SOILWATER CONSULTANTS

VEGETATION MANAGEMENT PLAN (VMP) FOR THE DAISY HILL SUBDIVISION	
Prepared for:	BOURKE SECURITIES PTY LTD
Date of Issue:	1 APRIL 2019
Project No.:	BSP-002-2-2
Document Ref:	Vegetation Management Plan for the Daisy Hill Subdivision DCP Rev2.docx

Distribution:

Electronic Copy – George Rice (Director; Bourke Securities)

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www.soilwatergroup.com

45 Gladstone Street, East Perth, WA 6004 | Tel: +61 8 9228 3060 | Email: swc@soilwatergroup.com

DOCUMENT STATUS RECORD

Project Title:	VEGETATION MANAGEMENT PLAN (VMP) FOR THE DAISY HILL SUBDIVISION
Project No.:	BSP-002-2-2
Client:	BOURKE SECURITIES PTY LTD

Revision History

Revision Code[1]	Date Revised	Revision Comments	Signatures		
			Originator	Reviewer	Approved
A	03/09/18	Internal review of document	ASP	SC	-
B	05/09/18	Draft report issued to client	ASP	SC	ASP
1	09/10/18	Final Report issued to client	ASP	SB	ASP
2	01/04/19	Changes to Final Report	ASP	SB	ASP

Revision Code[1]

A - Report issued for internal review

B - Draft report issued for client review

1 - Final report issued to client

LIMITATIONS

The sole purpose of this report and the associated services performed by Soil Water Consultants (SWC) was to prepare a Vegetation Management Plan (VMP) for the proposed Daisy Hill Residential Subdivision to be developed by Bourke Securities. This VMP was prepared to supplement the Development Control Plan (DCP) currently being prepared for this subdivision, and the work conducted was in accordance with the Scope of Work presented to Bourke Securities ('the Client'). SWC performed the services in a manner consistent with the normal level of care and expertise exercised by members of the earth sciences profession. Subject to the Scope of Work, the VMP was confined to the proposed Daisy Hill Subdivision. No extrapolation of the results and recommendations reported in this study should be made to areas external to this project area. In preparing this study, SWC has relied on relevant published reports and guidelines, and information provided by the Client. All information is presumed accurate and SWC has not attempted to verify the accuracy or completeness of such information. While normal assessments of data reliability have been made, SWC assumes no responsibility or liability for errors in this information. All conclusions and recommendations are the professional opinions of SWC personnel. SWC is not engaged in reporting for the purpose of advertising, sales, promoting or endorsement of any client interests. No warranties, expressed or implied, are made with respect to the data reported or to the findings, observations and conclusions expressed in this report. All data, findings, observations and conclusions are based solely upon site conditions at the time of the investigation and information provided by the Client. This report has been prepared on behalf of and for the exclusive use of the Client, its representatives and advisors. SWC accepts no liability or responsibility for the use of this report by any third party.

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1 INTRODUCTION

This Vegetation Management Plan (VMP) was prepared by Soilwater Consultants (SWC), in conjunction with Envirowest Consulting and Heath Consulting Engineers, to support the Development Control Plan (DCP) for the proposed Daisy Hill Rural Residential Subdivision to be developed in the Dubbo Regional Council precinct. As specified in the NSW Government Planning and Environment Gateway Determination (Appendix A), the DCP for the proposed subdivision shall include a section on "vegetation planting, including appropriate size and species" for the purpose of "prevention of potential sources of groundwater recharge". This VMP has therefore been prepared to address the DCP requirement to achieve the outcomes of the Salinity Management Strategy, satisfy instruction from the Department of Planning and Environment (DoP & E) Gateway Determination (Appendix A) and the recommendations contained in the advice to the DoP & E, prepared by EMM Consulting, dated June 14, 2018 (Appendix B).

It is considered that Condition 2 of the Gateway Determination has been adequately serviced by the material previously presented to the DoP & E. This VMP will address Bullet Point 3 of Condition 3 of the Gateway Determination, whilst Bullet Points 1, 2, 4 and 5 of this Condition will be addressed separately in the primary DCP document. The recommendations by EMM Consulting will also be addressed by this document.

As specified in the Dubbo City Urban Salinity Management Strategy and Implementation Plan, vegetation is an important component in controlling salinity. This VMP has therefore been prepared in accordance with these guiding documents with the primary purpose of controlling salinity by:

- maximising the use of stored soil moisture to minimise groundwater recharge;
- intercepting and reducing surface water flows to prevent the accumulation of surface water and the generation of a hydraulic head, which may exacerbate preferential or bypass flow and groundwater recharge, and
- Lowering the watertable under the Daisy Hill Subdivision area.

To achieve these overarching objectives it is necessary manage the type of species, and the structure and density of vegetation to be planted in the proposed Daisy Hill Subdivision.

1.1 SITE LOCATION AND LAYOUT

The proposed Daisy Hill Subdivision occurs approximately 5 km south east of the Dubbo town centre, immediately to the north of the Mitchell Highway (Figure 1.1). It covers a total area of approximately 430 ha of predominately undulating pasture with few remaining trees and native vegetation (Plate 1.1). The proposed subdivision will comprise 222 lots, with the breakdown of lots provided in Table 1.1.

The proposed subdivision occurs within the Troy Creek Gully Catchment. Troy Creek is an ephemeral creek system, draining into the regionally extensive Macquarie River, and only flows following extreme rainfall events.

Table 1.1: Breakdown of proposed lot sizes and number of lots in the Daisy Hill Subdivision

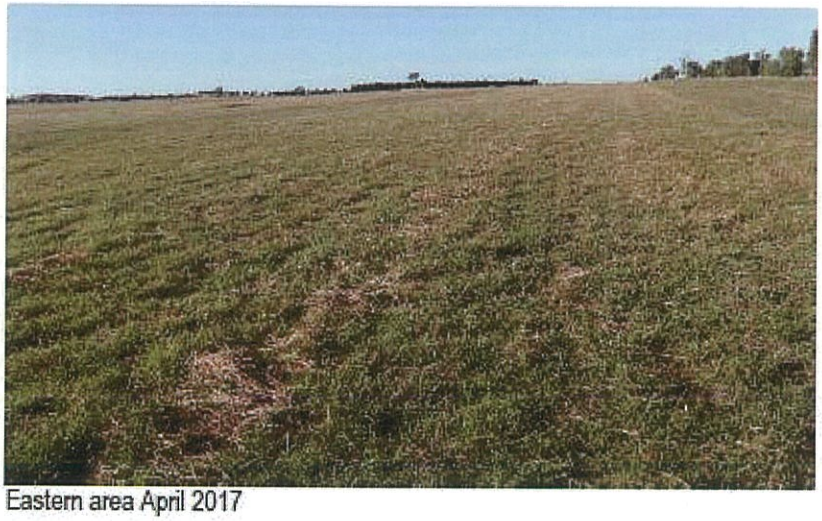
Lot Size	No. Lots	Total Area of Lots (ha)	% of Total Land Area
6,000 m2	55	35.4	8.3
1 ha	45	48.4	11.3
1.5 ha	52	81.7	19.1
1.5 ha (Lot 200)	26	41.0	9.6
3 ha	44	168.0	39.2
Roads	-	54.2	12.6

Lot Size	No. Lots	Total Area of Lots (ha)	% of Total Land Area
Total	222	428.7	100

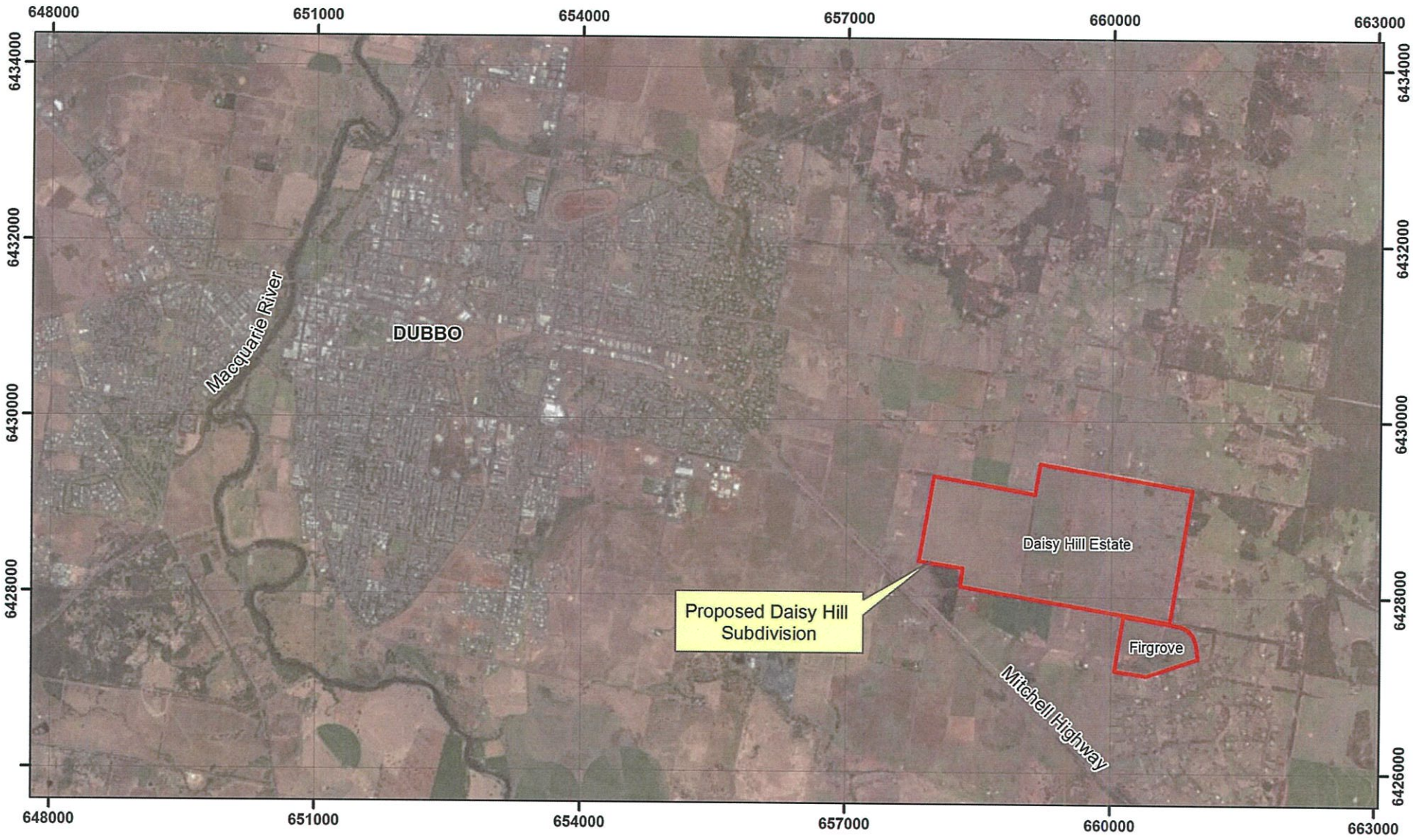
Plate 1.1: General photographs of the Daisy Hill Subdivision area (EnviroWest, 2017)

