

# Notice of Application for a Planning Permit

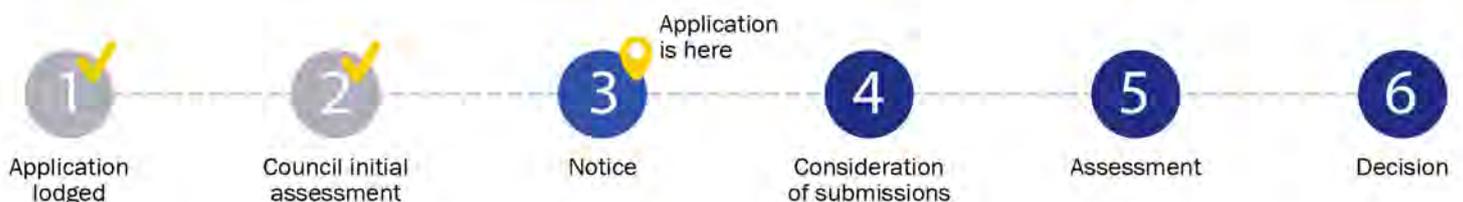
|   |   |
|---|---|
| The land affected by the application is located at: | L11 PS326096 V10139 F436<br>1000 Pakenham Road, Pakenham Upper VIC 3810                                 |
| The application is for a permit to:                 | Use and Development of the Land for a Dwelling and Alteration of Access to a Road in a Transport Zone 2 |

## APPLICATION DETAILS

|  |  |
|--|--|
| The applicant for the permit is:   |     |
| Application number:  | T230500  |
| You may look at the application and any documents that support the application at the office of the Responsible Authority:<br>Cardinia Shire Council, 20 Siding Avenue, Officer 3809.<br>This can be done during office hours and is free of charge.<br>Documents can also be viewed on Council's website:<br><a href="http://cardinia.vic.gov.au/advertisedplans">cardinia.vic.gov.au/advertisedplans</a> or by scanning the QR code. |  |

## HOW CAN I MAKE A SUBMISSION?

|  |   |   |
|--|---|---|
| This application has not been decided. You can still make a submission before a decision has been made. The Responsible Authority will not decide on the application before: | 02 July 2024  |   |
| <b>WHAT ARE MY OPTIONS?</b><br>Any person who may be affected by the granting of the permit may object or make other submissions to the responsible authority.               | <b>An objection must:</b> <ul style="list-style-type: none"><li>• be made to the Responsible Authority in writing;</li><li>• include the reasons for the objection; and</li><li>• state how the objector would be affected.</li></ul> If you object, the Responsible Authority will notify you of the decision when it is issued. | The Responsible Authority must make a copy of every objection available at its office for any person to inspect during office hours free of charge until the end of the period during which an application may be made for review of a decision on the application. |





# Request to amend a current planning permit application

This form is used to request an amendment to an application for a planning permit that has already been lodged with Council, but which has not yet been decided. This form can be used for amendments made before any notice of the application is given (pursuant to sections 50 / 50A of the *Planning and Environment Act 1987*) or after notice is given (section 57A of the Act).

## PERMIT APPLICATION DETAILS

|                      |                                  |
|----------------------|----------------------------------|
| Application No.:     | T230500PA                        |
| Address of the Land: | 1000 Pakenham RD, Pakenham Upper |

## APPLICANT DETAILS

|               |            |
|---------------|------------|
| Name:         | [REDACTED] |
| Organisation: | [REDACTED] |
| Address:      | [REDACTED] |
| Phone:        | [REDACTED] |
| Email:        | [REDACTED] |

## AMENDMENT TYPE

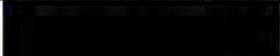
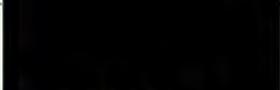
| Under which section of the Act is this amendment being made? (select one)                        |                                     |
|--|-------------------------------------|
| Section 50 - Amendment to application at request of applicant <b>before</b> notice:              | <input type="checkbox"/>            |
| Section 50A - Amendment to application at request of responsible authority <b>before</b> notice: | <input type="checkbox"/>            |
| Section 57A - Amendment to application <b>after</b> notice is given:                             | <input checked="" type="checkbox"/> |

## AMENDMENT DETAILS

| What is being amended? (select all that apply)  |   |  |
|---|---|--|
| What is being applied for <input type="checkbox"/>  | Plans / other documents <input checked="" type="checkbox"/> | Applicant / owner details <input type="checkbox"/> |
| Land affected <input type="checkbox"/>  | Other <input type="checkbox"/>                              |  |
| Describe the changes. If you need more space, please attach a separate page.                              |   |  |
| Amendment to the planing permit application. The location of the Dwelling will be in a different location |   |  |
|   |   |  |
|   |   |  |
|   |   |  |

|   |                                    |                      |
|---|------------------------------------|----------------------|
| Specify the estimated cost of any development for which the permit is required: |                                    |                      |
| Not applicable <input type="checkbox"/>   | Unchanged <input type="checkbox"/> | New amount \$150,000 |

### DECLARATION

|  |   |
|--|---|
| I declare that all the information in this request is true and correct and the owner (if not myself) has been notified of this request to amend the application. |   |
| Name:  |  |
| Signature:   |  |
| Date:  | 17/04/2024  |

### LODGEMENT

Please submit this form, including all amended plans/documents, to [mail@cardinia.vic.gov.au](mailto:mail@cardinia.vic.gov.au)

You can also make amendments to your application via the Cardinia ePlanning Portal at <https://eplanning.cardinia.vic.gov.au/>

If you have any questions or need help to complete this form, please contact Council's Statutory Planning team on 1300 787 624.

### IMPORTANT INFORMATION

It is strongly recommended that before submitting this form, you discuss the proposed amendment with the Council planning officer processing the application.

Please give full details of the nature of the proposed amendments and clearly highlight any changes to plans (where applicable). If you do not provide sufficient details or a full description of all the amendments proposed, the application may be delayed.

No application fee for s50/s50A requests unless the amendment results in changes to the relevant class of permit fee or introduces new classes of permit fees. The fee for a s57A request is 40% of the relevant class of permit fee, plus any other fees if the amendment results in changes to the relevant class (or classes) of permit fee or introduces new classes of permit fees. Refer to the *Planning and Environment (Fees) Regulations 2016* for more information.

The amendment may result in a request for more under section 54 of the Act and/or the application requiring notification (or re-notification). The costs associated with notification must be covered by the applicant.

Council may refuse to amend the application if it considers that the amendment is so substantial that a new application for a permit should be made.

Any material submitted with this request, including plans and personal information, will be made available for public viewing, including electronically, and copies may be made for interested parties for the purpose of enabling consideration and review as part of a planning process under the *Planning and Environment Act 1987*.

Copyright State of Victoria. No part of this publication may be reproduced except as permitted by the Copyright Act 1968 (Cth), to comply with a statutory requirement or pursuant to a written agreement. The information is only valid at the time and in the form obtained from the LANDATA REGD TM System. None of the State of Victoria, its agents or contractors, accepts responsibility for any subsequent publication or reproduction of the information.

The Victorian Government acknowledges the Traditional Owners of Victoria and pays respects to their ongoing connection to their Country, History and Culture. The Victorian Government extends this respect to their Elders, past, present and emerging.

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 10139 FOLIO 436

Security no : 124112078640U  
Produced 23/01/2024 03:36 PM

LAND DESCRIPTION

Lot 11 on Plan of Subdivision 326096R.  
PARENT TITLE Volume 09374 Folio 739  
Created by instrument PS326096R 25/10/1993

REGISTERED PROPRIETOR

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE PS326096R FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)

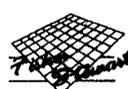
Street Address: 1000 PAKENHAM ROAD PAKENHAM UPPER VIC 3810

ADMINISTRATIVE NOTICES

NIL

DOCUMENT END

The information supplied by ALTS Corp has been obtained from GlobalX Pty Ltd by agreement between them. The information supplied has been obtained by GlobalX Pty Ltd who is licensed by the State of Victoria to provide this information via LANDATA® System.

|   |                        |  |                                  |  |
|---|------------------------|--|----------------------------------|--|
| <b>PLAN OF SUBDIVISION</b>  |                        | STAGE No.<br><hr/>   | LTO USE ONLY<br><b>EDITION 1</b> | PLAN NUMBER<br><b>PS 326096 R</b>  |
| <b>LOCATION OF LAND</b><br><br>PARISH: GEMBROOK<br><br>TOWNSHIP:<br><br>SECTION:<br><br>CROWN ALLOTMENT: 100 (PART)<br><br>CROWN PORTION:<br><br>LTO BASE RECORD: LITHO 2 (2645)<br>TITLE REFERENCES: VOL.9374 FOL.739<br><br>LAST PLAN REFERENCE/S: LP136624 ( LOT 9 ) (PART)<br>POSTAL ADDRESS: LOT 9 HEALESVILLE - KOO WEE RUP<br>(At time of subdivision) ROAD, PAKENHAM UPPER, 3810<br><br>AMG Co-ordinates E 369 300 ZONE: 55<br>(of approx centre of land in plan) N 5 793 600 |                        | <b>COUNCIL CERTIFICATION AND ENDORSEMENT</b><br><br>COUNCIL NAME: SHIRE OF PAKENHAM REF: P 8184 B<br><del>1. This plan is certified under Section 6 of the Subdivision Act 1988.</del><br>2. This plan is certified under Section 11(7) of the Subdivision Act 1988.<br>Date of original certification under Section 6. 28 / 8 / 93<br><del>3. This is a statement of compliance issued under Section 21 of the Subdivision Act 1988.</del><br><br>OPEN SPACE<br>(i) A requirement for public open space under Section 18 of the Subdivision Act 1988 <del>has</del> /has not been made.<br>(ii) <del>The requirement has been satisfied.</del><br><del>(iii) The requirement is to be satisfied in Stage .....</del><br><del>Council Delegate</del><br><del>Council Seal</del><br><del>Date / /</del><br><br>Re-certified under Section 11(7) of the Subdivision Act 1988.<br>Council Delegate<br><del>Council Seal</del><br>Date 23 / 8 / 93 |                                  |  |
| <b>VESTING OF ROADS AND/OR RESERVES</b>   |                        |  |                                  |  |
| IDENTIFIER  | COUNCIL/BODY/PERSON    |  |                                  |  |
| NIL   | NIL                    |  |                                  |  |
| <b>NOTATIONS</b>  |                        |  |                                  |  |
| STAGING This is not a staged subdivision.<br>Planning permit No. P 8184A  |                        |  |                                  |  |
| DEPTH LIMITATION DOES NOT APPLY.  |                        |  |                                  |  |
| LOTS 1 TO 9 (BOTH INCLUSIVE) HAVE BEEN OMITTED FROM THIS PLAN.<br>LOT 10 ONLY IS THE RESULT OF THIS SURVEY.<br>SURVEY THIS PLAN IS <del>NOT</del> BASED ON SURVEY<br>THIS SURVEY HAS BEEN CONNECTED TO PERMANENT MARKS No(s)<br>IN PROCLAIMED SURVEY AREA No.   |                        |  |                                  |  |
| <b>EASEMENT INFORMATION</b>   |                        |  |                                  | <b>LTO USE ONLY</b>  |
| LEGEND A - Appurtenant Easement E - Encumbering Easement R - Encumbering Easement (Road)  |                        |  |                                  | STATEMENT OF COMPLIANCE/<br>EXEMPTION STATEMENT  |
| Easement Reference  | Purpose                | Width (Metres)   | Origin                           | RECEIVED <input checked="" type="checkbox"/>   |
| E-1   | CARRIAGEWAY & DRAINAGE | SEE PLAN   | THIS PLAN                        | DATE: 5 / 10 / 93  |
|   |                        |  |                                  | LTO USE ONLY<br>PLAN REGISTERED<br>TIME 7:40 pm<br>DATE 25 / 10 / 93<br><br>Assistant Registrar of Titles |
|   |                        |  |                                  | SHEET 1 OF 2 SHEETS  |
|  <b>FISHER STEWART PTY.LTD.</b><br>Engineers • Surveyors<br>Town Planners<br>Environmental Consultants<br>88 Walsh Street, West Melbourne 3208<br>G.P.O.Box 8178AA Telephone 889 6488  |                        | LICENSED SURVEYOR (PRINT) <b>GERALD ROBERT SHONE</b><br>SIGNATURE ..... DATE / /<br>REF <b>3281</b> VERSION <b>B</b>   |                                  | DATE / /<br>COUNCIL DELEGATE SIGNATURE<br>ORIGINAL SHEET SIZE <b>A3</b>  |



649 CENTRE ROAD, EAST BENTLEIGH VIC 3165  
PO BOX 39, BONNIE DOON VIC 3720  
Phone: 0424 865 765

E-MAIL: [admin@ecov.com.au](mailto:admin@ecov.com.au)

## LAND CAPABILITY ASSESSMENT REPORT

**1000 Pakenham Road  
Pakenham Upper VIC**



Prepared for:



Site:

1000 Pakenham Road  
Pakenham Upper VIC

Prepared by:



– Eco Vision Australia

Reference No.

39FO24

Date:

June 4, 2024

## TABLE OF CONTENTS

1. Executive Summary
2. Introduction
3. Description of the Development
4. Site Key Features
5. Soil Assessment and Constraints
6. Land Capability Assessment Matrix
7. The Management Program
  - 7.1 Treatment System
  - 7.2 Land Application
  - 7.3 Sizing the Irrigation System
  - 7.4 Siting and Configuration of the Land Application Area
  - 7.5 Irrigation System Description
  - 7.6 Buffer Distances
8. Monitoring, Operation and Maintenance
9. Stormwater Management
10. Conclusions
11. References
12. Appendices:
  - i. Site Locality Plan – Property Report
  - ii. Proposed Development Plan
  - iii. Existing conditions
  - iv. Bureau of Meteorology Climate Report for Dandenong (086224) and Mean Rainfall Beaconsfield Upper (086261).
  - v. Water and Nitrogen Balance
  - vi. Test Site Location Plan
  - vii. Borelogs Descriptions

## 1. Executive Summary

The purpose of this report is to provide a Land Capability Assessment (LCA) for [REDACTED] who is proposing to construct a two bedroom + study dwelling on a site located at 1000 Pakenham Road, Pakenham Upper. It is proposed to install a Secondary Wastewater treatment plant (AWTS) on the site with the Land Application Area (LAA) for treated wastewater using Sub Surface Irrigation (SSI). The size of the roughly rectangular shaped allotment is approximately 10.2ha. Wastewater field sizing is based on an effective three bedroom bedroom capacity. The site will be connected to tank water with updated EPA guidelines allowing for a hydraulic load of 120L/P/D to be adopted for the site in conjunction with 4 star Wels fixtures and a minimum 3 star required for appliances. For the purposes of this report a hydraulic load of 150L/D/P has been adopted for additional conservatism.

The site is accessed from Pakenham Road along a narrow drive along the western boundary. The proposed dwelling is located in a cleared area towards the southern boundary as depicted in the site plan contained in the appendices. The allotment contains a slope from the south east to the north west. The proposed dwelling and LAA is located on a gentle to moderate slope and is very gently undulating with the proposed LAA having a gentle slope approximately 45 towards designated watercourse on the property.

The methods used for this report include soil tests and site survey undertaken by Eco Vision Australia (July 2<sup>nd</sup>, 2018) and (June 6<sup>th</sup>, 2024). A desktop study was undertaken and included obtaining relevant planning reports and climate data. Soil samples were taken and further analysed. These methods provided the information to write the LCA.

The overall land capability generally rates between very good to fair. One matrix indicator that rates as very poor is the watercourse setback that is less than 60 metres. The three matrix indicators that rates as poor utilising the land capability matrix is the soil permeability, soil category and rainfall. Installation of a secondary wastewater treatment system will aid in protection of the environment.

The soil type in the LAA consists of brown grey loam to a maximum depth of 300mm overlying yellow brown loam to a maximum depth of 700mm. Between 700mm to a maximum depth of 1200mm the soil grades into a strongly structured orange brown light clay. Below 1200mm to 1500mm the soil grades into an orange brown slightly red mottled medium clay. There was moisture throughout the soil profile, however given the recent wet weather the on-site soils inspected were not waterlogged. No groundwater within the proposed LAA was encountered.

The site allows for the utilisation of secondary wastewater treatment system with the septic (primary) tank with sand filter sized at 12m<sup>2</sup>. The allotment size is suitable for the installation of subsurface irrigation (SSI) as it complies with a minimum 30 metre watercourse setback to the north.

Site size is of sufficient size to allow for an appropriately sized effluent treatment field of a minimum size of 288m<sup>2</sup> (300m<sup>2</sup> can be adopted for additional environmental benefit) be established using Sub Surface Irrigation (SSI). A full water balance to attain zero water storage has been used to size the LAA. Hydraulic loading rates are typically 30% lower during these months. The water balance therefore sizes the SSI field adequately.

There is ample land available to apply secondary treated wastewater as shown on the site plan with the specific location located apart from areas within the cut and fill of the proposed dwelling. The LAA can be adjusted due to consistent soil profiles throughout although a minimum 30 metre setback to the watercourse is required. The LAA must be located in areas of natural soil profiles as depicted on the site plan.

The water balance is the most limiting factor in sizing the irrigation field with the following data shown below:

|  |   |  |
|--|---|--|
| Water Balance 480L/D – 231m <sup>2</sup> | Nitrogen Balance 480L/D – 159m <sup>2</sup> | Area Method 480L/D – 160m <sup>2</sup> |
| Water Balance 600L/D – 288m <sup>2</sup> | Nitrogen Balance 600L/D – 199m <sup>2</sup> | Area Method 600L/D – 200m <sup>2</sup> |

The aim of the on-site waste water management system achieves best environmental practice on the property.

Site Aerial Photo Depicting Watercourse and Forest Setbacks



## 2. Introduction

Eco Vision Australia has been engaged to undertake a Land Capability Assessment (LCA) for a site at 1000 Pakenham Road, Pakenham Upper. The field investigation and report have been undertaken and prepared by suitably experienced staff. Eco Vision Australia has appropriate professional indemnity insurance for this type of work. Our professional indemnity insurance certificate is available on request.

The report will accompany an application submitted to the Cardinia Shire Council to install a new secondary wastewater treatment system for a proposed two bedroom + study bedroom dwelling to be constructed on the allotment. This document provides information about the site and soil conditions. It also provides a detailed LCA and includes a conceptual design for a suitable onsite wastewater management system, including recommendations for monitoring and management requirements. LAA area sizing is based on six bedrooms.

The roughly rectangular shaped site allotment is approximately 10.2ha in size. The proposed house is to be built within the cleared area along the southern boundary with access to the site via a driveway to the located along the western boundary. Boundary dimensions are approximately 230 metres along the northern boundary, 340 metres along the eastern boundary and 397 metres along the western boundary. The southern boundary including driveway access is approximately 480 metres long, and south western boundaries. The allotment is undulating with the proposed LAA having a gentle to moderate slope with property elevations ranging from 190m to 160m. The site contains two designated watercourses with one located towards the forested area within the lower southern portion of the site.

Soil Testing and site survey was undertaken by Eco Vision Australia in July 2018 and June 2024.

Rainfall data was obtained from Beaconsfield Upper Climate Station – 086261. Evaporation data was obtained from Cranbourne Botanic Gardens Climate Station - 086375 as this is the closest Climate station that provides this data. There are now few climate stations that provide evaporation data.

There is sufficient land available for sustainable onsite effluent management that maintains appropriate buffers to protect sensitive receptors for to residentially develop the site.

We have considered a number of options for both the treatment system and land application area (LAA). Above all, effluent should be treated to secondary level through the installation of a septic (primary) tank with sand filter sized at 12m<sup>2</sup> or a secondary wastewater treatment plant (AWTS) and Land Application by SSI located within the cleared area (southern boundary) downslope and to the east of the proposed dwelling.

### 3. Description of the Development

**Table 1 Site Description**

|   |   |
|---|---|
| <b>Site Address:</b>                              | 1000 Pakenham Road<br>Pakenham Upper VIC  |
| <b>Owner/Developer:</b>                           | [REDACTED]  |
| <b>Postal Address:</b>                            | [REDACTED]  |
| <b>Contact:</b>                                   | [REDACTED]  |
| <b>Council Area:</b>                              | Cardinia Shire Council  |
| <b>Zoning:</b>                                    | Planning Zone – Rural Conservation Zone – Schedule RCZ2), Planning Overlays – Bushfire Management Overlay (BMO), Environmental Significance Overlay – Schedule 1 (ESO1), Land Subject to Inundation Overlay – Schedule (LSIOS) small area near the front entry along Pakenham Road.   |
| <b>Allotment Size:</b>                            | 10.2ha  |
| <b>Domestic Water Supply:</b>                     | Tank  |
| <b>Anticipated Wastewater Load per allotment:</b> | 2 Bedroom + study @ 4 person per residence maximum occupancy. Design wastewater load is 120L/person/day*, therefore total design load = 480L/day. This design load is sourced from Guidelines for onsite wastewater management (May 2024). (Table 4-1, Design Flows for households Minimum daily wastewater flow rates with minimum four star Wels fittings and minimum three star appliances). |
| <b>Anticipated BOD Load:</b>                      | 2 Bedroom + study @ 4 person per residence maximum occupancy. Design wastewater load is 60g/person/day, therefore total design load = 240g/day. This design load is sourced from Guidelines for onsite wastewater management (May 2024) p. 28 organic loading rates.  |
| <b>Availability of Sewer:</b>                     | The area is unsewered and unlikely to be sewerred in the short to medium term future  |

\* Hydraulic load of 150L/D/P – 600l/D adopted for the site for additional conservatism.

## 4. Site Key Features

██████████ undertook a desktop review and site inspection on the 2<sup>nd</sup> of July 2018 and 6<sup>th</sup> of June 2024. A range of site features were assessed in terms of the degree of limitation they present for a range of onsite wastewater management systems. Reference is made to the rating scale described in Table 1 of EPA (2003a). As a guide, remedial measures should be considered whenever ratings of 3, 4, or 5 occur and this might involve land improvement works, soil amelioration or simply adoption of higher-level technologies to ensure environmental protection. Table 3 summarises the key features in relation to effluent management at the site. The site experiences negligible stormwater run-on. There is no evidence of a water table in the proposed LAA.

The soil type in the LAA consists of brown grey loam to a maximum depth of 300mm overlying yellow brown loam to a maximum depth of 700mm. Between 700mm to a maximum depth of 1200mm the soil grades into a strongly structured orange brown light clay. Below 1200mm to 1500mm the soil grades into an orange brown slightly red mottled medium clay. There was moisture throughout the soil profile, however given the recent wet weather the on-site soils inspected were not waterlogged. No groundwater within the proposed LAA was encountered during the site inspection.

The site is within the locality of Pakenham Upper, which is part of the Planning Zone – Rural Conservation Zone – Schedule RCZ2), Planning Overlays – Bushfire Management Overlay (BMO), Environmental Significance Overlay – Schedule 1 (ESO1) Land Subject to Inundation Overlay – Schedule (LSIOS) small area near the front entry along Pakenham Road.

Appendix i provides a site locality plan (Property Report) and indicates the location of the site of the proposed development.

Appendix ii provides a Proposed Development Plan.

Appendix iii provides photographs of the existing site conditions

Appendix iv provides Bureau of Meteorology Climate Report for Dandenong - 086224 (Temperature Statistic) and Beaconsfield Upper - 086261 (Rainfall Statistics)

Appendix v provides a full water balance and nitrogen balance for Sub Surface Irrigation (SS1)

Appendix vi provides Test Site Location Plan

Appendix vii provides Borelog descriptions

**Table 2 Site Features**

| Feature                               |   |
|---------------------------------------|---|
| Climate                               | The site has a cool temperate climate with maximum temperatures and minimum rainfall in summer (Dandenong - 086224). The site experiences a mean annual rainfall of (1000mm – Rainfall – Beaconsfield Upper - 086261).  |
| Exposure                              | The building envelope is cleared with the proposed LAA having high sun and wind exposure.   |
| Vegetation                            | The building and LAA area is cleared of vegetation and is grassed.  |
| Landform                              | The site is contained within a gentle to moderate slope landform element consistent with Silurian Metamorphic Rocks. The proposed LAA is located on a gentle slope towards the east of the proposed dwelling  |
| Slope                                 | The proposed effluent management area is located on a gentle slope within this landform element.  |
| Fill                                  | No fill was observed on the allotment. The proposed LAA contains a natural light clay soil profile.   |
| Rocks and Rock Outcrops               | No rock outcrops or low lying large sub surface rocks were encountered within the proposed LAA. Other parts of the allotment (low lying) contain waterlogged heavy clay and are not suitable for the application of secondary treated effluent as they are in close proximity to the watercourse. |
| Erosion Potential                     | The erosion hazard is low.  |
| Surface Water                         | Not applicable.   |
| Flood Potential                       | Areas available for application of treated effluent lie above the 1:100 year flood level.   |
| Stormwater run-on and upslope seepage | The proposed effluent management area is expected to receive minor stormwater run-on which can be diverted via surface spoon drainage or sub surface drainage. There is no evidence of groundwater seepage, soaks or springs.   |
| Groundwater                           | There are no signs of shallow groundwater tables.   |
| Site Drainage and Subsurface Drainage | The site could experience variable stormwater run-on and run-off. However, there are minor visible signs of surface dampness. Surface dampness due to recent rainfall and seasonal conditions.  |
| Recommended Buffer Distances          | All buffer distances recommended in Table 4-10 of EPA Guideline for Onsite Wastewater Management May 2024 will be achievable in the proposed treatment envelope.  |
| Available Land Application Area       | Considering all site constraints and the buffers mentioned above, the site has ample land that is suitable and available for land application of effluent treated to secondary levels. There will be ample protection for surface and groundwater.  |

## 5. Soil Assessment and Constraints

The sites' soils have been assessed for their suitability for onsite wastewater management by a combination of soil survey and review of desktop published material.

The site at 1000 Pakenham Road, Pakenham Upper contains soils consistent with the Silurian Metamorphic moderate slope landform element (Smd) as described in the Cardinia Land Capability Study. The underlying geology is Silurian Metamorphic Hornfels. The ASC soil type for this geology are typically Bleached – Mottled, Magnesian, Yellow Chromosols although the onsite subsoils were more orange brown in colour.

Brown Chromosols are described as textural contrasting soils although the on-site soils (within the proposed LAA) did not contain a marked textural contrast with the soil being more consistent with a Dermosol soil. There was slight red mottling at lower profile depths.

The soil type in the LAA consists of brown grey loam to a maximum depth of 300mm overlying yellow brown loam to a maximum depth of 700mm. Between 700mm to a maximum depth of 1200mm the soil grades into a strongly structured orange brown light clay. Below 1200mm to 1500mm the soil grades into an orange brown slightly red mottled medium clay. There was moisture throughout the soil profile, however given the recent wet weather the on-site soils inspected were not waterlogged. No groundwater within the proposed LAA was encountered during the site inspection.

Soil permeability was not undertaken however textural soil analysis indicating that infiltration would be moderate within the A horizon and slowing through the B horizon. This is consistent with soil permeability testing undertaken on similar soil types. The on-site soils exhibit a slight change in texture throughout the soil profile and thus beneficial for sub-surface drainage. A conservative Ksat for light clay soils is >0.12m m/d with a corresponding minimum soil percolation rate of 5mm per hour.



On-site Orange Brown Chromosols at 1000 Pakenham Road, Pakenham Upper

**Table 3 Soil Features:**

| Soil Feature   |  |   |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
|--|--|---|----------|----------|-------------|----------------------------------|---|---------------------------------------|----------|----------|--------------------------------------|---------------------|---------------------|--|------------------------------------|-----------------------------------|
| Soil Depth   | Soil depth up to 1500mm encountered.   |   |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| Depth to watertable  | Groundwater not encountered.   |   |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| Coarse Fragments (%)                                       | No coarse fragments were observed through the soil profile.  |   |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| <b>Soil Permeability and Design loading Rates</b>          | Soil permeability was not directly measured but can be inferred with reference to Tables L1 to N1 in AS/NZS 1547:2012, that describe conservative design loading rates (DI-R5) and Design Irrigation Rates (DIRs) for various effluent application systems according to soil type. Critical soil properties are texture and structure, but depth, colour and degree of mottling are also used to infer drainage conditions. We note that the indicative loading rates below assume secondary treated effluent is being applied. Reduced loading rates would apply to primary treatment systems (septic tanks), although these are not recommended here.  |   |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
|  | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Topsoils</th> <th style="text-align: center;">Subsoils</th> </tr> </thead> <tbody> <tr> <td>Description</td> <td style="text-align: center;"><b>Loam (moderate structure)</b></td> <td style="text-align: center;"><b>Light Clay (moderately structured)</b></td> </tr> <tr> <td><b>Soil Category (AS/NZ1547:2012)</b></td> <td style="text-align: center;"><b>3</b></td> <td style="text-align: center;"><b>5</b></td> </tr> <tr> <td>Design Irrigation Rate (DIR mm/week)</td> <td style="text-align: center;"><b>28 (4mm/day)</b></td> <td style="text-align: center;"><b>21 (3mm/day)</b></td> </tr> <tr> <td><b>Design Loading Rate (DLR mm/week) for trenches/beds</b></td> <td style="text-align: center;"><b>Design Loading Rate<br/>210</b></td> <td style="text-align: center;"><b>Design Loading Rate<br/>84</b></td> </tr> </tbody> </table> |   | Topsoils | Subsoils | Description | <b>Loam (moderate structure)</b> | <b>Light Clay (moderately structured)</b> | <b>Soil Category (AS/NZ1547:2012)</b> | <b>3</b> | <b>5</b> | Design Irrigation Rate (DIR mm/week) | <b>28 (4mm/day)</b> | <b>21 (3mm/day)</b> | <b>Design Loading Rate (DLR mm/week) for trenches/beds</b> | <b>Design Loading Rate<br/>210</b> | <b>Design Loading Rate<br/>84</b> |
|  | Topsoils   | Subsoils                                  |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| Description  | <b>Loam (moderate structure)</b>   | <b>Light Clay (moderately structured)</b> |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| <b>Soil Category (AS/NZ1547:2012)</b>                      | <b>3</b>   | <b>5</b>                                  |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| Design Irrigation Rate (DIR mm/week)                       | <b>28 (4mm/day)</b>  | <b>21 (3mm/day)</b>                       |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| <b>Design Loading Rate (DLR mm/week) for trenches/beds</b> | <b>Design Loading Rate<br/>210</b>   | <b>Design Loading Rate<br/>84</b>         |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| pH   | The pH of 1:5 soil/water suspensions was not measured. The present soil conditions do not appear to be restricting plant growth.   |   |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |
| Electrical Conductivity                                    | Electrical conductivity was not measured.  |   |          |          |             |                                  |   |                                       |          |          |                                      |                     |                     |  |                                    |                                   |

## 6. Land Capability Assessment Matrix

The Land Capability Assessment has been developed for the whole site, but using the soils in the vicinity of the building envelope.

**Table 4 Land Capability Assessment Matrix**

| LAND FEATURES  | Land capability class rating               |   |                                   |   |                                      | Site rating |
|--|--|---|-----------------------------------|---|--------------------------------------|-------------|
|  | Very good (1)                              | Good (2)                                      | Fair (3)                          | Poor (4)  | Very poor (5)                        |             |
| <b>GENERAL CHARACTERISTICS</b>                           |  |   |                                   |   |                                      |             |
| Site drainage  | No visible signs of dampness               | Moist soil, but no standing water in soil pit |                                   | Visible signs of dampness, such as moisture-tolerant plants | Water ponding on surface             | 2           |
| Runoff   | None                                       | Low   | Moderate                          | High – need for diversionary structures                     | Very high – diversion not practical  | 2           |
| Flood Levels   | Never                                      |   | <1 in 100                         | >1 in 100 and <1 in 20                                      | <1 in 20                             | 1           |
| Proximity to Watercourses                                | >60 metres                                 |   |                                   |   | <60                                  | 1           |
| Slope (%)  | 0-2  | 2-8   | 8-12                              | 12-20   | >20                                  | 2           |
| Landslip   | No actual or potential failure             |   | Low potential for failure         | High potential for failure                                  | Present or past failure              | 3           |
| Groundwater (seasonal watertable depth (m))              | >5   | 5-2.5   | 2.5-2.0                           | 2.0-1.5   | <1.5                                 | 2           |
| Rock outcrop (1% of land surface containing rock >200mm) | 0  | <10%  | 10-20%                            | 20-50%  | >50%                                 | 1           |
| Erosion potential  | No erosion potential                       | Minor   | Moderate                          | High  | Severe erosion potential             | 2           |
| Exposure   | High sun and wind exposure                 |   | Moderate                          | Low sun and wind exposure                                   |                                      | 1           |
| Landform   | Hill crests, convex side slopes and plains |   | Concave sideslopes and footslopes |   | Floodplains & incised channels       | 1           |
| Vegetation Type  | Turf or pasture                            |   |                                   |   | Dense forest with little understorey | 1           |
| Average Rainfall (mm/yr)                                 | <450                                       | 450-650                                       | 650-750                           | 750-1000  | >1000                                | 4           |
| Pan evaporation (mm/yr)                                  | <1500                                      | 1250-1500                                     | 1000-1250                         | ---   | <1000                                | 3           |
| Fill   | No fill                                    |   | Fill present                      |   |                                      | 1           |

**SOIL PROFILE CHARACTERISTICS**

|   |                 |                              |                              |                              |                             |          |
|---|-----------------|------------------------------|------------------------------|------------------------------|-----------------------------|----------|
| <b>Soil permeability category<sup>1</sup></b> | <b>2 and 3</b>  | <b>4</b>                     |                              | <b>5</b>                     | <b>1 and 6</b>              | <b>4</b> |
| <b>Profile depth</b>                          | <b>&gt;2m</b>   | <b>1.5-2m</b>                | <b>1.5 – 1</b>               | <b>1.0-0.5m</b>              | <b>&gt;0.5m</b>             | <b>2</b> |
| <b>Presence of mottling</b>                   | <b>None</b>     |                              |                              |                              | <b>Extensive</b>            | <b>3</b> |
| <b>Course fragments (%)</b>                   | <b>&lt;10</b>   | <b>10-20</b>                 | <b>20-40</b>                 |                              | <b>&gt;40</b>               | <b>1</b> |
| <b>Permeability *<br/>(m/d)</b>               | <b>0.3-0.15</b> | <b>0.08-0.15<br/>0.3-0.6</b> | <b>0.06-0.08<br/>0.6-1.5</b> | <b>---</b><br><b>1.5-2.0</b> | <b>&lt;0.06<br/>&gt;2.0</b> | <b>4</b> |
| <b>pH</b>                                     | <b>6-8</b>      |                              | <b>4.5-6</b>                 |                              | <b>&lt;4.5, &gt;8</b>       | <b>3</b> |
| <b>Emerson Aggregate</b>                      | <b>4, 6, 8</b>  | <b>5</b>                     | <b>7</b>                     | <b>2, 3</b>                  | <b>1</b>                    | <b>3</b> |
| <b>Electrical Conductivity</b>                | <b>&lt;0.3</b>  | <b>0.3-0.8</b>               | <b>0.8-2</b>                 | <b>2-4</b>                   | <b>&gt;4</b>                | <b>1</b> |
| <b>Sodicity ESP%</b>                          | <b>&lt;3</b>    |                              | <b>6-8</b>                   | <b>8-14</b>                  | <b>&gt;14</b>               | <b>2</b> |
| <b>Overall Site Rating</b>                    |                 |                              |                              | <b>Very Poor</b>             |                             | <b>4</b> |

1. Source: AS/NZ1547:2012

## 7. The Management Program

This LCA has been prepared to accompany a development application to the Cardinia Shire Council for a new two bedroom + study residence to be constructed at 1000 Pakenham Road, Pakenham Upper and associated necessary wastewater management system. LAA sizing is based upon an effective three bedroom capacity. As such, this report provides recommendations for treatment and land application systems that are appropriate to the land capability. The following sections provide an overview of a suitable system, with sizing and design considerations and justification for its selection. Detailed design for the system is beyond the scope of this study but should be undertaken at the time of building application and submitted to Council.

