Notice of Application for a Planning Permit

Cardinia

The land affected by the application is located at:	L59 LP8240 V5691 F023 127 Cooinda Road, Beaconsfield VIC 3807
The application is for a permit to:	Building and works for alterations to the existing dwelling and Removal of Vegetation

A permit is required under the following clauses of the planning scheme:

42.01-2	Remove, destroy or lop vegetation
42.01-2	Construct a building or construct or carry out works
35.05-5	Construct a building or construct or carry out works associated with a a Dwelling
44.06-2	Construct a building or construct or carry out works associated with a Dwelling

APPLICATION DETAILS

The applicant for the permit is:	The Project Centre
Application number:	T240270

You may look at the application and any documents that support the application at the office of the Responsible Authority:

Cardinia Shire Council, 20 Siding Avenue, Officer 3809.

This can be done during office hours and is free of charge.

Documents can also be viewed on Council's website at cardinia.vic.gov.au/advertisedplans 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:	06 June 2025

WHAT ARE MY OPTIONS?

Any person who may be affected by the granting of the permit may object or make other submissions to the responsible authority.

If you object, the Responsible Authority will notify you of the decision when it is issued.

An objection must:

- be made to the Responsible Authority in writing;
- include the reasons for the objection; and
- state how the objector would be affected.

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.

Application is here

1 Application lodged — 2 Council initial assessment — 3 Notice — 4 Consideration of submissions — 5 Assessment — 6 Decision

Cardinia ePlanning

Application Summary

Portal Reference	A224772V

Basic Information

Proposed Use	for proposed extension to be built on property
Current Use	single storey dwelling with 1 outbuilding shed that be being built
Cost of Works	$300,000
Site Address	127 Coolnda Road Beaconsfield 3807

Covenant Disclaimer

Does the proposal breach, in any way, an encumbrance on title such as restrictive covenant, section 173 agreement or other obligation such as an easement or building envelope?	No such encumbrances are breached

☐ Note: During the application process you may be required to provide more information in relation to any encumbrances.

Contacts

Type	Name	Address	Contact Details
Applicant	[redacted] The Project Centre	GPO Box 15, Berwick VIC 3806	M: 0435-809-469 E: taya@projectcentre.com.au
Owner	[redacted]		
Preferred Contact	[redacted] The Project Centre	GPO Box 15, Berwick VIC 3806	M: 0435-809-469 E: taya@projectcentre.com.au

Fees

Regulation	Fee Condition	Amount	Modifier	Payable
9 - Class 4	More than $100,000 but not more than $500,000	$1,383.30	100%	$1,383.30
		Total		**$1,383.30**

Documents Uploaded

Date	Type	Filename
18-06-2024	A Copy of Title	TITLE PLAN - 127 Coolnda Road, Beaconsfield.PDF
18-06-2024	A Copy of Title	TITLE STATEMENT - 127 Coolnda Road, Beaconsfield.PDF
18-06-2024	Alteration statement	PLANNING DRAWINGS - 127 Coolnda Road, Beaconsfield.pdf
18-06-2024	Site plans	PLANNING DRAWINGS - 127 Coolnda Road, Beaconsfield.pdf
18-06-2024	Additional Document	PLANNING REPORT - 127 Coolnda Road, Beaconsfield.docx
18-06-2024	Additional Document	COOINDA_FINAL_CAM01_P (1).jpg
18-06-2024	Additional Document	COOINDA_FINAL_CAM02_P.jpg
18-06-2024	Additional Document	COOINDA_FINAL_CAM04_P.jpg
18-06-2024	Additional Document	COOINDA_FINAL_CAM05_P.jpg
18-06-2024	Additional Document	COOINDA_FINAL_CAM03_P.jpg

☐ Remember it is against the law to provide false or misleading information, which could result in a heavy fine and cancellation of the permit

Lodged By

Site User	[redacted] The Project Centre	PO BOX 15, Berwick VIC 3806	W: 03-9769-3517 M: 0415-328-111 E: carl@projectcentre.com.au
Submission Date	18 June 2024 - 11:04:AM		

Declaration

☑ By ticking this checkbox, I [redacted]eclare that all the information in this application is true and correct; and the Applicant and/or Owner (if not myself) has been notified of the application.