Photo taken looking south east over the southern section of the site May 2014

Photo taken looking north west over the site May 2014



Eastern area April 2017



BOURKE SECURITIES PTY LTD VEGETATION MANAGEMENT PLAN (VMP) FOR THE DAISY HILL SUBDIVISION	Figure 1.1: Regional location of the proposed Daisy Hill Subdivision	soilwater GROUP

2 VEGETATION REQUIREMENTS

As specified in the Salinity Management Strategy for the proposed Daisy Hill Subdivision, vegetation management to minimise potential groundwater impacts is to be controlled by the following design criteria:

- Total tree road reserves = 32.1 ha (or 7.5 % of the total area)
- Vegetation Buffer Zone = 3.3 ha (or 0.8 % of the total area)
- Targeted Tree Planting = 5.7 ha (or 1.3 % of the total area)
- Total road verges = 13.0 ha (or 3.0 % of the total area)

The above vegetation design specifications result in a substantial area to be vegetated of 54.1 ha (or 12.6 % of the total area), which is up from the current vegetated area of 0.8 ha (or 0.2 % of the total area). These areas do not take into account plantings by future residents. Examples of this can be seen at the Firgrove Rural Residential Subdivision, adjacent to Daisy Hill, in Plate 2.1 and Plate 2.2. A further example of how well the street tree plantings will grow (and look) is provided in Plate 2.3.

Plate 2.1: Established trees in Lot 27 of the Figrove Estate

Plate 2.2: Aerial view of established street trees in Firgrove Estate, highlighting the abundance of trees expected to occur in the proposed Daisy Hill Subdivision

Plate 2.3: Established street trees along Wilfred Smith Drive in the Firgrove Estate

2.1 VEGETATION PLANTING AREAS

As defined above (Section 2), there are four locations where revegetation will occur to achieve the outcomes of the Salinity Management Strategy – these are outlined below and shown in Figure 2.1: Typical cross section of the proposed 35 m and 45 m Road Reserves, showing the vegetated corridors and Figure 2.2. As shown in Figure 2.3, these vegetation areas have been specifically located to target potential elevated salinity levels underlying the proposed Daisy Hill Subdivision.

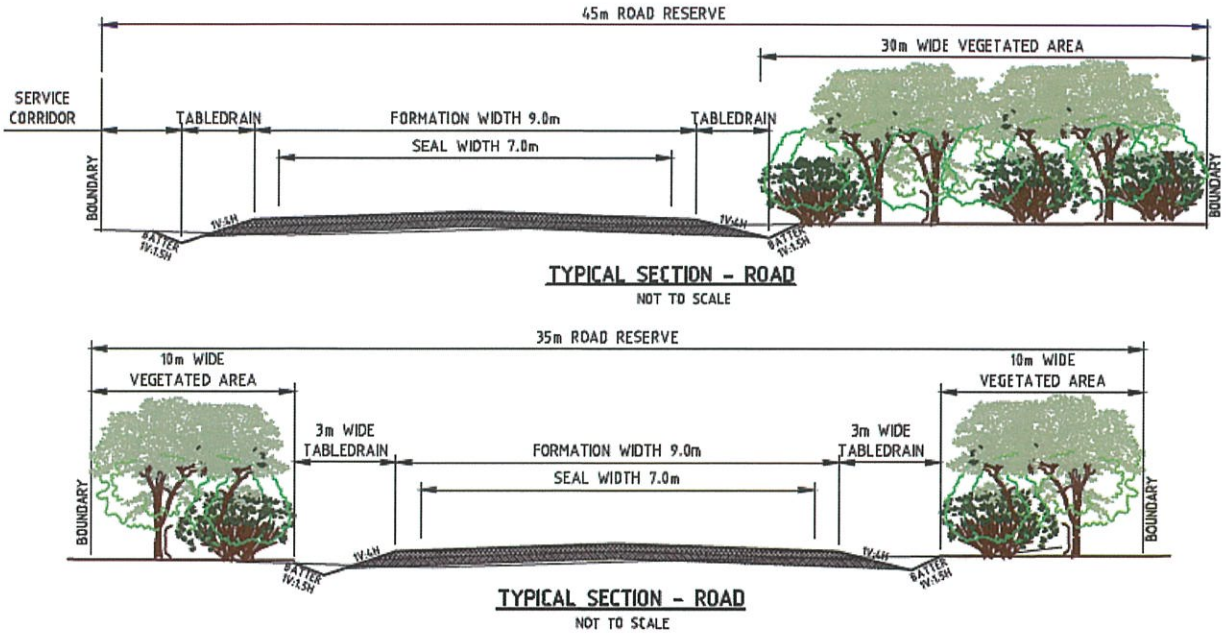


Figure 2.1: Typical cross section of the proposed 35 m and 45 m Road Reserves, showing the vegetated corridors

2.1.1 ROAD RESERVES

Two types of road reserves are planned for the Daisy Hill Subdivision, both containing vegetated zones (Figure 2.1):

- 35 m Road Reserve: this is the dominant road network and has a total length just over 15 km. This Road Reserve consists of a 10 m wide vegetation area (Figure 2.1), either side of the road, giving a total vegetated area of 28.9 ha.
- 45 m Road Reserve: this is a minor road reserve network, with a total length of only 1.1 km. This Road Reserve consists of a 30 m wide vegetation area (Figure 2.1), located on one side of the road, giving a total vegetated area of 3.2 ha.

Given these areas are outside of the table drains (Section 2.1.2) they will not experience waterlogging or ponded surface water conditions, and over most of the subdivision area they will be underlain by a relatively thick unsaturated (vadose) zone or free draining profile.

2.1.2 Road Verges or Table Drains

A 3 m wide table drain will be located on both sides of all roads to capture any surface water runoff from the road (Figure 2.1). These table drains have a total area of 13.0 ha, representing around 3.0 % of the subdivision land surface.

2.1.3 Vegetated Buffer Zones

The vegetated buffer zones are located on the eastern side of the proposed subdivision overlying the area thought to be the interface between the Pilliga Sandstone and Purlewaugh Formation, which may contain areas of elevated salinity (Figure 2.3). In total, the vegetation buffer zones cover 3.3 ha or 0.8 % of the subdivision land surface.

2.1.4 Targeted Tree Planting

In the northern portion of the proposed subdivision a 5.7 ha area (1.3 % of the total area) has been designated for revegetation. In this area groundwater levels are relatively high, and the revegetation species are expected to manage, and lower, groundwater levels.

BOURKE SECURITIES PTY LTD	Figure 2.2: Proposed Revegetation Areas for the Daisy Hill Subdivision	soilwater GROUP
VEGETATION MANAGEMENT PLAN (VMP) FOR THE DAISY HILL SUBDIVISION		

PN: BSP-002-2-2 Prepared by: Date: MM/DD/YY Reviewed by: Date: MM/DD/YY Revision:

BOURKE SECURITIES PTY LTD VEGETATION MANAGEMENT PLAN (VMP) FOR THE DAISY HILL SUBDIVISION	Figure 2.3: Location of the Revegetation Areas in relation to measured elevated salinity levels	soilwater GROUP

PN: BSP-002-2-2 Prepared by: Date: MM/DD/YY Reviewed by: Date: MM/DD/YY Revision:

3 PLANTING DESIGN & SPECIES

The primary objective of the of the revegetation strategy is to select species that will produce both a functional system, assisting to control potential salinity impacts, but also to produce a species-rich and structurally diverse system that has aesthetic and environmental value.

The species provided below for the various revegetation areas have been selected from local site knowledge and from the Dubbo Regional Council *Salinity in Your Backyard – Protect Your Property* (DRC, 2017[1]) document and the *Dubbo Street Tree Masterplan – Toolkit Booklet* (DRC, 2018[2]). The species have been selected to fulfil the following specific niche requirements as defined in Table 3.1.