### 7.1 Treatment System

To treat domestic wastewater and allow irrigation with the treated effluent, the existing system provides secondary treatment with disinfection to meet Environment Protection Authority requirements for irrigation. Indicative target effluent quality is:

- BOD <20 mg/l;
- SS <30 mg/l;

### 7.2 Land Application

A range of possible land application systems have been considered, such as absorption trenches, evapotranspiration/absorption (ETA) beds, surface and subsurface irrigation, and sand mounds. The preferred system is pressure compensating **subsurface irrigation**. In combination with the selected secondary treatment system subsurface irrigation will provide even and widespread dispersal of highly treated effluent loads within the root-zone of plants. Subsurface irrigation will provide beneficial reuse of wastewater. It will also ensure that the risk of effluent being transported off this site will be negligible.

### **7.3 Sizing the Irrigation System**

To determine the necessary size of the irrigation area water and nutrient balance modelling has been considered.

The full water balance has been considered to calculate the LAA area. As a result of these calculations a minimum area of 231m<sup>2</sup> (480L/D) is suitable for the Subsurface Irrigation (SSI) as long as the recommended LAA installation and management strategies are followed. However a more conservative water balance has been considered sizing the LAA at 288m<sup>2</sup> (600L/D) has been used to size the LAA for additional benefit. 300m<sup>2</sup> adopted for installation benefit.

This is based upon 480 litres/day with full water reduction facilities. 600L/D adopted for additional benefit. The water balance is the most limiting factor in sizing the LAA>

#### **Water Balance**

A full water balance for using SSI (231m<sup>2</sup>) and (288m<sup>2</sup>) is provided in appendix iv.

#### **Nutrient Balance**

A nutrient balance has been undertaken to check that the LAA (if subsurface irrigation is used) is of sufficient size to ensure nutrients (phosphorus and nitrogen) are assimilated by the soils and vegetation. It is acknowledged that a proportion of nitrogen will be retained in the soil through processes such as mineralisation and volatilisation.

Two nitrogen balances are provided in the appendices.

480L/D – 159m<sup>2</sup>

600L/D – 199m<sup>2</sup>

#### **Summary and Discussion**

It is worth noting that modeling includes several significant factors of conservatism:

- Hydraulic load (480L/D or 600 L/day). This assumes 4 people will permanently utilise the waste facilities. It is very likely that the actual numbers and daily water usage will be less than this;
- From the nutrient balances, in the absence of site specific data very conservative estimates of crop nutrient uptake rates and total nitrogen lost to soil processes are considered.

#### **7.4 Siting and Configuration of the Land Application Area**

It is preferable to keep the irrigation area as high on the property as possible based upon the proposed site plan. Eco Vision has delineated on the provided site plan a suitable LAA, but the areas tested are deemed suitable.

As well as providing area for application of effluent, it is important that buffer distances be adhered to. It is important to note that buffers are measured as the overland flow path for run-off water from the effluent irrigation area.

The LAA area 300m<sup>2</sup> is located to the west of the proposed dwelling in natural soil profiles as depicted on the site plan.

It is recommended that the owner consult an irrigation expert familiar with wastewater irrigation equipment, to help design and install the irrigation system. The irrigation plan must ensure good, even application of effluent.

#### **7.5 Irrigation System Design**

A detailed irrigation system design is beyond the scope of this report; however a general description of subsurface irrigation is provided here for the information of the client and Council.

Subsurface irrigation comprises a network of drip-irrigation lines that is specially designed for use with wastewater. The pipe contains pressure compensating emitters that employ a biocide to prevent build-up of slimes and inhibit root penetration. The laterals are usually 0.5 to 1.0 m apart, roughly parallel and along the contour if possible. -Installation depth is commonly 100-150 mm. It is critical that the irrigation pump be sized properly to ensure adequate pressure and delivery rate to the irrigation network.

A filter is installed in the main line to remove fine particulates that could block the emitters. This must be cleaned regularly following manufacturer's instructions.

Vacuum breakers should be installed at the high points in the system to prevent air and soil being sucked back into the drippers when the pump shuts off. Flushing valves are an important component and allow periodic flushing of the lines, which should be done at least yearly. Flush water can be either returned to the treatment system or should be released where it will be readily absorbed.

All trenching used to install the pipes must be backfilled properly to prevent preferential subsurface flows along trench lines, particularly where trenches are not absolutely parallel to contours. Irrigation areas should not be subject to high traffic movement, especially by vehicles, otherwise compaction around emitters can lead to premature system failure.

## 7.6 Buffer Distances

Buffer distances from LAAs are required to help prevent human contact, maintain public amenity and protect sensitive environments. Council generally adopts the following nominal buffers secondary sewage and greywater effluent, described in Guideline for Onsite Wastewater Management (May 2024):

Table 4-10: Setback distances (m) <sup>20,21</sup>

| Landscape feature or structure                          | OWMS with primary treated effluent | OWMS with secondary treated effluent or Level 3 greywater effluent | OWMS with Level 1 and 2 greywater effluent |
|---|------------------------------------|--|--|
| Building/allotment boundary                             |                                    |  |  |
| Up-slope of building (See Note 1)                       | 6                                  | 3  | 3  |
| Down-slope of building                                  | 3                                  | 1.5  | 1.5  |
| Up-slope of adjacent lot                                | 6                                  | 3  | 1  |
| Down-slope of adjacent lot                              | 3                                  | 1.5  | 0.5  |
| Services  |                                    |  |  |
| Water supply pipe                                       | 3                                  | 1.5  | 1.5  |
| Up-slope of potable supply channel (stock and domestic) | 300                                | 150  | 150  |
| Down-slope of potable water supply                      | 20                                 | 10   | 10   |

<sup>20</sup> Setback distances are measured horizontally from the external wall of the treatment plant and the boundary of the land application area, except for soil depth as per Note 10.

<sup>21</sup> The setback distances for flat land are equivalent to down-slope setback distances.

| Landscape feature or structure   | OWMS with primary treated effluent | OWMS with secondary treated effluent or Level 3 greywater effluent | OWMS with Level 1 and 2 greywater effluent |
|--|------------------------------------|--|--|
| channel (stock and domestic)   |                                    |  |  |
| In-ground water tank (See Note 2)  | 15                                 | 7.5  | 3  |
| Closed stormwater drain  | 6                                  | 3  | 2  |
| Open stormwater drain  | 50                                 | 30   | 10   |
| Gas supply pipe  | 3                                  | 1.5  | 1.5  |
| Recreational areas   |                                    |  |  |
| Children's grassed playground (See Note 3)   | 6                                  | 3  | 2  |
| In-ground swimming pool  | 6                                  | 3  | 2  |
| Surface waters   |                                    |  |  |
| Dam, lake or reservoir (used as source water for drinking or within a special water supply catchment) (See Notes 5, 6)   | 300                                | 300  | 150  |
| Waterways (used as a source of water for drinking or within a special water supply catchment) (See Notes 4, 5)   | 100                                | 100  | 50   |
| Waterways not used as source of water for drinking or within a special water supply catchment (for example, wetlands (continuous or ephemeral); estuaries (See Note 4) | 60                                 | 30   | 30   |
| Ocean beach at high-tide mark; dams, reservoirs or lakes not used as source of water for drinking or within a special water supply catchment (See Note 6)              | 60                                 | 30   | 30   |
| Dam, lake or reservoir (used as source water for drinking or within a special water supply catchment) (See Notes 5, 6)   | 300                                | 300  | 150  |
| Drainage lines (See Note 7)  | 40                                 | 20   | 20   |

| Landscape feature or structure                               | OWMS with primary treated effluent | OWMS with secondary treated effluent or Level 3 greywater effluent | OWMS with Level 1 and 2 greywater effluent |
|--|------------------------------------|--|--|
| Up-slope of cutting/escarpment (See Note 8)                  | 15                                 | 15   | 15   |
| Groundwater bores  |                                    |  |  |
| Groundwater bores – category 1 and 2a soils                  | NA                                 | 50   | 20   |
| Groundwater bores – category 2b to 6 soils                   | 20                                 | 20   | 20   |
| Soil depth (See Note 9)                                      |                                    |  |  |
| Depth to highest seasonal water table (See Note 10)          | 1.5                                | 1.5  | 1.5  |
| Depth to hydraulically limiting layer (for example, bedrock) | 1.5                                | 0.6  | 0.6  |

Notes to Table 4-10:

1. Establishing an OWMS up-slope of a building may have implications for the structural integrity of the building. This should be examined by a building surveyor on a site-by-site basis.
2. It is recommended that OWMS are installed down-slope of an in-ground water tank.
3. Means a school, council, community or other children's grassed playground managed by an organisation which may contain play equipment but does not mean a sports field.
4. Means a waterway as defined in the *Water Act 1989*.
5. Applies to land adjacent to a dam, lake, reservoir or waterway that provides source water used for the supply of public drinking water or, which is subject to an environmental significance overlay (ESO) that designates maintenance of water quality as the environmental objective to be achieved, or within a special water supply catchment area listed in Schedule 5 of the *Catchment and Land Protection Act 1994*.
6. Does not apply to dams, lakes or reservoirs located above ground level that cannot receive runoff.
7. An intermittent stream that is found to be a drainage line (drainage depression) with no defined banks and the bed is not incised. The topography of the drainage line should be demonstrated in writing and photographs in the LCA report.
8. A cutting/escarpment from which water is likely to emanate.
9. Depth is measured vertically through the soil profile from the base of absorption/ETA trenches/beds or from the irrigation pipes.
10. The highest seasonal water table occurs when groundwater is closest to the ground surface. This usually occurs in the wettest months of the year.

All nominal buffers are achievable for a suitably sized LAA.

## **8. Monitoring, Operation and Maintenance**

Maintenance is to be carried out in accordance with the certificate of approval and Council's permit conditions. The system proposed above will only function adequately if appropriately maintained. Residents will be required to carry out maintenance as discussed below.

### **To ensure the treatment system functions adequately, residents must:**

- Have a suitably qualified maintenance contractor service the treatment system as required by Council under the approval to operate.
- Any pump will need regular maintenance and seals checked regularly.
- Use household cleaning products sparingly and check that they are suitable for septic tanks;
- Keep as much fat and oil out of the system as possible; and
- Conserve water

### **To ensure the land application system functions adequately, residents must:**

- Regularly harvest (mow) vegetation within the LAA and remove this to maximise uptake of water and nutrients;
- Monitor and maintain the subsurface irrigation system following the manufacturer's recommendations, including flushing of irrigation lines;
- Regularly clean in-line filters;
- Not erect any structures over the LAA;
- Minimise vehicle access to the LAA, to prevent compaction; and
- Ensure that the LAA is kept level by filling any depressions with good quality topsoil (not clay).
- Good water conservation is an important aspect in the overall management of onsite systems. It will be important for the ongoing performance of both the treatment and application system that they are not overloaded hydraulically. AAA rated plumbing is recommended for all future water fixtures.

## **9. Stormwater Management**

As mentioned above, stormwater runoff is not expected to be a major concern in this case. However, the construction and maintenance of diversion drains would provide an additional precaution. Roof stormwater must not be disposed in the LAA.

## 10. Conclusions

As a result of our investigations we recommend that a sustainable onsite wastewater management system can be built to meet the needs of a new residence on the allotment.

Specifically, we recommend the following:

- Installation of a secondary wastewater treatment system that meets a minimum 20/30 water quality standards through the installation of a septic (primary) tank with sand filter sized at 12m<sup>2</sup> or a secondary wastewater treatment plant (AWTS).
- System requires supervision by the designer and test on completion;
- Land application of wastewater in a 300m<sup>2</sup> subsurface irrigation area;
- The LAA to the west of the proposed dwelling can be adjusted and moved within the area depicted (Minimum 30 metre setback from watercourse) on the site plan as soil profiles are consistent within this location;
- The LAA is not to be placed in filled areas as the proposed dwelling requires a cut and fill.
- Additional land is available if required as a reserve area.
- Installation of full water reduction facilities in the residence to reduce the effluent load for onsite disposal;
- Do not allow any vehicle access and utilise surface plants that tolerate wet conditions (including roots) and have a high evapo-transpiration capacity. Where possible use plants well exposed to the sun. Plant high transpiration species to minimise waterlogging.
- Use of low phosphorus and low sodium (liquid) detergents to improve effluent quality and maintain soil properties;
- Operation and management of the treatment and disposal system in accordance with manufacturer's recommendations and the recommendations made in this report; and
- Construction of diversion drains on sides of the LAA to divert stormwater and surface water run-on.

**Land Management Consultant**

Grad Cert. Environmental Management (CSU), Ad. Dip. Land Management (Syd), Cert Hort. Landscape & Nursery (Qld)

---

## 11. References & Bibliography

AS/NZS 1547:2012, *On-site domestic wastewater management*, SAI Global Limited

Charman, P.E.V. & Murphy, B.W., ed. (2007), *Soils Their Properties and Management (Third Edition)*, Oxford University Press.

Department of Primary Industries (2002), Yarram Map Sheet (Sargeant & Imhof 2002).

Environment Protection Authority: (May 2024). *Guideline for Onsite Wastewater Effluent Dispersal and recycling systems*.

Environment Protection Authority: (1991). *Guidelines for Wastewater Irrigation Publication 168*.

Environment Protection Authority: (May 2024). *Guideline for Onsite Wastewater Management*.

Environment Protection Authority Code of Practice - Publication 451, March 1996 - *Septic Tanks On Site Domestic Wastewater Management*

Environment Protection Authority Information Bulletin – Publication 746.1  
March 2003 – *Land Capability Assessment for On-site Domestic Wastewater Management*.

MAV – The Model Land Capability Assessment Report – February 2006

McKenzie N., Jacquier D., Isbell R. & Brown K. (2004), *Australian Soils and Landscapes: An illustrated compendium*. CSIRO Publishing

## **11. APPENDICES**

- i. Site Locality Plan – Property Reports
- ii. Proposed Development Plan
- iii. Existing conditions
- iv. Bureau of Meteorology Rainfall Report for Beaconsfield Upper (086261) and Climate Report for Dandenong (086224).
- v. Full Water and Nitrogen Balance
- vi. Test Site Location Plan
- vii. Borelogs Descriptions

**APPENDIX i**

---

**SITE LOCALITY PLAN – PROPERTY PLANNING REPORTS**

**PROPERTY REPORT**



From [www.land.vic.gov.au](http://www.land.vic.gov.au) at 2:23 February 2024 09:40 PM

**PROPERTY DETAILS**

Address: **1000 PAKENHAM ROAD PAKENHAM UPPER 3810**  
 Lot and Plan Number: **Lot 11 PS326096**  
 Standard Parcel Identifier (SPI): **11/PS326096**  
 Local Government Area (Council): **CARDINIA**  
 Council Property Number: **1684255000**  
 Directory Reference: **Melway 314 A10**

[www.cardinia.vic.gov.au](http://www.cardinia.vic.gov.au)

**SITE DIMENSIONS**

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



**Area:** 10118 sq. m (10.11 ha)  
**Perimeter:** 1697 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.

2 overlapping dimension labels are not being displayed

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 of Title and Property Certificates

**UTILITIES**

Rural Water Corporation: **Southern Rural Water**  
 Melbourne Water Retailer: **South East Water**  
 Melbourne Water: **Inside drainage boundary**  
 Power Distributor: **AUSNET**

**STATE ELECTORATES**

Legislative Council: **EASTERN VICTORIA**  
 Legislative Assembly: **PAKENHAM**

**PLANNING INFORMATION**

Property Planning details have been removed from the Property Reports to avoid duplication with the Planning Property Reports from the Department of Transport and Planning which are the authoritative source for all Property Planning information.

The Planning Property Report for this property 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>

Copyright © - State Government of Victoria  
 Disclaimer: This content is provided for information purposes only. No claim is made as to the accuracy or authenticity of the content. The Victorian Government does not accept any liability to any person for the information provided.  
 Read the full disclaimer at <https://www.deeca.vic.gov.au/theclaimer>.

## PLANNING PROPERTY REPORT



Environment,  
 Land, Water  
 and Planning

From [www.planning.vic.gov.au](http://www.planning.vic.gov.au) as of 05 June 2024 15:14 AEST

### PROPERTY DETAILS

Address: **1000 PAKENHAM ROAD PAKENHAM UPPER 3810**  
 Lot and Plan Number: **Lot 11 PS326096**  
 Standard Parcel Identifier (SPI): **11PS326096**  
 Local Government Area (Council): **CARDINIA** [www.cardinia.vic.gov.au](http://www.cardinia.vic.gov.au)  
 Council Property Number: **1664255000**  
 Planning Scheme: **Cardinia** [Planning Scheme - Cardinia](#)  
 Directory Reference: **Melway 314 A10**

### UTILITIES

Rural Water Corporation: **Southern Rural Water**  
 Melbourne Water Retailer: **South East Water**  
 Melbourne Water: **Inside drainage boundary**  
 Power Distributor: **AUSNET**

### STATE ELECTORATES

Legislative Council: **EASTERN VICTORIA**  
 Legislative Assembly: **PAKENHAM**

### OTHER

Registered Aboriginal Party: **Bunurong Land Council Aboriginal Corporation**

[View location in VicPlan](#)

### Planning Zones

[RURAL CONSERVATION ZONE \(RCZ\)](#)

[RURAL CONSERVATION ZONE - SCHEDULE 2 \(RCZ2\)](#)



GWZ - Green Wedge  
 TRZ2 - Principal Road Network  
 PCRZ - Public Conservation and Resource  
 Water area  
 RCZ - Rural Conservation  
 Water course

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

#### Copyright © - State Government of Victoria

**Disclaimer:** This content is provided for information purposes only. No claim is made as to the accuracy or authenticity of the content. The Victorian Government does not accept any liability to any person for the information provided.  
 Read the full disclaimer at <https://www.delwp.vic.gov.au/disclaimer>

Notwithstanding this disclaimer, a vendor may rely on the information in this report for the purpose of a statement that land is in a bushfire prone area as required by section 92C (b) of the Sale of Land 1962 (Vic).

PLANNING PROPERTY REPORT: 1000 PAKENHAM ROAD PAKENHAM UPPER 3810

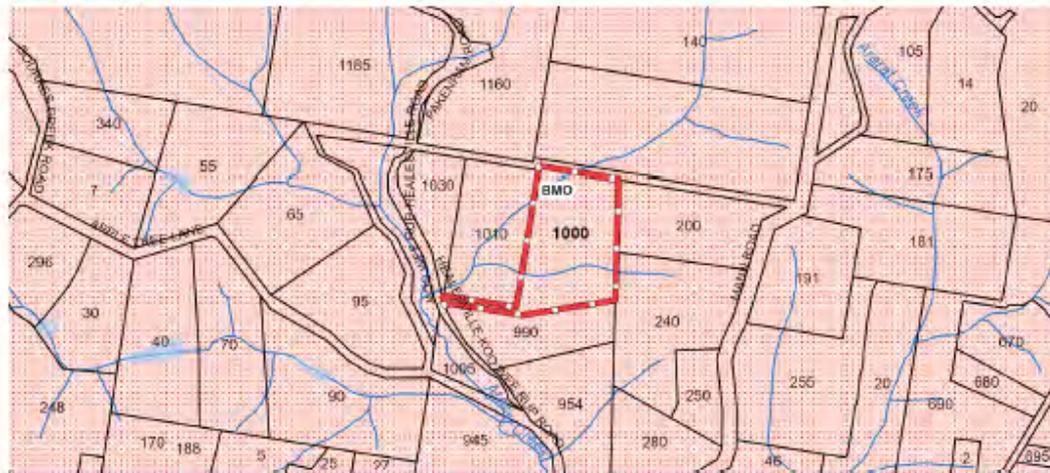
Page 1 of 6

**PLANNING PROPERTY REPORT**



**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 1 (ESO1)



**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

Copyright © - State Government of Victoria  
 Disclaimer: This content is provided for information purposes only. No claim is made as to the accuracy or authenticity of the content. The Victorian Government does not accept any liability to any person for the information provided.  
 Read the full disclaimer at <https://www.delwp.vic.gov.au/disclaimer>

Notwithstanding this disclaimer, a vendor may rely on the information in this report for the purpose of a statement that land is in a bushfire prone area as required by section 92C (b) of the Sale of Land 1962 (Vic).

**PLANNING PROPERTY REPORT**



**Planning Overlays**

LAND SUBJECT TO INUNDATION OVERLAY (LSIO)  
LAND SUBJECT TO INUNDATION OVERLAY SCHEDULE (LSIOS)



**LSIO - Land Subject to Inundation 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)



**HO - Heritage 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.

**Copyright © - State Government of Victoria**  
**Disclaimer:** This content is provided for information purposes only. No claim is made as to the accuracy or authenticity of the content. The Victorian Government does not accept any liability to any person for the information provided.  
 Read the full disclaimer at <http://www.delwp.vic.gov.au/landinfo/more>

Notwithstanding this disclaimer, a vendor may rely on the information in this report for the purpose of a statement that land is in a bushfire prone area as required by section 32C (b) of the Sale of Land 1962 (Vic).

**PLANNING PROPERTY REPORT**



**Areas of Aboriginal Cultural Heritage Sensitivity**

All or part of this property is an 'area of cultural heritage sensitivity'.

'Areas of cultural heritage sensitivity' are defined under the Aboriginal Heritage Regulations 2018, and include registered Aboriginal cultural heritage places and land form types that are generally regarded as more likely to contain Aboriginal cultural heritage.

Under the Aboriginal Heritage Regulations 2018, 'areas of cultural heritage sensitivity' are one part of a two part trigger which require a 'cultural heritage management plan' be prepared where a listed 'high impact activity' is proposed.

If a significant land use change is proposed (for example, a subdivision into 3 or more lots), a cultural heritage management plan may be triggered. One or two dwellings, works ancillary to a dwelling, services to a dwelling, alteration of buildings and minor works are examples of works exempt from this requirement.

Under the Aboriginal Heritage Act 2006, where a cultural heritage management plan is required, planning permits, licences and work authorities cannot be issued unless the cultural heritage management plan has been approved for the activity.

For further information about whether a Cultural Heritage Management Plan is required go to <http://www.av.nrms.net.au/avQuestion1.aspx>

More information, including links to both the Aboriginal Heritage Act 2006 and the Aboriginal Heritage Regulations 2018, can also be found here - <https://www.aborig.in/victoria.vic.gov.au/aboriginal-heritage-legislation>



**Copyright © - State Government of Victoria**  
**Disclaimer:** This content is provided for information purposes only. No claim is made as to the accuracy or authenticity of the content. The Victorian Government does not accept any liability to any person for the information provided.  
 Read the full disclaimer at <https://www.delwp.vic.gov.au/disclaimer>

Notwithstanding this disclaimer, a vendor may rely on the information in this report for the purpose of a statement that land is in a bushfire prone area as required by section 32C (b) of the Sale of Land 1962 (Vic).

PLANNING PROPERTY REPORT: 1000 PAKENHAM ROAD, PAKENHAM UPPER 3000

Page 4 of 5

## PLANNING PROPERTY REPORT



Environment,  
Land, Water  
and Planning

### Further Planning Information

Planning scheme data last updated on 29 May 2024.

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 affect 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>

**Copyright © - State Government of Victoria**

**Disclaimer:** This content is provided for information purposes only. No claim is made as to the accuracy or authenticity of the content. The Victorian Government does not accept any liability to any person for the information provided.  
Read the full disclaimer at <https://www.delap.vic.gov.au/disclaimer>

Notwithstanding this disclaimer, a vendor may rely on the information in this report for the purpose of a statement that land is in a bushfire prone area as required by section 33C (b) of the Sale of Land 1962 (Vic).

PLANNING PROPERTY REPORT: 1000 PAKENHAM ROAD, PAKENHAM UPPER 3000

Page 5 of 5

## PLANNING PROPERTY REPORT



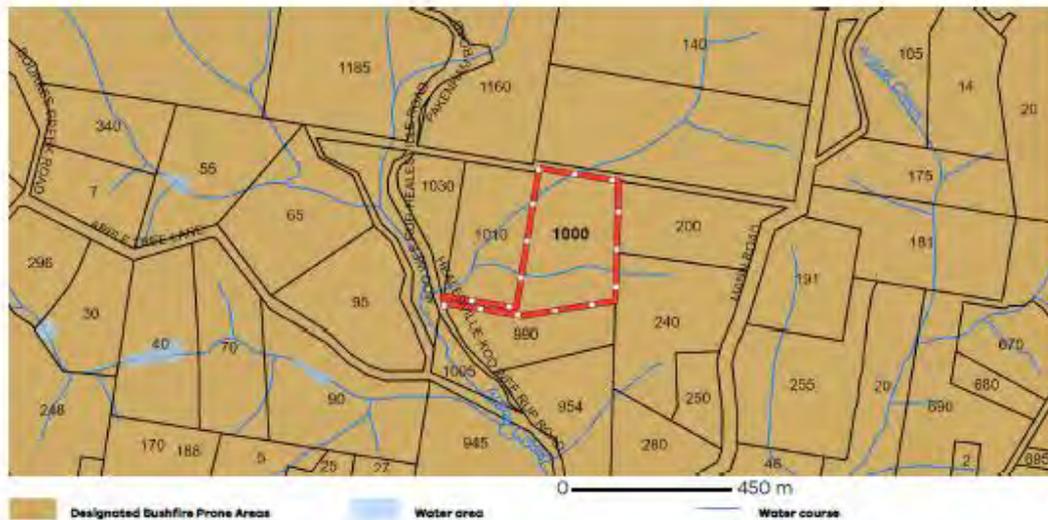
Environment,  
 Land, Water  
 and Planning

### Designated Bushfire Prone Areas

**This property 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 \(environment.vic.gov.au\)](#)

#### Copyright © - State Government of Victoria

**Disclaimer:** This content is provided for information purposes only. No claim is made as to the accuracy or authenticity of the content. The Victorian Government does not accept any liability to any person for the information provided.  
 Read the full disclaimer at <https://www.delwp.vic.gov.au/disclaimer>

Notwithstanding this disclaimer, a vendor may rely on the information in this report for the purpose of a statement that land is in a bushfire prone area as required by section 32C(1b) of the Sale of Land 1962 (Vic).

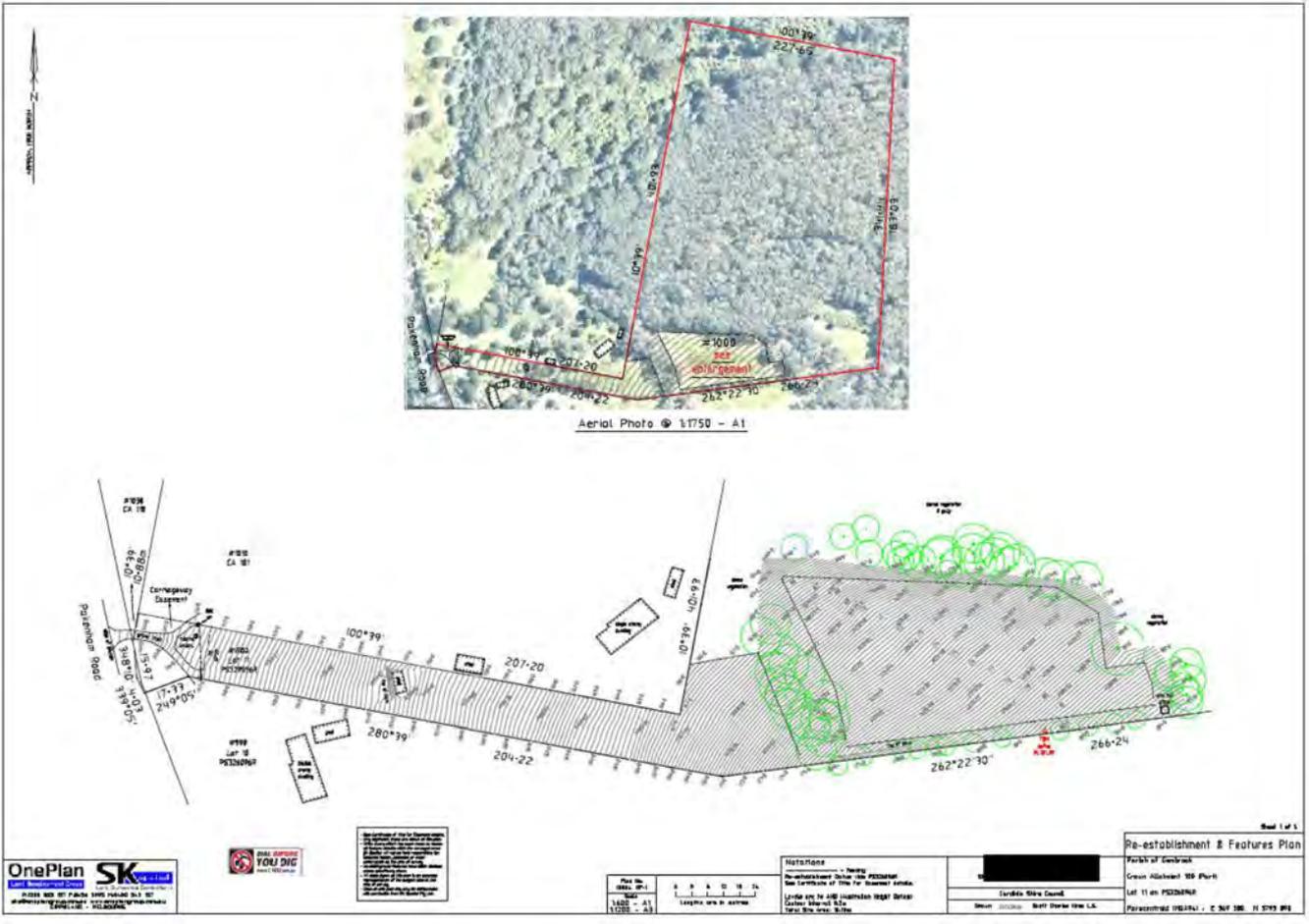
PLANNING PROPERTY REPORT: 1000 PAKENHAM ROAD PAKENHAM UPPER 3000

Page 6 of 8

**APPENDIX ii**

---

**PROPOSED DEVELOPMENT PLAN,  
AERIAL PHOTO, MAPSHARE & GEOVIC**

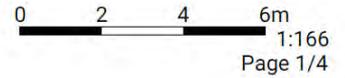
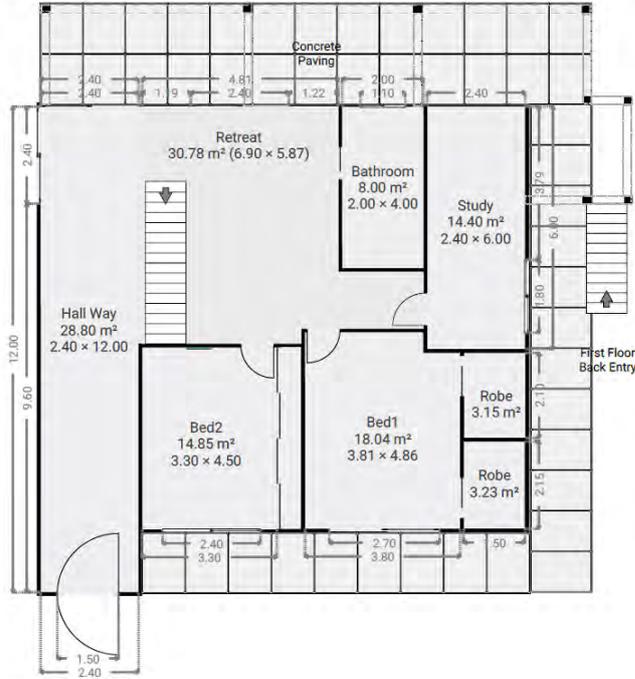






▼ **Ground Floor Plan**

TOTAL AREA: 123.49 m<sup>2</sup> · LIVING AREA: 123.49 m<sup>2</sup> ·



48 Bell Street, Heidelberg Heights, 3081

REGISTERED  
 Building Practitioner

miskdesign.com.au

**Michael Miskas**  
 info@miskdesign.com.au

1000 Pakenham Rd, Pakenham Upper, 3810 Melbourne, Victoria, Australia

☎ 0403 568 160

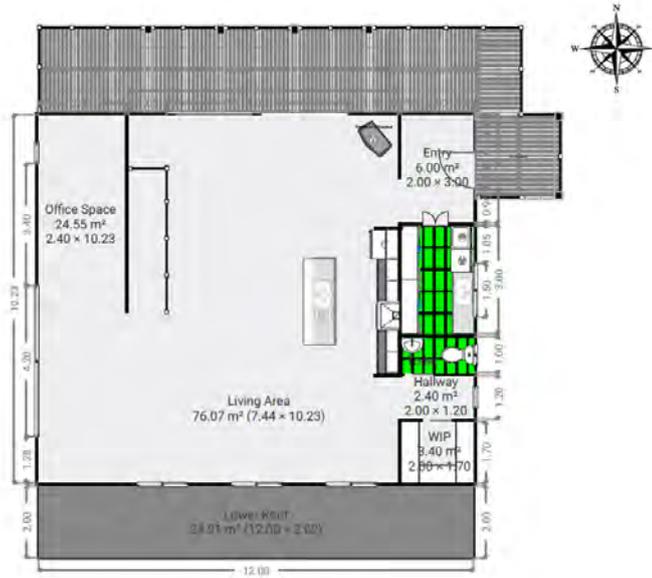
**FARM HOUSE**



1000 Pakenham Rd, Pakenham Upper, 3810 Melbourne, Victoria, Australia  
 TOTAL AREA: 763.22 m<sup>2</sup> · LIVING AREA: 645.02 m<sup>2</sup> · FLOORS: 5