Civic Centre
20 Siding Avenue, Officer, Victoria

Council's Operations Centre (Depot)
Purton Road, Pakenham, Victoria

Postal Address
Cardinia Shire Council
P.O. Box 7, Pakenham VIC, 3810

Email: mail@cardinia.vic.gov.au

Monday to Friday 8.30am–5pm
Phone: 1300 787 624
After Hours: 1300 787 624
Fax: 03 5941 3784

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

VOLUME 05691 FOLIO 023

Security no : 124115735785M
Produced 12/06/2024 11:33 AM

LAND DESCRIPTION

Lot 59 on Plan of Subdivision 008240.
PARENT TITLE Volume 04224 Folio 781
Created by instrument 1466711 22/09/1930

REGISTERED PROPRIETOR

[redacted]

ENCUMBRANCES, CAVEATS AND NOTICES

[redacted]

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 or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE LP008240 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: 127 COOINDA ROAD BEACONSFIELD VIC 3807

ADMINISTRATIVE NOTICES

NIL

[redacted]

DOCUMENT END

Imaged Document Cover Sheet

The document following this cover sheet is an imaged document supplied by LANDATA®, Secure Electronic Registries Victoria.

Document Type	**Plan**
Document Identification	**LP008240**
Number of Pages (excluding this cover sheet)	**5**
Document Assembled	**12/06/2024 11:33**

PLAN OF SUBDIVISION
OF PART OF SUBDIVISION B
OF CROWN ALLOTMENT 56 & PART OF
CROWN ALLOTMENTS 56A,57A,57B2,&58B
PARISH OF PAKENHAM
COUNTY OF MORNINGTON

V4224 FOL781

LP 8240
EDITION 2
PLAN MAY BE LODGED
5-4-21

4 SHEETS
SHEET 1

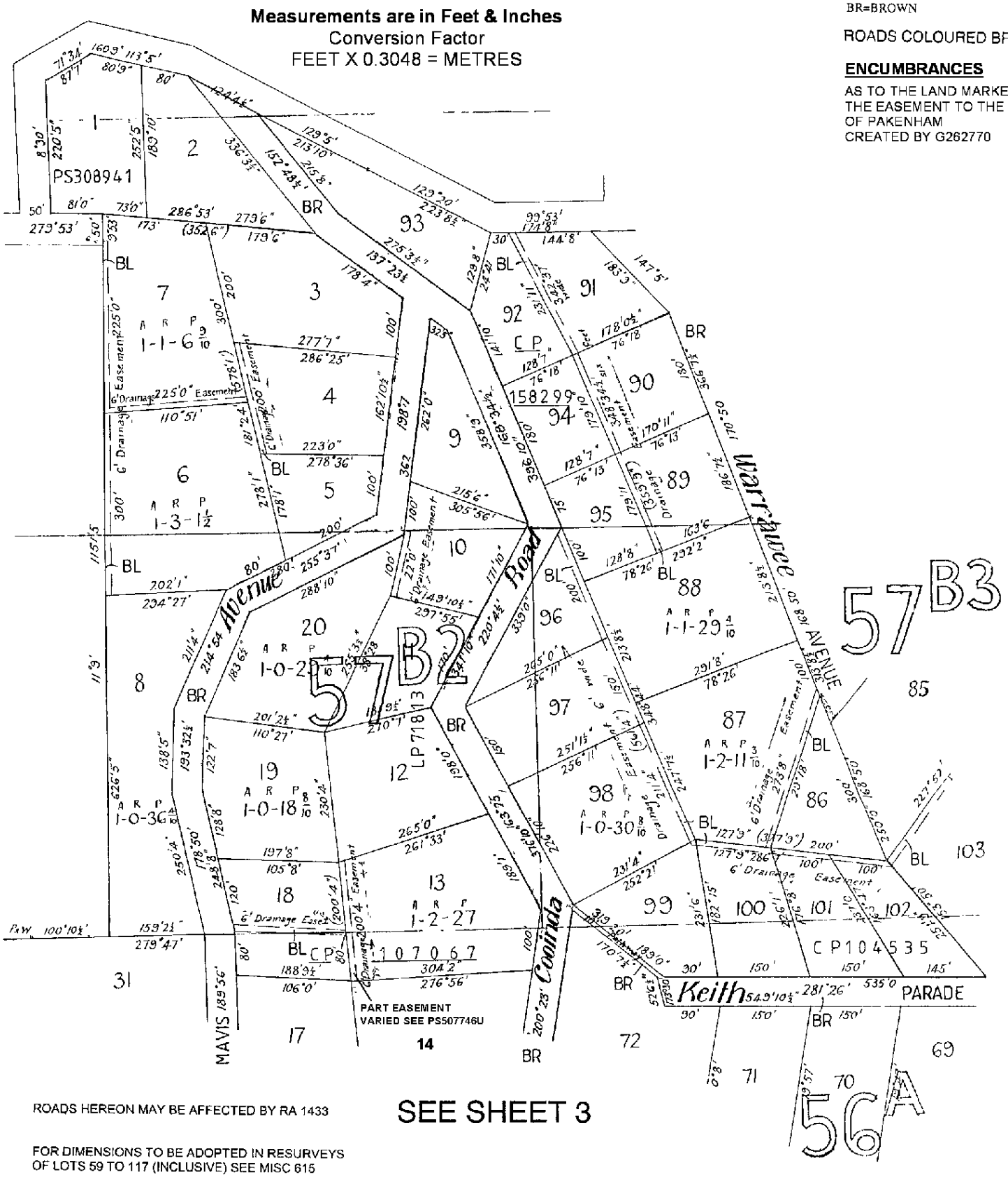
Measurements are in Feet & Inches
Conversion Factor
FEET X 0.3048 = METRES