Table 3.1: Vegetation types and functional role

Vegetation Type	Role or Function
Groundcovers	Control surface water runoff and flows, and thus reduce the potential for surface water convergence and surface water ponding. By controlling surface water the potential for preferential or bypass flow, under hydraulic head conditions, resulting in groundwater recharge, is negated.
Small shrubs to 1 m height	Utilise moisture stored in the unsaturated soil profile, thus minimising groundwater recharge, Provides a structural and functional transition from the groundcovers to the upper canopy.
Medium Shrubs	
Large Shrubs	Deep root systems and high water using vegetation which will minimise any excess soil water that may recharge groundwater levels, and has the potential to lower the water table overtime.
Trees	

3.1 SPECIES

The Dubbo Regional Council lists suitable species for salinity mitigation in urban areas (DRC, 2017) and residential roads (DRC, 2018). Suitable species are Australian natives with a combination of water, drought, salinity and frost tolerant trees and shrubs (Table 3.2 and Table 3.3).

A predominantly local species list is proposed from the critically endangered Grey Box and Fuzzy Box woodland communities (Plate 3.1). As specified above, the species will comprise trees and shrubs to create a diverse community with ecological benefits. The shrubs will establish quickly and cover the areas. Over time tree species will dominate and replace some of the shrubs. The vegetation community associated with the area is the Grey Box alliance and species from this community are suitable for the vegetation reserve (Table 3.3).

Grasses and other low growing herbs will naturally colonise the available space and will not require planting. The grasses currently present on the site include red grass, kangaroo grass, wallaby grass, weeping grass, lovegrass, windmill grass and other native grass species. The grasses do not require sowing as are present on the site.

The final selection of species will be dependent on the nursery supplier. The location of the trees and shrubs will match appropriate soils, drainage and landscape area in the development.

[1] DRC (2017). *Salinity in Your Backyard – Protect Your Property.* Dubbo Regional Council, NSW, Australia.

[2] DRC (2018). *Dubbo Street Tree Masterplan Tool Kit Booklet.* Dubbo Regional Council (DRC), NSW, Australia

Table 3.2: Species in the Dubbo Street Tree Masterplan (DRC 2018)

Scientific name	Common name	Type
Acacia decurrens	Early green wattle, black wattle	Shrub
Acacia pendula	Weeping myall	Shrub
Agonis flexusa	Willow myrtle	Shrub
Angophora floribunda	Rough barked apple	Tree
Angophora hispida	Dwarf apple	Tree
Brachychiton populneus	Kurrajong	Tree
Callitris glaucophylla	White cypress pine	Tree
Casuarina cristata	Belah	Tree
Corymbia eximia	Yellow bloodwood	Tree
Corymbia ficfolia	Red flowering gum	Tree
Corymbia ptychocarpa	Swamp bloodwood	Tree
Eucalytpus astringens	Brown mallet	Tree
Eucalytpus coaldocalyx	Dwarf sugar gum	Tree
Eucalyptus microcarpa	Grey box	Tree
Eucalyptus platypus	Round leaf moort	Tree
Eucalyptus polybractea	Blue Mallee	Tree
Eucalyptus robusta	Swamp mahogany	Tree
Melaleuca bracteate	Black tea tree	Shrub
Melaleuca linarifolia	Snow in summer	Shrub
Melaleuca quinquenervia	Broad leaved paperbark	Shrub

Table 3.3: Other suggested species

Scientific name	Common name	Type
Acacia dealbata	Silver wattle	Shrub
Acacia deanei	Deans Wattle	Shrub
Acacia implexa	Hickory wattle	Shrub
Cassinia spp	Rosemary Shrub	Shrub
Eucalyptus albens	White box	Tree
Eucalyptus blakelyi	Blakely's red gum	Tree
Eucalyptus conica	Fuzzy box	Tree
Eucalyptus microcarpa	Inland Grey box	Tree
Eucalyptus melliodora	Yellow box	Tree
Acacia stenophylla	Eumong/River Cooba	Shrub
Casuarina cristata	Belah	Tree
Eucalyptus largiflorens	Black Box	Tree
Eucalyptus polybracta	Mallee	Tree
Eucalyptus sideroxylon	Red Ironbark	Tree
Eucalyptus spathulata	Swamp mallet	Tree

Eucalyptus wimmrensis	Honey Pots	Tree
Lophostemon confertus	Brush Box	Tree

Plate 3.1: Box trees along Pinedale Road, north of the proposed subdivision, and adjacent to Monitoring Bore MW3

3.2 ARRANGEMENT AND DENSITY

Trees are expected to fill an area of 9m by 9m, shrubs 6m by 6m and grasses will colonise other available spaces. The planting density recommended is 100 trees per hectare and 200 shrubs per hectare. Tube stock will be planted at a ratio of 2 shrubs to 1 tree. The total planting density will be 300 trees and shrubs/ha equivalent to one plant per 33 m^2. The following planting pattern approximately 4 m to 6 m between planting lines and 5 m to 5.5 m between each plant is recommended:

- 10 m planting strips – 1 line of shrubs adjacent to the road and one line of shrub and tree planting adjacent to the boundary, lines planting, 4 m apart, plants spaced 5 m apart
- 30 m planting strips – 1 line of shrubs adjacent to the road and four lines of shrub and tree planting adjacent to the boundary, lines planting, 6 m apart, plants spaced 5.5 m apart
- Buffer zones - lines of planting, 6 m apart, plants spaced 5.5 m apart
- Targeted tree planning – lines of planting, 6 m apart, plants spaced 5.5 m apart

Planting will be undertaken in a staged process after the roads have been constructed and services installed.

3.3 ESTABLISHMENT

3.3.1 PLANTING STOCK

The trees and shrubs will be tube stock, which are acclimatised to the local area prior to planting. The tube stock will be planted into prepared areas.

3.3.2 SOIL PREPARATION AND WEED MANAGEMENT

The soil will be ripped to a depth of 30cm prior to planting. Weeds will be controlled in the planting tree lines by herbicide application within 1 m of the planting location. A suitable mixture of glyphosate and simazine will provide control during the first year of growth. Weed control should not be required in following years.

3.3.3 TIMING

Tube stock will be planted in early Autumn or early Spring. Soil conditions should be moist at the time of planting. Higher elevation to be planted in Autumn and lower elevation in Spring which is the expected times of satisfactory moisture.

3.3.4 PROTECTION

Individual tree guards should be fixed around each plant to protect from damage by rabbits, kangaroos and other pests.

3.3.5 MANAGEMENT

Planting should be protected from excavation for installation of infrastructure if possible. If trees and shrubs are damaged in the development process replanting may be necessary.

Ongoing tree lopping and pruning may be required for site access and public safety. Some trees will be removed for driveways to enable access to individual lots from the roadways. The tree removal for driveways will not impact on the effectiveness of the vegetation reserves.

4 STAGING

With reference to Recommendation 3 of the EMM Consulting Report dated 14 June 2018.

Following considerable discussion with officers from the NSW Department of Primary Industries and Environment and the NSW Office of Environment and Heritage, over the imagery presented by the Electro Magnetic (EM) Survey which highlighted two areas of potentially higher levels of salinity central to the development, it was decided as a precaution to overlay these areas with larger, 3.0 ha allotments – this is clearly shown in Figure 4.1.

The location of Stage 1, which will create nine 0.6 ha, seven 1.0 ha and six 1.5 ha Lots, has been determined by the availability of services (power, water and telecommunications) off Eulomogo Road (Figure 4.2). Following Stages will continue on from stage 1, make-up and timing will be influenced by market trends. Nonetheless, Stages 3 or 4 (of possibly 20) should contain some 3.0 ha Lots.

It is envisaged that Stage 4 or 5 will identify, locate and service (water, roads, fencing etc.) the 5.7 ha Tree Planting Area.

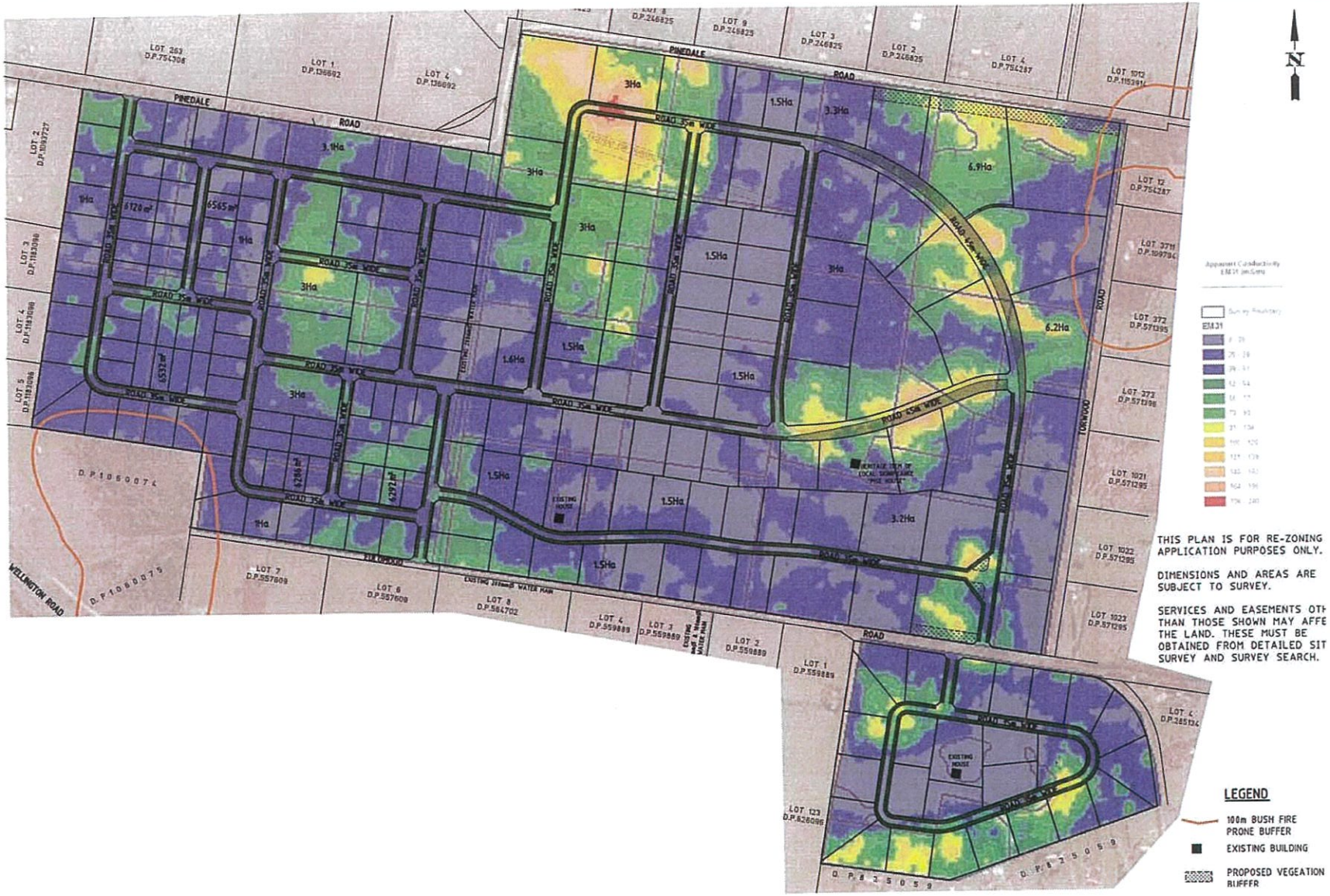
These early Stages are located on an elevated landscape, where there is no groundwater to 16m depth (MW 2), transitioning to the northwest where there is no groundwater to 12m depth (MW 1A), (Figure 4.3) negating any potential adverse impacts on the Salinity Management Strategy.