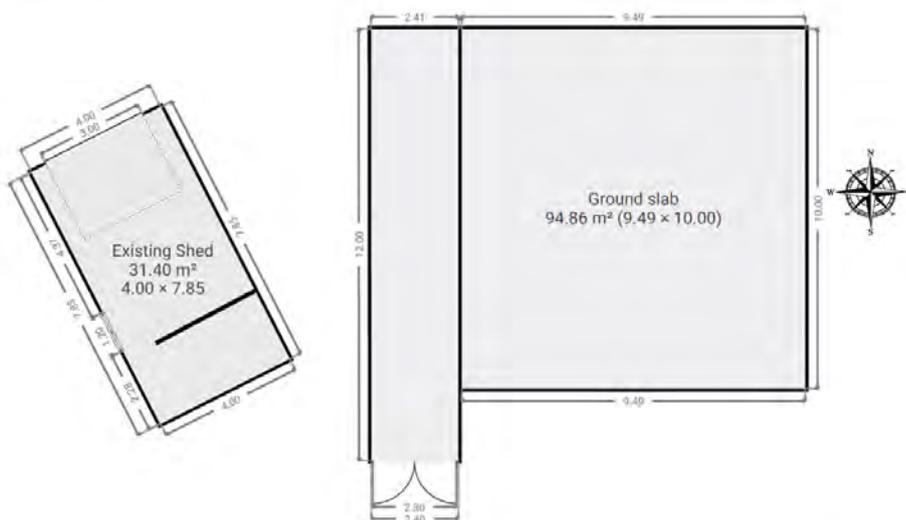
▼ **First Floor Plan**

TOTAL AREA: 144.36 m<sup>2</sup> · LIVING AREA: 120.37 m<sup>2</sup> ·

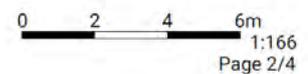


▼ **Ground Floor Slab**

TOTAL AREA: 155.08 m<sup>2</sup> · LIVING AREA: 123.68 m<sup>2</sup> ·



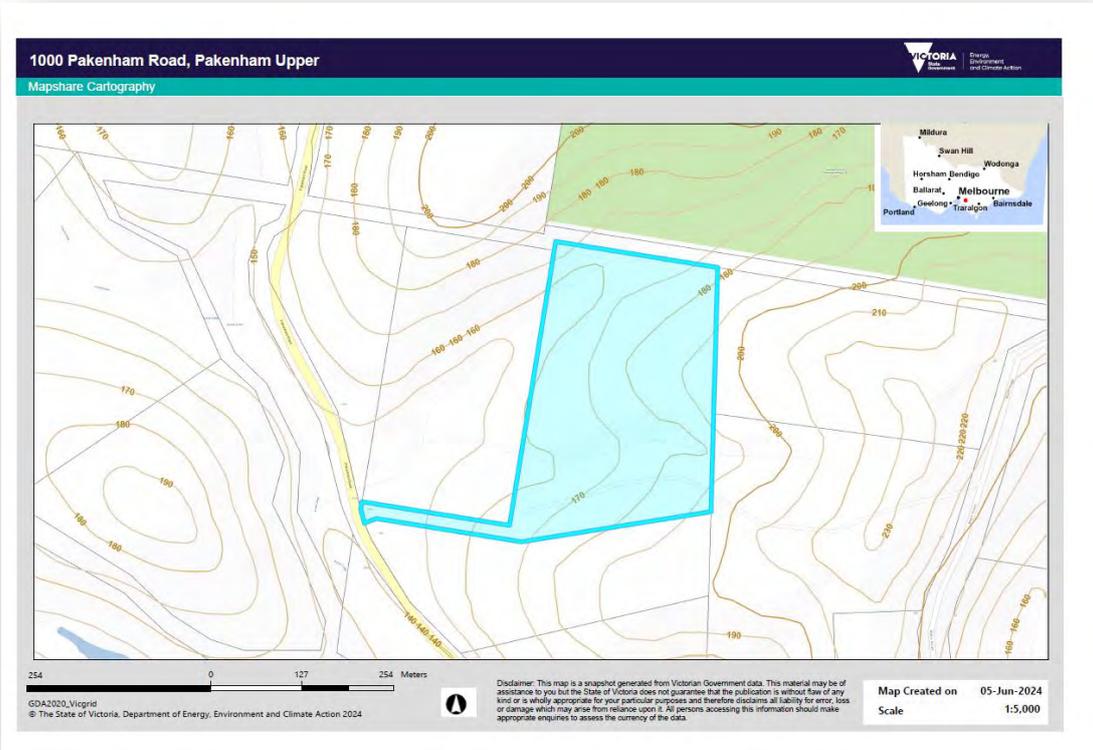
48 Bell Street, Heidelberg Heights, 3081  
 REGISTERED  
 Building Practitioner  
 miskdesign.com.au

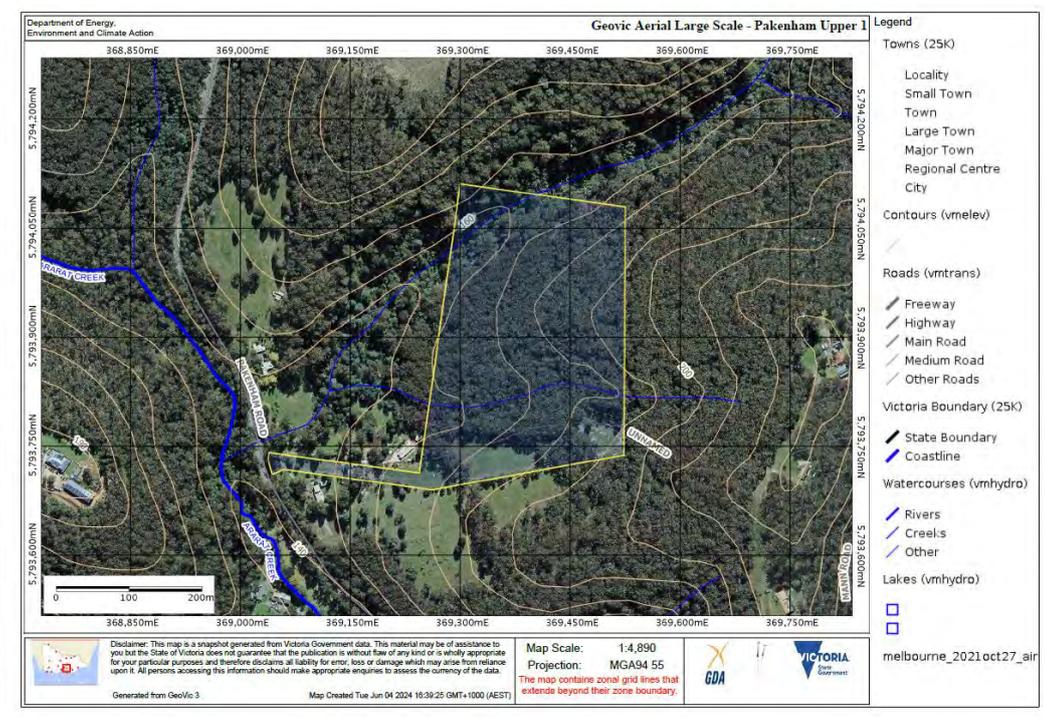
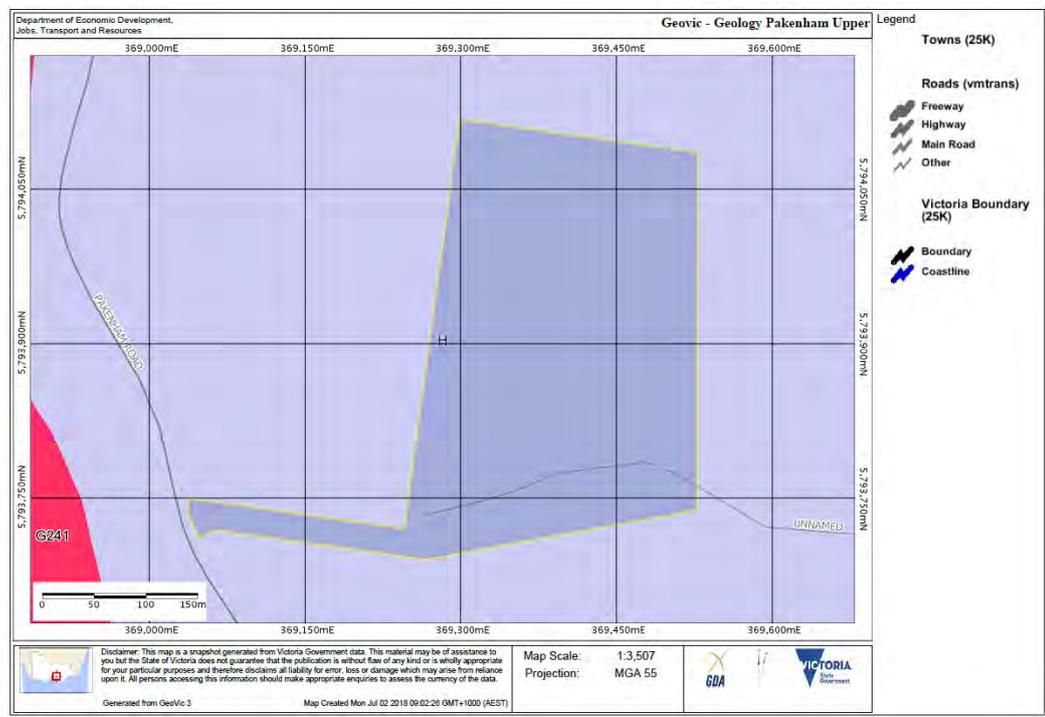


**Michael Miskas**  
 info@miskdesign.com.au

1000 Pakenham Rd, Pakenham Upper, 3810 Melbourne, Victoria, Australia

☎ 0403 568 160





**APPENDIX iii**

---

**EXISTING CONDITIONS**



P1 - View towards the east depicting high moderate exposure SSI location that can be adjusted in consultation with Eco Vision – to be located in natural soil profiles away from the construction zone that will have a cut and fill (1000 Pakenham Road, Pakenham Upper).



P2 - View towards the east depicting high moderate exposure SSI location that can be adjusted in consultation with Eco Vision – to be located in natural soil profiles away from the construction zone that will have a cut and fill (1000 Pakenham Road, Pakenham Upper).

**APPENDIX iv**

---

**CLIMATE STATISTICS TEMPERTURE DANDENONG (086224) & RAINFALL  
BEACONSFIELD UPPER (086261)**

Bureau Home > Climate > Climate Data Online > Monthly Statistics

## Climate statistics for Australian locations

### Monthly climate statistics

All years of record

About Climate statistics | Data file of statistics for this site (csv) | Site selection menu

#### Summary statistics DANDENONG

A summary of the major climate statistics recorded at this site is provided below. There is also an extended table with more statistics available. More detailed data for individual sites is available.

##### Site information

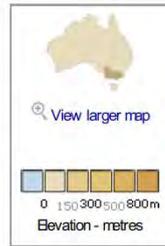
Site name: DANDENONG  
 Site number: 086224  
 Latitude: 37.98°S Longitude: 145.22°E  
 Elevation: 54 m  
 Commenced: 1960 Status: Open  
 Latest available data: 31 Aug 2017

##### Additional information

Additional site information

##### Nearest alternative sites

- 086077 MOORABBIN AIRPORT (11.2km)
- 086104 SCOPESBY RESEARCH INSTITUTE (12.0km)
- 086147 ASPENDALE CSIRO (12.6km)



- Climate
  - Seasonal outlooks
  - Reports & summaries
  - Weather & climate data
  - Data services
  - Maps – recent conditions
  - Maps – average conditions
  - Climate change
  - Extremes of climate
  - About Australian climate

View:  Main statistics  All available | Period: Use all years of data | Text size:  Normal  Large

| Statistics                         | Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  | Annual | Years | Plot      |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|--------|-------|-----------|
| <b>Temperature</b>                 |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| Mean maximum temperature (°C)      | 26.6 | 26.2 | 24.3 | 20.5 | 16.2 | 14.0 | 13.3 | 14.3 | 16.3 | 19.3 | 20.8 | 23.5 | 19.6   | 12    | 1962-1974 |
| Mean minimum temperature (°C)      | 12.8 | 13.4 | 11.7 | 9.9  | 7.6  | 5.6  | 5.3  | 6.1  | 7.2  | 8.5  | 9.5  | 11.0 | 9.0    | 11    | 1962-1974 |
| <b>Rainfall</b>                    |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| Mean rainfall (mm)                 | 50.4 | 52.4 | 48.4 | 66.9 | 73.1 | 66.4 | 68.6 | 72.7 | 72.1 | 71.3 | 70.7 | 64.6 | 776.2  | 42    | 1960-2017 |
| Decile 5 (median) rainfall (mm)    | 46.0 | 34.9 | 42.8 | 63.6 | 71.3 | 62.6 | 68.6 | 76.2 | 65.2 | 63.4 | 63.5 | 58.0 | 766.4  | 49    | 1960-2017 |
| Mean number of days of rain ≥ 1 mm | 5.9  | 4.9  | 6.4  | 8.1  | 11.1 | 10.9 | 12.0 | 12.7 | 11.3 | 9.5  | 8.4  | 7.4  | 108.6  | 49    | 1960-2017 |
| <b>Other daily elements</b>        |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| Mean daily sunshine (hours)        |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| Mean number of clear days          |      |      |      |      |      |      |      |      |      |      |      |      |        | 9     | 1964-1974 |
| Mean number of cloudy days         |      |      |      |      |      |      |      |      |      |      |      |      |        | 9     | 1964-1974 |
| <b>9 am conditions</b>             |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| Mean 9am temperature (°C)          |      |      |      |      |      |      |      |      |      |      |      |      |        | 9     | 1964-1974 |
| Mean 9am relative humidity (%)     |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| Mean 9am wind speed (km/h)         |      |      |      |      |      |      |      |      |      |      |      |      |        | 9     | 1964-1974 |
| 9am wind speed vs direction plot   |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| <b>3 pm conditions</b>             |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| Mean 3pm temperature (°C)          |      |      |      |      |      |      |      |      |      |      |      |      |        | 9     | 1964-1974 |
| Mean 3pm relative humidity (%)     |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |
| Mean 3pm wind speed (km/h)         |      |      |      |      |      |      |      |      |      |      |      |      |        | 8     | 1964-1974 |
| 3pm wind speed vs direction plot   |      |      |      |      |      |      |      |      |      |      |      |      |        |       |           |

red = highest value blue = lowest value

Product IDCJCM026 Prepared at Thu 14 Sep 2017 01:35:58 AMEST

#### Related information

##### Maps

- Long term [climatology maps](#) for selected elements
- [Rainfall maps](#) and [temperature maps](#) based on recent observations

##### Recent observations for this site

- Daily Weather Observations from this site are included in the Daily Weather Observations

##### Climate outlooks

- Monthly and seasonal [climate outlooks](#)

##### Additional climate information

- [Weather station directory](#)
- [Climate and oceans data and analysis](#)

Page created: Thu 14 Sep 2017 01:35:58 AM EST

Monthly Rainfall (millimetres)

BEACONSFIELD UPPER

Station Number: 086261 · State: VIC · Opened: 1968 · Status: Open · Latitude: 37.98°S · Longitude: 145.42°E · Elevation: 199 m

Statistics for this station calculated over all years of data

|                        | Jan   | Feb   | Mar   | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec   | Annual |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| <b>Mean</b>            | 65.4  | 60.9  | 70.6  | 81.0  | 87.5  | 88.8  | 87.2  | 95.3  | 99.3  | 100.0 | 90.4  | 81.0  | 1016.0 |
| <b>Lowest</b>          | 2.5   | 0.0   | 13.7  | 20.1  | 15.8  | 17.4  | 27.3  | 34.8  | 44.0  | 33.2  | 0.0   | 0.0   | 589.1  |
| <b>5th percentile</b>  | 22.2  | 7.2   | 17.8  | 30.2  | 24.5  | 31.4  | 34.2  | 37.5  | 48.0  | 45.3  | 29.2  | 5.0   | 712.6  |
| <b>10th percentile</b> | 30.0  | 7.9   | 27.4  | 34.6  | 30.0  | 45.3  | 40.4  | 50.5  | 51.9  | 49.1  | 42.4  | 18.2  | 802.6  |
| <b>Median</b>          | 65.6  | 43.8  | 64.6  | 71.4  | 90.6  | 84.2  | 76.9  | 95.8  | 86.3  | 102.0 | 93.0  | 80.8  | 1030.2 |
| <b>90th percentile</b> | 96.9  | 161.0 | 111.0 | 135.4 | 151.1 | 130.6 | 138.5 | 139.6 | 160.4 | 160.6 | 135.7 | 126.4 | 1226.1 |
| <b>95th percentile</b> | 120.8 | 183.1 | 129.6 | 157.1 | 178.4 | 159.9 | 144.8 | 148.7 | 201.3 | 165.0 | 160.7 | 171.4 | 1253.2 |
| <b>Highest</b>         | 151.7 | 237.4 | 234.4 | 191.6 | 190.5 | 179.8 | 200.0 | 161.9 | 208.6 | 213.9 | 201.1 | 205.6 | 1323.9 |

Statistics calculated over the period 1961-1990

|                        | Jan   | Feb   | Mar   | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec   | Annual |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| <b>Mean</b>            | 57.1  | 56.5  | 77.1  | 82.6  | 102.4 | 83.9  | 84.2  | 98.0  | 93.5  | 106.2 | 84.0  | 74.8  | 1000.0 |
| <b>Lowest</b>          | 2.5   | 4.6   | 13.7  | 29.1  | 15.8  | 17.4  | 27.3  | 34.8  | 47.3  | 39.0  | 0.0   | 0.0   | 704.7  |
| <b>5th Percentile</b>  | 22.4  | 7.6   | 15.1  | 35.4  | 22.4  | 29.8  | 37.5  | 47.9  | 52.4  | 50.2  | 26.2  | 1.9   | 724.5  |
| <b>10th percentile</b> | 26.3  | 8.0   | 26.6  | 46.6  | 39.8  | 33.1  | 40.9  | 52.0  | 58.0  | 56.6  | 32.0  | 8.5   | 806.2  |
| <b>Median</b>          | 56.2  | 42.2  | 75.0  | 74.9  | 101.9 | 76.1  | 84.8  | 95.4  | 86.3  | 105.8 | 92.1  | 80.8  | 1008.9 |
| <b>90th percentile</b> | 85.8  | 164.4 | 111.3 | 114.2 | 159.1 | 125.0 | 124.8 | 146.7 | 130.1 | 158.4 | 123.3 | 125.0 | 1203.7 |
| <b>95th percentile</b> | 96.4  | 179.1 | 125.2 | 122.6 | 177.1 | 156.2 | 130.7 | 149.9 | 139.6 | 182.5 | 130.3 | 127.8 | 1251.8 |
| <b>Highest</b>         | 130.9 | 204.0 | 234.4 | 191.6 | 181.6 | 179.8 | 144.0 | 161.9 | 208.0 | 213.9 | 201.1 | 171.4 | 1323.9 |

1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

3) Further information

<http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml>.

**APPENDIX v**

---

**WATER & NITROGEN BALANCE FOR SUB SURFACE  
IRRIGATION (480L/D & 600L/D)**

**Nominated Area Water Balance & Storage Calculations - SSI**

Site Address: 1000 Pakenham Road, Pakenham Upper

INPUT DATA

|                                 |                               |         |          |
|---------------------------------|-------------------------------|---------|----------|
| Design Wastewater Flow          | Q                             | 480     | L/day    |
| Design DIR                      | DI R                          | 21      | mm/week  |
| Daily DIR                       |                               | 3.0     | mm/day   |
| Nominated Land Application Area | L                             | 350     | m sq     |
| Crop Factor                     | C                             | 0.7-0.8 | unitless |
| Retained Rainfall               | Rf                            | 0.8     | unitless |
| Rainfall Data                   | Beaconsfield Upper (086261)   |         |          |
| Evaporation Data                | Cranbourne Botanic - (086375) |         |          |

480

Ave hydraulic load

| Parameter                                      | Symbol | Formula       | Units    | Jan            | Feb    | Mar   | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec    | Total   |
|--|--------|---------------|----------|----------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------|
| Days in month                                  | D      | \             | days     | 31             | 28     | 31    | 30    | 31    | 30    | 31    | 31    | 30    | 31    | 30    | 31     | 365     |
| Rainfall                                       | R      | \             | mm/month | 65.4           | 60.9   | 79.1  | 82.6  | 87.5  | 83.9  | 84.2  | 96    | 93.5  | 106.2 | 84    | 72.8   | 956.1   |
| Evaporation                                    | E      | \             | mm/month | 115            | 152.9  | 127.6 | 72.8  | 68.1  | 52.6  | 59.3  | 70.7  | 76.6  | 145.1 | 129.5 | 197.4  | 1267.6  |
| Crop Factor                                    | C      |               |          | 0.80           | 0.80   | 0.80  | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  | 0.80  | 0.80  | 0.80   |         |
| <b>OUTPUTS</b>                                 |        |               |          |                |        |       |       |       |       |       |       |       |       |       |        |         |
| Evapotranspiration                             | ET     | ExC           | mm/month | 92.0           | 122.3  | 102.1 | 54.6  | 51.1  | 39.5  | 44.5  | 53.0  | 57.5  | 116.1 | 103.6 | 157.9  | 994.075 |
| Percolation                                    | B      | (DIR/7)*D     | mm/month | 93.0           | 84     | 93.0  | 90.0  | 93.0  | 90.0  | 93.0  | 93.0  | 90.0  | 93.0  | 90.0  | 93.0   | 1095.0  |
| Outputs  |        | ET+B          | mm/month | 185.0          | 206.32 | 195.1 | 144.6 | 144.1 | 129.5 | 137.5 | 146.0 | 147.5 | 209.1 | 193.6 | 250.9  | 2089.1  |
| <b>INPUTS</b>                                  |        |               |          |                |        |       |       |       |       |       |       |       |       |       |        |         |
| Retained Rainfall                              | RR     | R*Rf          | mm/month | 52.32          | 48.72  | 63.28 | 66.08 | 70    | 67.12 | 67.36 | 78.4  | 74.8  | 84.96 | 67.2  | 58.24  | 788.48  |
| Effluent Irrigation Inputs                     | W      | (Q/D)/L       | mm/month | 42.5           | 38.4   | 42.5  | 41.1  | 42.5  | 41.1  | 42.5  | 42.5  | 41.1  | 42.5  | 41.1  | 42.5   | 500.6   |
| Inputs   |        | RR+W          | mm/month | 94.8           | 87.1   | 105.8 | 107.2 | 112.5 | 108.3 | 109.9 | 120.9 | 115.9 | 127.5 | 108.3 | 100.8  | 1289.1  |
| <b>STORAGE CALCULATION</b>                     |        |               |          |                |        |       |       |       |       |       |       |       |       |       |        |         |
| Storage remaining from previous month          |        |               | mm/month | 0.0            | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |         |
| Storage for the month                          | S      | (RR+W)-(ET+B) | mm/month | -90.2          | -119.2 | -89.3 | -37.4 | -31.6 | -21.2 | -27.6 | -25.1 | -31.5 | -81.6 | -85.3 | -150.2 | -351.3  |
| Cumulative Storage                             | M      |               | mm       | 0.0            | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |         |
| Maximum Storage for Nominated Area             | N      |               | mm       | 0.00           |        |       |       |       |       |       |       |       |       |       |        |         |
|  | V      | NxL           | L        | 0              |        |       |       |       |       |       |       |       |       |       |        |         |
| <b>LAND AREA REQUIRED FOR ZERO STORAGE</b>     |        |               |          | m <sup>2</sup> | 112    | 85    | 113   | 183   | 201   | 231   | 212   | 220   | 198   | 120   | 114    | 77      |
| <b>MINIMUM AREA REQUIRED FOR ZERO STORAGE:</b> |        |               |          | m <sup>2</sup> | 231.0  |       |       |       |       |       |       |       |       |       |        |         |

**Nominated Area Water Balance & Storage Calculations - SSI**

Site Address: 1000 Pakenham Road, Pakenham Upper

INPUT DATA

|                                 |                               |         |          |
|---------------------------------|-------------------------------|---------|----------|
| Design Wastewater Flow          | Q                             | 600     | L/day    |
| Design DIR                      | DI R                          | 21      | mm/week  |
| Daily DIR                       |                               | 3.0     | mm/day   |
| Nominated Land Application Area | L                             | 350     | m sq     |
| Crop Factor                     | C                             | 0.7-0.8 | unitless |
| Retained Rainfall               | Rf                            | 0.8     | unitless |
| Rainfall Data                   | Beaconsfield Upper (086261)   |         |          |
| Evaporation Data                | Cranbourne Botanic - (086375) |         |          |

600

Ave hydraulic load

| Parameter                                      | Symbol | Formula       | Units    | Jan            | Feb    | Mar   | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec    | Total   |
|--|--------|---------------|----------|----------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------|
| Days in month                                  | D      | \             | days     | 31             | 28     | 31    | 30    | 31    | 30    | 31    | 31    | 30    | 31    | 30    | 31     | 365     |
| Rainfall                                       | R      | \             | mm/month | 65.4           | 60.9   | 79.1  | 82.6  | 87.5  | 83.9  | 84.2  | 96    | 93.5  | 106.2 | 84    | 72.8   | 956.1   |
| Evaporation                                    | E      | \             | mm/month | 115            | 152.9  | 127.6 | 72.8  | 68.1  | 52.6  | 59.3  | 70.7  | 76.6  | 145.1 | 129.5 | 197.4  | 1267.6  |
| Crop Factor                                    | C      |               |          | 0.80           | 0.80   | 0.80  | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  | 0.75  | 0.80  | 0.80  | 0.80   |         |
| <b>OUTPUTS</b>                                 |        |               |          |                |        |       |       |       |       |       |       |       |       |       |        |         |
| Evapotranspiration                             | ET     | ExC           | mm/month | 92.0           | 122.3  | 102.1 | 54.6  | 51.1  | 39.5  | 44.5  | 53.0  | 57.5  | 116.1 | 103.6 | 157.9  | 994.075 |
| Percolation                                    | B      | (DIR/7)*D     | mm/month | 93.0           | 84     | 93.0  | 90.0  | 93.0  | 90.0  | 93.0  | 93.0  | 90.0  | 93.0  | 90.0  | 93.0   | 1095.0  |
| Outputs  |        | ET+B          | mm/month | 185.0          | 206.32 | 195.1 | 144.6 | 144.1 | 129.5 | 137.5 | 146.0 | 147.5 | 209.1 | 193.6 | 250.9  | 2089.1  |
| <b>INPUTS</b>                                  |        |               |          |                |        |       |       |       |       |       |       |       |       |       |        |         |
| Retained Rainfall                              | RR     | R*Rf          | mm/month | 52.32          | 48.72  | 63.28 | 66.08 | 70    | 67.12 | 67.36 | 78.4  | 74.8  | 84.96 | 67.2  | 58.24  | 788.48  |
| Effluent Irrigation Inputs                     | W      | (Q/D)/L       | mm/month | 53.1           | 48.0   | 53.1  | 51.4  | 53.1  | 51.4  | 53.1  | 53.1  | 51.4  | 53.1  | 51.4  | 53.1   | 625.7   |
| Inputs   |        | RR+W          | mm/month | 105.5          | 96.7   | 116.4 | 117.5 | 123.1 | 118.5 | 120.5 | 131.5 | 126.2 | 138.1 | 118.6 | 111.4  | 1424.2  |
| <b>STORAGE CALCULATION</b>                     |        |               |          |                |        |       |       |       |       |       |       |       |       |       |        |         |
| Storage remaining from previous month          |        |               | mm/month | 0.0            | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |         |
| Storage for the month                          | S      | (RR+W)-(ET+B) | mm/month | -79.5          | -109.6 | -76.7 | -27.1 | -20.9 | -10.9 | -17.0 | -14.5 | -21.2 | -71.0 | -75.0 | -139.5 | -278.6  |
| Cumulative Storage                             | M      |               | mm       | 0.0            | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    |         |
| Maximum Storage for Nominated Area             | N      |               | mm       | 0.00           |        |       |       |       |       |       |       |       |       |       |        |         |
|  | V      | NxL           | L        | 0              |        |       |       |       |       |       |       |       |       |       |        |         |
| <b>LAND AREA REQUIRED FOR ZERO STORAGE</b>     |        |               |          | m <sup>2</sup> | 140    | 107   | 141   | 229   | 251   | 289   | 265   | 275   | 248   | 150   | 142    | 97      |
| <b>MINIMUM AREA REQUIRED FOR ZERO STORAGE:</b> |        |               |          | m <sup>2</sup> | 288.8  |       |       |       |       |       |       |       |       |       |        |         |

## Nitrogen Balance

**Site Address:** 19 Richard Road, Woodside Beach (1LP44798)

**SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE** 159 m<sup>2</sup>

### INPUT DATA<sup>1</sup>

| Wastewater Loading                                |      |         | Nutrient Crop Uptake |     |          |  |
|---|------|---------|----------------------|-----|----------|--|
| Hydraulic Load                                    | 600  | L/day   | Crop N Uptake        | 220 | kg/ha/yr | which equals <span style="background-color: yellow;">60.27</span> mg/m <sup>2</sup> /day |
| Effluent N Concentration                          | 20   | mg/L    |                      |     |          |  |
| % N Lost to Soil Processes (Geary & Gardner 1996) | 0.2  | Decimal |                      |     |          |  |
| Total N Loss to Soil                              | 2400 | mg/day  |                      |     |          |  |
| Remaining N Load after soil loss                  | 9600 | mg/day  |                      |     |          |  |

### NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES

| Minimum Area required with zero buffer |     | Determination of Buffer Zone Size for a Nominated Land Application Area (LAA) |   |       |                |
|--|-----|---|---|-------|----------------|
| Nitrogen                               | 159 | m <sup>2</sup>  | Nominated LAA Size                          | 300   | m <sup>2</sup> |
|  |     |   | Predicted N Export from LAA                 | -3.10 | kg/year        |
|  |     |   | Minimum Buffer Required for excess nutrient | 0     | m <sup>2</sup> |

## Nitrogen Balance

**Site Address:** 1000 Pakenham Road, Pakenham Upper

**SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE** 199 m<sup>2</sup>

### INPUT DATA<sup>1</sup>

| Wastewater Loading                                |       |         | Nutrient Crop Uptake |     |          |  |
|---|-------|---------|----------------------|-----|----------|--|
| Hydraulic Load                                    | 600   | L/day   | Crop N Uptake        | 220 | kg/ha/yr | which equals <span style="background-color: yellow;">60.27</span> mg/m <sup>2</sup> /day |
| Effluent N Concentration                          | 25    | mg/L    |                      |     |          |  |
| % N Lost to Soil Processes (Geary & Gardner 1996) | 0.2   | Decimal |                      |     |          |  |
| Total N Loss to Soil                              | 3000  | mg/day  |                      |     |          |  |
| Remaining N Load after soil loss                  | 12000 | mg/day  |                      |     |          |  |

### NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES

| Minimum Area required with zero buffer |     | Determination of Buffer Zone Size for a Nominated Land Application Area (LAA) |   |       |                |
|--|-----|---|---|-------|----------------|
| Nitrogen                               | 199 | m <sup>2</sup>  | Nominated LAA Size                          | 300   | m <sup>2</sup> |
|  |     |   | Predicted N Export from LAA                 | -2.22 | kg/year        |
|  |     |   | Minimum Buffer Required for excess nutrient | 0     | m <sup>2</sup> |



**APPENDIX vii**

---

**BORELOGS**



**BORELOG SHEET**

CLIENT: Charles Parry  
 PROJECT ADDRESS: 1000 Pakenham Road, Pakenham Upper  
 JOB NO: 39FO24 – LCA  
 FIELD WORK DATE: 06/06/24  
 LOGGED BY: Rob Krainz  
 DRILLING METHOD: 90mm Mechanical Auger, 100mm Earth Auger, Shovel and Crowbar

| BORELOG 1 |                     |     |      | BORELOG 2 |                     |     |      |
|-----------|---------------------|-----|------|-----------|---------------------|-----|------|
| DEPTH     | Soil Profile        | Clr | Fill | DEPTH     | SOIL PROFILE        | Clr | Fill |
| 100mm     | Loam (Br Gy)        |     |      | 100mm     | Loam (Br Gy)        |     |      |
| 200mm     | Moist; Medium Dense |     |      | 200mm     | Moist; Medium Dense |     |      |
| 300mm     |                     |     |      | 300mm     |                     |     |      |
| 400mm     | Clay Loam (Yl Br)   |     |      | 400mm     | Clay Loam (Yl Br)   |     |      |
| 500mm     | Moist; Medium Dense |     |      | 500mm     | Moist; Medium Dense |     |      |
| 600mm     |                     |     |      | 600mm     |                     |     |      |
| 700mm     |                     |     |      | 700mm     | Light Clay (Or Br)  |     |      |
| 800mm     | Light Clay (Or Br)  |     |      | 800mm     | Moist; Medium Dense |     |      |
| 900mm     | Moist; Medium Dense |     |      | 900mm     |                     |     |      |
| 1000mm    |                     |     |      | 1000mm    |                     |     |      |
| 1100mm    |                     |     |      | 1100mm    |                     |     |      |
| 1200mm    |                     |     |      | 1200mm    | Med. Clay (Or Br)   |     |      |
| 1300mm    | Med. Clay (Or Br)   |     |      | 1300mm    | Moist; Medium Dense |     |      |
| 1400mm    | Moist; Medium Dense |     |      | 1400mm    | Some Red Mottles    |     |      |
| 1500mm    | Some Red Mottles    |     |      | 1500mm    |                     |     |      |
| 1600mm    | End Log             |     |      | 1600mm    | End Log             |     |      |
| 1700mm    |                     |     |      | 1700mm    |                     |     |      |
| 1800mm    |                     |     |      | 1800mm    |                     |     |      |
| 1900mm    |                     |     |      | 1900mm    |                     |     |      |
| 2000mm    |                     |     |      | 2000mm    |                     |     |      |
| 2100mm    |                     |     |      | 2100mm    |                     |     |      |



MELBOURNE  
**ARBORIST REPORTS**

ABN 53 606 501 204

E: [info@melbournearboristreports.com.au](mailto:info@melbournearboristreports.com.au)

M: 0438 082 327

# Arboricultural Report Development Impact Assessment

**Site address:** 1000 Pakenham Road, Pakenham Upper. Vic 3810

**Date of assessments:** 28 Feb 2019, 23 Apr 2024, 06 June 2024

**Date of issue:** 08 June 2024

**Version:** 5

**Prepared by:** Jack Machar

Graduate Certificate in Arboriculture  
Diploma of Horticulture (Arboriculture)

## Contents

|     |   |    |
|-----|---|----|
| 1   | Introduction .....  | 3  |
| 1.1 | Scope of report .....                                       | 3  |
| 1.2 | Assessment methodologies and limitations .....              | 3  |
| 1.3 | Planning information .....                                  | 3  |
| 2   | Findings .....  | 4  |
| 2.1 | Tree assessment data .....                                  | 4  |
| 2.2 | Tree location plan .....                                    | 8  |
| 2.3 | Proposed site plan .....                                    | 9  |
| 3   | Discussion.....   | 10 |
| 3.1 | Tree protection zones and root system overview .....        | 10 |
| 3.2 | Environmental significance overlay .....                    | 11 |
| 3.3 | Clause 52.17 .....  | 11 |
| 3.4 | Previous tree removal.....                                  | 11 |
| 3.5 | Trees planned for removal under proposal .....              | 12 |
| 3.6 | Impact to retained trees .....                              | 12 |
| 4   | Conclusion and recommendations .....                        | 12 |
| 5   | References and appendices .....                             | 14 |
| 5.1 | Appendix 1 supportive photographs .....                     | 14 |
| 5.2 | Appendix 2 data descriptors, definitions and criteria ..... | 16 |
| 5.3 | References .....  | 19 |

# 1 INTRODUCTION

## 1.1 SCOPE OF REPORT

This report has been prepared in response to a request for further information issued by the responsible authority dated 15 May 2024, regarding planning application No: T230500. The purpose of this report is to provide an independent arboricultural assessment of the subject trees and to outline the potential impacts proposed development will have on these trees. Recommendations are provided for tree protection during onsite development works.