COLOUR CODE
BL=BLUE
BR=BROWN

ROADS COLOURED BROWN

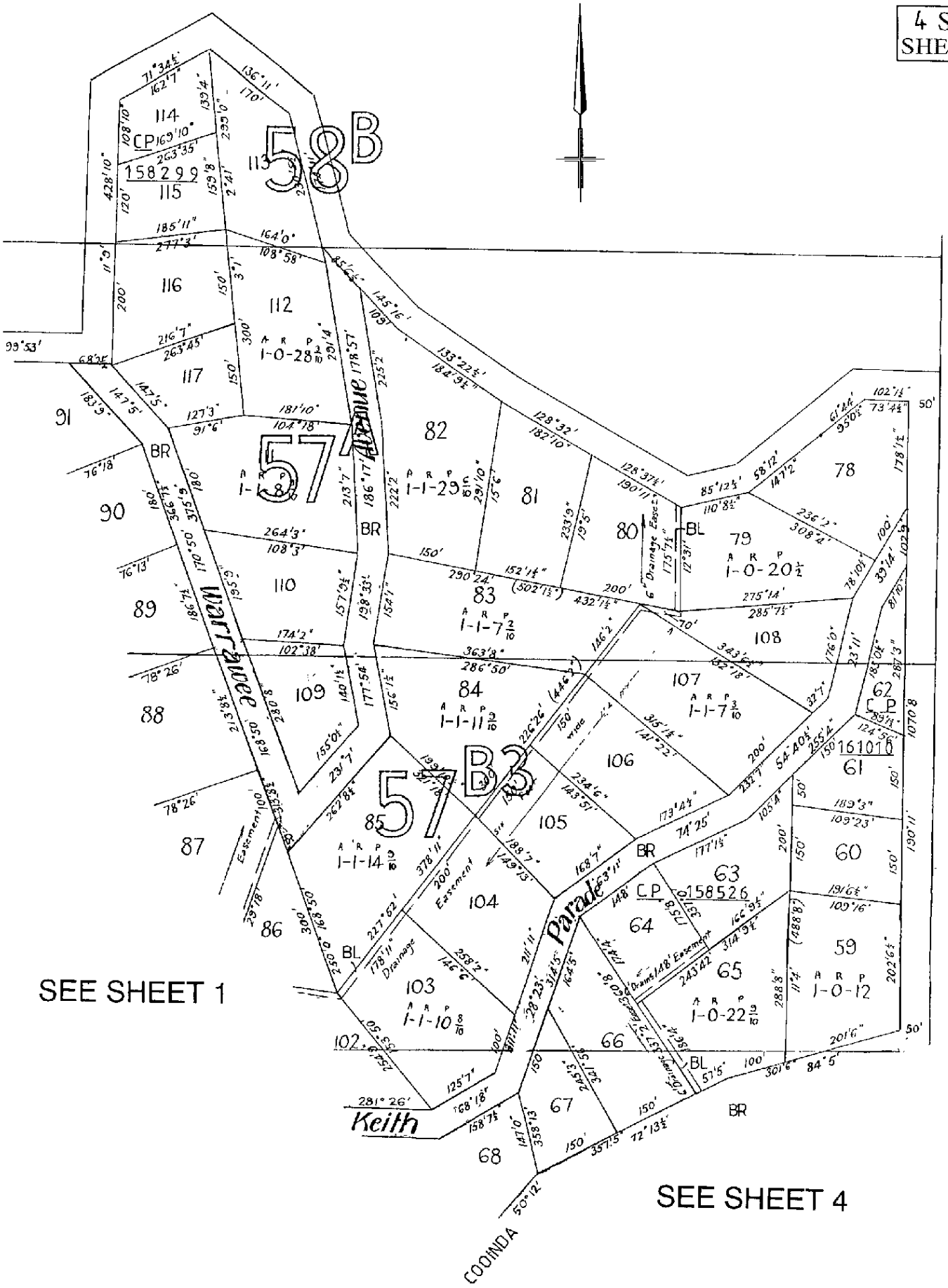
ENCUMBRANCES

AS TO THE LAND MARKED E-1
THE EASEMENT TO THE SHIRE
OF PAKENHAM
CREATED BY G262770



LP 8240

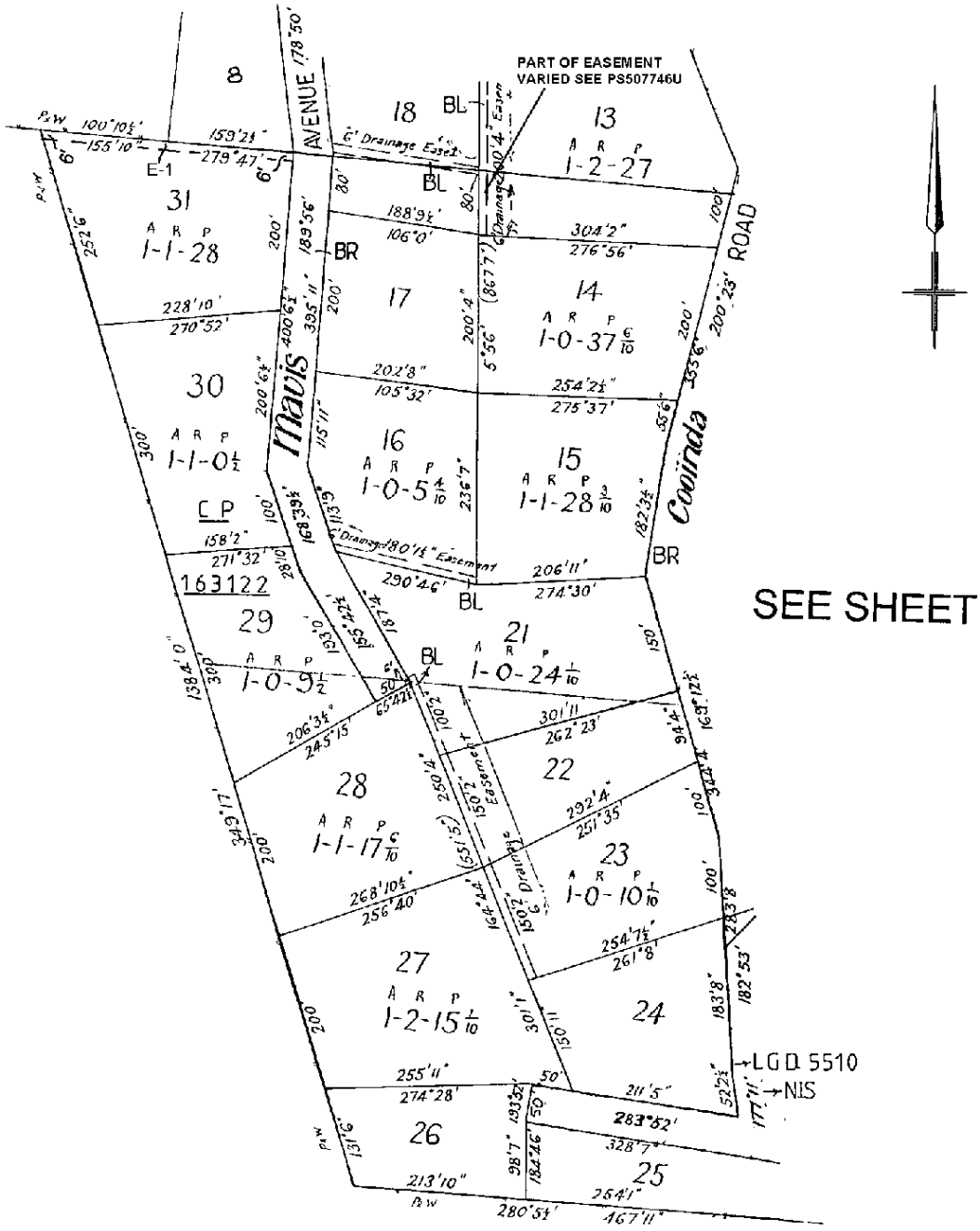
4 SHEETS
SHEET 2



LP 8240

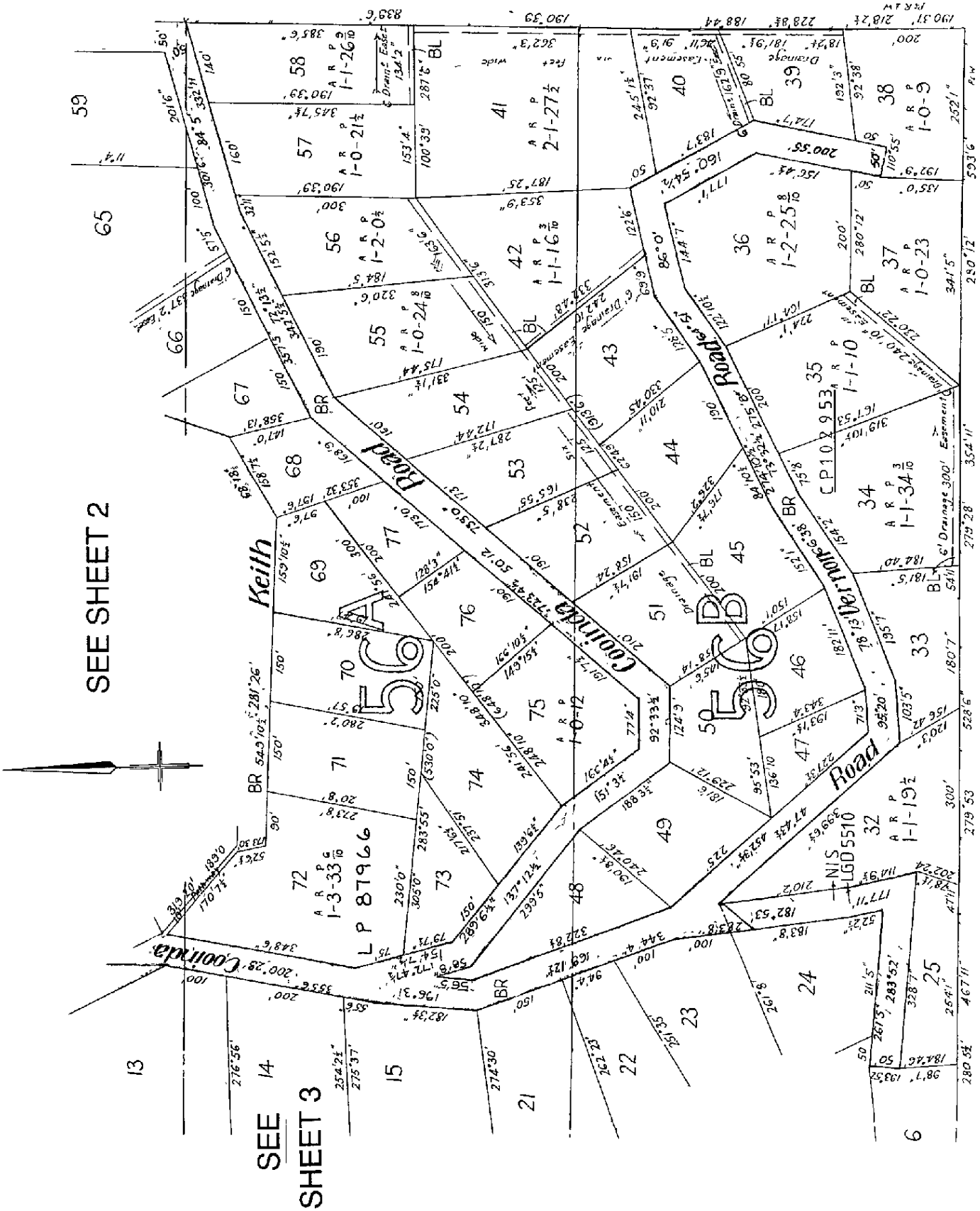
4 SHEETS
SHEET 3

SEE SHEET 1



LP 8240

4 SHEETS
SHEET 4



MODIFICATION TABLE

RECORD OF ALL ADDITIONS OR CHANGES TO THE PLAN

PLAN NUMBER

LP 8240

AFFECTED LAND/PARCEL	LAND/PARCEL IDENTIFIER CREATED	MODIFICATION	DEALING NUMBER	DATE	EDITION NUMBER	ASSISTANT REGISTRAR OF TITLES
		ROAD DISCONTINUED	L.G.D.5510		1	