Whilst the street trees will be planted in each stage at the completion of the roads / road reserves pertinent to that stage, the plantings in the 5.7 ha Tree Planting Area will be as follows:

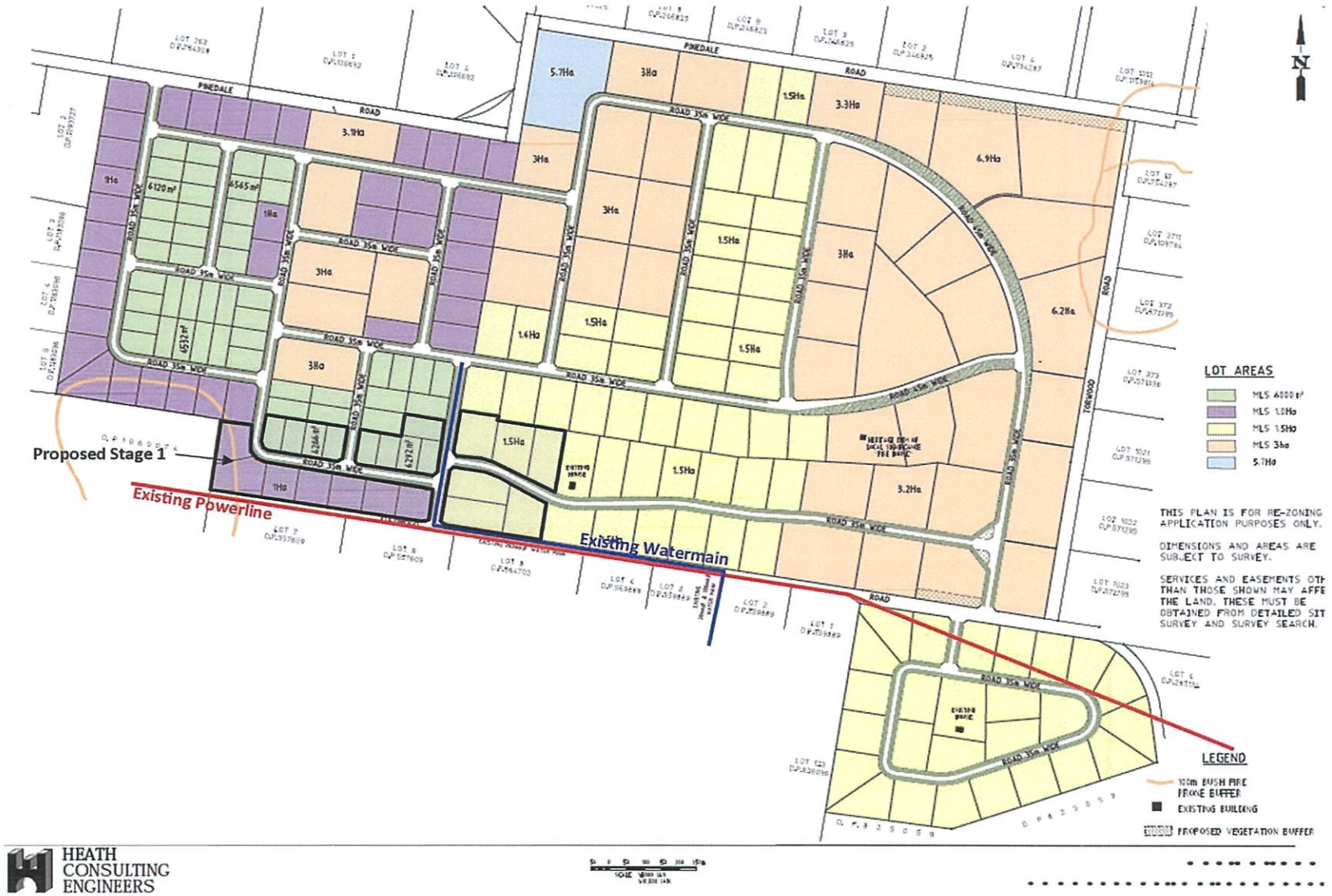
- Prior to the release of the Subdivision Certificate for the 55th Lot (25%) in the subdivision, the Tree Planting Area should be at least 25% (1.4 ha) complete.

- Prior to the release of the Subdivision Certificate for the 110th Lot (50%) in the subdivision, the Tree Planting Area should be at least 50% (2.8 ha) complete.

- Prior to the release of the Subdivision Certificate for the 165th Lot (75%) in the subdivision, the Tree Planting Area should be at least 100% (5.7 ha) complete.



BOURKE SECURITIES PTY LTD	Figure 4.1: EM survey results showing the location of larger 3.0 ha Lots over areas of potentially elevated salinity
VEGETATION MANAGEMENT PLAN (VMP) FOR THE DAISY HILL SUBDIVISION	



BOURKE SECURITIES PTY LTD	Figure 4.2: Proposed Stage 1 development of the Daisy Hill Subdivision	soilwater GROUP
VEGETATION MANAGEMENT PLAN (VMP) FOR THE DAISY HILL SUBDIVISION		

BOURKE SECURITIES PTY LTD	Figure 4.3: Surface elevation across the proposed Daisy Hill Subdivision, showing the southeast to northwest relief	soilwater GROUP
VEGETATION MANAGEMENT PLAN (VMP) FOR THE DAISY HILL SUBDIVISION		

5 CONCLUSIONS AND RECOMMENDATIONS

This VMP has been prepared to satisfy the requirements of the Gateway Determination (Appendix A) and the recommendations of the EMM Consulting report (Appendix B) to achieve the outcomes of the Salinity Management Strategy for the proposed Daisy Hill Subdivision, which is in alignment with the Dubbo City Urban Salinity Management Strategy and Implementation Plan. It is the role of this VMP to utilise floristic and structurally diverse vegetation to manage salinity by minimising potential groundwater recharge in response to the proposed development. The implementation of this VMP will see the total area of the current Daisy Hill Estate, under native vegetation, increasing from 0.2 % to a substantial 12.6 %.

This VMP has identified the optimal vegetation structure to achieve the above salinity control measures, and has identified suitable species principally from the critically endangered Grey Box and Fuzzy Box Woodland Communities. Ongoing monitoring of existing bores will be a matter of course by the Dubbo Regional Council, as it is now.

APPENDIX A

GATEWAY DETERMINATION

NSW GOVERNMENT | Planning & Environment

16/05770

Mr Robert Duffy
Duffy Elliot Lawyers
PO Box 64
Dubbo NSW 2830

Dear Mr Duffy

Planning Proposal (PP_2016_DUBBO_005_00) to amend Dubbo Local Environmental Plan 2011 to reduce the minimum lot size of zone R5 – Large Lot Residential land to create 284 lots at land known as Daisy Hill, Dubbo.

I am writing in response to your letters dated 15 April 2016 and 4 May 2016 requesting a Gateway determination under section 56 of the *Environmental Planning and Assessment Act 1979* in respect of the planning proposal to amend Dubbo Local Environmental Plan 2011 to reduce the minimum lot size of zone R5 – Large Lot Residential land to create 284 lots at land known as Daisy Hill, Dubbo.

As delegate of the Minister for Planning, I have now determined the planning proposal should proceed subject to the conditions in the attached Gateway determination.

I further advise on 18 March 2016 the Minister for Planning appointed the Western Joint Regional Planning Panel as the Relevant Planning Authority to progress this matter.

Should you have any queries or require assistance in regard to this matter, I have arranged for Jenna McNabb of the Departments' Western Region office to assist you. Ms McNabb can be contacted on (02) 6841 2180.