The scope of this report extends to trees within and adjacent to the subject site that could potentially be impacted by the proposed development, including for compliance with the bushfire management plan. This report is limited to trees over 3 meters high only and is not intended to comment on the impacts to grasses, weeds, minor shrubs or habitat corridors. The retrospective Vegetation Assessment provided by Ecolink Consulting 20 February 2024 should be referred to for this information.

## 1.2 ASSESSMENT METHODOLOGIES AND LIMITATIONS

Tree assessment was conducted by Jack Machar (GradCertArb) 28 Feb 2019 and reviewed and updated as required by Ben Machar (DipArb) on 23 Apr 2024 and again on the 06 June 2024. Tree assessment was conducted using Visual Tree Assessment (VTA) principals described by Mattheck and Breloer (1994) and is limited to parts of the tree which are easily viewed from within the subject site, at ground level. No assessment was made of soil characteristics or below ground tree parts unless otherwise stated. Tree health and structure were assessed to record the condition of the trees and inform useful life expectancy (ULE) and retention value ratings only. The scope of this report does not include any tree risk assessment. The content provided within this report relates to information and observations available at the time of inspection only. All plans supplied by the client or third-party are assumed to be correct and accurate. Melbourne Arborist Reports or it's representatives will not be held responsible for errors resulting from supplied documents or plans.

Diameter at Breast Height (DBH) = measurement of trunk diameter 1.4m above ground level. Methods shown in appendix A of AS4970-2009 *Protection of Trees on Development Sites* were used for low branching, multi-stemmed and leaning trees.

A diameter tape was used for DBH and basal measurements, tree heights and canopy spreads are estimates only unless otherwise stated. DBH and basal measurements of third-party trees or trees with inaccessible stems were estimated due to access restrictions. Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) were calculated using the formulas provided in section 3 of AS4970-2009.

Descriptors were used to define tree health, tree structure, ULE, age class, origin and tree retention values. Descriptors are in the appendix section at the rear of the report and should be referred to for definitions of ratings assigned to trees within this report. All photos were taken by the authors unless otherwise stated.

## 1.3 PLANNING INFORMATION

Responsible Authority: Cardinia Shire

Planning Zones: Rural Conservation Zone – Schedule 2

Planning Overlays: Bushfire Management Overlay, Environmental Significance Overlay – Schedule 1, Land Subject to Inundation Overlay

(Victoria State Government DTP 2024A)

## 2 FINDINGS

### 2.1 TREE ASSESSMENT DATA

| Tree No | Botanical name<br>Common name                         | Origin     | DBH<br>cm | TPZ<br>Radius m | SRZ<br>Radius m | Height<br>m | Spread<br>m | Health | Structure | ULE      | Age class   | Retention<br>value |
|---------|---|------------|-----------|-----------------|-----------------|-------------|-------------|--------|-----------|----------|-------------|--------------------|
| 1       | <i>Eucalyptus obliqua</i><br>Messmate Stringybark     | Vic native | 101       | 12.1            | 3.6             | 30          | 14          | Good   | Good      | 40+yrs   | Mature      | High               |
| 2       | <i>Hakea salicifolia</i><br>Willow-leaved Hakea       | Native     | 30        | 3.6             | 2.4             | 6           | 6           | Fair   | Fair      | <5yrs    | Mature      | Low                |
| 3       | <i>Eucalyptus pauciflora</i><br>Snow Gum              | Vic native | 41        | 4.9             | 2.5             | 8           | 6           | Fair   | Fair-poor | 5-15yrs  | Mature      | Low                |
| 4       | <i>Eucalyptus obliqua</i><br>Messmate Stringybark     | Vic native | 44        | 3.6             | 2.1             | 15          | 4.5         | Good   | Good      | 40+yrs   | Semi mature | Moderate           |
| 5       | <i>Eucalyptus obliqua</i><br>Messmate Stringybark     | Vic native | 80        | 7.4             | 3.0             | 18          | 7           | Good   | Good      | 40+yrs   | Mature      | High               |
| 6       | <i>Eucalyptus crenulata</i><br>Buxton Gum             | Vic native | 35        | 4.2             | 2.3             | 9           | 4.5         | Dead   | Fair      | 15-40yrs | Semi mature | Moderate           |
| 7       | <i>Eucalyptus botryoides</i><br>Southern Mahogany Gum | Vic native | 44        | 5.3             | 2.6             | 13          | 10          | Good   | Good      | 40+yrs   | Mature      | High               |
| 8       | <i>Corymbia maculata</i><br>Spotted Gum               | Vic native | 33        | 3.0             | 2.1             | 13          | 4           | Good   | Fair      | 40+yrs   | Semi mature | Moderate           |
| 9       | <i>Melaleuca armillaris</i><br>Honey Myrtle           | Vic native | 40        | 4.8             | 2.3             | 5           | 4           | Fair   | Fair      | 5-15yrs  | Mature      | Low                |
| 10      | <i>Eucalyptus saligna</i><br>Sydney Blue Gum          | Native     | 32        | 3.8             | 2.3             | 10          | 9           | Good   | Good      | 40+yrs   | Semi mature | High               |
| 11      | <i>Eucalyptus obliqua</i><br>Messmate Stringybark     | Vic native | 33        | 4.0             | 2.5             | 15          | 5           | Good   | Fair-poor | 15-40yrs | Semi mature | Moderate           |
| 12      | <i>Acacia melanoxylon</i><br>Blackwood                | Vic native | 26        | 3.1             | 2.1             | 12          | 4           | Good   | Good      | 40+yrs   | Mature      | High               |
| 13      | <i>Eucalyptus</i> sp.<br>Gum                          | Native     | 25        | 3.0             | 2.0             | 16          | 4.5         | Good   | Good      | 40+yrs   | Semi mature | Moderate           |
| 14      | <i>Eucalyptus obliqua</i><br>Messmate Stringybark     | Vic native | 73        | 8.8             | 3.2             | 24          | 11          | Good   | Fair      | 40+yrs   | Mature      | High               |
| 15      | <i>Eucalyptus obliqua</i><br>Messmate Stringybark     | Vic native | 60        | 7.2             | 2.7             | 20          | 10          | Poor   | Fair-poor | 40+yrs   | Mature      | Third-party        |
| 16      | <i>Callistemon salignus</i><br>Willow Bottlebrush     | Native     | 12        | 2.0             | 1.5             | 7           | 3           | Good   | Fair      | 40+yrs   | Semi mature | Low                |
| 17      | <i>Eucalyptus camaldulensis</i><br>River Red Gum      | Vic native | 30        | 3.6             | 2.1             | 7           | 4           | Good   | Fair      | 40+yrs   | Juvenile    | Low                |

| Tree No | Botanical name<br>Common name                            | Origin     | DBH<br>cm | TPZ<br>Radius m | SRZ<br>Radius m | Height<br>m | Spread<br>m | Health | Structure | ULE      | Age class   | Retention<br>value |
|---------|--|------------|-----------|-----------------|-----------------|-------------|-------------|--------|-----------|----------|-------------|--------------------|
| 18      | <i>Eucalyptus camaldulensis</i><br>River Red Gum         | Vic native | 41        | 3.5             | 2.1             | 6           | 4           | Good   | Good      | 40+yrs   | Juvenile    | Low                |
| 19      | <i>Leptospermum petersonii</i><br>Lemon-scented Tea-tree | Native     | NA        | 2.0             | 1.5             | 4           | 3           | Good   | Good      | 40+yrs   | Semi mature | Low                |
| 20      | <i>Hakea salicifolia</i><br>Willow-leaved Hakea          | Native     | 35        | 4.2             | 2.3             | 4           | 4.5         | Good   | Good      | 40+yrs   | Mature      | Low                |
| 21      | <i>Hakea salicifolia</i><br>Willow-leaved Hakea          | Native     | NA        | 2.0             | 1.5             | 4           | 3           | Good   | Good      | 40+yrs   | Semi mature | Low                |
| 22      | <i>Eucalyptus leucoxylon</i><br>Yellow Gum               | Vic native | 30        | 3.6             | 2.3             | 6           | 5           | Good   | Good      | 40+yrs   | Semi mature | Moderate           |
| 23      | <i>Eucalyptus leucoxylon</i><br>Yellow Gum               | Vic native | 12        | 2.0             | 1.7             | 4           | 3           | Fair   | Fair      | 40+yrs   | Juvenile    | Low                |
| 24      | <i>Eucalyptus leucoxylon</i><br>Yellow Gum               | Vic native | 15        | 2.0             | 1.7             | 5           | 4           | Good   | Fair      | 40+yrs   | Juvenile    | Low                |
| 25      | <i>Acacia melanoxylon</i><br>Blackwood                   | Vic native | 41        | 3.4             | 2.0             | 10          | 4           | Good   | Good      | 40+yrs   | Semi mature | Moderate           |
| 26      | <i>Acacia melanoxylon</i><br>Blackwood                   | Vic native | 20        | 2.4             | 1.8             | 12          | 4           | Good   | Good      | 40+yrs   | Semi mature | Third-party        |
| 27      | <i>Acacia melanoxylon</i><br>Blackwood                   | Vic native | 18        | 2.2             | 1.8             | 10          | 3           | Good   | Good      | 40+yrs   | Semi mature | Third-party        |
| 28      | <i>Acacia melanoxylon</i><br>Blackwood                   | Vic native | 50        | 6.0             | 2.7             | 13          | 6           | Good   | Good      | 40+yrs   | Semi mature | High               |
| 29      | <i>Acacia mearnsii</i><br>Black Wattle                   | Vic native | 77        | 9.2             | 3.1             | 18          | 9           | Fair   | Fair      | 15-40yrs | Mature      | Removed            |
| 30      | <i>Acacia mearnsii</i><br>Black Wattle                   | Vic native | 44        | 5.3             | 2.6             | 16          | 6.5         | Dead   | Poor      | 5-15yrs  | Dead        | Removed            |
| 31      | <i>Acacia mearnsii</i><br>Black Wattle                   | Vic native | 40        | 4.8             | 2.5             | 11          | 5           | Poor   | Poor      | 5-15yrs  | Senescent   | Removed            |
| 32      | <i>Eucalyptus viminalis</i><br>Manna Gum                 | Vic native | 12        | 2.0             | 1.5             | 10          | 3           | Good   | Fair      | 40+yrs   | Juvenile    | Removed            |
| 33      | <i>Eucalyptus obliqua</i><br>Messmate Stringybark        | Vic native | 80        | 9.6             | 3.2             | 25          | 14          | Good   | Good      | 40+yrs   | Mature      | Removed            |
| 34      | <i>Eucalyptus viminalis</i><br>Manna Gum                 | Vic native | 93        | 11.2            | 3.4             | 30          | 15          | Fair   | Fair-poor | 5-15yrs  | Mature      | Removed            |
| 35      | <i>Acacia melanoxylon</i><br>Blackwood                   | Vic native | 34        | 4.1             | 2.3             | 15          | 7           | Fair   | Fair      | 15-40yrs | Mature      | Moderate           |
| 36      | <i>Acacia mearnsii</i><br>Black Wattle                   | Vic native | 15        | 2.0             | 1.7             | 5           | 2           | Fair   | Poor      | 5-15yrs  | Mature      | Removed            |

| Tree No | Botanical name<br>Common name                            | Origin     | DBH<br>cm | TPZ<br>Radius m | SRZ<br>Radius m | Height<br>m | Spread<br>m | Health | Structure | ULE      | Age class   | Retention<br>value |
|---------|--|------------|-----------|-----------------|-----------------|-------------|-------------|--------|-----------|----------|-------------|--------------------|
| 37      | <i>Acacia mearnsii</i><br>Black Wattle                   | Vic native | 12        | 2.0             | 1.7             | 8           | 2           | Dead   | Poor      | 5-15yrs  | Dead        | Removed            |
| 38      | <i>Acacia mearnsii</i><br>Black Wattle                   | Vic native | 30        | 3.6             | 2.0             | 12          | 6           | Fair   | Fair      | 5-15yrs  | Mature      | Removed            |
| 39      | <i>Acacia mearnsii</i><br>Black Wattle                   | Vic native | 12        | 2.0             | 1.6             | 6           | 5           | Fair   | Fair      | 5-15yrs  | Semi mature | Removed            |
| 40      | <i>Leptospermum petersonii</i><br>Lemon-scented Tea-tree | Native     | 13        | 2.0             | 1.5             | 4           | 3           | Good   | Fair      | 15-40yrs | Semi mature | Low                |
| 41      | <i>Callistemon salignus</i><br>Willow Bottlebrush        | Native     | 14        | 2.0             | 1.5             | 4           | 3           | Good   | Fair      | 40+yrs   | Semi mature | Low                |
| 42      | <i>Callistemon salignus</i><br>Willow Bottlebrush        | Native     | 12        | 2.0             | 1.5             | 4           | 3           | Good   | Good      | 40+yrs   | Juvenile    | Low                |
| 43      | <i>Callistemon viminalis</i><br>Bottlebrush              | Native     | NA        | 2.0             | 1.5             | 5           | 3           | Good   | Fair      | 40+yrs   | Semi mature | Low                |
| 44      | <i>Eucalyptus radiata</i><br>Peppermint Gum              | Vic native | 44        | 5.3             | 2.6             | 12          | 5.5         | Good   | Good      | 40+yrs   | Semi mature | High               |
| 45      | <i>Eucalyptus scoparia</i><br>Wallangarra White Gum      | Native     | NA        | 2.0             | 1.5             | 3           | 2           | Good   | Good      | 40+yrs   | Juvenile    | Removed            |
| 46      | <i>Prunus xdomestica</i><br>European Plum                | Exotic     | NA        | 2.0             | 1.5             | 3           | 3           | Good   | Good      | 40+yrs   | Semi mature | Third-party        |
| 47      | <i>Prunus xdomestica</i><br>European Plum                | Exotic     | NA        | 2.0             | 1.5             | 3           | 3           | Good   | Good      | 40+yrs   | Semi mature | Third-party        |
| 48      | <i>Acacia mearnsii</i><br>Black Wattle                   | Vic native | 13        | 2.0             | 1.5             | 9           | 4           | Good   | Good      | 40+yrs   | Semi mature | Removed            |
| 49      | <i>Alnus acuminata</i><br>Evergreen Alder                | Exotic     | 20        | 2.4             | 1.7             | 10          | 5           | Fair   | Fair      | 15-40yrs | Mature      | Low                |
| 50      | <i>Alnus acuminata</i><br>Evergreen Alder                | Exotic     | 35        | 4.2             | 2.1             | 10          | 5           | Good   | Fair      | 15-40yrs | Mature      | Low                |
| 51      | <i>Acacia melanoxylon</i><br>Blackwood                   | Vic Native | 30        | 3.6             | 2.0             | 14          | 5           | Good   | Fair      | 15-40yrs | Mature      | Third-party        |
| 52      | <i>Acacia melanoxylon</i><br>Blackwood                   | Vic Native | 30        | 3.6             | 2.0             | 14          | 5           | Good   | Fair      | 15-40yrs | Mature      | Third-party        |
| 53      | <i>Acacia melanoxylon</i><br>Blackwood                   | Vic Native | 65        | 7.8             | 2.8             | 12          | 6           | Dead   | Fair      | <5yrs    | Mature      | Low                |
| 54      | <i>Eucalyptus cypellocarpa</i><br>Mountain Grey Gum      | Vic Native | 35        | 4.2             | 2.1             | 15          | 5           | Good   | Fair      | 40+yrs   | Mature      | Third-party        |
| 55      | <i>Eucalyptus cypellocarpa</i><br>Mountain Grey Gum      | Vic Native | 25        | 3.0             | 1.8             | 10          | 4           | Good   | Fair      | 40+yrs   | Mature      | Third-party        |

| Tree No | Botanical name<br>Common name                     | Origin     | DBH<br>cm | TPZ<br>Radius m | SRZ<br>Radius m | Height<br>m | Spread<br>m | Health | Structure | ULE      | Age class | Retention<br>value |
|---------|---|------------|-----------|-----------------|-----------------|-------------|-------------|--------|-----------|----------|-----------|--------------------|
| 56      | <i>Acacia melanoxylon</i><br>Blackwood            | Vic Native | 45        | 5.4             | 2.4             | 14          | 8           | Good   | Fair      | 15-40yrs | Mature    | Third-party        |
| G57     | <i>Eucalyptus obliqua</i><br>Messmate Stringybark | Vic Native | 70        | 8.4             | 2.8             | 18          | 8           | Good   | Fair      | 40+yrs   | Mature    | High               |
| G58     | <i>Eucalyptus</i> Spp.                            | Vic Native | 50        | 6.0             | 2.5             | 18          | 8           | Good   | Fair      | 40+yrs   | Mature    | High               |
| G59     | <i>Eucalyptus</i> Spp.                            | Vic Native | 50        | 6.0             | 2.5             | 18          | 8           | Good   | Fair      | 40+yrs   | Mature    | High               |
| G60     | <i>Eucalyptus obliqua</i><br>Messmate Stringybark | Vic Native | 40        | 4.8             | 2.3             | 16          | 7           | Good   | Fair      | 40+yrs   | Mature    | High               |

2.2 TREE LOCATION PLAN



Figure 1 Aerial image (Nearmap Feb 2024) shows tree locations and numbering. Red numbers indicate trees no longer present.



## 3 DISCUSSION

### 3.1 TREE PROTECTION ZONES AND ROOT SYSTEM OVERVIEW

Successful retention of trees on development sites requires development plans to allow suitable space for branches and roots. Roots are crucial for tree health, providing water and mineral nutrient uptake, hormone production and energy storage. Roots also provide anchorage, especially woody roots within the Structural Root Zone (SRZ). Typically, roots spread radially from the base of the tree. Large woody roots are found close to the tree inside the SRZ, these roots branch and form a network of smaller woody transporting roots and fine absorbing roots (Harris, Clark & Matheny 2004, Roberts, Jackson and Smith 2006). Tree species differ in root growth habit and tolerance to root disturbance. Urban soil environments also have an influence on root growth depth and spread (Matheny and Clark 1998).

Roots can be impacted by development in two ways, directly by being severed during excavation or by the soil environment becoming uninhabitable through soil compaction or the placement of structures or surfaces that restrict water and oxygen supply. The effects of root damage are not immediately visible, it may take several years for the tree canopy to decline following impacts to the root system (Matheny and Clark 1998).

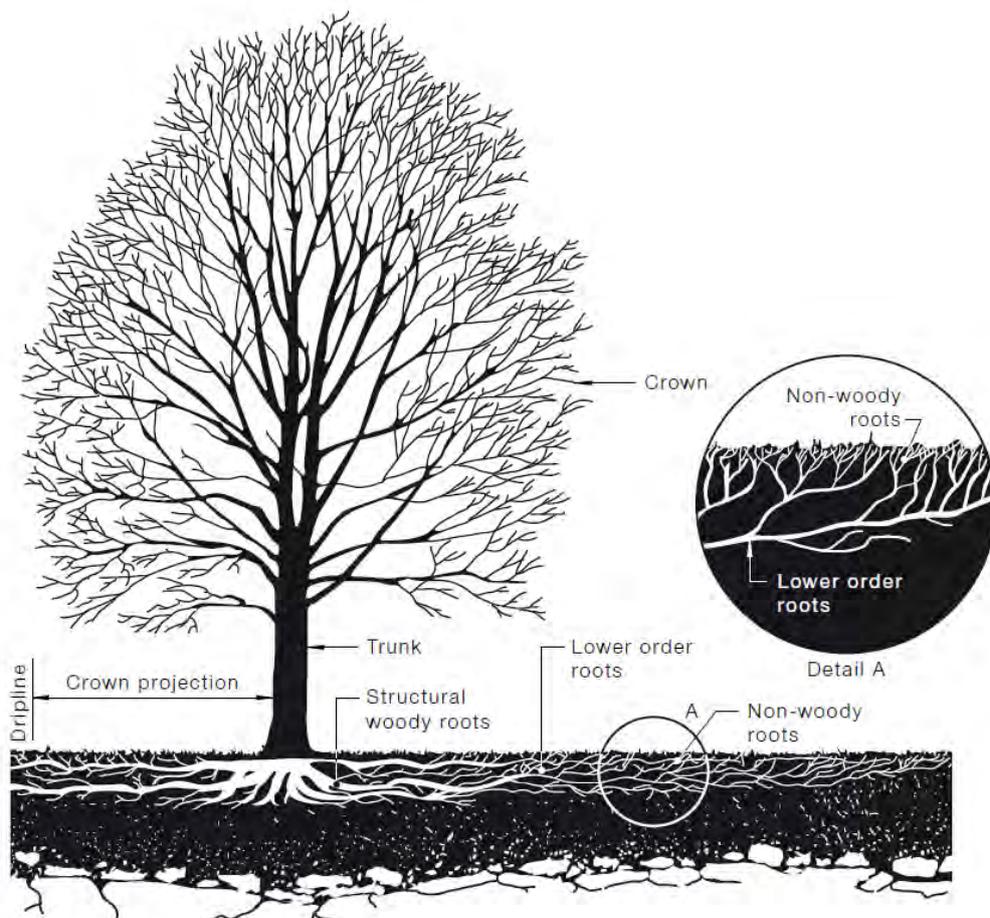


Figure 3 Example of typical root growth habits (AS4970-2009)

Each tree is allocated a tree protection zone (TPZ) and structural root zone (SRZ) calculated using formulas provided in AS4970-2009 *Protection of Trees on Development Sites*. These zones are used to gain an understanding of the impact to trees by development activities.

Works which constitute as TPZ encroachments include, but are not limited to; all soil excavation, retaining walls, site cuts, placement of fill, new hard surface coverings, new buildings and underground drainage and services.

Minor encroachments up to 10% of the total TPZ area are generally considered acceptable. Encroachments that exceed 10% of the TPZ or enter the SRZ are considered major, and must either be justified by the Project Arborist, reduced to an acceptable level or allow for the tree to be removed and replaced.

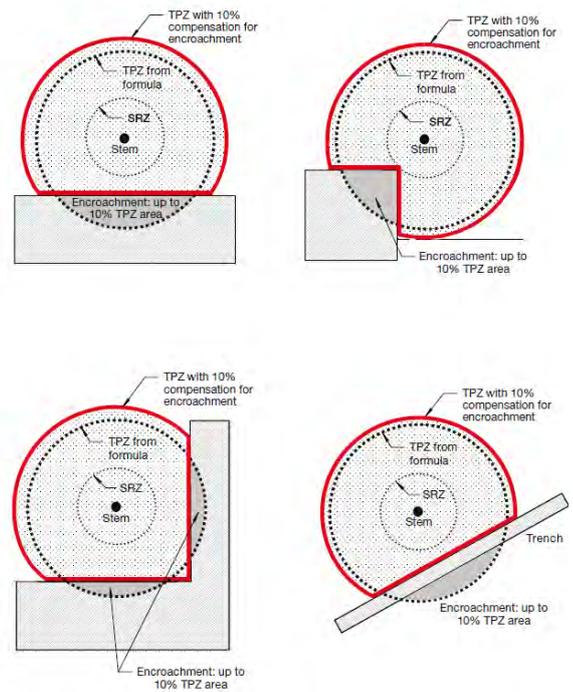


Figure 4 Example of TPZ encroachments (AS4970-2009)

### 3.2 ENVIRONMENTAL SIGNIFICANCE OVERLAY

The subject site is covered by Schedule 1 to Clause 42.01 *Environmental Significance Overlay* (ESO1). The permit triggers of ESO1 relating to tree preservation are closely aligned with Clause 52.17 *native vegetation* and can be viewed at <https://planning-schemes.app.planning.vic.gov.au/CARDINIA/ordinance/42.01-s1>

### 3.3 CLAUSE 52.17

Clause 52.17 *native vegetation* relates to the protection of native vegetation on sites greater than 4000m<sup>2</sup> (Victoria State Government DTP 2024B). The Victorian Planning Scheme glossary defines native vegetation as - *plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses* (Victoria Planning Authority 2024). Table 7 of Clause 52.17 provides a list of exemptions. Notable exemptions include dead trees with a DBH of <40cm, vegetation that was planted (unless publicly funded for the purpose of land protection or enhancing biodiversity) and naturally occurring regrowth vegetation that is less than 10 years old, on land that was previously lawfully cleared. (Victoria State Government DTP 2024B).

Arboriculture is the study of trees, which are defined as long-lived woody perennials, usually greater than 3m in height, with one or few main stems. As such, an Arborist is not qualified to make assessments on understory plants, grasses, herbs or fauna. For that reason, the scope of this report is limited to tree impacts only. An ecologist and/or zoologist should be consulted if the Responsible Authority requires expert advice on other flora and fauna.

### 3.4 PREVIOUS TREE REMOVAL

The landowner has advised the previous removal of trees along the driveway was due to tree failure in a storm event or removed for bushfire management along fence lines (C. Parry 2024, Pers. Comm, 06 June). No further tree removal is planned as part of the development permit application.

Melbourne Arborist Reports are unable to provide any further retrospective assessment of trees previously removed or the reasons for those removal.

### 3.5 TREES PLANNED FOR REMOVAL UNDER PROPOSAL

The proposed construction of a new dwelling including any outbuildings, infrastructure and the associated bushfire defendable area will not require the removal of any trees.

### 3.6 IMPACT TO RETAINED TREES

Proposed plans show a new driveway surface to be constructed from the site entry to the southeast corner of the site. These works will be in proximity of most trees assessed as part of this report.

Tree 1 will incur a minor (<10%) TPZ encroachment by proposed soil excavation for the new driveway, turning area and the 10,000 litre firefighting water tank. Due to the minor works required and permeable surface of the proposed driveway, tree 1 will remain unaffected by these works.

Trees 2, 3, 4, 6, 7, 8, 9, 10, 11, 12 and 13 will have no direct TPZ encroachment during excavation for the proposed driveway.

Tree 5 will incur a minor (<10%) TPZ encroachment resulting from the proposed driveway.

Trees 14 and 15 will incur TPZ encroachment resulting from the proposed driveway. Proposed plans show the driveway to be above grade and permeable, these works are unlikely to affect the health or structure of trees 14 and 15. Figure 8 shows tree 14 in relation to the proposed above grade portion of driveway.

The proposed driveway within the TPZs of trees 16-49 appears to be able to be constructed above the existing natural ground level. An informal crushed rock driveway is in place at the approximate location of the proposed driveway (Figures 9-11).

Trees G57, G58, G59 and G60 were remnant stands of tall eucalypts and dense understory vegetation. Proposed plans will have no direct impact on trees G57, G58, G59 and G60 which are all located beyond the bushfire defendable area.

## 4 CONCLUSION AND RECOMMENDATIONS

Proposed plans to develop the subject site as shown in Figure 2 will not require the removal of any trees onsite.

Proposed plans allow for the successful retention of all third-party trees in adjacent properties with only minor TPZ encroachments planned as listed in section 3.6.

Third-party trees and retained trees onsite, must be protected during all stages of site development in accordance with AS4970-2009 *Protection of Trees on Development Sites* and to the satisfaction of the Responsible Authority.

The following site-specific tree protection measures must be implemented for all trees surrounding the subject site:

- A. An AQF level 5 or higher arborist must be engaged as the Project Arborist for the duration of site works and must be consulted by the Project Manager prior to any works commencing.
- B. Tree protection zones (TPZ) must be established within the site and nature strip around each retained tree prior to any works commencing. 1.8m high temporary chain mesh fencing held

in position with concrete pads must be used to exclude works from within a TPZ. TPZ fence locations must be defined by referring to TPZ dimensions provided in this report, modified only to allow for site access and construction works approved within those zones.

- C. Signage in accordance with AS1319 stating the words 'Tree Protection Zone-No Access' must be affixed to TPZ fencing and remain visible from within the development site.
- D. Areas of exposed soil within a TPZ radius that cannot be fenced off due to essential site access requirements must be covered by geotextile fabric, 100mm of mulch and be topped by wooden rumble boards or plastic tracker mats.
- E. Soil excavation within a TPZ must be supervised and documented by the Project Arborist. Excavation encroachments must be limited to those shown on endorsed plans. Any modification or additional excavation inside a TPZ must first be approved by the Responsible Authority.
- F. Underground utilities and services must be routed outside of TPZs or be installed using manual excavation, non-destructive digging (NDD) or directional boring at a depth greater than 1.0m. Boring pits must be positioned outside of TPZs.
- G. Roots damaged during site works must be pruned back to undamaged wood using clean sharp tools. Root pruning must be conducted and documented by the project arborist and be in accordance with AS4373-2007 *Pruning of Amenity Trees*.
- H. Pruning of roots greater than 50mm in diameter must first be approved by the Responsible Authority.
- I. Material storage, waste disposal and site amenities must be located outside of TPZs.
- J. Any essential canopy pruning must be completed in accordance with AS4373-2007 *Pruning of Amenity Trees* and any other relevant law, policy or guidelines enforced by local authority.
- K. The project arborist must supply final documentation that all tree protection measures were implemented, comment on the post development health of the trees and make any further recommendations as required.

## 5 REFERENCES AND APPENDICES

### 5.1 APPENDIX 1 SUPPORTIVE PHOTOGRAPHS



Figure 5 Tree 1



Figure 6 Trees 2-4



Figure 7 Trees 5-14



Figure 8 Tree 14 in approximate proximity to above grade gravel driveway



Figure 9 Location of proposed driveway from tree 16 looking west



Figure 10 Location of proposed driveway from tree 29 looking west



Figure 11 Location of proposed driveway from tree 40 looking west

## 5.2 APPENDIX 2 DATA DESCRIPTORS, DEFINITIONS AND CRITERIA

### Origin

**Indigenous** – Known to occur naturally at the subject site location.

**Vic native** – Species that occur naturally in Victoria (may include the subject site location).

**Native** – Species that occur naturally in other states of Australia, but not Victoria.

**Exotic** – Species that occur naturally outside of Australia, i.e. the species has been introduced.

**Garden origin** – Species, or varieties that have been developed through the nursery industry.

### Health ratings

**Dead** – Tree is completely dead, non-functional crown (no green leaves), stem cambium completely dead, no evidence of root suckers or sprouts.

**Poor** – Tree is presenting large quantities of crown dieback and/or major crown thinning. Persistent infections of pathogens, insect borers, fungal cankers and root disease may be present. Irreversible condition, any treatments may only be temporary to achieve hazard reduction prior to tree removal.

**Fair** – Tree is presenting symptoms of stress that may be due to seasonal biotic or abiotic conditions e.g. water stress or seasonal defoliators. The symptoms may include tip dieback, crown thinning, defoliation, leaf discoloration, reduced leaf and/or internode length. The condition may be reversible.

**Good** – Tree is generally free of pest and disease symptoms; any biotic or abiotic stress is not present over more than 10% of the tree parts concerned. Internode length may be variable but generally consistent in length for the last 2 annual increments.

**Excellent** – Tree is completely free from evidence of pest or disease organisms. Tree is exhibiting no signs of abiotic stress such as tip dieback or loss of foliage. Growth is of typical colouration, size and quantity for that species at that location. Internode length is consistent or increasing in length from previous 2 increments. The tree crown appears complete and balanced.

### Structure ratings

**Very poor** – Tree has pronounced structural weakness that may be due to poor growth development, advanced fungal decay, multiple previous failures within crown, and/or mechanical damage. Tree is presenting symptoms of instability and possible imminent structural failure of major structural component(s).

**Poor** – Tree has structural weakness that may be due to poor growth development, fungal decay, mechanical damage including past pruning or a combination of these but is not at this time presenting symptoms of imminent structural failure of major structural components.

**Fair** – Tree has some structural weakness but failure of which is not a major structural component and does not present any symptoms of potential imminent failure. Fungal degradation was not observed in any structurally significant component.

**Good** – Tree does not appear to have any obvious, notable structural defects, symptoms of structural distress or indicators of fungal decay.

## Age classifications

**Juvenile** – Young trees that are yet to reach one third of their expected size, generally less than 10 years old.

**Reformed** – Trees which have previously been cut to a stump and allowed to regrow.

**Semi-mature** – Trees which have reached approximately half of their expected size and are less than one third of the way through their expected lifespan; species and location considered.

**Mature** – Trees which have reached their expected size and are approximately two thirds of the way through their expected average lifespan; species and location considered.

**Senescent** – Trees which have over matured within the surrounding landscape and present in a state of health and/or structural decline.

**Dead** – Trees with a non-functional crown (no green leaves), stem cambium completely dead, no evidence of root suckers or sprouts.

## Retention value

**Low retention value** – Trees that offer little in terms of contributing to the future site for reasons of poor health and/or structural condition or species inaptness in relation to unacceptable growth habit, noxious or invasive weed species or a combination of these characteristics. Juvenile and semi-mature trees which could be readily replaced may also be placed in this category.

Low retention value trees should be considered for removal prior to development works proceeding. Trees of low retention value should place no restraints on proposed designs.

**Moderate retention value** – Trees offering some beneficial attributes that may enhance the site or local environment in relation to botanical, historical or local significance but may be limited to some degree by their current health condition, structural condition or ULE of <20yrs.

Moderate retention value trees should be considered for retention where possible within the development design, but not necessarily to the detriment of the design. Arboricultural works or alternate construction techniques within acceptable limits may be utilized to allow construction to proceed with the retention of moderate retention value tree/s.

**High retention value** – Trees with potential to positively contribute to the future site or local environment due to their botanical, historical or local significance in combination with good characteristics of health and structure, ULE of >20 yrs. Significant remnant specimens may also be placed in this category regardless of health and structure.