WARNING: THE IMAGE OF THIS DOCUMENT OF THE REGISTER HAS BEEN DIGITALLY AMENDED. NO FURTHER AMENDMENTS ARE TO BE MADE TO THE ORIGINAL DOCUMENT OF THE REGISTER.						
LOT 31	E-1	CREATION OF EASEMENT	G262770		2	AD

Bushfire Management Statement

Property Address:	**127 Cooinda Road Beaconsfield**
Local Government Area:	**Cardinia Shire Council**
Assessment Date:	**14th September 2024**
Report Date:	**30th September 2024 Ver 1**
Proposed works:	**A extension to an existing residential dwelling.**

Prepared By:	**Fast Inspect Consulting** ***Pty Ltd***
Name:	[redacted] **Accreditation no BPAD 48350**
Telephone:	**0417 696 277**
Email:	[redacted]
Signature:	[redacted]

Introduction

This Bushfire Management Statement has been prepared in response to the requirements of Clause 44.06 – Bushfire Management Overlay, and in accordance with the application requirements of Clause 53.02 – Bushfire Planning.

The statement contains four components:

1. A **bushfire hazard landscape assessment** including a plan that describes the bushfire hazard of the general locality more than 150 metres from the site.25 Kilometres & 75 kilometres from the site.

2. A **bushfire hazard site assessment** including a plan that describes the bushfire hazard within 150 metres of the proposed development.

3. A **bushfire management statement** describing how the proposed development responds to the requirements of Clause 44.06 and 53.02.

4. A **Defendable space & water tank plan.**

Attachment 1- Site drawing in plan view

Attachment 2- Site photos

Attachment 3 - Table 6 of Clause 53.02-5 – Vegetation management

Attachment 4 – Building Requirements of the Bushfire Attack Level

Attachment 5– Example of foliage classification/downslope/separation.

Attachment 6 - CFA Water tank fittings.

Attachment 7- FDI 100 Table

Attachment 8- Clause 53.03-5 Tables for defendable Space

Bushfire Hazard Landscape Assessment

The bushfire hazard landscape assessment provides information on the bushfire hazard more than 150 metres away from a development site.