Yours sincerely

Marcus Ray
Deputy Secretary
Planning Services
Encl: Attachment 1 – Gateway determination
09/06/2016

NSW GOVERNMENT | Planning & Environment

Gateway Determination

***Planning proposal (Department Ref: PP_2016_DUBBO_005_00)**: to reduce the minimum lot size of land in zone R5 Large Lot Residential to facilitate the creation of 284 lots with a range of minimum lot sizes, of 6000m2, 1.5ha and 3ha at land known as Daisy Hill, Dubbo.*

I, the Deputy Secretary, Planning Services at the Department of Planning and Environment as delegate of the Minister for Planning, have determined under section 56(2) of the *Environmental Planning and Assessment Act,1979* that an amendment to the *Dubbo Local Environmental Plan 2011* to reduce the minimum lot size of land in zone R5 Large Lot Residential to facilitate the creation of 284 lots with a range of minimum lot sizes, of 6000m2, 1.5ha and 3ha at land known as Daisy Hill, Dubbo, should proceed subject to the following conditions:

1. Prior to community consultation the Western Regional Planning Panel (Panel) is to consult with NSW Rural Fire Service to address section 117 Direction 4.4 Planning for Bushfire Protection. The Panel is to submit the NSW Rural Fire Service comments to the Department of Planning and Environment for approval prior to community consultation being undertaken.

2. Prior to community consultation, a Salinity Management Strategy is to be prepared for the site in consultation with, and endorsed by, Western Plains Regional Council and the Department of Primary Industries. The Salinity Management Strategy shall include agreed:

    - success criteria;
    - range of scenarios to be modelled;
    - modelling methodology; and
    - format for the presentation of results.

    The Strategy shall address salinity management on the site as well as potential downstream impacts on the Troy Gully catchment and demonstrate that the proposed type, layout and density of development will not have a significant impact on downstream salinity. Once endorsed by Western Plains Regional Council and the Department of Primary Industries, the Strategy is to be submitted to the Panel to form part of the community consultation package.

3. Prior to community consultation, a draft Development Control Plan (DCP) for the site is to be prepared. The draft DCP shall include a revised subdivision pattern and road network layout that demonstrates that the agreed outcomes of the Salinity Management Strategy have been addressed with regard to salinity management of the site, including:

    - size and location of lots to a achieve a transition in lot size;
    - appropriate lot layout to protect the identified heritage items on the subject land;
    - vegetation planting, including appropriate size and species; prevention of potential sources of groundwater recharge;
    - on-site effluent management; and
    - building and infrastructure design and materials.

The draft DCP shall be submitted to the Panel to form part of the community consultation package.

4. Community consultation is required under sections 56(2)(c) and 57 of the *Environmental Planning and Assessment Act 1979* as follows:

   (a) the planning proposal must be made publicly available for a minimum of 28 days; and
   (b) the relevant planning authority must comply with the notice requirements for public exhibition of planning proposals and the specifications for material that must be made publicly available along with planning proposals as identified in section 5.5.2 of A Guide to Preparing LEPs (Department of Planning & Infrastructure 2013).

5. Consultation is required with the following public authorities under section 56(2)(d) of the *Environmental Planning and Assessment Act 1979*:

   i. Office of Environment and Heritage;
   ii. Department of Primary Industries – Water;
   iii. Transport NSW – Roads and Maritime Services; and
   iv. Dubbo City Council

   Each public authority is to be provided with a copy of the planning proposal and any relevant supporting material, and given at least 21 days to comment on the proposal.

6. A public hearing is not required to be held into the matter by any person or body under section 56(2)(e) of the *Environmental Planning and Assessment Act 1979*. This does not discharge the Panel from any obligation it may otherwise have to conduct a public hearing (for example, in response to a submission or if reclassifying land).

7. The LEP maps shall be prepared in accordance with the requirements of the Department's "Standard Technical Requirements for Spatial Datasets and Maps" (2015).

8. The timeframe for completing the LEP is to be 12 months from the week following the date of the Gateway determination.

Dated 9th day of June 2016.

Marcus Ray
Deputy Secretary
Planning Services
Department of Planning and Environment

Delegate of the Minister for Planning

APPENDIX B

EMM CONSULTING REPORT

RECOMMENDATIONS

Independent Review of Daisy Hill Groundwater and Salinity Modelling

Prepared for Department of Planning and Environment | 14 June 2018

Ground Floor, Suite 01, 20 Chandos Street
St Leonards, NSW, 2065

T +61 2 9493 9500
F +61 2 9493 9599
E info@emmconsulting.com.au

www.emmconsulting.com.au

4 Recommendations

The further information provided by the proponent in the revised assessment, in response to issues raised by DPE, has addressed the issues raised from the initial EMM review. The soil/groundwater balance modelling is now adequately documented such that the inputs, assumptions and predicted impacts are clearly presented. Four additional recommendations are made with regard to progression of the proposed development in terms of potential impacts on the regional groundwater and salinity:

1. Given the strong reliance on vegetation in proposed roadside reserves to uptake excess soil moisture transferred laterally from other land use types, it is imperative that plant selection be made in consultation with appropriate experts such that it performs this role;

2. Modelling suggests waterlogging may occur at times. Appropriate water and landscaping engineering (e.g. roadside drains and drainage around buildings and landscaped areas such as retaining walls or excavations) will be required to ensure this does not negatively impact site access, stability or land use;

3. Staged development of the site would enable early identification, and potential mitigation, of any groundwater impacts. Development of larger blocks (with expected lower irrigation density) first would provide a precautionary approach to development. Further, a reconfiguration of smaller blocks to overly areas with greater depth to water table and larger blocks to the region of shallow water table in the west of the site, would reduce the risk of impacts in this higher risk area.

4. Ongoing monitoring of groundwater levels in existing monitoring bores on and within 1 km of the site should be maintained such that any impacts of development can be identified as soon as possible and appropriate mitigation measures implemented if necessary.

APPENDIX C

EXAMPLES OF SPECIES TO USE IN THE REVEGETATION OF THE DAISY HILL SUBDIVISION

(taken from the Street Tree Masterplan Booklet)

DUBBO REGIONAL COUNCIL

DUBBO STREET TREE MASTERPLAN

Botanical name:

Acacia pendula

Common name:

Weeping Myall

Origin:

Eastern Australia, mainly the western side of the Great Dividing Range

Typical height:

8-10 metres

Typical width:

5-8 metres

Growth rate:

Moderate to fast.

Typical form:

Spreading or erect tree with pendulous branches.

Characteristics:

Small to moderate sized evergreen tree. Striking blue-grey, narrow foliage. Bark rough, fissured and dark grey. Bright yellow globose flowers.

Site requirements:

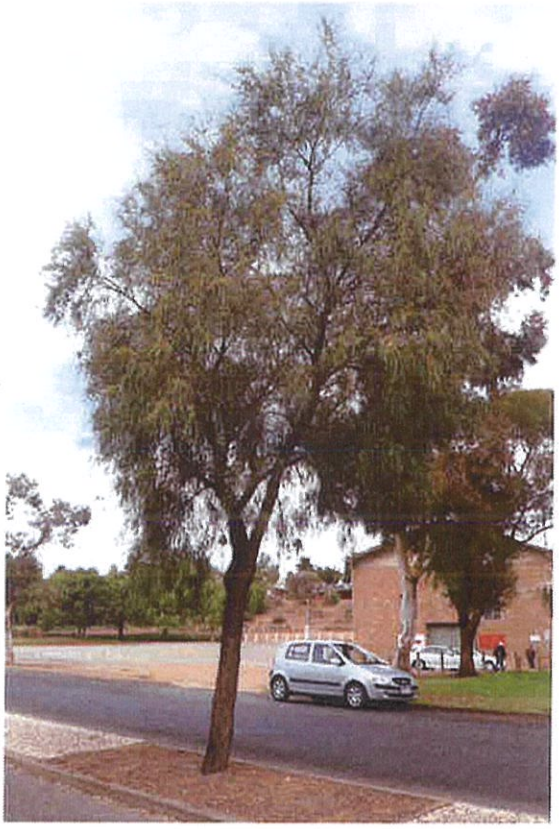
Widespread in inland areas. Often grows in alluvial soils. It is also found in relatively heavy clay soils in Victoria. Its natural habitat gets between 400-600 mm annual rainfall.

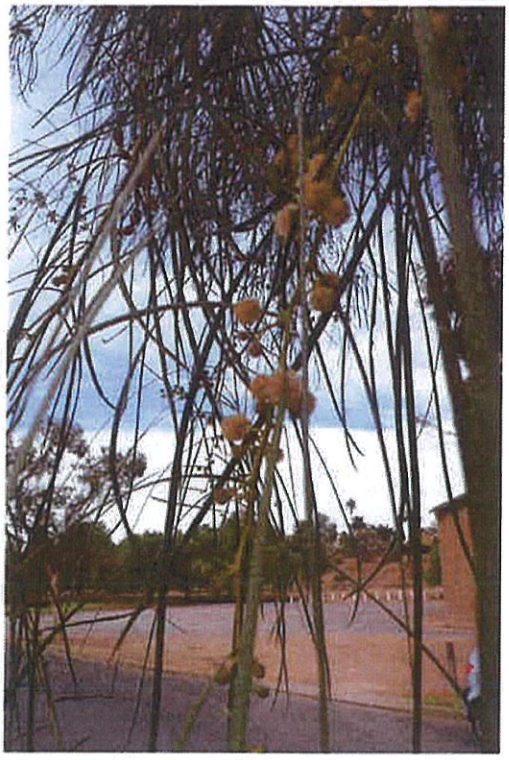
Tolerances:

High drought tolerance. Tolerant of frosts.

Notes:

Very ornamental small to moderate sized tree with good tolerances for Dubbo area.





Botanical name:

Acacia stenophylla

Common name:

Eumong, River Cooba, Munumula, Balkura, Gurley, Gooralee

Origin:

Eastern Australia. Widespread in inland arid areas

Typical height:

5-10 metres

Typical width:

5-10 metres

Growth rate:

Moderate to fast

Typical form:

Small to medium evergreen tree with ascending branches and pendulous branchlets

Characteristics:

Rough and fissured, dark grey-brown bark. Grey-green, long, leathery pyllodes (modified stems). Creamy-yellow ball flower heads in sparse clusters

Site requirements:

Typically grows in alluvial heavy clay soils that are usually alkaline, often saline, near watercourses and around the margins of swamps and depressions, which are often waterlogged and sometimes inundated. Annual rainfall: 125-600 mm

Tolerances:

High water logging, salinity and frost tolerance. Moderate to high drought tolerance. High salt tolerance.