High retention value trees should be considered for retention and be incorporated within the design layout. All avenues of tree protection and alternative construction techniques that will allow for tree retention should be investigated.

**Third-party** – Trees located within adjoining properties or council owned land adjacent to the subject site. Third-party trees must be protected from major physical injury, or where appropriate permission may be sought to alter or replace the tree/s.

Useful Life Expectancy – ULE  
(Adapted from Barrell 2001)

**40+ years/long:** *Trees that appear to be retainable in the current landscape for more than 40 years.*

1. Structurally sound trees located in positions that can accommodate future growth.
2. Minimally defective trees that could be made suitable for retention in the long term by remedial arboricultural practices and maintenance.
3. Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.

**15-40 years/Medium:** *Trees that appear to be retainable in the current landscape for 15 to 40 years.*

1. Trees that may only live between 10 and 40 years.
2. Trees that may live for more than 40 years but would be removed to allow for new plantings.
3. Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons.
4. Minimally defective trees that can be made suitable for retention in the medium term by remedial arboricultural practices and maintenance.

**5-15 years/Short:** *Trees that appear to be retainable in the current landscape for 5 to 15 years.*

1. Trees that may only live for 5 to 15 years.
2. Trees that may live for more than 15 years but would be removed to allow for new plantings.
3. Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons.
4. Defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.

**<5 years/Remove:** *Trees requiring immediate removal or trees that should be removed within 5 years.*

1. Dead trees.
2. Declining trees through disease or inhospitable conditions.
3. Dangerous trees through instability or recent loss of adjacent trees.
4. Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor structure.
5. Damaged trees that are considered unsafe to retain.
6. Trees that are listed as noxious weeds in the subject site location.
7. Trees conflicting with structures, underground utilities or hard surfaces that cannot easily be remedied through engineering solutions.

**N/A:** *Small, young or regularly pruned trees of low retention value.*

1. Trees that can be reliably moved or replaced.
2. Small trees less than 5m in height.
3. Young trees less than 15 years old but over 5m in height.
4. Trees intended for regular pruning to artificially control growth.

### 5.3 REFERENCES

- Barrell. J, 2001. *SULE: Its use and status into the new millennium*. Viewed 18 Oct 2018  
<<https://www.barrelltreecare.co.uk/assets/Uploads/BTC08-Sydney.pdf>>
- Harris. R, Clark. J & Matheny. N, 2004. *Arboriculture-integrated management of landscape trees, shrubs and vines*, 4<sup>th</sup> edn. Pearson Education, Inc., Upper Saddle River, New Jersey.
- Matheny. N & Clark. J, 1998. *Trees and development*. International Society of Arboriculture, Champaign, USA.
- Mattheck. C and Breloer. H, 1994. *The body language of trees-a handbook for failure analysis*, The Stationary Office, UK.
- Nearmap, 2024. *1000 Pakenham Road, Pakenham Upper*. Viewed 07 June 2024  
<<http://maps.au.nearmap.com/>>
- Standards Australia, 2007. *Australian Standard AS-4373-2007 Pruning of Amenity Trees*, Standards Australia, Sydney.
- Standards Australia, 2009. *Australian Standard AS-4970-2009 Protection of Trees on Development Sites*, Standards Australia, Sydney.
- Victoria State Government DTP, 2024A. *Vicplan*. Viewed 07 June 2024  
<<https://mapshare.vic.gov.au/vicplan/>>
- Victoria State Government DTP, 2024B. *Victoria Planning Provisions Clause 52.17*. Viewed 24 Jan 2024  
<<https://planning-schemes.app.planning.vic.gov.au/Victoria%20Planning%20Provisions/ordinance/52.17>>
- Victoria Planning Authority, 2024. *Glossary*. Viewed 24 Jan 2024  
<<https://vpa.vic.gov.au/glossary/#glossaryN>>

Liam McCormack  
Botanist/Ecologist  
Ecolink Consulting Pty Ltd  
PO Box 356  
Northcote VIC 3070

Our Ref: 2409

20 February 2024

Charles Parry  
1000 Pakenham Road  
Pakenham Upper 3810 VIC

Via email: parbrookhomes@gmail.com

Dear Charles,

**Re: Retrospective Vegetation Assessment  
1000 Pakenham Road, Pakenham Upper, Victoria.**

Ecolink Consulting Pty Ltd was engaged by Mr Charles Parry to undertake a Retrospective Vegetation Assessment of the property located at 1000 Pakenham Road, Pakenham Upper, Victoria. The study area for the current assessment is the panhandle of the property and is isolated to the area around the house and associated buildings (Figure 1). The Retrospective Vegetation Assessment was commissioned to provide assistance to the property owner in relation to a letter from Cardinia Shire Council (hereafter Council) that alleges vegetation has been cleared from the subject site. Therefore, the current assessment will address the requirements of Clause 52.17 of the Cardinia Shire Council Planning Scheme by mapping and assessing the location, extent and quality of native vegetation, in accordance with the Guidelines for the removal, destruction or lopping of native vegetation. The assessment also estimates recent impacts to native vegetation, based on the site inspection and a review of aerial photography of the study area.

## Methods

### Desktop Assessment

A desktop assessment reviewed the following data sources:

- The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool to determine Matters of National Environmental Significance (MNES), under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), that are modelled to occur in the vicinity of the study area (Department of Climate Change Energy the Environment and Water 2023a);
- Planning Maps to identify the planning zones and overlays relating to environmental matters e.g. Vegetation Protection Overlays or Environmental Significance Overlays (Department of Transport and Planning 2023);
- The NatureKit webpage (Department of Environment Land Water and Planning 2023c) from the Department of Energy, Environment, and Climate Action (DEECA) to identify the historic and current Ecological Vegetation Classes (EVCs);
- The Victorian Biodiversity Atlas (Department of Environment Land Water and Planning 2023f) for records of threatened<sup>1</sup> flora and fauna within three kilometres of the study area;
- Nearmap aerial photography to understand previous land use and changes in vegetation extent (Nearmap 2023);
- The Native Vegetation Information Management System (NVIM) to determine biodiversity offset requirements (Department of Environment Land Water and Planning 2023b);
- Melbourne Arborists Reports' *Arboricultural Report Development Impact Assessment* (Melbourne Arborists Reports Pty Ltd 2019);
- The 'Weeds of National Significance' database (Department of Climate Change Energy the Environment and Water 2023b); and,
- Other relevant legislation and policies (as required).

### Site Assessment

A site assessment was undertaken on 16 February 2024 by Botanist/Ecologist, Liam McCormack. Liam is suitably qualified and experienced to undertake such assessments and holds a current Vegetation Quality Assessments (Habitat Hectares) Accreditation with DEECA (Department of Environment Land Water and Planning 2023e).

All flora species observed within the study area were recorded, with the exception of planted vegetation that was not considered a 'weed' (i.e. planted vegetation that was not spreading or reproducing). Where a species was not able to be confidently identified in the field, a sample was collected and later identified. Plants were identified to species level wherever possible, however, some plants that were planted, cultivars, hybrids, or plants that did not contain suitable fertile material used for identification were recorded to genus level. All metrics required to fulfil the

---

<sup>1</sup> Threatened flora and fauna includes species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth), and the *Flora and Fauna Guarantee Act 1988* (Vic).

requirements of the Guidelines (described below) were collected, and a search for threatened flora and fauna, or habitat that is likely to support such species, was also undertaken by systematically traversing the entire study area on foot.

The Guidelines require that information regarding the biodiversity values of the site were obtained though:

- Site-based information that can be measured or observed at a site, including:
  - Extent of native vegetation patches;
  - Large trees;
  - Native vegetation condition assessed in accordance with the *Vegetation Quality Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method* (Department of Sustainability and Environment 2004);
  - Ecological Vegetation Classes (EVC); and
  - Sensitive wetlands and coastal areas.
- Landscape scale information that cannot be measured or observed at the site and includes maps and models procured from DEECA.

The Guidelines require a Habitat Hectare assessment in instances where the impact is to be assessed under the Detailed Assessment Pathway. Where required, the Habitat Hectare assessment is to be undertaken in accordance with the methodology prescribed within the *Vegetation Quality Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method* (Department of Sustainability and Environment 2004) at patches<sup>2</sup> of vegetation.

In addition, the location, species and size of indigenous ‘scattered trees’<sup>3</sup>, and any ‘large trees’<sup>4</sup> that are proposed to be removed must also be mapped using a hand-held tablet loaded with GIS software (accuracy +/- 5 metres).

### Limitations

The following limitations and qualifications apply to this report:

- The assessment was largely limited to an assessment of the vegetation within the study area in accordance with the Guidelines (Department of Environment Land Water and Planning 2017). Therefore, a detailed fauna assessment was not undertaken.
- The results of the desktop assessment are reliant on data obtained from various databases and other reports. These databases all have internal vetting procedures, however the accuracy of these historical data and some of the results provided within these reports cannot be verified. The desktop assessment does, however, rely on the most accurate data available.

---

<sup>2</sup> A ‘patch’ is defined as an area with at least 25% cover abundance of perennial native vegetation, or a group (i.e. three or more) trees forming a continuous canopy.

<sup>3</sup> Scattered trees are defined as a native canopy tree that does not form a patch.

<sup>4</sup> Large trees are defined as meeting the size threshold specified in the bioregional EVC Benchmark.

- As with all ecological assessments, a greater survey effort is likely to yield additional flora records. Where these additional flora records may alter the recommendations made within this report (e.g. where additional threatened species may utilise habitats within the study area, or where threatened species may be impacted by the proposed development), further assessment has been recommended within this report, depending on the implications of relevant policies and legislation.
- Some flora species may only be recorded during certain times or seasons (e.g. plants that only contain above-ground biomass and are only visible annually). The author has made an informed decision about the likely presence of threatened species that may be present, or that may utilise habitats within the study area, based on a detailed desktop assessment, a review of the species' biology, an understanding of the ecological values of the local area, and an assessment of flora and fauna as well as their habitats.
- It is not possible to accurately identify the provenance or species of plant that was present prior to land disturbance. We have made an informed judgement of the likely vegetation that was present, based on the landholder's advice, aerial photography and the vegetation that is present in the adjoining land.

Despite the limitations to the assessment listed above, the results gained by both a desktop and a field-assessment are adequate to address the purposes of this report.

## **Results**

### *The Study Area*

The larger property is roughly square, with the panhandle that comprises the study area, extending to Pakenham Road. Much of the property contains native vegetation that is contiguous with Gembrook G67 Bushland Reserve. The study area consists of a house and associated outbuilding, with manicured lawns and trees, both remnant and planted, occurring to the north and south, before giving way to remnant forest. To the south is the developmental hub of Pakenham, hosting medium density suburban development.

The landscape surrounding the study area is hilly, with hobby farms and small-scale agriculture set amongst bushland reserves. Local features include Cardinia Reservoir to the north-west, Bunyip State Park to the north-east and the M1 Freeway to the south. Reserves and protected areas include the Gembrook G67 Bushland Reserve to the north and the RJ Chambers Flora and Fauna Reserve to the north-west

The study area is zoned Rural Conservation Zone – Schedule 2 (RCZ2). It is covered by an Environmental Significance Overlay – Schedule 1 (ESO1). The ESO1 is placed over the hills within the northern reaches of the municipality, because they provide habitat of zoological and botanical significance. No other planning overlays, relevant to the current assessment, such as Vegetation Protection or Significant Landscape Overlays, cover the study area (Department of Environment Land Water and Planning 2023e).

The ESO1 details several relevant objectives, as listed below:

- To protect and enhance the significant environmental and landscape values in the northern hills area including the retention and enhancement of indigenous vegetation;
- To ensure that the siting and design of buildings and works does not adversely impact on environmental values including the diverse and interesting landscape, areas of remnant vegetation, hollow bearing trees, habitat of botanical and zoological significance and water quality and quantity;
- To ensure that the siting and design of buildings and works addresses environmental hazards including slope, erosion and fire risk, the protection of view lines and maintenance of vegetation as the predominant feature of the landscape; and,
- To protect and enhance biolinks across the landscape and ensure that vegetation is suitable for maintaining the health of species, communities and ecological processes, including the prevention of the incremental loss of vegetation (Department of Environment Land Water and Planning 2023d).

The objectives of the ESO1 are considered within the body of this report.

#### Flora Species and Vegetation Communities

The study area is located within the Highlands Southern Fall bioregion of Victoria. DEECA modelling of the vegetation within the study area suggests that it was historically covered by Ecological Vegetation Classes (EVC) 29: Damp Forest, throughout the study area, however EVC 16: Lowland Forest and EVC 59: Riparian Thicket also occur in close proximity (Department of Environment Land Water and Planning 2023c). These EVCs are described as:

- EVC 29: Damp Forest *'Grows on a wide range of geologies on well-developed generally colluvial soils on a variety of aspects, from sea level to montane elevations. [It is] ominated by a tall eucalypt tree layer to 30 m tall over a medium to tall dense shrub layer of broad-leaved species typical of wet forest mixed with elements from dry forest types. The ground layer includes herbs and grasses as well as a variety of moisture-dependent ferns including occasional tree ferns'* (Department of Environment Land Water and Planning 2023a). EVC 29: Damp Forest is listed as 'Least Concern' within the bioregion.
- EVC 16: Lowland Forest is a *'Eucalypt forest to 25 m tall on relatively fertile, moderately well-drained soils in areas of relatively high rainfall. Characterised by the diversity of life forms and species in the understorey including a range of shrubs, grasses and herbs'* (Department of Environment Land Water and Planning 2023a). EVC 16: Lowland Forest is listed as 'Least Concern' within the bioregion.
- EVC 59: Riparian Thicket consists of *'Dense thickets of Woolly Tea-tree Leptospermum lanigerum and/or Scented Paperbark Melaleuca squarrosa to 6 m tall with occasional emergent eucalypts that occur on broad beds of small streams or on regular flooded terraces of large streams and rivers. Ground layer is dominated by a number of ferns, tree-ferns and sedges'* (Department of Environment Land Water and Planning 2023a). EVC 59: Riparian Thicket is listed as 'Vulnerable' within the bioregion.

Current vegetation modelling, by DEECA, suggests that some of this vegetation persists within the study area (Department of Environment Land Water and Planning 2023c). The current assessment confirmed the presence of EVC 29: Damp Forest within the study area.

Twenty-five flora species were recorded during the assessment (excluding the planted trees). This comprised eight indigenous species and 17 exotic species.

The study area exhibited a highly modified understorey that consisted of exotic pasture species including Sweet Vernal-grass *Anthoxanthum odoratum*, Yorkshire Fog *Holcus lanatus*, Kikuyu *Cenchrus clandestina*, Perennial Ryegrass *Lolium perenne* and Couch *Cynodon dactylon* var. *dactylon*, as well as environmental weeds including White Clover *Trifolium repens*, Ragwort *Senecio jacobaea*, Flatweed *Hypochaeris radicata* and Ribwort *Plantago lanceolata* (Plate 1).

Two small patches of native vegetation were located on the southern boundary of the property (Plate 2). This vegetation largely consisted of an understorey tree layer of Blackwood *Acacia melanoxylon* or Black Wattle *Acacia mearnsii*, interspersed with planted, horticultural trees. The understorey in these patches included Thatch Saw-sedge *Gahnia radula*, Common Raspwort *Gonocarpus tetragynus* and Weeping Grass *Microlaena stipoides* (Plates 3). One scattered Narrow-leaf Peppermint *Eucalyptus radiata* was recorded within the study area (Plate 4).

The vegetation diversity and structure of Patch 1 and 2 represented highly modified relics of EVC 29: Damp Forest, with the overstorey removed and they exhibited low species richness, when compared with the EVC Benchmark. The quality of Patches 1 and 2 was low when compared with the EVC Benchmark, with both having a Habitat Hectare Score of 15 (out of 100) (Table 1).

The data observed and measured to assess the extant Patches 1 and 2 were applied to the assessment of the removed Patch 3, which was plotted based on aerial imagery of the study area from 2018. This imagery also confirmed the presence of a large, canopy tree within Patch 3 that is no longer present. Patch 3 scored a moderate Habitat Hectare Score of 26 (out of 100), largely due to the large tree component being present (based on the aerial imagery).

**Table 1.** Habitat Hectare Assessment results for the patch of native vegetation

| Patch                                    |                       |               | 1                       | 2                       | 3                       |
|--|-----------------------|---------------|-------------------------|-------------------------|-------------------------|
| Bioregion                                |                       |               | Highlands Southern Fall | Highlands Southern Fall | Highlands Southern Fall |
| EVC name                                 |                       |               | Damp Forest             | Damp Forest             | Damp Forest             |
| EVC number                               |                       |               | 29                      | 29                      | 29                      |
| Conservation rating within bioregion     |                       |               | Least Concern           | Least Concern           | Least Concern           |
| Assessment Criteria                      |                       | Maximum Score | Patch Score             | Patch Score             | Patch Score             |
| Site Condition                           | a. Large old trees    | 10            | 0                       | 0                       | 9                       |
|  | b. Canopy cover       | 5             | 0                       | 0                       | 2                       |
|  | c. Understorey        | 25            | 5                       | 5                       | 5                       |
|  | d. Lack of weeds      | 15            | 0                       | 0                       | 0                       |
|  | e. Recruitment        | 10            | 0                       | 0                       | 0                       |
|  | f. Organic litter     | 5             | 2                       | 2                       | 2                       |
|  | g. Logs               | 5             | 0                       | 0                       | 0                       |
|  | h. Total (sum of a-g) | 75            | 7                       | 7                       | 18                      |
| Landscape                                | j. Patch size         | 10            | 1                       | 1                       | 1                       |
|  | k. Neighbourhood      | 10            | 4                       | 4                       | 4                       |
|  | l. Distance to core   | 5             | 3                       | 3                       | 3                       |
| m. Habitat Score (sum of h-l)            |                       | 100           | 15                      | 15                      | 26                      |
| <b>n. Habitat score out of 1 (m÷100)</b> |                       |               | <b>0.15</b>             | <b>0.15</b>             | <b>0.26</b>             |
| Patch Size (Ha)                          |                       |               | 0.018                   | 0.016                   | 0.079                   |
| Large Old Trees (LOTs)                   |                       |               | 0                       | 0                       | 1                       |

One scattered indigenous tree was also recorded within the study area during the current assessment (Plate 5) (Table 2). No recent evidence of the removal of any scattered trees was observed in the aerial imagery or the current assessment.

**Table 2.** Scattered tree assessment results.

| Arborist Ref | Ecolink Ref | Species                | Size  | DBH (cm) |
|--------------|-------------|------------------------|-------|----------|
| 44           | ST1         | Narrow-leaf Peppermint | Small | 44       |

**Table note:** EVC 29: Damp Forest size class for Large Eucalypts is 90 centimetres Diameter at Breast Height (DBH).

### Vegetation Removal

An investigation of aerial photography shows that vegetation within the study area has been removed since late 2018. A timeline of vegetation impacts is presented in Table 3 below.

The landowner has acknowledged that:

- One remnant healthy Manna Gum *Eucalyptus viminalis* was actively removed (the Large tree from Patch 3—Tree 34 of the arborists' report (Melbourne Arborists Reports Pty Ltd 2019));
- Four remnant *Acacias* were removed from the southern boundary;
  - These trees had senesced and were in a state of decay supporting no foliage or branches;
- One remnant *Acacia*, in ill health, was removed from where the house is now located; and,
- Two remnant *Acacias*, in ill health, were removed from the area that now holds the water tank (C Parry, Pers. Comm., 16 February 2024).

The landholder has suggested that all trees in question, excluding Tree 34, were removed due to ill-health and posing a risk of falling (C Parry, Pers. Comm., 16 February 2024). Some hard landscaping has also occurred on the site where the house and ancillary structures are located.

Based on the landholders' advice, and the findings of the current assessment, including the site assessment and the review of aerial photography, we conclude:

- Eight Trees were removed, these trees supported a contiguous canopy and were part of patches;
- One of these trees qualified as a Large Old Tree within a patch (Patch 3—Tree 34 ); and,
- The movement of soil associated with the hard landscaping had no impacts on understorey vegetation.

**Table 3.** Timeline of vegetation removal

| Image Date        | Description  | Image  |
|-------------------|--|--|
| <b>30/11/2017</b> | Aerial imagery taken in November 2017 shows several netted fruit trees occurring within the area that will later undergo hard landscaping. Due to the presence of these fruit trees, it is likely that the understorey vegetation that was later landscaped, did not consist of a minimum 25% cover abundance of native species to qualify as a patch.   |   |
| <b>23/12/2018</b> | Aerial imagery taken in December 2018, when referenced against the arboricultural report (Melbourne Arborists Reports Pty Ltd 2019), it is understood that the three trees on the northern boundary were mature native <i>Acacias</i> , one of which was assessed as Tree 35: a Blackwood. The largest tree (centrally located) was a remnant, large, Manna-gum, assessed as Tree 34, the four small Blackwoods on the southern boundary, were reported to be in poor health, both by the landowner and arboricultural report, being Trees 28-31, this is visually evident in later aerial imagery (Melbourne Arborists Reports Pty Ltd 2019; Nearmap 2023). |  |

| Image Date        | Description  | Image  |
|-------------------|--|--|
| <b>18/12/2019</b> | <p>Prior to this image dated December 2019, one of the northern <i>Acacias</i> was removed, and some hard landscaping undertaken. This tree was not mentioned within the arboricultural report (Melbourne Arborists Reports Pty Ltd 2019); however the landowner recalls it being a Blackwood.</p> <p>As per the aerial imagery from 2017, much of the area around the buildings has historically been managed as orchards and vineyards. In turn it is highly unlikely that the hard landscaping on site has affected remnant understorey vegetation.</p> |   |
| <b>28/11/2021</b> | <p>Prior to this image in November 2021, the other northern <i>Acacias</i>, consisting of Tree 35, an unassessed Blackwood and Tree 34, a Manna-gum, were removed. Trees 28-31 have been removed; however, removal has occurred recently such that the aerial imagery has not updated (Plate 5).</p>   |  |

### Threatened Flora Species and Communities

The current assessment recorded no threatened flora species within the study area. There are no historical records of threatened flora species within the study area (Department of Environment Land Water and Planning 2023f) (Figure 2). The threatened species identified by the desktop assessment that are predicted to occur within the vicinity of the study area are, in fact, unlikely to occur, as their habitat requirements are not met within the study area and the records are attributed to areas of high quality habitat away from the study area (such as the Gembrook Bushland reserve). There were no threatened ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) recorded within the study area. It is concluded that no threatened flora species or ecological communities were likely to have been impacted by the unauthorised native vegetation removal.

### Fauna Species, Fauna Habitats and Threatened Fauna Species

A detailed fauna assessment was not undertaken. However, the study area is likely to provide roosting and foraging substrates for a range of locally common birds. Despite this, based on the current assessment, the study area is unlikely to provide important breeding habitat to any birds, bats or arboreal mammals. It is therefore unlikely to provide important habitat to threatened fauna species that may persist within the broader landscape.

## **Discussion**

### Planning and Environment Act 1987 (Vic)

The project requires a retrospective planning permit from the Cardinia Shire Council. No further removal of native vegetation is permitted without approval of a planning permit application to the Council.

Due to the prior removal of some native vegetation, pursuant to Clause 52.17 of the Cardinia Planning Scheme, which references the Guidelines (Department of Environment Land Water and Planning 2017), the applicant must meet the three-step approach to:

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided; and
3. Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation (Department of Environment Land Water and Planning 2017).

In this case, there is no opportunity to demonstrate the three-step approach and we have retrospectively identified the offsets for the removal of native vegetation.

### *Avoidance and Minimisation*

We are not aware of any efforts to apply the three step approach to avoid, minimise or offset the vegetation that has been removed to date. As such we have calculated offsets for the likely

unauthorised impacts to native vegetation based on the current site assessment, a review of historical aerial imagery and the assessment undertaken by the arborist (Melbourne Arborists Reports Pty Ltd 2019). We have not speculated on how the vegetation was impacted, as there was no way to determine this from the site assessment.

### *Offsets*

On the basis of the above the offsets have been calculated based on impacts for:

- The removal of Tree 34, confirmed to be a Large tree;
- The removal of Trees 28, 29, 30, 31 and 35, which are confirmed to be *Acacias* and therefore understorey species;
- The removal of two unassessed trees, which are likely to be *Acacias* and therefore understorey species.

The impacted vegetation data was issued to DEECA, who generated a Native Vegetation Removal report (Appendix 3). This report uses the data collected during the current assessment and modelled vegetation quality scores to determine offset requirements. The Native Vegetation Removal report also includes the species specific offset test, which determines if the proposed vegetation removal will have a proportional impact on any Victorian rare or threatened species habitat above a specific offset threshold, which is set at 0.005 per cent of total habitat for each species. This offset would comprise:

- 0.045 General Habitat Units:
  - With a minimum Strategic Biodiversity Score of 0.566;
  - Located with the Melbourne Water Catchment Management Authority area or Cardinia Shire municipality.
- 1 Large Tree.

We have confirmed that these offsets are available through the Native Vegetation Credit Register (Attachment 2). It is expected that offsets will be achieved through a third-party offset, through a vegetation broker, as securing the offsets on site is not practicable.

### *Catchment and Land Protection Act 1994 (Vic)*

The primary considerations of the *Catchment and Land Protection Act 1994 (Vic)* relate to soil and water conservation, as well as the management of pest plants and animals. Three weed species that are listed as 'noxious' within the Port Phillip and Westernport Catchment Management Area:

- Blackberry *Rubus fruticosus* spp. agg. and Ragwort *Senecio jacobaea* are listed as 'Regionally Controlled' within the catchment. The proponent is required to 'control the spread' of all 'Regionally Controlled' species from their property; and
- Soursob *Oxalis pes-caprae*, which is listed as 'Restricted'. 'Restricted' weeds have limitations on their collection and trade (Table 2).

The landholder should aim to remove these plants when undertaking works, and ensure they are removed during the future the landscaping and maintenance of the study area. It is expected that weed management would form part of a Construction Environment Management Plan (or equivalent). As a minimum, this should include:

- Maintain vehicle hygiene and vehicle wash-down areas;
- Using clean fill (if required);
- Managing noxious weeds that may establish post-construction through appropriate management techniques; and,
- Avoiding the use of noxious species during any landscaping of the property.

It is anticipated that key recommendations described above, will form a condition of approval for the permit application.

I trust the above meets with your expectations, but please contact me if you have any queries.

Kind regards,

A handwritten signature in black ink, appearing to read "Liam McCormack".

Liam McCormack  
Botanist/Ecologist  
Ecolink Consulting Pty Ltd

## References

- Department of Climate Change Energy the Environment and Water (2023a). The Protected Matters Search Tool. Available at <http://www.environment.gov.au/arcgis-framework/apps/pmst/pmst.jsf>. Accessed January 2023. Department of Climate Change Energy the Environment and Water, Canberra.
- Department of Climate Change Energy the Environment and Water (2023b). Weeds of National Significance. Available at <http://www.weeds.org.au/WoNS/>. Accessed January 2023. Department of Climate Change Energy the Environment and Water, Canberra.
- Department of Environment Land Water and Planning (2017). 'Guidelines for the Removal, Destruction or Lopping of Native Vegetation.' (Department of Environment Land Water and Planning: Melbourne).
- Department of Environment Land Water and Planning (2023a). EVC Benchmarks. Available at [www.depi.vic.gov.au](http://www.depi.vic.gov.au) Accessed January 2023. Department of Environment Land Water and Planning, Melbourne.
- Department of Environment Land Water and Planning (2023b). Native Vegetation Information Management System. Available at [www.nvim.depi.vic.gov.au](http://www.nvim.depi.vic.gov.au). Accessed January 2023. Department of Environment Land Water and Planning, Melbourne.
- Department of Environment Land Water and Planning (2023c). NatureKit. Available at <http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit>. Accessed January 2023. Department of Environment Land Water and Planning, Melbourne.
- Department of Environment Land Water and Planning (2023d). Planning Schemes Online. Available at <http://services.land.vic.gov.au/maps/pmo.jsp>. Accessed January 2023. Department of Environment Land Water and Planning, Victoria.
- Department of Environment Land Water and Planning (2023e). Vegetation Quality Assessment list of accredited assessors. Available at [https://www.environment.vic.gov.au/data/assets/pdf\\_file/0026/51785/DELWP-VQA-AccreditedAssessorList8July2019.wbk.pdf](https://www.environment.vic.gov.au/data/assets/pdf_file/0026/51785/DELWP-VQA-AccreditedAssessorList8July2019.wbk.pdf). Accessed January 2023. Department of Environment, Land, Water and Planning, Melbourne.
- Department of Environment Land Water and Planning (2023f). Victorian Biodiversity Atlas. Available at <https://vba.dse.vic.gov.au/vba/index.jsp>. Accessed January 2023. Department of Environment Land Water and Planning, Melbourne.
- Department of Sustainability and Environment (2004). 'Habitat Hectares Native Vegetation: Sustaining a Living Landscape. Vegetation Quality Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method. Version 1.3.' (Department of Sustainability and Environment: Melbourne).
- Department of Transport and Planning (2023). Planning Maps Online. Available at <http://services.land.vic.gov.au/maps/pmo.jsp>. Accessed January 2023. Department of Transport and Planning,
- Melbourne Arborists Reports Pty Ltd (2019). Arboricultural Report Development Impact Assessment. (Melbourne Arborists Reports Pty Ltd).
- Nearmap (2023). PhotoMaps by Nearmap. Available at <http://maps.au.nearmap.com/>. Accessed January 2023. Nearmap, Victoria.

**Table 2.** Flora species recorded within the study area during the current assessment.

| Origin | Common Name               | Scientific Name                                   | Weeds of National Significance | Noxious Weeds Classification |
|--------|---------------------------|---|--------------------------------|------------------------------|
| *      | Annual Meadow-grass       | <i>Poa annua</i> s.l.                             | -                              | -                            |
| *      | Black Nightshade          | <i>Solanum nigrum</i> s.s.                        | -                              | -                            |
|        | Black Wattle              | <i>Acacia mearnsii</i>                            | -                              | -                            |
| *      | Blackberry                | <i>Rubus fruticosus</i> spp. agg.                 | Yes                            | Controlled                   |
|        | Blackwood                 | <i>Acacia melanoxylon</i>                         | -                              | -                            |
|        | Austral Bracken           | <i>Pteridium esculentum</i>                       | -                              | -                            |
|        | Common Raspwort           | <i>Gonocarpus tetragynus</i>                      | -                              | -                            |
| *      | Common Sow-thistle        | <i>Sonchus oleraceus</i>                          | -                              | -                            |
| *      | Drain Flat-sedge          | <i>Cyperus eragrostis</i>                         | -                              | -                            |
| *      | Flatweed                  | <i>Hypochaeris radicata</i>                       | -                              | -                            |
| *      | Hairy Bird's-foot Trefoil | <i>Lotus subbiflorus</i>                          | -                              | -                            |
| *      | Kikuyu                    | <i>Cenchrus clandestinus</i>                      | -                              | -                            |
|        | Manna Gum                 | <i>Eucalyptus viminalis</i>                       | -                              | -                            |
|        | Messmate Stringybark      | <i>Eucalyptus obliqua</i>                         | -                              | -                            |
| *      | Panic Veldt-grass         | <i>Ehrharta erecta</i>                            | -                              | -                            |
| *      | Paspalum                  | <i>Paspalum dilatatum</i>                         | -                              | -                            |
| *      | Pimpernel                 | <i>Lysimachia arvensis</i>                        | -                              | -                            |
| *      | Ragwort                   | <i>Senecio jacobaea</i>                           | -                              | Controlled                   |
| *      | Ribwort                   | <i>Plantago lanceolata</i>                        | -                              | -                            |
| *      | Soursob                   | <i>Oxalis pes-caprae</i>                          | -                              | Restricted                   |
| *      | Sweet Vernal-grass        | <i>Anthoxanthum odoratum</i>                      | -                              | -                            |
|        | Thatch Saw-sedge          | <i>Gahnia radula</i>                              | -                              | -                            |
|        | Weeping Grass             | <i>Microlaena stipoides</i> var. <i>stipoides</i> | -                              | -                            |
| *      | White Clover              | <i>Trifolium repens</i> var. <i>repens</i>        | -                              | -                            |
| *      | Yorkshire Fog             | <i>Holcus lanatus</i>                             | -                              | -                            |

\* denotes introduced species.

**Plates**



**Plate 1.** The weedy vegetation that covers much of the study area (16 February 2024).



**Plate 2.** Patch 1 consisting of a stand of Blackwood (16 February 2024).



**Plate 3.** The understorey vegetation within the patches largely consisted of Thatch Saw-sedge *Gahnia radula* (16 February 2024).