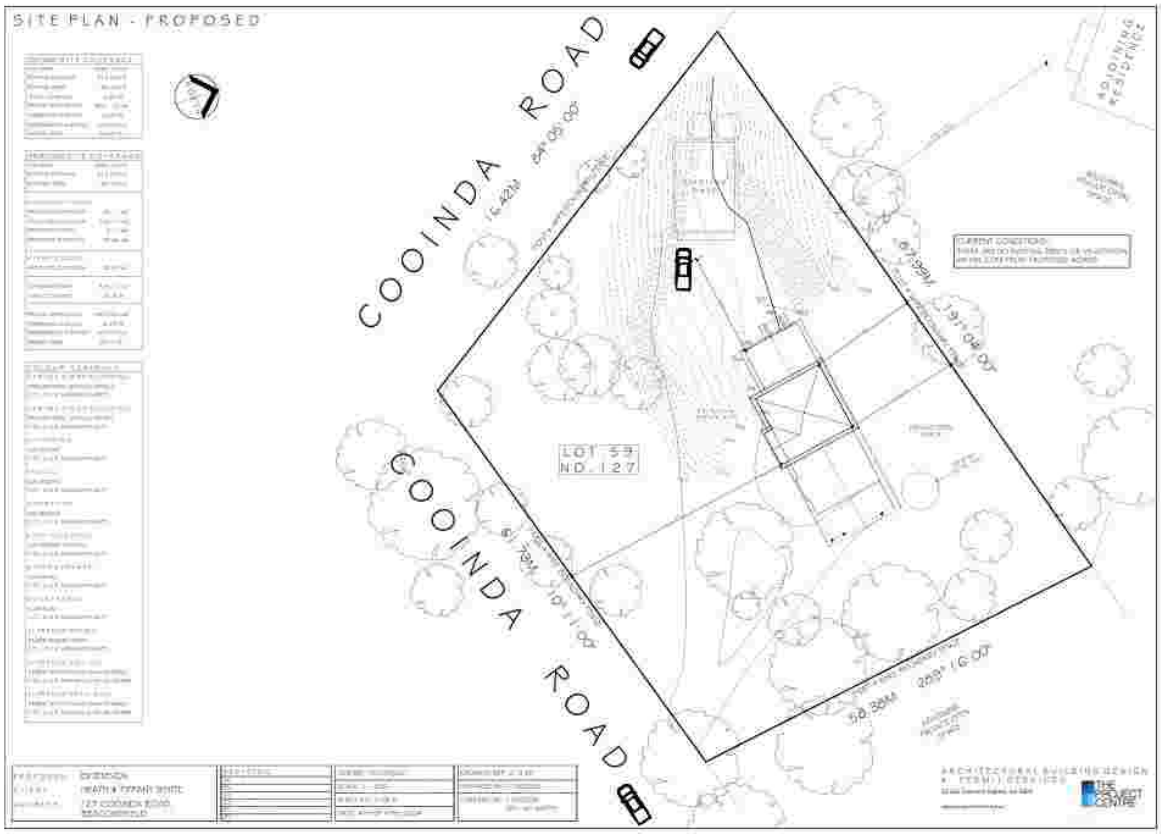
Considering bushfire from this broader landscape perspective is important as it affects the level of bushfire risk a development and its future occupants may be exposed to.

The landscape assessment:

- **provides information on the bushfire hazard (vegetation extent and slope)**
- **provides information on key features of the general locality that are relevant to better understanding the protection provided by the location.**
- **provides contextual information on a site.**

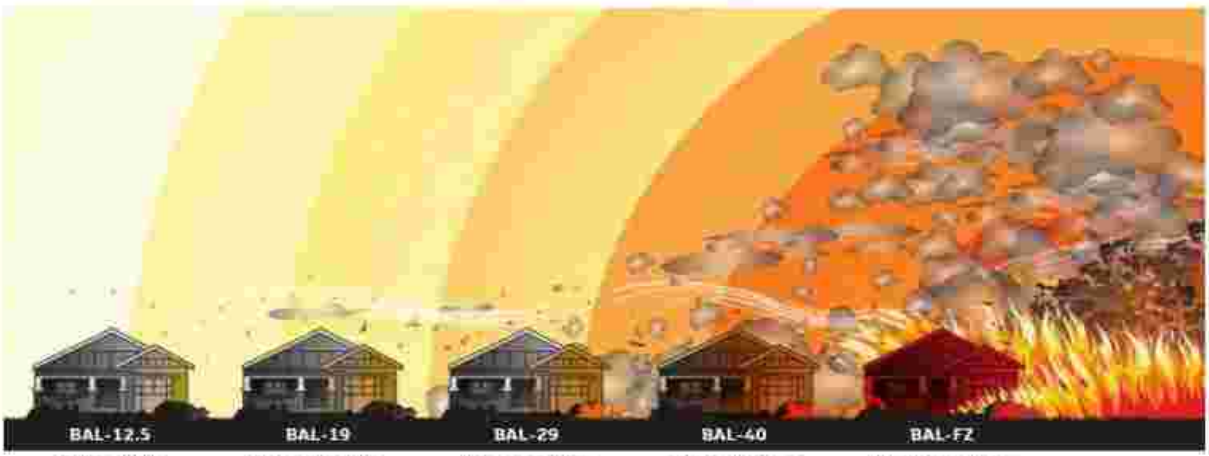
Landscape Scenario	Landscape Scenario 2
Description	• The property has foliage to the South & East of the proposed building which would subject the proposed building to ember attack in a North Eastly wind but not radiant heat. Which BAL 29 construction should sustain. • The type and extent of vegetation is unlikely to result in neighbourhood-scale destruction of property. • Immediate access is available to a place that provides shelter from bushfire.

