tree (red arrows) rather than along the line of trench.

Road & Roadside Management

Access points

There are a number of instances along the Avenue of Honour where access points have been created, both formally and informally, between the trees. These access points detract from the visual integrity of the landscape and in some cases have caused tree damage. It is likely that any formal access point to be created along the dedicated Avenue would require a permit from Heritage Victoria.

To maintain the integrity and significance of the Avenue, the strategy for access points should be as follows:

- New access points will only be permitted as a last course of action and must only be permitted if they do not involve removal of trees
- Limit driveway crossing to one per property and two entrances per property to be separated by a minimum of two trees
- Existing access points should be reviewed and opportunities explored to close informal/unauthorised access points

- Access to properties directly off the Avenue of Honour should be minimised as much as possible.

Road works and upgrades

To maintain the integrity and significance of the Avenue, the strategy for road works and upgrades should be as follows:

- Engage a project arborist to assist with design and assessment of impacts from any proposal in accordance with AS4970-2009 *Protection of Trees on Development Sites*
- Ensure designs are to the satisfaction of Heritage Victoria, Moorabool Shire Council and Department of Transport and Planning
- Priority is to avoid the removal of trees. Permanent loss of existing trees must be avoided.
- Where possible, ensure replanting maintains the pattern and paired layout of the existing Avenue of Honour along the original alignment.
- Road signage along the Avenue of Honour is to be minimal and only provided for the purpose of enhancing safety.

Traffic safety and tree setback

Trees in the roadside are potentially hazardous to errant vehicles. Careful consideration shall be given to the best treatment of hazards where conflicts occur between environmental requirements and safety. A balanced approach will be required, addressing traffic safety in regards to the Avenue of Honour.

The posted speed along the Avenue of Honour varies between 50 to 60km/hr. DTP Tree Planting Policy (2015) includes suggested road safety mitigation measures for different speed zones. Safety mitigation measures for roads posted at 70km/hr will generally involve the control of the impact forces through speed management or barrier protection. Due to the potential visual impact from barrier protection, a reduction in the posted speed is the preferred approach to addressing concerns regarding traffic safety and tree setback.

In some areas of the Avenue of Honour, the trees (N215, N217, S158 and S160) are very close to the road edge (Figure 7). Consideration should be given to planting these trees slightly further away from the road at the time of replanting.

To maintain the integrity and significance of the Avenue, the strategy for tree setback and traffic safety should be as follows:

- Adjust the alignment of trees slightly at replanting to increase the offset from the tree to the edge of the running lane
- If required when replanting the Avenue of Honour, reduce posted speed rather than install barrier protection



FIGURE 7: Some Avenue of Honour trees have a narrow offset from the road

Alternative Funding Sources

Moorabool Shire Council should also explore alternative funding sources to assist with the management of the Avenue of Honour. Additional funds will also enable further community engagement and interpretation of the Avenue to ensure the avenue continues to remain relevant to the community.

National Trust Tax Deductible Appeals

Donations from community members and organisations are a potential alternative funding source for the management of the Avenue of Honour. The National Trust oversees a tax deductible appeals facility which would be a simple and effective system, requiring minimal staff resources from Moorabool Shire Council (<http://www.nationaltrust.org.au/heritage-appeals-donations>). The National Trust sets up and manages the account, issues tax receipts to donors and provide monthly receipts to Council of the account balance.

Funding raised needs to be spent on heritage purposes which could include arboricultural works, replanting or plaque maintenance. The RSL and other community groups, such as the Great War Centenary Committee, may be interested to assist with the development of the project and raising community awareness about the appeal.

Grants Program

External grant funding will also be considered as an alternative funding source and activities that will be considered for funding may include:

- Planting of trees that formed part of the original avenue of honour
- The installation of explanatory walls and interpretive signage
- The installation of additional plaques on existing memorials

Appendices



Appendix

Appendix 1: Tree Health Considerations

Elm Leaf Beetle

Elm Leaf Beetle (*Xanthogaleruca luteola*) is a pest of elm trees with both larvae and beetles feeding on the foliage. Adult beetles eat small holes in the leaves and the larvae skeletonise the foliage. The beetles are active in spring when they emerge from hibernation and begin feeding. Sustained infestations over successive seasons can cause tree health to significantly decline. The management program undertaken by Moorabool Shire Council to address this pest and support the health of the Bacchus Marsh Avenue trees is described in SECTION 4-MANAGEMENT OF THE AVENUE OF HONOUR.