**Plate 4.** Scattered Tree 1, a Narrow-leaf Peppermint (16 February 2024).



**Plate 5.** A stump from one of the recently felled Acacias on the southern boundary (16 February 2024).



**Figure 1:** Results of the current assessment.

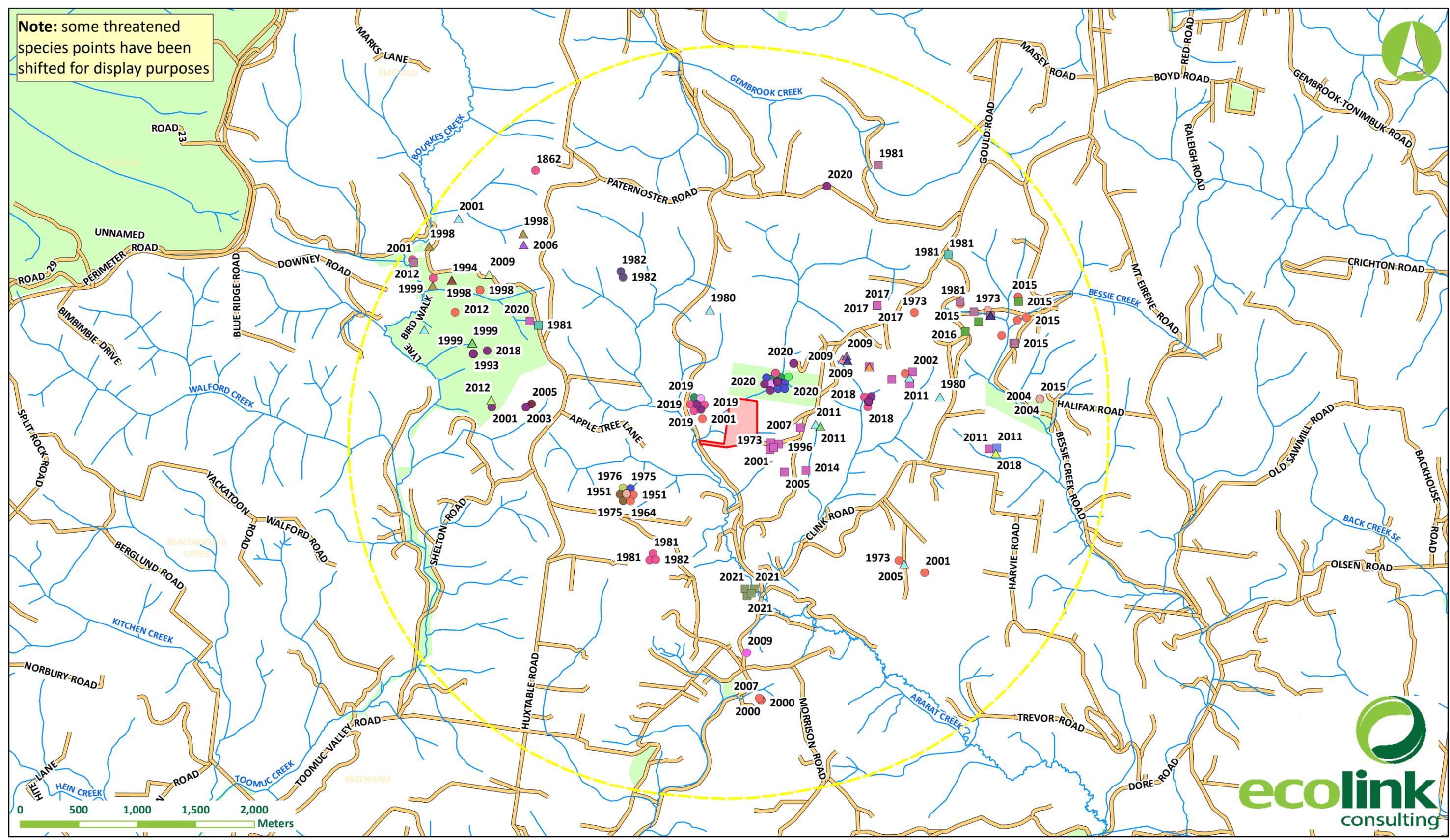
1000 Pakenham Road, Pakenham Upper, Victoria

**Legend**

- Study Area
- Patches of Native Vegetation**
- Current Extent
- Historic Extent
- ▲ Impacted Trees
- Scattered Trees



**Note:** some threatened species points have been shifted for display purposes



**Figure 2:** Threatened flora and fauna within 3 kms of the study area  
 1000 Pakenham Road, Pakenham Upper, Victoria

| Legend   |   |
|--|---|
| <span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px;"></span> Study Area                | <span style="color: red;">●</span> Gang-gang Cockatoo   |
| <span style="border: 1px dashed yellow; display: inline-block; width: 15px; height: 10px;"></span> 3km Study Area Buffer | <span style="color: green;">●</span> Grey Goshawk   |
| <b>Common Name</b>   | <span style="color: brown;">●</span> Hardhead   |
| <span style="color: brown;">●</span> Barking Owl   | <span style="color: purple;">●</span> Hooded Robin  |
| <span style="color: blue;">●</span> Black Falcon   | <span style="color: pink;">●</span> Little Eagle  |
| <span style="color: green;">●</span> Blue-winged Parrot  | <span style="color: lightblue;">●</span> Chestnut-rumped Heathwren  |
| <span style="color: lightblue;">●</span> Chestnut-rumped Heathwren   | <span style="color: darkred;">●</span> Musk Duck  |
| <span style="color: brown;">●</span> Barking Owl   | <span style="color: purple;">●</span> White-throated Needle-tail  |
| <span style="color: blue;">●</span> Black Falcon   | <span style="color: grey;">■</span> Platypus  |
| <span style="color: green;">●</span> Blue-winged Parrot  | <span style="color: blue;">■</span> Southern Brown Bandicoot  |
| <span style="color: lightblue;">●</span> Chestnut-rumped Heathwren   | <span style="color: brown;">●</span> Pilotbird  |
| <span style="color: darkred;">●</span> Musk Duck   | <span style="color: red;">●</span> Powerful Owl   |
| <span style="color: purple;">●</span> White-throated Needle-tail   | <span style="color: lightgreen;">●</span> Sooty Owl   |
| <span style="color: grey;">■</span> Platypus   | <span style="color: blue;">●</span> Turquoise Parrot  |
| <span style="color: blue;">■</span> Southern Brown Bandicoot   | <span style="color: green;">■</span> Southern Greater Glider  |
| <span style="color: brown;">●</span> Pilotbird   | <span style="color: purple;">■</span> Yellow-bellied Glider   |
| <span style="color: red;">●</span> Powerful Owl  | <span style="color: teal;">■</span> Southern Toadlet  |
| <span style="color: lightgreen;">●</span> Sooty Owl  | <span style="color: purple;">■</span> Lace Monitor  |
| <span style="color: blue;">●</span> Turquoise Parrot   | <span style="color: orange;">▲</span> Cobra Greenhood   |
| <span style="color: green;">■</span> Southern Greater Glider   | <span style="color: brown;">▲</span> Dandenong Wattle   |
| <span style="color: purple;">■</span> Yellow-bellied Glider  | <span style="color: purple;">▲</span> Floodplain Fireweed   |
| <span style="color: teal;">■</span> Southern Toadlet   | <span style="color: green;">▲</span> Green Scentbark  |
| <span style="color: purple;">■</span> Lace Monitor   | <span style="color: lightgreen;">▲</span> Large-leaf Cinnamon-wattle  |
| <span style="color: orange;">▲</span> Cobra Greenhood  | <span style="color: lightblue;">▲</span> Long Pink-bells  |
| <span style="color: brown;">▲</span> Dandenong Wattle  | <span style="color: blue;">▲</span> Mountain Bird-orchid  |
| <span style="color: purple;">▲</span> Floodplain Fireweed  | <span style="color: lightgreen;">▲</span> Oval Fork-fern  |
| <span style="color: green;">▲</span> Green Scentbark   | <span style="color: blue;">▲</span> Powelltown Correa   |
| <span style="color: lightgreen;">▲</span> Large-leaf Cinnamon-wattle   | <span style="color: lightblue;">▲</span> Slender Fork-fern  |
| <span style="color: lightblue;">▲</span> Long Pink-bells   | <span style="color: purple;">▲</span> Slender Pink-fingers  |
| <span style="color: blue;">▲</span> Mountain Bird-orchid   | <span style="color: brown;">▲</span> Slender Tree-fern  |
| <span style="color: lightgreen;">▲</span> Oval Fork-fern   | <span style="color: green;">▲</span> Small Fork-fern  |
| <span style="color: blue;">▲</span> Powelltown Correa  | <span style="color: lightgreen;">▲</span> Victorian Flat-pea  |
| <span style="color: lightblue;">▲</span> Slender Fork-fern   | <span style="color: lightgreen;">▲</span> Wine-lipped Spider-orchid   |
| <span style="color: purple;">▲</span> Slender Pink-fingers   | <span style="background-color: lightgreen; display: inline-block; width: 15px; height: 10px;"></span> Public Land |



**Attachment 1. Native Vegetation Removal Report**



# Native Vegetation Removal Report

NVRR ID: 311\_20240220\_ZXQ

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the [Guidelines for the removal, destruction or lopping of native vegetation](#) (the Guidelines). This report **is not an assessment by DEECA** of the proposed native vegetation removal. Offset requirements have been calculated using modelled condition scores.

## Report details

**Date created:** 20/02/2024

**Local Government Area:** CARDINIA SHIRE

**Registered Aboriginal Party:** Bunurong

**Coordinates:** 145.50993, -37.99475

**Address:**

1000 PAKENHAM ROAD PAKENHAM UPPER 3810  
990 PAKENHAM ROAD PAKENHAM UPPER 3810  
1010 PAKENHAM ROAD PAKENHAM UPPER 3810

## Summary of native vegetation to be removed

| Assessment pathway  | Intermediate Assessment Pathway   |  |       |
|---|---|--|-------|
| <b>Location category</b>  | <b>Location 1</b><br>The native vegetation extent map indicates that this area is not typically characterised as supporting native vegetation. It does not meet the criteria to be classified as Location Category 2 or 3. The removal of less than 0.5 hectares of native vegetation in this area will not require a Species Offset. |  |       |
| <b>Total extent including past and proposed removal (ha)</b><br><i>Includes endangered EVCs (ha): 0</i> | <b>0.048</b>  | <i>Extent of past removal (ha)</i>                       | 0     |
|   |   | <i>Extent of proposed removal - Patches (ha)</i>         | 0.048 |
|   |   | <i>Extent of proposed removal - Scattered Trees (ha)</i> | 0.000 |
| <b>No. Large Trees proposed to be removed</b>   | <b>1</b>  | <i>No. Large Patch Trees</i>                             | 1     |
|   |   | <i>No. Large Scattered Trees</i>                         | 0     |
| <b>No. Small Scattered Trees</b>  | 0   |  |       |

## Offset requirements if approval is granted

Any approval granted will include a condition to secure an offset, before the removal of native vegetation, that meets the following requirements:

| General Offset amount <sup>1</sup>                      | 0.045 General Habitat Units                     |
|---|---|
| Minimum strategic biodiversity value score <sup>2</sup> | 0.566   |
| Large Trees   | 1   |
| Vicinity  | Melbourne Water CMA<br>or<br>CARDINIA SHIRE LGA |

NB: values within tables in this document may not add to the totals shown above due to rounding

The availability of third-party offset credits can be checked using the Native Vegetation Credit Register (NVCR) Search Tool - <https://nvcr.delwp.vic.gov.au>

---

1. The General Offset amount required is the sum of all General Habitat Units in Appendix 1.

2. Minimum strategic biodiversity value score is 80 per cent of the weighted average score across habitat zones where a General Offset is required. **Page 2**



## Application requirements

Applications to remove, destroy or lop native vegetation must include all the below information. If an appropriate response has not been provided the application is not complete.

### Application Requirement 1 - Native vegetation removal information

If the native vegetation removal is mapped correctly, the information presented in this Native Vegetation Removal Report addresses Application Requirement 1.

### Application Requirement 2 - Topographical and land information

This statement describes the topographical and land features in the vicinity of the proposed works, including the location and extent of any ridges, hilltops, wetlands and waterways, slopes of more than 20% gradient, low-lying areas, saline discharge areas or areas of erosion.

### Application Requirement 3 - Photographs of the native vegetation to be removed

Application Requirement 3 is not addressed in this Native Vegetation Removal Report. All applications must include recent, timestamped photos of each Patch, Large Patch Tree and Scattered Tree which has been mapped in this report.

### Application Requirement 4 - Past removal

If past removal has been considered correctly, the information presented in this Native Vegetation Removal Report addresses Application Requirement 4.

### Application Requirement 5 - Avoid and minimise statement

This statement describes what has been done to avoid and minimise impacts on native vegetation and associated biodiversity values.

### Application Requirement 6 - Property Vegetation Plan

This requirement only applies if an approved Property Vegetation Plan (PVP) applies to the property  
Does a PVP apply to the proposal?

### Application Requirement 7 - Defendable space statement

Where the removal of native vegetation is to create defendable space, this statement:

- Describes the bushfire threat; and

- 
- Describes how other bushfire risk mitigation measures were considered to reduce the amount of native vegetation proposed for removal (this can also be part of the avoid and minimise statement).

This statement is not required if, the proposed defensible space is within the Bushfire Management Overlay (BMO), and in accordance with the 'Exemption to create defensible space for a dwelling under Clause 44.06 of local planning schemes' in Clause 52.12-5.

### **Application Requirement 8 - Native Vegetation Precinct Plan**

This requirement is only applicable if you are removing native vegetation from within an area covered by a Native Vegetation Precinct Plan (NVPP), and the proposed removal is not identified as 'to be removed' within the NVPP.

Does an NVPP apply to the proposal?

### **Application Requirement 9 - Offset statement**

This statement demonstrates that an offset is available and describes how the required offset will be secured. The Applicant's Guide provides information relating to this requirement.



## Next steps

Applications to remove, destroy or lop native vegetation must address all the application requirements specified in the Guidelines. If you wish to remove the mapped native vegetation you are required to apply for approval from the responsible authority (e.g. local Council). This Native vegetation removal report must be submitted with your application and meets most of the application requirements. The following requirements need to be addressed, as applicable.

### **Application Requirement 3 - Photographs of the native vegetation to be removed**

Recent, dated photographs of the native vegetation to be removed **must be provided** with the application. All photographs must be clear, show whether the vegetation is a Patch of native vegetation, Patch Tree or Scattered Tree, and identify any Large Trees. If the area of native vegetation to be removed is large, provide photos that are indicative of the native vegetation.

Ensure photographs are attached to the application. If appropriate photographs have not been provided the application is not complete.

### **Application Requirement 6 - Property Vegetation Plan**

If a PVP is applicable, it must be provided with the application.

## Appendix 1: Description of native vegetation to be removed

General Habitat Units for each zone (Patch, Scattered Tree or Patch Tree) are calculated by the following equation in accordance with the Guidelines.

**General Habitat Units = extent without overlap x condition score x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)**

The General Offset amount required is the sum of all General Habitat Units per zone.

### Native vegetation to be removed

| Information provided by or on behalf of the applicant |       |          | Information calculated by NVR Map |                                 |               |                            |                     |                             |           |                       |
|---|-------|----------|-----------------------------------|---------------------------------|---------------|----------------------------|---------------------|-----------------------------|-----------|-----------------------|
| Zone  | Type  | DBH (cm) | EVC code (modelled)               | Bioregional conservation status | Large Tree(s) | Condition score (modelled) | Polygon extent (ha) | Extent without overlap (ha) | SBV score | General Habitat Units |
| 1   | Patch | -        | HSF_0029                          | Least Concern                   | -             | 0.729                      | 0.009               | 0.009                       | 0.700     | 0.009                 |
| 2   | Patch | -        | HSF_0029                          | Least Concern                   | 1             | 0.740                      | 0.039               | 0.039                       | 0.710     | 0.037                 |

## Appendix 2: Images of mapped native vegetation

### 1. Property in context



- Proposed Removal
- Property Boundaries



200 m

## 2. Aerial photograph showing mapped native vegetation



□ Proposed Removal

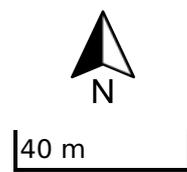


40 m

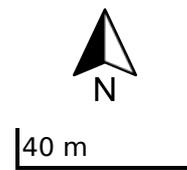
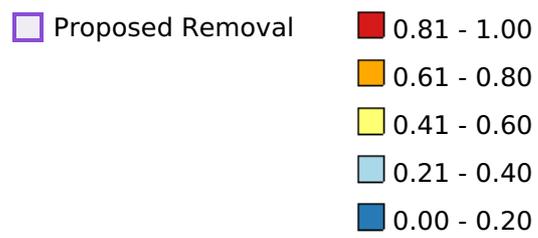
### 3. Location Risk Map



- Proposed Removal
- Location 1
- Location 2
- Location 3



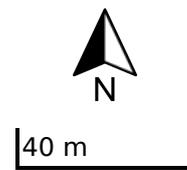
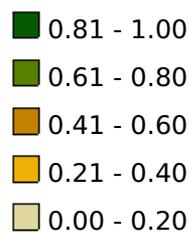
#### 4. Strategic Biodiversity Value Score Map



## 5. Condition Score Map



Proposed Removal



## 6. Endangered EVCs

Not Applicable

© The State of Victoria Department of Energy, Environment and Climate Action 2024



This work is licensed under a Creative Commons Attribution 4.0 International licence. You are free to re-use the work under that licence, on the condition that you credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, the Victorian Government logo and the Department of Energy, Environment and Climate Change (DEECA) logo. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>

### **Disclaimer**

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

**Attachment 2. Native Vegetation Credit Register Search**



# Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 20/02/2024 01:25

Report ID: 22916

## What was searched for?

### General offset

| General habitat units | Strategic biodiversity value | Large trees | Vicinity (Catchment Management Authority or Municipal district) |                 |
|-----------------------|------------------------------|-------------|---|-----------------|
| 0.045                 | 0.566                        | 1           | CMA   | Melbourne Water |

## Details of available native vegetation credits on 20 February 2024 01:25

### These sites meet your requirements for general offsets.

| Credit Site ID | GHU    | LT   | CMA             | LGA                        | Land owner | Trader | Fixed price | Broker(s)              |
|----------------|--------|------|-----------------|----------------------------|------------|--------|-------------|------------------------|
| BBA-0277       | 2.520  | 443  | Melbourne Water | Mornington Peninsula Shire | No         | Yes    | No          | Abezco, Ethos, VegLink |
| BBA-0670       | 16.287 | 107  | Melbourne Water | Cardinia Shire             | No         | Yes    | No          | Abezco, VegLink        |
| BBA-0677       | 9.502  | 1407 | Melbourne Water | Whittlesea City            | No         | Yes    | No          | Abezco, VegLink        |
| BBA-0678       | 43.374 | 2602 | Melbourne Water | Nillumbik Shire            | No         | Yes    | No          | VegLink                |
| BBA-0678_02    | 0.562  | 58   | Melbourne Water | Nillumbik Shire            | Yes        | Yes    | No          | Abezco, VegLink        |
| BBA-2789       | 1.317  | 14   | Melbourne Water | Baw Baw Shire              | Yes        | Yes    | No          | Contact NVOR           |
| BBA-2790       | 2.911  | 116  | Melbourne Water | Baw Baw Shire              | Yes        | Yes    | No          | Contact NVOR           |
| BBA-2870       | 2.338  | 398  | Melbourne Water | Yarra Ranges Shire         | Yes        | Yes    | No          | VegLink                |
| BBA-2871       | 15.428 | 1575 | Melbourne Water | Yarra Ranges Shire         | Yes        | Yes    | No          | VegLink                |
| TFN-C1636      | 0.045  | 111  | Melbourne Water | Yarra Ranges Shire         | Yes        | Yes    | No          | Yarra Ranges SC        |
| TFN-C1664      | 1.243  | 56   | Melbourne Water | Yarra Ranges Shire         | Yes        | Yes    | No          | Yarra Ranges SC        |
| VC_CFL-0838_01 | 0.121  | 354  | Melbourne Water | Yarra Ranges Shire         | Yes        | Yes    | No          | VegLink                |
| VC_CFL-3687_01 | 0.278  | 61   | Melbourne Water | Baw Baw Shire              | Yes        | Yes    | No          | Baw Baw SC             |
| VC_CFL-3708_01 | 0.198  | 507  | Melbourne Water | Yarra Ranges Shire         | Yes        | Yes    | No          | VegLink                |

|                |       |     |                 |                      |     |     |    |             |
|----------------|-------|-----|-----------------|----------------------|-----|-----|----|-------------|
| VC_CFL-3709_01 | 0.139 | 395 | Melbourne Water | Yarra Ranges Shire   | Yes | Yes | No | VegLink     |
| VC_CFL-3710_01 | 6.468 | 322 | Melbourne Water | Yarra Ranges Shire   | Yes | Yes | No | VegLink     |
| VC_CFL-3740_01 | 0.085 | 16  | Melbourne Water | Yarra Ranges Shire   | Yes | Yes | No | Bio Offsets |
| VC_CFL-3744_01 | 0.941 | 225 | Melbourne Water | Macedon Ranges Shire | Yes | Yes | No | VegLink     |
| VC_CFL-3764_01 | 5.344 | 7   | Melbourne Water | Yarra Ranges Shire   | Yes | Yes | No | VegLink     |

**These sites meet your requirements using alternative arrangements for general offsets.**

| Credit Site ID | GHU   | LT | CMA             | LGA             | Land owner | Trader | Fixed price | Broker(s) |
|----------------|-------|----|-----------------|-----------------|------------|--------|-------------|-----------|
| VC_CFL-3762_01 | 0.047 | 79 | Melbourne Water | Moorabool Shire | Yes        | Yes    | No          | VegLink   |

**These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.**

| Credit Site ID | GHU   | LT  | CMA             | LGA                  | Land owner | Trader | Fixed price | Broker(s) |
|----------------|-------|-----|-----------------|----------------------|------------|--------|-------------|-----------|
| VC_CFL-3746_01 | 4.050 | 467 | Melbourne Water | Macedon Ranges Shire | Yes        | Yes    | No          | VegLink   |

*LT - Large Trees*

*CMA - Catchment Management Authority*

*LGA - Municipal District or Local Government Authority*

## Next steps

### If applying for approval to remove native vegetation

Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

### If you have approval to remove native vegetation

Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

## Broker contact details

| Broker Abbreviation | Broker Name                         | Phone                          | Email  | Website                                      |
|---------------------|-------------------------------------|--------------------------------|--|--|
| Abezco              | Abzeco Pty. Ltd.                    | (03) 9431 5444                 | offsets@abzeco.com.au                            | www.abzeco.com.au                            |
| Baw Baw SC          | Baw Baw Shire Council               | (03) 5624 2411                 | bawbaw@bawbawshire.vic.gov.au                    | www.bawbawshire.vic.gov.au                   |
| Bio Offsets         | Biodiversity Offsets Victoria       | 0452 161 013                   | info@offsetsvictoria.com.au                      | www.offsetsvictoria.com.au                   |
| Contact NVOR        | Native Vegetation Offset Register   | 136 186                        | nativevegetation.offsetregister@delwp.vic.gov.au | www.environment.vic.gov.au/native-vegetation |
| Ecocentric          | Ecocentric Environmental Consulting | 0410 564 139                   | ecocentric@me.com                                | Not available                                |
| Ethos               | Ethos NRM Pty Ltd                   | (03) 5153 0037                 | offsets@ethosnrm.com.au                          | www.ethosnrm.com.au                          |
| Nillumbik SC        | Nillumbik Shire Council             | (03) 9433 3316                 | offsets@nillumbik.vic.gov.au                     | www.nillumbik.vic.gov.au                     |
| TFN                 | Trust for Nature                    | 8631 5888                      | offsets@tfn.org.au                               | www.trustfornature.org.au                    |
| VegLink             | Vegetation Link Pty Ltd             | (03) 8578 4250 or 1300 834 546 | offsets@vegetationlink.com.au                    | www.vegetationlink.com.au                    |
| Yarra Ranges SC     | Yarra Ranges Shire Council          | 1300 368 333                   | biodiversityoffsets@yarraranges.vic.gov.au       | www.yarraranges.vic.gov.au                   |

© The State of Victoria Department of Energy, Environment and Climate Action 2024



This work is licensed under a Creative Commons Attribution 4.0 International licence. You are free to re-use the work under that licence, on the condition that you

credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, the Victorian Government logo and the Department of Energy, Environment and Climate Action (DEECA) logo. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>

For more information contact the DEECA Customer Service Centre 136 186 or the Native Vegetation Credit Register at [nativevegetation.offsetregister@delwp.vic.gov.au](mailto:nativevegetation.offsetregister@delwp.vic.gov.au)

### Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Obtaining this publication does not guarantee that the credits shown will be available in the Native Vegetation Credit Register either now or at a later time when a purchase of native vegetation credits is planned.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes

|                |       |     |                 |                      |     |     |    |             |
|----------------|-------|-----|-----------------|----------------------|-----|-----|----|-------------|
| VC_CFL-3709_01 | 0.139 | 395 | Melbourne Water | Yarra Ranges Shire   | Yes | Yes | No | VegLink     |
| VC_CFL-3710_01 | 6.468 | 322 | Melbourne Water | Yarra Ranges Shire   | Yes | Yes | No | VegLink     |
| VC_CFL-3740_01 | 0.085 | 16  | Melbourne Water | Yarra Ranges Shire   | Yes | Yes | No | Bio Offsets |
| VC_CFL-3744_01 | 0.941 | 225 | Melbourne Water | Macedon Ranges Shire | Yes | Yes | No | VegLink     |
| VC_CFL-3764_01 | 5.344 | 7   | Melbourne Water | Yarra Ranges Shire   | Yes | Yes | No | VegLink     |

**These sites meet your requirements using alternative arrangements for general offsets.**

| Credit Site ID | GHU   | LT | CMA             | LGA             | Land owner | Trader | Fixed price | Broker(s) |
|----------------|-------|----|-----------------|-----------------|------------|--------|-------------|-----------|
| VC_CFL-3762_01 | 0.047 | 79 | Melbourne Water | Moorabool Shire | Yes        | Yes    | No          | VegLink   |

**These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.**

| Credit Site ID | GHU   | LT  | CMA             | LGA                  | Land owner | Trader | Fixed price | Broker(s) |
|----------------|-------|-----|-----------------|----------------------|------------|--------|-------------|-----------|
| VC_CFL-3746_01 | 4.050 | 467 | Melbourne Water | Macedon Ranges Shire | Yes        | Yes    | No          | VegLink   |

*LT - Large Trees*

*CMA - Catchment Management Authority*

*LGA - Municipal District or Local Government Authority*

## Next steps

### If applying for approval to remove native vegetation

Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

### If you have approval to remove native vegetation

Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

## Broker contact details

| Broker Abbreviation | Broker Name                         | Phone                          | Email  | Website                                      |
|---------------------|-------------------------------------|--------------------------------|--|--|
| Abezco              | Abzeco Pty. Ltd.                    | (03) 9431 5444                 | offsets@abzeco.com.au                            | www.abzeco.com.au                            |
| Baw Baw SC          | Baw Baw Shire Council               | (03) 5624 2411                 | bawbaw@bawbawshire.vic.gov.au                    | www.bawbawshire.vic.gov.au                   |
| Bio Offsets         | Biodiversity Offsets Victoria       | 0452 161 013                   | info@offsetsvictoria.com.au                      | www.offsetsvictoria.com.au                   |
| Contact NVOR        | Native Vegetation Offset Register   | 136 186                        | nativevegetation.offsetregister@delwp.vic.gov.au | www.environment.vic.gov.au/native-vegetation |
| Ecocentric          | Ecocentric Environmental Consulting | 0410 564 139                   | ecocentric@me.com                                | Not available                                |
| Ethos               | Ethos NRM Pty Ltd                   | (03) 5153 0037                 | offsets@ethosnrm.com.au                          | www.ethosnrm.com.au                          |
| Nillumbik SC        | Nillumbik Shire Council             | (03) 9433 3316                 | offsets@nillumbik.vic.gov.au                     | www.nillumbik.vic.gov.au                     |
| TFN                 | Trust for Nature                    | 8631 5888                      | offsets@tfn.org.au                               | www.trustfornature.org.au                    |
| VegLink             | Vegetation Link Pty Ltd             | (03) 8578 4250 or 1300 834 546 | offsets@vegetationlink.com.au                    | www.vegetationlink.com.au                    |
| Yarra Ranges SC     | Yarra Ranges Shire Council          | 1300 368 333                   | biodiversityoffsets@yarraranges.vic.gov.au       | www.yarraranges.vic.gov.au                   |

© The State of Victoria Department of Energy, Environment and Climate Action 2024



This work is licensed under a Creative Commons Attribution 4.0 International licence. You are free to re-use the work under that licence, on the condition that you

credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, the Victorian Government logo and the Department of Energy, Environment and Climate Action (DEECA) logo. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>

For more information contact the DEECA Customer Service Centre 136 186 or the Native Vegetation Credit Register at [nativevegetation.offsetregister@delwp.vic.gov.au](mailto:nativevegetation.offsetregister@delwp.vic.gov.au)

### Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Obtaining this publication does not guarantee that the credits shown will be available in the Native Vegetation Credit Register either now or at a later time when a purchase of native vegetation credits is planned.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes

# SOUTHERN GEOTECH



Experience you build on

## SITE CLASSIFICATION REPORT

|                              |   |
|------------------------------|---|
| <b>SITE ADDRESS:</b>         | <b>1000 Pakenham Road, PAKENHAM UPPER VIC</b>   |
| <b>COMMISSION:</b>           | <b>Site Investigation and Classification to Australian Standard AS2870-2011: Residential Slabs and Footings</b> |
| <b>CLIENT:</b>               | <b>CHARLES PARRY<br/>C/- PARBROOK HOMES</b>   |
| <b>DATE:</b>                 | <b>22 May 2024</b>  |
| <b>REFERENCE NUMBER:</b>     | <b>24D064</b>   |
| <b>PROPOSED DEVELOPMENT:</b> | <b>Double Storey Dwelling</b>   |

**SOUTHERN GEOTECH PTY LTD ABN: 69 083 037 209**

## TABLE OF CONTENTS

|  |    |
|--|----|
| 1. INTRODUCTION .....                    | 3  |
| 2. SITE CLASSIFICATION .....             | 3  |
| 3. SITE SOIL CHARACTERISTICS .....       | 4  |
| 4. SITE CHARACTERISTICS .....            | 4  |
| 5. SITE CONSTRAINTS .....                | 5  |
| 6. TESTING PROGRAMME .....               | 5  |
| 7. FINDINGS .....                        | 6  |
| 8. CONCLUSIONS AND RECOMMENDATIONS ..... | 7  |
| 9. LIMITATIONS .....                     | 8  |
| 10. SITE PLAN .....                      | 9  |
| 11. BOREHOLE LOGS .....                  | 10 |
| 11. BOREHOLE LOGS .....                  | 11 |
| 12. SITE PHOTOGRAPHS .....               | 12 |
| 13. GENERAL NOTES .....                  | 14 |
| 14. DRAINAGE .....                       | 15 |
| 15. ARTICULATION .....                   | 15 |
| 16. SERVICE TRENCHES .....               | 15 |
| 17. ANGLE OF REPOSE .....                | 16 |
| 18. SITE MAINTENANCE .....               | 16 |

## 1. INTRODUCTION

Southern Geotech Pty Ltd has been commissioned by the client to provide a Site Classification pursuant to AS2870 – 2011, Residential Slabs & Footings for the proposed development at the nominated address.

The Site Classification hereby reported has been carried out with regard to the information supplied to us by the client or the client's agent at the date of our commission. Should the client or the client's agent have omitted to supply us with relevant information or make significant changes to the building type, building envelope, or site our report may be irrelevant and/or inappropriate. No responsibility will be accepted by Southern Geotech Pty Ltd for the consequences of such actions.

The Client should acknowledge that this is a Geotechnical and Site Classification Report specifically prepared for the proposed works at the identified location and does not extend beyond that brief. Specifically, this report does not address retention of vertical batters/retaining walls or any other structures requiring footings unless nominated in the report brief – this also extends to pavements. Where proposed, the designing engineer is advised to commission further investigation for design parameters.

All site works related to the building project must be undertaken to comply with the relevant Codes, Standards and best practices. Any works must not potentially adversely impact upon the building envelope. Southern Geotech Pty Ltd accepts no liability or responsibility for any sites works outside of our specific commission.

The conclusions and recommendations contained in this report are based on, but not limited to the following;

- The building specification and site treatment indicated to us by the client or client's agent.
- The results of our investigation at the nominated test site locations.
- The present "state of the art" in testing and design.

## 2. SITE CLASSIFICATION

### **CLASS M (Moderately Reactive Site)**

This classification is appropriate for the site pursuant to the existing site and soil conditions encountered at the time of our investigation. The site was classified in accordance with Australian Standard AS2870-2011 – Residential Slabs and Footings. The methods adopted include 2.2.1 (a) and are made after considering the geology, climatic zone, soil profile and site-specific features encountered during our investigation. Clause 2.2.1 (b) can be adopted under instruction from the client.

The following soil and site characteristics may or will lead to footing design in excess of the minimum requirements within AS2870-2011: Residential Slabs and Footings.

### 3. SITE SOIL CHARACTERISTICS

SITE FILLING: Up to 200 mm encountered.

UNSUITABLE FOUNDATION CONDITIONS: The fill present is not considered a suitable foundation material.

GROUND/PERCHED WATER INFLUENCE: The susceptible nature of the Silty Clay encountered to water inundation may necessitate localised deepening of footings to satisfactory underlying foundation soils if footing excavations are undertaken during wet periods.

BEDROCK/SHALLOW FLOATERS: None encountered.

GEOLOGY: Silurian Sediments.

Identification assisted by reference to appropriate geological survey maps and/or GeoVic Spatial Data. This report may contain a geological map obtained from the GeoVic Portal including the site under investigation. It is provided as a guide to mapping of the local geology only and not to be used as a basis for design.

NATURAL SOIL TYPES: Silty Clays overlying Clays typical of areas geology. Clays of the above Sedimentary origin are generally considered moderately reactive.

### 4. SITE CHARACTERISTICS

LOCATION: East Side of Road.

SLOPE: Variable to the North-West.

DRAINAGE: SURFACE: Fair.  
SUB-SURFACE: Poor. Silty Clays overlying impermeable Clays may become inundated in wet periods. The installation of cut off drains will be required.

SITE CUTS: EXISTING: No.  
PROPOSED: No.

CLIMATIC ZONE: CZ 2

INFRASTRUCTURE WITHIN OR IN PROXIMITY TO BUILDING ENVELOPE: No.

VEGETATION WITHIN OR IN PROXIMITY TO BUILDING ENVELOPE: No.

GRASSES: Sparse.

SHRUBS: None.

TREES: None.

OTHER: No existing vegetation on this or adjoining allotments within influence distance.

NOTE: The designing engineer should review available aerial mapping data and/or available site context information to assess the current or pre-existing conditions in respect to design considerations for Abnormal Moisture Conditions.

This report may provide photographic evidence of either existing or pre-existing site context (refer to appendix)

## **5. SITE CONSTRAINTS**

### EXCAVATION/CONSTRUCTION DIFFICULTIES

SITE VEHICLE ACCESS: Good.

SITE VEHICLE MANOEUVRABILITY: Good. Site may become slippery/boggy.

EXISTING STRUCTURES AROUND CONSTRUCTION AREA: No.

VEGETATION AROUND CONSTRUCTION AREA: No.

WET WEATHER IMPACT: Possible

Sites without good natural or installed drainage can be adversely impacted upon during construction. The Client should be aware that the following impacts can occur after wet weather.

- Site may become slippery and boggy
- Foundation soils may become inundated or unworkable
- Site drainage may need to be installed
- Construction delays
- Deeper footings or additional earthworks

## **6. TESTING PROGRAMME**

Four (4) test sites were established and excavated with the following equipment;

- Drilling Rig

The approximate test locations are shown on the appended Site Plan (refer to appendix)

Where soil conditions dictated, investigation was assisted by the use of a penetrometer, dynamic cone penetrometer and vane shear apparatus. Where testing is not undertaken the soil profile, depths and conditions may be extrapolated from our knowledge of the geology and local soils. Disturbed samples were collected and hand classified.

Site History: The client is advised that the Site Classification can be altered by past activities on this site not known at the time of our site investigation and report preparation. The client is advised that failure to investigate and report past history to this office may invalidate this report.

## 7. FINDINGS

The soil profiles encountered are shown on the borehole log sheets of this report.

The Sedimentary origin and depth of Clay indicates a moderate soil reactivity and seasonal heave potential.

Soil horizon properties are included in the conclusions and recommendations section of the report along with the log section. The client/builder and engineer should note that the stated figures are to be read in conjunction with the whole report, borehole logs and recommendations – and as such should be used as a guide only. Where quoted, bearing pressures are as investigated - during the wetter months of the year or after heavy rain permeable soils such as silty or sandy soils will soften and lose strength with the ingress of moisture and as such any values quoted may not be representative during these times.