Notes:

Formative prune to develop good structure and can send up root suckers.

Botanical name:

Angophora floribunda

Common name:

Rough-barked Apple

Origin:

Widely distributed in S/E Qld, and eastern NSW apart from the northern coast, and extends south into the Mallacoota area in far eastern Victoria.

Typical height:

15-25 metres

Typical width:

8-15 metres

Growth rate:

Fast

Typical form:

Narrow-domed with ascending branches.

Characteristics:

Large evergreen tree. Shortly fibrous, grey to brown bark persistent to small branches. Opposite, lanceolate leaves; sessile. Terminal peduncle of white-cream flowers.

Site requirements:

Adaptable to a wide range of soils types particularly suited to sandy soils of poor fertility. Prefers well-drained soils.

Tolerances:

High tolerance of drought. Low tolerance of waterlogged conditions.

Notes:

Species can vary. Requires rigorous formative pruning program to develop strong structure.

Botanical name:

Brachychiton populneus

Common name:

Kurrajong

Origin:

Eastern Victoria, tablelands and slopes of New South Wales, north to south eastern Queensland Occurs in a wide range of habitats and soils, from deep sandy loams on plains, to skeletal types on rocky hilltops,.

Typical height:

10 20 metres

Typical width:

5-7 metres

Growth rate:

Slow

Typical form:

A tree which usually has a relatively short bole and a densely-foliaged crown. Some trees are semi-deciduous in early summer.

Characteristics:

Site requirements:

Tolerates a wide range of soils - clay loam, heavy clay (greater than 50% clay), light to medium clay (35-50% clay) or loam, sandy loam, sandy clay loam.

Requires well-draining soils – Sensitive to water logging. Prefers full sun.

Tolerances:

High drought tolerance. Frost: tolerates frosts in the 0° to -5°C range. Tolerates both acid and alkaline soils.

Notes:

Botanical name:

Callistris glaucophylla

Common name:

White Cypress Pine

Origin:

Australia – widespread over the southern half of the continent.

Typical height:

12 15 metres

Typical width:

4-6 metres

Growth rate:

Moderate

Typical form:

Slender pyramid shaped tree, generally with a single straight trunk.

Characteristics:

An attractive medium sized evergreen tree that is extremely resilient to our local conditions.

Site requirements:

Wide range of soils from heavy clay to sandy loams, and from acidic to alkaline soils.

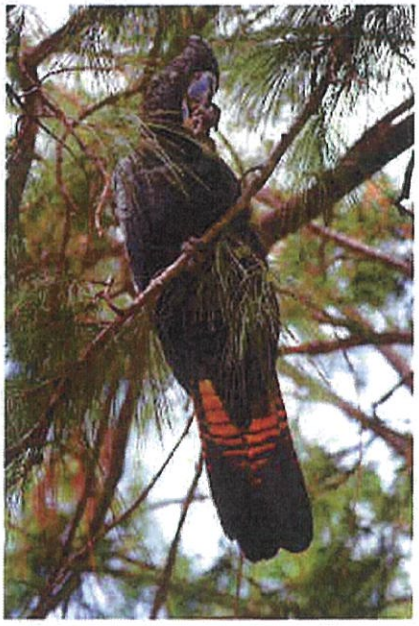
Able to adapt to a wide range of soil depths from skeletal to shallow (, 30cm) to moderate to deep soils (30 – 100cm).

Tolerances:

High drought and frost tolerance.

Notes:

Has a shallow root system that may outcompete adjacent plants.



Botanical name:

Casuarina cristata

Common name:

Belah

Origin:

Australia widespread throughout inland NSW and Queensland

Typical height:

20 metres

Typical width:

4-5 metres

Growth rate:

Moderate to Fast

Typical form:

Evergreen tree with an erect trunk and an open – textured spreading canopy.

Characteristics:

The bark is finely fissured, grey-brown to almost black. The branchlets are drooping in vigorous trees. The segments are somewhat waxy and the tiny leaf teeth are in whorls of 8-12.

Site requirements:

Grows in most soils, but prefers coarse sands and clay loams and full sun.

Well drained alkaline soils.

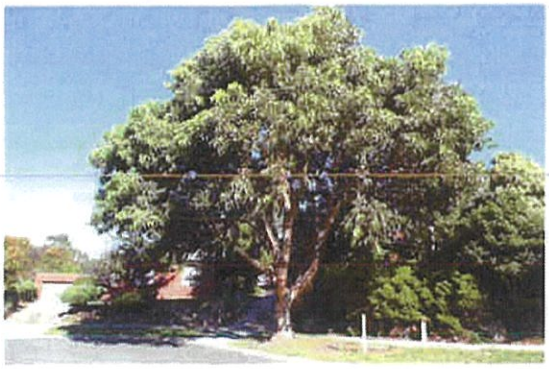
Tolerances:

High drought and frost tolerance.

Notes:

Important food source the black cockatoo.

Frequently produces suckers at the base that will require pruning.



Botanical name:

Corymbia eximia

Common name:

Yellow Bloodwood

Origin:

Central New South Wales, from the Hunter River south to Nowra

Typical height:

8-15 metres

Typical width:

4-8 metres

Growth rate:

Fast

Typical form:

Narrow-domed. Can be gnarled on exposed sites.

Characteristics:

Evergreen, moderated sized tree. Flaky, patchy yellow-brown rough bark. Thick curved, broad lanceolate leaves. Profuse white terminal flowers for short period in early spring. Fruit are thick and urn shaped.

Site requirements:

Adapts to a range of climatic conditions and soils, including heavy clays and on poor, gravelly or sandy soils. Found on sandy, often shallow soils derived from sandstone.

Tolerances:

Tolerant of drought once established. May suffer from frost damage when young.

Notes:

There is also a 'nana' form which gets to approximately 8 m in height.

Botanical name:

Corymbia ficifolia 'Wildfire' and 'Wild Sunset'

Common name:

Grafted varieties of Red-flowering Gum

Origin:

Grafted cultivars

Typical height:

5-6 metres

Typical width:

5-6 metres

Growth rate:

Slow

Typical form:

Rounded, domed

Characteristics:

Small evergreen trees. Dense rounded canopy, rough brown bark. Deep green leathery leaves with bronzy new growth. 'Wildfire' has deep red flowers and 'Wild Sunset' has orange flowers.

Site requirements:

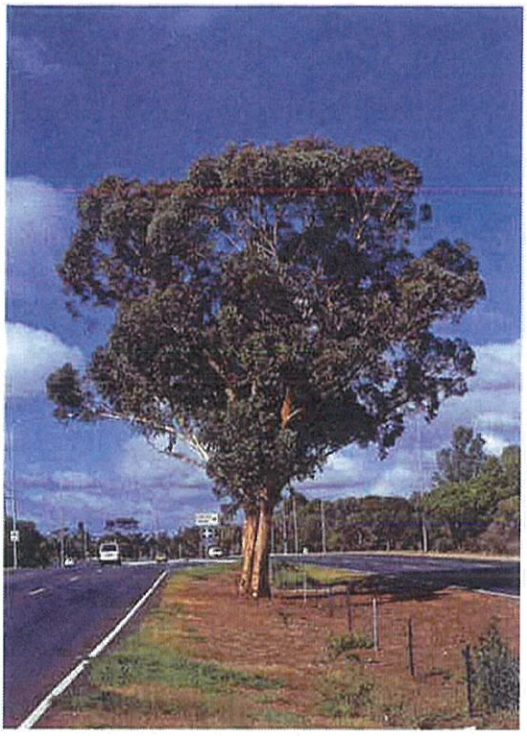
Prefer well drained sites in low humidity areas. Although plants grafted onto specially selected rootstock ensures viability for growing in a wide range of soil types.

Tolerances:

High drought tolerance.

Notes:

Use grafted plants to assure flower colour & form. Ensure good production methods for grafted plants. Fruit drop can be a problem.



Images courtesy of Westflora

Botanical name:

Eucalyptus astrigens

Common name:
Brown Mallet

Origin:
Australia – South west Western Australia

Typical height:
15 metres

Typical width:
8 metres

Growth rate:
Moderate to fast

Typical form:
The trunk is erect and branching, and a densely textured crown.

Characteristics:
Large evergreen tree. The bark is fluted and light brown in colour. Leaves are dark green and glossy, curved – lanceolate and 13cm in length. Flowers are yellow and appear in spring.

Site requirements:
Prefers light to heavy, well drained soils in an open sunny position.

Tolerances:
Drought and frost tolerant.

Notes:
Formative prune to develop good branch architecture, particularly for street trees (clearances).

Above image from Baranduda Landcare (http://wodongaurbanlandcarenetwork.org.au/)

Botanical name:

Eucalyptus blakelyi

Common name:

Blakely's Red Gum

Origin:

Tablelands of New South Wales and adjacent areas in Queensland and Victoria

Typical height:

10-24 metres

Typical width:

8-20 metres

Growth rate:

Moderate to slow

Typical form:

Upright to rounded

Characteristics:

Medium to tall evergreen tree. Dull green lanceolate leaves. Smooth bark, patchy white, grey to brown or red, shedding in large plates or flakes. Buds in clusters of 5–11; caps elongated and conical; flowers white, very rarely pink, occurring from late winter to early summer.

Site requirements:

Prefers alluvial flats, midslope terrain or depressions with seasonal water flows. It is often found on loamy soils but also tolerates heavier types that have poorer soil properties

Tolerances:

High drought tolerance and can tolerate temporary inundation.