Dutch Elm Disease

Dutch Elm Disease can be spread between trees with grafted root systems and by Elm Bark Beetles (*Scolytus multistriatus*), which are present in Australia. Elm species are extremely vulnerable to Dutch Elm Disease (*Ophiostoma ulmi* and *Ophiostoma novo-ulmi*) and many trees in the northern hemisphere have been killed by it. The pathogen is not present in Australia; however, it is established in New Zealand. The fungi infect sapwood, clogging the xylem tissue and stopping water movement to the canopy. Symptoms include wilting, yellowing and shrivelling of leaves in isolated areas of the canopy at first. Infected branches have brown streaking in the newly formed wood.

Early detection and rapid response will be important if the disease arrives in Australia. If Council suspects any of elms have Dutch Elm Disease they should contact the Department of Energy, Environment and Climate Action (DEECA) immediately.

Slime flux

Slime flux is caused by a diverse range of bacteria that grow in the wood of trees, including elms. Minor occurrence of slime flux is present in some trees. This is unlikely to be a major issue for the health of the Avenue trees. There are no known control measures and in most cases slime flux causes little damage. Trees that are stressed due to other factors, such as soil compaction, are more likely to be affected by slime flux and symptoms may include leaf yellowing, wilting and branch dieback. It is recommended that the extent of slime flux is monitored and tree health inspected on a more frequent basis.

Tree Decay

The trees have aged and over time the trunks, stems and branches have suffered decay. In many instances, the decay is localised and manageable. Where there has been concern regarding the level of decay to a trunk or stem, tomographic testing has been completed. In 2019, several trees nominated for removal were tested to quantify the amount of sound wood remaining. Tomographic testing uses sound impulses to assess the integrity of the wood and can identify hollows in trees. Whilst it is likely that there are numerous decay fungi responsible, the result is the same. Tree removal is required if the level of decay exceeds acceptable thresholds.

It is recommended that any tree recommended for removal due to decay is tested in this way.

Installation of infrastructure along the Avenue of Honour

Installation of infrastructure along the Avenue of Honour can detract from the visual form of the Avenue. These activities should be monitored to reduce their

negative impact on the landscape. Various permit triggers exist to help control these actions under the Heritage Victoria requirements.

There are a range of activities associated with development and surrounding land uses that may affect tree health and longevity. Car parking, construction activities, installation and clearance offset for service utilities and farming practices are issues for the Avenue of Honour. The major impacts of these events are due to:

- physical damage to tree roots or the trunk
- soil compaction which reduces the area for root growth
- increase in hard surfaces increasing runoff and reducing water infiltration
- canopy pruning for power line clearance

Informal car parking

Informal car parking areas under the tree canopies and the construction of driveway crossings can impact tree condition and the integrity of the avenue. Traffic can compact root zone soils and cause physical damage to trunks. Car parking is particularly a problem at the western end of the Avenue opposite the residential properties and in the middle sections of the Avenue where there are fruit stalls and cafes.

Driveway crossovers

Driveway crossovers to provide access to adjacent properties are an issue for tree health. Root growth at these crossing locations will be affected by soil compaction and damage if excavation is required to build new crossings. This is particularly an issue where large or multiple crossings have been constructed. Loss of a tree site by the creation of a new crossover is of greater concern. The historical significance of the avenue is centred around each tree being dedicated to an individual soldier. It is an imperative that the vacant sites are replanted to

ensure that the integrity of the Avenue of Honour is retained.

Construction of built elements

Construction of built elements within the tree root zone damages roots and alters the amount of water and oxygen available to tree roots. Construction design and installation methods must consider the trees to ensure their health and longevity is not adversely impacted. Much of the land adjoining the Avenue of Honour is within a Farming Zone (FZ). The construction of any future buildings, fences or other built elements may also have a visual impact on the Avenue of Honour (Figure 8).

There is a conflict between the Avenue of Honour trees and the footpath and drainage infrastructure along the southern section of the Avenue of Honour closest to Bacchus Marsh (Figure 9). This is due to a competition for space. A reconfiguration of this area is required to ensure replacement trees can be planted.

Utilities

Utilities are provided via a large number of services running along the Avenue of Honour. Trenching activities to install or repair underground utilities within the tree root zones are likely to cut roots.

There are two main overlays that contain tree controls for the Bacchus Marsh Avenue of Honour trees: The Victorian Heritage Register and the Heritage Overlay within the Moorabool Shire Council Planning Scheme. Both set triggers for works along the Avenue. The management and protection of the trees shall be in accordance with Australian Standard AS4970 *Protection of Trees on Development Sites*.



FIGURE 8: Built elements on adjoining land should not visually detract from the Avenue of Honour or impact tree health and longevity.

All underground services must be directionally bored within TPZs rather than being installed using open trench construction

Trees can be impacted from canopy pruning to provide clearance to above ground electric wires and is another challenge for the management of the Avenue of Honour trees. The required offset requirements are specified in the Electric Line Clearance Guidelines (2020).

