Macedon Ranges Shire Council

ATTACHMENTS

Planning Delegated Committee Meeting
Under Separate Cover

Wednesday 9 October 2024

Table of Contents

1 DETAILED SITE PLAN

1 : 400

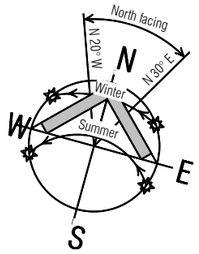
Woodend Building Design
Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au
Registered Architect : Paul Youngs 17573

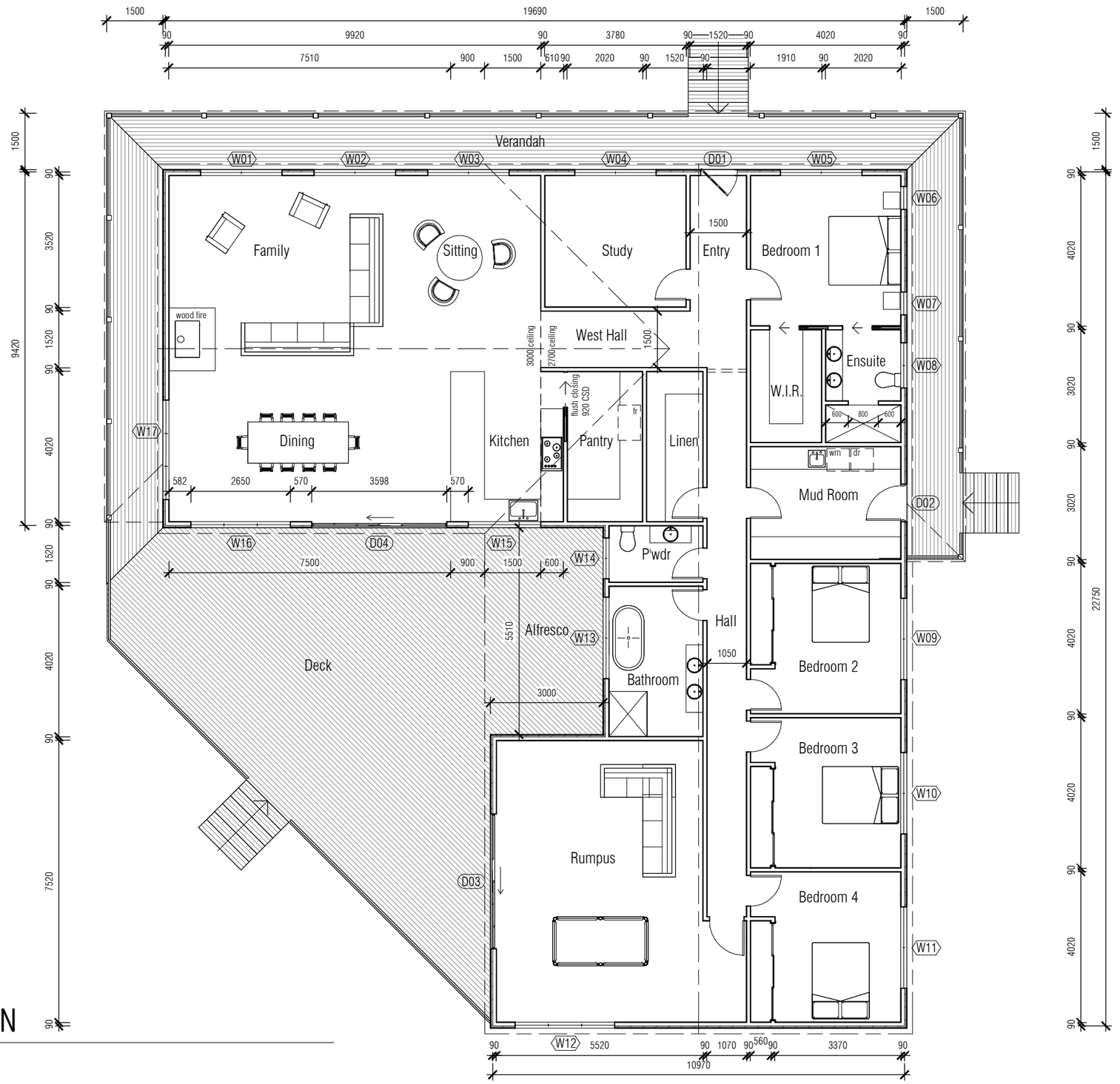
PROJECT TITLE: Proposed Residence	CLIENT: Nathan & Kat Matsinos	DRAWN BY: PY	CHECKED BY: PY	SCALE: 1:100 @ A3	SHEET: 2 of 7	SHEET No: TP02
SHEET TITLE: DETAILED SITE PLAN	PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DATE: 24th August 2023				JOB No: W230803

Woodend Building Design
Building Design Consultants
Ph: (03) 5427 4272
Email: plans@wbdg.com.au
Office 3 / 93 High Street, Woodend
Registered Architect : Paul Youngs 17573

This is sheet _____of___drawing reffered to in the contract
DATE: _____
BUILDER: _____
PROPRIETOR: _____

PROJECT TITLE: Proposed Residence
SHEET TITLE: PROPOSED FLOOR PLAN
PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek
CLIENT: Nathan & Kat Matsinos
SHEET: 3 of 7
DRAWN BY: PY
CHECKED BY: PY
SCALE: 1:100 @ A3
SHEET No: TP03
DATE: 24th August 2023
JOB No: W230803





Area Schedule		
Name	Area	Squares
Proposed Dwelling	324.86 m²	34.97
Proposed Decking	82.48 m²	8.88
Proposed Verandah	63.94 m²	6.88
Proposed Alfresco	16.53 m²	1.78
Total	487.81 m²	52.51

1 PROPOSED FLOOR PLAN
1 : 100

1 NORTH ELEVATION

1 : 100

External Finishes and Colour Schedule

Colorbond Roofing & Gutters
Shale Grey

Weatherboard Cladding
Taubmanns 'Country Beige'

Trim, Windows and Plinth Cladding
Taubmanns 'Aspen Snow'

2 EAST ELEVATION

1 : 100

Woodend Building Design Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au Registered Architect : Paul Youngs 17573	COPYRIGHT © DO NOT SCALE THESE DRAWINGS	PROJECT TITLE: Proposed Residence SHEET TITLE: NORTH & EAST ELEVATION	CLIENT: Nathan & Kat Matsinos PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DRAWN BY: PY	CHECKED BY: PY	SCALE: 1:100 @ A3	SHEET: 4 of 7	SHEET No: TP04 JOB No: W230803
				DATE: 24th August 2023				

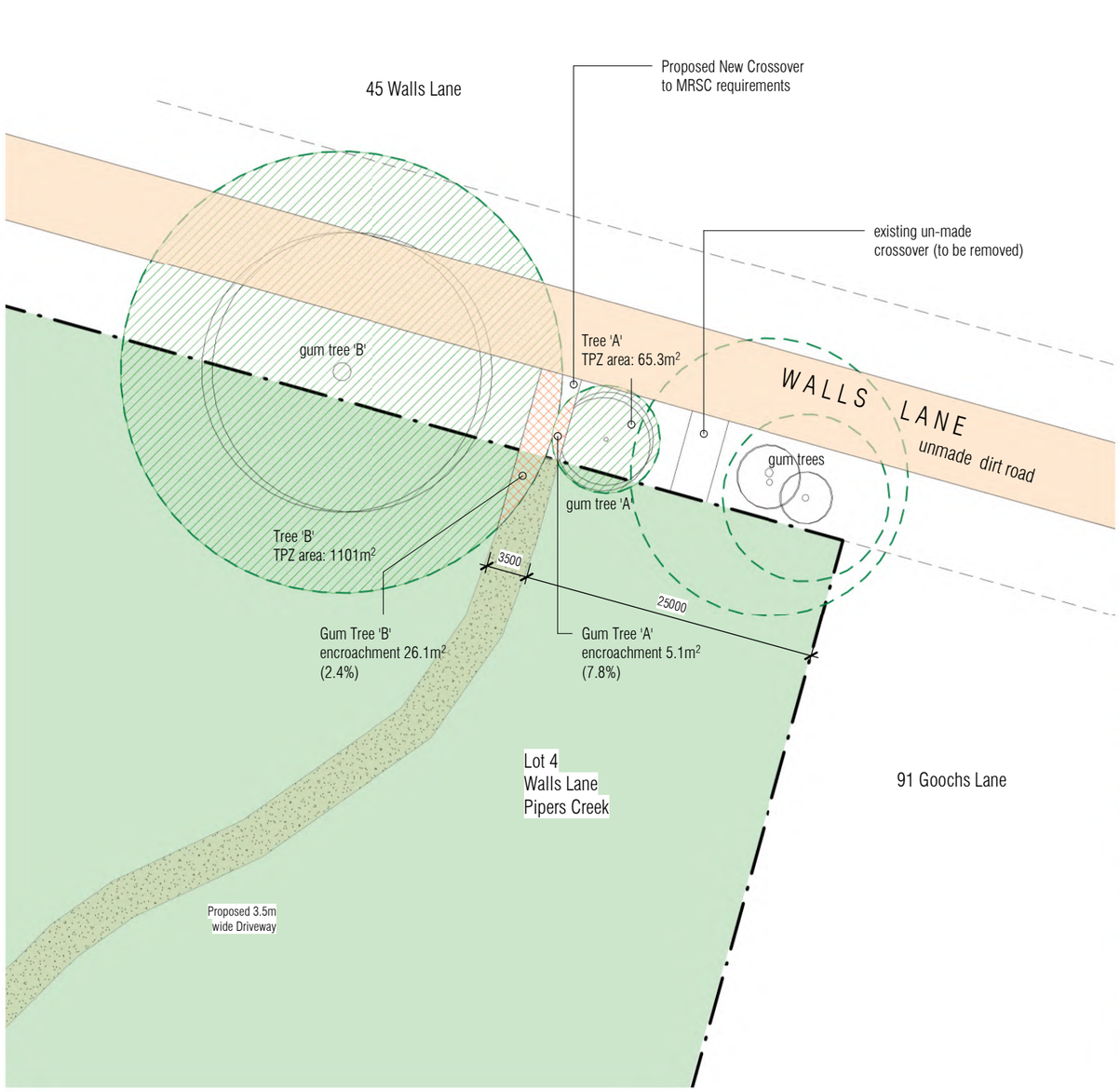
1 SOUTH ELEVATION
1 : 100

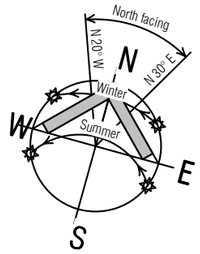
2 WEST ELEVATION
1 : 100

Woodend Building Design
Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au
Registered Architect : Paul Youngs 17573

PROJECT TITLE: Proposed Residence	CLIENT: Nathan & Kat Matsinos	DRAWN BY: PY	CHECKED BY: PY	SCALE: 1:100 @ A3	SHEET: 5 of 7	SHEET No: TP05
SHEET TITLE: SOUTH & WEST ELEVATION	PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DATE: 24th August 2023				JOB No: W230803


WBD
Woodend Building Design





1 CROSSOVER DETAIL PLAN

1 : 400

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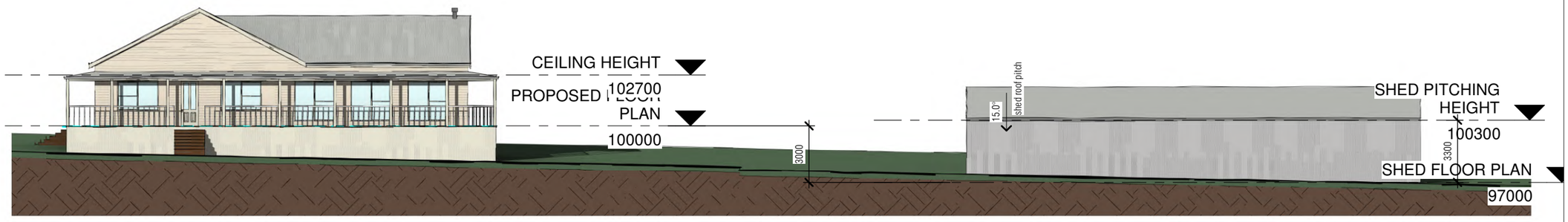
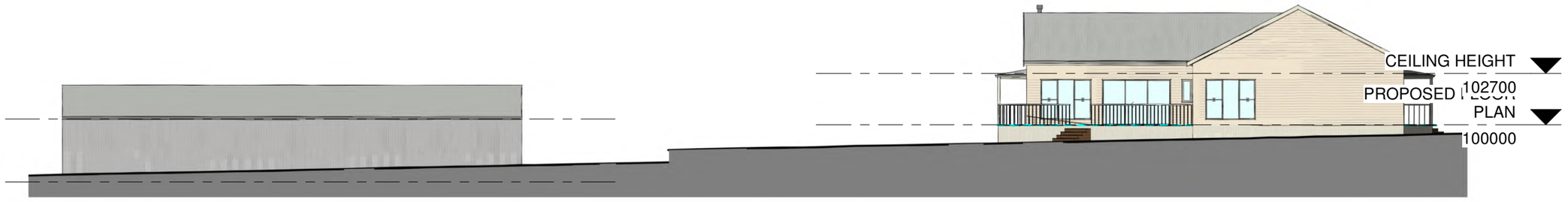
				DATE: 24th August 2023				



1 NORTH house + shed

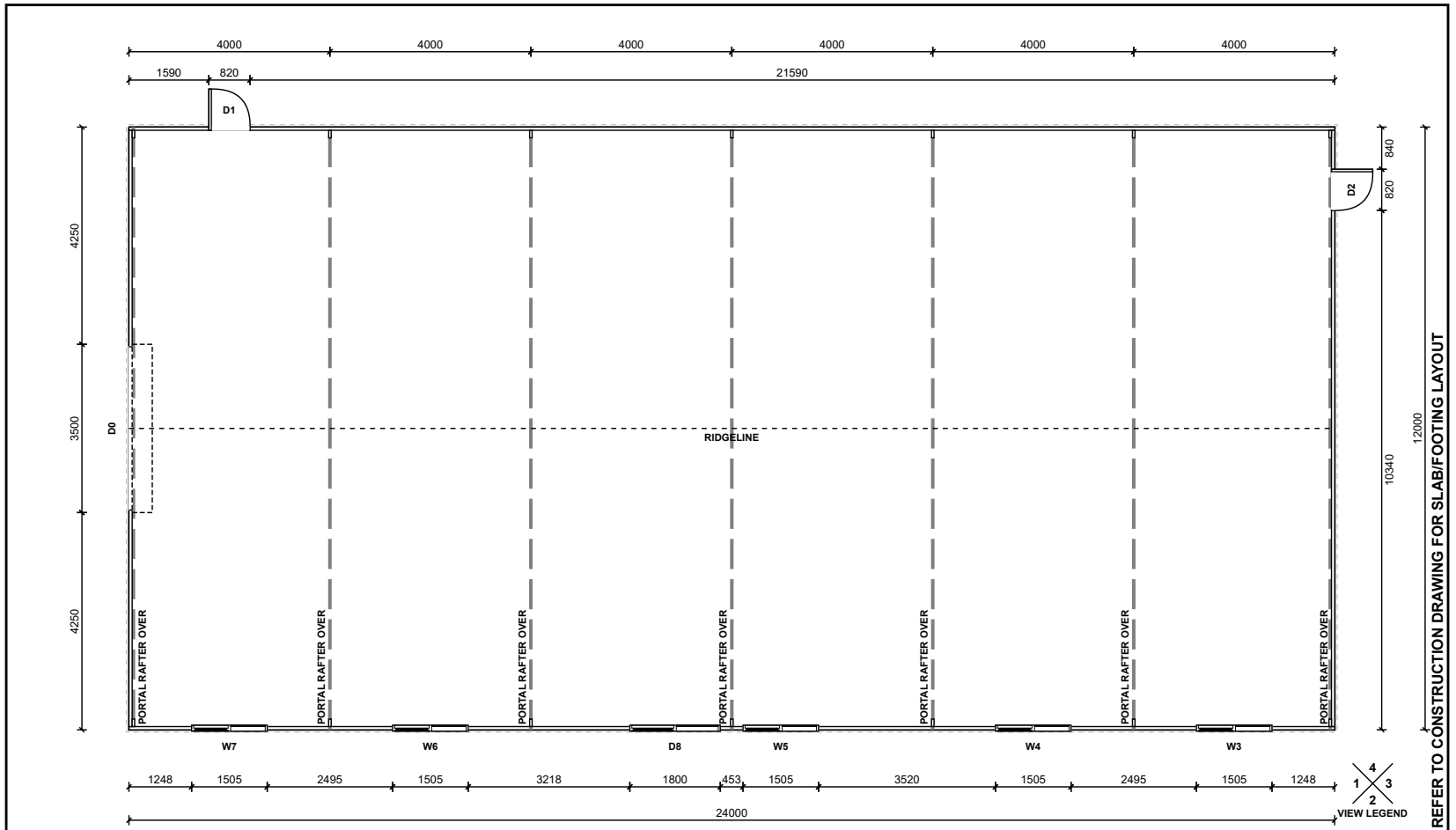
1 : 200



2 SOUTH - house + shed

1 : 200

Woodend Building Design Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au Registered Architect : Paul Youngs 17573	COPYRIGHT © DO NOT SCALE THESE DRAWINGS	PROJECT TITLE: Proposed Residence SHEET TITLE: WIDE ELEVATIONS WTH SHED	CLIENT: Nathan & Kat Matsinos PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DRAWN BY: PY	CHECKED BY: PY	SCALE: 1:200 @ A3	SHEET: 7 of	SHEET No: SK07 JOB No: W230803
				DATE: 24th August 2023				



FLOORPLAN
SCALE 1:100

OPENING SCHEDULE				
MARK	TYPE	HEIGHT	WIDTH	DESCRIPTION
D0	ROLLER DOOR	3100	3500	COLORBOND® SHALE GREY STRAMIT RAD A - ROLLER DOOR
D1-2	PA DOOR	2040	820	COLORBOND® SHALE GREY PERSONAL ACCESS DOOR
D8	ALUM. SLIDING DOOR	2100	1800	COLORBOND® SHALE GREY ALUM. SLIDING DOOR
W3-7	WINDOW	790	1505	COLORBOND® SHALE GREY WINDOW

Tailor Made Steel Buildings
1805 - 1825 Hume Highway
Campbellfield, 3061
P: 9303 7577
F: 03 9303 7588

AUSTRALIAN MADE AND OWNED
AUTHORISED A-LINE BUILDING SYSTEMS DISTRIBUTOR

client: Nathan Matsinos
project: Proposed Garage: Enduro
Lot 4 Walls Lane
Pipers Creek, VIC, 3444

Drawing Name: Floor Plan
Project Number: TMSB - 13490G - 1
Drawing Number:
Rev.
Drawn:
Date: 03/10/2023
All Dimensions In Millimetres U.N.O.
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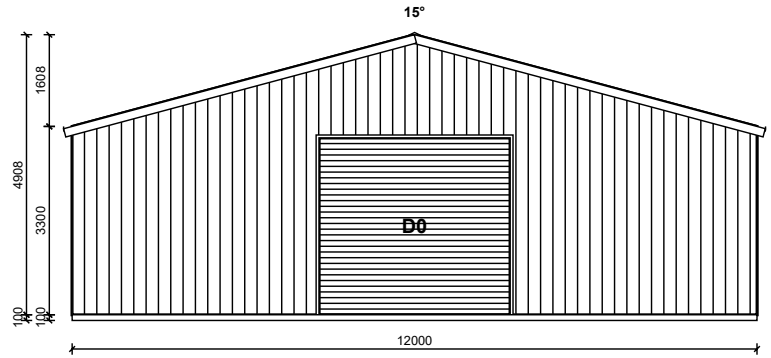
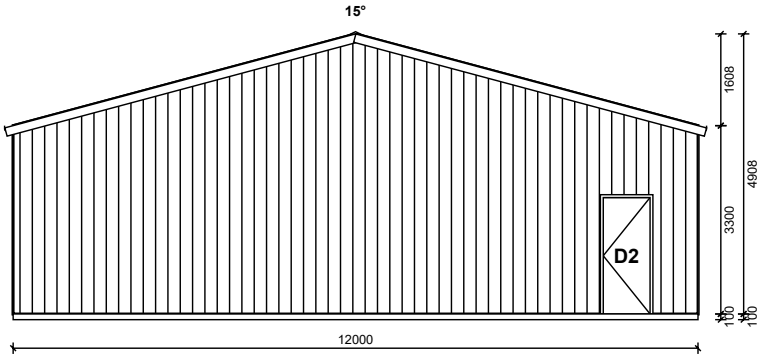
Sheet Size: A4



1. FRONT ELEVATION
SCALE 1:100



3. REAR ELEVATION
SCALE 1:100

REFER TO CONSTRUCTION DRAWING FOR SLAB/FOOTING LAYOUT

OPENING SCHEDULE				
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D0	ROLLER DOOR	3100	3500	COLORBOND® SHALE GREY STRAMIT RAD A - ROLLER DOOR
D1-2	PA DOOR	2040	820	COLORBOND® SHALE GREY PERSONAL ACCESS DOOR
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Lot 4 Walls Lane
Pipers Creek, VIC, 3444

Drawing Name: End Elevation
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Drawing Number:
Rev:
Drawn:
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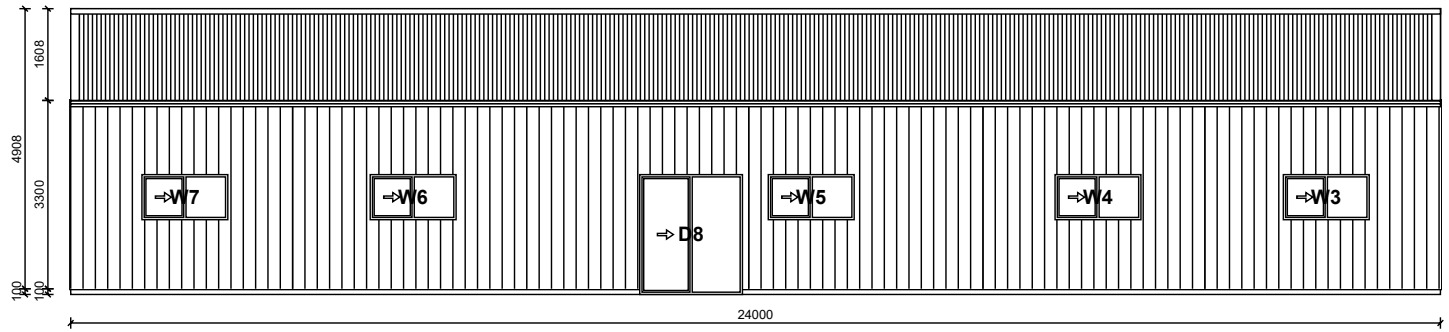

2. RIGHT ELEVATION
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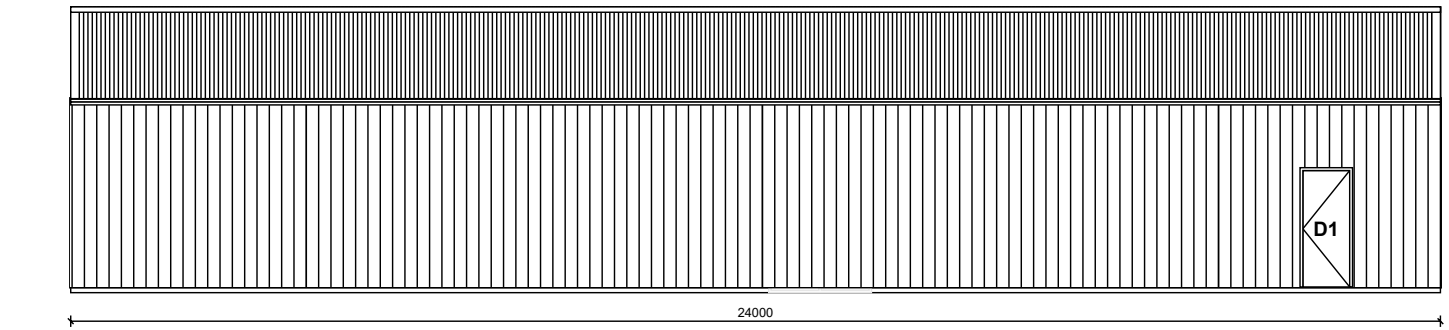

4. LEFT ELEVATION
SCALE 1:100

REFER TO CONSTRUCTION DRAWING FOR SLAB/FOOTING LAYOUT

OPENING SCHEDULE				
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D1-2	PA DOOR	2040	820	COLORBOND® SHALE GREY PERSONAL ACCESS DOOR
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client: Nathan Matsinos
project: Proposed Garage: Enduro
Lot 4 Walls Lane
Pipers Creek, VIC, 3444

Drawing Name: Side Elevation
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Drawing Number:
Rev:
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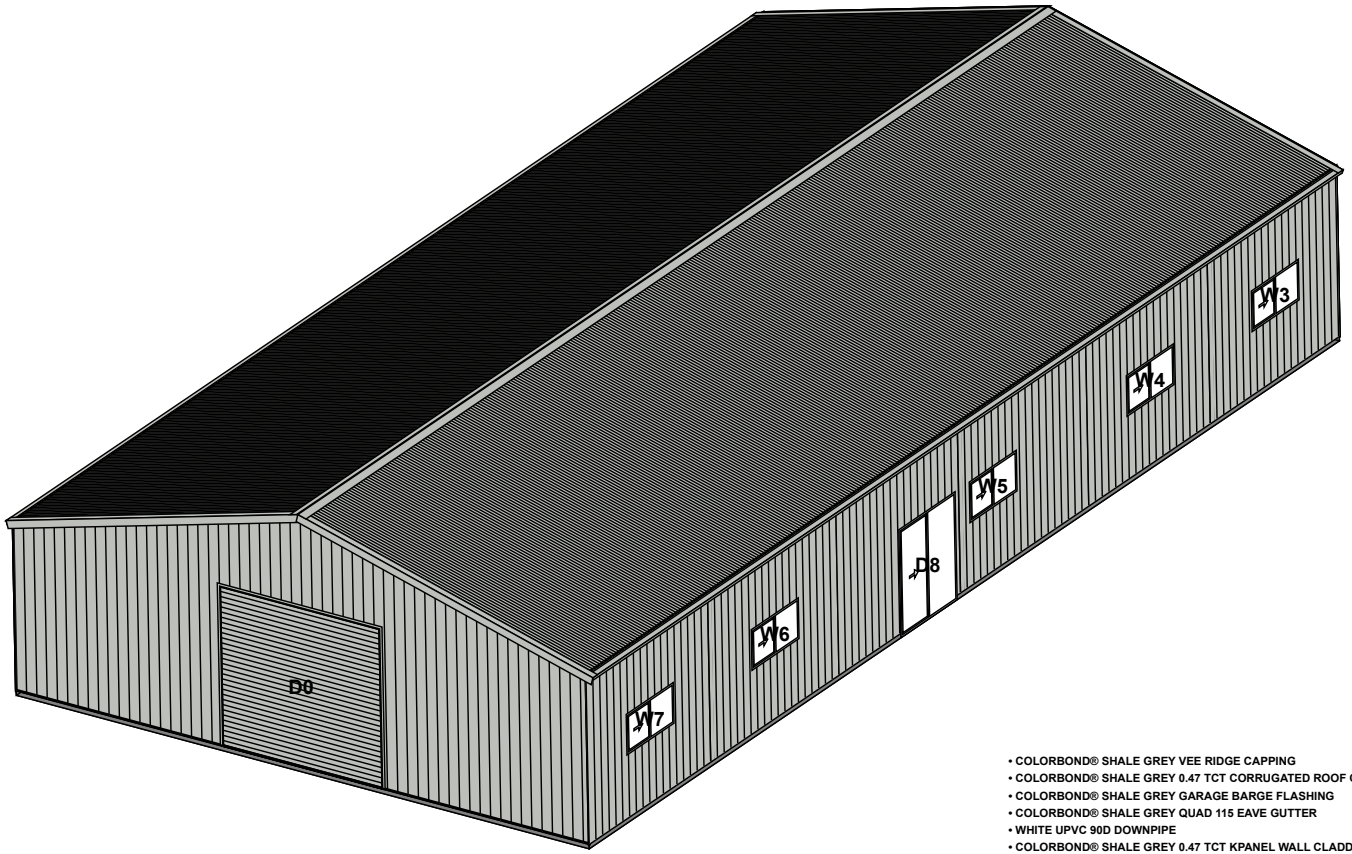

FRONT RIGHT ELEVATION
SCALE 1:100

- COLORBOND® SHALE GREY VEE RIDGE CAPPING
- COLORBOND® SHALE GREY 0.47 TCT CORRUGATED ROOF CLADDING
- COLORBOND® SHALE GREY GARAGE BARGE FLASHING
- COLORBOND® SHALE GREY QUAD 115 EAVE GUTTER
- WHITE UPVC 90D DOWNPIPE
- COLORBOND® SHALE GREY 0.47 TCT KPANEL WALL CLADDING
- COLORBOND® SHALE GREY CORNER FLASHING

REFER TO CONSTRUCTION DRAWING FOR SLAB/FOOTING LAYOUT

OPENING SCHEDULE

MARK	TYPE	HEIGHT	WIDTH	DESCRIPTION
D0	ROLLER DOOR	3100	3500	COLORBOND® SHALE GREY STRAMIT RAD A - ROLLER DOOR
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Rev.
Drawn:
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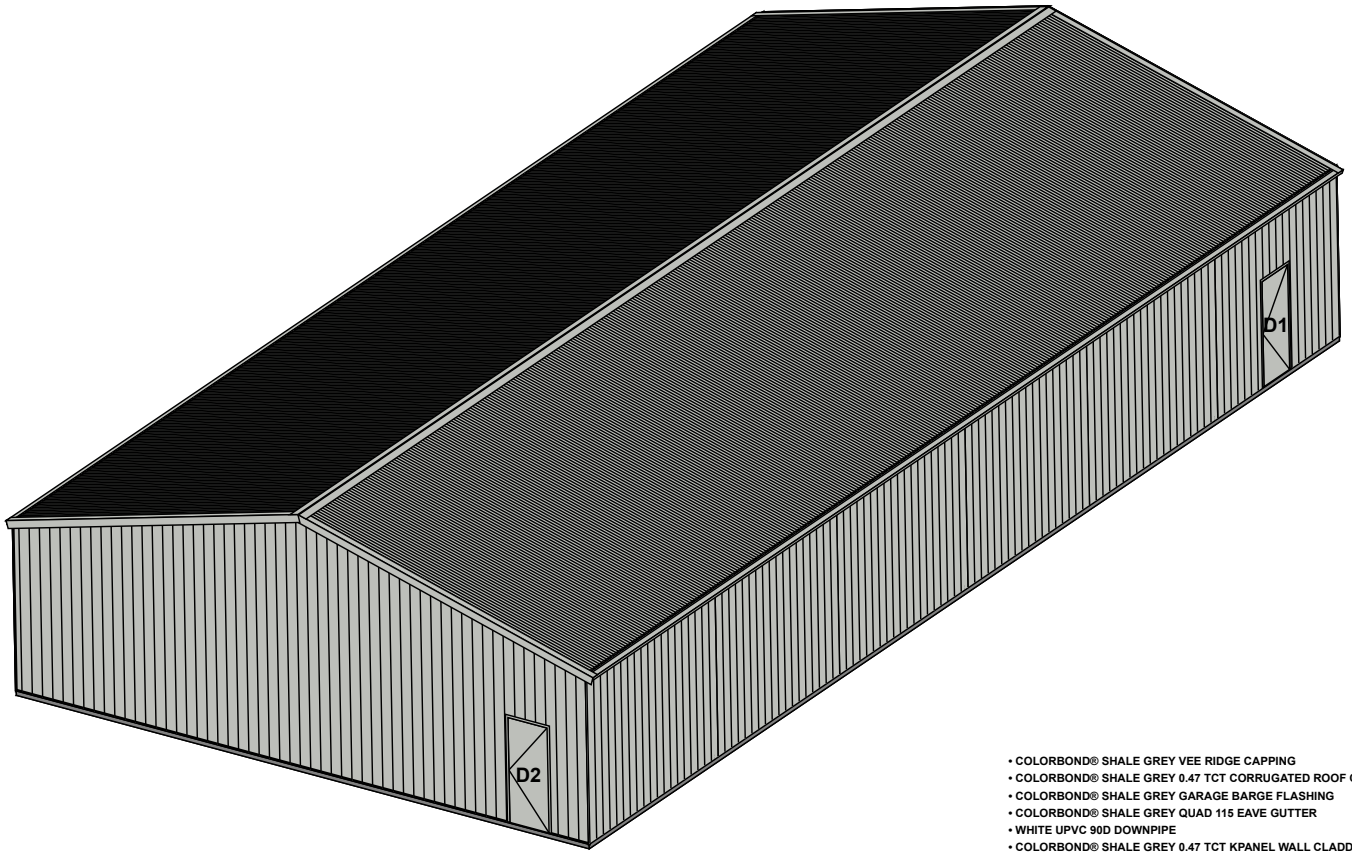

REAR LEFT ELEVATION
SCALE 1:100

- COLORBOND® SHALE GREY VEE RIDGE CAPPING
- COLORBOND® SHALE GREY 0.47 TCT CORRUGATED ROOF CLADDING
- COLORBOND® SHALE GREY GARAGE BARGE FLASHING
- COLORBOND® SHALE GREY QUAD 115 EAVE GUTTER
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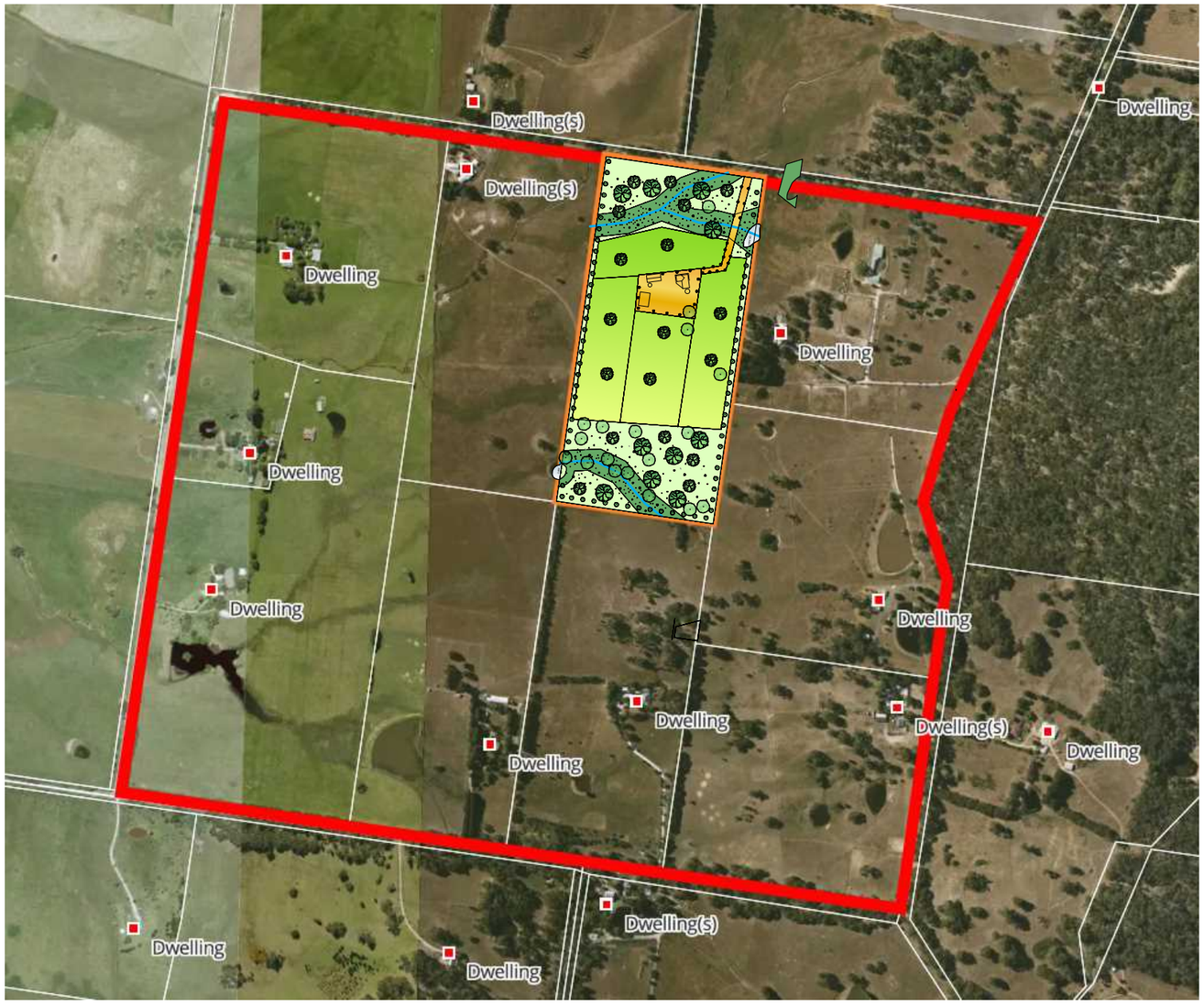

Arcadia sustainable design

REVISION	DATE	NOTE	
PROJECT	Lot 4 Walls Lane Pipers Creek		PROJECT # 2409
CLIENT	Nathan Matsinos	DATE # 17-Jul-24	DWG # 4
DWG	Landscape Overlay Plan	SCALE @ A1 1:4000	
		DRAWN G Shadforth	
		CHKD	REVISION

ARCADIA Sustainable Design 28 Dover St Cremorne Vic 3121
W: arcadiasustainabledesign.com.au E: gary@arcadiasustainabledesign.com.au
T: 0431 022 953

edwards environmental

Land Management Plan

Lot 4 LP112012 Walls Lane, Pipers Creek 3444

Prepared for Nathan Matsinos

July 2024 Version **4**.0

Abbreviations

AHD	Australian Height Datum
BGL	Below Ground Level
CMA	Catchment Management Authority
DEECA	Department of Environment, Energy and Climate Action
DSE	Dry Sheep Equivalents
dS/m	deciSiemens per metre
EPA	Environmental Protection Authority
EVC	Ecological Vegetation Class
ha	hectares
kL	kilolitre
km	kilometre
LASSI	Land and Survey Spatial Information
m	metres
mm	millimetres
SDS	Safety Data Sheets

Land Management Plan

Lot 4 LP112012 Walls Lane, Pipers Creek 3444

Distribution:

Version	Date	Copies	Recipient
1.0	September 2023	Electronic	Nathan Matsinos
2.0	December 2023	Electronic	Nathan Matsinos
3.0	February 2024	Electronic	Nathan Matsinos

Prepared for
Nathan Matsinos
e-mail: contact@auscanelectrics.com.au

Prepared by
Edwards Environmental
11 Matchett Drive, Strathdale VIC 3550
Telephone: (03) 5406 0522
www.edwardsenvironmental.com.au

Table of Contents

Figures:

Tables:

Appendices:

1 Introduction

1.1 Background

Edwards Environmental has been engaged by Nathan Matsinos (the 'client'), to develop a Land Management Plan (LMP) for Lot 4 LP112012 Walls Lane, Pipers Creek 3444 (the 'site'). The property is number 1178298 in the local government area of Macedon Ranges Shire Council and zoned Rural Conservation Zone (RCZ), refer to Appendix 1, Site Location Map. The client proposes to build a single story four-bedroom dwelling with detached shed and utilise the site for horse agistment of Six broodmares, and to establish a small orchard and vegetable garden. Refer to architectural plans, Appendix 2.