Notes:

Prone to leaf damage by psyllids or lerps, particularly when understorey shrubs and insect eating birds are absent.

Botanical name:

Eucalyptus mannifera

Common name:

Red-spotted Gum, Brittle Gum

Origin:

Western side of the Central Tablelands and the Southern Tablelands of New South Wales, south to eastern Victoria

Typical height:

10-20 metres

Typical width:

6-13 metres

Growth rate:

Moderate

Typical form:

Narrow-domed, ascending branches

Characteristics:

Medium sized, evergreen tree. Smooth white, powdery, trunk, often mottled with patches of grey, which changes to a pink colour in late spring or summer.

Site requirements:

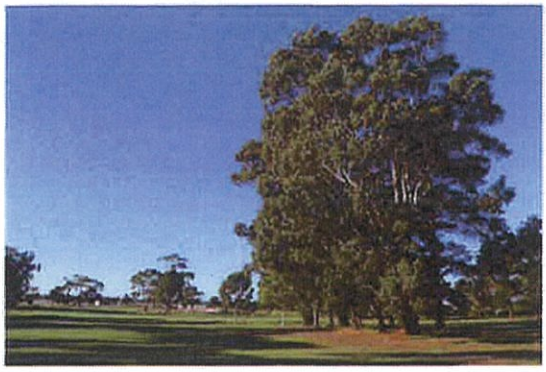
Grows well in poor soils often containing large amounts of clay, or in shallow, rocky soils. Subspecies *mannifera* commonly occurs on shallow, rocky, somewhat infertile soils on plateaux and hill slopes.

Tolerances:

High tolerances of drought and frost.

Notes:

Very ornamental tree well suited to planting in urban situations. Structural issues with older specimens. As the common name implies, the wood is very brittle and is not considered useful for timber.



Botanical name:

Eucalyptus melliodora

Common name:

Yellow Box

Origin:

Common species in the grassy woodlands of the tablelands and western slopes of the Great Dividing Range, extending from northern Victoria, through NSW, with a scattered extension into south-eastern Queensland.

Typical height:

15-25 metres (taller in natural range)

Typical width:

8-18 metres

Growth rate:

Moderate to slow.

Typical form:

Narrow-domed, ascending branches on solitary trunk. Moderately open crown.

Characteristics:

Large evergreen tree. Box like bark can vary from smooth to rough all the way down the trunk often in different colourings from grey, yellow to brown. Sometimes very dark and rough. Light green to grey or bluish, narrow foliage. White flowers in spring to summer.

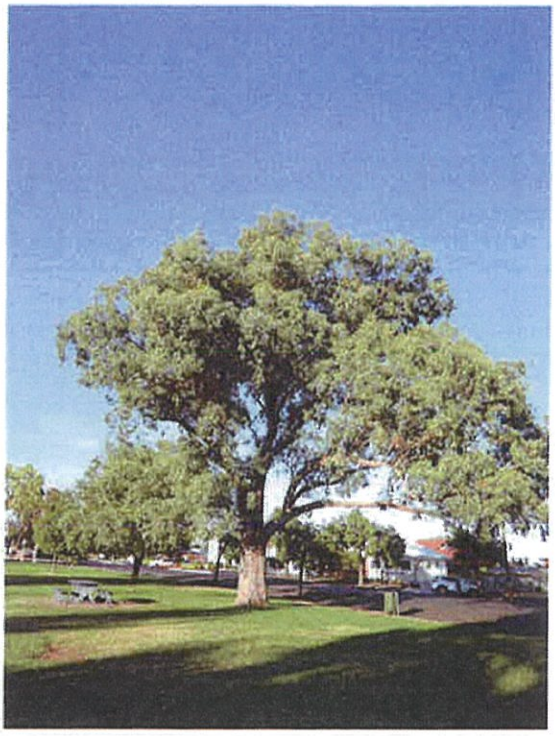
Site requirements:

Adaptable to a range of soils, including heavy clay. Prefers well-drained. Species usually found on lower slopes and plains, on sandy or loamy alluvial soils.

Tolerances:

High tolerance of drought. Intolerant of high water tables and poorly drained soils. Tolerant of frosts.

Notes:



Botanical name:

Eucalyptus microcarpa

Common name:

Grey Box

Origin:

Inland from the Great Dividing Range; Victoria, South Australia, New South Wales and Queensland.

Typical height:

10-20 metres

Typical width:

8-20 metres

Growth rate:

Moderate to slow.

Typical form:

Open, spreading crown.

Characteristics:

Large, evergreen tree. Bark greyish, rough and finely fissured over most of the trunk; upper limbs smooth. Narrow, leathery, dull olive green leaves. White flowers held in clusters of 7.

Site requirements:

Grows best in heavy alluvial soils, clay loams and good quality sandy loams; including moderately alkaline soils.

Tolerances:

Tolerates infrequent flooding and extended dry periods. High frost tolerance.

Notes:

Botanical name:

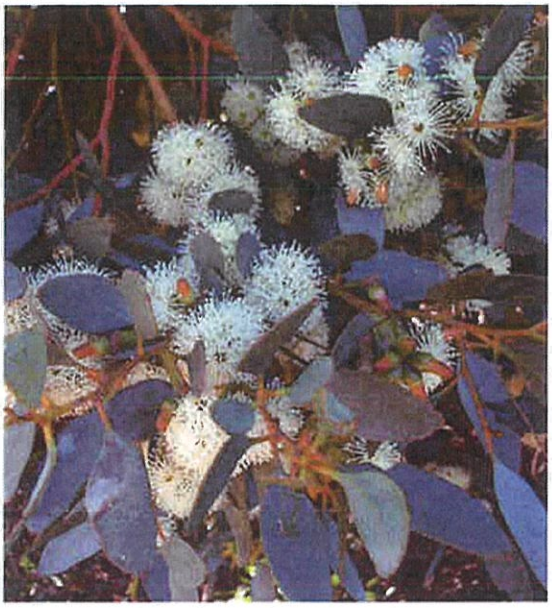
Eucalyptus platypus

Common name:
Round-leaf Moort

Origin:
Southern Western Australia in an area between Albany and Esperance.

Typical height:
4-10 metres

Typical width:
3-10 metres



Growth rate:
Moderate

Typical form:
Dense canopy, rounded Mallee tree.

Characteristics:
Small, evergreen tree. Leaves are elliptical to round (orbicular), dark green. The bark is smooth and light brown, ageing to grey. The flattened peduncles support stalkless buds with long, conical caps in clusters of up to seven.

Site requirements:
Adaptable to a range of conditions and soils, including heavy clay soils.

Tolerances:
High drought and heat tolerance. Good tolerance of strong winds.

Notes:
Subspecies *heterophylla* also useful amenity tree, particularly for coastal locations. Prune tree to single trunk. Could also consider *E. utilis*.

Botanical name:

Eucalyptus polybractea

Common name:

Blue-leaved Mallee

Origin:

Western NSW, Northern and Central Victoria

Typical height:

6 metres

Typical width:

3 metres

Growth rate:

Moderate to fast

Typical form:

Small multi-stemmed tree. Stems are erect, slender and branching.

Characteristics:

Small evergreen tree. Leaves are blushish green and narrowly lanceolate. Flowers are white, appearing from autumn to winter.

Site requirements:

Adaptable to most soils but prefers an open sunny position.

Tolerances:

Drought and frost tolerant.

Notes:

Botanical name:

Eucalyptus sideroxylon

Common name:

Red Ironbark

Origin:

Northern Victoria, north along the western slopes and western plains of New South Wales, with scattered occurrences into south-eastern Queensland.

Typical height:

15-20 metres

Typical width:

7-15 metres

Growth rate:

Moderate to fast

Typical form:

Rounded with open crown

Characteristics:

Medium to large evergreen tree. Dark rough bark hard, and furrowed which is typical of Ironbarks. The bark is persistent and deep brown to black in colour. The foliage is dull, greyish-green to blue-green in colour. White or pink flowers in winter/spring.

Site requirements:

Species adaptable to a wide range of soil conditions, from heavy clay to sand. Tolerates alkaline soils and poor, shallow soils; typical of its natural range. Prefers well-drained soils, no tolerant of waterlogged soils.

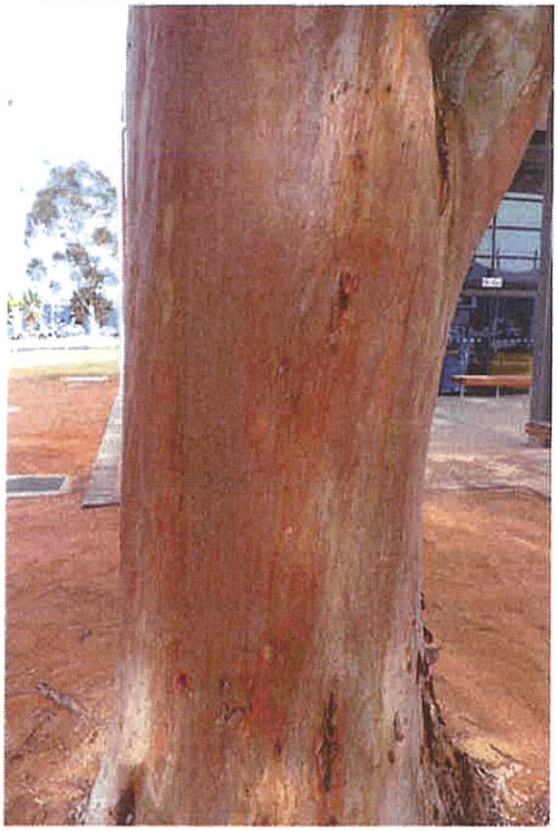
Tolerances:

Drought and frost tolerant.