Farming practices

Farming practices particularly on the eastern section of the Avenue of Honour have potential for tree damage. The



FIGURE 10: Soil compaction (laneways) is an issue in the tree root zones



FIGURE 9: Conflict between the footpath and Avenue of Honour tree.

management activities associated with the market gardens are likely to impact tree health in both a negative way from soil compaction or root damage by cultivation (Figure 10 and Figure 11) and in a positive manner with supplementary water and nutrients.

Sections of the market gardens have compacted laneways adjacent to the Avenue of Honour. Compaction pushes the soil particles together and reduces the large pore spaces important for soil drainage and aeration. Root growth is inhibited in compacted soils as a result of higher penetrative resistance, lower infiltration rates and higher soil bulk density.



FIGURE 11: The soil is frequently cultivated in the adjacent market gardens

Modern road safety requirements

Modern road safety requirements are a potential challenge for the Bacchus Marsh Avenue as trees in the roadside are a potential hazard to errant vehicles. The Avenue of Honour trees line Bacchus Marsh Road and form the gateway to the town from Melbourne (Planning by Design 2003). Road safety requirements were considered at the time of planting:

“The trees are planted where they are (encroaching on the pathway in places) by order of the Country Roads Board, this august body insisting on them being 23ft (7m) from the centre of the roadway” (Bacchus Marsh Express 10 August 1918, p.2).

The trees have grown considerably and road design requirements in relation to safety have changed over time.

DTP Tree Planting Policy (May 2016) describes DTP’s approach to the planting of trees within arterial road reserves. This recently developed policy aims to support greener healthier environments and facilitate a safe and efficient road network. Road safety mitigation methods are suggested for different speed zones.

Road and intersection upgrades are a major potential impact on the Bacchus Marsh Avenue. Works may involve tree removal, planting that does not reflect the original alignment and spacing, visual intrusion from traffic signs and road infrastructure which would all impact on the integrity of the Avenue of Honour.

Woolpack Road

A recent proposal to upgrade the intersection at Woolpack Road created tension within the local community, with opinion divided about the proposal to build a roundabout within the Avenue of Honour (Webb 2010). To address traffic congestion and road safety issues, DTP had proposed to extend Woolpack Road to the north and link it with the Western Freeway. The works would have required the removal of some Avenue of Honour trees and the replacements would have been planted on a splayed alignment. The matter was heard before the Heritage Council who provided an independent report. In January 2012 the Planning Minister refused a permit for the removal of trees to construct the roundabout.

It is acknowledged that the issue of traffic congestion along the Bacchus Marsh Avenue remains unresolved. However, DTP are progressing investigations and design work with respect to the preferred Eastern Bypass alignment, to help alleviate traffic congestion in Bacchus Marsh.

Moorabool Shire Council will continue to investigate opportunities for the long-term transport vision of Bacchus Marsh.





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MAP DETAILS

Assessed Trees

Bacchus Marsh Avenue of Honour

Proposed Replacement Strategy

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Legend

Proposed Replacement Strategy

- 0-2.5 years
- 2.5-5 years
- 5-10 years

- 10-15 years
- 15-20 years
- Not part of replacement strategy
- Existing Juvenile
- Vacant Site
- Property

CLIENT



MOORABOOL
SHIRE COUNCIL

215 MAIN STREET
BACCHUS MARSH VIC 3340

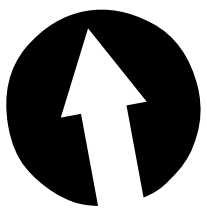
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AUTHOR	C. RYDER
DATE	02.06.2023
MAP DATUM	GDA 1994 MGA Zone 55

NORTH ARROW





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SHIRE COUNCIL
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AUTHOR	C. RYDER
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MAP DATUM	GDA 1994 MGA Zone 55







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2.5-5 years

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10-15 years

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15-20 years

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Not part of replacement strategy

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Existing Juvenile

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Vacant Site

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Property

CLIENT



MOORABOOL
SHIRE COUNCIL

215 MAIN STREET
BACCHUS MARSH VIC 3340

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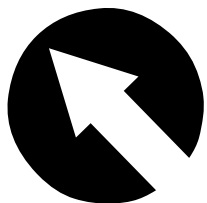
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SHIRE COUNCIL

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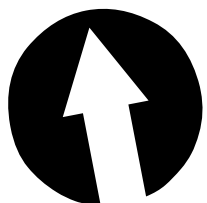
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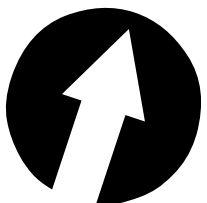
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NORTH ARROW







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