1.2 Purpose

Land Management Planning involves the process of planning a property's uses, activities and management of a site's natural values. It includes the enhancement of the biodiversity, waterway health and on-farm productivity (if relevant), as well as the landowner's vision and aspirations for the property. Land Management Plans set the goals and priorities for successful land management, taking into account:

- Property goals and business plan
- Planning overlays and zones
- Land use capabilities and soil management
- Water supply
- Weed management plan
- Pest animal management plan
- Biodiversity and native vegetation

This LMP is prepared for the use, subdivision or development of a specific property in the Rural Conservation Zone (RCZ) of Macedon Ranges Shire Council. The LMP objectives are to ensure consistency with the purposes of the Rural Conservation Zone (see http://planning-schemes.DEECA.vic.gov.au/schemes/vpps) and Clause 22 of the *Infrastructure Design Manual* "Environmental Management During Construction". The purposes of the Rural Conservation Zone are:

- To protect and enhance the natural environment and natural processes for their historic, archaeological, and scientific interest, landscape faunal habitat and cultural values
- To protect and enhance natural resources and biodiversity of the area
- To encourage development and use of land which is consistent with sustainable land management and land capability practices, and which takes into account the conservation values and environmental sensitivity of the locality
- To provide for agricultural use consistent with the conservation of environmental and landscape values of the area
- To conserve and enhance the cultural significance and character of open rural and scenic non-urban landscapes

1.3 Limitations

- The report addresses the potential interaction of proposed land use with land characteristics of the specific site and does not apply to any other site
- The report does not obviate the need for Engineering Soil Tests prior to design of foundations, footings, or road pavement

2 Methodology

2.1 Criteria to be assessed

LMP assessment criteria are set out in the Land Management Plan Guideline – Macedon Ranges Shire Council) and/or in Overlays impacting the property. The adopted criteria are:

1. Current and proposed land uses
2. Soils type, soil salinity, and erosion potential
3. Current and proposed farming activity (grazing / cropping)
4. Water supply, surface water and groundwater
5. Native flora and fauna
6. Pest plants and animals
7. Revegetation (if applicable)

2.2 Desktop Study

Site details are set out in Table 2.

2.3 Site Inspection

Site-specific characteristics are recorded in Section 4. Photographs are included in Appendix 3.

2.4 Development Proposal

The development proposal was assessed, with respect to the objectives of the rural zone and site-specific characteristics associated with the proposed land use. In discussion with the client, desirable land improvements were included in the Land Management Plan.

3 Desktop Assessment

3.1 Landowner Details

TABLE 1: LANDOWNER DETAILS	
Name of Landowner(s)	Nathan Matsinos
Property Address	Lot 4 LP112012 Walls Lane, Pipers Creek 3444
Phone(s)	0450 726 858
Email(s)	contact@auscanelectrics.com.au

3.2 Property Details

Also refer to Site Location Map, Appendix 1, and Figures 1 & 2.

TABLE 2: PROPERTY DETAILS (see Appendix 1 for Site Location Map)	
Property Size	Approximately 17.4 ha
Council Area	Macedon Ranges Shire Council
Property No.	1178298
CMA Catchment	North Central
Bioregion	Central Victoria Uplands (Source: DEECA NatureKit, refer to Appendix 4)
Ecological Vegetation Class/s (EVCS)	EVC 175: Grassy Woodland EVC 47: Valley Grassy Forest (Source: DEECA NatureKit, refer to Figure 3 and Appendix 5)
Significant Landscape Features	• Largely open pasture with predominant land slope to the west and towards waterways. • Two prominent dams located in the northeast and southwest sections of the site, along the site boundary. Dams fed by waterways trending east-west across the site. • Mature eucalypts in small numbers across the site (~20) and fallen timbers with hollows, mainly within the southern section of the site. • Refer to Figure 1 and Appendix 3 Site Photographs
PLANNING DETAILS (see Appendix 6 for Property Planning Report)	
Planning Zones	Rural Conservation Zone (RCZ) Rural Conservation Zone – Schedule 1 (RCZ1)
Planning Overlays	Bushfire Management Overlay (BMO) Environmental Significance Overlay (ESO) Environmental Significance Overlay – Schedule 4 (ESO4) Vegetation Protection Overlay (VPO) Vegetation Protection Overlay – Schedule 9 (VPO9)
Others	Designated Bushfire Prone Area
Current land use	Vacant (former cattle grazing)
Adjoining land uses	Rural residential / stock grazing

Figure 1. Aerial view of site at Walls Lane, Pipers Creek (Source: Nearmap, 11-02-2023)

Figure 2. Ground view of site, taken near site entrance from Walls Lane, looking southwest (Edwards Environmental 23/08/23)

3.3 Primary use of the Property

The property is currently vacant pastural land, that was previously used for Stock Grazing

3.4 Aims for the Property

The aim for the property is for cohesive and site responsive conservation and land management, seeking to protect and enhance biodiversity, habitat and waterways, balanced by a more appropriate agricultural use supported by a dwelling. A residential dwelling and detached shed are proposed to be constructed in the northern section of the site, accessed via a 3.5m wide all-weather driveway from Walls Lane. The proposed dwelling comprises four bedrooms and study. Refer to architectural plans, Appendix 2.

3.5 Planning Zones and Overlays

The property is zoned Rural Conservation Zone Schedule 1 (RCZ1). Planning overlays include Bushfire Management Overlay (BMO), Environmental Significance Overlay Schedule 4 (ESO4) and Vegetation Protection Overlay Schedule 9 (VPO9). The site is within a Declared Water Supply Catchment Area. Refer to Appendix 6, Property Planning Report.

Schedule 4 to the Environmental Significance Overlay (ESO4) recognises Lake Eppalock as a major water storage and recreational facility located within the Campaspe River catchment. It is a major source of water for irrigation, stock and domestic and urban water supplies for towns within the municipality. The schedule aims to ensure protection and maintenance of water quality and yield within the Eppalock Water Supply Catchment Area as listed under Section 5 of the Catchment and Land Protection Act, 1994. Under this schedule, a permit for buildings and works is only required only for accommodation (including a dwelling) which is not connected to reticulated sewerage or buildings and works for intensive animal husbandry.

The intention for Schedule 9 to the Vegetation Protection Overlay (VPO9) "Living Forest" is to protect and enhance the existing forest mosaic for the areas around Woodend, Macedon and the Cobaw Ranges. The objectives for the VP09 Schedule are to protect and enhance remnant vegetation for its role in biodiversity, natural resource management, and landscape and character. Under the schedule, a permit is required to remove, destroy, or lop any native vegetation. This does not apply to the removal, destruction and lopping of vegetation which is associated with the collection of firewood for private use.

For further information, refer to Victoria Planning Schemes:
https://www.planning.vic.gov.au/schemes-and-amendments/browse-planning-scheme

3.6 Heritage

The site is not impacted by a Heritage Overlay or Areas of Aboriginal Cultural Heritage Sensitivity Overlay.

3.7 Biodiversity

3.7.1 Bioregion

The site is located withing the Central Victorian Uplands bioregion (refer to Appendix 4). The Central Victorian Uplands is dominated by Lower Palaeozoic deposits giving rise to dissected uplands at higher elevations, amongst granitic and sedimentary (with Tertiary colluvial aprons) terrain with metamorphic and old volcanic rocks which have formed steeply sloped peaks and ridges. The less fertile hills support Grassy Dry Forrest and Heathy Dry Forest ecosystems. Herb-rich Foothill Forest and Shrubby Foothill Forest ecosystems dominate on the more fertile outwash slopes. The granitic and sedimentary terrain is dominated by Grassy Woodlands, much of which has been cleared. Lower lying valleys and plains are dominated by Valley Grassy Forest and Plains Grassy Woodland ecosystems (DEECA 2023).

3.7.2 Flora

Two ecological vegetation class (2005 EVCs) are observed onsite:

EVC 47: Valley Grassy Forest (VGF): An open forest to 25m tall that may carry a variety of eucalypts, usually species that prefer more moist or fertile conditions over a sparse shrub cover. A rich array of herbs, lilies, grasses and sedges dominate the ground layer but under drier conditions the ground layer may be sparse and slightly less diverse. Occurs under moderate rainfall regimes of 700-800mm per annum on fertile well-drained colluvial or alluvial soils on gently undulating lower slopes and valley floors.

EVC 175: Grassy Woodland (GW): A variable open eucalypt woodland to 15m tall over a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on plains or undulating hills on a range of geologies.

Refer to Figure 3 and Appendix 5. Undefined EVC areas in Figure 3 are described as *cleared grazing pasture*.

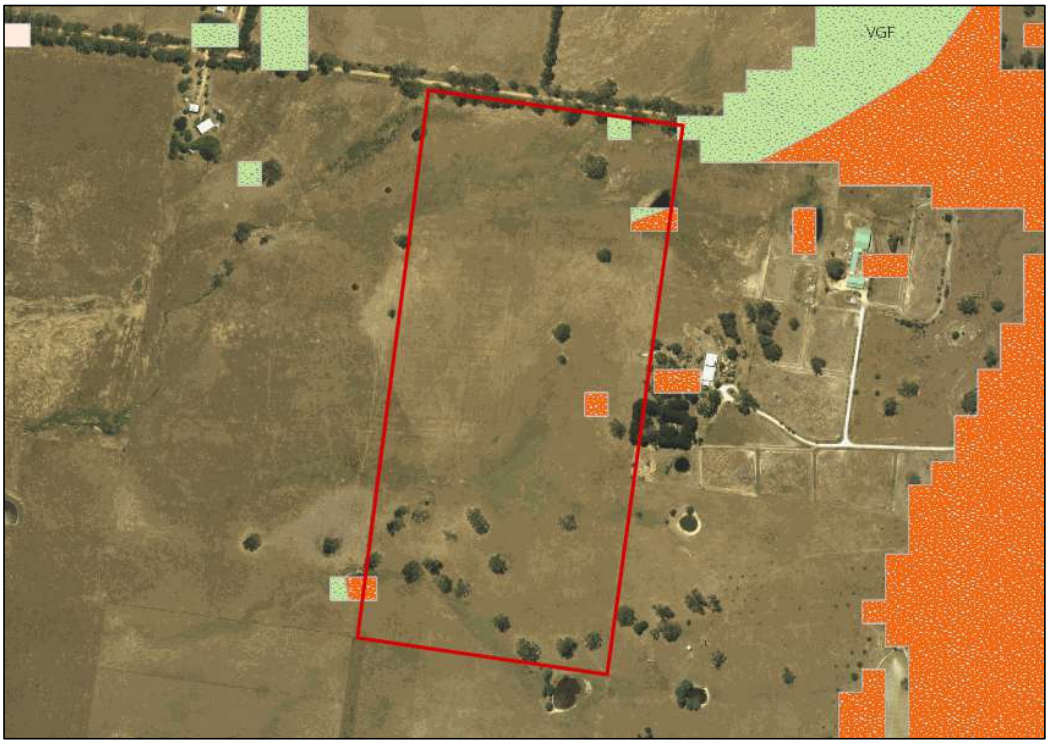

Figure 3. Ecological Vegetation Classes (EVC) overlaying aerial Image of the site (Source: Victoria State Government NatureKit)

3.8 Erosion

The site is not affected by an Erosion Management Overlay (EMO).

3.9 Salinity

The site is not affected by a Salinity Management Overlay (SMO).

3.10 Flood

The site is not subject to a Flood Management Overlay (FMO).

3.11 Fire

The site is subject to a Bushfire Management Overlay (BMO).

3.12 Water Quality

The site is located within a Declared Water Supply Catchment.

3.13 Main Land Management Issues

The main land management issues identified for the site include control of noxious weeds.

4 Site Inspection

A site inspection was completed on the 23rd of August 2023. Refer to site photographs, Appendix 3.

4.1 Location

The site is located approximately 11km east of Kyneton Train Station and 1.4km west of Cobaw State Forest. The site is located on Walls Lane, an unsealed all-weather road, and surrounded by rural residential / farming properties.

4.1.1 Access to site

Access to the site is from Walls Lane, an unsealed (all-weather) road to the existing site entrance (farmgate), refer to proposed development plans Appendix 2.

4.2 Views in and out of site

North (in): Mature eucalypts lining boundary with broken views to undulating grassed paddocks.

North (out): Mature eucalypts lining boundary with broken views to grassed paddocks.

South (in): Open view of grassed paddocks and sparse distribution of mature eucalypts.

South (out): Open view of adjoining rural residential property and dam.

East (in): Open view of grassed paddocks.

East (out): Open view of adjoining rural residential property and hills of Cobaw State Forest beyond.

West (in): Open view of grassed paddocks.

West (out): Open views of adjoining rural residential properties and surrounding extensive rural landscape.

4.3 Land Use

4.3.1 Existing

Vacant pastural land

4.3.2 Adjoining

Rural residential / stock grazing

4.4 Geography

4.4.1 Topography

The land has a general slope to the west from a central-east maximum elevation of approximately 560mAHD to a southwest minimum elevation of approximately 540mAHD. More specifically, the land slopes towards the waterways that trend east-west across the site. Refer to Appendix 7 Contours and Surface Waters Map.

4.4.2 Soils

Soil type and properties were assessed during the site inspection. Refer to Section 6 for details.

4.4.3 Salinity

Refer to Section 6 for details.

4.4.4 Surface Waters & Groundwater

Refer to Section 8 for details.

4.4.5 Erosion

Minor erosion was observed along the southern waterway before entering the dam on the western site boundary. Refer to Section 6.2 for further details.

4.5 Heritage

No heritage infrastructure was observed during the site inspection.

4.6 Biodiversity

4.6.1 Native Flora and Fauna

Refer to Section 9.

4.6.2 Pest Plants

A brief identification of noxious weeds onsite was undertaken, refer to Section 10.

4.6.3 Pest Animals

No pest animals or evidence of pest animals was observed on site during the inspection.

4.7 Fire Threat

The property is subject to a Bushfire Management Overlay (BMO). While the BMO only affects the northeast corner of the site, the site is located within a Designated Bushfire Prone Area. Therefore, sufficient firebreaks will need to be maintained around the proposed dwelling, particularly to the west and southeast as these are the directions of predominant winds during the main fire risk season (spring & summer). Vegetation levels should be maintained along the site boundaries by regular mowing. At a minimum 10kL of stored water should be reserved onsite for fire-fighting purposes.

5 Site Plan

Refer to Appendix 8 for the Site Plan. The plan divides the site into zones that define the main features / land uses across the site. The site plan shows:

- Existing native vegetation patches/scattered trees
- Existing structures (if present) and proposed development site
- Waterways/dams
- Existing and proposed fencing
- Areas where pest plants and animals were observed (where applicable)
- Areas of proposed re-vegetation

Also refer to architectural plans (Appendix 2) for proposed site development.

5.1 Description & Proposed Use of Land Zones

TABLE 3: DESCRIPTION & PROPOSED USE OF LAND ZONES

LAND ZONE	ZONE AREA	DESCRIPTION	PROPOSED LAND USE
ZONE 1 North	8.4 ha	Comprises the northern waterway and dam. Perimeter post-and-wire fencing. Mature eucalypts along northern site boundary road reserve with Walls Lane. Remnants of central internal post-and-wire-fence (poor condition) running south from northern boundary. Zone includes northern waterway trending east-west from "Dam 1" at eastern site boundary, extending into adjoining property. Prominent large mature eucalypt to the northeast of the zone. Spiny Rush (*juncus acutus*) observed around the dam and along the waterway. Small numbers of Kangaroo Thorn (*acacia paradoxa*) observed in western section of the zone.	Conservation Zone. Native revegetation along waterway and banks of dam to stabilise and minimise erosion. Establish native shrubs around driveway and native trees near northern site boundary. Establish native gums to the East, West and South boundary to improve visual impact. Control Spiny Rush (*juncus acutus*) and Kangaroo Thorn (*acacia paradoxa*).
ZONE 2	8.0 ha	Central pasture (good quality). Maximum site elevation at central eastern boundary (~560mAHD) sloping west to a minimum site elevation (~540mAHD). Zone includes several mature eucalypts. Perimeter (east and west) post-and-wire fencing. Remnants of central internal post-and-wire-fence (poor condition) running south from Zone 1.	Stock Grazing Zone. Equine grazing of Six broodmares. Remnants of central fence to be removed. Install 1.2m high equine fence with 3x electric white sighter wires installed at 1.2m, .8m and .4m as to comply with MRSC wildlife friendly fencing. ur Grazing paddocks with central access lane. Establish native trees within paddocks. Fence off existing and new trees for protection from stock.

TABLE 3: DESCRIPTION & PROPOSED USE OF LAND ZONES			
LAND ZONE	ZONE AREA	DESCRIPTION	PROPOSED LAND USE
ZONE 3	1 ha	Currently vacant pasture with mature eucalypt in southeast corner of the zone. Includes existing site entrance (farmgate) from Walls Lane.	House / Site Access Zone. Proposed single-level 4-bedroom dwelling with shed and 2 water tanks (80kL & 100kL). Reconfigure site entrance from Walls Lane with all-weather driveway (3.5m wide) to house site. Establish vegetable garden plot southwest of the proposed dwelling. Native shrubs along driveway and house boundary to improve visual impact to neighbouring properties.
ZONE 1 South	8.4 ha	Comprises southern waterway trending east-west to "Dam 2" at western site boundary, extending into adjoining property. Spiny Rush (*juncus acutus*) observed around the dam and along the waterway. Minor erosion observed along waterway prior to entering "Dam 2".	Conservation Zone. Native revegetation along waterway and banks of dam to stabilise and minimise erosion. Establish native gums to the East, West and South boundary to improve visual impact. Control Spiny Rush (*juncus acutus*)

6 Soils

6.1 Soil Description

Soils encountered during intrusive drilling works undertaken by Edwards Environmental for the Land Capability Assessment (21st August 2023) were predominately shallow brown to pale brown dry loams overlying pale orange slight moist light clays and strongly structured orange/red light clays. Laboratory analysis of the soil samples indicated the soils to be slightly acidic (pH ~5) with low salinity (EC <0.5 dS/m). The soils were identified as non-sodic but prone to dispersion.

6.2 Erosion Potential

The site is largely covered by a dense layer of well-maintained pasture grasses. The greatest erosion potential exists along the northern and southern waterways. Minor erosion was observed along the southern waterway prior to the waterway entering the dam on the western site boundary (refer to Appendix 3, site inspection photographs). Revegetation along the waterways (within 20m) is recommended to stabilise the soils in these areas and mitigate further erosion (refer to revegetation plan, Section 12). No stock grazing should occur within these conservation zones (Zone 1 & 4). The waterways and banks of the dams should continue to be monitored for erosion and appropriate remedial action taken.

7 Farming Activity - Refer CADEEMA Soil and Pasture Report - Appendix 9

7.1 Grazing Stock Overview - Refer Appendix 9

Grazing stock will comprise six broodmares as described in Table 4.

TABLE 4: GRAZING STOCK DETAILS			
Area currently used for grazing		17.4ha historically used for agricultural grazing	
Area of proposed grazing		Approximately 8 ha (4 x grazing paddocks)	
Proposed stock numbers[1]		60 DSE	
Stock type (including horses)	Number of animals	Seasonal variation in stock numbers	Feeding requirements (stock feed supply including the percentage of imported feed)
Horse	6	0	Supplement with lucerne and hard feed as required.

[1] Stock numbers are calculated using the Dry Sheep Equivalent (DEECA) stocking rate system where the carrying capacity of the land is equated to 'dry sheep equivalents' or how many dry (non-breeding) sheep of average condition can be kept on the land without weight loss or handfeeding.)

7.2 Stock Grazing Plan (Soil Improvement & Pasture Renovation) Overview - Refer Appendix 9

The following stock grazing and pasture renovation plan has been developed in consultation with the property owner and based on recommendations provided in the CADEEMA Soil and Pasture Report, as developed by CADEEMA (Appendix 9). The plan aims to improve and soil and pasture quality, and prevent over grazing of the site. The objectives of the plan are to maintain 90% pasture cover and ensure pastures are not grazed to less than 5cm. Refer to the CADEEMA Report (Appendix 9) for the proposed grazing paddock configuration.

Soil Improvement Plan **Overview - Refer Appendix 9**

The following plan aims to improve soil conditions within the stock grazing zone over a 2-to-3-year period.

- Application of Calcipril® (granular lime) at a rate of approximately 300kg/ha in autumn 2024 and 2025 to raise soil pH to target 5.5, and improve availability of trace elements (zinc, copper and boron).
- Annual (Spring) application of Croplift® or Pasture Boosta® fertilisers at a rate of approximately 150kg/ha to improve nutrient levels (i.e. nitrate).
- Application of Single Superphosphate (SPP) and Muriate of Potash (MOP) fertilisers at approximate rates of 200kg/ha and 100kg/ha respectively in autumn 2024 and 2025 to improve levels of key elements (i.e., phosphorus, potassium and sulphur.
- Soil testing to be undertaken in 2026 to confirm soil condition and the revise soil improvement as/if required.

Stock Grazing Plan **Overview - Refer Appendix 9**

- Zones 2 will be divided into 4 individual grazing paddocks.
- Paddock Fencing will comprise of 1.3m high treated pine posts evenly spaced at 5m intervals. 3x White electric sighter wires will be installed at heights of 1.2m, .8m and .4m as to comply with MRSC wildlife friendly fencing.
- Movable temporary electric fencing will be utilised to fence off pasture that needs time to rest and rejuvenate.
- Stock will be excluded from the root zone of existing native trees and new tree plantings using post and rail fencing.
- All fencing will be regularly inspected and repaired as required.
- The vacated paddock is to be cleaned and harrowed to allow for clean re-growth. Any identified weeds will be removed at this time.
- In winter, where pasture yields are reduced, imported hard feed will be introduced to supplement grazing.
- In other seasons grazing will be augmented with hard feed and hay as required.
- Lick blocks / loose lick is to be made available to horses to supplement trace elements.
- No stock grazing is to occur within the conservation zones (Zone 1). Therefore, vegetation levels along the site boundary are to be maintained via mowing rather than stock grazing.

Pasture Renovation Plan **Overview - Refer Appendix 9**

Measures described in the soil improvement and grazing plans will facilitate pasture renovation. In addition:

- Bare patches will be resown (e.g., using local pasture mix with deep rooted and hardy perennials).
- Where pasture cover in a paddock falls below 90% (e.g., due to high traffic, water or poor fertility), stock will be excluded from the paddock for at least a 10-week period to allow the resown area to re-establish.
- Regular inspections of paddocks to identify undesirable pasture weeds, including capeweed (*Arcto theca calendula*), sorrel (*Rumex acetosa*), soursop (*Annona muricata*) and eradicate outbreaks by spraying with a prescribed herbicide (refer to Section 10, pest plant management plan).

7.3 Cropping

No cropping activities are currently occurring on the property. A small orchard and vegetable garden are proposed to be established southwest of the dwelling (refer to Appendix 8, Site Plan for location).

8 Water

8.1 Water Supply

TABLE 5: WATER SUPPLY DETAILS	
Domestic water supply (proposed)	Rainwater tank (minimum capacity 100kL)
Current number of dams	2 (approximate storage capacity 0.8ML)
Current number of groundwater bores	None
Creeks / Wetlands / Watercourses	Northern and southern waterways (drainage lines) feeding existing two dams onsite
Annual Rainfall	770 mm[1]
Fire water supply	Existing dams and proposed rainwater tanks (80kL & 100kL – min. 10kL to be reserved in each tank for firefighting purposes).
Water supply for stock	Proposed 80kL tank collected from shed runoff. Tank to feed permanent 9L auto water feeders within each paddock fed by underground pipe. Supplemented (as required) by existing dams.
Water supply for cropping	N/A

[1] Mean annual rainfall data as provided by the Australian Bureau of Meteorology for Station 87175 (Newham-Cobaw).

8.2 Wastewater - Land Capability Assessment Summary

Residential developments in areas without reticulated sewers require wastewater management to protect human health, amenity, resources and the environment. A Land Capability Assessment (LCA) is required for high-risk sites and/or where the site is in a Declared Water Supply Catchment *(refer to EPA 891.4 July 2016, p34 -36).* The aims of the assessment are to:

- assess the capability of the site to sustainably manage wastewater within the allotment boundaries;
- quantify the wastewater volume and nutrient load due to the development;
- determine the effluent quality the treatment system must achieve having regard to site capability;
- design a land application area (LAA) and layout having regard to site capability;
- provide advice to the landowner/occupier to ensure safe on-site disposal of wastewater into the future.

A Land Capability Assessment was undertaken for the site by Edwards Environmental on 21st August 2023. The findings of the LCA are summarised below:

Conclusion:

- Sewer is not available at the property.
- The property has sufficient and suitable land for a Land Application Area (based on the proposed dwelling comprising four bedrooms).
- All required buffer distances as shown on the plans comply with the Code of Practice.
- From the Land Capability Assessment, it is concluded that sustainable on-site wastewater management is achievable by implementing management options as per Table 6 and the recommendations of the LCA report, detailed below.

Recommendations:

- Installation of a Primary Treatment System with discharge to sub-soil trenches/beds or a Secondary Treatment System with discharge to subsurface irrigation;
- Land application of treated effluent on no less than 360m² for primary treatment (1000mm width trenches) or 540m² of sub-surface irrigation for secondary treatment;
- The design of the septic system shall be completed by an irrigation specialist and constructed by a person registered or licensed with the Victorian Building Association in Plumbing (Drainage) works.
- Operation and management of the treatment and disposal system shall be undertaken in accordance with manufacturer's recommendations, the EPA Certificate of Approval, EPA Publication 891.4 2016 and the LCA report.

TABLE 6: SUMMARY OF LCA #877 (SEPTEMBER 2023)	
Feature	Description
Areas of Aboriginal Cultural Heritage Sensitivity	Not observed on site
Declared Catchment	Site is located with a Declared Water Catchment
Elevation of site (in context)	Approximately 540-560mAHD (Source: LASSI Survey Data)
Erosion Risk Rating	Low
Hydrogeology / Geology	Groundwater layer (0-200mBGL): BSE Mesozoic and Palaeozoic Bedrock (basement) sedimentary (fractured rock): Sandstone, siltstone, mudstone, shale. Igneous (fractured rock): includes volcanics, granites, granodiorites.
Soil	Dispersive top soils and subsoils are found in the area.

8.3 Protection and Enhancement of Waterways

Native revegetation of the southern waterway is proposed to enhance this riparian zone and reduce erosion potential, refer to Section 12 for details.

9 Native Flora and Fauna

9.1 Description

Existing native vegetation comprises mature eucalyptus trees predominately in the southwest section of the site (within Zone 3) and scattered along the eastern side of the site (total ~20 trees). In addition, mature eucalypts line the Walls Lane road reserve along the northern site boundary. Fallen timber with hollows were observed mainly in the southern section of the site (Zone 3), refer to Appendix 3 – site photographs, and Appendix 8 – site plan. Due to their ecological value for native fauna, existing hollows on the property should be retained. A large mob of eastern grey kangaroos (~30 individuals) was observed during the site investigation. According to NatureKit, Grey Shrike Thrush (*Colluricincla harmonica*), Masked Lapwing (Vanellus miles) and Superb Fairy-wren (*Malurus cyaneus*) have been observed near the site between 2019-2021. It should be noted that native flora and fauna was assessed in Winter 2023 and there could be considerable seasonal variation in annual plant cover and presence of native fauna.

9.2 Protection / Enhancement Measures

The principles of effective revegetation are to:

- Protect remnant vegetation
- Enhance remnant vegetation
- Build on remnant vegetation
- Create landscape links as many species of birds and animals will not cross open land.

Planting with local indigenous trees and shrubs will enhance this area. Areas of native grasses near drainage depressions and tributaries should be retained and will help to minimise erosion. Planting of trees for revegetation purposes should be undertaken having regard to spacing between tree species. Trees should not be too tightly spaced as this creates competition between individual tress and may also create a dense, unnatural area.

Regeneration of flora specific to the Ecological Vegetation Class seen in the surrounding area is recommended. Enhancement of native vegetation will assist with stabilisation of soil and increased native flora benefits to the site.

Reestablishment of flora along the existing waterways (within 20m) is recommended to enhance the natural environment of the area and reduce erosion potential. Refer to the Revegetation Plan (Section 12).

10 Pest Plants

10.1 Description

A brief identification of noxious weeds onsite was undertaken, as shown below and indicated on the site plan (Appendix 8). Only one variety of declared noxious weeds was observed on the site. Spiny Rush (*Juncus acutus*) was observed along the northern and southern waterways and within the two dams onsite. Few seedlings of Kangaroo Thorn (*Acacia paradoxa*) were observed in the northeast section of the site (within Zone 1) and within the adjoining property to the west. While Kangaroo Thorn is native to large parts of Victoria, it is sometimes regarded as being an environmental weed or problem species as it provides a refuge for pest animals such as rabbits. Control of this species is therefore recommended for the site. As there are few individual plants onsite, the recommended control measure would be hand pulling and ongoing monitoring of new germinations. Pasture across the site was in good condition with few weeds observed.

Identification of pest plants was undertaken in Winter 2023. Therefore, all species of weeds may not have been identified as there is considerable variation in annual species from season to season and from year to year.

Recommended measures for the control of noxious weeds are provided below for identified species (Spiny Rush).

Weed Site Classification	
Classification/ Control Measure	Image (taken onsite)
Spiny Rush (*Juncus acutus*) Prescribed measures for the control of noxious weeds • Application of a registered herbicide • Physical removal	

More information is available from the Agriculture Victoria website, https://agriculture.vic.gov.au/biosecurity/weeds.

10.2 Pest Plants Management Plan

Under the Catchment and Land Protection Act (1994) four classes of noxious weeds (invasive species) are declared:

1. State Prohibited Weeds
2. Regionally Prohibited Weeds
3. Regionally Controlled Weeds
4. Restricted Weeds

The level of management required by legislation varies according to the classification. The seeds of some weed species remain viable for 20 years and germination can be expected to recur whenever weather conditions are conducive. More information is available from the local Landcare Group, and from the Agriculture Victoria staff or website: https://agriculture.vic.gov.au/biosecurity/weeds/invasive-plant-classifications.

There are no active weed control measures being undertaken at the site. Few weed species were detected during the site inspection. Spiny Rush (*Juncus acutus*) was the most prolific weed observed, predominantly along the waterways and within the dam onsite. The following Pest Plant Management Plan (Table 7) focuses primarily on the control of Spiny Rush but also includes the recommended control of Kangaroo thorn (Acacia paradoxa) as a potential harbour for pest animals (e.g., rabbits), Additionally, the plan includes biannual (minimum) inspections to detect other weed species that may be occur onsite. Inspections should focus on the following areas:

Near and downwind of previous weed infestation areas

- Around the dams and associated waterways onsite
- Roadways (driveway and along the northern site boundary with Walls Lane.
- Boundaries with adjoining properties and along fence lines
- Livestock stables and feeding areas
- Near sheds, tanks, stock yards and other structures
- Remnant areas of eucalypts, particularly in the southwest area of the site (Zone 3).
- Revegetation and garden areas (particularly in areas of new plantings where mulch or topsoil has been used)

Existing noxious weeds should be eradicated or at least contained. Methods such as hand pulling, mowing/slashing, mulching, selective grazing and spot spraying are recommended. In addition, stock are to be excluded from weed infested areas during periods when seeds are present, as this will control further spread. Use strategic grazing to reduce weeds density prior to spraying. Regularly inspect areas in which stock and fauna graze, treat new weed infestations before seed sets (becomes viable).

Minimum biannual inspections of the condition of pasture areas are also included in the Pest Plants Management Plan. Undesirable pasture weeds, including, capeweed (*Arcto theca calendula*), sorrel (*Rumex acetosa*), soursop (*Annona muricata*) will thrive where there is bare ground or gaps in the pasture. Maintaining the health of desirable pasture plants in accordance with the stock grazing and pasture renovation plan (Section 7.2) will assist them in outcompeting weed species for water, nutrients, and light. Measures include fertiliser application and/or irrigation at the start of the active growth period. Areas of bare ground may need to be resown. Adherence to the stock grazing plan will prevent overgrazing and help to minimise weed infestations. Also refer to *Weed Detection and Control on Small Farms* owners guide (2010) provided as Appendix 11.

TABLE 7: PEST PLANTS MANAGEMENT PLAN

Year	Weed & Action	Location	Timing / Frequency	Who	Technique	Target Completion
1	Spiny Rush – control existing plants	Zones 1	Commence within first quarter of site occupation.	Landowner	Manual removal / chemical	Year 1 end.
	Kangaroo Thorn – control existing plants	Zone 1	Commence within first quarter of site occupation.	Landowner	Manual removal	Year 1 end.
2-10	Manage outbreaks: – Spiny Rush & Kangaroo Thorn	Zone 1	As germination takes place	Landowner	Manual removal / chemical	Year end.
	General site inspection for weed detection & control.	Zone 1	Biannual	Landowner	Manual removal / chemical	Autumn, Spring
	General site inspection for pasture condition	Zone 1	Biannual	Landowner	Irrigate and fertilise as required. Resow gaps / bare ground.	Winter, Summer

11 Pest Animals

11.1 Description

No pest animals or evidence of pest animals (scats, burrows, dens, diggings, etc) were observed during the site inspection. Common pest animals including foxes and rabbits however may visit the site. It should be noted that this assessment was carried out on a single day in Winter 2023. The owners should monitor for sightings and evidence of pest animals and update the Pest Management Plan accordingly.

Under the Catchment and Land Protection Act (1994), Landowners have a responsibility to take all reasonable steps to prevent the spread of, and as far as possible eradicate established pest animals from their land. Foxes prey of livestock, native animals, and carry various endemic diseases (e.g., hydatids and mange).

Control of pest animals requires planning, persistence, and an integrated approach. The Pest Animal Management Plan provided in Table 8 provides control measures for potential pest animals that may be found onsite, including foxes, rabbits, and hares. The recommended control of Kangaroo Thorn (*Acacia paradoxa*) as part of the pest plants management plan (Section 10.2) will assist in limiting harbour for pest animals. For further advice consult the Department of Primary Industries and local Land Care groups.

11.2 Pest Animal Management Plan

TABLE 8: PEST ANIMALS MANAGEMENT PLAN

Zone	Pest animal species	Evidence found on site (burrows/dens, scats, diggings	Control method(s) for an integrated approach	Monitoring techniques	Timing of treatment/control	Treatment options over 3 years
1-4	Fox	No evidence observed during site inspect but may occur onsite.	Shooting, baiting, den fumigation & ripping, harbour removal, exclusion fencing	Observation	As required	As required
1-4	Rabbit	No evidence observed during site inspect but may occur onsite.	Baiting, ripping & harbour removal, fumigation, exclusion fencing	Observation	As required	As required

For further advice, visit:
https://agriculture.vic.gov.au/biosecurity/pest-animals/invasive-animal-management

12 Vegetation

12.1 Revegetation Plan

In consultation with the property owner, the following revegetation plan has been recommended for the property **(also refer to Appendix 8, Site Plan)**:

- Removal of high risks weeds and pest plants (within 12 months of site establishment).
- Plantation of approximately 128 eucalypts specific to the EVC (Appendix 10) across the site. Within Zone 1 and 2.
- Plantation of approximately 132 native shrubs specific to the EVC (Appendix 10) across the proposed conservation Zone 1.
- Native Grasses within the nominated conservation zones (Zone 1) along the waterways and around the dams (within 20m) to enhance the biodiversity of these zones and control erosion potential. This includes plantation of an effective under story and ground-cover, including 200 native shrubs, grasses, sedges, and rushes.
- No planting or establishment of any plant recognised by the Macedon Ranges Shire as an Environmental Weed is to occur outside of the domestic use Zone 3 (refer to Weeds of Central Victoria at www.mrsc.vic.gov.au).

The proposed revegetation plan is detailed in Table 9.

The species to be used are associated with the Ecological Vegetation Classes pertaining to the site (EVC 47: Valley Grassy Forest, and EVC 175: Grassy Woodlan), refer to the *Indigenous Flora Revegetation Species List* provided by the Macedon Ranges Shire Council for each EVC, Appendix 10. Local Landcare groups can also provide useful advice on species selection and sourcing of seed / tube stock.

Revegetation will encourage native wildlife to visit the property. If allowed to remain in place, leaf litter, fallen branches and timber will provide shelter sites. Revegetation around waterways will encourage use by frogs and birds. Spacing of trees and shrubs should be considered to avoid creating a large, dense impenetrable area. Dense vegetation is a higher fire risk than well-spaced vegetation. The mix of species selected for revegetation of the waterways and dams aims to provide appropriate layers of vegetation as recommended in Figures 4 and 5. A guide to revegetation along waterways published by Landcare Australia is provided via the following link:
https://www.greeningaustralia.org.au/wp-content/uploads/2017/11/GUIDE_A-revegetation-guide-for-temperate-riparian-lands.pdf

A guide to native flora of the Macedon Ranges is provided via the following link:

https://www.mrsc.vic.gov.au/files/assets/public/live-amp-work/environment/flora-of-the-macedon-ranges.pdf

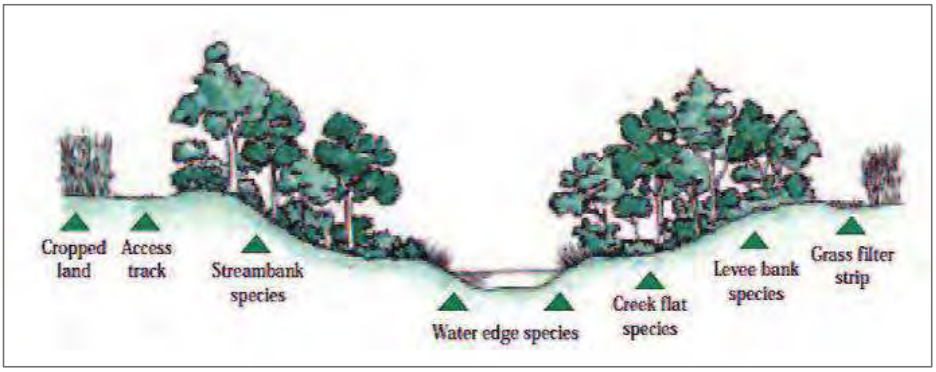

Figure 4. Vegetation structure recommended for waterways (source: Landcare Australia: *A Revegetation Guide for Temperate Riparian Lands*).

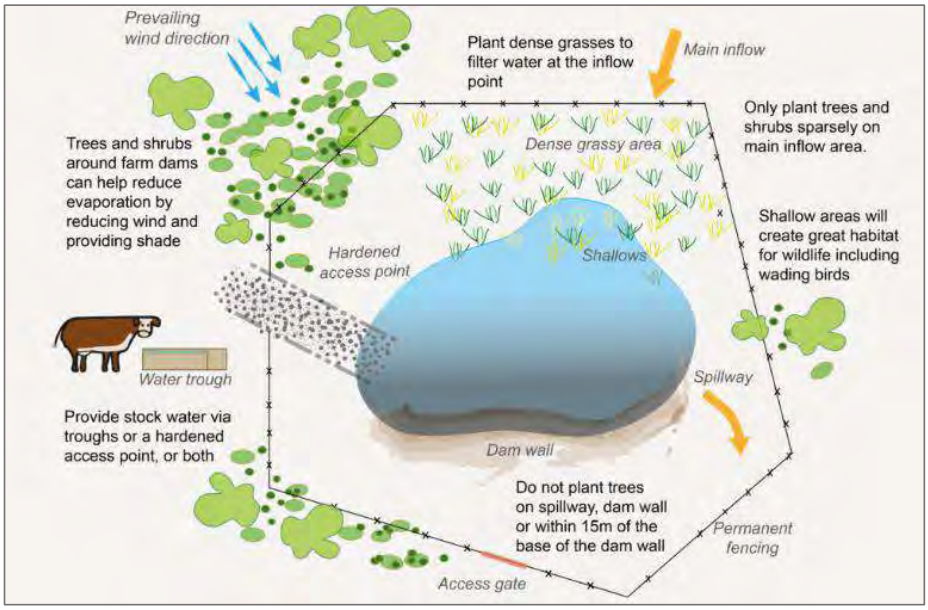

Figure 5. Vegetation structure recommended for dams (source: Sustainable Farms: *Enhancing Farm Dams)*.