The client should recognise that the soil profiles encountered during our testing are deemed representative of the building envelope for the purpose of classification. The client should be aware however that in some cases soil conditions can change dramatically over short distances and although every effort is made to determine possible soil profile variations, no responsibility is taken for any undetected variations or discrepancies. The most careful and extensive exploration programme may not locate all soil profile variations due to time and economic constraints.

If foundation excavations or site works reveal soil conditions differing from those described in this report, Southern Geotech Pty Ltd should be contacted immediately to carry out further testing or inspection to confirm or revise our conclusions and recommendations.

Excavations extending beyond the depth of this investigation are the responsibility of the client/engineer/builder and may impact on the integrity of the building.

## 8. CONCLUSIONS AND RECOMMENDATIONS

### **Slab on Ground Recommendations:**

We have classified this site as **CLASS M (Moderately Reactive Clay Site)** for a Slab-On-Ground.

The slab and any non-load-bearing beams may be founded on the Surface or deeper where a maximum allowable bearing pressure of 50kPa may be adopted.

The load-bearing slab beams should be founded a minimum of 100mm into the Natural Undisturbed Soil or at the standard **CLASS M** depths-**WHICHEVER IS DEEPER**. At these depths a maximum allowable bearing pressure of 100kPa may be adopted.

**NOTE: If construction is to commence during the wetter periods it may be necessary to deepen the footings to the underlying clays (refer attached log section).**

**NOTE: The installation of an adequate drainage system will divert excess water from the area.**

NOTE: While designing this system the ENGINEER should note that we consider this site to have a MODERATE soil reactivity (ie similar to CLASS M type).

**NOTE: All relevant design requirements and appendices of AS2870-2011 should be adopted by the designer and/or builder. Owners must recognise their responsibilities as per CSIRO document "Foundation Maintenance and Footing Performance", the compliance of which is recommended. This document is available for purchase from <https://www.publish.csiro.au/book/7942>.**

### **Strip +/-or Pad Footing Recommendations:**

At the recommended foundation depths we have classified this site as **CLASS M (Moderately Reactive Clay Site)** for strip and/or pad footings.

All footings should be founded a minimum of 500mm into the Natural Stiff Clay or at the standard **CLASS M** depths – **WHICHEVER IS DEEPER**.

**NOTE: The installation of an adequate drainage system will divert excess water from the area.**

**NOTE: If construction is to commence during the wetter months, difficulties may be encountered with water seepage and possible excavation collapse. The client should ensure that all footings are cleaned out of any soft material prior to the placement of the footings.**

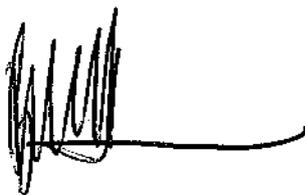
**NOTE: All relevant design requirements and appendices of AS2870-2011 should be adopted by the designer and/or builder. Owners must recognise their responsibilities as per CSIRO document "Foundation Maintenance and Footing Performance", the compliance of which is recommended. This document is available for purchase from <https://www.publish.csiro.au/book/7942>.**

## 9. LIMITATIONS

This report is based on limited site investigation and observations taken and therefore may not identify all of the ground conditions on the described site. SOUTHERN GEOTECH PTY LTD. does not take any responsibility for undetected subsurface conditions, we believe that at the time of investigation the recommendations and findings of this report to be 'most likely' to be representative of the site but cannot account for any unforeseen discrepancies. If any variations or anomalies are detected in the future or during site works it is recommended that SOUTHERN GEOTECH PTY LTD be engaged to confirm or review the site investigation and make further revised recommendations and/or conclusions if deemed necessary. Site works that may have an affect include: changing of the soil profile though cutting and filling, landscaping works including addition or removal of trees near proposed development, and drainage and watering changes. This report is for the use of the party it is addressed to only. This report should be made available to site contractors. This report should only be reproduced in full.

If there are any further queries regarding anything pertaining to this report please contact SOUTHERN GEOTECH PTY LTD

For and on behalf of SOUTHERN GEOTECH PTY LTD



B.R. Weberruss B.Sc

**GEOLOGIST**

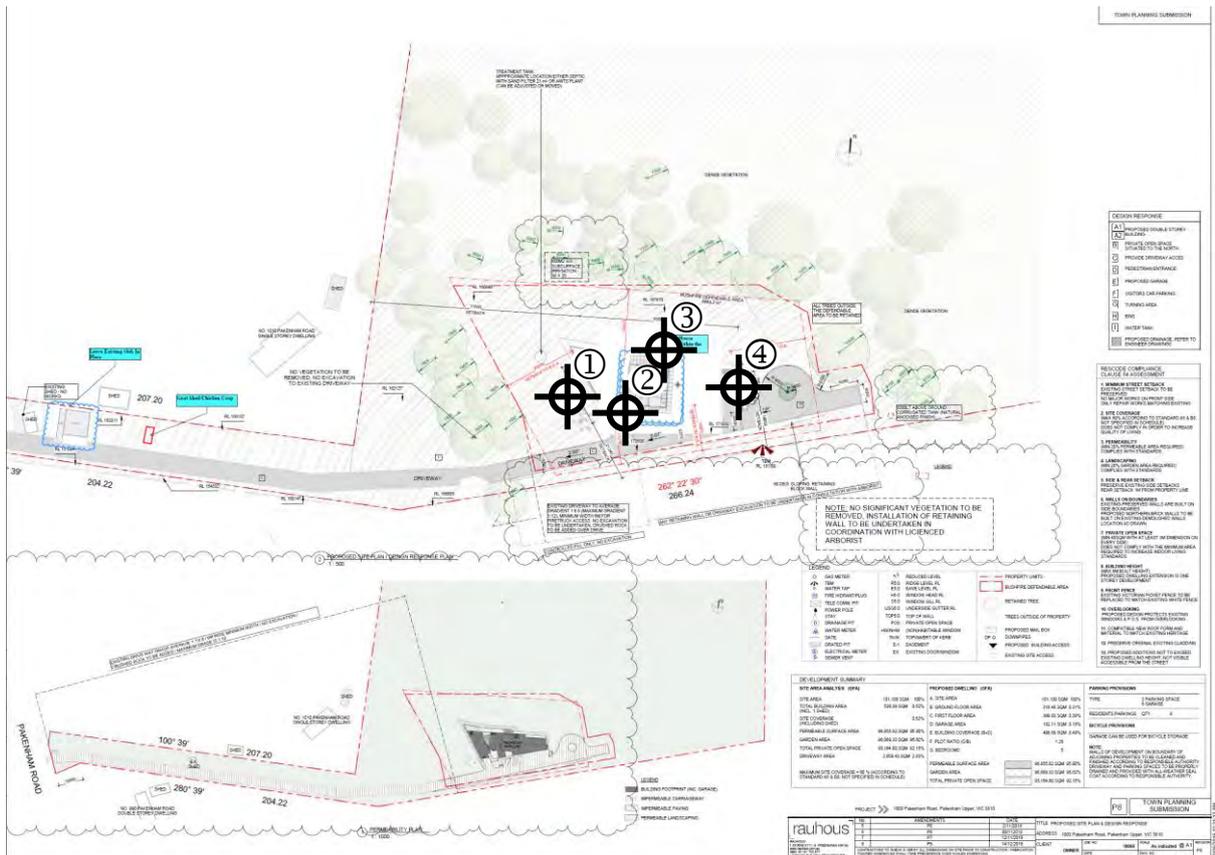
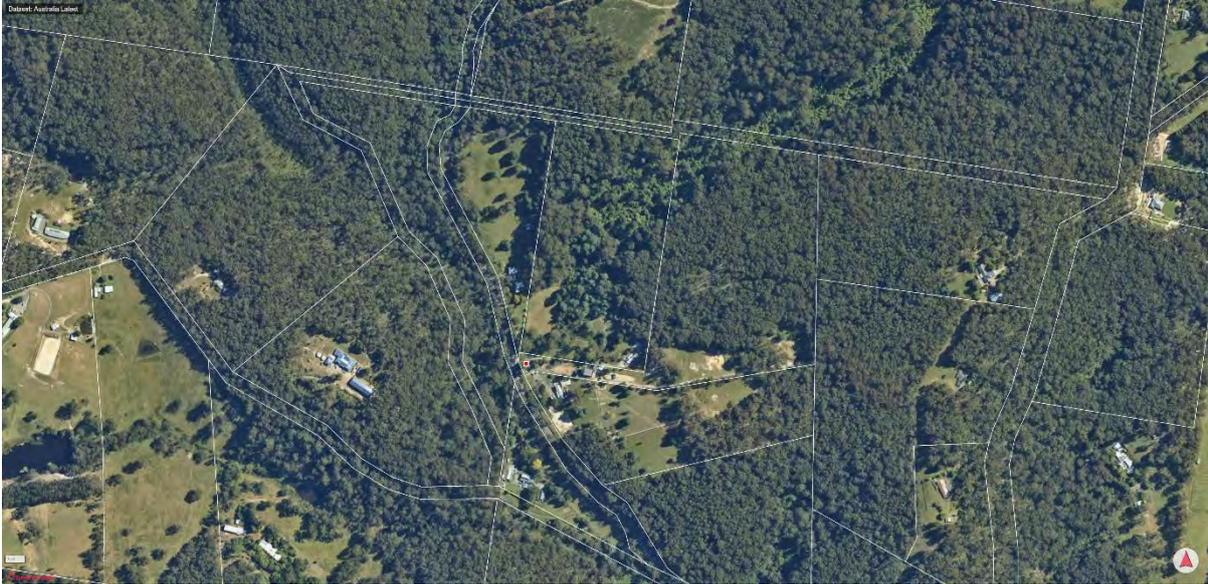
Member FFSV (Vic)

Member Australian Institute of Geoscientists

Member Australian Geomechanics Society

# 10. SITE PLAN

Map Not to Scale and borehole locations and vegetation descriptions are an approximation only. Source NearMap 2024



**Slope. Variable to the North-West**

# 11. BOREHOLE LOGS

**PROJECT ADDRESS:** 1000 Pakenham Road, PAKENHAM UPPER VIC  
**REFERENCE NUMBER:** 24D06

**FIELD WORK DATE:** 06/05/2024  
**SUPERVISING GEOLOGIST:** Bernie Weberruss

| BORELOG 1 |  |      |           | BORELOG 2 |  |      |           | BORELOG 3 |  |      |           |
|-----------|--|------|-----------|-----------|--|------|-----------|-----------|--|------|-----------|
| Depth mm  | SOIL PROFILE                             | Fill | EST. ipt% | Depth mm  | SOIL PROFILE   | Fill | EST. ipt% | Depth mm  | SOIL PROFILE                                   | Fill | EST. ipt% |
| 100       | <b>SILTY CLAY</b><br><b>YI, Moist</b>    |      |           | 100       | <b>(FILL) Silty Clay Mix</b><br><b>Br, Moist, Moderately Compacted</b> |      |           | 100       | <b>SILTY CLAY</b><br><b>YI Br, Moist, Firm</b> |      |           |
| 200       |  |      |           | 200       |  |      |           | 300       |  |      |           |
| 300       |  |      |           | 300       | 400  |      |           |           |  |      |           |
| 400       | <b>CLAY</b><br><b>YI Br, Moist Stiff</b> |      |           | 400       | <b>SILTY CLAY</b><br><b>YI Br, Moist, Firm</b>                         |      |           | 400       | <b>CLAY</b><br><b>YI Br, Moist Stiff</b>       |      |           |
| 500       |  |      |           | 500       |  |      |           | 600       |  |      |           |
| 600       |  |      |           | 600       |  |      |           | 700       |  |      |           |
| 700       |  |      |           | 700       | 800  |      |           |           |  |      |           |
| 800       |  |      |           | 800       | 900  |      |           |           |  |      |           |
| 900       |  |      |           | 900       | 1000   |      |           |           |  |      |           |
| 1000      |  |      |           | 1000      | 1100   |      |           |           |  |      |           |
| 1100      |  |      |           | 1100      | 1200   |      |           |           |  |      |           |
| 1200      |  |      |           | 1200      | 1300   |      |           |           |  |      |           |
| 1300      |  |      |           | 1300      | 1400   |      |           |           |  |      |           |
| 1400      |  |      |           | 1400      | 1500   |      |           |           |  |      |           |
| 1500      |  |      |           | 1500      | 1600   |      |           |           |  |      |           |
| 1600      |  |      |           | 1600      | 1700   |      |           |           |  |      |           |
| 1700      |  |      |           | 1700      | 1800   |      |           |           |  |      |           |
| 1800      |  |      |           | 1800      | 1900   |      |           |           |  |      |           |
| 1900      | 1900                                     | 2000 |           |           |  |      |           |           |  |      |           |
| 2000      | 2000                                     | 2100 |           |           |  |      |           |           |  |      |           |
| 2100      | 2100                                     | 2200 |           |           |  |      |           |           |  |      |           |
| 2200      | 2200                                     | 2300 |           |           |  |      |           |           |  |      |           |
| 2300      | 2300                                     | 2400 |           |           |  |      |           |           |  |      |           |
| 2400      | 2400                                     | 2500 |           |           |  |      |           |           |  |      |           |
| 2500      | 2500                                     | 2600 |           |           |  |      |           |           |  |      |           |
| 2600      | <b>END OF HOLE – No Refusal</b>          |      |           | 2600      | <b>END OF HOLE – No Refusal</b>  |      |           | 1900      | <b>END OF HOLE – No Refusal</b>                |      |           |
| 2700      |  |      |           | 2700      |  |      |           | 2000      |  |      |           |
| 2800      |  |      |           | 2800      |  |      |           | 2100      |  |      |           |
| 2900      |  |      |           | 2900      |  |      |           | 2200      |  |      |           |
| 3000      |  |      |           | 3000      |  |      |           | 2300      |  |      |           |
| 3100      |  |      |           | 3100      |  |      |           | 2400      |  |      |           |
| 3200      |  |      |           | 3200      |  |      |           | 2500      |  |      |           |
| 3300      |  |      |           | 3300      |  |      |           | 2600      |  |      |           |
| 3400      |  |      |           | 3400      |  |      |           | 2700      |  |      |           |
| 3500      |  |      |           | 3500      |  |      |           | 2800      |  |      |           |

# 11. BOREHOLE LOGS

**PROJECT ADDRESS:** 1000 Pakenham Road, PAKENHAM UPPER VIC  
**REFERENCE NUMBER:** 24D064

**FIELD WORK DATE:** 06/05/2024  
**SUPERVISING GEOLOGIST:** Bernie Weberruss

| BORELOG 4   |  |      |              | BORELOG 5   |              |      |              | BORELOG 6   |              |      |              |
|-------------|--|------|--------------|-------------|--------------|------|--------------|-------------|--------------|------|--------------|
| Depth<br>mm | SOIL PROFILE                           | Fill | EST.<br>ipt% | Depth<br>mm | SOIL PROFILE | Fill | EST.<br>ipt% | Depth<br>mm | SOIL PROFILE | Fill | EST.<br>ipt% |
| 100         | <b>SILTY CLAY</b>                      |      |              | 100         |              |      |              | 100         |              |      |              |
| 200         | <b>YI Br, Moist, Firm</b>              |      |              | 200         |              |      |              | 200         |              |      |              |
| 300         |  |      |              | 300         |              |      |              | 300         |              |      |              |
| 400         | <b>CLAY</b>                            |      |              | 400         |              |      |              | 400         |              |      |              |
| 500         | <b>YI Or, Moist, Stiff</b>             |      |              | 500         |              |      |              | 500         |              |      |              |
| 600         |  |      |              | 600         |              |      |              | 600         |              |      |              |
| 700         |  |      |              | 700         |              |      |              | 700         |              |      |              |
| 800         |  |      |              | 800         |              |      |              | 800         |              |      |              |
| 900         |  |      |              | 900         |              |      |              | 900         |              |      |              |
| 1000        |  |      |              | 1000        |              |      |              | 1000        |              |      |              |
| 1100        |  |      |              | 1100        |              |      |              | 1100        |              |      |              |
| 1200        |  |      |              | 1200        |              |      |              | 1200        |              |      |              |
| 1300        |  |      |              | 1300        |              |      |              | 1300        |              |      |              |
| 1400        |  |      |              | 1400        |              |      |              | 1400        |              |      |              |
| 1500        |  |      |              | 1500        |              |      |              | 1500        |              |      |              |
| 1600        |  |      |              | 1600        |              |      |              | 1600        |              |      |              |
| 1700        |  |      |              | 1700        |              |      |              | 1700        |              |      |              |
| 1800        | <b>-Rd Br</b>                          |      |              | 1800        |              |      |              | 1800        |              |      |              |
| 1900        |  |      |              | 1900        |              |      |              | 1900        |              |      |              |
| 2000        |  |      |              | 2000        |              |      |              | 2000        |              |      |              |
| 2100        |  |      |              | 2100        |              |      |              | 2100        |              |      |              |
| 2200        |  |      |              | 2200        |              |      |              | 2200        |              |      |              |
| 2300        |  |      |              | 2300        |              |      |              | 2300        |              |      |              |
| 2400        |  |      |              | 2400        |              |      |              | 2400        |              |      |              |
| 2500        |  |      |              | 2500        |              |      |              | 2500        |              |      |              |
| 2600        |  |      |              | 2600        |              |      |              | 2600        |              |      |              |
| 2700        |  |      |              | 2700        |              |      |              | 2700        |              |      |              |
| 2800        |  |      |              | 2800        |              |      |              | 2800        |              |      |              |
| 2900        | <b>END OF HOLE – Borehole Taken in</b> |      |              | 2900        |              |      |              | 2900        |              |      |              |
| 3000        | <b>Site Cut</b>                        |      |              | 3000        |              |      |              | 3000        |              |      |              |
| 3100        |  |      |              | 3100        |              |      |              | 3100        |              |      |              |
| 3200        |  |      |              | 3200        |              |      |              | 3200        |              |      |              |
| 3300        |  |      |              | 3300        |              |      |              | 3300        |              |      |              |
| 3400        |  |      |              | 3400        |              |      |              | 3400        |              |      |              |
| 3500        |  |      |              | 3500        |              |      |              | 3500        |              |      |              |

## 12. SITE PHOTOGRAPHS





## 13. GENERAL NOTES

- 13.1. The conclusions and recommendations contained in this report are based on:-
- (i) the building specifications and site treatment indicated to us by the client;
  - (ii) the results of our investigation at the nominated Test Site Locations;
  - (iii) the present “state of the art” in both testing and design.
- 13.2. Notwithstanding the recommendations made in this report, we also recommend that wherever footings are close to an excavation or easement and are founded in soil, they should be deepened so that the projection from the underside of the excavation to the underside of the footings makes an angle not exceeding 40 degrees to the horizontal for Clays and 30 degrees to the horizontal for Sands. We do not recommend using a steeper angle unless sufficient testing is carried out to indicate otherwise or unless the footings in that area are founded on or almost on solid rock. Service excavations adjacent to the existing footings must also comply with the above guideline.
- 13.3. Grub holes should be clear of all significant vegetation and organic matter then be back-filled with suitable material to the proper degree of compaction.
- 13.4. Material to be used in controlled compaction should be free of all significant vegetation and/or organic material.
- 13.5. If the removal of a pre-existing structure or vegetation disturbs the natural soil profile at the recommended foundation depths, we recommend deepening of the footings at least 200mm below this level.
- 13.6. The attached site sketch is not to scale and ground slopes indicated are approximate. As such no calculation should be undertaken with these values.
- 13.7. The client should recognise that on cut and fill site, slab edge beam depths may require deepening of the minimum requirements to ensure a natural foundation.
- 13.8. Clients are advised to refer to the CSIRO document BTF 18-2011 “Foundation Maintenance and Footing Performance: A Homeowner’s Guide”. Copies of this leaflet can be obtained from this office or other relevant building agencies. All parties must recognise that this leaflet is to be regarded as an integral part of AS2870-2011 and its recommendations are to be applied to all sites investigated where relevant.
- 13.9. The client should recognise that the soil profiles encountered during our testing as deemed representative of the building envelope for the purpose of classifications. The client should be aware however that in some cases soil conditions can change dramatically over short distances and although all effort is made to determine possible soil profile variations, no responsibility is taken for any undetected variations. The most careful exploration programme may not locate all soil profile variations due to time and economic restraints.
- If footing excavations reveal soil conditions differing from those shown on the log sheet in this report, we recommend that Southern Geotech be contacted immediately to carry out further testing to confirm or revise our conclusions and recommendations.

## 14. DRAINAGE

Clients must ensure that close attention is given to site drainage. Excessive build-up of water under footings can create a moisture differential in clays soils which in turn can cause heave or settlement in the footing system. Cracked brickwork and/or structural damage or distortion of the structure may be the result of such movement.

On cut and filled sites, sealed open surface drains should be used to divert water from the works site. Dish drains may be required on the high side of the batter of the face is likely to scour.

On sloping sites where, permeable topsoils overly impermeable soils a perched water table can develop adjacent to the footing on the high side of the site. This moisture build-up can create localised swelling of the soils that which in turn may cause footing movement with cracked brickwork and/or structural damage or distortion resulting.

Where this occurs, it is recommended that an agricultural drain be installed to divert the flow of water around the house site. Any such drain should penetrate the impermeable soils (such as clays) by approximately 200 mm. Further discussion and advice in regard to site drainage and maintenance is contained in C.S.I.R.O Information Sheet BTF 18-2011.

## 15. ARTICULATION

It is recommended that on reactive clay sites that structures be articulated to allow flexibility of the building in response to footing movements that may occur.

Provisions for wall articulation (control joints) should be considered at the design stage of structures and from an aesthetic viewpoint, clients should consult architects and/or building designers.

It is recommended that the client consult the Cement and Concrete Association of Australia; Construction Note TN61 – 1998 (Articulated Walling). This leaflet provides a comprehensive discussion of the necessity of articulation on reactive sites.

## 16. SERVICE TRENCHES

Incorrectly backfilled service trenches within proximity to a building can cause substantial foundation soil movement. Loose backfill can become inundated resulting in localised soil swelling, heave or settlement.

All service trenches should be properly backfilled with the excavated soils at the optimum moisture content to ensure that sub-surface inundation does not occur. On reactive sites, effort should be made to locate service trenches away from the building to eliminate the potential of movement that can be caused by service trench inundation.

## **17. ANGLE OF REPOSE**

Notwithstanding the recommendations made within this report, we also recommend that whenever footings are close to an excavation or easement and are founded in soils, they should be deepened so that the projection of the underside of the excavation to the underside of the footing makes an angle not exceeding 40° (degrees) to the horizontal. We do not recommend using a steeper angle unless sufficient testing has been undertaken to indicate otherwise or unless footings in that area are founded on confirmed competent rock. Service excavations adjacent to the footings must also comply with the above guideline.

## **18. SITE MAINTENANCE**

Clients are advised to obtain and refer to both the C.S.I.R.O. document, “Foundation Maintenance and Footing Performance” and the Victorian Building Authority (VBA) “Minimising Foundation Movement and Damage to Your House”, Issued August, 2015. Copies of these leaflets can be obtained online from the relevant building agencies. All parties must recognise their responsibilities and that they form an integral part in ensuring the long-term performance of a footing system.

# Bushfire Management Statement Pathway 2



Property Address:

**1000 Pakenham Rd Pakenham**

**Upper 3810**

Prepared for: **Charles Parry**

Date: **April 2024**

Ref# **2278/3.0**



KEYSTONE  
ALLIANCE



1000 Pakenham Rd Pakenham Upper 3810  
M 0450 770 778 T 03 9478 8991 Email [paul@keystonealliance.com.au](mailto:paul@keystonealliance.com.au)

0

Bushfire Assessments project: 2278/3.0  
Cover image: Looking at site.

## Bushfire Assessments

ABN 44 103 792 088

277 Plenty Road, Preston Vic

M: 0450 770 778

## Version Control

| Version | Date       |  | Name   |
|---------|------------|--|--|
| 3.0     | 12/04/2024 | Analysis, mapping and report compilation | Paul Oikonomidis Manager, Bushfire Planning and Design |
| 3.0     | 15/04/2024 | Peer review                              | Viky Patsari Admin                                     |
| 3.0     | 15/04/2024 | Bushfire Assessment and BMP reports      | To client  |

## Copyright

Unless otherwise agreed in writing, this report is the intellectual property of BUSHFIRE ASSESSMENTS. The report is designed to be used exclusively by the person that commissioned it. Permission must be sought prior to the reproduction of any portion of this document and every effort made to ensure proper referencing of this document.

## Disclaimer

This report may be of assistance to you and has been made with careful consideration and with the best information available to BUSHFIRE ASSESSMENTS at the time of writing. Before relying on information in this report, users should carefully evaluate the accuracy, completeness, and relevance of the information provided for their purposes. BUSHFIRE ASSESSMENTS Pty Ltd, its directors, and employees do not guarantee that it is without flaw or omission of any kind or is wholly appropriate for your particular purposes and therefore disclaim all liability for any error, loss or other consequence that may arise from you relying on any information in this report.

## Contents

|       |  |    |
|-------|--|----|
| 1     | Executive Summary .....                                | 3  |
| 2     | Introduction .....                                     | 4  |
| 3     | Site Description .....                                 | 5  |
| 4     | Bushfire hazard site assessment.....                   | 6  |
| 4.1   | Hazard Assessment.....                                 | 7  |
| 4.2   | Vegetation .....                                       | 7  |
| 4.3   | Photos of Assessment Area .....                        | 8  |
| 5     | Bushfire Hazard Landscape Assessment.....              | 10 |
| 5.1   | Location description .....                             | 10 |
| 5.1.1 | <b>Location &amp; Landscape Assessment</b> .....       | 11 |
| 5.1.2 | Landscape risk .....                                   | 12 |
| 5.2   | Bushfire History .....                                 | 13 |
| 5.3   | Bushfire Scenario .....                                | 14 |
| 6     | Bushfire Management Statement .....                    | 15 |
| 6.1   | Landscape, siting and design objectives .....          | 15 |
| 6.1.1 | Approved measure 2.1 Landscape .....                   | 15 |
| 6.1.2 | Approved measure 2.2 Siting.....                       | 15 |
| 6.1.3 | Approved measure 2.3 Design.....                       | 16 |
| 6.2   | Defendable space and construction objectives .....     | 16 |
| 6.2.1 | Building defendable space.....                         | 17 |
| 6.2.2 | Adjoining property defendable space .....              | 17 |
| 6.3   | Water supply and access objectives .....               | 18 |
| 7     | Clause 13.02-1S Bushfire .....                         | 19 |
| 8     | Overall Conclusion.....                                | 20 |
|       | Appendix 1: BMO vegetation management standards.....   | 21 |
|       | Appendix 2: BMO static water supply requirements ..... | 22 |
|       | Appendix 3: BMO access requirements .....              | 24 |
|       | Appendix 4 BMP.....                                    | 25 |

## 1 Executive Summary

The property was visited in **February 22** to undertake a bushfire hazard assessment.

The site is a **residential lot** in a **Rural Conservation Zone** of **Cardinia Shire**

The parcel to be developed has a total area of approximately **10.2 Ha**.

We are seeking development approval to **construct a building (dwelling)**.

On-site and surrounding area vegetation within the 150m assessment area is classified as **scrub**.

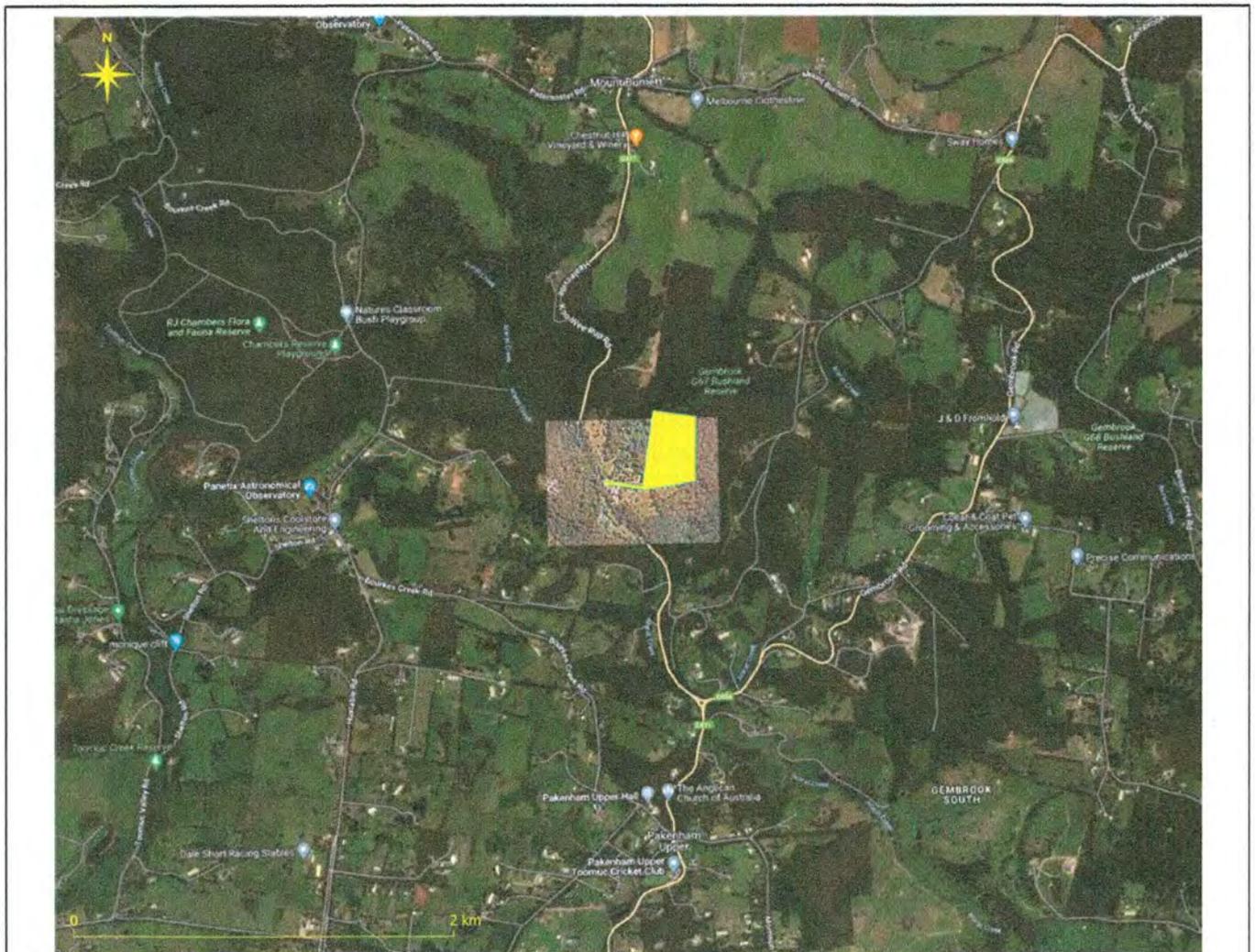
Classified vegetation **scrub** on a **36° downslope** constructing with a **BAL 29** defendable space around the building is **25m or to the property boundary, whichever is lesser**, corresponding to Clause 53.02-5 Table 2

The area close to the site has no bushfire history, and in the event of a bushfire, the impact to the dwelling will be from **ember attack and radiant heat**.

There are several designated NSP in **Cardinia Shire** the **Cockatoo Complex Community Hall** are the closest one.

A **10,000**-litre water tank will be required for firefighting purposes,

Access can meet BMO's access requirements (Appendix 4).



**Figure 1** Aerial view of site highlighted parcel to be developed QGIS, data.vic.gov.au, google maps & nearmap

## 2 Introduction

The proposal seeks development approval to **construct a building (dwelling)** on the land known as; **1000 Pakenham Rd Pakenham Upper 3810**. The property comprises of one parcel as seen in *Figure 1 & Figure 2*

Keystone Alliance Bushfire Assessments has been engaged by; **Charles Parry** to provide a Bushfire Management Statement in accordance with Clause 44.06 Bushfire Management Overlay and 53.02 Bushfire Planning Requirements at which is to accompany the planning permit application lodged with **Cardinia Shire**.

This assessment describes the subject site and surrounding area in relation to the risk associated with the Bushfire Attack Level (BAL), together with the relevant planning controls, namely, Australian Standard 3959-2009, "Construction of buildings in bushfire-prone areas."

The parcel to be developed has a **rectangular** shape and an area of approx. **10.2 Ha** It is located approximately **10km north of Pakenham via road in a rural area of Upper Pakenham's township** in one of **Cardinia Shire** rural areas. The property's static water supply will be from water tanks, it is provided with telecommunication services, and is connected to the sealed road network. Vehicular access to the land is via **Pakenham Road**. (as in *Figures 1 & 2*)

The purpose of the report is to assist in a decision of issuing a planning permit for the construction of the proposed development in a Bushfire Management Overlay.