Notes:

Requires good formative pruning program to develop sound branch architecture.

Mean annual rainfall: 450-920 mm.



Botanical name:

Eucalyptus spathulata

Common name:

Swamp Mallet

Origin:

South-western Western Australia.

Typical height:

6-12 metres

Typical width:

5-10 metres

Growth rate:

Moderate to slow

Typical form:

Ascending branches with generally dense crown; slender, erect stems, acutely attached branches.

Characteristics:

Small to medium sized evergreen tree. Newly exposed bark is colourful and showy, usually brownish grey, reddish brown, coppery, or salmon coloured and typically with a glossy, metallic bronzy or coppery sheen, sometimes aging to grey or brownish grey. Linear to narrow lance-shaped, dull blue- or grey-green leaves. Cream-white flowers.

Site requirements:

It can grow on a range of soil types including heavy soils affected by high levels of salinity, seasonally waterlogged areas and on sandy alkaline soils.

Tolerances:

An extremely adaptable species. It tolerates harsh conditions, including cold, heat, wind, pollution, aridity, saline and alkaline soils, and coastal exposure, and is extremely drought tolerant although occasional summer irrigation is beneficial in hot, desert areas.

Notes:

Botanical name:

Eucalyptus wimmerensis 'Honey Pots'

Common name:
Tucker Time® Honey Pots™

Origin:
Cultivar

Typical height:
3-5 metres

Typical width:
2-4 metres

Growth rate:
Moderate

Typical form:
Small evergreen mallee to small tree with ascending branches

Characteristics:
Small tree or multi-stemmed mallee with small narrow grey-green leaves. Profuse white flowers. Smooth bark

Site requirements:
Adaptable to a range of conditions and soils

Tolerances:
High tolerance of drought and frost. Moderate to low water logging tolerance.

Notes:
Formative prune to develop good structure. Low maintenance.

Botanical name:

Fraxinus griffithii

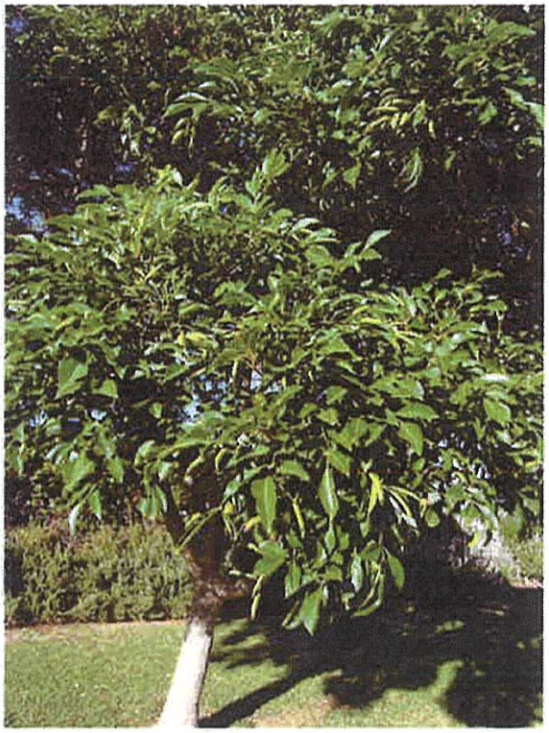
Common name:
Evergreen Ash, Himalayan Ash

Origin:
India-subcontinent, China-Korea, Japan, Tropical Asia

Typical height:
6-8 metres

Typical width:
4-6 metres

Growth rate:
Moderate



Typical form:
Small evergreen tree with a rounded, dense canopy.

Characteristics:
Leaves are green and shiny on the top & hairy silver coloured underneath. Profuse white flowers followed by samaras that remain on the tree until the winter months. Smooth grey bark.

Site requirements:
Tolerates a wide range of soils and climatic conditions but performs best in moist, well drained soils with full sun. May benefit from additional irrigation during extended dry periods.

Tolerances:
Moderate to high drought tolerance. High frost tolerance.

Notes:
Formative prune to develop good structure. Low maintenance. Has shown invasive tendencies in some regions.

Botanical name:

Fraxinus pennsylvanica 'Cimmaron'

Common name:
Cimmaron Green Ash

Origin:
Variety

Typical height:
15-20 metres

Typical width:
8-10 metres

Growth rate:
Moderate

Typical form:
Large, narrow domed deciduous tree

Characteristics:
Dense, lustrous foliage, turns burgundy to red-orange in autumn. Reported seedless variety. Attractive dark grey bark.

Site requirements:
Transplants readily & adapts to most soils, although performs best in moist well drained soils.

Tolerances:
High wind and frost tolerance. Moderate to high tolerance of water logging.

Notes:
Formative prune to develop strong structure. Research indicates tree has good potential for street planting

Botanical name:

Lophestemon confertus

Common name:
Brush Box

Origin:
Eastern Australia

Typical height:
15 - 20 metres

Typical width:
8 -12 metres

Growth rate:
Fast

Typical form:
A tall, sturdy evergreen tree that develops a densely spreading crown with a broad dome. The trunk develops a rough bark at the base and smooth whitish pinkish bark above.

Characteristics:
Leaves are deep green and glossy, ovate to acuminate and 15cm in length. White, dainty 5 petalled flowers, which are heavily fragrant, develop in spring.

Site requirements:
Adaptable to a wide range of soils but prefers sandy to medium soils in an open and full sun position.

Tolerances:
Drought and frost tolerant. Moderately tolerant to heat stress.

Notes:

Botanical name:

Melaleuca bracteata

Common name:

Black Tea-Tree

Origin:

All Australian states except Vic. Coastal & inland, adjacent to water

Typical height:

5-10 metres

Typical width:

3-5 metres

Growth rate:

Moderate to slow

Typical form:

Small rounded, evergreen tree with ascending branches.

Characteristics:

Thin, linear foliage, dense. Rough fissured dark grey bark. Flowers white-cream & profuse

Site requirements:

Tolerant of a wide range of soil types including heavy clays. Good tolerance of waterlogged soils. Tolerates sites with high pH and salinity.

Tolerances:

High water logging and frost tolerance

Notes:

Formative, to single trunk prune

Botanical name:

Melaleuca linariifolia

Common name:

Snow in Summer / Narrow leaved Paperbark

Origin:

Eastern Australia

Typical height:

8 metres

Typical width:

4 metres

Growth rate:

Moderate

Typical form:

The trunk is erect with white papery bark, spreading branches and a densely textured crown.

Characteristics:

Trunk is covered by a white, beige and grey papery bark. The grey-green leaves are ovate to lanceolate, prickly and 5cm in length. Cream or white bottlebrush-like flowers appear from late spring to autumn.

Site requirements:

Prefers light to heavy, moist alkaline soils in an open sunny position.

Tolerances:

High water logging and wind tolerance.

Drought and frost tolerant.

Botanical name:

Melaleuca styphelioides

Common name:

Prickly Paperbark

Origin:

Eastern Australia

Typical height:

7 - 10metres

Typical width:

3 - 4 metres

Growth rate:

Moderate

Typical form:

Medium size evergreen tree

Characteristics:

Trunk is covered by a white, beige and grey papery bark. The grey-green leaves are ovate to lanceolate, prickly and 5cm in length. Cream or white bottlebrush-like flowers appear from late spring to autumn.

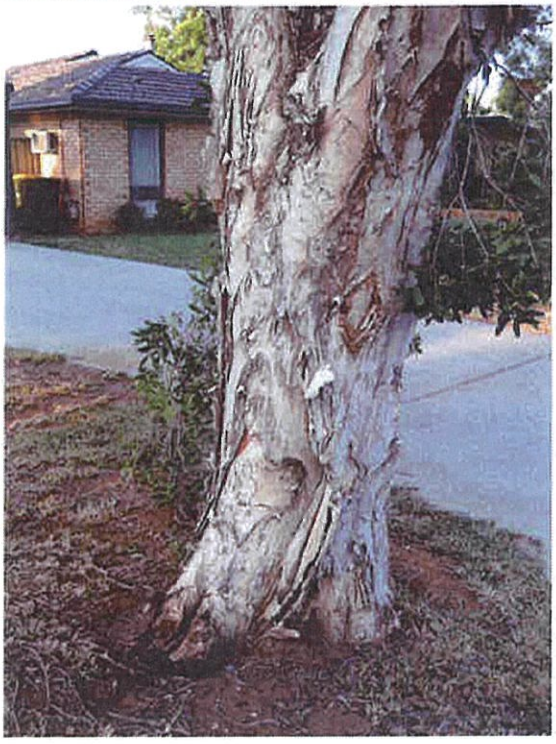
Site requirements:

Able to adapt to many soil types, including compacted, water logged, and acidic.

Tolerances:

High water logging and wind tolerance. Moderate drought tolerance.

Notes:



Botanical name:

Melaleuca quinquenervia

Common name:
Broad-leaved Paperbark

Origin:
Coastal from mid-NSW to Qld, New Guinea, Indonesia & New Caledonia. Stream sides, estuary banks & swamps

Typical height:
6-15 metres

Typical width:
3-8 metres

Growth rate:
Moderate

Typical form:
Erect, broadly columnar medium-sized evergreen tree

Characteristics:
Trunk is covered by a white, beige and grey papery bark. The grey-green leaves are lanceolate to elliptic and the cream or white bottlebrush-like flowers appear from late spring to autumn.

Site requirements:
Able to adapt to many soil types, including compacted, water logged, and acidic.

Tolerances:
High water logging and wind tolerance. Moderate drought tolerance.

Notes:
Formative prune to develop good structure. Low maintenance once established. Surface roots can conflict with adjacent infrastructure and other plants. Ensure appropriate space is allowed for growth.