Stock grazing is not to occur within the nominated conservation zones (Zone 1). The proposed zone of fenced grazing paddocks (Zone 2) will restrict stock access to these areas. In addition, stock will be excluded from existing native trees and new tree plantings within Zone 2 using post and rail fencing.

Weeds and pasture grasses will need to be spot sprayed prior to planting to reduce competition with tube stock. Once weeds show visible signs of brown off (dying) then individual holes can be made with mattock, crowbar or Hamilton Tree Planter. Seed / plant stocks for revegetation should be collected within or as close to the site as possible.

Where native vegetation removal is necessary for the proposed development a permit is required in accordance with the Vegetation Protection Overlay – Schedule 9 (VPO9). The permit application requirements are detailed in the planning scheme and include the following:

- Full details of the vegetation to be removed, lopped or destroyed, including species, age and number of plants to be removed or lopped.
- An assessment of the significance of the vegetation at a local level.
- Conclusive demonstration that works requiring the removal/lopping/destruction of the native vegetation are essential and consistent with Council's vision for the area.
- Details of the revegetation works planned to mitigate the loss of the vegetation proposed to be removed, lopped or destroyed.

Note : No native vegetation will be removed as part of this application.

TABLE 9: PROPOSED REVEGETATION PLAN					
Zone	Description	Estimated No. Plants	Example Species (per EVC)		Target Completion
			Common Name	Scientific Name	
Zone 1	Native revegetation within 20m of waterway and dam to prevent erosion and enhance biodiversity, and along site boundaries to improve visual amenity to and from the site.	51 Understory – medium shrub	Cats Claw Grevillea	*Grevillea alpina*	50% Complete by Spring year 1 Remaining complete Spring year 3
			Sweet Bursaria	*Bursaria spinosa*	
			Prickly Moses	*Acacia verticillata*	
		81 Understory – small shrub	Austral Indigo	*Indigofera australis*	
			Narrow-leaf Bitter-pea	*Daviesia leptophylla*	
			Dwarf Bush-pea	*Pultenaea humillis*	
		200 Groundcover – grasses/sedges /rushes	Kidney-weed	*Dichondra repens*	
			Spiny-Headed Rush	*Lomandra filiformis*	
			Stiped Wallaby Grass	*Austrondanthonia racemosa*	
			Com. Tussock Grass	*Poa labillardierel*	
		70 Boundary Trees	Wallangarra White Gums	Eucalyptus Scoparia	
Zone 1	Planting of eucalypt trees in the conservation zone (refer to Appendix 8, Site Plan).	10	Messmate Stringy Bark	*Eucalyptus obliqua*	Complete by Spring of year 3
Zone 3	Planting of native shrubs along driveway and house boundary to improve visual amenity.	30	Golden Wattle	*Acacia pycnantha*	
Zone 2	Planting of eucalypt trees within grazing zone (refer to Appendix 8, Site Plan).	8	Messmate Stringy Bark	*Eucalyptus obliqua*	
Zone 1	Planting of eucalypt trees in the conservation zone (refer to Appendix 8, Site Plan).	10	*River Red Gum*	Eucalyptus Camaldulensis	

13 Land Management Works Plan

The Land Management Works Plan described in Table 10 incorporates actions from the Pest Plant and Animal Management Plans (Sections 10.2 and 11.2) and the Revegetation Plan (Section 12.1). The Land Management Works Plan provides a perpetual table for the life of the property so future landowners have a management tool to maintain and enhance the biodiversity on the property. A reporting template for detailing the progress of the Land Management Plan is provided in Appendix 12. The landowner is to complete this document and submit to Council on an annual basis.

TABLE 10: LAND MANAGEMENT WORKS PLAN					
Zone	Action	When	Who	How	Target Completion
Year 1					
Zone 1	Weed Management: - Control existing Kangaroo Thorn pest plants	Commencing within Q1 following site habitation	Landowner	Manual removal	Complete within 12 months of site habitation
Zone 1	Weed Management: - Control existing Spiny Rush pest plants focusing on waterways and dams	Commencing within Q1 following site habitation	Landowner	Manual removal / chemical	Complete within 12 months of site habitation
Zone 2	Fencing: - Construct internal fencing for four equine grazing paddocks per site plan (timber post wildlife friendly design) - Construct exclusion fencing around existing eucalypt trees (timber post and rail design)	Completed before site habitation	Contractor	Contractor	Complete before site habitation
	Soil improvement: - Application of Calcipril® (granular lime) per soil improvement plan - Application of Single Superphosphate (SPP) and Muriate of Potash (MOP) fertilisers per soil improvement plan	Autumn	Landowner	Broadcaster	Autumn
	Soil improvement: - Application of Croplift® / Pasture Boosta® fertilisers per soil improvement plan	Spring	Landowner	Broadcaster	Spring
Year 2					
Zone 1	Revegetation: - Native revegetation within 20m of waterways and dams to prevent erosion and enhance biodiversity per revegetation plan	Spring/Autumn	Landowner	Tube Stock	Complete by Spring of year 3
Zone 2	Soil improvement: - Application of Calcipril® (granular lime) per soil improvement plan - Application of Single Superphosphate (SPP) and Muriate of Potash (MOP) fertilisers per soil improvement plan	Autumn	Landowner	Broadcaster	Autumn
	Soil improvement: - Application of Croplift® / Pasture Boosta® fertilisers per soil improvement plan	Spring	Landowner	Broadcaster	Spring
	Soil improvement: - Conduct soil testing to confirm soil quality. Revise soil improvement plan accordingly.	3 months after last fertilizer application	NATA Accredited Laboratory	NATA Accredited Laboratory	Year end

TABLE 10: LAND MANAGEMENT WORKS PLAN					
Zone	Action	When	Who	How	Target Completion
Year 3					
Zone 2 & 3	Revegetation: - Planting of native shrubs (~30 total) along the driveway and house fencing (70 native Eucalpts to site boundaries to improve visual amenity to and from the site.	Spring/Autumn	Landowner	Tube Stock	50% Spring year 1 Complete by Spring of year 3
Ongoing Actions					
Zone 1	Inspect site for evidence of pest animals (e.g., foxes, rabbits, etc.) and initiate appropriate controls (if required). Update Pest Animal Management Plan as required.	Where observed	Landowner / Contractor	Observational – integrated approach (refer to Section 11).	Yearly basis
Zone 2	Monitor condition of existing fencing and repair as necessary to prevent stock grazing in conservation zones (Zone 1)	Quarterly	Landowner	Observational	Quarterly basis
Zone 2	Monitor condition of existing fencing and repair as necessary to facilitate restriction of movement of stock according to the grazing rotation schedule and to prevent overgrazing in a single paddock	Quarterly	Landowner	Observational	Quarterly basis
Zone 1	Monitor site for weed species and general growth. Act accordingly to control	Spring/Autumn	Landowner	Observational / manual removal	Biannual basis
Zone 2	Monitor pasture areas and promote pasture health through fertiliser application & irrigation. Resow gaps / bare areas as required.	Winter/Summer	Landowner	Observational	Biannual basis

14 Land Management Measures – Construction Phase

14.1 Proposed Development

This section should be read in conjunction with site plans and the Site Map, refer to Appendices 1 & 2. The LMP for the Construction Phase of the site considers the proposed single-story four-bedroom dwelling with shed, and the construction of the driveway from Walls Lane.

14.2 Potential Impacts

14.2.1 Construction phase

Impacts 1 to 5 are from Local Government Infrastructure Design Manual (2017).

1. Erosion and sediment discharge
2. Dust impacts neighbours or visibility on public road
3. Noise impacts neighbours
4. Importation of contaminated fill or weeds
5. Environmental incident or safety incident occurs
6. Unauthorised removal of vegetation/ native vegetation
7. Soil disturbance/compaction in proposed effluent disposal area
8. Spill of fuel or oil contaminates soil

14.3 Design Phase

The following considerations should be made during the design phase of the project:

- Approvals: Local government
- Liaise with service providers in planning phase (electricity, telecommunications, storm water)
- Prepare a list of contact numbers for incident reporting (EPA, Worksafe Victoria, Local Council, the Public Liability Insurer of the property or works)
- Provide water and fire-fighting equipment for immediate suppression of ignitions
- Plan access and turning space for trucks and emergency vehicles
- Plan access tracks to follow land contour
- Site tracks and buildings to minimise removal of native vegetation and minimise cut/fill works
- Cluster buildings together to minimise visual impact
- Plant visual screen(s) to protect neighbourhood views
- Engineering soil tests required for design of foundations
- Plan size and siting of rainwater tanks to take advantage of roof run-off

14.4 Permits and the like that may be required by property owner or contractor

- *Building Permit* (Council)
- *Planning Certificate* (Council)
- *Septic Tank Permit* (Council)

14.5 Management Controls – Construction Phase

The following controls are consistent with AS3798-2007: *Guidelines on Earthworks for Commercial and Residential Developments* and, where considered applicable, EPA Publication 1834, *Civil Construction, Building and Demolition Guide*. Information about safety can be found on the WorkSafe Victoria website.

14.5.1 Summary of the risks:

The erosion risk during the construction phase is considered minimal due to the lack of slope at the development site. Risks include unauthorised or accidental removal of vegetation during earthworks, importation of weed seeds on contaminated machinery or in poor quality fill or topsoil.

14.5.2 Controls

Stormwater Management

Off-site stormwater should be diverted away from the construction site. This can be done by constructing diversion banks and intercept drains around the site and ensuring that the water discharging from these structures is not causing erosion.

Controls to manage onsite stormwater include:

- Pre–plan and install erosion controls before commencing work.
- Stabilise drains using grasses, matting or rock armouring.
- Stripped areas and stockpiles are more easily eroded than undisturbed soil. Install drains to divert waters from these areas.
- Construct drains to slow sheet water flows across exposed areas, by following contours and using rock beaching and check dams.
- Stockpiles should be located away from natural drainage lines.
- Minimise continuous slopes where flowing water can scour.
- Any natural drainage lines that discharge water up-slope of works should be directed to grass areas by intercept drains.
- Perimeter banks or sediment fences should also be constructed at the toe of the slope to contain sediment run-off.
- After works are completed, on-site inlets should not be connected until the site has been stabilised and rehabilitated. By doing this, silt-laden stormwater cannot escape the site via this route and pollute surface waters and will be treated onsite.

Soil Stockpile Management

Stockpiles and batters are a potential source of dust and sediment run-off. Soil stockpile management measures include:

- Locate stockpiles away from drainage lines to where they are protected from wind.
- Locate stockpiles at least 50m from waterways where possible.
- Locate stockpiles at least 2m from vegetation.
- Ensure stockpiles will not be driven over as part of construction works.

- For topsoils, retain the top 50mm to 150mm (as a guide) as it contains the most organic component of the topsoil.
- Minimise the number and size of stockpiles.
- Keep topsoil separate from subsoil stockpiles.
- Construct the stockpile with no slope steeper than 2:1 (horizontal to vertical). A less steep slope may be required where the erosion risk is high.
- Mulch, roughen and seed with sterile grasses any batter or topsoil stockpile which is to be maintained for longer than 28 days.
- Treat subsoil stockpiles in the same way, but check whether they need a layer of topsoil to provide a media for grass seeds before seeding.
- Circle all unstabilised stockpiles and batters with silt fences or a drainage system that will collect and correctly dispose of contaminated water.
- Hand water or install temporary sprinklers to suppress dust from unstabilised stockpiles and batters.
- Finish and contour any stockpiles located on a floodplain so as to minimise loss of material in a flood or rainfall event.

Dust Control

Dust has the potential to result in; detrimental effects on the health and amenity of neighbours and employees, reduced visibility, increased wear on machinery and equipment, pollute water, complaints from neighbours and OH&S issues.

Prevent the generation of dust in preference to applying dust suppression measures.

Water used for dust control – special conditions

- For recycled water, use water treated to class A standard where possible.
- Recycled water treated to class B, or C will have environmental and health implications, and special controls must be implemented before and during use.
- As a suggested contingency plan; for areas that do not have access to a reticulated water supply, water stored on-site should never be less than 2,000 litres per hectare of disturbed land surface.
- Ensure water use does not create contaminated run-off that will contaminate surface waters.

Dust Control - suggested measures of management

- Retain existing vegetation; ensure that the area of cleared land is minimized
- Grassing exposed areas including stockpiles, use native grass, domestic species or sterile rye where appropriate.
- Mulch areas using wood chips or straw.
- Progressive revegetation.
- Avoid driving over stockpiled topsoils.
- Roughen surface of exposed soil with a plough to reduce wind speed across the surface
- Employ a paved parking area.
- Exits and high traffic areas should be paved with gravel.
- Spray water on exposed areas with water carts, sprinklers and handheld hoses (ensure no runoff to water ways).

- Use dust suppressant products to form a crust on exposed areas.
- Cover all loads of soil being taken off site for disposal.
- Restrict vehicle movement.
- Restrict earthworks and vehicle movement activities during dry windy conditions.
- Stabilisation/erosion control matting on exposed areas.
- Cover stockpiles and locate them where they are protected from wind.
- Construct wind breaks such as wind fences using shade cloth.
- Stop work may be necessary in dry windy conditions due to effects on neighbours.

Waste Management

Use the following hierarchy for waste management, with avoidance being most preferred and disposal least preferred.

To identify opportunities for improving waste management it is necessary to consider all aspects of the project and the wastes it generates. Wherever possible, include performance measures and targets for avoidance, reuse and recycling options in site environmental management.

Waste Minimisation – suggested measures:

Avoidance and reduce

- Use recycled materials.
- Obtain construction materials, paints, lubricants and other liquids in reusable packaging or containers.
- Don't over order materials.
- Negotiate with suppliers to take back any materials that are not used.
- Use prefabricated materials.

Reuse

- Appropriate reuse of contaminated soil on site.
- Use subsoil to construct temporary noise barriers.
- Appropriate use of water out of sediment dams for dust suppression.
- Appropriate reuse of fill material.
- Clean topsoil may be retained at the end of earthworks. The top 150 mm contains valuable organic components to assist revegetation.
- Safety, survey and other equipment should be collected and reused on other sites or future stages.

Recycling

- Choose noise barriers and sediment controls made from recycled materials.
- Send waste concrete from demolition activities to a concrete recycler instead of landfill.
- Segregate and recycle solid wastes generated by construction activities, offices and mess-rooms.
- Collect lubricating oil from the construction vehicle fleet and arrange for collection by a recycler.

- Where possible select products for purchase that have been produced from recycled materials. For example, recycled crushed concrete may be appropriate for use on subdivision sites as aggregate for road base.
- If trees need to be removed, mulch for use on site.

Recovery of energy

- Some waste oils that can't be recycled have high calorific value and can be collected by a licensed vehicle or taken to a licensed facility to be blended into fuel.

Treatment

- Waste that cannot be avoided, reused or recycled may need to be treated or stabilized before sending off site.

Containment

- Short term storage of used oils in a bunded area.
- Short term storage of other materials, including soils, until solutions become available.

Disposal

- Wastes that have no other option must be transferred to an appropriate landfill licenced to receive that waste (industrial waste, prescribed waste, including contaminated soils).
- Vehicles must be permitted for transporting prescribed industrial waste.

Clean fill soil

- Clean fill is;
    - Soil consisting of clay, silt, sand, gravel and rock of naturally occurring materials, and
    - DOES NOT contain chemical substances in concentrations more than "fill material" as defined in EPA Victoria guideline 1828.2 *Waste Disposal Categories – Characteristics and Thresholds*, Table 3. See the following link: https://www.epa.vic.gov.au/about-epa/publications/1828-2
    - DOES NOT include any other materials such as concrete, brick, pipe, plastics, metal pieces wood or organic matter.
- An assessment of soil, including site history will determine whether the soil material has been contaminated as a result of industrial, commercial, construction or agricultural activities, or contaminated with manufactured chemicals.
- Soils that have elevated levels of metals (such as arsenic) or other constituents, that can be demonstrated to be of natural origin, may be classified as fill material. Approval from EPA is required for these cases.

- When using clean fill:
    - Assess the risks (air, land and water) at the receiving site (eg risk of dust and risk to surface water through erosion).
    - Seek authorisation from local council to receive, and store clean fill soil.
    - EPA recommends fill material generators and receivers collate the same information as a site receiving contaminated soils. This provides certainty and evidence that they are only receiving fill material.

- Exemptions may be granted by EPA where the proposal is for genuine substitution of another resource. Environmental management plans to prevent unacceptable risk of damage to the environment will be required as a condition of an exemption.

Solid inert wastes

Solid inert waste found on construction sites usually consist of building rubble, but may also include demolition material, concrete, bricks, timber, plastic, glass, metals, bitumen and trees. Such wastes should be recycled or disposed to a landfill licensed to take such wastes. Designate a stockpile area or use a skip to store solid waste until a sufficient amount has accumulated for removal.

Washings, residues, slurries, and other water contaminated by wash up

Wash up materials including drilling tailings, concrete, paint and brick cutting slurry in a designated area.

Washings/slurry from concrete trucks is frequently the key material that requires a disposal area on a civil construction site. Run-off contaminated with concrete is of environmental concern as it is alkaline. Designate an area on site for concrete trucks to be washed out with the following characteristics:

- The area should be located away from drainage lines, stormwater inlets, waterways, areas of significant flora and fauna and other sensitive areas identified on site.
- The area should be appropriately bunded to contain all contaminated water from washing up.
- Placing this area near the site exit will encourage drivers to use it due to accessibility (i.e. they must pass it on the way out). It may be necessary to notify the concrete supplier to inform their drivers of the presence of the wash out area. It is often impractical to inform every driver that comes on site.
- It may be necessary to sign the area for easy identification by subcontractors.
- Small amounts of concrete washings/slurry may be placed on an impervious liner until the water evaporates. Concrete residue may then be disposed of as solid waste (VSAP Building Construction Sites Project Group, 2003).

In the event that painting, brick cutting, or other items require wash up, resulting in contaminated run-off, the designated area can also be utilised.

Litter

Litter is often caused by thoughtlessness and the unavailability of suitable litter bins on the construction site. To ensure that all litter is disposed of in a responsible manner, and is not released into the environment the following measures are suggested.

- Maintain a high quality of housekeeping and ensure that materials are not left where they can be washed or blown away to become litter.
- Provide bins for construction workers and staff at locations where they consume food.

- Ensure that all bins and disposal facilities have correctly fitting secure lids to prevent material blowing away or being accidentally tipped out.
- Site inductions to emphasize the need to avoid littering.
- Reinforce the understanding that cigarette butts are litter and need to be disposed of correctly.
- Install fencing about the site to trap wind-blown litter.

Chemical Storage & Handling

Chemical spills on site have the potential to contaminate (pollute) land, surface water and groundwater. The pollution may be harmful to the health of human beings, harmful to flora and fauna and detrimental to beneficial use of land and waters. The environmental protection measures outlined in this section may be used to mitigate these effects.

Storage Area

Chemicals and fuels should always be stored in an area where spills can be contained and safely removed without causing any environmental damage.

Chemicals and fuels should be located away from drainage lines, stormwater inlets, waterways, areas of significant flora and fauna and other sensitive areas. When designing chemical and fuel storage areas, the gradient of the site and the potential flow pathways to the sensitive areas should be taken into account. As an absolute minimum, chemicals and fuels should be stored at least 10 m away from any sensitive areas.

Bunding

Bunding provides a secondary containment measure in the event of a spill. Bunded areas should have the following characteristics:

- Materials should be impervious to and compatible with the chemicals to be contained.
- The floor should be graded towards a sump to enable collection of spilt material.
- Incompatible chemicals should not be stored together in the same bunded area.
- The area should be covered where possible to minimise ingress of rainwater.
- Where the area is not covered the bund height should be greater than150 mm.
- The capacity of a bunded area containing tank/s should be sufficient to hold 100 per cent of the capacity of the largest tank, plus 10 per cent of the capacity of the second largest tank.
- The capacity of a bunded area for refuelling should be 100 per cent of the largest compartment of any tank vehicle using the facility.
- Ramps or roll-over bunds should be used where vehicle access is required into the bunded area to maintain effective bund height.
- Run-off should be diverted away from the bunded area and any ponding in the bunded area should be regularly disposed. (EPA ,1992).

Earth bunds are often utilised due to their cost effectiveness and ease of construction. However, in the event of a spill the spilled liquids must be quickly cleaned up with absorbent materials to ensure the spilt material does not leach into the groundwater and contaminated soil within the bund must be disposed of or treated. Other bunding material (i.e., concrete, steel, rubber) may be used, dependant on type of stored liquids and site limitations.

Lightweight, portable bunds may be useful for multi-stage sites requiring an impervious bunded area. They can be easily moved to different locations as site works progress, without incurring costs of constructing permanent bunds. Portable bunds must be stored on level ground when not in use so as not to compromise the bund capacity.

Refuelling / Maintenance Areas

Mobile refuelling

It may not be practical for some sites to have a designated refuelling area. In these cases, as a minimum ensure that:

- Refuelling does not take place near drainage lines, stormwater inlets, waterways, areas of significant flora and fauna and other sensitive areas identified on site.
- Portable bunds are used to contain any spills from transfer pumps, valves and hose connections.
- A suitable spill kit is kept on the fuel truck or the site spill kit is kept within 10m of refuelling activities.

Spill clean up

- Clean up all spills immediately to ensure that:
  - the contamination is not spread around the site increasing volume of contaminated material; and
  - the spilt material does not infiltrate into the ground and contaminate the groundwater.

Spill kits

- Spill kits should be kept on sites where chemicals will be stored.
- The spill kit should be kept approximately 10 m away from the chemical storage area so that it is accessible in the event of a spill, but safely out of the range of spills.
- Common components of spill kits include; booms, pads, pillows, socks, rolls, floor sweeps, gloves and disposal bags. These items may be contained in wheelie bins, bags, buckets, or drums.
- Different spill kits are designed to absorb different materials. Ensure that the spill kit selected for the site is designed to treat the types of chemicals that are stored on that site.
- If a fuel truck without a spill kit on board is periodically on site, the site spill kit should be kept within 10 m of the fuel truck while it undertakes refuelling activities. As a general rule it is far easier to keep a spill kit on the fuel truck, than to transport the site spill kit around when a fuel truck is on site.

Training of staff in the event of spill

A minimum of two people on site should be trained to act in the event of a spill and should be made familiar with:

- The types of chemicals stored on site and their appropriate methods for clean up if spilt.
- Location and content of the Safety Data Sheets (SDS).

- Components and appropriate use of spill kits and clean up measures if a spill kit is not used.
- Whom to contact in the event of a spill which could not be contained and may cause pollution.
- Methods of disposal of spilt materials.
- Incident reporting.

Disposal of material affected by spills
Where possible collect and reuse spilt materials. Where this is not practical or if the material is contaminated, collect the spilt material, any material used to absorb the spill and any soil or other materials contaminated by the spill, and dispose of these in accordance with the Waste Management section above.

Fire Contingency

Firefighting contingencies will be subject to site location, availability of firefighting equipment and site access. To minimise the risk of a fire being started on site works during periods of high fire danger will be minimal. Storage of chemicals and fuels onsite will be subject to the type of works and minimised where possible.

The potential for a fire to start on a works area, particularly in rural areas can be fairly high. These can start from sparks from cutting equipment, driving and parking of vehicles in tall grass and numerous other reasons. Fire can be a problem not just to the safety of the people on site but to neighbours and in extreme circumstances to large areas. No high risk activities will be undertaken on site.

Fire Management- suggested measures:

- All staff should be aware of the declared Fire Danger Period
- Monitoring of weather conditions should be done to avoid undertaking works during periods of high fire danger such windy or very hot days.
- Adequate fire suppression equipment should be on site
- Areas should be cleared around generators and areas where cutting equipment is used
- Site induction procedures should include training in the use of fire suppression equipment.
- All fire suppression equipment should be inspected for serviceability of a daily basis.
- The contact numbers for the local fire authorities should be supplied to site supervisor.

Weeds

Weeds, pest animals and pathogens are major threats to native biodiversity because of their ability to change and destroy habitats and ecosystems. They are the number one cause of native animal extinctions in Australia, the second biggest threat to rivers streams and wetlands, and the third biggest threat to threatened ecosystems.

Noxious Weed Management – suggested measures

- Be trained in the identification of noxious weeds and how they spread.
- Establish and monitor entry and exit points, and wash down areas for weeds on vehicles and machinery.

- All plant and vehicles entering the site should be cleaned or washed prior to entry.
- Plan works to progress from clean areas to infested areas.
- Avoid driving through infested areas particularly at high risk times such as seeding.
- Remove any noxious weeds before stockpiling soil or other materials.
- Use a removable screen over light vehicle grills to prevent seeds lodging in internal parts such as the radiator.
- Turning points should be within the site works or planned where no damage will be done to the natural vegetation.

Wash Down and Machinery Hygiene

- Use high pressure washer, air blast, vacuuming and physical removal.
- Cleaning site selection should be close to entry and exit points and clear of watercourses and drainage lines.
- Contaminants and waste are best destroyed at the site of incidence.
- Permits are required for off-site disposal of waste.
- Use machinery logbooks as best practice.

15 References

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Environmental Protection Authority Victoria (2008b), Publication 884.1 *Greywater Use around the Home*.

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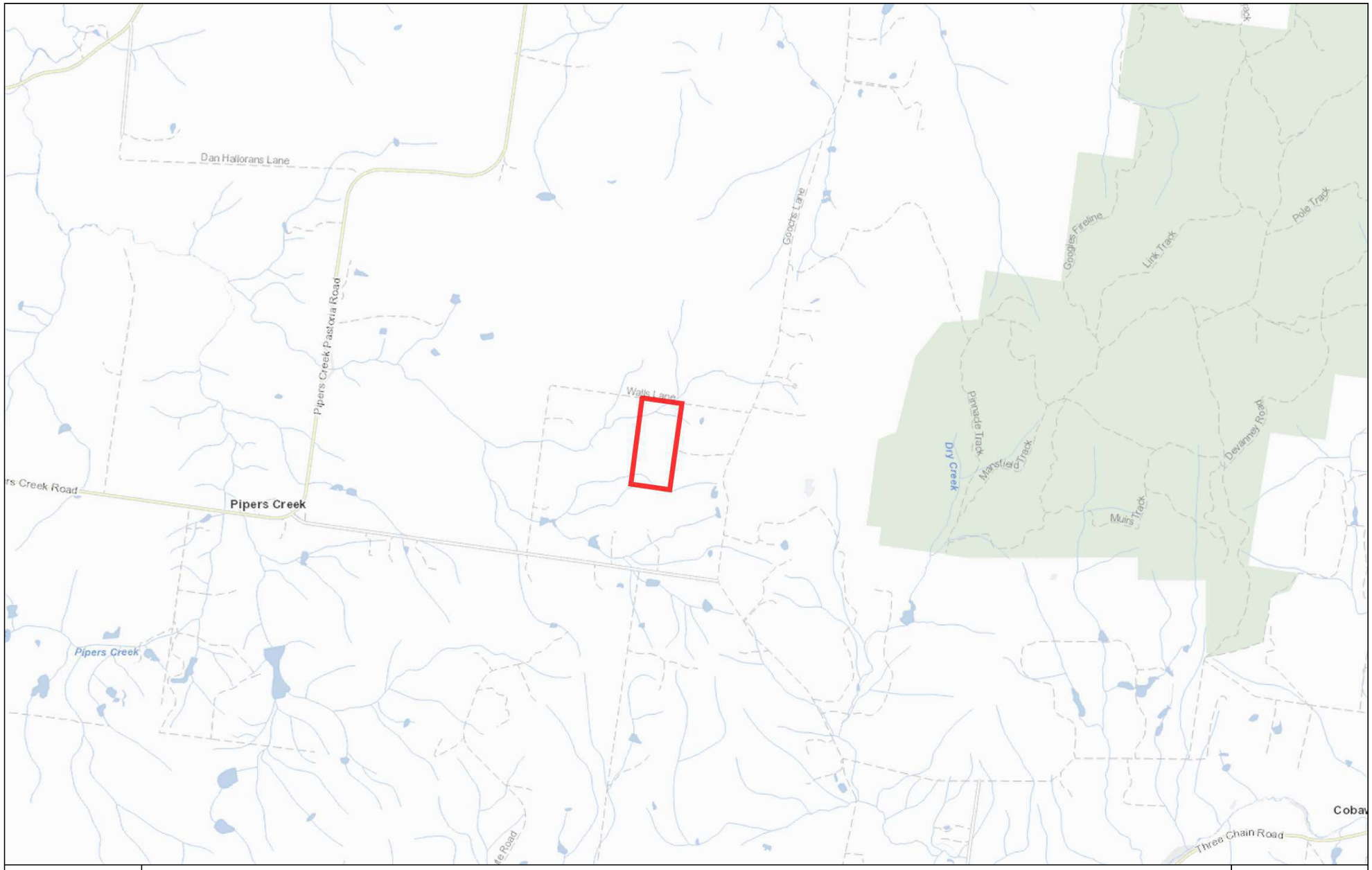
Sindel, B., & Coleman, M.(2010) Weed Detection and Control on Small Farms – A Guide for Owners, University of New England.

Appendices

Appendix 1.

Site Locality Map



Co-ordinates of Plot Corners	Data Source: Vicmap Property	Co-ordinates of Plot Corners
NW 280138,5877859	0 200 400 600 800 1000 1200 1400 1600 1800 2000m	NE 289832,5878064
SW 280268,5871737	Scale of Metres (1:25,000)	SE 289961,5871943
MGA Zone 55	MGA Zone 55 Vicroads- 415 B2 (ed.8) Created 01:03 PM on Sep 7, 2023	MGA Zone 55

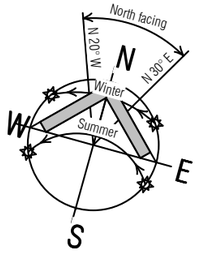
WARNING: No warranty is given as to the accuracy or completeness of this map. Dimensions are approximate. For property dimensions, undertake a Title search.

Co-ordinates of Plot Corners	Data Source: Vicmap Property	Co-ordinates of Plot Corners
NW 283866,5875409	0 50 100 150 200 250 300 350 400 450 500m	NE 285804,5875450
SW 283892,5874184	Scale of Metres (1:5,000)	SE 285830,5874225
MGA Zone 55	MGA Zone 55 Vicroads- 415 B2 (ed.8) Created 01:02 PM on Sep 7, 2023	MGA Zone 55

WARNING: No warranty is given as to the accuracy or completeness of this map. Dimensions are approximate. For property dimensions, undertake a Title search.

Appendix 2.

Proposed Development Plans



Note:

All measurements must be verified on site prior to commencement of any works.

All contours & levels indicated on plan are approximate only & must be verified on site prior to commencement of any works.

Stormwater to be connected to legal point of discharge to local authority approval. Plumbing contractor to determine exact location of stormwater on site.

Sewerage to be connected to legal point of discharge to local authority approval.

The builder & subcontractor shall ensure that all stormwater drains, sewer pipes & the like are located at a sufficient distance from any buildings footing & / or slab edge beams so as to prevent general moisturepenetration, dampness, weakening & undermining of any building & its footing system.

No native vegetation will need to be removed for the construction of proposed works.

All rainwater heads & downpipes to be in accordance with PART 3.5.2 of the NCC Vol. II & AS3500.3

All roof penetrations shall be sealed & flashed in accordance with manufacturers specifications & relevant standards.

External finished surfaces must be drained away from the building and graded to give a slope of not less than 50mm over the first 1m from the building in accordance with Clause 3.1.3 of the NCC2019 to avoid surface water ponding against buildings.

Wind classification: N3

Bushfire Attack Level (BAL): BAL-12.5

1 SITE PLAN
1 : 3000

Woodend Building Design Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au Registered Architect : Paul Youngs 17573	COPYRIGHT © DO NOT SCALE THESE DRAWINGS	PROJECT TITLE: Proposed Residence SHEET TITLE: SITE PLAN	CLIENT: Nathan & Kat Matsinos PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DRAWN BY: PY	CHECKED BY: PY	SCALE: 1:3000 @ A3	SHEET: 1 of 7	SHEET No: TP01 JOB No: W230803
				DATE: 24th August 2023				

1 DETAILED SITE PLAN

1 : 400

Woodend Building Design Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au Registered Architect : Paul Youngs 17573	COPYRIGHT © DO NOT SCALE THESE DRAWINGS	PROJECT TITLE: Proposed Residence SHEET TITLE: DETAILED SITE PLAN	CLIENT: Nathan & Kat Matsinos PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DRAWN BY: PY DATE: 24th August 2023	CHECKED BY: PY	SCALE: 1:100 @ A3	SHEET: 2 of 7	SHEET No: TP02 JOB No: W230803

Woodend Building Design
Building Design Consultants
Ph: (03) 5427 4272
Email: plans@wbdg.com.au
Office 3 / 93 High Street, Woodend
Registered Architect : Paul Youngs 17573

This is sheet _____of___drawing reffered to in the contract
DATE:
BUILDER:
PROPRIETOR:

PROJECT TITLE:
Proposed Residence

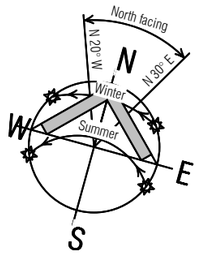
SHEET TITLE:
PROPOSED FLOOR PLAN

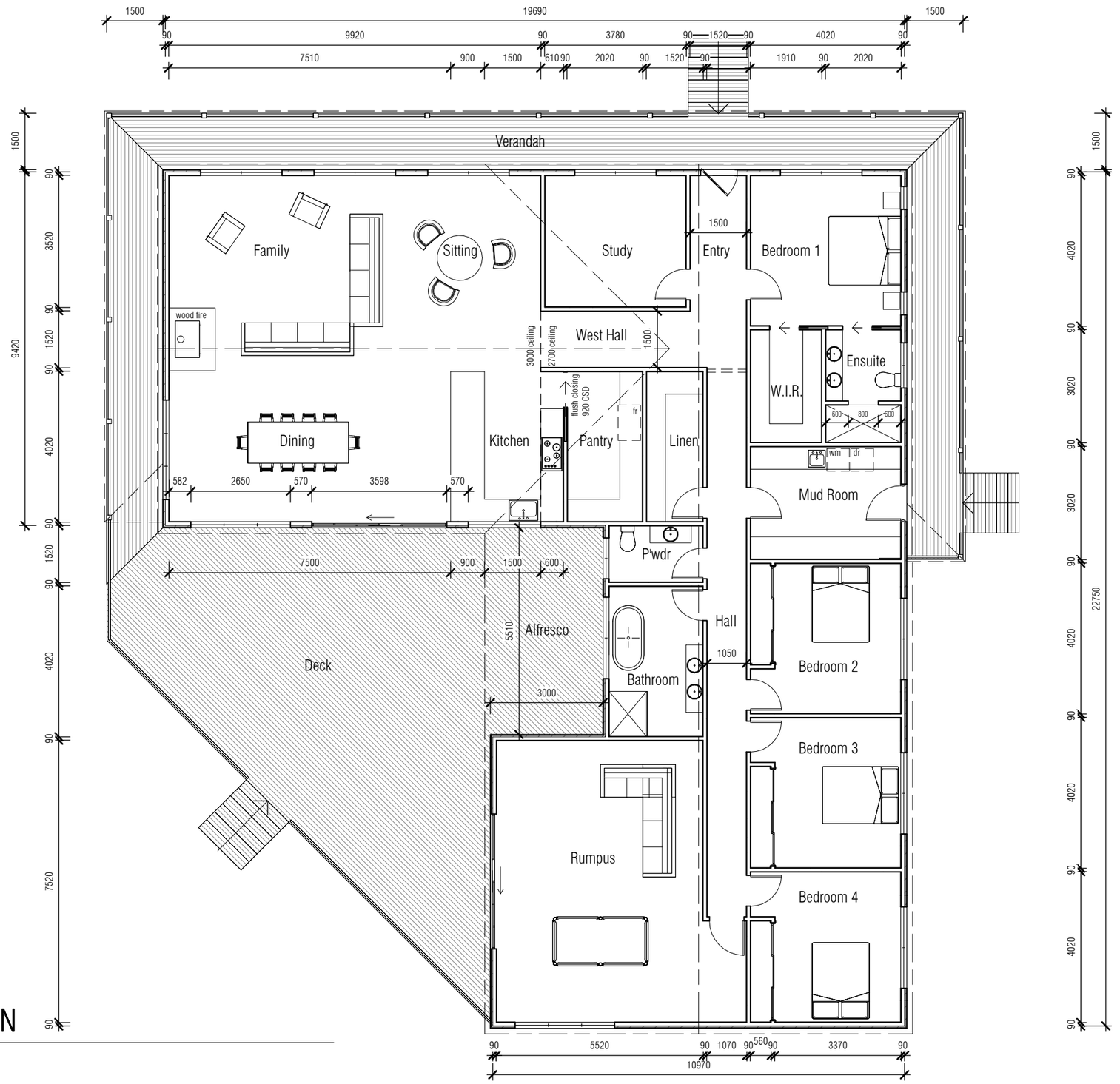
PROJECT ADDRESS:
Lot 4, Walls Lane, Pipers Creek

CLIENT: Nathan & Kat Matsinos
SHEET: 3 of 7

DRAWN BY: PY
CHECKED BY: PY
SCALE: 1:100 @ A3
SHEET No: TP03

DATE: 24th August 2023
JOB No: W230803





Area Schedule		
Name	Area	Squares
Proposed Dwelling	324.86 m²	34.97
Proposed Decking	82.48 m²	8.88
Proposed Verandah	63.94 m²	6.88
Proposed Alfresco	16.53 m²	1.78
Total	487.81 m²	52.51

1 PROPOSED FLOOR PLAN
1 : 100

1 NORTH ELEVATION

1 : 100

External Finishes and Colour Schedule

Colorbond Roofing & Gutters
Shale Grey

Weatherboard Cladding
Taubmanns 'Country Beige'

Trim, Windows and Plinth Cladding
Taubmanns 'Aspen Snow'

2 EAST ELEVATION

1 : 100

Woodend Building Design Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au Registered Architect : Paul Youngs 17573	COPYRIGHT © DO NOT SCALE THESE DRAWINGS	PROJECT TITLE: Proposed Residence SHEET TITLE: NORTH & EAST ELEVATION	CLIENT: Nathan & Kat Matsinos PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DRAWN BY: PY	CHECKED BY: PY	SCALE: 1:100 @ A3 DATE: 24th August 2023	SHEET: 4 of 7	SHEET No: TP04 JOB No: W230803

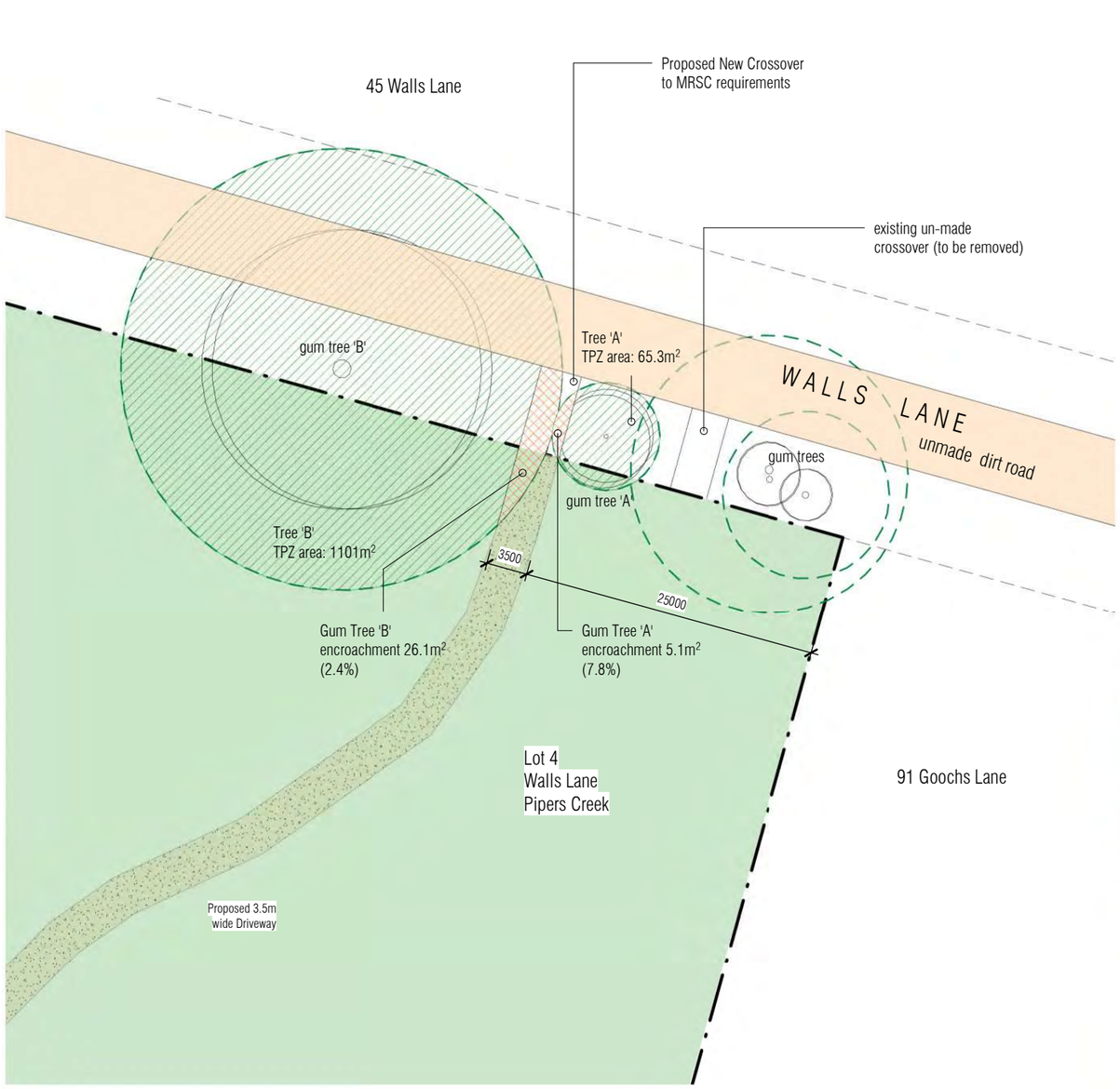
1 SOUTH ELEVATION
1 : 100

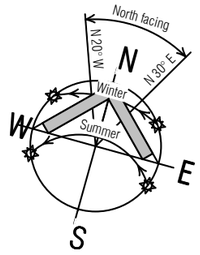
2 WEST ELEVATION
1 : 100

Woodend Building Design
Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au
Registered Architect : Paul Youngs 17573

PROJECT TITLE: Proposed Residence	CLIENT: Nathan & Kat Matsinos	DRAWN BY: PY	CHECKED BY: PY	SCALE: 1:100 @ A3	SHEET: 5 of 7	SHEET No: TP05
SHEET TITLE: SOUTH & WEST ELEVATION	PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DATE: 24th August 2023				JOB No: W230803


WBD
Woodend Building Design





1 CROSSOVER DETAIL PLAN

1 : 400

Woodend Building Design Office 3 / 93 High Street, Woodend P: (03) 5427 4272 E: plans@wbdg.com.au Registered Architect : Paul Youngs 17573	COPYRIGHT © DO NOT SCALE THESE DRAWINGS	PROJECT TITLE: Proposed Residence SHEET TITLE: CROSSOVER DETAIL	CLIENT: Nathan & Kat Matsinos PROJECT ADDRESS: Lot 4, Walls Lane, Pipers Creek	DRAWN BY: PY	CHECKED BY: PY	SCALE: 1:400@A3 DATE: 24th August 2023	SHEET: 7of 7	SHEET No: TP07 JOB No: W230803

Appendix 3.