## 3 Site Description

### 3.1 Site shape, dimensions, size and planning controls

|  |  |
|--|--|
| <i>Local government:</i>   | Cardinia Shire   |
| <i>Lot and Plan Number:</i>                                      | Lot 11 PS326096  |
| <i>The shape of the site is:</i>                                 | Irregular  |
| <i>The dimensions of the site are:</i>                           | Please refer to Fig2 Site Dimensions   |
| <i>The site has a total area of:</i>                             | Approximately 10.2 Ha  |
| <i>The zoning of the site is:</i>                                | RURAL CONSERVATION ZONE (RCZ)<br>RURAL CONSERVATION ZONE - SCHEDULE 2 (RCZ2) |
| <i>The overlays that apply to the site are:<br/>Effectuated:</i> | Bushfire Management Overlay & ESO1,  |

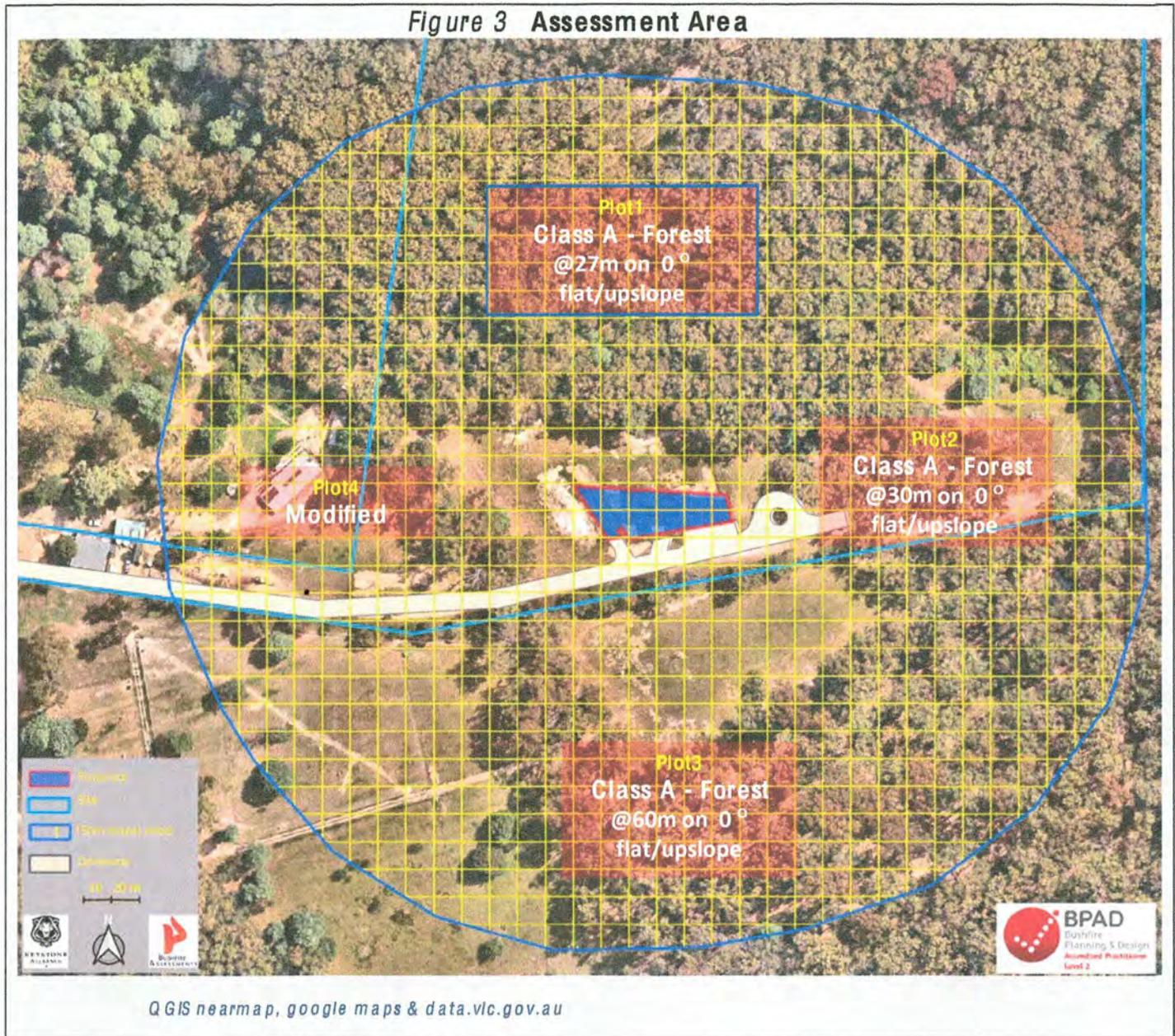
**Assessed by: Paul Apostolos Oikonomidis**



**Figure 2** Property's area *QGIS data.vic.gov.au, google maps & nearmap*

## 4 Bushfire hazard site assessment

A vegetation hazard assessment was carried out within a 150m radius from the proposed development. Within this area our interest was directed on the type of vegetation surrounding the proposal the distance from the proposal and the effective slope it stood (see Figure 3 below).



## 4.1 Hazard Assessment

The proposed development has been assessed under Victoria's Planning Provisions Clause 44.06, 53.02 and AS 3959 – 2018 "Construction of buildings in bushfire prone areas."

| Plot | Vegetation Classification | Effective Slope (degrees) |              | Separation (m) | BAL      | Defendable Space (m) |
|------|---------------------------|---------------------------|--------------|----------------|----------|----------------------|
| 1    | Class A - Forest          | 0                         | flat/upslope | 25             | BAL – 29 | NA                   |
| 2    | Class A - Forest          | 0                         | flat/upslope | 25             | BAL – 29 | 35                   |
| 3    | Class A - Forest          | 0                         | flat/upslope | 25             | BAL – 29 | NA                   |
| 4    | Modified                  | N/A                       | N/A          | NA             | BAL – 29 | NA                   |

**PB= property boundary**

An assessment of the site conditions has categorized this site as **BAL-29** fire risk and a requirement of defendable space around the building is **25m or to the property boundary, whichever is lesser.**

## 4.2 Vegetation

### Forest

Trees 10–30 metres high with foliage cover in the range of 30 per cent to 70 per cent at maturity, predominantly dominated by Eucalypts. Sclerophyllous understorey (vegetation that has hard leaves and short internodes [the distance between leaves along the stem]), small trees, tall scrubs or tall shrubs. Forests generally have several layers of tiered vegetation arranged vertically extending from the surface to the canopy including a pronounced shrubby middle layer in addition to a taller canopy and an underlying layer of grasses, herbs or sedges. AS 3959 Method 1 cannot differentiate between open, closed, tall or short forest. It should all be classified as Class A Forest. Includes plantations, which are classified as Class A Forest.

### Modified Vegetation

Much of the vegetation to the north and east of the site has been identified as 'modified vegetation' (see Map 2). Planning Practice Note 65 notes that modified vegetation can occur where fuel loads are high but the vegetation is modified because of urban development, gardens, the way the vegetation is configured (for example, limited or no understorey), or because the fuel loads are different from the fuel loads assumed by AS3959-2009 but the vegetation cannot be excluded as it is not low-threat or low-risk (DTPLI, 2014).

## 4.3 Photos of Assessment Area



**PLOT1** *Northern vegetation*



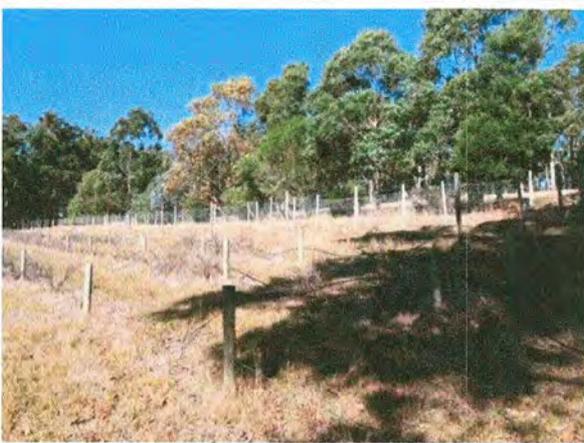
**PLOT2** *Eastern vegetation*



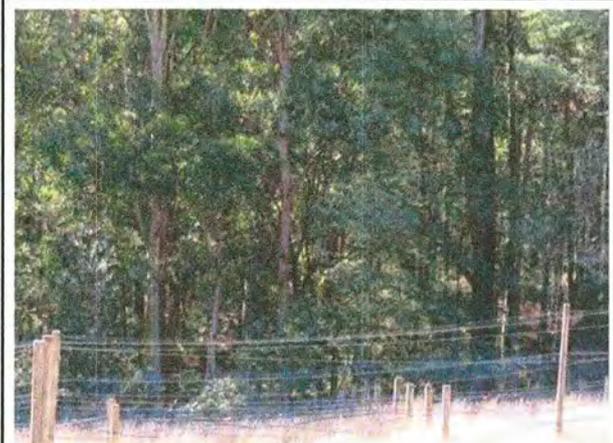
**PLOT3** *Southern vegetation*



**PLOT4** *Western vegetation.*



*Photo 5 Site*



*Photo 6 Northern Forest.*

## VEGETATION AND FENCING HAS BEEN REMOVED



*Photo 7 South Forest at distance*



*Photo 8 East veg.*

## 5 Bushfire Hazard Landscape Assessment

### 5.1 Location description

The area surrounding the subject site is known for its rural and semi-rural character, characterized by a mix of residential properties, farmland, and natural landscapes. It is located in an area of Victoria, known for its lush forests and natural beauty. The region experiences a temperate climate, with warm summers and cool winters. During the summer months, the area can be prone to bushfires, especially if dry conditions and strong winds are present.

When assessing the bushfire risk at any given time, it is important to consider factors such as weather conditions, topography, and the types of vegetation in the vicinity. From a bushfire perspective, the site is situated in an area that may be susceptible to bushfire risk due to its surroundings and the vegetation present in the region. It is known for its diverse landscapes, including farmland and bushland. Bushland regions contain a significant amount of fuel for fires, including trees, undergrowth, and leaf litter. The region experiences a climate with hot, dry summers and cool, wet winters, which can contribute to the potential for bushfires during the summer months.

Considering the siting of the proposal within the landscape, the likelihood of a bushfire event is considered **possible**; signifying the threat could take place sometime in the future. The consequences from a bushfire event are indicated as **minor**, first aid treatment required, minor damage, some financial loss.

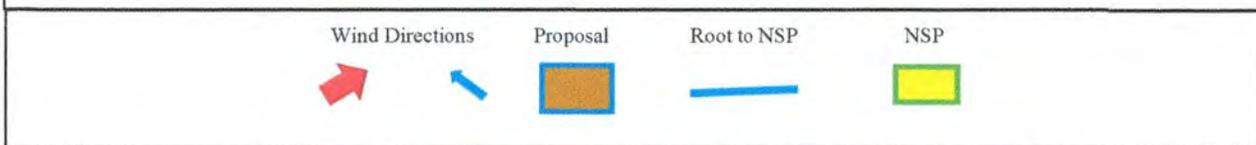
Due to the type & extent of vegetation surrounding the proposal, a potential fire run can take place in extreme weather conditions. A landscape fire is possible, approaching from the north or northwest.

The main driveway access into the site is from **Pakenham Road**. This is a dual carriageway, linking to **Chewton's** closest CFA Fire Station located 1.5 km via road on **Mount Street** east of the entrance driveway.

## 5.1.1 Location & Landscape Assessment



**Figure 4** Location of site



**Cardinia Shire** has several designated Neighbourhood Safe Places (NSP). The Cockatoo Complex Community Hall is the closest NSP at approx. 3.1km as you can see in *Figure 4* above.

## 5.1.2 Landscape risk

Clause 13.05 stipulates that new development is only permitted where 'the risk to human life, property and community infrastructure from bushfire can be reduced to an acceptable level'. To assist in defining the risk, four 'broader landscape types', representing different risk levels are described in "Planning Permit Applications Bushfire Management Overlay Technical Guide Sep. 2017".

The four types range from low risk landscapes where there is little hazardous vegetation beyond 150m of the site and extreme bushfire behaviour is not credible, to extreme risk landscapes with limited or no evacuation options.

The Technical Guide outlines four Landscape Types. The local landscape character surrounding the property is most attributable to Landscape Type 2.

Table 1- Landscape risk

| Broader Landscape Type 1   | Broader Landscape Type 2   | Broader Landscape Type 3   | Broader Landscape Type 4  |
|--|--|--|---|
| <ul style="list-style-type: none"> <li>• There is little vegetation beyond 150m of the site (except grasslands and low-threat vegetation).</li> <li>• Extreme bushfire behaviour is not possible.</li> <li>• The type and extent of vegetation is unlikely to result in neighbourhood-scale destruction of property.</li> <li>• Immediate access is available to a place that provides shelter from bushfire.</li> </ul> | <ul style="list-style-type: none"> <li>• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.</li> <li>• Bushfire can only approach from one aspect and the site is located in a suburban, township or urban m area managed in a minimum fuel condition.</li> <li>• Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area.</li> </ul> | <ul style="list-style-type: none"> <li>• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.</li> <li>• Bushfire can approach from more than one aspect.</li> <li>• The site is in an area that is not managed in a minimum fuel condition.</li> <li>• Access to an appropriate place that provides shelter from bushfire is not certain.</li> </ul> | <ul style="list-style-type: none"> <li>• The broader landscape presents an extreme risk.</li> <li>• Evacuation options are limited or not available.</li> </ul> |

## 5.2 Bushfire History

Cardinia Shire areas are prone to bushfires, the area has been impacted by bushfires in the recent history, bushfires have been recorded in the wider area and in the immediate area surrounding the subject site.

Controlled burns have taken place and a wildfire history has been recorded in the wider areas surrounding the proposal as you can see on Map 2. The immediate area has a fire history, and the publicly available database indicates that the site itself has experienced bushfire in 1983.

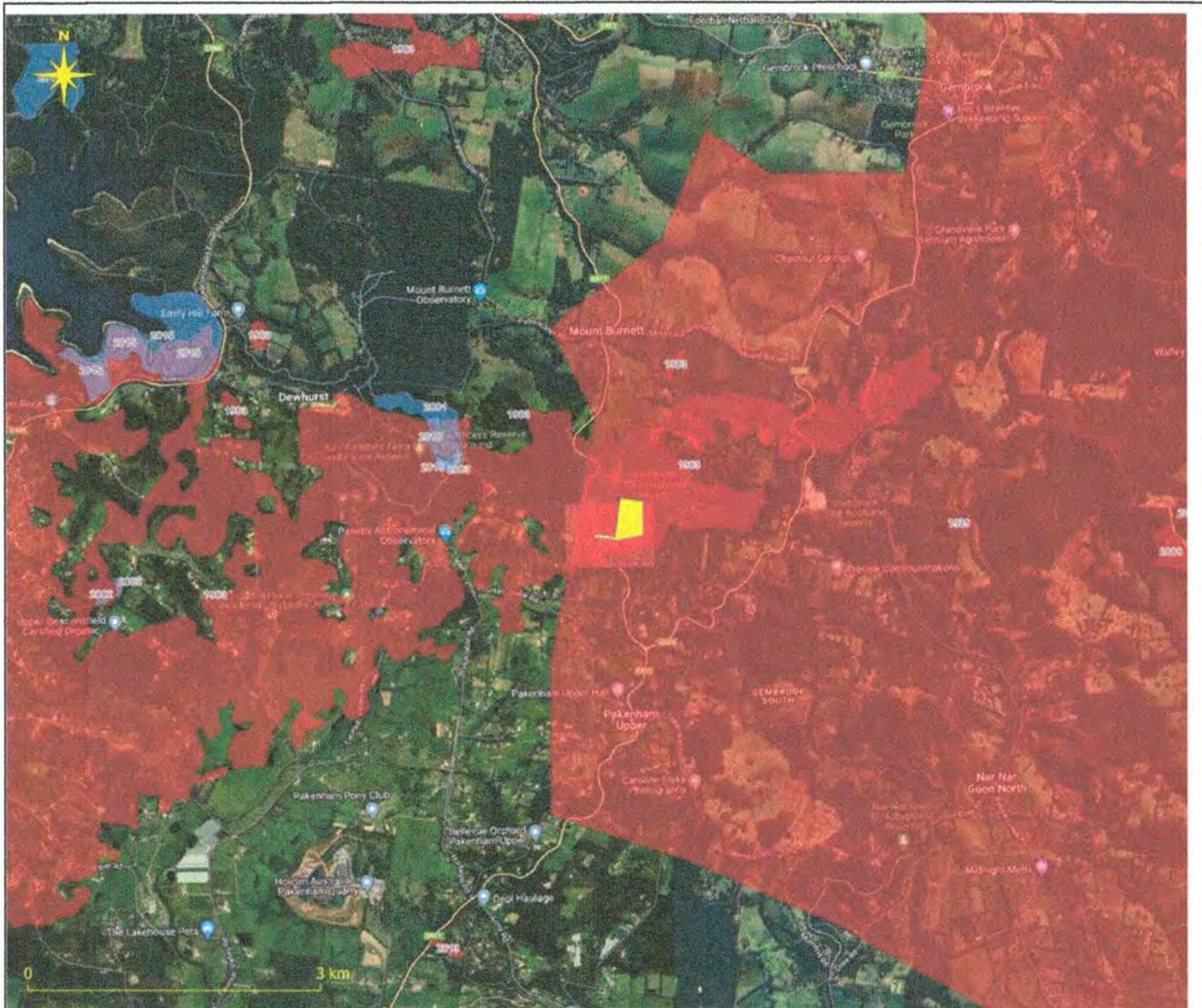


Figure 5 Bushfire history & planned burns around the proposal QGIS data.vic.gov.au, google maps & nearmap



## 5.3 Bushfire Scenario

The most likely bushfire scenarios are those typically associated with the direction of the wind on severe or higher, fire danger days i.e. a approach of bushfire from the north, northwest, west or southwest.

Hazard vegetation in this occasion is located **north** from the proposal, the development site will be impacted upon by a **landscape scale** fire approaching from the **north, northwest**. A fire from these directions would approach through the **forested** areas of driven by hot, dry **north, north-western** winds commonly experienced during summer.

Whilst the **north, northwestern forested** areas may intemperate the speed and intensity of the fire before it impacted the site, under the BMO conditions of low humidity, elevated temperatures and fierce winds, the development could be subjected to significant ember attack and possibly radiant heat. The cleared areas around the development are a considerable asset in this scenario and substantially reduce the threat of radiant heat and flame impacts.

The **forested** areas to the **north, northwest** of the site is a potential hazard to the development and could result in a fire approaching from the **north, northwest**, generating significant ember attack and radiant heat.

Whilst the **forested** area, can cause substantial amounts of embers and burning material to be blown long distances, the development site is sufficiently setback from the **hazard** such that it will be able to provide appropriate defendable space, commensurate with the risk and proposed construction standard of the building.

## 6 Bushfire Management Statement

### 6.1 Landscape, siting and design objectives.

- *Development is appropriate having regard to the nature of the bushfire risk arising from the surrounding landscape.*
- *Development is sited to minimise the risk from bushfire.*
- *Development is sited to provide safe access for vehicles, including emergency vehicles. Building design minimises vulnerability to bushfire attack.*

Compliance with these objectives at Clause 53.02-4.1 is proposed via the following Approved measures.

#### 6.1.1 Approved measure 2.1 Landscape

*'The bushfire risk to the development from the landscape beyond the site can be mitigated to an acceptable level'.*

As identified in Section 5 the landscape is **not one** of extreme bushfire risk. Whilst a landscape scale bushfire could impact the site, the speed and intensity of a fire approaching from the **north**, will be somewhat moderated by residential land managed to low fuel levels surroundings of the proposal and of areas of low threat and/or non-vegetated areas.

To the **north at a distance** there are large contiguous **forested** areas and the possibility of a potential fire run in extreme weather conditions of high temperatures and low humidity is feasible.

It is proposed that the risk can be mitigated to an acceptable level by implementing bushfire protection measures in compliance with the BMO requirements including BAL construction standard, commensurate defensible space, provision of a water supply for firefighting, ensuring good access and egress are available for occupants and emergency services and, most importantly, management planning in the form of a Bushfire Emergency Management Plan.

#### 6.1.2 Approved measure 2.2 Siting

*A building is sited to ensure the site best achieves the following:*

- *The maximum separation distance between the building and the bushfire hazard.*
- *The building is in close proximity to a public road.*
- *Access can be provided to the building for emergency service vehicles.*

The proposed development is sited to have maximum distance from hazard vegetation from all aspects. Sufficiently distant to achieve **BAL-29** defensible space.

The building will be sufficiently distant from hazardous vegetation such that 'Table 2' to Clause 53.02-5 setbacks are achieved (please refer to Defensible Space Map 3).

The proposed development is close to a main public road enabling access and egress in compliance with BMO requirements for emergency vehicles and occupants/visitors.

## 6.1.3 Approved measure 2.3 Design

*A building is designed to be responsive to the landscape risk and reduce the impact of bushfire on the building.*

All BAL standards above BAL-Low are deemed to satisfy the building code requirement that buildings be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the:

- (a) *'potential for ignition caused by embers, radiant heat or flame generated by a bushfire; and*
- (b) *Intensity of the bushfire attack on the building' (Building Code of Australia 2016).*

The design of the buildings will aim to facilitate wind flow over the building and easy maintenance (e.g. cleaning of gutters) and avoid complex roof lines which may allow build-up of debris (e.g. accumulation of leaves and bark) and trap embers. Walls and eaves should similarly avoid or minimise re-entrant corners and other features that may trap debris and embers.

The proposal will be constructed with a **BAL-29**.

## 6.2 Defendable space and construction objectives

*'Defendable space and building construction mitigate the effect of flame contact, radiant heat and embers on buildings'.*

Compliance with this objective is proposed via the following Approved and Alternative measures.

**Approved measure 3.1 (AM 3.1)** requires that: *'A building used for a dwelling (including an extension or alteration to a dwelling), a dependant person's unit, industry, office or retail premises is provided with defendable space in accordance with:*

- *Column A, B or C of Table 2 to Clause 53.02-5 wholly within the title boundaries of the land; or if there are significant siting constraints,*
- *Column D of Table 2 to Clause 53.02-5.*

The building is constructed with a **BAL-29** the bushfire attack level that corresponds to the defendable space of **25m or to the property boundary, whichever is lesser** provided in accordance with Clause 53.02-5 Table 2.

## 6.2.1 Building defensible space

The habitable building will be constructed with a **BAL-29** vegetation classified as forest on an effective slope of flat/upslope, required defensible space is **25m or to the property boundary, whichever is lesser** from the edges of the proposal as shown in *Figure 6* corresponding to Clause 53.02-5 Table 2.



## 6.2.2 Adjoining property defensible space

### Alternative measures 3.3 (AltM 3.3)

Adjoining land may be included as defensible space where there is a reasonable assurance that the land will remain or continue to be managed in that condition as part of the defensible space.

Required vegetation setback of **25m or to the property boundary, whichever is lesser** meters are achieved within adjacent property where grassland vegetation is maintained to low fuel levels as in Clause 53.02-5 Table 6 standards.

## 6.2.1 Building defensible space

The habitable building will be constructed with a **BAL-29** vegetation classified as forest on an effective slope of flat/upslope, required defensible space is **25m or to the property boundary, whichever is lesser** from the edges of the proposal as shown in *Figure 6* corresponding to Clause 53.02-5 Table 2.



## 6.2.2 Adjoining property defensible space

### Alternative measures 3.3 (AltM 3.3)

Adjoining land may be included as defensible space where there is a reasonable assurance that the land will remain or continue to be managed in that condition as part of the defensible space.

Required vegetation setback of **25m or to the property boundary, whichever is lesser** meters are achieved within adjacent property where grassland vegetation is maintained to low fuel levels as in Clause 53.02-5 Table 6 standards.

### 6.3 Water supply and access objectives

*'A static water supply is provided to assist in protecting the property.*

*Vehicle access is designed and constructed to enhance safety in the event of a bushfire'.*

These objectives can be achieved via Approved measures 4.1 (AM 4.1):

*'A building used for a dwelling (including an extension or alteration to a dwelling), a dependant person's unit, industry, office or retail premises is provided with:*

- A static water supply for firefighting and property protection purposes specified in Table 4 to Clause 53.02-5.*
- Vehicle access that is designed and constructed as specified in Table 5 to Clause 53.02-5'.*

*The water supply may be in the same tank as other water supplies if a separate outlet is reserved for firefighting water supplies.*

It is proposed that a minimum total capacity of **10,000-litres** be provided as a dedicated static water supply for bushfire firefighting only.

#### **Access**

Internal roads will provide access in accordance with the vehicle access design and construction specifications in Table 5 to Clause 53.02-5 (detail provided as Appendix 4).

## 7 Clause 13.02-1S Bushfire

Clause 13.02-1S Bushfire has the objective to “*strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life*”. This clause applies to land within the Bushfire Prone Area (BPA), BMO or proposed to be used or developed in a way that may create a bushfire hazard. Clause 13.02-1S contains five strategies to meet the objective, being:

- Protection of human life.
- Bushfire hazard identification and assessment.
- Settlement planning.
- Areas of high biodiversity conservation value; and
- Use and development control in a BPA.

This development addresses the requirements of Clause 13.02-1S in several ways. It is considered that the development can appropriately prioritise the protection of human life by ensuring that the proposed building within the development will not be exposed to a radiant heat flux of more than **29** kilowatts/square metre, which is commensurate to a BAL **29** construction standard.

The lot is **10.2 Ha** m<sup>2</sup> and is required to provide a minimum static water supply of **10,000** - litres as per Table 4 to Clause 53.02-5. Vehicles can easily access the development since it is on a main public road.

This report identifies the bushfire hazard and applies the standard site assessment methodology used in AS3959-2018 and Clause 53.02, which is applied to developments in the BMO and is based on the best available science. The bushfire modelling inputs that form the basis for this methodology factor in vegetation type (e.g., Woodland, Grassland), potential fuel-loads in a long-unburnt vegetation community, weather conditions on higher bushfire risk days (e.g. wind speed, fuel moisture content, days since last rainfall) and the effect of slope gradient on the way fire travels through unmanaged vegetation. The site assessment process and desktop assessment using GIS software has determined the most appropriate vegetation type and commensurate slope category for each section/aspect of unmanaged vegetation.

Non-vegetated areas such as dwellings, roads, driveways and footpaths are considered part of a landscape in which a building would be rated as BAL-LOW (AS3959- 2018). Occupants will be able to move towards areas rated as BAL-LOW by travelling in a generally **southern** direction into a highly urbanised area, or at the more localised scale, directly **north** on **Pakenham Road** leading to the closest NSP in **Cockatoo Complex Community Hall**.

The CFA specify that areas where development should not proceed could include:

- Isolated settlements where the size and/or configuration of the settlements will be insufficient to modify fire behaviour and provide protection from a bushfire.
- Where bushfire protection measures will not reduce the risk to an acceptable level.
- Where evacuation (access) is severely restricted.
- Where the extent and potential impact of required bushfire protection measures may be incompatible with other environmental objectives or issues, e.g., vegetation protection, land subject to erosion or landslip’ (CFA, 2015).

None of these criteria or characteristics are applicable to the area of the proposed.

## 8 Overall Conclusion

The proposed development has been assessed under Clause 53.02 & AS 3959 – 2018.

An assessment of the site conditions & adjoining property has categorised this site as “**BAL 29**” fire risk, with Sections 3 & 7 utilised for the building construction under AS3959 and is subject to the recommendations outlined above.

The proposed development has been sited and designed to avoid on and off-site constraints. AS3959 2018’ Construction of buildings in a bushfire prone area’ describes **risk category for:**

- BAL – 12.5 as: “Ember Attack”
- BAL – 19 as: “Increasing levels of Ember Attack and burning debris ignited by wind borne embers with increasing heat flux between 12.5-19KW”
- **BAL – 29 as: “Increasing levels of Ember Attack and burning debris ignited by wind borne embers with increasing heat flux between 19-29KW”**
- BAL – 40 as: “Increasing levels of Ember Attack and burning debris ignited by wind borne embers with increasing heat flux with the increased likelihood of exposure to flames.
- BAL – FZ as: Direct exposure to flames from fire front in addition to heat flux and ember attack.

The final categorization of this site is subject to the relevant fire authority (CFA/MFB) review and approval.

Overall, the proposed development meets the requirements of the BMO and Clause 53.02– Bushfire Protection: Planning requirements.

## Appendix 1: BMO vegetation management standards

### Clause 53.02.5 Table 6 Vegetation management requirement

#### Vegetation management requirement

Defendable space is provided and is managed in accordance with the following requirements:

- Grass must be short cropped and maintained during the declared fire danger period.
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
- Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building.
- Shrubs must not be located under the canopy of trees.
- Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres.
- Trees must not overhang or touch any elements of the building.
- The canopy of trees must be separated by at least 5 metres.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.

Unless specified in a schedule or otherwise agreed in writing to the satisfaction of the relevant fire authority.

## Appendix 2: BMO static water supply requirements

Table 4 from Clause 53.02-5

**Table 4 Water supply**

| Lot sizes (square meters) | Hydrant available | Capacity (litres) | Fire authority fittings and access required |
|---------------------------|-------------------|-------------------|---|
| Less than 500             | Not applicable    | 2,500             | No  |
| 500-1,000                 | Yes               | 5,000             | No  |
| 500-1,000                 | No                | 10,000            | Yes   |
| 1,001 and above           | Not applicable    | 10,000            | Yes   |

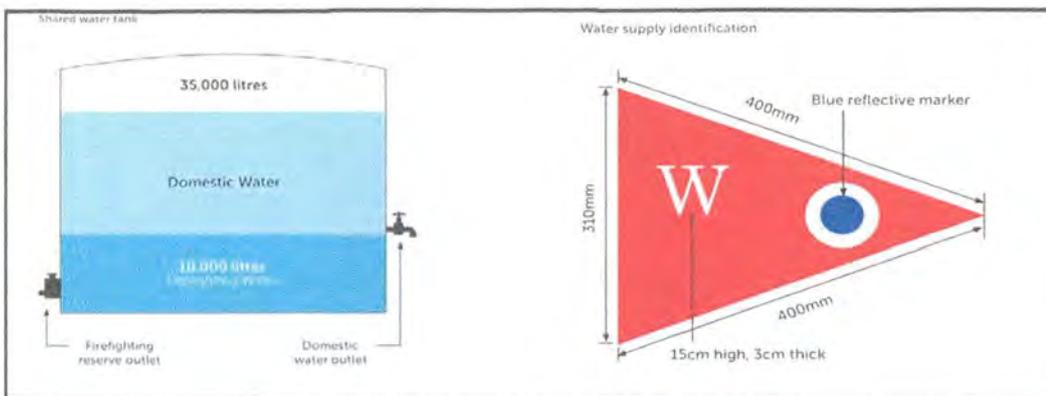
Water tank

Note 1: A hydrant is available if it is located within 120 metres of the rear of the building

Note 2: Fittings must be in accordance with the published requirements of the relevant fire authority.

**requirements**  
The water supply should

be stored in an above ground water tank constructed of concrete, steel or corrugated iron. The water supply should be identified. The water supply may be provided in the same water tank as other water supplies



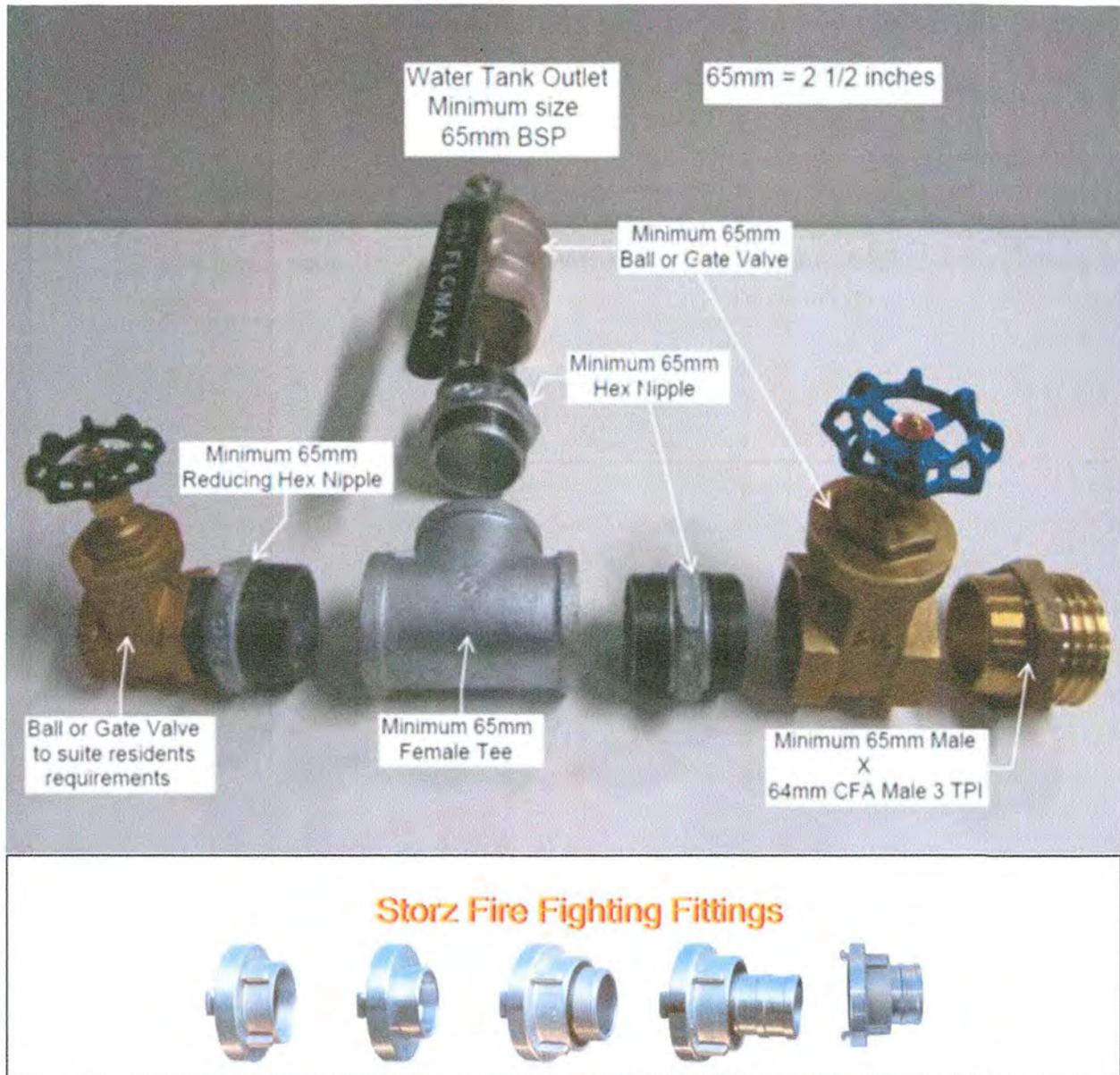
provided they are separated with different outlets'.

### CFA Fittings (CFA, 2014b)

'If specified within Table 4 to Clause 53.02-5 (if fire brigade access to your water supply is required), CFA's standard BMO permit conditions require the pipe work, fittings and tank outlet to be a minimum size of 64 mm.

65 mm BSP (British Standard Pipe) is the most common size available. A 65 mm fitting is equivalent to the old 2 1/2 inch. A 65 mm BSP (2 1/2 inch) fitting exceeds CFA's requirements and will therefore comply with CFA's standard permit conditions for the BMO.

Diagram 1 below shows some common tank fittings available at most plumbing suppliers which meet the connection requirements. It includes a 65mm tank outlet, two 65 mm ball or gate valves with a 65mm male to 64 mm CFA 3 threads per inch male coupling. This is a special fitting which allows the CFA fire truck to connect to the water supply. An additional ball or gate valve will provide access to the water supply for the resident of the dwelling'



**Diagram 1 CFA Standard permit conditions for water supply, in FRV areas pls check if they use same fittings or Storz Fitting apply.**

### Conditions required for all applications

'Show [xx litres] of effective water supply for firefighting purposes which meets the following requirements:

- Is stored in an above ground water tank constructed of concrete or metal.
- All fixed above-ground water pipes and fittings required for firefighting purposes must be made of corrosive resistant metal'.

Additional conditions to apply if CFA fittings and access is required

'The water supply must also –

- Incorporate a ball or gate valve (British Standard Pipe (BSP) 65mm) and coupling (64 mm CFA 3 thread per inch male fitting).
- The outlet/s of the water tank must be within 4m of the access way and be unobstructed.
- Be readily identifiable from the building or appropriate identification signage to the satisfaction of CFA must be provided.
- Any pipework and fittings must be a minimum of 65 mm (excluding the CFA coupling)'.