Site Inspection Photographs (23/08/2023)

		
1. Site access from Walls Lane, looking south into the site.	2. Taken from site entrance, looking west along Walls Lane (unsealed, gravel all-weather road).	3. Taken from site entrance, looking east along Walls Lane (unsealed, gravel all-weather road).
		
4. Within the site, looking west along northern site boundary with Walls Lane. Walls Lane lined with mature Eucalypts.	5. View out of site (east) towards Cobaw State Forest. Taken near site entrance from Walls Lane.	6. Mature eucalypt located in the northeast section of the site.

7. View out of site, looking north towards Walls Lane and adjoining rural property.

8. Dam located in the northeast section of the site. The dam extends beyond the eastern site boundary into the adjoining property.

9. Dam from image 8, looking southeast towards the eastern site boundary.

10. Spiny Rush (*juncus acutus*) observed on the banks of the eastern dam from images 8 & 9.

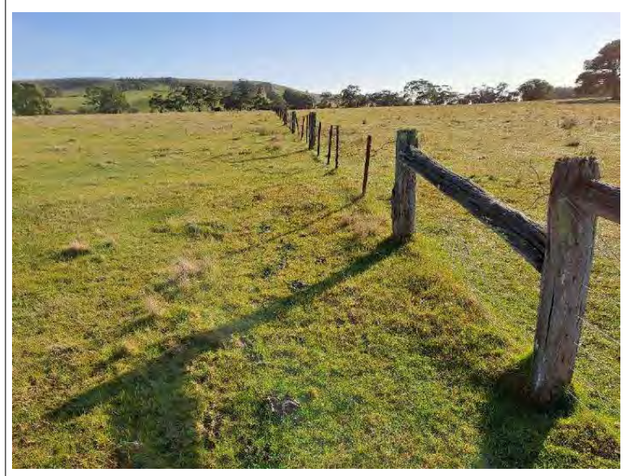
11. View north across the site towards the eastern dam and Walls Lane.

12. Evidence of previous cattle grazing onsite (cow pats) observed across the site.

		
13. Rock outcrop observed along the eastern site boundary.	14. Pine trees within adjoining property overhanging the eastern site boundary. Looking south.	15. Eastern site boundary, looking north. Post and wire fence line in reasonable condition.
		
16. Taken from eastern site boundary, looking west across the site.	17. Fallen timber observed near the eastern site boundary. Potential habitat for native fauna.	18. Fallen timber observed near the eastern site boundary. Hollow providing potential habitat for native fauna.

		
19. Waterway entering the site from the eastern boundary and trending west.	20. Southern section of the site, looking west. Several mature eucalypts observed.	21. Southern section of the site, looking southwest. Several mature eucalypts observed.
		
22. Southern site boundary, looking west. Post and wire fence line in reasonable condition.	23. View out of site (south) into adjoining rural property.	24. Upright dead trees observed near the southern site boundary. Potential habitat for native fauna.

		
25. Fallen timber observed near the southern site boundary. Potential habitat for native fauna.	26. Fallen timber observed near the southern site boundary. Potential habitat for native fauna.	27. Waterway entering site from the southern boundary and trending northwest.
		
28. Spiny Rush (*juncus acutus*) observed along the southern waterway.	29. Taken from the southwest corner of the site, looking south into adjoining property. Revegetation corridor observed.	30. Taken from the southwest corner of the site, looking north along the western site boundary. Post and wire fence line in reasonable condition.

		
31. Taken from southwest corner of the site, looking east along the southern site boundary. Post and wire fence line in reasonable condition.	32. Dam onsite located in the southwest section of the site. The dam extends beyond the western site boundary into the adjoining property.	33. Evidence of minor erosion along the southern waterway feeding into the dam from image 32.
		
34. Spiny Rush (*juncus acutus*) observed along the southern waterway feeding into the dam from image 32.	35. Waterway exiting the site at the western site boundary.	36. Internal section of post and wire fencing running N-S along the centre of the site. Looking north.

		
37. Western site boundary, looking south. Post and wire fence line in reasonable condition.	38. Kangaroo Thorn (*acacia paradoxa*) observed within the adjoining property (west).	39. Northern waterway exiting the site at the western site boundary.
		
40. Spiny Rush (*juncus acutus*) observed along the northern waterway near the western site boundary.	41. Taken from the northwest corner of the site, looking east along the site boundary with Walls Lane.	42. Mature eucalypt observed in the northeast section of the site.

43. Spiny Rush (*juncus acutus*) observed near the eucalypt from image 42.

44. Kangaroo Thorn (*acacia paradoxa*) observed near the eucalypt from image 42.

45. Spiny Rush (*juncus acutus*) and Kangaroo Thorn (*acacia paradoxa*) observed near the northern site boundary.

46. Kangaroo Thorn (*acacia paradoxa*) observed near the northern site boundary.

Appendix 4.

Bioregion Map

Source: DELWP NatureKit 2023

BIOREGION MAP - Walls Lane, Pipers Creek

Legend

Victorian Bioregions Shaded

- 1.1 Lowan Mallee (LoM)
- 1.2 Murray Mallee (MuM)
- 1.3 Wimmera (Wim)
- 2.1 Glenelg Plain (GleP)
- 2.2 Bridgewater (Brid)
- 3.1 Victorian Volcanic Plain (VVP)
- 4.1 Victorian Riverina (VRiv)
- 4.2 Murray Scroll Belt (MSB)
- 4.3 Robinvale Plains (RobP)
- 4.4 Murray Fans (MuF)
- 5.1 Gippsland Plain (GipP)
- 5.2 Otway Plain (OtP)
- 5.3 Warrnambool Plain (WaP)
- 6.1 Goldfields (Gold)
- 6.2 Central Victorian Uplands (CVU)
- 6.3 Greater Grampians (GGr)
- 6.4 Dundas Tablelands (DunT)
- 7.1 Northern Inland Slopes (NIS)
- 8.1 East Gippsland Lowlands (EGL)
- 8.2 East Gippsland Uplands (EGU)
- 9.1 Wilsons Promontory (WPro)
- 10.1 Highlands - Southern Fall (HSF)
- 10.2 Highlands - Northern Fall (HNF)
- 10.3 Otway Ranges (OtR)
- 10.4 Strzelecki Ranges (Strz)
- 10.5 Monaro Tablelands (MonT)
- 10.6 Highlands - Far East (HFE)
- 11.1 Victorian Alps (VAlp)

0 200.0 m

1 : 5,000

N

NatureKit

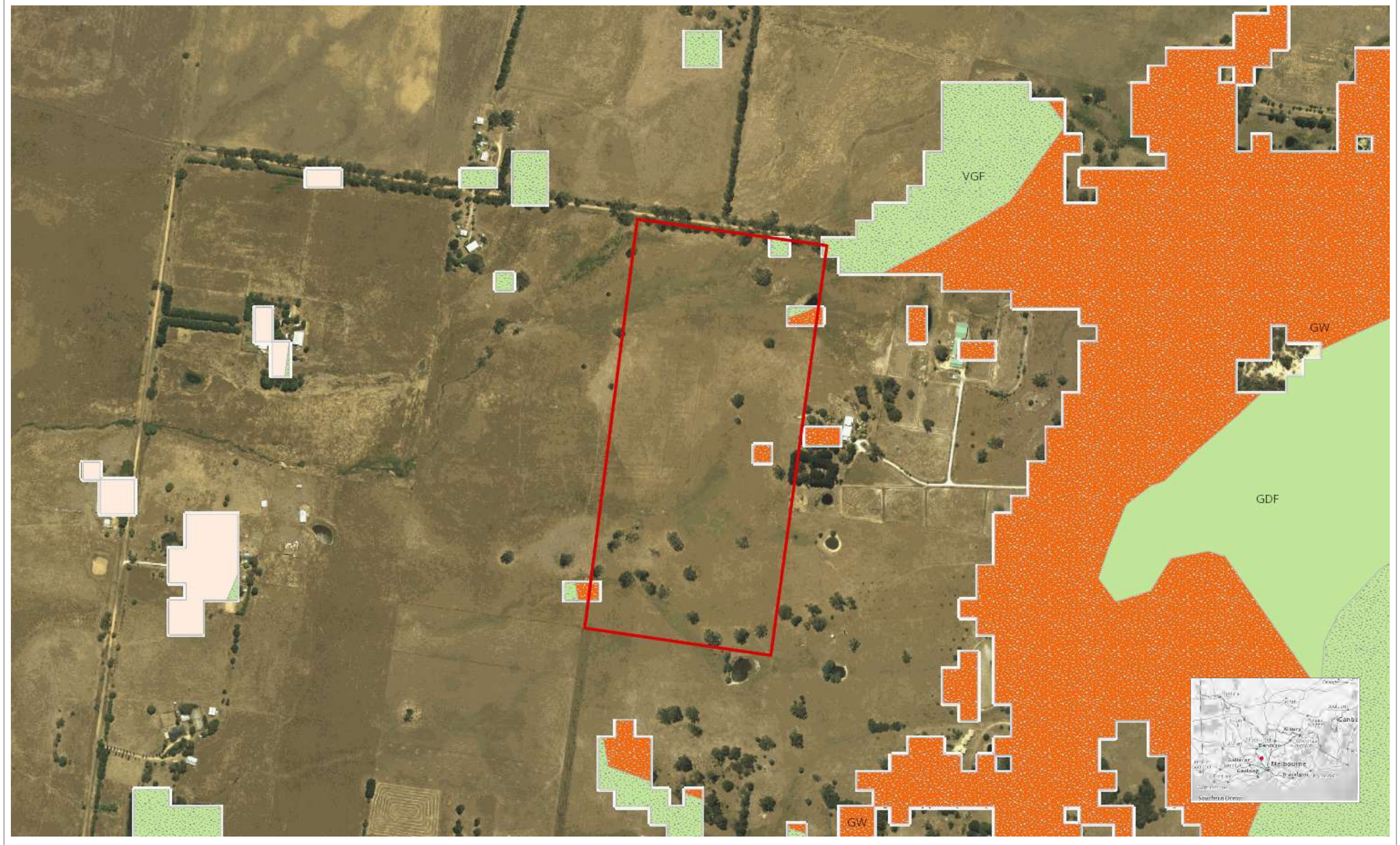
Created on 07/09/23

VICTORIA State Government | Environment, Land, Water and Planning

Appendix 5.

Ecological Vegetation Class (EVC) Map

Source: DELWP NatureKit 2023


biodiversity.vic.gov.au
VGF
GW
GDF
GW
Melbourne
Disclaimer: This map is a snapshot from Victorian Government data. This material may be of assistance to you but the State of Victoria does not guarantee it is without flaw of any kind or is wholly appropriate for your particular purpose and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons accessing this information should make the appropriate enquiries to access the currency of data. © The State of Victoria, Department of Environment, Land, Water and Planning
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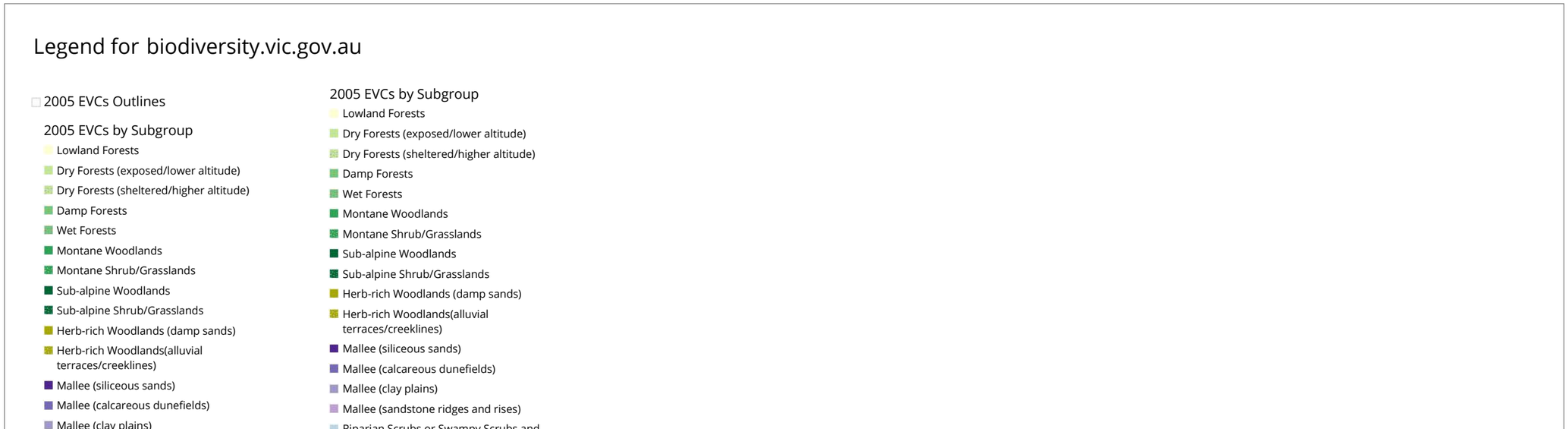
NatureKit
Created on 01/09/23
VICTORIA State Government
Environment, Land, Water and Planning


Legend for biodiversity.vic.gov.au
2005 EVCs Outlines
2005 EVCs by Subgroup
Lowland Forests
Dry Forests (exposed/lower altitude)
Dry Forests (sheltered/higher altitude)
Damp Forests
Wet Forests
Montane Woodlands
Montane Shrub/Grasslands
Sub-alpine Woodlands
Sub-alpine Shrub/Grasslands
Herb-rich Woodlands (damp sands)
Herb-rich Woodlands(alluvial terraces/creeklines)
Mallee (siliceous sands)
Mallee (calcareous dunefields)
Mallee (clay plains)
Mallee (sandstone ridges and rises)
Riparian Scrubs or Swampy Scrubs and Woodlands
Riparian Forests or Woodlands
Coastal Scrubs, Gras and Woodlands
Riverine Grassy Woodlands/Forests (creekline, swampy)
Riverine Grassy Woodlands/Forests (broader plain)
Wetlands (fresh water)
Wetlands (brackish/estuarine)
Box Ironbark Forests or Dry/Lower Fertility Woodlands
Lower Slopes/Hills Woodlands (seasonally inundated, shrubby)
Lower Slopes/Hills Woodlands (herb-rich)
Lower Slopes/Hills Woodlands (grassy)
Heathy Woodlands (dry/better drained)
Heathy Woodlands (damp/less well-drained)
Heathlands (sandy/well-drained)
Heathlands (not well-drained)
Heathlands (sub-alpine)
Plains Woodlands/Forests (freely-draining)
Plains Woodlands/Forests (lunettes, ridges)
Plains Woodlands/Forests (poorly-draining)
Plains Woodlands/Forests (semi-arid non-Eucalypt)
Plains Grasslands and Chenopod Shrublands (clay soils)
Salt-tolerant/Succulent Shrublands
Rocky Outcrop or Escarpment Scrubs
Rainforests
2005 EVCs by Subgroup
Lowland Forests
Dry Forests (exposed/lower altitude)
Dry Forests (sheltered/higher altitude)
Damp Forests
Wet Forests
Montane Woodlands
Montane Shrub/Grasslands
Sub-alpine Woodlands
Sub-alpine Shrub/Grasslands
Herb-rich Woodlands (damp sands)
Herb-rich Woodlands(alluvial terraces/creeklines)
Mallee (siliceous sands)
Mallee (calcareous dunefields)
Mallee (clay plains)
Mallee (sandstone ridges and rises)
Riparian Scrubs or Swampy Scrubs and Woodlands
Riparian Forests or Woodlands
Coastal Scrubs, Gras and Woodlands
Riverine Grassy Woodlands/Forests (creekline, swampy)
Riverine Grassy Woodlands/Forests (broader plain)
Wetlands (fresh water)
Wetlands (brackish/estuarine)
Box Ironbark Forests or Dry/Lower Fertility Woodlands
Lower Slopes/Hills Woodlands (seasonally inundated, shrubby)
Lower Slopes/Hills Woodlands (herb-rich)
Lower Slopes/Hills Woodlands (grassy)
Heathy Woodlands (dry/better drained)
Heathy Woodlands (damp/less well-drained)
Heathlands (sandy/well-drained)
Heathlands (not well-drained)
Heathlands (sub-alpine)
Plains Woodlands/Forests (freely-draining)
Plains Woodlands/Forests (lunettes, ridges)
Plains Woodlands/Forests (poorly-draining)
Plains Woodlands/Forests (semi-arid non-Eucalypt)
Plains Grasslands and Chenopod Shrublands (clay soils)
Salt-tolerant/Succulent Shrublands
Rocky Outcrop or Escarpment Scrubs
Rainforests
2005 EVCs Outlines

Appendix 6.

Property Planning Report

PROPERTY REPORT

Environment, Land, Water and Planning

From www.planning.vic.gov.au at 21 August 2023 11:42 AM

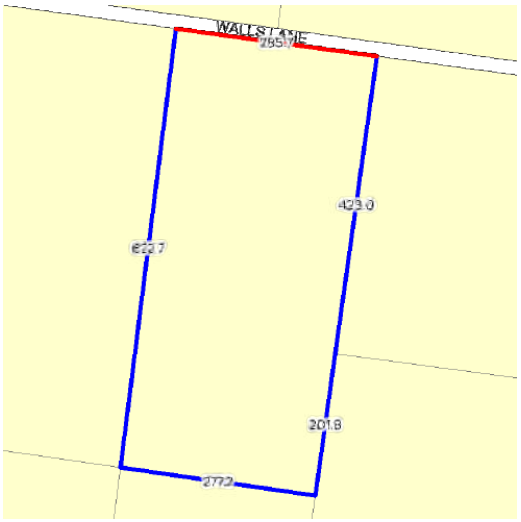
PROPERTY DETAILS

Lot and Plan Number:	**Lot 4 LP112012**
Address:	**WALLS LANE PIPERS CREEK 3444**
Standard Parcel Identifier (SPI):	**4\LP112012**
Local Government Area (Council):	**MACEDON RANGES**
Council Property Number:	**1178298**
Directory Reference:	**Vicroads 60 B5**

www.mrsc.vic.gov.au

SITE DIMENSIONS

All dimensions and areas are approximate. They may not agree with those shown on a title or plan.



Area: 175543 sq. m (17.55 ha)
Perimeter: 1810 m
For this property:
— Site boundaries
— Road frontages

Dimensions for individual parcels require a separate search, but dimensions for individual units are generally not available.

Calculating the area from the dimensions shown may give a different value to the area shown above

For more accurate dimensions get copy of plan at Title and Property Certificates

UTILITIES

Rural Water Corporation:	**Goulburn-Murray Water**
Urban Water Corporation:	**Coliban Water**
Melbourne Water:	**Outside drainage boundary**
Power Distributor:	**POWERCOR**

STATE ELECTORATES

Legislative Council:	**NORTHERN VICTORIA**
Legislative Assembly:	**MACEDON**

PLANNING INFORMATION

Property Planning details have been removed from the Property Reports to address duplication with the Planning Property Reports which are DELWP's authoritative source for all Property Planning information.

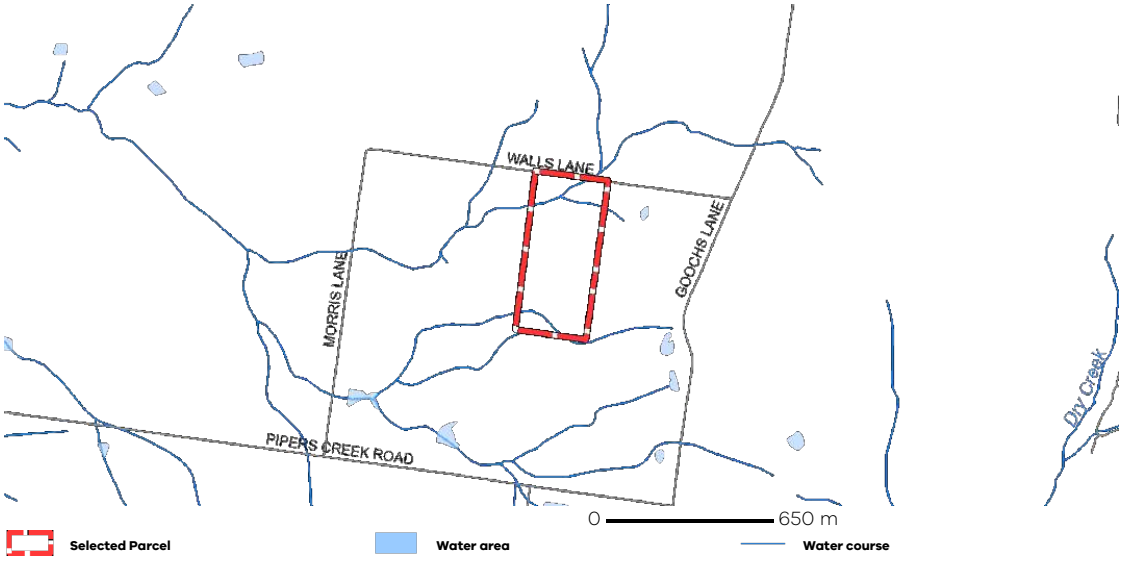
The Planning Property Report for this parcel can found here - Planning Property Report

Planning Property Reports can be found via these two links
Vicplan https://mapshare.vic.gov.au/vicplan/
Property and parcel search https://www.land.vic.gov.au/property-and-parcel-search

PROPERTY REPORT

VICTORIA State Government Environment, Land, Water and Planning

Area Map



PLANNING PROPERTY REPORT

From www.planning.vic.gov.au at 21 August 2023 11:42 AM

PROPERTY DETAILS

Lot and Plan Number:	**Lot 4 LP112012**
Address:	**WALLS LANE PIPERS CREEK 3444**
Standard Parcel Identifier (SPI):	**4\LP112012**
Local Government Area (Council):	**MACEDON RANGES** www.mrsc.vic.gov.au
Council Property Number:	**1178298**
Planning Scheme:	**Macedon Ranges** Planning Scheme - Macedon Ranges
Directory Reference:	**Vicroads 60 B5**

UTILITIES

Rural Water Corporation:	**Goulburn-Murray Water**
Urban Water Corporation:	**Coliban Water**
Melbourne Water:	**Outside drainage boundary**
Power Distributor:	**POWERCOR**

STATE ELECTORATES

Legislative Council:	**NORTHERN VICTORIA**
Legislative Assembly:	**MACEDON**

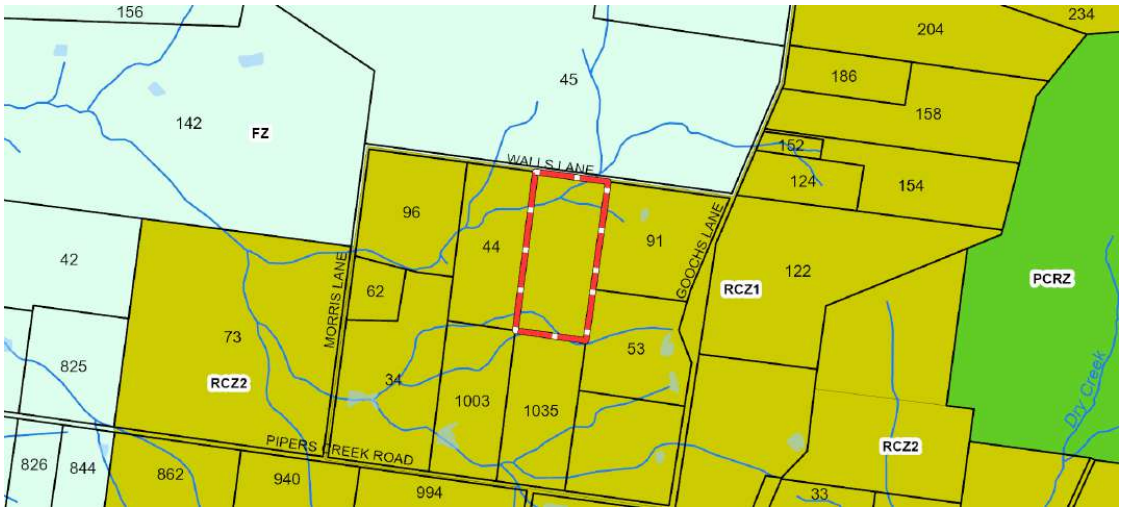
OTHER

Registered Aboriginal Party: **Taungurung Land and Waters Council Aboriginal Corporation**

View location in VicPlan

Planning Zones

RURAL CONSERVATION ZONE (RCZ)
RURAL CONSERVATION ZONE - SCHEDULE 1 (RCZ1)



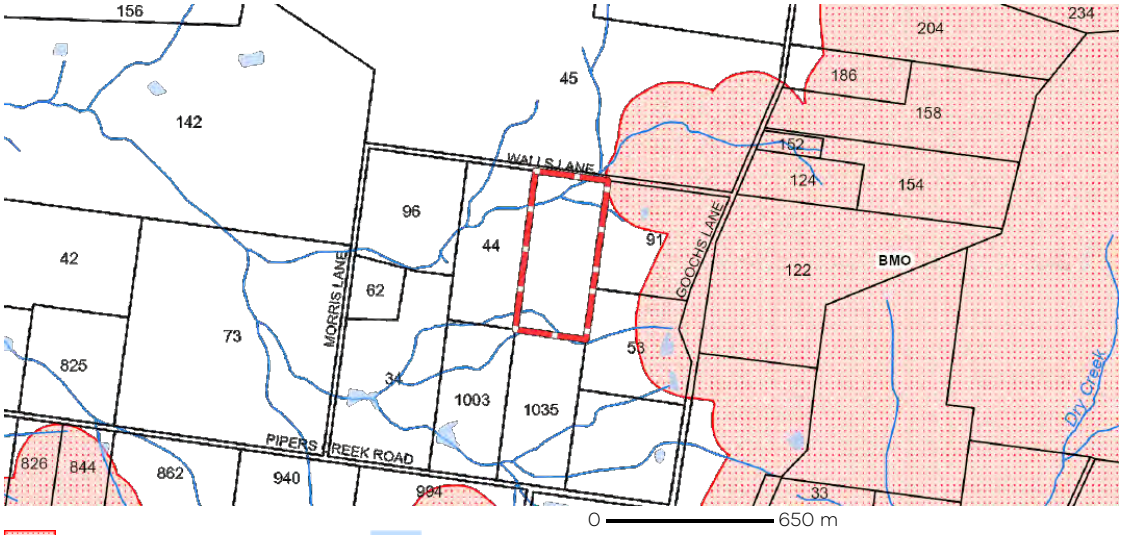
Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

PLANNING PROPERTY REPORT

Environment, Land, Water and Planning

Planning Overlays

BUSHFIRE MANAGEMENT OVERLAY (BMO)

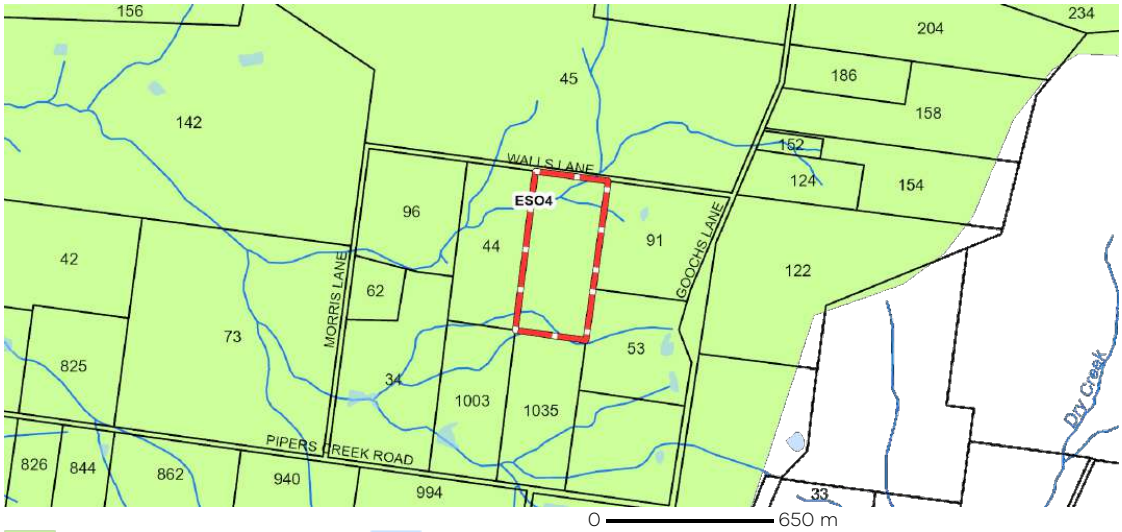


BMO - Bushfire Management Overlay | Water area | Water course

Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

ENVIRONMENTAL SIGNIFICANCE OVERLAY (ESO)

ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 4 (ESO4)



ESO - Environmental Significance Overlay | Water area | Water course

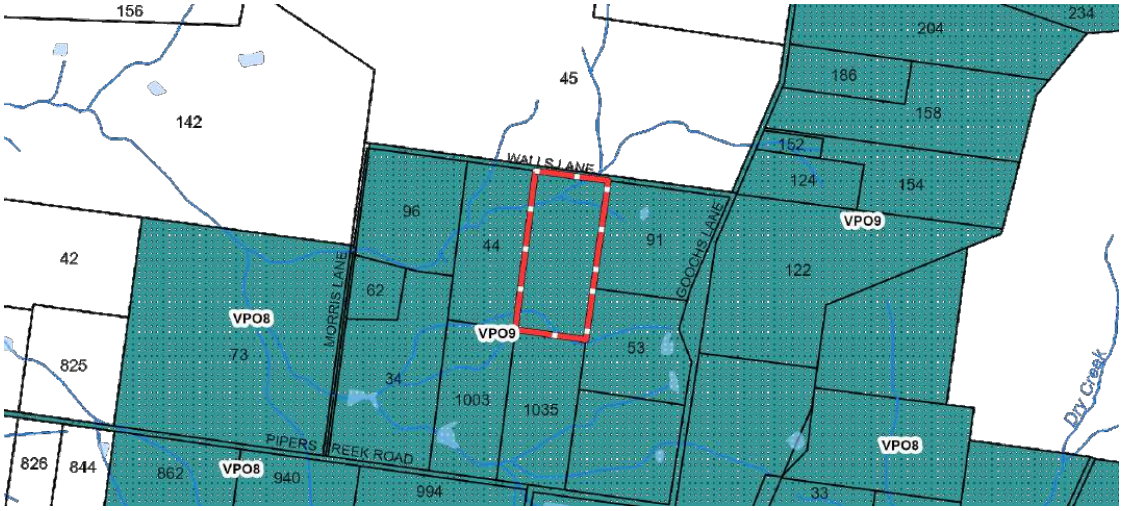
Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

PLANNING PROPERTY REPORT

Environment, Land, Water and Planning

Planning Overlays

VEGETATION PROTECTION OVERLAY (VPO)
VEGETATION PROTECTION OVERLAY - SCHEDULE 9 (VPO9)



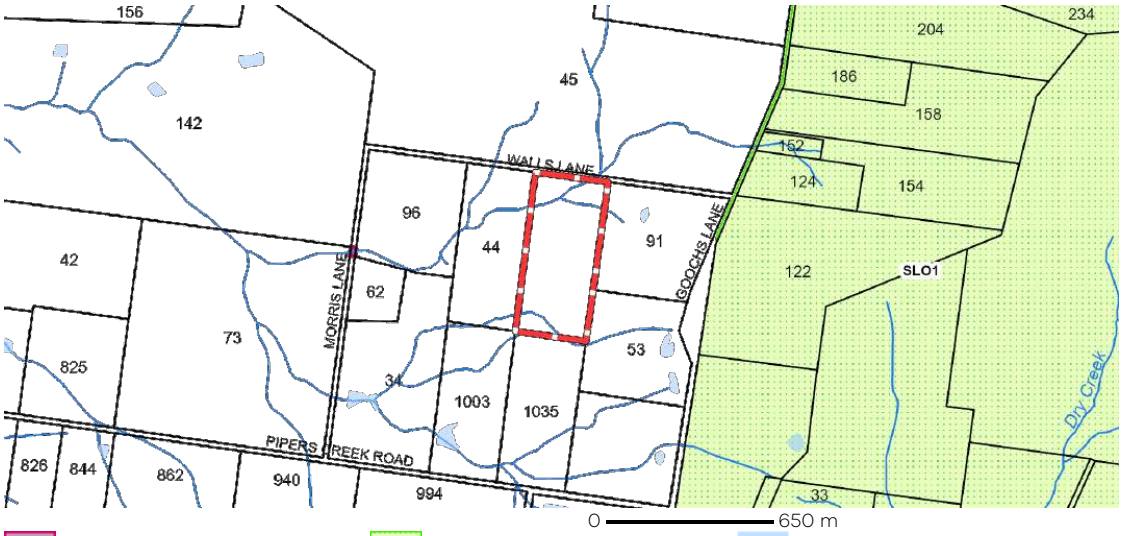
VPO - Vegetation Protection Overlay | Water area | Water course

Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

HERITAGE OVERLAY (HO)
SIGNIFICANT LANDSCAPE OVERLAY (SLO)



HO - Heritage Overlay | SLO - Significant Landscape Overlay | Water area | Water course

Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

PLANNING PROPERTY REPORT

Environment, Land, Water and Planning

Further Planning Information

Planning scheme data last updated on 16 August 2023.

A **planning scheme** sets out policies and requirements for the use, development and protection of land.
This report provides information about the zone and overlay provisions that apply to the selected land.
Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting https://www.planning.vic.gov.au

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the ***Planning and Environment Act 1987.***
It does not include information about exhibited planning scheme amendments, or zonings that may abut the land.
To obtain a Planning Certificate go to Titles and Property Certificates at Landata - https://www.landata.vic.gov.au

For details of surrounding properties, use this service to get the Reports for properties of interest.

To view planning zones, overlay and heritage information in an interactive format visit https://mapshare.maps.vic.gov.au/vicplan

For other information about planning in Victoria visit https://www.planning.vic.gov.au

PLANNING PROPERTY REPORT

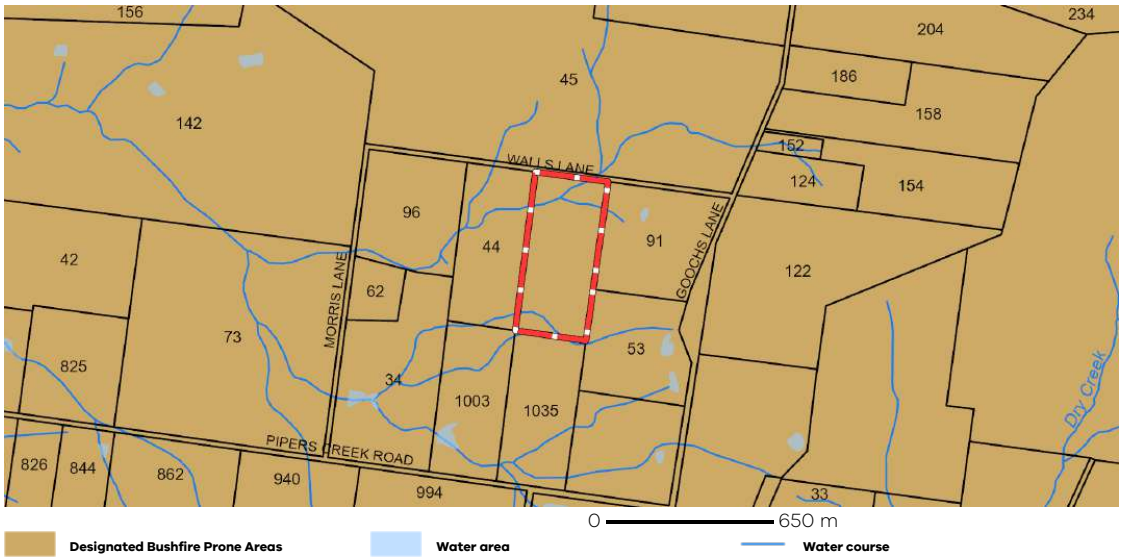
Environment, Land, Water and Planning

Designated Bushfire Prone Areas

This parcel is in a designated bushfire prone area. Special bushfire construction requirements apply to the part of the property mapped as a designated bushfire prone area (BPA). Planning provisions may apply.

Where part of the property is mapped as BPA, if no part of the building envelope or footprint falls within the BPA area, the BPA construction requirements do not apply.

Note: the relevant building surveyor determines the need for compliance with the bushfire construction requirements.



Designated BPA are determined by the Minister for Planning following a detailed review process. The Building Regulations 2018, through adoption of the Building Code of Australia, apply bushfire protection standards for building works in designated BPA.

Designated BPA maps can be viewed on VicPlan at https://mapshare.vic.gov.au/vicplan/ or at the relevant local council.

Create a BPA definition plan in VicPlan to measure the BPA.

Information for lot owners building in the BPA is available at https://www.planning.vic.gov.au.

Further information about the building control system and building in bushfire prone areas can be found on the Victorian Building Authority website https://www.vba.vic.gov.au. Copies of the Building Act and Building Regulations are available from http://www.legislation.vic.gov.au. For Planning Scheme Provisions in bushfire areas visit https://www.planning.vic.gov.au.

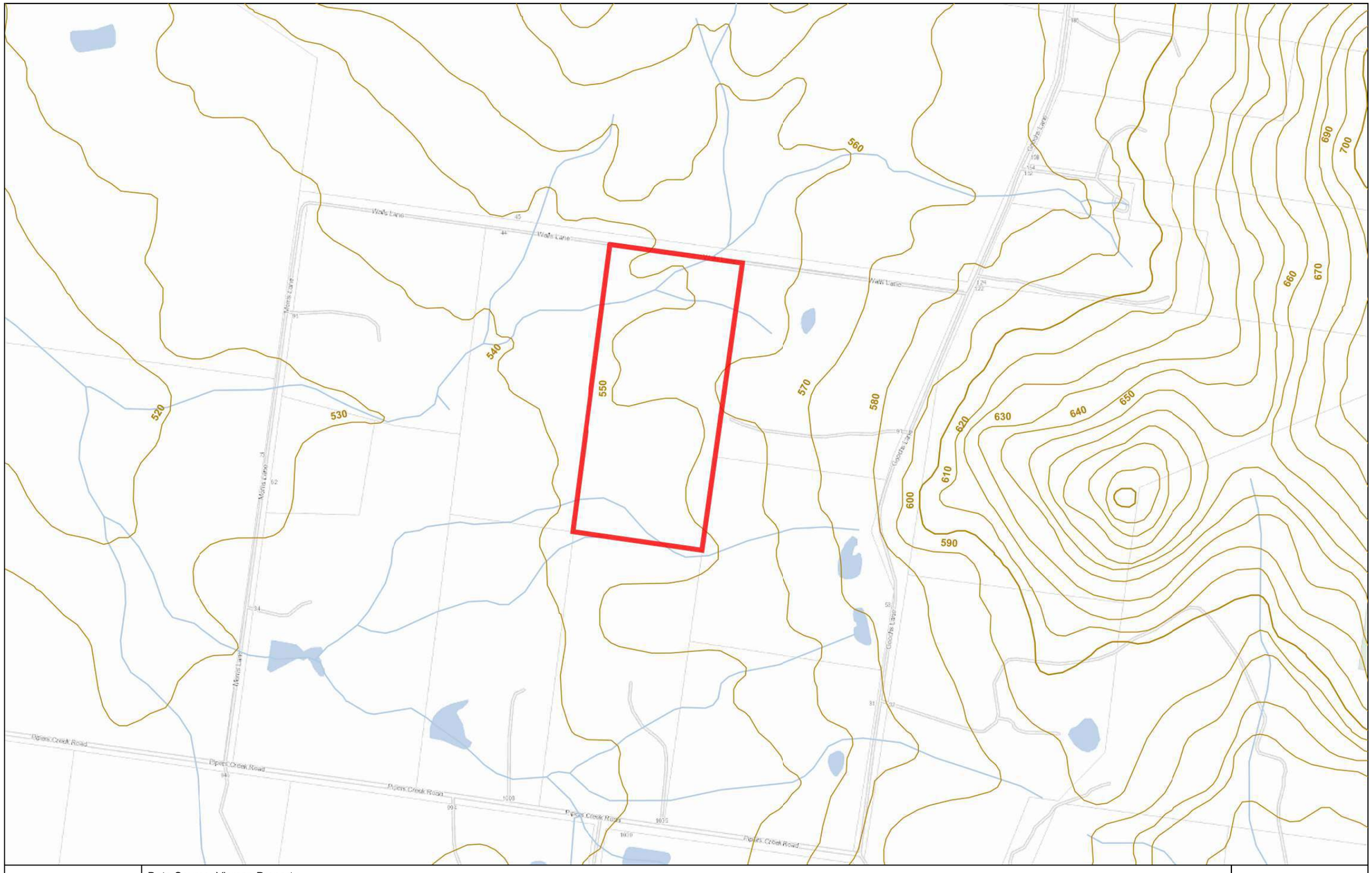
Native Vegetation

Native plants that are indigenous to the region and important for biodiversity might be present on this property. This could include trees, shrubs, herbs, grasses or aquatic plants. There are a range of regulations that may apply including need to obtain a planning permit under Clause 52.17 of the local planning scheme. For more information see Native Vegetation (Clause 52.17) with local variations in Native Vegetation (Clause 52.17) Schedule

To help identify native vegetation on this property and the application of Clause 52.17 please visit the Native Vegetation Information Management system https://nvim.delwp.vic.gov.au/ and Native vegetation (environment.vic.gov.au) or please contact your relevant council.

You can find out more about the natural values on your property through NatureKit NatureKit (environment.vic.gov.au)

Appendix 7.
Contours and Surface Waters Map

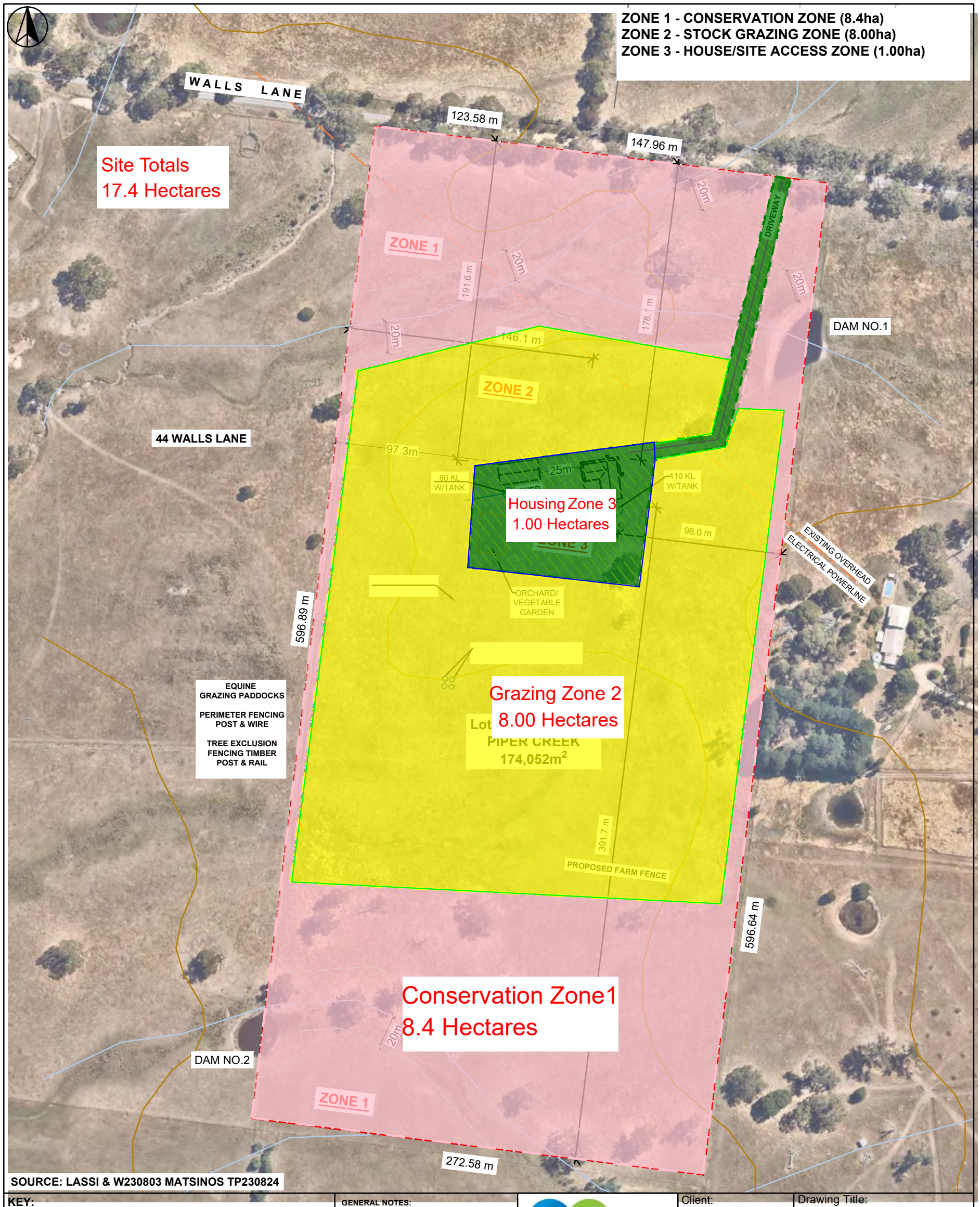


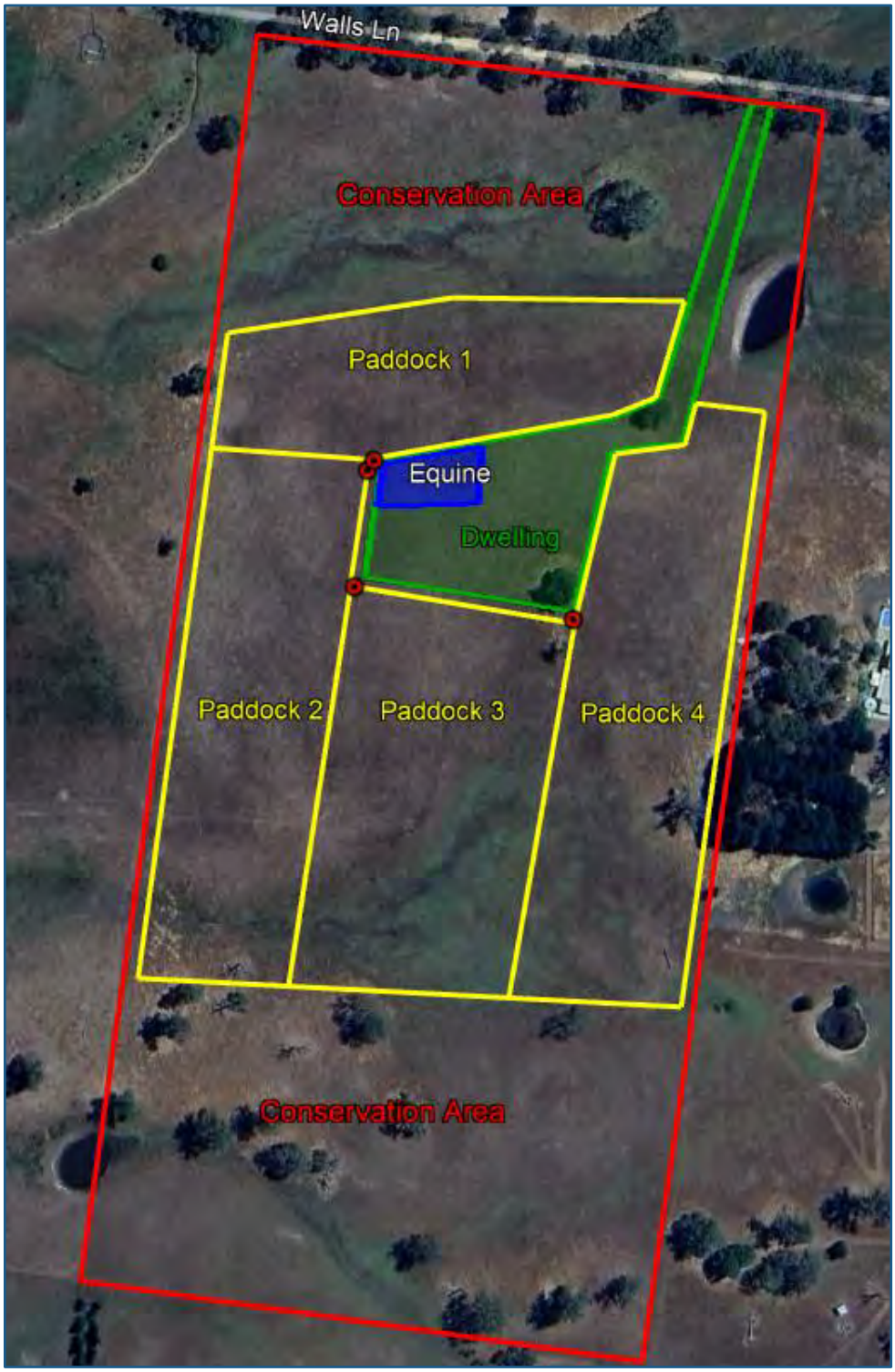
Co-ordinates of Plot Corners	Data Source: Vicmap Property	Co-ordinates of Plot Corners
NW 283429,5875637	0 50 100 150 200 250 300 350 400 450 500m	NE 286337,5875698
SW 283468,5873800	Scale of Metres (1:7,500)	SE 286376,5873862
MGA Zone 55	MGA Zone 55 Vicroads- 415 B2 (ed.8) Created 01:04 PM on Sep 7, 2023	MGA Zone 55

WARNING: No warranty is given as to the accuracy or completeness of this map. Dimensions are approximate. For property dimensions, undertake a Title search.

Appendix 8.

Site Plans
-Zone Outline
-Paddock Layout
-Vegetation Plans


ZONE 1 - CONSERVATION ZONE (8.4ha)
ZONE 2 - STOCK GRAZING ZONE (8.00ha)
ZONE 3 - HOUSE/SITE ACCESS ZONE (1.00ha)
WALLS LANE
Site Totals
17.4 Hectares
123.58 m
147.96 m
ZONE 1
20m
DRIVEWAY
191.6 m
178.1 m
DAM NO.1
146.1 m
ZONE 2
44 WALLS LANE
97.3m
25m
80 KL W/TANK
110 KL W/TANK
Housing Zone 3
1.00 Hectares
98.0 m
EXISTING OVERHEAD ELECTRICAL POWERLINE
ORCHARD/ VEGETABLE GARDEN
596.89 m
EQUINE GRAZING PADDOCKS
PERIMETER FENCING POST & WIRE
TREE EXCLUSION FENCING TIMBER POST & RAIL
Grazing Zone 2
8.00 Hectares
Lot
PIPER CREEK
174,052m2
391.7 m
PROPOSED FARM FENCE
596.64 m
Conservation Zone1
8.4 Hectares
20m
DAM NO.2
ZONE 1
272.58 m
SOURCE: LASSI & W230803 MATSINOS TP230824
KEY:
PARCEL BOUNDARY
ZONE3
WATERWAY / DAM
FENCE LINE
AUTOFEEDER WATER TROUGHS
INFRASTRUCTURE
CONTOUR LINE
ROADWAY/ LANEWAY
WATER TANK
REVEGETATION ZONE
GENERAL NOTES:
-THE AERIAL MAP IS PROVIDED FOR ILLUSTRATIVE PURPOSE AND MAY NOT REFLECT CURRENT SITE CONDITIONS
-BOUNDARIES, DIMENSIONS AND AREA SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND SUBJECT TO SURVEY
REV D
REVISION
DATE 06-02-2024
CHECKED SM
edwards environmental
11 MATCHETT DRIVE STRATHDALE, VICTORIA, 3550.
(03) 5406 0522 admin@edwardsenvironmental.com.au
Client: NATHAN MATSINOS
Project: #877-01
Location: LOT 4 WALLS LANE, PIPERS CREEK VICTORIA
Drawing Title: SITE MAP- ZONE LAYOUT
Drawn: LC
Project - Drawing No. #877 - 02/24
Date: 06-07-2024
Figure No. 1 Rev. D



Proposed property layout showing conservation zones, dwelling area (green), equine infrastructure and management area (blue) and the minimum recommended 4 x 2ha paddocks (with gates as a red dot) - Base image sourced from Google Earth 2024.

Plant List

Image	Common Name	Botanical Name	Qty	Pot Size (cm)	Mature Ht (m)	Mature Wd (m)
Trees						
	Golden Wattle	Acacia pycnantha	30	20	6	4
	Sweet Bursaria	Bursaria spinosa	17	20	4	3
	River Red Gum	Eucalyptus camaldulensis	10	20	30	30
	Messmate Stringybark	Eucalyptus obliqua	18	20	45	22
	Messmate (EXISTING)	Eucalyptus obliqua (EXISTING)	18	Existing	45	22
	Wallangarra White Gum	Eucalyptus scoparia	70	20	10	7.5
Shrubs						
	Prickly Moses	Acacia verticillata	17	15	3	2.5
	Slender Bitter Pea	Daviesia leptophylla	27	15	1.5	1.5
	Cat's Claw	Grevillea alpina	17	15	1.5	1.5
	Austral indigo	Indigofera australis	27	15	1.5	1.5
	Dwarf Bush-pea	Pultenaea humilis	27	15	0.35	1
Perennials						
	Kidney Weed	Dichondra repens	50	10	0.03	1.1
	Spiny-headed mat rush	Lomandra longifolia	50	10	0.75	0.9
	Tussock Grass	Poa labillardieri	50	10	0.8	0.75
	Striped Wallaby Grass	Rytidosperma racemosum	50	10	0.8	0.2

KEY

- Conservation Zone
- Stock grazing zone
- House/Site access Zone
- Revegetation Zone

N

0 10 20 30 40 50 m

Arcadia sustainable design

REVISION	DATE	NOTE	
PROJECT	Lot 4 Walls Lane Pipers Creek		PROJECT # 2409
CLIENT	Nathan Matsinos	DATE # 09-Jul-24	DWG # 1
DWG	Landscape Plan	SCALE @ A1 1:1000	
		DRAWN G Shadforth	
		CHKD	REVISION

ARCADIA Sustainable Design 28 Dover St Cremorne Vic 3121
W: arcadiasustainabledesign.com.au **E**: gary@arcadiasustainabledesign.com.au
T: 0431 022 953

Proposed Block

1 View from NW
Scale: 1:2000

2 View from NE
Scale: 1:2000

3 View from SE
Scale: 1:2000

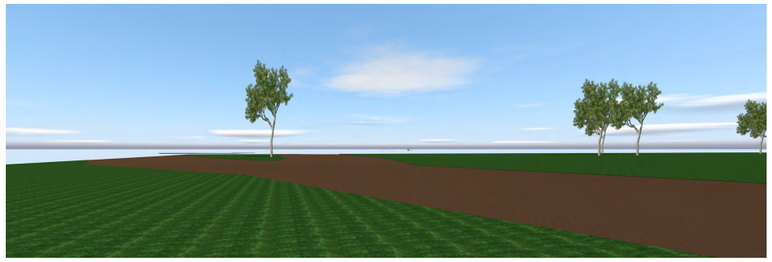
4 View from SW
Scale: 1:2000

Arcadia sustainable design

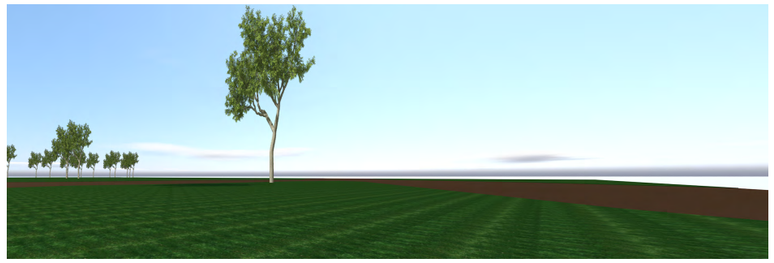
REVISION	DATE	NOTE	
PROJECT	Lot 4 Walls Lane Pipers Creek		PROJECT # 2409
CLIENT	Nathan Matsinos	DATE # 09-Jul-24	DWG # 2
DWG	Landscape Perspectives	SCALE @ A1 1:1000	
		DRAWN G Bradforth	
		CHKD	REVISION

ARCADIA Sustainable Design 28 Dover St Cremorne Vic 3121
W: arcadiasustainabledesign.com.au E: gary@arcadiasustainabledesign.com.au
T: 0431 022 953

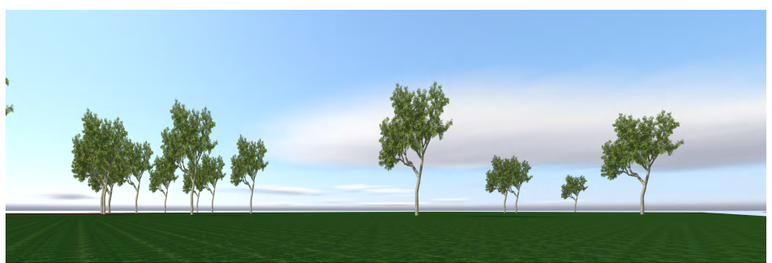
Existing Block



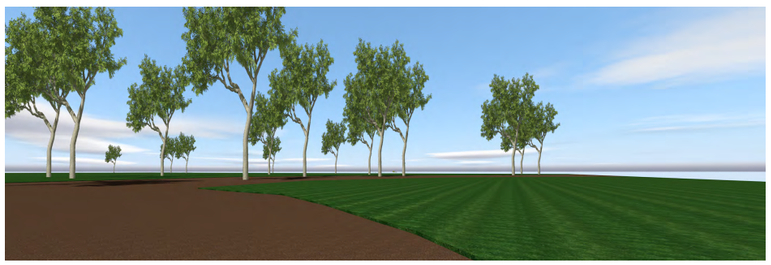
1 View from NW
Scale: 1:2000



2 View from NE
Scale: 1:2000



3 View from SE
Scale: 1:2000



4 View from SW
Scale: 1:2000

Arcadia sustainable design

REVISION	DATE	NOTE
A	10-Jul-24	Remove added landscape features

PROJECT	Lot 4 Walls Lane Pipers Creek		PROJECT # 2409
CLIENT	Nathan Matsinos	DATE # 10-Jul-24	DWG # 3
		SCALE @ A1 1:1000	
DWG	Landscape Existing Perspectives	DRAWN G.Shadforth	
		CHKD	REVISION A

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Appendix 9.

CADEEMA Soil and Pasture Report

Soil & Pasture Plan

Lot 4 LP112012 Walls Lane, Pipers Creek, Vic.

Prepared for

Nathan Matsinos

June 2024

Cadeema

DOCUMENT INFORMATION

Prepared For:	Nathan Matsinos
Prepared By:	Cadeema Pty. Ltd
Project Name:	Soil & Pasture Plan - Lot 4 Walls Lane, Pipers Creek
File Reference:	C393
Job Reference:	Soil and Pasture Plan Report
Project Duration:	June 2024

DOCUMENT CONTROL

Version	Date	Issue	Author	Reviewed/Approved
1.0	20th June 2024	Draft 1	Briony Dance	Jodie Coutts
2.0	25th June 2024	Draft 2	Cliff Dillon	Jodie Coutts
3.0	28th June 2024	Final	Cliff Dillon	Jodie Coutts

CONSULTANT INFORMATION

Cadeema - Soil, Water & Environmental Consulting

- A Shepparton based environmental consultancy servicing Victoria, NSW & South Australia
- An independent, science-driven company, Operating since 1996
- Ensuring Synergy between People, Productivity and Natural Resources
- Tertiary qualified staff with over 70 years of combined experience
- State-wide, big picture experience, but with a local community & site focus
- Specialising in:

Soil / Water Analysis	EMP	Renewable Energy	Agriculture
Contaminated Soil	LCA	Climate Challenges	Wastes
Wastewater	Groundwater	Water Modelling	Biosolid
Community Engagement	Soil Mapping	Soil Geotech	Horticultural
Environmental Monitoring (soil, surface water & groundwater, vegetation, air etc.)			EIS

ABN:	37 621 073 032	**Email:**	admin@cadeema.com.au
Phone:	0428 29 1011	**Web:**	www.cadeema.com.au

TABLE OF CONTENTS

1 INTRODUCTION

Cadeema (Shepparton) were engaged by Nathan Matsinos to compile this Soil and Pasture Plan for the property known as Lot 4 (LP1120212) Walls Lane in Pipers Creek (*Appendix A - Property Locality Plans*) (*Image 1*). An aerial image of the property is provided in the appendices (*Appendix B - Property Plan*). The aim of this Plan is to detail proposed soil and pasture management plans for the agricultural areas of the property which cover approximately 8 ha and which are referred to herein as '*the site'*.

This Soil and Pasture Plan details infrastructure and land development proposals as described by the owner (Nathan Matsinos) and assimilates these plans with existing site environmental and agricultural features, and with best management practices for the proposed land use and for soils and pastures in this district. This Plan provides recommendations and boundaries for the development and ongoing management of the agricultural enterprise proposed for the site which is agistment of brood mares. This Plan also details the need for a permanent presence on the property to manage this agricultural enterprise justifying the need for a permanent dwelling.

A development plan was provided by the site owner (Nathan Matsinos) and a copy of this is provided in the appendices (*Appendix C - Property Development Plans*). This Property Development Plan indicates the property covers approximately 17.1 ha property however, a Land Management Plan prepared for the site (see hereunder) indicates the property covers approximately 17.4 ha. The Site Development Plan indicates the agricultural areas of the site cover approximately 8 ha and it is this area that this Soil and Pasture Plan pertains to. Some example locations of proposed infrastructure to support the agricultural enterprise is also detailed on a Property Development Plan in the appendices (*Appendix C - Property Development Plans*).

***Image 1**: The site is located on the south side (right) of Walls Lane in Pipers Creek.*

2 LAND MANAGEMENT PLAN

A detailed Land Management Plan was prepared by Edwards Environmental for the site (December 2023 Version 2.0) and for background, ancillary and supplementary information on details and development plans for the site, reference should be made to this document. The Land Management Plan covers a range of topics including details on ownership, land use (*Image 2*), planning, the proposed dwelling, heritage, biodiversity, flora, susceptibility to erosion, salinity, flood and fire, hydrology, access, topography, soils, hydrogeology, pest plants, pest animals, and descriptions of land use development plans including stock grazing, pasture renovation, water supply, wastewater, and the protection and enhancement of native vegetation, biodiversity and waterways including plans for revegetation.

The Land Management Plan also provides:

- a summary of the Land Capability Assessment for on-site wastewater management (#877 Sept 2023)
- a Pest Plants Management Plan
- a Pest Animals Management Plan
- a Land Management Works Plan
- the Proposed Development Plans
- site photographs
- bioregion and EVCs mapping
- the Property Planning Report
- a contours and surface waters map
- a Revegetation Species List
- a Land Management Plan reporting template

***Image 2**: An image of the site in August last year taken from the existing property entrance and looking southwest (Image sourced from the Land Management Plan (Edwards Environmental) (dated 23/08/23)).*

3 THE BROODMARE AGISTMENT ENTERPRISE

Demand - The approximately 8 ha of the site designated for agriculture will be utilised for agistment of brood mares to help service the significant Macedon Ranges equine industry. Whilst horse breeders, studs and farms typically manage joining and training on site, they often require somewhere relaxed, secure and comfortable, with sufficient supervision and sustenance, for mares to be housed over the gestation period and to subsequently foal down. As the gestation period of a mare is significant (approximating 340 days), this creates demand for land and facilities appropriate for brood mares. In addition, foaling can be a complicated process requiring human assistance to ensure a successful outcome for these often valuable livestock. The property is ideally situated in a district popular with horse enthusiasts and breeders, and where demand for brood mare lodging is high.

Applicability - Agricultural enterprises which are appropriate to agist brood mares require good access, horse handling and husbandry facilities, stables, foaling areas, infrastructure to facilitate supplementary feeding and sufficient grazing land for the horses. Once the required infrastructure is installed and the site is set up for brood mare agistment, the property will be suitable for agistment of up to 6 brood mares as detailed herein. The site is located on an appropriate landscape with suitable open agricultural grazing land, and has a suitable climate with suitable soil types (as detailed herein). The site consists of gently undulating slopes facilitating good surface drainage however, is not sufficiently steep to present a risk of soil erosion. This land use is appropriate for the district and is compatible with surrounding land uses, district agricultural practices and the local equine industry. The property can facilitate appropriate water supply and supplementary feed is readily accessible in the district. Some mitigation from inclement climatic conditions is afforded by the properties north facing aspect and position in the landscape in the lee of the nearby Cobaw Range and Cobaw State Forest.

Management - The site owner has the knowledge, experience, equipment and capacity to appropriately establish and manage a brood mare agistment enterprise. The owner is a registered commercial breeder with Australian studbook, is appropriately qualified (has completed registered tertiary courses etc.) and has significant experience in the equine industry and with foaling and the management of brood mares. The property has been specifically selected to facilitate establishment of an effective brood mare agistment business. The owner has the ability and experience to manage and maintain horses ensuring maintenance of stock health and condition, and can readily render assistance with foaling.

4 DWELLING JUSTIFICATION

A permanent presence on the site is required for this proposed agricultural enterprise and the proposed dwelling will afford this facilitating effective and efficient enterprise management. A permanent presence is important to regularly inspect and maintain stock health, stock condition, pasture condition, fencing, water supply, pest weed and animal control, for foaling, in case of stock injury, for regular stock inspection, to protect stock from the elements and to provide daily supplementary feeding for the brood mares (as detailed herein). The brood mare agistment enterprise could not operate without a permanent presence on the property. It would be too risky from an animal welfare perspective, from potential mortality during foaling, and for maintenance of stock health and condition to operate such an enterprise without a permanent presence.

The proposed dwelling will afford this permanent presence and dwelling position and elevation is designed to afford surveillance of the site ensuring appropriate supervision of stock. The brood mare agistment enterprise is compatible with the owner's lifestyle, ambitions, values and interests. The property owner is committed to contributing sufficient time and resources to establish, maintain and manage a successful, viable brood mare agistment enterprise on the property. The property owner maintains that a permanent presence is required for a manager to ensure successful operation of the broodmare agistment agricultural enterprise to undertake tasks such as protecting stock from the elements, changing stock bedding, moving stock shelters, ensuring sufficient water supply, daily supplementary feeding, checking fences, relocating temporary electric fencing, assessing stock for injuries, nursing injured stock, monitoring pasture growth and condition, and for the preparation for, supervision of, and assistance with foaling. In addition, a permanent presence on the property will also ensure efficient and effective management of other general property requirements such as security, fire risk, infrastructure maintenance and environmental protection.

5 FACILITIES & MANAGEMENT

General Infrastructure - As detailed in the Land Management Plan and in the Site Development Plans in the appendices (*Appendix C - Site Development Plans*), it is proposed to establish sufficient infrastructure to facilitate operation of a successful brood mare agistment enterprise. The infrastructure relevant to this Soil and Pasture Plan include appropriate all-weather access (3.5 m width) from Walls Lane, an all-weather driveway (3.5 m width) from Walls Lane to the dwelling and to the stock handling infrastructure, a single-story four-bedroom dwelling, and domestic and agricultural shedding. Sufficient all-weather access will be provided for horse transportation vehicles including sufficient area for turning and facilities for unloading/loading stock.

Equine Facilities - The shedding in part will include equine handling, management and husbandry infrastructure including holding yards, horse shelters, foaling areas, treatment facilities and shedding for the storage and preparation of supplementary feed. In addition to general stock handling, these facilities will also allow for the administration of any required stock husbandry practices or veterinary requirements to maintain stock health and vitality. Four approximately 6 x 4 m containment yards with shelters will be established in the northeast corner of the dwelling zone. These will be suitable for brood mare containment for protection from the elements in inclement weather, to contain sick or injured animals and to remove stock from paddocks when soil conditions are conducive to soil or pasture degradation. Synthetic soil protection (e.g. 'mudgrids' and similar) will be installed in these yards to protect the soil, maintain trafficability and to improve hoof health (*Image 3*). To provide shelter from inclement weather and to protect the brood mares from the elements, relocatable equine suitable shelters will be utilised in these holding yards and these can also be utilised in selected paddocks if and where required (*Image 4*). A permanent presence on the site, afforded by the proposed dwelling, is essential to ensure stock health and condition is adequately maintained.

Paddocks & Fencing - The site will be fenced into a minimum of 4 paddocks with round, treated, pine posts installed at 5m intervals and protruding 1.3 m above the natural surface, with highly visible white sighter wires which will be electrified and installed at 1.2m, .8m and .4m. This fencing design is designed in accordance with MRSC "Wildlife Friendly Fencing". Access to each of these paddocks will be facilitated with minimum 3.6 m wide gateways with equine suitable gates. Each paddock will be accessed from the adjoining paddock and/or from the equine management area in the northeast of the proposed dwelling zone. In addition, it is also proposed to utilise temporary electric fencing to further subdivide the paddocks as this facilitates flexible grazing management targeting specific areas whilst excluding other areas if and when required. Equine suitable portable temporary electric fencing will provide a flexible management option to optimise pasture and supplementary feed utilisation, to allow selected areas of pasture to establish or regenerate, and to segregate areas susceptible to soil degradation for both protection and rehabilitation. A permanent presence on the site, afforded by the proposed dwelling, be required to inspect, maintain and relocate fencing to ensure optimum soil, pasture and land management.

***Images 3 & 4**: Synthetic soil protection (e.g. 'mudgrids' or similar) will be installed in holding yards, around drinking troughs and in high traffic areas to protect the soil; grass seed will be regularly distributed across these to maintain stability and trafficability, and to provide a modicum of feed (left). Relocatable equine shelters will be utilised in the holding yards and occasionally in selected paddocks to afford protection for the brood mares in inclement weather.*

Water Supply - A reticulated watering system will be installed utilising an electric pump housed in the agricultural shedding, sourcing water from the proposed minimum 80,000 L rainwater tank(s) and distributed with buried 32 mm diameter poly piping. Poly fence-mounted equine drinking troughs with float valves will be located in the holding yards and at both ends of all paddocks to facilitate continuous access for stock to fresh drinking water. Where required, the aforementioned synthetic soil protection will be installed beneath and adjoining stock watering points. Sufficient stock drinking water will be available given the proposed rooftop rainwater catchments, average annual rainfall and typical brood mare water consumption. For example, maximum annual water intake for 6 horses approximates 100,000 L and average annual rainfall (770 mm) harvested off 300 m^2 (house and sheds) equates to more than 200,000 L per annum. It will be important to have a permanent presence on the site, afforded by the proposed dwelling, to ensure a continuous supply of clean drinking water for the stock.

Storage - Sufficient and appropriate shedding will be installed in the northeast of the proposed dwelling zone and will be utilised for the storage of equine management equipment, agricultural equipment and will provide for the weather and vermin proof storage of supplementary feed supplies. This shedding will include a partially enclosed stable area for housing of sick or injured stock and will also include a foaling containment stable and foaling area.

Manures - Manure and spent straw bedding will be cleaned out of the aforementioned holding yards, stable area and shelters on a regular basis as required. A dedicated and appropriate bunded area will be set aside for the storage and composting of this material. Whilst some of this composted material will be utilised in the dwelling gardens, vegetable garden and home orchard, the majority will be spread back across the pastures to increase soil organic matter and provide additional nutrients for pasture growth. In addition, regular harrowing and/or redistribution of manures across pasture areas will be

undertaken as required, typically after a longer (>10 days) grazing period. When stock are housed in stables or holding yards, daily removal of manure is required to minimise the risk of adverse impacts to animal welfare or to the environment. A permanent presence on the site will help facilitate the efficient and effective implementation of this process.

6 PASTURE & GRAZING LAND MANGEMENT

6.1 Grazing Land

As detailed earlier and in the appendices (*Appendix C - Property Development Plans*), land on the property has been set aside for conservation, for the proposed dwelling and associated shedding, and for the equine management facilities including holding yards. In addition, an 8 ha area in the centre of the property consisting of open agricultural grazing land will be utilised for pasture production to facilitate brood mare grazing (*Image 5*). As detailed above, this 8 ha will be subdivided into a minimum of 4 paddocks with permanent fencing providing approximately 2 ha in each paddock. As also detailed above, each of these paddocks will also have the option of being further subdivided with temporary electric fencing. This is considered sufficient fencing and land segregation for appropriate management of the pastures and the brood mares for the brood mare agistment enterprise.

***Image 5**: Open, cleared, gently undulating, agricultural grazing land in the centre of the site will be utilised for pasture production and grazing for the brood mare agistment agricultural enterprise.*

6.2 Current Pastures

The site currently supports unimproved native pastures which consist of a combination of native and introduced grass species and weeds. The current pastures are in relatively good condition because only limited grazing has occurred on the site last season. Providing good grazing management, these existing pastures could be maintained over the longer term and can provide good volumes of 'feed on offer' however, palatability and nutritional content of these pastures is only moderate particularly by comparison with the proposed improved perennial pastures. These pastures will need regular inspection and this process will be improved by permanent presence on the property

6.3 Improved Perennial Pastures

To increase carrying capacity, to protect soils and to provide significantly more volume of palatable feed with a higher nutritional content by comparison with the existing unimproved native pastures, it is proposed to establish improved perennial pastures across the site. By comparison with the existing unimproved native pastures, this will double the carrying capacity and available stocking rate of the site. Whilst this could facilitate a higher stocking rate, it is not intended to increase stock numbers based on effective perennial pasture establishment and production. Rather, the presence of this enhanced volume and quality of pasture will be utilised to more effectively manage pastures and grazing rotations. In addition, this pasture will result in more effective and efficient 'feed on offer' for the brood mares which will in turn improve stock resilience, health, gestation and maintenance of condition. Again, better pasture management will be afforded by the permanent presence of an enterprise manager on the property.

6.4 Establishing Improved Perennial Pastures

It is proposed to progressively implement the establishment of improved perennial pastures in stages with one of the 2 ha paddocks sown to perennial pasture in autumn each year over the initial four years of site establishment and operation (*Image 6*). A local agricultural contractor will be engaged to prepare the land for sowing and to sow the pasture. Whilst ongoing pasture management including weed control will be undertaken by the property owner, periodically an agricultural contractor may be utilised for broadacre herbicide application for weed control. The area proposed for establishment will initially be grazed or slashed to minimise vegetive matter, herbicide will be applied to control weeds and soil tillage and preparation implemented to create an effective seedbed. Whilst dependent on vegetation cover, this is likely to only require minor scarifying of the soil surface and implementation of this process will strive to minimise soil disturbance, maximise soil organic matter levels and maintain optimum soil structure (further details on the soil physical characteristics and soil management are provided hereunder).

Prior to preparation for sowing, lime (at a rate of 5 t/ha) and fertiliser (phosphorus, potassium and sulphur) will be applied and the subsequent soil preparation for sowing will help incorporate this into the topsoil (further details on soil chemical characteristics and soil amelioration and fertilisation are provided hereunder). Local agronomic advice will be sought to ensure selection of suitable equine pasture species however, this is likely to include a blend of annual and perennial ryegrass, fescue, cocksfoot, clovers and lucerne. Equine pasture blends are available from some agricultural pasture seed suppliers and where no suitable blend is available, seed can be purchased separately and blended on-farm. The crop will be sown with 150 kg/ha of MAP (mon-ammonium phosphate) fertiliser to aid establishment and growth. Whilst dependent on seasonal conditions, sowing will typically occur in March prior to autumn rains. The pasture will not be grazed initially, and will be afforded an establishment period over winter and early spring, and whilst dependent on establishment success, pasture density and sward growth, would typically be first grazed in late spring/early summer.

***Image 6**: The site currently supports unimproved native pastures which facilitates a moderate stock carrying capacity providing feed of moderate quality. It is proposed to establish improved perennial pastures to increase carrying capacity, improve pasture resilience and to improve the quality of feed available for the brood mares.*

A well managed and maintained perennial pasture would typically have an effective lifespan of 6 to 8 years. If and when pasture decline becomes significant, the pastures can either be over sown or re-established. With the aforementioned progressive pasture establishment, the four grazing paddocks are likely to have varying ages, composition and quality of pasture at any given time, and therefore the paddock with poorest pasture composition can be selected every approximately 2 years for pasture enhancement/re-establishment. To budget for establishment of a good improved perennial pasture, approximate costs for sowing (excluding lime and fertiliser application) are likely to approximate $600/ha

including initial tillage, seed, fertiliser and sowing. An additional approximately $100/ha should be budgeted for the purchase and application of weedicide for weed control. Further supplementary information on establishing and managing pastures for horses is provided in the appendices (*Appendix D - Pasture for Horses Factsheet*).

6.5 Supplementary Feed

Because the palatability, and the nutrition and mineral content, of the existing unimproved native pastures is not sufficient to sustain brood mares over the longer term, supplementary feeding will occur throughout the year. Even where a brood mare is grazing improved perennial pastures, supplementary feeding is still typically required for stock maintenance, particularly during gestation. Supplementary feed will consist of hay (lucerne, oaten and grass hay) and of hard dry feed (pellets). Because supplementary feeding will be employed, not all of the 'feed on offer' in the pastures will be consumed, and as a result some pasture will always be retained facilitating successful pasture regeneration post grazing. Supplementary feeding may approximate 90% of feed requirements in low pasture growth periods (such as in February/March in extended dry summers and in June/July in cold winters). However, supplementary feeding will typically only approximate 40% of feed requirements for the majority of the year.

Whilst difficult to estimate due to variables in climate, pasture growth, brood mare physique and condition, and stage of gestation, an approximation of annual supplementary feed requirements includes:

- 80 bags of pelleted hard dry feed
- 150 small square bales of lucerne
- 22 large round bales of oaten/ryegrass blend hay

Equine appropriate supplementary feed facilities will be provided in the holding yards and in the paddocks to facilitate efficient feed utilisation. Supplementary feed will be provided to the brood mares daily with any damaged/rejected feed removed and composted. To facilitate preparation and provision of supplementary feed on a daily or twice daily basis, a permanent presence on the property, afforded by the proposed dwelling, is necessary.

6.6 Carrying Capacity & Grazing Rotations

Stock carrying capacity can be estimated based on dry sheep equivalents (DSE) where one brood mare is equivalent to 10 DSE. Whilst it is proposed to establish improved perennial pastures, for the worst-case scenario, an approximate carrying capacity has been estimated based on the existing unimproved native pastures which consist of a combination of native and introduced grass species and weeds.

Pasture growth on these soil types in this district are significantly variable throughout the growing season and from year to year (*Images 7, 8 & 9*). When pasture growth is low, the agricultural grazing land is likely to have a carrying capacity as low as 100 DSE days per hectare, typically occurring at the end of a dry summer or in midwinter. This equates to sufficient feed in one of the 2 ha paddocks for 1 brood mare for 20 days without any supplementary feeding. At a peak stocking rate, this equates to 6 brood mares grazing the available 8 hectares for 2 weeks however, where supplementary feed represents 75% of feed requirements, this period would be extended to 8 weeks. This scenario could occur when climatic conditions limit pasture growth in February/March in extended dry summers, and in June/July in cold winters. This period of low pasture growth is not likely to exceed 6 weeks at any one time, and is not likely to exceed 3 months (12 weeks) per year.

***Images 7, 8 & 9**: Variations in ground cover from November 2016 (left), February 2019 (centre) and February 2023 (right) resulting from variations in climatic conditions (predominantly rainfall) - Images sourced from Google Earth 2024.*

For remaining times of the year pasture growth is likely to be significantly higher and when pasture growth is high in autumn and spring, the carrying capacity could be as high as 800 DSE days per hectare. This equates to sufficient feed for 6 brood mares to graze the available 8 hectares for 3.5 months and with supplementary feed representing 25% of feed requirements, this would be extended to 4.5 months. This extended period of 'feed on offer' is based on feed available at a single given time and significant pasture regeneration will occur during this period. This indicates that there will be more than ample 'feed on offer' from the pastures for the brood mares for the majority of the year. It is only in the

aforementioned minimal pasture growth conditions that the pasture 'feed on offer' would technically need to be supplemented.

Apart from the low pasture growth conditions in midwinter or at the end of summer, a typical grazing rotation for the majority of the year should be based on a carrying capacity of 400 DSE days per hectare which equates to sufficient feed in one of the 2 ha paddocks for 2 brood mares for 40 days without any supplementary feeding. However, horses are renowned for selective grazing and can heavily graze (graze out) certain preferable pasture species which can lead to pasture damage and poor pasture composition. It is therefore recommended that where 2 brood mares are grazing one of the 2 ha paddocks, a maximum grazing rotation of 20 days is adopted for the majority of the year. This will ensure maintenance of an average pasture height of 5 cm or greater and of 90% minimum ground cover. This scenario is likely to be applicable for the majority of the year with the exception of February/March in extended dry summers and June/July in cold winters.

In times of low pasture growth (as detailed above) and inclement weather, the brood mares will be housed in the holding yards overnight or for several days and permitted to graze selected paddocks during the day or for several days at a time. During these periods of low pasture growth, the majority of stock feed requirements will be facilitated through supplementary feed. During excessively wet periods when soil conditions are susceptible to 'pugging', or during excessively dry periods when pasture growth is minimal and/or soil vegetive cover is minimal, stock access to grazing pastures will be minimal (no more than a continuous 5 days) and/or prevented, and stock will be confined to the holding yards with supplementary feed. This is only likely to be required for several weeks a year. A continual presence will be required on the property to maintain these variable and flexible grazing rotations and to provide supplementary feed daily. The aforementioned movable electric fencing will be strategically utilised to assist with grazing rotations and pasture management.

Where less than 6 brood mares are kept on site, the number of days of pasture available for grazing can be extended resulting in an extended grazing rotation. Where the proposed improved perennial pastures are established, the carrying capacity of the site would approximately double. Whilst site carrying capacity could approximate 10 brood mares for the majority of the year, it is not likely that sufficient pasture will be available to sustain more than 6 brood mares over the estimated 12 week (3 month) period of low pasture growth typically occurring in February/March in extended dry summers, and in June/July in cold winters. It is therefore recommended that the property sets a maximum stocking rate of 6 brood mares at any one time. However, it must be noted that for significant periods of the year the pastures could carry 10 brood mares and the land available, the site layout and the property equine infrastructure is capable of managing this number of stock. To ensure regular and diligent pasture and grazing management, a permanent presence on the site is required to optimise

paddock stocking rates and to implement grazing rotations to help ensure maintenance of pasture quality and composition, and to protect soil structure.

Occasionally pasture growth may be so prolific that topping (slashing) is required to maintain palatability and stop pastures from becoming 'rank'. This process will also minimise excessive wildfire fuel which can create a fire risk. Whilst not likely to occur, the site owner so has the option of introducing additional stock (such as sheep) to 'crash graze' areas of the property if and where required.

The site owner has the knowledge and experience to appropriately manage this carrying capacity and grazing rotation plan to most efficiently and effectively utilise the pasture feed available throughout the year and to maintain optimum pasture composition and health. Implementation of this will be optimised by a permanent presence on site afforded by the proposed dwelling. Further supplementary information on pasture management for horses is provided in the appendices (*Appendix D - Pasture for Horses Factsheet*).

6.7 Fodder Conservation

The site, and both the existing pastures and the proposed perennial pastures, will at times be suitable for fodder conservation (hay/silage production). Whilst it will remain an option to implement fodder conservation (hay/silage production), this will only be utilised if and when excess pasture of appropriate quality is present and when climatic conditions are conducive to fodder conservation. It is envisaged that fodder conservation will only be undertaken rarely, if at all. If and when fodder conservation is to be undertaken, reputable and experienced local agricultural contractors will be utilised for this. The process of curing and baling fodder for conservation requires paddock, pasture and fodder inspections up to 6 times daily to ensure optimum fodder quality and preservation. This process can really only be effectively implemented by a permanent presence on site.

6.8 Fire Risk Mitigation

Whilst the risk of wildfire is always present in rural Victoria, the site owner will instigate strategies to limit this risk on the property and on the site. The strategies available on the property are limited due to location in the landscape, site and surrounding land uses, and the often conflicting aim to maintain and enhance native vegetation and biodiversity throughout the site. Extensive fire breaks will not be created as these have the potential to adversely impact biodiversity. Fuel loads comprising of existing native vegetation will not typically be reduced as this is also likely to adversely impact native vegetation and biodiversity on and adjoining the property. However, fuel loads across the site, around the proposed dwelling and in the conservation areas will be managed through a combination of slashing, brush

cutting, herbicide application and grazing. However, these management strategies will take into consideration the aim of protecting and enhancing natural vegetation and biodiversity on the property, and the aim of maximising palatable and high-quality 'feed on offer' across the pasture areas of the site for the brood mares. It is understood that the site owner will ensure emergency fire water supplies are available from the 2 dams on the property and from the proposed rain water storage tanks, the latter which will be fitted with CFA compliant fixtures to facilitate effective fire vehicle replenishment. The siting and construction of the proposed dwelling will take into consideration the risk of wildfire with measures implemented to minimise this risk. The dwelling is situated sufficient distance from significant vegetation and vegetation around the dwelling and the equine management infrastructure will be managed to minimise fuel loads. A permanent presence on the site, afforded by the proposed dwelling, will help minimise the risk of adverse impacts from wildfire.

7 SOILS

7.1 Soil Physical Characteristics

7.1.1 Topography & Landscape

As detailed earlier, the site consists of gently undulating land with a slight surface slope. The aforementioned Land Management Plan provides a topographical map of the property and indicates that the property '*has a general slope to the west from a central-east maximum elevation of approximately 560 m AHD to a southwest minimum elevation of approximately 540 m AHD*'. The property is located in a mid to lower location in the landscape which is dominated by the Cobaw Range and Cobaw State Forest, the lower slopes of which are located 500 metres east of the property. The property is located upslope and approximately 2.7 km east of Pipers Creek.

7.1.2 Geology

The property is founded on colluvial deposits associated with the adjoining Cobaw Range and which consist of Late Devonian Beauvallet Granodiorite, Pyalong Granite and Biotite-Hornblende Granodiorite geology which is described as mid and pale grey, medium and coarse grained equigranular to porphyritic with K-feldspar phenocrysts.

7.1.3 Soil Physical Characteristics

Based on the Consultants extensive experience with soils in this district, the physical characteristics of the soils on the site can be extrapolated based on parent material, topography, position in the landscape, and on typical, predictable patterns of geomorphology. The soils on the site are likely to consist of Alluvial Yellow Podzols comprising 10 cm of grey loam (A1 topsoil) overlying 40 cm of light grey to white, conspicuously bleached, silty loam (A2 topsoil) with an abrupt change to orange-brown to

yellow-grey-brown, silty medium clay subsoils (B1 subsoil) (*Images 10 & 11*. This was corroborated by the aforementioned Land Management Plan which describes the soils as '*predominately shallow brown to pale brown dry loams overlying pale orange slight moist light clays and strongly structured orange/red light clays*'.

***Images 10 & 11**: The soils on the site are likely to be Alluvial Yellow Podzol consisting of 10 cm of grey loam overlying 40 cm of light grey to white, conspicuously bleached, silty loam with an abrupt change to orange-brown to yellow-grey-brown, silty medium clay.*

7.2 Soil Chemical Characteristics

The property owner organised the collection and laboratory soil chemical analysis of 1 soil sample from the site which is described as 'Horse Paddock' and was sampled on 25th October 2023. Soil sample collection and analysis was organised by Elders in Kyneton. The results of this soil chemical laboratory analysis are provided in the appendices (*Appendix E - Soil Analysis Results*). As indicated by the site's minimal intensity management history, it is assumed that the soils have not had soil ameliorants such as lime or gypsum applied, and have not had fertilisers applied, for an extended period. Based on the results of this soil chemistry analysis, the surface soils on the site have the following soil chemical characteristics.

- **pH (H_2O) -** Soil pH measures the acidity or alkalinity of a soil. The surface soil pH level was moderately to strongly acidic with a soil pH level of 5.1. This indicates a need to apply lime to raise soil pH levels closer to optimum (pH = 6.5 to 7.0).
- **Salinity -** Due to position in the landscape, rainfall, hydrology and surface and soil profile drainage, soil salinity (measured as electrical conductivity ($EC_{1:5}$) and as soil chloride (Cl)) in the surface soil was low ($EC_{1:5}$ < 0.04 dS/m; Cl = 27 mg/kg). This indicates a low risk of adverse impacts from soil salinity on the site.

- **Phosphorus -** Most Australian soils are naturally low in plant available phosphorus. The surface soil had a low available phosphorus level of 16 mg/kg Mehlich P. This indicates a need to apply phosphorus fertiliser to enhance pasture establishment and growth.
- **Nitrogen -** Nitrogen is often transient in soils and is likely to vary throughout the year and from year to year. Surface soil nitrogen levels were low with a nitrate nitrogen level of 2.9 mg/kg and an ammonium nitrogen level of 4.5 mg/kg. This indicates a need to apply nitrogen fertiliser for pasture establishment and regular ongoing nitrogen fertiliser applications to maximise pasture production.
- **Potassium -** These soil types in this district typically have low soil potassium levels. The surface soil on this site had a low potassium level of 75 mg/kg. This indicates a need for a once off application of potassium fertiliser.
- **Sulphur -** The surface soil sulphur levels was moderate (9.9 mg/kg) and is likely to be adequate for pasture production.
- **Cation Exchange Capacity (CEC) -** The cation exchange capacity of soils reflects soil clay content and provides an indication of the propensity for the soil to retain cations and nutrients. The surface soil CEC level on the site was marginal at 7.7 meq/100g but is still likely to be adequate for pasture production.
- **The Calcium/Magnesium Ratio (Ca:Mg) -** The ratio of calcium to magnesium in soils provides an indication of soil calcium levels which are important for the maintenance of soil structure. The surface soil on the site had a good soil calcium level (Ca:Mg = 2.7).
- **Exchangeable Sodium Percentage (ESP) -** Due to position in the landscape, rainfall, hydrology and soil profile drainage, these surface soils are likely to have low sodium levels. The surface soil on the site had an ESP level of 3 point four indicating low soil sodicity (ESP < 6). This is beneficial as sodium contributes to soil structural degradation.
- **Organic Carbon -** Surface soil organic carbon levels were good due to the long-term pasture history of the site with minimal grazing. Surface soil organic carbon levels were 3.3 % and this indicates organic matter levels of 5%. This indicates good soil organic matter levels which will be beneficial for enhancing soil structure, improving cation exchange capacity and to increase soil water and nutrient holding capacity.
- **Trace Elements -** Soil trace element analysis is not particularly accurate and the results should therefore be used with caution. These soil analysis results indicate that the surface soils have adequate zinc, manganese and iron levels, and low copper and boron levels.

As detailed in the aforementioned Land Management Plan, limited soil laboratory chemical analysis was undertaken as part of the Land Capability Assessment (LCA) and the results indicated a soil pH level approximating 5.0 and soil Electrical Conductivity (EC) of less than 0.5 dS/m. In addition, the Land Management Plan concludes that the soils are prone to dispersion and are non-sodic. These results are similar to those detailed above.

These soil chemical characteristics are typical of these soil types under this land-use in this district. Whilst conducive to unimproved native pasture maintenance, for improved pasture production and to ensure adequate establishment and growth of improved perennial pastures, the soils need lime to

increase pH levels, and need applications of phosphorus, potassium and nitrogen fertilisers (see hereunder).

7.3 Soil Chemical Enhancement

Based on the results of the soil chemistry analysis, it is recommended that 5.0 t/ha of good quality, fine lime is applied and incorporated into the soils on the site. This should increase soil pH levels to greater than 6.0 and is typically only undertaken once every 10-15 years. In addition, potassium fertiliser should also be applied and incorporated into the topsoil. It is recommended that potassium fertiliser is applied at a rate of 300 kg/ha. this would typically only be applied approximately once every 5-10 years. Because the soils are low in phosphorus, it is also recommended that phosphorus fertiliser is applied at a rate of 500 kg/ha of single superphosphate. To enhance and maintain soil phosphorus and nitrogen levels, it is recommended that 150 kg/ha of MAP (mon-ammonium phosphate) is applied when sowing pastures. The soils will then require applications of nitrogen fertiliser in late winter and early summer. It is recommended that 100 kg/ha of urea (or similar nitrogen fertiliser applying an equivalent nitrogen rate) is applied twice per season. In summary, apply:

• Lime	5.0 t/ha	once off
• Potash	300 kg/ha	once off
• Single superphosphate	500 kg/ha	once off
• MAP	150 kg/ha	when sowing
• Urea	100 kg/ha	late winter and early summer

7.4 Optimising Soil Management

Providing application of the above-mentioned soil fertilisers and ameliorants, and considering soil physical characteristics, the soils on the site are suitable for both the existing unimproved native pastures and for improved perennial pasture production. Managed correctly, the soils have a high productivity potential and provide a good basis for the high production of good quality pastures. Whilst the aforementioned Land Management Plan indicates minimal risk of erosion on the site, it is recommended that vegetive cover in the form of pastures is maintained and maximised wherever possible to help protect the soil surface which will further minimise the risk of erosion. Where the surface soils are exposed and/or have low organic matter levels, the surface soil layers are susceptible to soil structural breakdown which can see the surface soils form a powder when dry, they can set hard (cement) and can form and structureless, incohesive ‘soup’ when wet. For these reasons it is important to minimise soil exposure to the elements, to minimise the soils to excessive compaction from vehicles and to avoid overworking (over cultivation) these soils as these processes can lead to soil structural decline. It will also be important to regularly monitor the soil surface to minimise adverse impacts from stock, particularly in the form of ‘pugging’ when wet, and soil loosening when dry. It will be important to regularly inspect pastures and to maintain appropriate stocking rates and grazing rotations to minimise

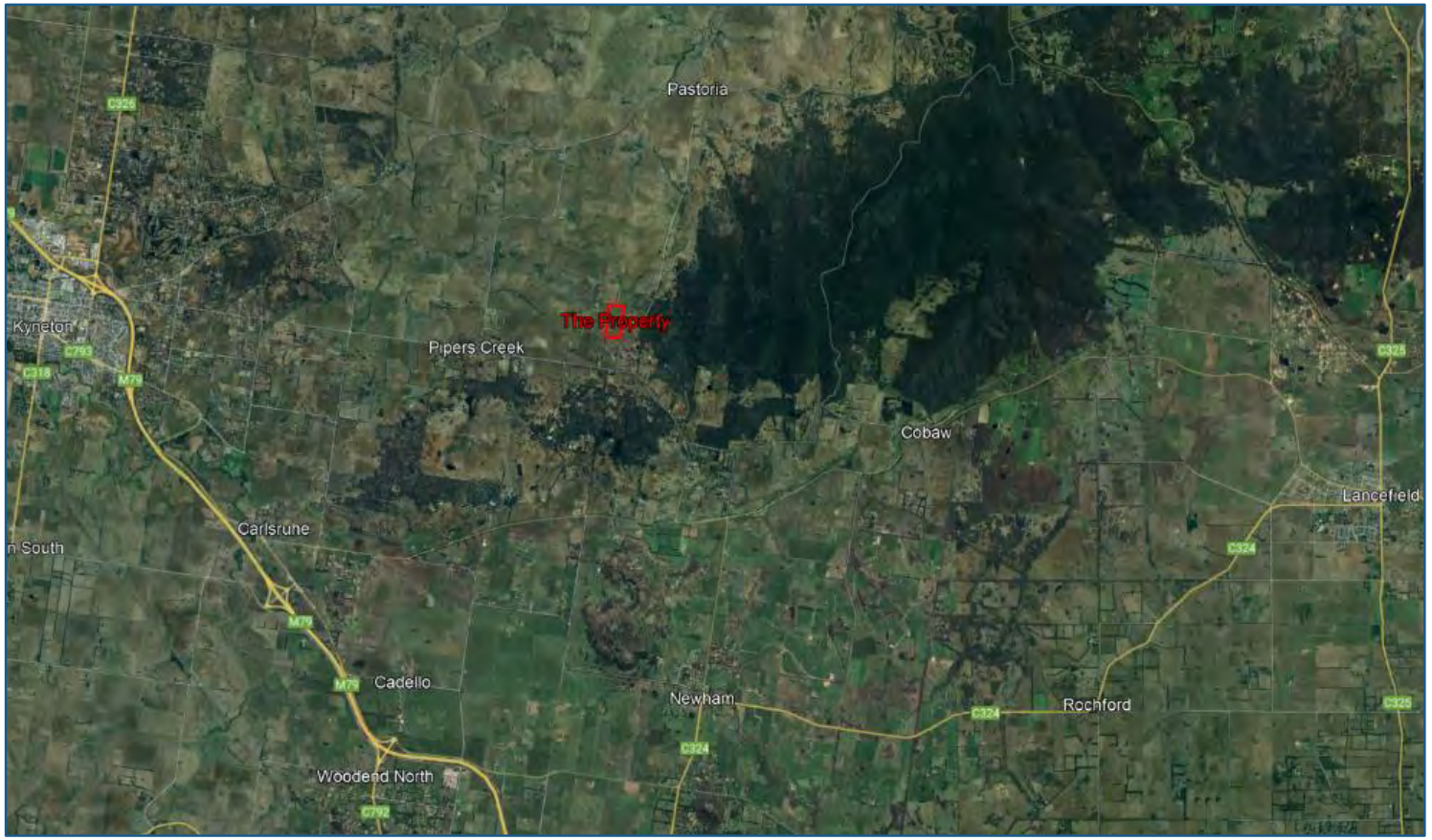
the risk of adverse impacts to soil physical characteristics. The previously detailed stocking rates and grazing management are not likely to adversely impact soil physical characteristics on the site and these recommendations should be adhered to, to minimise this risk. Implementing these recommendations to minimise the risk of adverse impacts to soils and the landscape will be more efficiently and effectively undertaken with a permanent presence on the property.

8 APPLICATION & CONCLUSIONS

Implementation of the practices outlined in the Land Management Plan, combined with the implementation of the recommendations, practices and infrastructure detailed herein, will help ensure appropriate environmental and agricultural land management on the property. As detailed herein, the site is suitable for pasture production for grazing by horses and will be conducive to the proposed brood mare agistment agricultural enterprise (*Image 12*). The relatively intense site improvement and management detailed herein will help minimise the risk of adverse impacts to the environment and are conducive to the successful ongoing operation of the brood mare agistment enterprise. Strategies such as soil chemistry improvement (through lime and fertiliser application), good pasture management, the establishment of improved perennial pastures, appropriate stocking rates, good grazing rotations, soil surface protection, fencing (including holding yards and temporary electric fencing), and careful attention to the maintenance of optimum pasture composition and the protection of surface soil structure, will combine to help ensure effective soil, vegetation and pasture management. In addition, the enterprise managers permanent presence on the property, afforded through the proposed dwelling, will be imperative to ensure successful stock protection and well-being, and efficient and effective enterprise management. Implementation of these strategies will provide a sound basis for the successful ongoing operation of the proposed brood mare agistment enterprise.

9 APPENDICES

9.1 Appendix A - Property Locality Plans



The location of the property in central Victoria in relation to Kyneton, Lancefield and Woodend with the Cobaw State Forest to the east of the property - Image sourced from Google Earth 2024.

The location of the property in the Pipers Creek rural district with the Cobaw State Forest to the east - Image sourced from Google Earth 2024.

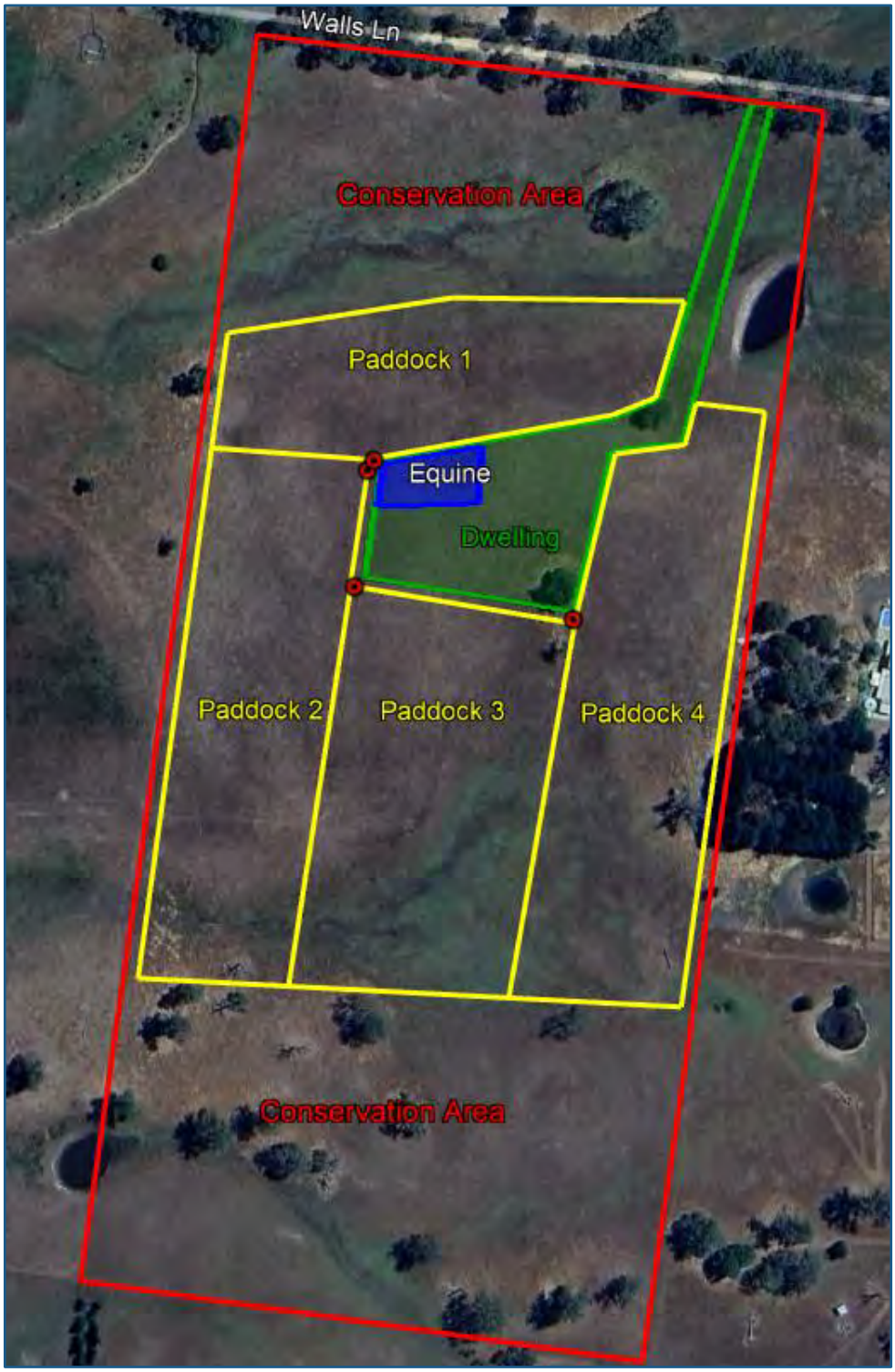
The location of the property in relation to Pipers Creek Road, and to Goochs, Morris and Walls Lanes - Image sourced from Google Earth 2024.

9.2 Appendix B - Property Plan

The boundaries of the Property - Image sourced from Google Earth 2024.

9.3 Appendix C - Property Development Plans

Plan prepared by Edwards Environmental and provided by Nathan Matsino.



Proposed property layout showing conservation zones, dwelling area (green), equine infrastructure and management area (blue) and the minimum recommended 4 x 2ha paddocks (with gates as a red dot) - Base image sourced from Google Earth 2024.

9.4 Appendix D - Pasture for Horses Factsheet

NSW DPI primefacts
PROFITABLE & SUSTAINABLE PRIMARY INDUSTRIES www.dpi.nsw.gov.au
FEBRUARY 2007 PRIMEFACT 525 (REPLACES AGFACT P2.4.3)

Pastures for horses

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Introduction

A good pasture will meet the nutritional needs of most horses including brood and lactating mares and growing foals, although working horses may require some supplementation. However, the grazing habits of horses require that special consideration is given to the selection and management of the pasture. Because of New South Wales' range of soils and rainfall, no single pasture species suits all horse properties. Select pastures suited to your area and then select from these the most suitable for horses.

Well managed high quality pastures can meet the nutritional needs of most horses including brood and lactating mares and growing foals.

Feed requirements of horses

Recent research has shown that high quality pastures can meet the feed requirements of horses. However, most horse establishments supplementary feed their horses because they are held in confined areas where they can be checked on a regular basis. These areas are usually set stocked with the result that the pasture is damaged and only the toughest plants or weeds survive. Supplementary feeding also guarantees feed quality and quantity and counters seasonal fluctuations in pasture supply.

Species or varieties do not define a high duality pasture. They are important, but the management of the pasture is just as important. Grazing in the early vegetative stages, having a mix of legumes and grasses, applying adequate fertiliser, weed control and maintaining sufficient moisture will affect the quality and feed value of the pasture.

A critical time of the year is July/August when mares heavily in foal have to eat pastures that are frost affected. Frost-affected kikuyu, paspalum and couch are adequate if clovers are in the pasture mix.

High quality pasture is essential when a mare foals to ensure that the mare produces enough milk to support her rapidly growing foal. Also, it is important that the mare does not lose condition at this time because she will be mated for next year's foal.

For further information on feeding requirements of horses read Primefact 425 *Practical feeding of horses*, Primefact 526 *Feeding the brood mare*, and Primefact 527 *Feeding the working horse*.

Why are horses and the management of their pastures special?

- Horses have a different digestive system to cows and sheep. Cows and sheep have four stomachs, horses have one stomach and a well developed large intestine. This limits the digestion of low quality feed and increases grazing time for horses. As a general rule, a 500 kg horse will eat less than a 500 kg cow but a horse wastes more pasture. The stocking rate for horses is similar to that of cattle.
- Horses are very selective in their grazing habits. They prefer certain pastures and crops and leave species that are unpalatable. These `weeds' can soon dominate more desirable species.

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- Horses prefer short pastures to tall pastures. A paddock stocked with horses will have a short cropped `lawn area' where the horses graze and long rank areas where they defecate. Horses do not like to graze where there is horse manure. Thus, the `lawn area' becomes depleted of nutrients that are moved to areas where the horses prefer not to graze. Only in drought conditions or in overstocked paddocks will horses graze up to manure pats.
- Management of pastures, especially the management of manure and application of fertiliser, requires special consideration. Rotation of paddocks is critical with horses. Always have spare paddocks to allow rotation.
- Select pastures and crops suited to the area, then select from that list the pastures and crops that horses prefer.

What type of pastures do your horses need?

The horse industry comprises many types of horse enterprises. Most enterprises can be divided into one or more of the following.

Stud breeding farm

A stud-breeding farm standing a stallion has a great demand on its pastures in spring and summer. Visiting mares arrive as early as August and leave in January

A suitable pasture for a stud-breeding farm would be a summer growing pasture that is well adapted to that area, e.g. kikuyu or lucerne, and a spring pasture, e.g. phalaris, fescue, cocksfoot, ryegrass (all or one of the preceding) and sub clover and white clover.

Because stocking rates are low in autumn and winter, this is an ideal time to get pastures and crops established for spring and summer.

Broodmare farm

A stud farm not standing a stallion has feed requirements opposite to that of a stud-breeding complex.

The mares are at the farm from February to July/August. The previous year's yearling foals will require pasture during the summer period.

A suitable pasture in this situation is a winter growing pasture comprising phalaris, fescue, cocksfoot, ryegrass, lucerne, sub clover, and white clover, assuming these species are well adapted to the area.

Riding hacks, pleasure horses

These horses need a continuity of feed throughout the year. However, because winter is the period of poorest pasture growth it may be necessary for some form of winter pasture or winter crop to be grown or a supplementary feed provided.

During periods of feed shortage or without rotational grazing, the desirable pasture species are eaten out and the pasture deteriorates rapidly. At these times horses may be better managed by keeping them in a stable and/or yard with supplementary feed and letting them out to graze for limited periods.

Suitable species

Grasses

Prairie grass

Prairie grass is very acceptable to horses. Prairie grass performs well on very fertile soils under favourable growing conditions. It will not persist under dry conditions. Some varieties have a longer growing season and are not as prone to go to seed as early as the naturalised strain of prairie grass which starts seeding in August/September.

Ryegrass

Ryegrass is a lush, desirable, cool season pasture for horses. It requires high rainfall or irrigation, good soil fertility, and good grazing management to persist.

Phalaris

Phalaris sown with white, red and sub clover and/or lucerne is quite acceptable for horses. It must be rotationally grazed to allow seedhead development in spring and good growth after autumn breaking rains.

Fescue

Fescue pastures are very acceptable to horses in the first year of growth. The plants tend to become tussocky and coarse and less acceptable to horses in later years. Fescues prefer moist areas. These areas are prone to damage by horses, making management difficult.

Fescues and ryegrasses can contain endophytes. They are bred into ryegrass and fescue to improve the plants' tolerance to insects and to improve productivity. Endophytes can affect the acceptability of the pasture, ultimately affecting livestock performance. When selecting ryegrasses and fescues check the endophyte status.

Cocksfoot

Cocksfoot is more suited to high altitudes. It thrives in the tableland areas of New South Wales. Cocksfoot dominant pastures in South Africa have caused calcium deficiency in horses.

Kikuyu

Kikuyu is the most common coastal NSW horse pasture because of its ability to persist. It contains an oxalate that inhibits the uptake of calcium. This deficiency can be overcome by supplementary feeding a calcium supplement (see below) or by overseeding ryegrass and clover into the kikuyu in autumn.

Couch grass

Couch grass has often been regarded as a weed. It is very acceptable to horses, very hardy and capable of tolerating high stocking rates on poorer sandy soils.

Red clover

Red clover has always been regarded as a most acceptable clover for horses because of its summer growth habit. Always select a low oestrogen variety as infertility has been reported in broodmares grazing high oestrogen varieties.

Subterranean clover

Sub clover is a self-regenerating annual with winter spring growth habit. It is adapted to many horse areas. Horses readily accept subterranean clover. Some older varieties contain high oestrogen levels.

White clover

White clovers are not readily accepted. In most cases horses prefer to graze other pasture species and weeds in the paddock. However, white clovers should be included in pasture mixes because they are widely adapted to coastal and milder inland areas.

Lucerne

Lucerne is another popular legume for horses, more suited to non-coastal situations. To increase persistence and yield it is important that the plants are not overgrazed. Rotational grazing is especially important when managing lucerne as it allows the plant to build up energy reserves and to persist. Lucerne is susceptible to leaf spot diseases. Mares grazing lucerne or eating lucerne hay with excessive leaf spot may have fertility problems.

Calcium problems associated with pasture species

The ideal calcium to phosphorus ratio for horses is 2:1. Most clovers and medics (including lucerne) have ratios in excess of 2:1. Most grasses have calcium to phosphorus ratios of 1:1. However, the lusher a grass is the lower the calcium to phosphorus ratio. In some cases the ratio may be 0.8:1. Pastures that are over-fertilised with effluent run-off and are very lush can be a problem. Including grasses, clovers and medics in the pasture mix will overcome this problem. See Table 1.

Table 1. Feed value of common horse pastures and forage crops on a dry matter basis (Ref. Camdairy)

Pasture/crop	Metabolisable Energy	Crude Protein %)	Ca : P (g/kg)
Lucerne early veg.	10	22	4.57 : 1
Lucerne late veg.	9	18	4.48 : 1
Lucerne flowering	8.5	16	4.48 : 1
Ryegrass early veg.	12.5	22	1.3 : 1
Ryegrass late veg.	12	18	1.3: 1
Oats early veg.	11.3	20	1.5 : 1
Oats late veg.	10.2	17	1.5:1
White clover early veg.	11.5	23	4.3 : 1
White clover late veg.	11.0	18	5.4 : 1
Kikuyu early veg.	8.5	16	1.1 : 1
Kikuyu late veg.	8.0	13	1.1:1

Table 2. Effect of calcium:oxalate ratio on availability of calcium (adapted from Hinz, 1990)

Names	Calcium %	Oxalate %	Ca oxalate	Ca availability
Flinders grass	0.49	0.25	1.92	99%
Rhodes	0.80	0.45	1.79	76%
Oaten chaff	0.11	0.08	1.36	100%
Buffel	0.40	1.06	0.38	17%
Green panic	0.26	0.81	0.32	42%
Kikuyu	0.28	1.30	0.23	20%
Narok setaria	0.27	1.60	0.13	0%

Horses grazing some tropical grasses for extended periods can suffer `Big Head' disease or *Osteodystrophia fibrosa*. These grasses are buffel grass, green panic, setaria, kikuyu, guinea grass, para grass, pangola grass and signal grass. The cause of the problem is a high level of oxalates. Calcium oxalate is insoluble and unavailable to the horse. There needs to be more calcium than oxalate in the pasture for the calcium to be available. See Table 2.

Oaten chaff has 0.11 percent calcium with 0.08 percent oxalate and 100 percent of the oaten chaff calcium is available. However, Narok setaria has 0.27 percent calcium and 1.6 percent oxalate. It has a calcium to oxalate ratio of 0.1:3. Because oxalate dominates, it means none of the calcium is available to the horse.

Mineral supplement mixtures that provide the required amount of calcium to phosphorus should be made available to horses grazing setaria, buffel and kikuyu pastures. Good mixtures are 1 kilogram of rock phosphate mixed with 1.5 kilograms of molasses or 1 kilogram of a mixture of 1.33 kilograms of ground limestone and 0.66 kilograms of dicalcium phosphate mixed with 1.5 kilograms of molasses. Alternatively, supplement with a feed that is a good source of calcium such as lucerne hay.

Fodder crops

Fodder crops are usually grown in rotation with pastures providing feed when pastures are not actively growing.

Winter

For winter feed the most acceptable or preferred crops in order are triticale, barley, ryegrass and oats. Horse breeders have accepted for many years that barley was the most acceptable but recent observations at Hawkesbury Agricultural College indicate that triticale is the most acceptable.

Saia oats, one of the most productive oats, is totally unacceptable to horses until it goes to seed. The horses will then selectively eat the seedheads.

Berseem clover, a winter/spring growing legume, has been sown with ryegrass as a pasture. In the County of Cumberland it is gown as a winter forage crop for horses; baled wet it is fed to thoroughbred racehorses in work at the major racetracks in Sydney.

Summer

Summer feed has often been a problem on breeding stud farms. Farmers have experimented with various crops with little success. The most common summer forage crops are shirohie and japanese millet, pearl millets, hybrid millets, hybrid forage sorghums and sudan grass. They grow actively from November to March.

Horses do not like grazing the millets, hybrid sorghums and sudan grass. They prefer to graze summer grasses that might be growing in the paddock. The millets have an advantage over the hybrid sorghums and sudan grasses in that they do not cause prussic acid poisoning. The hybrid Sudan grasses are the best sorghum, sudan grass options because they have lower prussic acid and thinner stems with more leaf. Always check with the seed company for recommended grazing and cutting heights.

In areas of south-western United States, forage sorghums are reported to cause an increasing number of cases of `Cystitis syndrome' in horses. The condition causes irritation of the urethra and vagina in the mare, and of the urethra in the stallion and gelding. Another symptom is muscular incoordination in the rear quarters. So far as is known, sudan grass hay, if properly cured, may be used without danger.

Establishing pastures for horses

Soil fertility

A property can have many different soil types; therefore do not treat the whole property as if it were one paddock.

The most common nutrient deficiencies in New South Wales soils are phosphorus, sulphur, potassium, molybdenum and nitrogen.

To determine nutrient deficiencies and the level of nutrient deficiency, do a soil test. A soil test will provide the level of available soil nutrient. Then a fertiliser program needs to be developed for the property. Remember that each property, and paddocks on that property, are unique and must be treated as such.

A well-planned fertiliser program can be one of the best investments on a property. More feed is produced and the quality of feed is better, which ultimately means livestock performance and profitability are increased.

Applying small balanced rates of nitrogen; phosphorus; potassium; and sulphur; fertiliser on a regular basis is sensible where they are all deficient, when compared to the alternative of applying large quantities of only one nutrient.

When applying high rates of any fertiliser it is important to understand the effect of the program on other soil nutrients. In the past, some farmers have applied Mo single superphosphate annually over many years to find their livestock are copper deficient. Excess molybdenum can tie up copper, inducing copper deficiency in livestock.

Calcium, magnesium, copper and zinc may also be deficient in some soils. It is important that all deficiencies be met because one deficiency may limit the response to the other nutrients.

Lime is often used on acid soils to increase soil pH and calcium levels. Many horse owners believe horses do better on soils that are regularly limed regardless of the soil pH. This is incorrect. As long as a soil has adequate calcium levels and a desirable pH the addition of extra lime can be wasteful and in some cases dangerous. The amount of calcium relative to other minerals, particularly phosphorus, is more critical.

Poultry manure is readily available in the Sydney, Central Coast and Tamworth areas. It is a low analysis (approximately 3:2:1 N:P:K) organic fertiliser that must be applied at heavy rates (e.g. 10 t/ha) to get the best results. Cartage and spreading are difficult and costly. It is best applied in early spring. The Sydney and Central Coast area is dominated by poor sandstone soils which have a high prevalence of kikuyu and responds well to poultry manure.

Ground preparation

The most important issue in preparing a paddock for a pasture is weeds. Most horse paddocks have high populations of weeds because horses are supplementary fed grain that contains weed seeds. Also the selective grazing of pastures by horses encourages weeds.

Weeds can be classified into perennial, winter, spring annuals and summer annuals. Therefore a relatively quick ground preparation in autumn may not control the hard to kill perennials and summer annuals. It is important to know what weeds you have before sowing a pasture.

Pastures can be established by direct drill techniques (herbicides and no-till seeders), or by sowing into a prepared seedbed or a combination of both.

On heavily compacted soils, or where kikuyu is to be sown, sowing into a prepared seedbed may be the best option.

Time of sowing

March, April, May is the preferred time for most pasture species. In cool climates, sowing in August is an option. The subtropical grasses like kikuyu must be sown from October to March when soil temperatures are high. Where summer grass weeds are a problem sow in February/early March.

Pasture management

Stocking rates

The biggest problem on most horse properties is overstocking. Also horses dominate small holdings. Table 3 provides a guide to desirable stocking rates.

Table 3. A Guide to Stocking Rates on small holdings

Pasture	Horses per 2 acres
Highly pasture improved with summer and winter pasture species. High rates of fertiliser and irrigation.	4
Reasonable summer dominant pasture with some winter pasture species and moderate rate of fertiliser.	2
Poor pasture, low rate of fertiliser mainly summer dominant pasture.	1
Note: the above is only a guide to assist new horse owners.	

Relating the feed required by a dry sheep (wether) to the carrying capacity of land is another way of determining suitable stocking rates (see tables 4 & 5).

Example: A light horse has a DSE rating of 10. If the horse is grazing cleared, moderate fertility, native grasses, with no seed or fertiliser then the horse will need 5 hectares of pasture to survive.

It should be remembered that DSE ratings are a very approximate guide to carrying capacity and that monitoring and adjustments are continually needed to match the area to livestock requirements.

Table 4. Livestock DSE Ratings

Class of Livestock	DSE
Merino wether	1.0
Merino ewe	1.5
Steer	10.0
Cow	13.0
Light horse	10.0
Draught horse	14.0
Pony	6.0
Horse - light work	13.5
Horse - heavy work	18.7

Determining trace element deficiencies

Consult your veterinarian for advice on trace elements. Although blood test is the most accurate method of determining deficiencies, mineral imbalances are hard to diagnose, even with blood tests. The horse's metabolism will try to keep the blood level of minerals at normal levels even when there is insufficient for normal bone growth. It is best to prevent problems by providing a good balance in the pasture.

Care needs to be taken with lush pastures because some horses, particularly ponies, are prone to founder (laminitis) when the feed is lush. Urgent veterinary attention must be sought for any horse that shows a reluctance to move which might be the first stages of founder.

Grazing management

Horses are wasteful grazers. They selectively graze pastures, damaging parts of the pasture by overgrazing and leaving other parts of the pasture tall and rank and relatively unacceptable.

Management practices should reduce wastage of feed.

At all times maintain a high level of ground cover to prevent erosion. The appropriate level will vary with the situation (soil type, rainfall, slope, etc.) For most high rainfall areas of New South Wales 90% ground cover is acceptable.

Allow horses to graze the pasture. After they have grazed the paddock to 2.5 cm in height over 20 percent of the paddock, remove the horses. Slash or mulch the paddock and harrow the manure. Wait until the pasture is 10 cm in height before regrazing.

Opinions differ on the management of manure droppings in horse pastures. Spreading manure droppings evenly by running a chain harrow will add fertility to the soil and spread any parasite eggs in the droppings where they can be killed more easily by sunlight. Collecting and removing manure will help grazing management but could lead to major nutrient deficiencies. It is critical to apply a balanced fertiliser program with potassium if all the manure is removed. The other alternative of leaving the manure in the paddock encourages

Table 5. Estimated dryland carrying capacity in DSE ratings for the Northern Slopes of New South Wales

Class of Pasture	Average DSE/ha*
Native, unimproved, low fertility or country dominated by Poa Tussock	1.25
Cleared, moderate fertility, native grasses, no seed or fertiliser	2.0
Moderate fertility, native grasses plus sub-clover and fertiliser	5.75–6.0
Moderate fertility sown with phalaris sub-clover and fertiliser	7.5–10.5
Rotational grazed lucerne	12.5
Extensively grazed lucerne	8.75
Kikuyu + clover + oversown ryegrass and fertiliser (intensive)	25–30

* A ‘DSE’ is the dry sheep equivalent and is equal to the amount of feed needed to sustain a 50 kg Merino wether over a 12 month period.

selective grazing.

Rotational grazing is a must for horses. It is desirable to have at least 3 paddocks for a group of horses. However, because horses have a pecking order that includes biting and kicking, many horse managers prefer to set stock paddocks with smaller numbers of horses which means that paddocks do not get a rest to recuperate.

The rotation of clean pastures, in conjunction with a good parasite control program, will help to discourage parasites and diseases.

Keep horses out of the pasture during extreme wet weather to prevent 'pugging' of the soil with hooves.

Most pasture species will benefit from spelling – some to set seed and others to replenish energy reserves.

The optimum time to graze ryegrass is at the three-leaf stage, prairie grass at the five-leaf stage and kikuyu at the four and a half leaf stage.

To encourage vigorous growth of pastures it may be necessary to topdress with nitrogen fertilisers such as urea and nitram. Apply these fertilisers straight after mulching or slashing and give the paddock at least 4 weeks to regrow before grazing.

Weed management

Weeds are a problem in horse pastures because of selective grazing by horses and also because horses are usually supplementary fed. The bought feed can contain weed seeds. Correct grazing management is critical in controlling weeds but particular weeds can cause problems.

- Annual and perennial broadleaf weeds like Paterson's curse, Paddy's lucerne, wild radish and nettles thrive in horse paddocks. They grow in the overgrazed areas of the paddock. Spraying with a registered herbicide or removing by hand is necessary. These weeds usually grow near fence lines and under trees.
- Advanced hepatic disease has been noted in horses grazing Paterson's curse (*Echium plantagineurn*) and Fireweed (*Senecio madagascariensis*) in New South Wales.
- Horses have the ability to spread weed seeds. Paddy's lucerne (*Sida* sp.) has improved seed germination after passing through the digestive tract of a horse. St. John-Sweeting and Morris (1990) suggested horses that have previously grazed weeds should be held and fed in yards or stables for 10 days before being introduced to weed-free pastures.
- Crofton weed is very poisonous to horses. It thrives on coastal hill country with high rainfall, preferring sandstone and rocky escarpments. Inspect all horse pastures for this weed.
- Catsear or flatweed (*Hypocboeris radicata*) causes stringhalt in horses. It is often confused with annual smooth catsear (*Hypochoeris glabra*) and dandelion (*Taraxacum officinale*). Do not graze horses in heavily infested fields during the summer–autumn growth period.

Further reading

The following factsheets contain information on pastures. The factsheets are available from www.dpi.nsw.gov.au/aboutus/resources/factsheets

- P2.2.4 *Pasture establishment on native country: central and southern tablelands*
- P2.2.5 *Lucerne for pasture and fodder*
- P2.5.1 *Phalaris pastures*
- P2.5.5 *Cocksfoot - a versatile pasture grass*
- *Pastures for Horses – A Winning Resource* by Angela Avery, published by RIRDC

Acknowledgements

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- Fred Persiah, Werombi
- John Muir, Nepean Stud Farm, Grose Vale
- Ron & Val Males, Ralvon, Colo
- The White family, Robrick Lodge, Castlereagh
- Neil & Darcy Shedden, Hadden Farm, Ebenezer

Adequate subdivision enables rotational grazing, a practice which ensures horses are continually presented with clean pastures, better pasture utilisation, less weeds and adequate ground cover.

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Replaces Agfact P2.4.3

Check for updates of this Primefact at:
www.dpi.nsw.gov.au/primefacts

PASTURE IMPROVEMENT CAUTIONS
Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

The *Native Vegetation Act 2003* restricts some pasture improvement practices where existing pasture contains native species. Inquire through your office of the Department of Natural Resources for further details.

Job number 7441

9.5 Appendix E - Soil Analysis Results

AGVITA ANALYTICAL

expressSoil®

Client Details

Client:	ELDERS (KYNETON)	**Date received:**	25/10/2023
Grower:	NATHAN MATSINOS	**Current Paddock:**	HORSE PDK (Sampled: 25/10/2023)
Order No.:	AV71804	**Date reported:**	0/01/00
Sample ID:	23029402	**Profile sampled (cm):**	30
Lab code:	ES25	**Client agronomist:**	ROHAN MEGGS
Crop:	SOIL (Pasture)	**Soil Type:**	Medium Soil (CEC 8-12meq)

N-Check Results

NO3-N:	0.15ppm	**Nitrate:**	2.9 kg/ha	**Total available NO3 + NH4:**	**7.4 kg/ha**
NH4-N:	0.23ppm	**Ammonium:**	4.5 kg/ha	Total req. NO3 + NH4 (kg/ha):	
				Total available NITROGEN =	**4.2 kg/ha**
Bulk Density:	1.13 g/cm3	**Rootzone Moisture**	41 mm	**% Moisture:**	12.11% W/W

expressSoil Results

Analyte	Units	Result	Optimal Range	Status
pH (H_2O)*	(pH)	**5.08**	6 - 7	Acidic
pH ($CaCl_2$)*	(pH)	**4.34**	5.3 - 6.5	Acidic
EC*	dS/m	**0.036**	0 - 0.15	Satisfactory
Lime requirement	t/ha	**6.4**		
ESI	units	**0.027**	value >0.05	Low
Total Carbon*	%	**3.235**		
Total Nitrogen*	%	**0.239**		
Carbon:Nitrogen Ratio	(ratio)	**13.531**		
Organic Matter	%	**5**		
M3 PSR	(ratio)	**0.01**	0.06 - 0.23	Very Low
Mehlich Phosphorus*	ppm	**16.3**	40 - 90	Very Low
Potassium*	ppm	**75.1**	245 - 400	Very Low
Sulphur*	ppm	**9.9**	12 - 45	Low
Calcium*	ppm	**378**	1620 - 2700	Very Low
Magnesium*	ppm	**87.5**	200 - 400	Very Low
Sodium*	ppm	**21.4**	20 - 85	Satisfactory
Chloride*	ppm	**27.36**	0 - 200	Satisfactory
Zinc*	ppm	**1.45**	2.2 - 11	Low
Copper*	ppm	**0.45**	2.5 - 10	Very Low
Boron*	ppm	**0.66**	2.2 - 6	Very Low
Manganese*	ppm	**26.4**	18 - 70	Satisfactory
Iron*	ppm	**426.3**	35 - 230	Very High
CECe	meq/100g	**7.7**		
Calcium	meq/100g	**1.9 (24.7%CEC)**	8.1 - 13.5	Very Low
Potassium	meq/100g	**0.2 (2.6%CEC)**	0.6 - 1.0	Very Low
Magnesium	meq/100g	**0.7 (9.1%CEC)**	1.7 - 3.3	Very Low
Sodium	meq/100g	**0.1 (1.3%CEC)**	0.1 - 0.4	Satisfactory
Base Saturation	%	**37.7**	80 - 87	Very Low
Exchangeable Acidity	meq/100g	**4.8 (62.3%CEC)**	13 - 20 %CEC	Very High
Aluminium Saturation	%	**34.00**		
Ca:Mg Ratio	(ratio)	**2.71**	3 - 5	Low
K:Mg Ratio	(ratio)	**0.3**	0.3 - 0.5	Low

ASPAC

This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report by an * next to the analyte name.

Analysis by AgVita Analytical

The information in this report is factual only and is based on specific data (e.g. sampling, sample handling, extraction and analytical procedures) performed by AgVita on the sample analysed. Different results may be obtained from alternate procedures and different batch samples.

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BEST PRACTICE CERTIFICATION ISO9001 QUALITY MANAGEMENT SYSTEM

Appendix 10.

Indigenous Flora Revegetation Species List (EVC 47 & 175)

Macedon Ranges Shire
Indigenous Flora Revegetation Species List

Bioregion Name: BioregionNo: 6.2 Central Victorian Uplands

Ecological Vegetation Class Description

Valley Grassy Forest

EVC No': 47

Botanical Name:	Common	Form	RainFall:	Proposed Planting Area							Aspect		Soil Type			
				Hill Crests	CreekZone-DrainageLine	Escarpments	Slopes	Plains	VolcanicCone	Depression-Waterlogged	NthAspect	SthAspect	Granit	AlluvialPlain	Sedimentary	Volcanic
Hardenbergia violacea	Purple Coral-pea	Climber	More than 500mm pA	☐	☑	☐	☑	☑	☑	☐	☑	☑	☐	☑	☑	☑
Austrodanthonia caespitosa	Common Wallaby-grass	Grass	Broad ranging	☐	☐	☑	☐	☑	☐	☐	☑	☑	☐	☐	☑	☑
Austrodanthonia eriantha	Hill Wallaby-grass	Grass	More than 500mm pA	☐	☐	☐	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Austrodanthonia geniculata	Kneed Wallaby-grass	Grass	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Austrodanthonia pilosa	Velvet Wallaby-grass	Grass	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☐
Austrodanthonia racemosa var. racemosa	Stiped Wallaby-grass	Grass	Less than 500mm pA	☐	☑	☐	☐	☑	☐	☐	☑	☐	☐	☑	☐	☑
Dichelachne rara	Common Plume-grass	Grass	More than 500mm pA	☐	☐	☐	☑	☐	☐	☐	☑	☑	☐	☐	☐	☑
Elymus scaber var. scaber	Common Wheat-grass	Grass	Broad Ranging	☐	☑	☐	☑	☑	☐	☐	☑	☐	☐	☑	☐	☑
Joycea pallida	Silvertop Wallaby-grass	Grass	Broad Ranging	☑	☐	☐	☑	☐	☐	☐	☑	☐	☐	☑	☑	☐
Microlaena stipoides var. stipoides	Weeping Grass	Grass	Less than 500mm pA	☐	☑	☐	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Poa labillardierei	Common Tussock-grass	Grass	Broad Ranging	☐	☑	☑	☑	☑	☑	☐	☐	☑	☐	☑	☐	☑
Poa sieberiana	Grey Tussock-grass	Grass	Broad Ranging	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☐
Themeda triandra	Kangaroo Grass	Grass	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☐	☑
Acaena novae-zelandiae	Bidgee-widgee	Ground Cover	Broad Ranging	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☐	☑
Dichondra repens	Kidney-weed	Ground Cover	Broad Ranging	☐	☑	☑	☐	☑	☑	☑	☐	☑	☐	☑	☑	☑
Glycine clandestina	Twining Glycine	Ground Cover	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☑
Gonocarpus tetragynus	Common Raspwort	Ground Cover	Broad ranging	☑	☐	☑	☑	☐	☐	☐	☑	☑	☑	☐	☑	☑

Ecological Vegetation Class Description

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				Hill Crests	CreekZone-DrainageLine	Escarpments	Slopes	Plains	VolcanicCone	Depression-Waterlogged	NthAspect	SthAspect	Granit	AlluvialPlain	Sedimentary	Volcanic
Kennedia prostrata	Running Postman	Ground Cover	Less than 500mm pA	☑	☐	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑
Pelargonium australe	Austral Stork's-bill	Ground Cover	Less than 500mm pA	☐	☑	☐	☑	☑	☑	☐	☑	☑	☐	☑	☐	☑
Pelargonium rodneyanum	Magenta Stork's-bill	Ground Cover	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☑	☐	☑	☐	☑
Platylobium formosum	Handsome Flat-pea	Ground Cover	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐
Viola hederacea sensu Willis (1972)	Ivy-leaf Violet	Ground Cover	More than 500mm pA	☐	☐	☑	☑	☑	☑	☐	☑	☑	☐	☑	☑	☑
Helichrysum scorpioides	Button Everlasting	Herb	Less than 500mm pA	☑	☐	☐	☑	☑	☑	☐	☑	☐	☐	☐	☑	☑
Hovea heterophylla	Common Hovea	Herb	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☑	☑	☐	☑	☑	☑
Leptorhynchos squamatus	Scaly Buttons	Herb	Less than 500mm pA	☐	☐	☐	☑	☑	☑	☐	☑	☐	☐	☑	☑	☑
Microseris scapigera spp. agg.	Yam Daisy	Herb	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☐	☑
Pimelea humilis	Common Rice-flower	Herb	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☐	☑	☑
Podolepis jaceoides s.l.	Showy/Basalt Podolepis	Herb	Broad ranging	☐	☐	☐	☑	☑	☑	☐	☑	☑	☐	☐	☑	☑
Wahlenbergia stricta subsp. stricta	Tall Bluebell	Herb	Broad Ranging	☑	☐	☑	☑	☑	☑	☐	☑	☑	☐	☐	☐	☑
Arthropodium strictum s.l.	Chocolate Lily	Lily	Less than 500mm pA	☐	☑	☐	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Burchardia umbellata	Milkmaids	Lily	Less than 500mm pA	☐	☐	☐	☑	☑	☑	☐	☑	☐	☐	☑	☑	☑
Dianella revoluta s.l.	Black-anther Flax-lily	Lily	Broad Ranging	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Tricoryne elatior	Yellow Rush-lily	Lily	Less than 500mm pA	☐	☐	☐	☑	☑	☑	☐	☑	☐	☐	☑	☐	☑
Arthropodium milleflorum s.l.	Pale Vanilla-lily	Lily/Bulb	More than 500mm pA	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐
Stylidium graminifolium s.l.	Grass Triggerplant	Lily/Bulb	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☑
Lomandra filiformis	Wattle Mat-rush	Rush	Broad Ranging	☑	☐	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑
Lomandra longifolia	Spiny-headed Mat-rush	Rush	More than 500mm pA	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☑	☑	☑
Acacia stricta	Hop Wattle	Shrub	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Acacia verticillata	Prickly Moses	Shrub	More than 500mm pA	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑

Ecological Vegetation Class Description

Valley Grassy Forest

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Botanical Name:	Common	Form	RainFall:	Proposed Planting Area							Aspect		Soil Type			
				Hill Crests	CreekZone-DrainageLine	Escarpments	Slopes	Plains	VolcanicCone	Depression-Waterlogged	NthAspect	SthAspect	Granit	AlluvialPlain	Sedimentary	Volcanic
Bursaria spinosa subsp. spinosa	Sweet Bursaria	Shrub	Less than 500mm pA	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑	☑	☑
Cassinia aculeata	Common Cassinia	Shrub	Broad Ranging	☐	☐	☐	☑	☑	☐	☑	☑	☐	☐	☑	☑	☑
Cassinia arcuata	Drooping Cassinia	Shrub	Broad Ranging	☑	☐	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑
Daviesia latifolia	Hop Bitter-pea	Shrub	More than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☐
Leptospermum continentale	Prickly Tea-tree	Shrub	More than 500mm pA	☐	☑	☐	☐	☐	☐	☑	☑	☑	☐	☑	☑	☑
Pultenaea humilis	Dwarf Bush-pea	Shrub	More than 500mm PA	☑	☐	☑	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Billardiera scandens	Common Apple-berry	Shrub - Small	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐
Daviesia leptophylla	Narrow-leaf Bitter-pea	Shrub - Small	Broad Ranging	☑	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☐
Daviesia ulicifolia	Gorse Bitter-pea	Shrub - Small	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐
Dillwynia cinerascens s.l.	Grey Parrot-pea	Shrub - Small	Less than 500mm pA	☑	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☑
Indigofera australis	Austral Indigo	Shrub - Small	Broad Ranging	☐	☐	☑	☑	☑	☐	☐	☐	☑	☐	☐	☑	☑
Leucopogon virgatus	Common Beard-heath	Shrub - Small	Less than 500mm pA	☑	☐	☐	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Eucalyptus dives	Broad-leaved Peppermint	Tree - Large	Less than 500mm pA	☑	☐	☐	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Eucalyptus obliqua	Messmate Stringybark	Tree - Large	More than 500mm pA	☑	☑	☐	☑	☐	☐	☐	☑	☑	☑	☑	☑	☑
Eucalyptus ovata	Swamp Gum	Tree - Large	More than 500mm pA	☐	☑	☐	☐	☑	☐	☑	☑	☑	☑	☑	☑	☑
Eucalyptus radiata s.l.	Narrow-leaf Peppermint	Tree - Large	More than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☑	☑	☑	☑	☑
Eucalyptus rubida	Candlebark	Tree - Large	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☑
Eucalyptus viminalis	Manna Gum	Tree - Large	Broad Ranging	☑	☑	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Acacia dealbata	Silver Wattle	Tree - Medium	Broad Ranging	☐	☑	☐	☑	☑	☐	☑	☐	☑	☑	☑	☐	☑
Acacia melanoxylon	Blackwood	Tree - Medium	Broad Ranging	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Acacia mearnsii	Black Wattle	Tree - Small	Less than 500mm pA	☑	☐	☑	☑	☑	☑	☐	☑	☐	☑	☑	☐	☑
Acacia pycnantha	Golden Wattle	Tree - Small	Less than 500mm pA	☑	☐	☑	☑	☑	☑	☐	☑	☐	☐	☐	☐	☑

Ecological Vegetation Class Description

Valley Grassy Forest

EVC No': 47

Botanical Name:	Common	Form	RainFall:	Proposed Planting Area							Aspect		Soil Type			
				Hill Crests	CreekZone-DrainageLine	Escarpments	Slopes	Plains	VolcanicCone	Depression-Waterlogged	NthAspect	SthAspect	Granit	AlluvialPlain	Sedimentary	Volcanic
Acacia retinodes	Wirilda	Tree - Small	Broad Ranging	☐	☐	☐	☑	☑	☐	☐	☐	☐	☐	☑	☑	☑
Allocasuarina littoralis	Black Sheoak	Tree - Small	Less than 500mm pA	☐	☐	☑	☑	☑	☑	☐	☑	☐	☐	☑	☑	☑

Macedon Ranges Shire
Indigenous Flora Revegetation Species List

Bioregion Name: BioregionNo: 6.1 Goldfields

Ecological Vegetation Class Description

Grassy Woodland

EVC No': 175

Botanical Name:	Common	Form	RainFall:	Proposed Planting Area							Aspect		Soil Type			
				Hill Crests	CreekZone-DrainageLine	Escarpments	Slopes	Plains	VolcanicCone	Depression-Waterlogged	NthAspect	SthAspect	Granit	AlluvialPlain	Sedimentary	Volcanic
Hardenbergia violacea	Purple Coral-pea	Climber	More than 500mm pA	☐	☑	☐	☑	☑	☑	☐	☑	☑	☐	☑	☑	☑
Austrodanthonia racemosa var. racemosa	Stiped Wallaby-grass	Grass	Less than 500mm pA	☐	☑	☐	☐	☑	☐	☐	☑	☐	☐	☑	☐	☑
Austrodanthonia setacea	Bristly Wallaby-grass	Grass	More than 500mm pA	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☑	☐
Austrostipa bigeniculata	Kneed Spear-grass	Grass	Less than 500mm PA	☐	☐	☑	☐	☑	☐	☐	☑	☑	☐	☐	☐	☑
Austrostipa elegantissima	Feather Spear-grass	Grass	Broad ranging	☑	☐	☑	☑	☑	☐	☐	☐	☐	☐	☐	☑	☑
Austrostipa mollis	Supple Spear-grass	Grass	Broad Ranging	☐	☑	☐	☐	☑	☐	☐	☑	☑	☐	☑	☐	☑
Austrostipa scabra	Rough Spear-grass	Grass	Broad ranging	☑	☐	☑	☐	☑	☑	☐	☑	☐	☐	☐	☑	☑
Elymus scaber var. scaber	Common Wheat-grass	Grass	Broad Ranging	☐	☑	☐	☑	☑	☐	☐	☑	☐	☐	☑	☐	☑
Joycea pallida	Silvertop Wallaby-grass	Grass	Broad Ranging	☑	☐	☐	☑	☐	☐	☐	☑	☐	☐	☑	☑	☐
Microlaena stipoides var. stipoides	Weeping Grass	Grass	Less than 500mm pA	☐	☑	☐	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Poa sieberiana	Grey Tussock-grass	Grass	Broad Ranging	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☐
Themeda triandra	Kangaroo Grass	Grass	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☐	☑
Acacia aculeatissima	Thin-leaf Wattle	Ground Cover	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐
Bossiaea prostrata	Creeping Bossiaea	Ground Cover	Broad Ranging	☐	☐	☐	☑	☑	☐	☐	☑	☐	☑	☑	☑	☐
Convolvulus erubescens spp. agg.	Pink Bindweed	Ground Cover	Less than 500mm pA	☐	☐	☑	☐	☑	☑	☐	☑	☐	☐	☐	☐	☑
Dichondra repens	Kidney-weed	Ground Cover	Broad Ranging	☐	☑	☑	☐	☑	☑	☑	☐	☑	☐	☑	☑	☑
Gonocarpus tetragynus	Common Raspwort	Ground Cover	Broad ranging	☑	☐	☑	☑	☐	☐	☐	☑	☑	☑	☐	☑	☑

Ecological Vegetation Class Description

Grassy Woodland

EVC No': 175

Botanical Name:	Common	Form	RainFall:	Proposed Planting Area							Aspect		Soil Type			
				Hill Crests	CreekZone-DrainageLine	Escarpments	Slopes	Plains	VolcanicCone	Depression-Waterlogged	NthAspect	SthAspect	Granit	AlluvialPlain	Sedimentary	Volcanic
Calocephalus citreus	Lemon Beauty-heads	Herb	Less than 500mm pA	☐	☐	☐	☑	☑	☑	☐	☑	☐	☐	☑	☐	☑
Chrysocephalum apiculatum s.l.	Common Everlasting	Herb	Less than 500mm pA	☐	☐	☐	☑	☑	☑	☐	☑	☐	☐	☑	☑	☑
Chrysocephalum baxteri	White Everlasting	Herb	More than 500mm pA	☐	☐	☐	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Chrysocephalum semipapposum	Clustered Everlasting	Herb	Less than 500mm pA	☑	☐	☐	☑	☑	☑	☐	☑	☐	☐	☐	☑	☑
Hovea heterophylla	Common Hovea	Herb	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☑	☑	☐	☑	☑	☑
Pimelea humilis	Common Rice-flower	Herb	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☐	☑	☑
Veronica plebeia	Trailing Speedwell	Herb	Broad ranging	☐	☐	☑	☑	☐	☐	☐	☑	☑	☐	☐	☑	☐
Vittadinia cuneata	Fuzzy New Holland Daisy	Herb	Broad ranging	☐	☐	☑	☑	☐	☐	☐	☑	☑	☐	☐	☑	☐
Wahlenbergia luteola	Bronze Bluebell	Herb	Broad ranging	☐	☐	☑	☑	☐	☐	☐	☑	☑	☐	☐	☑	☐
Wahlenbergia stricta subsp. stricta	Tall Bluebell	Herb	Broad Ranging	☑	☐	☑	☑	☑	☑	☐	☑	☑	☐	☐	☐	☑
Xerochrysum viscosum	Shiny Everlasting	Herb	Broad ranging	☑	☐	☑	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Arthropodium strictum s.l.	Chocolate Lily	Lily	Less than 500mm pA	☐	☑	☐	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Burchardia umbellata	Milkmaids	Lily	Less than 500mm pA	☐	☐	☐	☑	☑	☑	☐	☑	☐	☐	☑	☑	☑
Caesia calliantha	Blue Grass-lily	Lily	Less than 500mm pA	☑	☐	☑	☑	☑	☑	☐	☑	☐	☐	☐	☐	☑
Dianella revoluta s.l.	Black-anther Flax-lily	Lily	Broad Ranging	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Thysanotus patersonii	Twining Fringe-lily	Lily/Bulb	Less than 500mm pA	☑	☐	☐	☑	☑	☑	☐	☑	☐	☐	☑	☑	☑
Lomandra filiformis	Wattle Mat-rush	Rush	Broad Ranging	☑	☐	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑
Acacia paradoxa	Hedge Wattle	Shrub	Less than 500mm pA	☐	☐	☑	☑	☑	☐	☐	☑	☐	☐	☐	☐	☑
Bursaria spinosa subsp. spinosa	Sweet Bursaria	Shrub	Less than 500mm pA	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑	☑	☑
Cassinia arcuata	Drooping Cassinia	Shrub	Broad Ranging	☑	☐	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑
Dodonaea viscosa	Sticky Hop-bush	Shrub	Less than 500mm pA	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☐	☐	☑
Grevillea alpina	Cat's Claw Grevillea	Shrub	Broad Ranging	☐	☑	☐	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐

Ecological Vegetation Class Description

Grassy Woodland

EVC No': 175

Botanical Name:	Common	Form	RainFall:	Proposed Planting Area							Aspect		Soil Type			
				Hill Crests	CreekZone-DrainageLine	Escarpments	Slopes	Plains	VolcanicCone	Depression-Waterlogged	NthAspect	SthAspect	Granit	AlluvialPlain	Sedimentary	Volcanic
Pultenaea humilis	Dwarf Bush-pea	Shrub	More than 500mm PA	☑	☐	☑	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Pultenaea largiflorens	Twiggy Bush-pea	Shrub	Broad ranging	☑	☐	☑	☑	☐	☐	☐	☑	☑	☐	☐	☑	☐
Acacia acinacea s.s.	Gold-dust Wattle	Shrub - Small	Less than 500mm pA	☑	☐	☑	☑	☑	☑	☐	☑	☐	☐	☑	☐	☑
Atriplex semibaccata	Berry Saltbush	Shrub - small	Less than 500mm PA	☐	☐	☑	☑	☑	☑	☐	☑	☐	☐	☐	☑	☑
Daviesia leptophylla	Narrow-leaf Bitter-pea	Shrub - Small	Broad Ranging	☑	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☐
Daviesia ulicifolia	Gorse Bitter-pea	Shrub - Small	Broad Ranging	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐
Dillwynia cinerascens s.l.	Grey Parrot-pea	Shrub - Small	Less than 500mm pA	☑	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☑
Einadia nutans subsp. nutans	Nodding Saltbush	Shrub - small	Less than 500mm PA	☑	☐	☑	☐	☑	☑	☐	☑	☐	☐	☐	☑	☑
Eutaxia microphylla	Common Eutaxia	Shrub - Small	Broad ranging	☑	☐	☑	☑	☐	☐	☐	☑	☑	☐	☐	☑	☑
Eucalyptus leucoxylon	Yellow Gum	Tree - Large	Broad ranging	☑	☐	☑	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Eucalyptus melliodora	Yellow Box	Tree - Large	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☑	☑	☑	☑
Eucalyptus microcarpa	Grey Box	Tree - Large	Less than 500mm pA	☐	☐	☐	☐	☑	☐	☐	☑	☐	☐	☐	☑	☑
Eucalyptus ovata	Swamp Gum	Tree - Large	More than 500mm pA	☐	☑	☐	☐	☑	☐	☑	☑	☑	☑	☑	☑	☑
Eucalyptus rubida	Candlebark	Tree - Large	Less than 500mm pA	☐	☐	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☑
Eucalyptus viminalis	Manna Gum	Tree - Large	Broad Ranging	☑	☑	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Acacia implexa	Lightwood	Tree - Medium	Less than 500mm pA	☑	☐	☑	☑	☑	☑	☐	☑	☐	☐	☐	☐	☑
Acacia melanoxylon	Blackwood	Tree - Medium	Broad Ranging	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Acacia pycnantha	Golden Wattle	Tree - Small	Less than 500mm pA	☑	☐	☑	☑	☑	☑	☐	☑	☐	☐	☐	☐	☑

Appendix 11.

Weed Detection & Control on Small Dams – Owners Guide

Weed Detection and Control on Small Farms

A Guide for Owners

Brian Sindel & Michael Coleman

Acknowledgements

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With the exception of the photograph on page 18 ('blackberry rust', Weeds CRC/CSIRO Entomology), all photographs used in this booklet are sourced from Brian Sindel and the Institute for Rural Futures, University of New England.

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Disclaimers

Descriptions of herbicide use in this guide are not to be taken as recommendations. Herbicides must only be used in accordance with the recommendations provided on herbicide labels. Landholders are advised to consult with their State or Territory government departments regarding the legal requirements relating to weed control.

Australian Government
Land & Water Australia

une University of New England

Institute for Rural Futures

Contents

Introduction

Weeds constitute a significant cost to Australian agriculture each year, both in terms of control and lost productivity. However, weeds also cause problems for the owners of small 'hobby' or lifestyle farms.

Apart from the legal obligation to control certain weeds, extensive weed outbreaks on small farms may:

- impact on biodiversity and human health;
- spread to neighbouring land, including production farms, which in turn may strain community relationships;
- cut significantly into niche-farming profits;
- detract from time better spent on other activities;
- make it more difficult to restore natural habitats on your land;
- detract from the natural beauty of your land and reduce its value;
- increase farm costs;
- be toxic or harmful to livestock and pets;
- harbour feral animals such as rabbits and foxes; and
- make it difficult to access certain areas of your farm.

The primary emphasis of this booklet is on *the importance of detecting and controlling weeds on your land before they have a chance to spread*. It is also important to *seek advice and assistance from your local weeds officer*, and, when necessary, to *work with your neighbours to control weeds*. In the longer term, effective and diligent weed control will make managing your farm easier and less time-consuming, and will allow you to focus on the enjoyable aspects of living in rural Australia.

In the following pages we discuss the significance of weeds to small farms in Australia, and summarise best practice weed detection and control methods most appropriate to small farm owners. Much of this information is based on a 2008 national survey of weed officers and landholders.

It is important to understand the 'principles' of weed detection and control: what constitutes a weed, how weeds spread, where and when to look for weeds on your land, how to detect weeds and identify unknown species, and the best methods to control weed outbreaks *quickly*.

Considerable information, assistance and resources are available to help landholders control weeds on their properties. For small farm owners, however, external assistance can be expensive, difficult to access, or more appropriate to large-scale production agriculture.

Therefore, towards the end of this booklet, options for small farm owners seeking assistance with weed control are discussed. You will also find a list of contact details for relevant authorities in your State or Territory, and a list of useful references (weed identification booklets, brochures and websites).

What is a weed?

Weeds are plants that require some form of action to reduce their harmful effects on farmers' livelihoods, the economy, environment, human health and amenity.

Around 28,000 plant species have been introduced into Australia since European settlement. More than 2,770 of these have become naturalised and weedy, of which around 65% are considered a problem for natural ecosystems and about 35% are considered a problem for agricultural systems.

In addition to plants not native to Australia, weeds may include native plants that are growing outside their known natural range.

Some weeds are declared under legislation as requiring control by all landholders. These are usually particularly harmful and may not yet have spread far, and so it is in the wider community's best interest if individual landholders are required by law to control these weeds on their land.

Other more widespread weeds may not be declared under legislation, but there is an economic and environmental imperative for individual landholders to manage such weeds.

Each weed species may pose a threat to different regions or parts of Australia, depending on factors such as climate and the extent to which the weed has taken hold in a region. Some species may be declared or prohibited at a State/Territory or Federal level, while others may only be prohibited at a regional level (for example, a catchment or local government area).

To obtain a list of declared species for your region, contact your local weeds officer, weeds authority, council/local government office, or your State or Territory department of agriculture or primary industries. A list of weed identification resources is also included on pages 26 and 27.

How do weeds spread?

There are many different causes of weed spread. In reality, anything that moves or is moved may cause weeds to spread. Seventeen 'pathways' of weed spread have been identified in Australia (Sindel *et al.* 2008b).

- *Deliberate spread by humans*: aquarium plant trade, fodder trade, food plant trade, medicinal plant trade, ornamental plant trade, revegetation and forestry.
- *Accidental spread by humans*: agricultural produce, construction and landscaping materials, human apparel and equipment, livestock movement, machinery and vehicles, research sites, waste disposal.
- *Natural spread*: birds, other animals, water, wind.

The pathways most likely to spread weeds on farms include birds, wind, water, machinery and vehicles, hay and fodder, and livestock.

On small farm blocks, other pathways including ornamental plant trade (gardens and exotic tree plantings), food plant trade (orchards and vegetable gardens) and landscaping materials (mulches, gravel and topsoils) will also be important.

Minimising weed spread on your property

By identifying the potential ways in which weeds may spread onto your property, you may be able to implement some simple measures to reduce the appearance of new weeds in your paddocks or garden, or minimise the spread of weeds from one area of your property to another.

The best way to minimise weed spread onto other parts of your property, or onto neighbouring properties, is to eradicate the weeds at the source as soon as possible. In the longer term, you will have less weeds to remove, and will generally have to remove them from fewer locations.

Some reduction in the spread of weeds on your farm can be achieved by restricting the movement of newly acquired livestock, in case they are carrying weed seeds (inside or outside). It is also worth restricting the areas where off-farm fodder is fed to livestock, in case it is contaminated.

Other measures to prevent weeds spreading onto your land may include ensuring that potential weed species are not planted in the garden, removing garden plants that appear to be spreading into the paddocks, purchasing stock fodder that has been certified weed-free, ensuring your vehicles, or contractor vehicles, do not carry weed seeds onto your property from another recently visited property, or ensuring that seed attached to your clothing is removed and destroyed.

When you have determined which weed species are prevalent on your land or in your district, it is worth seeking advice from your local weeds officer to determine what can be done to limit the spread of these particular species.

Why is it important to control weeds on small farms?

Given the estimated cost of weeds to Australian agriculture of $4 billion annually (Sinden *et al.* 2004), the focus of weeds professionals and agencies is largely on the economic benefits of controlling weeds to maximise farm profits, on the legal requirements of controlling prohibited or declared species, or on biosecurity.

However, most small farm owners have purchased land not to make a profit, but to realise a variety of non-economic 'lifestyle' goals, including habitat restoration, self-sufficiency, family well-being, involvement in a rural community, and/or small-scale hobby farming (Hollier and Reid 2007).

Many small farm managers in Australia are keen to do more to control weeds on their land. Where small farm managers are unable to control weeds effectively, it is mostly due to lack of time, knowledge, or equipment, rather than lack of motivation (Low Choy and Harding 2008).

Early weed detection and on-going control is vital to effective land management on a small farm, and may prevent costly economic, environmental and human health and amenity impacts in the future. It is essential to find and eradicate new weeds *before* they become troublesome. Early detection and prevention is better than cure!

Keeping the weeds on your land under control will help you to enjoy your farm and get the most out of it. An extensive weed outbreak on your property will be expensive and time-consuming to control, may strain relationships with your neighbours, and will make it difficult to achieve other goals such as hobby farming or habitat restoration.

Being diligent in detecting and controlling weeds will minimise the chance of a large outbreak, will save you time and money, and will help you to enjoy the benefits of a rural lifestyle.

The first step in controlling weeds is successful detection. In the next few pages we summarise 'best practice' principles for detecting weeds on your farm.

What are the principles of weed detection?

Where should I look for weeds on my farm?

- *Near and downwind of previous weed infestation areas*
- *Watercourses and dams, particularly after floods*
- *Roadways and traffic areas*
- *Areas in which earthmoving and other contractors have been working*
- *Boundaries with neighbours and along fencelines*
- *Livestock camps and feeding areas*
- *Newly sown crop and pasture paddocks*
- *In remote or relatively inaccessible areas (such as remnant bushland)*
- *Near sheds, tanks, stock yards and other structures*
- *Revegetation areas (e.g. tree plantings) and gardens (particularly new gardens where mulch or topsoil has been used)*

When determining where on your property to check for weeds, consider:

- those areas that have had weed infestations in previous seasons *(seeds can often persist in the soil for many years)*; and
- focusing on areas on your property that may be particularly vulnerable to new weed infestations, such as those listed above *(identify these areas and inspect them for weeds on a regular basis).*

Relatively inaccessible areas on your property (such as areas of dense vegetation, remote areas, steep and/or rocky country) may be difficult to check for weeds. However, it is these areas which often have new weed infestations, for example, those spread by birds. On a small farm, it may be more practical to inspect difficult areas on foot, horseback, motorbike or quad bike, and to inspect other areas using a vehicle.

If you are new to your property, or are not certain which areas may be most vulnerable to weeds, you should ask your local weeds officer, agronomist, or your neighbours for advice. The parts of a property where weeds are most likely to be found vary across Australia.

When should I look for weeds?

Weed detection becomes a more important issue at certain times of year. The best time or times of year to look for weeds on your property will depend on the climate, the species of weeds prevalent in the district, and the type of farm you own.

For example, farmers in southern regions with a typical Mediterranean-type climate will check for weeds after the start of the autumn 'break' (first rains after a typical dry summer), or in early spring when there is still sufficient soil moisture from winter rains and warmer temperatures for weed growth. In northern monsoonal Australia, weeds will be best detected over the wet summer. However, in other parts of Australia, such as the subtropics and arid inland, time of year may be less important, due to relatively warmer temperatures, rainfall occurring at any time throughout the year, or the relative importance of year-round species.

The best approach is to check your property for weeds while doing other jobs, but also to undertake regular specific paddock inspections.

Why is time of year important for weed detection?

- *Each weed species has a particular life-cycle, and time of year when it is flowering or producing seed. It is important to detect and control weeds early in their life-cycle before they produce seed (there is a well known saying that "one year's seeding is 7 years weeding!").*
- *Some weed species are more noticeable at certain times of year.*
- *Often you will have the best chance of killing or controlling weeds, at least with herbicides, when they are young and actively growing.*
- *Seasonal and climatic conditions, particularly rainfall, influence the time of year when weeds are most likely to grow quickly.*
- *Likewise, major disturbances that create bare ground, such as floods, fire, cyclones, drought and overgrazing, and even weed control activity (such as spraying of herbicide) can contribute to weed infestation.*

It is important to know which weed species are most likely to grow on your land, and to be aware of how the factors above will affect the growth of these species. A list of weed identification resources is provided at the end of this booklet. Your State department of agriculture or primary industries, or weeds officer may also be able to provide fact sheets or further information on when specific weed species are likely to grow.

How do I identify an unknown weed or unusual plant?

Landholders may undertake a variety of identification measures when they find an unknown or unusual plant on their property, including:

- asking a local professional such as a weeds officer or agronomist for advice (see the section *Where can I get further information?*) – best option;
- using a weed identification book, a web site, or other reference materials (a list of useful materials is provided at the end of this booklet) – a good starting point then confirm by using professional identification service or weeds expert; and
- asking a neighbour (particularly one who is an experienced farm manager), other landholder or Landcare member for advice – a good starting point then follow if unsure with weed professional or identification service.

Noting the conditions in which the plant was growing, e.g. a wet area in a grazed paddock, can sometimes assist these people in identifying the plant.

It is important to identify an unknown or previously unseen plant on your land as soon as possible, to determine whether it is a weed and how to control it. If the plant is a weed, early identification and removal will give you the best chance of controlling the weed before it has a chance to spread and become a larger problem next season.

Why should I seek advice on unknown plants?

In the event that you find an unknown plant, it is highly recommended that you contact your local weeds officer or local government office for immediate advice. Weeds officers receive training in weed identification, and have access to other weed identification services including government agencies, agronomists, botanists, and herbaria. They can also provide you with information on the high priority weeds for which you should be looking.

A list of contacts is provided in the section *Where can I get further information?*

How do I collect and preserve a weed specimen for identification?

For proper identification, a flower or other reproductive part of the plant, for example, a fruit that contains the seed, is almost always required. You should therefore aim to collect one or two plants that have these 'structures' on them to take to your local weeds professional for identification. For large weeds, only part of the plant needs to be collected, as long as it contains all the types of structures of the plant, for example, leaves, stems, flowers and fruit. Storing the plant in a sealed plastic bag in a cool place out of the sun or in the fridge will keep it fresh for a day or two for ease of identification, and also eliminate the chance of seed spread.

Where the time between collection and identification is likely to be longer than a day, plants may need to be preserved in their original state by immediately pressing and drying them between sheets of newspaper (4 or 5 at least on each side), with a heavy object on top. It is important to change the newspaper every couple of days until the specimen is dried. The flattened and dried specimen can then be taken for identification as is, or taped to a piece of stiff paper or cardboard for easier display.

Digital photographs can also be taken of your unknown plant and shown or emailed to your weeds officer for identification. However, these need to include close-ups of all the parts as well as images of the whole plant. Photographs may also be preferable over a plant specimen when there is only one plant in the field (it could be a rare native species that requires protection) or when the weeds are seeding and there is a chance of weed spread if the plant is moved.

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What should I do when I find a new weed outbreak?

When farmers detect new weeds on their property, they are often marked (for example, with a stick, pole, or pile of rocks), or recorded in a farm note book or paddock diary if the farmer has one.

Once you have identified the plant, and if it is considered to be a serious weed, then it is important to notify your local weeds officer of the outbreak. They will record the location of the outbreak, and seek to manage the spread of the weed at the regional level.

The aim in marking and recording a weed 'find' is to be able to come back and regularly check the location. It is likely that if one weed is found, more plants will be found at that site in the future, particularly if that plant or another has set seed. The weeds seen above ground may only be 5% of what is there in total. Up to 95% may be seeds on and in the ground.

The time over which weed seeds will persist in the soil varies greatly between species, and so once a new weed is found, the location needs to be marked or recorded in some way and then checked regularly for a period of up to 5 years for new outbreaks, assuming no more seeds arrive at that site.

The most important action to take when finding a new weed outbreak on your property is to control the weeds as soon as possible. In the next section of this booklet we discuss appropriate weed control methods for small farm owners.

Controlling weed outbreaks on your farm

What are my weed control responsibilities?

There are many personal benefits for managers of small farms in controlling weeds as described earlier, but you also have a legal responsibility to the broader community to control weeds that are declared or prohibited under legislation that may spread and cause havoc elsewhere (lists of declared or prohibited weeds vary across Australia). It is advisable to control all weeds along property boundaries whether they are declared or not, simply to be a good neighbour and to avoid disputes about weed spread from one property to another.

You may too be required by law to inform neighbours or authorities before undertaking certain control activities, particularly large-scale spraying or burning.

If you are unsure of your weed control responsibilities, please seek advice from your local weeds officer. Legal responsibilities vary between States, Territories and local government areas.

Which control methods are suitable for small farm owners?

Experience shows that those farmers who have a plan (Deliberation), in which they integrate several control methods (Diversity), and with which they persist over many years (Dedication), are the ones most likely to have success in controlling weeds. In applying this '3D' approach, the two primary methods used by the majority of small farm owners to control new weed outbreaks are digging or pulling the weed out; and spraying the weed with a herbicide. However, there is also a variety of other options for weed control.

The control methods used will be dictated by the type or types of weeds you are controlling (hence accurate identification is important), their growth stage, the size of the infestation, the situation or site you are

controlling in, and the resources you have available. State and Territory departments overseeing agriculture and primary industries produce a series of weed management guides for particular species, usually available for free download from the web. Your local weeds officer or district agronomist will also be able to advise you on the best way to manage particular species in your region.

Some of the more common weed control methods for small farms are described below.

Farm hygiene

Good farm hygiene practices aim to stop weed seeds from ever entering your farm. You can do this, for example, by only buying weed-free hay and only feeding out hay in areas that can be regularly checked for weed growth in case the hay is contaminated with weed seeds.

Digging and pulling

Small numbers of weeds can be dug or chipped out with a hoe or pulled out by hand, but if they are setting seed then they should be bagged and burnt once the plants are dry. Gloves may be required for weeds like thistles and Bathurst burr that have sharp spines or for other weeds that may be poisonous (for example, Parthenium weed and some spurges). Broadcasting pasture seeds onto the site where weeds have been removed will help to outcompete weeds that may germinate there in the future (see following page).

Slashing and mowing

Slashing or mowing before plants set seed can be used to help control larger outbreaks of certain weeds in a pasture environment, particularly annuals that have a limited ability to reshoot once cut, such as several thistle species. Caution must be taken as slashing and mowing can also be a very effective means of spreading weeds especially perennial grasses. Ensure no seed are attached to the plants before using this method.

Outcompeting weeds

The best way to control weeds in a pasture is to promote the growth of desirable pasture plants so that they outcompete the weeds for water, nutrients and light. This may involve timely fertilizer application and/or irrigation at the start of the active growth period of the pastures. Where there is bare ground or gaps in the pasture, weeds will thrive. Consequently, these areas may need to be resown with seed of vigorous pasture plants. One sure way to promote pasture growth is to not graze your pastures too heavily (i.e. with too many animals), and to allow your pasture plants to set seed (often in summer) to fill in the pasture gaps with new seedlings. An ideal pasture mix, where climatic conditions allow it, will contain a mixture of perennial grasses and clovers.

Grazing

While most livestock avoid grazing unpalatable and toxic weeds in pastures, they can sometimes be encouraged to be less selective, and to eat and trample the less palatable non-toxic species, by running them in paddocks in large numbers for a short period of time. If timed correctly, such grazing can restrict the ability of weeds to set seed or otherwise propagate. Goats will selectively eat some weed species, such as blackberry, but unless a farm is set up to run goats, they can be difficult to contain. However, selective grazing with goats is a potentially useful method for controlling weeds on areas of your property that are difficult to access.

Mulching

Mulching with either a synthetic or natural organic mulch can suppress weed growth in gardens, orchards and other areas used to grow a variety of crops. Mulches act to cut out light to germinating seedlings, and provide a physical barrier to weed emergence.

Spraying with herbicide

There are two broad categories of herbicides. 'Selective' herbicides will kill certain target weeds but cause little damage to other weeds and certain desirable species. In contrast, 'non-selective' herbicides, such as the commonly used glyphosate, will kill most plants with which it comes in contact. It is particularly important, therefore, when using non-selective herbicides, to apply the chemical only to the target weed to avoid damage to surrounding vegetation.

Small outbreaks of weeds may be 'spot sprayed', often with a non-selective herbicide, using a backpack or handheld spray applicator. However, larger outbreaks of difficult-to-control weeds, such as perennial weedy grasses, may best be sprayed with a selective herbicide (registered for that weed and situation) using a vehicle mounted 'boom' applicator. Larger woody shrub weeds may need to be cut at ground level and the cut stem treated immediately with a suitably registered herbicide.

Bringing the control methods together

Farmers will combine these and other weed control methods in various ways. For example, in pastures, the first aim may be to remove existing weeds using methods known as 'weed removers'. Digging or pulling weeds out, or spot-spraying weeds are frequently the quickest and most economic methods for small farm owners, given the small scale of weed outbreaks they generally face. If you check your property regularly and thoroughly for weeds, and remove them as soon as possible (especially before they have had a chance to set seed), these simple control methods should remain applicable. The second aim may then be to make the pasture more resilient to future weed invasion by filling in gaps and promoting its growth using methods known as 'pasture improvers' (see *Outcompeting weeds* above).

A word on biological control

Biological control involves government agencies introducing to Australia 'natural enemies' of a particular weed, such as fungal pathogens or insects, from where the weed originated overseas. This has been done occasionally with spectacular success. But in *most* cases, biological control agents will only suppress growth and/or flowering, and will not achieve sufficient control alone. They therefore need to be integrated with other methods to achieve effective weed control.

While it is worthwhile finding out from your local weeds officer if biological control agents are available for you to establish in your weed infestation, you must realise that biological weed control programs are no 'silver bullets' for success and have largely only been introduced for some perennial non-grass weeds in aquatic, pasture, and rangeland habitats.

Further information on biological control options is available from the Australian Government web page *Weeds in Australia: Biological control* – www.weeds.gov.au/management/biological-control.html

How do I control large-scale weed outbreaks?

In some cases, you may be faced with a large weed control task that is too difficult to manage without help or expensive equipment. However, large-scale outbreaks often involve a number of neighbouring properties, particularly where there are a number of adjoining small farms. By joining together with your neighbours to control the same weed, you can share the associated labour and costs, and possibly even share equipment if, for example, one neighbour has a large sprayer. Local Landcare volunteers may also be able to assist, particularly if you intend to control large weed outbreaks as a step towards revegetation or environmental restoration works on your property.

Using accredited subcontractors

For small farm owners who may be time-poor, using a subcontractor for weed control may be an attractive option. Combining resources with your neighbours may make employing a spray contractor more affordable. When employing a contractor, ensure that they have the correct licencing and/or accreditation. Requirements vary across Australian States and Territories, so if you are not sure, contact your local weeds officer or authority for advice. They should be able to recommend a contractor, and may even be able to undertake the work themselves.

What are the guidelines for responsible use of herbicides?

Herbicides must be used in accordance with the instructions included on the label or packaging. You must always follow these instructions, as they maximize your chance of success, and it is illegal to do otherwise. It is important to wear appropriate protective clothing when using herbicides, which may include a long sleeved shirt and long pants, waterproof gloves, heavy duty shoes, eye protection and a respirator. Care is also needed to prevent herbicide spray droplets from drifting onto non-target vegetation and neighbours' properties and to protect the environment, such as watercourses, from chemical contamination. Drift can largely be avoided by not spraying in windy conditions and by adjusting your spray nozzle so that it does not produce fine, misty (small) spray droplets.

You may also be obliged by State or Territory legislation to undergo training and obtain accreditation or certification in correct chemical safety, handling, application and record-keeping procedures. Some States or Territories only require accreditation for those who use more than a certain amount of chemicals annually (although these requirements may have changed since this booklet was published). Several organisations offer accreditation or certification courses. See the section *Chemical certification or accreditation* for contact details.

You may also be required to keep records of chemical use on your property to comply with legislation or quality assurance programmes, such as the Livestock Production Assurance programme administered by Meat & Livestock Australia. If you participate in any quality assurance or primary production accreditation programmes, make sure you understand the requirements relating to chemical use. Organisations administering these programmes, or local weeds officers, will be able to provide advice on how chemical use records must be kept.

Chemical certification or accreditation

Short courses such as those developed by SMARTtrain or ChemCert Australia teach participants appropriate chemical storage, use and safety. Once you have completed the course, you will obtain accreditation in chemical use on farm, appropriate to your State or Territory's legal requirements. Ongoing accreditation may require participation in refresher courses after a set period (e.g. five years).

Training may be available from your State or Territory farmers association, TAFE, or other local provider. Your department of agriculture or primary industries, or your local weeds officer, should be able to advise you where training is available locally.

Alternatively, the SMARTtrain National Support Centre (freecall 1800 138 351) or ChemCert Australia (02 9387 4714) will also advise you on your responsibilities, where training is available locally, and on the form of accreditation required in your State or Territory.

What assistance is available to control weeds on my land?

Personal assistance

Weeds officers are responsible for weed detection and control within a district, but are also available to help all farmers, including small farm owners, to manage weeds on their land. They will be able to advise you on the most effective methods to control weeds. *If you need assistance or advice on weed control, your local weeds officer is the best first contact.* Your local government office or State/Territory government will be able to advise you who to contact locally.

Many rural merchandise stores now employ agronomists, who may also be able to offer you advice on controlling particular weed species. Your State or Territory government may also employ local or district agronomists. A list of State and Territory contacts is given in the section *Where can I get further information?*

Your neighbours may also be a useful source of assistance and advice. It may be in the best interests of neighbouring farmers (particularly commercial farmers) to see that weeds are kept under control in their district, as rapidly spreading weed infestations may impact on their farm's profitability. Whether they are prepared to help you manage weeds on your land will depend on the individuals concerned.

Financial assistance

Depending on the extent of the weed problem on your property, and the weed species involved, you may be able to obtain a grant to undertake control activities. Funding may be available from a range of sources, including various community and environmental grants from local, State, Territory, and Federal government, Landcare Australia, or regional natural resource management bodies (such as Catchment Management Authorities - CMAs).

Your chance of obtaining a grant to control weeds may increase if you apply for funding in conjunction with neighbours, if you are seeking to control prohibited or high priority weed species, or if the weed control work coincides with habitat restoration (such as revegetation or tree planting).

A list of possible funding providers is available on the following two web pages:

- *www.weeds.gov.au/government/programmes/index.html*
- *www.weeds.org.au/weedfunding.htm*

For advice on Australian Government funding sources, phone the Commonwealth Regional Information Service on 1800 026 222.

Where can I get further information?

To obtain further information on weeds on your property please contact your local weeds authority or local government/council, whose contact details should be listed in the 'White Pages'. Alternatively, a list of State or Territory contacts is provided below. Please be aware that these contact details may have changed since this booklet was produced.

National
Department of Agriculture, Fisheries and Forestry
Exotic Plant Pest Hotline
Phone: 1800 084 881
Web: www.daff.gov.au

Australian Capital Territory
Territory and Municipal Services
ACT Parks, Conservation and Lands
Phone: 13 22 81 or 02 6207 5111
Web: www.tams.act.gov.au/live/environment

South Australia
Department of Water, Land and Biodiversity Conservation
Animal and Plant Control Group
Phone: 08 8463 6800
Web: www.dwlbc.sa.gov.au

New South Wales
Industry and Investment New South Wales
Weeds Hotline (new weed incursions)
Phone: 1800 680 244
Email: weeds@dpi.nsw.gov.au
Web: www.dpi.nsw.gov.au/weeds

Tasmania
Department of Primary Industries and Water
DPIW Switchboard: 1300 368 550
Principal Weed Management Officer
Phone: 03 6233 6168
Web: www.dpiw.tas.gov.au

Northern Territory
Natural Resources, Environment, The Arts & Sport
Weed Management Branch (Darwin)
Phone: 08 8999 4567
Email: weedinfo.nretas@nt.gov.au
Web: www.nt.gov.au/nreta/natres/weeds/index.html

Victoria
Department of Primary Industries
Customer Service Centre
Phone: 136 186
Email: customer.service@dpi.vic.gov.au
new.landholders@dpi.vic.gov.au
Web: www.dpi.vic.gov.au

Queensland
Department of Primary Industries and Fisheries
Phone: 13 25 33 or 07 3404 6999
Email: callweb@dpi.qld.gov.au
Web: www.dpi.qld.gov.au

Western Australia
Department of Agriculture and Food Western Australia - Small Landholder Information Service
Phone: 08 9368 3807 or 08 9733 7777
Email: Small_Landholder@agric.wa.gov.au
Web: www.agric.wa.gov.au/

References and further reading

Department of Agriculture and Food, Western Australia (2003), *Biosecurity for Small Landholders*, Bulletin No. 4573, available from www.agric.wa.gov.au

Department of Agriculture and Food, Western Australia (2006), *The Land is in Your Hands*, Bulletin No. 4686, available from www.agric.wa.gov.au

Department of the Environment, Water, Heritage and the Arts (2007), *Weeds in Australia: How You can Help – Hobby Farmers*, www.weeds.gov.au/help/hobby.html

Department of Primary Industries, New South Wales (2005), *Weed Management FAQs*, www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/definition#faqs

Department of Primary Industries, Victoria (2007), *How to Manage Weeds*, Information Note LC0172, available from www.dpi.vic.gov.au

Hollier C, Reid M (2007), *Small Lifestyle Farms: Improving Delivery Mechanisms for Sustainable Land Management*. Rural Industries Research and Development Corporation, Canberra.

Low Choy D, Harding J (2008), *Exploring Agents of Change to Peri-urban Weed Management: Final Summary Report*. Land & Water Australia, Canberra.

North East Catchment Management Authority (2004), *A Resource Guide: Managing Your Rural Property*, Department of Primary Industries, Victoria and North East Catchment Management Authority, Rutherglen.

Nursery & Garden Industry Australia (2009), *Grow Me Instead: A Guide for Gardeners in New South Wales*, NGIA and Department of Environment, Water, Heritage and Arts, Canberra.

Sindel, BM (2000), *Australian Weed Management Systems*. RG and FJ Richardson, Melbourne.

Sindel B, Jhorar O, Reeve I, Thompson L, Coleman M (2008a), *Best Practice for On-ground Property Weed Detection*. Land & Water Australia, Canberra.*

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Sindel B, Jhorar O, Reeve I, Thompson L, Moss J, Coleman M (2009), *Weed Detection on Farms: A Guide for Landholders*, University of New England, Armidale.*

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* *These documents, on which this booklet is based, are available from www.ruralfutures.une.edu.au*

Weed identification resources

No one resource is sufficient for identifying weeds throughout Australia. Most resources have a regional focus. Your local weeds officer, local government office, State department of agriculture or primary industry, or rural merchandise store are likely to have a range of weed identification resources available. Weed identification training may also be available in your area, so ask your local weeds officer.

Listed below are some of the more general books, field guides, web sites and CD based weed identification tools available to Australian landholders.

These resources can be accessed through libraries, the web or purchased through book shops and book sellers, such as through Weed Information, Web http://www.weedinfo.com.au, phone (03) 5286 1533.

Books and field guides

Aquatic Weeds

Waterplants in Australia, by Sainty GR, Jacobs SWL (1994), Sainty and Associates, Darlinghurst.

Tropical and Subtropical Northern Australia

Weeds of the Wet/Dry Tropics of Australia: a Field Guide, by Smith N (2002), The Environment Centre NT, Darwin.

Crop Weeds of Northern Australia, by Wilson BJ, Hawton D, Duff AA (1995), Queensland Department of Primary Industries, Brisbane.

Poisonous Plants: a Field Guide, by Dowling R, McKenzie R (1993), Queensland Department of Primary Industries, Brisbane.

Temperate South Eastern Australia

Environmental Weeds: a Fieldguide for SE Australia, by Blood K (2001), CH Jerram and Associates, Science Publishers, Waverley.

Weeds: an Illustrated Botanical Guide to the Weeds of Australia, by Auld BA, Medd RW (1987), Inkata Press, Butterworth-Heinemann, Melbourne.

Weeds: the Ute Guide, by Cummins J, Moerkerk M (1996), Primary Industries South Australia, Adelaide.

Bush Invaders of South-East Australia, by Muyt A (2001), RG and FJ Richardson, Meredith, Victoria.

Crop Weeds, by Wilding JL, Barnett AG, Amor RL (1986), Inkata Press, Melbourne.

More Crop Weeds, by Moerkerk MR, Barnett AG (1998), RG and FJ Richardson, Meredith, Victoria.

Weeds of the South East: an Identification Guide for Australia, by Richardson FJ, Richardson RG, Shepherd RCH (2006), RG and FJ Richardson, Meredith, Victoria.

Field Guide to Weeds in Australia, by Lamp C, Collet F (1989), Inkata Press, Melbourne.

Grasses of Temperate Australia: a Field Guide, by Lamp CA, Forbes SJ, Cade JW (2001), CH Jerram and Associates, Science Publishers, Waverley.

Western Australia

Western Weeds: a Guide to the Weeds of Western Australia, by Hussey BMJ, Keighery GJ, Cousens RD, Dodd J, Lloyd SG (1997) The Plant Protection Society of Western Australia, Victoria Park.

Semi-arid and Arid Australia

Plants of Western New South Wales, by Cunningham GM, Mulham WE, Milthorpe PL and Leigh JH (1992), Inkata Press, Butterworth Heinemann, Melbourne.

Plant Identification in the Arid Zone, by Milson J (1996), Queensland Department of Primary Industries, Brisbane.

CDs

Declared Plants of Australia - An identification and information system for declared weeds. http://www.cbit.uq.edu.au/software/declaredplants/default.htm

Crop Weeds of Australia (Educational Version) - A crop weed identification and information tool for students. http://www.cbit.uq.edu.au/software/cropweedsaust/

Environmental Weeds of Australia - An interactive identification and information resource for over 1000 invasive plants. http://www.cbit.uq.edu.au/software/enviroweeds/

Web sites

Australian Government	http://www.weeds.gov.au/
Weeds Australia	http://www.weeds.org.au/

Weed outbreak record

The following two pages can be used to record weed outbreaks on your farm. Alternatively, you can adapt this table into a farm notebook, or computer spreadsheet or database, to suit your requirements. More information on weed marking and recording may be found in the section *What should I do when I find a new weed outbreak?*

Species	*Location (e.g. paddock)*	*How outbreak marked (e.g. stick, pole, rock pile)*	*Date controlled and how*	*When to check location again (e.g. Spring)*

Species	*Location (e.g. paddock)*	*How outbreak marked (e.g. stick, pole, rock pile)*	*Date controlled and how*	*When to check location again (e.g. Spring)*

To obtain an electronic copy of this booklet, please visit:

www.ruralfutures.une.edu.au

Australian Government
Land & Water Australia

une
University of New England

Institute for Rural Futures

Appendix 12.

Land Management Reporting Template

LAND MANAGEMENT REPORTING TEMPLATE

Lot 4 LP112012 Walls Lane, Pipers Creek 3444

Completed by:

Date:

Council Authorisation (name):

Council Authorisation (date):

Management Category	Outcome / Management Action		Where (Zone)	When	Who	Council Notes / Comments
Revegetation	Species	No. plants				
	Condition of revegetation / remedial action:					
	Comments:					

Management Category	Outcome / Management Action		Where (Zone)	When	Who	Council Notes / Comments
General Pest Plant Inspection / Control	Pest Plant Identified	Control Action				
	Control status / inspection comments:					
Pest Plant (Spiny Rush) Inspection / Control	Control Action:					
	Control status / inspection comments:					
Pest Plant (Kangaroo Thorn) Inspection / Control	Control Action:					
	Control status / inspection comments:					

Management Category	Outcome / Management Action		Where (Zone)	When	Who	Council Notes / Comments
Pest Animal Inspection / Control	Pest Animal Identified	Control Action				
	Control status / inspection comments:					
Pasture Inspection / Improvement	Inspection outcome:					
	Remedial action:					
	Comments:					
Soil Condition	Product(s) Applied:					
	Application Rate(s):					
	Comments:					

Management Category	Outcome / Management Action	Where (Zone)	When	Who	Council Notes / Comments
Livestock Grazing Plan	Review (effectiveness of grazing plan):				
	Remedial action (if required):				
	Comments:				
Infrastructure	Dam condition / actions:				
	External fencing condition / actions:				
	Internal fencing condition / actions:				
General Comments					

The above reporting template refers to the Land Management Works Plan developed for the site as described in Table 9 below from the LMP, Edwards Environmental, February 2024 (#877 V3).

AGVITA ANALYTICAL

eXpressSoil®

Client Details

Client:	ELDERS (KYNETON)	**Date received:**	25/10/2023
Grower:	NATHAN MATSINOS	**Current Paddock:**	HORSE PDK (Sampled: 25/10/2023)
Order No.:	AV71804	**Date reported:**	0/01/00
Sample ID:	23029402	**Profile sampled (cm):**	30
Lab code:	ES25	**Client agronomist:**	ROHAN MEGGS
Crop:	SOIL (Pasture)	**Soil Type:**	Medium Soil (CEC 8-12meq)

N-Check Results

NO3-N:	0.15ppm	**Nitrate:**	2.9 kg/ha	**Total available NO3 + NH4:**	**7.4 kg/ha**
NH4-N:	0.23ppm	**Ammonium:**	4.5 kg/ha	**Total req. NO3 + NH4 (kg/ha):**	
				Total available NITROGEN =	**4.2 kg/ha**
Bulk Density:	1.13 g/cm3	**Rootzone Moisture**	41 mm	**% Moisture:**	12.11% W/W

expressSoil Results

Analyte	Units	Result	Optimal Range	Status
pH (H_2O)*	(pH)	**5.08**	6 - 7	Acidic
pH ($CaCl_2$)*	(pH)	**4.34**	5.3 - 6.5	Acidic
EC*	dS/m	**0.036**	0 - 0.15	Satisfactory
Lime requirement	t/ha	**6.4**		
ESI	units	**0.027**	value >0.05	Low
Total Carbon*	%	**3.235**		
Total Nitrogen*	%	**0.239**		
Carbon:Nitrogen Ratio	(ratio)	**13.531**		
Organic Matter	%	**5**		
M3 PSR	(ratio)	**0.01**	0.06 - 0.23	Very Low
Mehlich Phosphorus*	ppm	**16.3**	40 - 90	Very Low
Potassium*	ppm	**75.1**	245 - 400	Very Low
Sulphur*	ppm	**9.9**	12 - 45	Low
Calcium*	ppm	**378**	1620 - 2700	Very Low
Magnesium*	ppm	**87.5**	200 - 400	Very Low
Sodium*	ppm	**21.4**	20 - 85	Satisfactory
Chloride*	ppm	**27.36**	0 - 200	Satisfactory
Zinc*	ppm	**1.45**	2.2 - 11	Low
Copper*	ppm	**0.45**	2.5 - 10	Very Low
Boron*	ppm	**0.66**	2.2 - 6	Very Low
Manganese*	ppm	**26.4**	18 - 70	Satisfactory
Iron*	ppm	**426.3**	35 - 230	Very High
CECe	meq/100g	**7.7**		
Calcium	meq/100g	**1.9 (24.7%CEC)**	8.1 - 13.5	Very Low
Potassium	meq/100g	**0.2 (2.6%CEC)**	0.6 - 1.0	Very Low
Magnesium	meq/100g	**0.7 (9.1%CEC)**	1.7 - 3.3	Very Low
Sodium	meq/100g	**0.1 (1.3%CEC)**	0.1 - 0.4	Satisfactory
Base Saturation	%	**37.7**	80 - 87	Very Low
Exchangeable Acidity	meq/100g	**4.8 (62.3%CEC)**	13 - 20 %CEC	Very High
Aluminium Saturation	%	**34.00**		
Ca:Mg Ratio	(ratio)	**2.71**	3 - 5	Low
K:Mg Ratio	(ratio)	**0.3**	0.3 - 0.5	Low

ASPAC

This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report by an * next to the analyte name.

BESTPRACTICE CERTIFICATION ISO9001 QUALITY MANAGEMENT SYSTEM

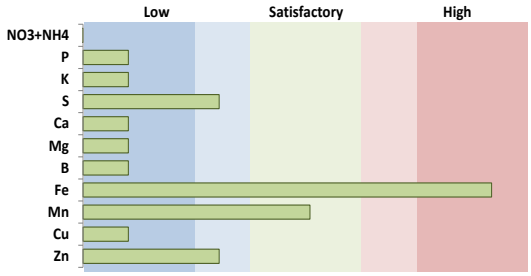
AGVITA ANALYTICAL

eXpressSoil®

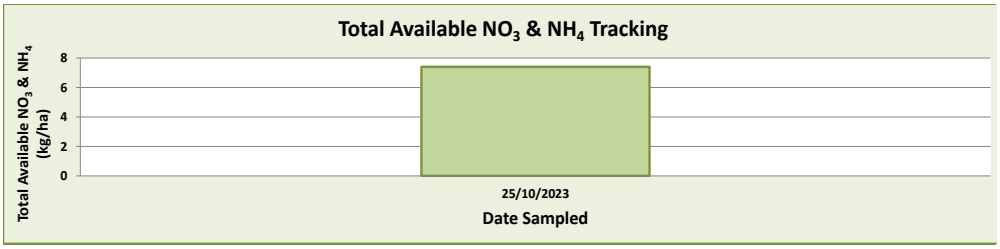
Nutrient Status and Imbalances*

HORSE PDK (Sampled: 25/10/2023)

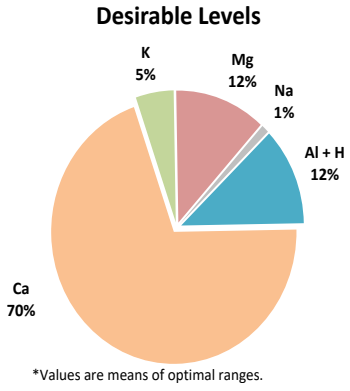
Analyte	Desired Level (kg/ha)	Measured Level (kg/ha)
NO3 + NH4		7.4
Phosphorus	46.3	11.6
Potassium	213.6	53.5
Sulphur	20.29	7.03
Calcium	1537.7	268.9
Magnesium	213.6	62.3
Boron	2.9	0.5
Iron	94.33	303.50
Manganese	31.3	18.8
Copper	4.4	0.3
Zinc	4.7	1.0



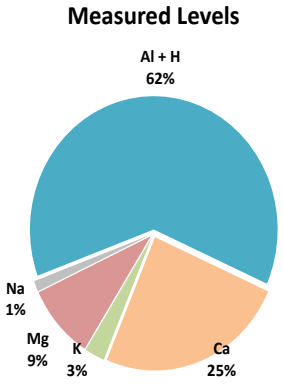
* For further explanation, please see our **expressSoil Users Guide** here



Soil Cation Ratio (as % CECe)



*Values are means of optimal ranges.



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Analysis by AgVita Analytical

The information in this report is factual only and is based on specific batch sampling, sample handling, extraction and analytical procedures performed by AgVita on the sample analysed. Different results may be obtained from alternate procedures and different batch samples.

The information in this report does not constitute any recommendation or professional advice by AgVita and professional advice from an agronomist should be sought before acting or relying on this information.

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BESTPRACTICE CERTIFICATION ISO9001 QUALITY MANAGEMENT SYSTEM

AGVITA ANALYTICAL eXpressSoil®

Recommendations: HORSE PDK (Sampled: 25/10/2023)

RECOMMENDATIONS:

Recommended Soil Ameliorant Applications

Product	Timing	Rate (kg/ha)	Application method	Comments

Recommended Fertiliser Applications

Product	Timing	Rate (kg/ha)	Application	N	P	K	S	Ca	Mg

Total nutrient application (kg/ha):

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Soil Report 25/10/2023

Lot 4 Walls Lane, Pipers Creek - Soil and Pasture Improvement Plan

Introduction
Historically the property has had little to no improvements to the soil. This has been outlined in the results of the soil analysis. A continuation of taking from the soil in the form of exports in pasture or feed and no program to replace those exports.
Plant nutrients need to be available for the plant to access them, so the plant can be healthy and therefore provide the appropriate nutrition to the animals that are feeding on that pasture. Returning appropriate levels of nutrition back to the soil enables the process of feeding the plants and animals to continue.

Results
pH
The level under the Calcium chloride analysis depicts a level of 4.34. This is acidic and at this level plants find it difficult to access nutrients. Nutrient “tie-up” becomes an issue as the level of pH will directly affect the status of elements and their availability to the plant in the soil.

The flow on effect of this pH level is outlined by the levels of the other nutrients in the report (report attached) which includes;
Low levels of
Phosphorous
Potassium
Sulphur
Calcium
Magnesium
Boron
Copper, and
Zinc
All of these are required for healthy plant growth and the trading of elements by the microbes in the soil.

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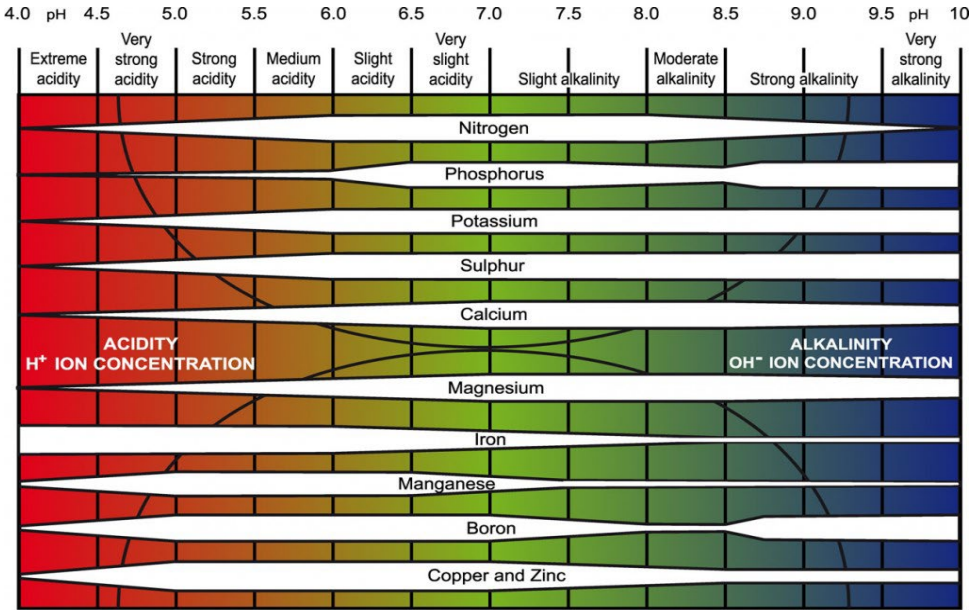
Soil Amendments
Firstly, the soil pH needs be corrected by adding lime to the topsoil. This is at a rate of 6.4 Tonnes per Ha. This will require time to activate.
The addition of lime is to adjust the pH towards neutral 6.5. (See table below)



Secondly the addition of lime as depicted by the table above shows the availability of nutrients in the soil as pH changes. At a pH of 6.5 nutrient availability to the plant is considered ideal.

Thirdly, the nutritional values in the soil will still need to be adjusted since they are low and haven't been replaced.
Desirable levels of nutrition for some elements can be achieved in the short-term other elements will be on going in the longer term mainly calcium (this is a slow moving element).

Macronutrients (Nitrogen, Phosphorous, Potassium, Sulphur, and Calcium) will be replaced in a granular form. Micronutrients (trace elements) can be replaced as granular or foliar (sprayed onto leaf).

Phosphorous
Can be delivered to the soil as MAP at 200kg/Ha, at planting.

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Potassium
Can be added to the soil as Hayboosta at 100kg/Ha before planting, follow up additions of foliar potassium can be added to the plant after emergence. Fertigofol.

Sulphur
Can be delivered to the soil as prilled gypsum at 200kg/Ha before planting

Calcium
Will be adding to the soil as lime 6.4 tonne/Ha and as prilled gypsum 200kg/Ha
The above additions to the soil should be achieved over 2-3 applications as 'dumping' of nutrition can lead to leaching.

Seed
The Elders horse mix will be sown for the horse paddocks and can be blended with other seed as required for the different paddocks regarding low lying areas, and water availability during the year.
There is also the ability to coat the seed prior to sowing with beneficial microbes particularly fungi to aid pasture establishment and plant resilience into the future.

Conclusion
The above recommendations will need be reassessed regularly as many aspects of pasture management can change over time and within the season. Organic inputs can also be used if desired, also cost-effective products can be utilised if need. Access to products can also be a limiting factor.
Environmental impacts of the forementioned inputs to the property will be negligible as the input levels are only for the improved pasture. It is not advised to add more than required levels of nutrition to the soil for pasture growth.
Once the soil nutritional levels are brought back into balance the owner would like to utilise a more holistic approach to pasture management, and even progress to organic methods if feasible.
This soil analysis is typical of many soil tests in the area. There are many tired soils in the area that require investment. With the right advice, management and timing of soil corrections there will be good pasture for horses.

Please don't hesitate to contact me if you require further assistance.

Rohan Meggs

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