SITE Drawing Attachment 1 BAL 29 construction

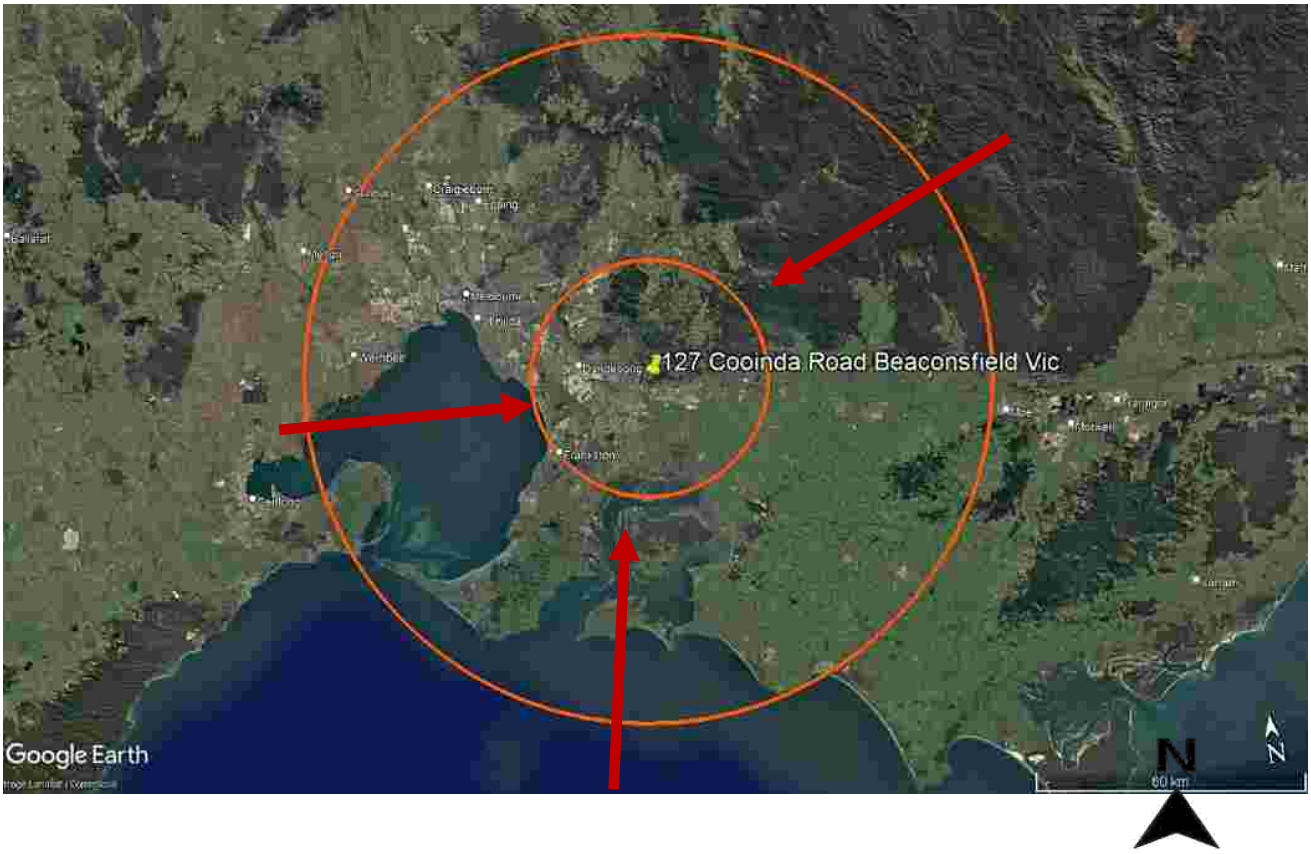


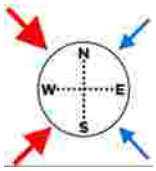
> Figure 9: **BAL construction levels respond to different levels of risk.**

withstand different levels of bushfire attack, as illustrated below.



Bushfire Landscape Assessment Plan





Key

25 Klm Radius

75 Klm Radius

Prevailing Winds

Bushfire Hazard Assessment

The bushfire hazard site assessment (the site assessment) documents the bushfire hazard on and near a site.

The assessment:

1. **provides information on the bushfire hazard (vegetation type and slope)**

2. **informs defendable space and building construction requirements.**

3. **Is informed by the methodology contained in Australian Standard AS3959:2018 Construction of buildings in bushfire prone areas (AS3959) to provide contextual information on a site.**

4. **Potential Bushfire Impacts**

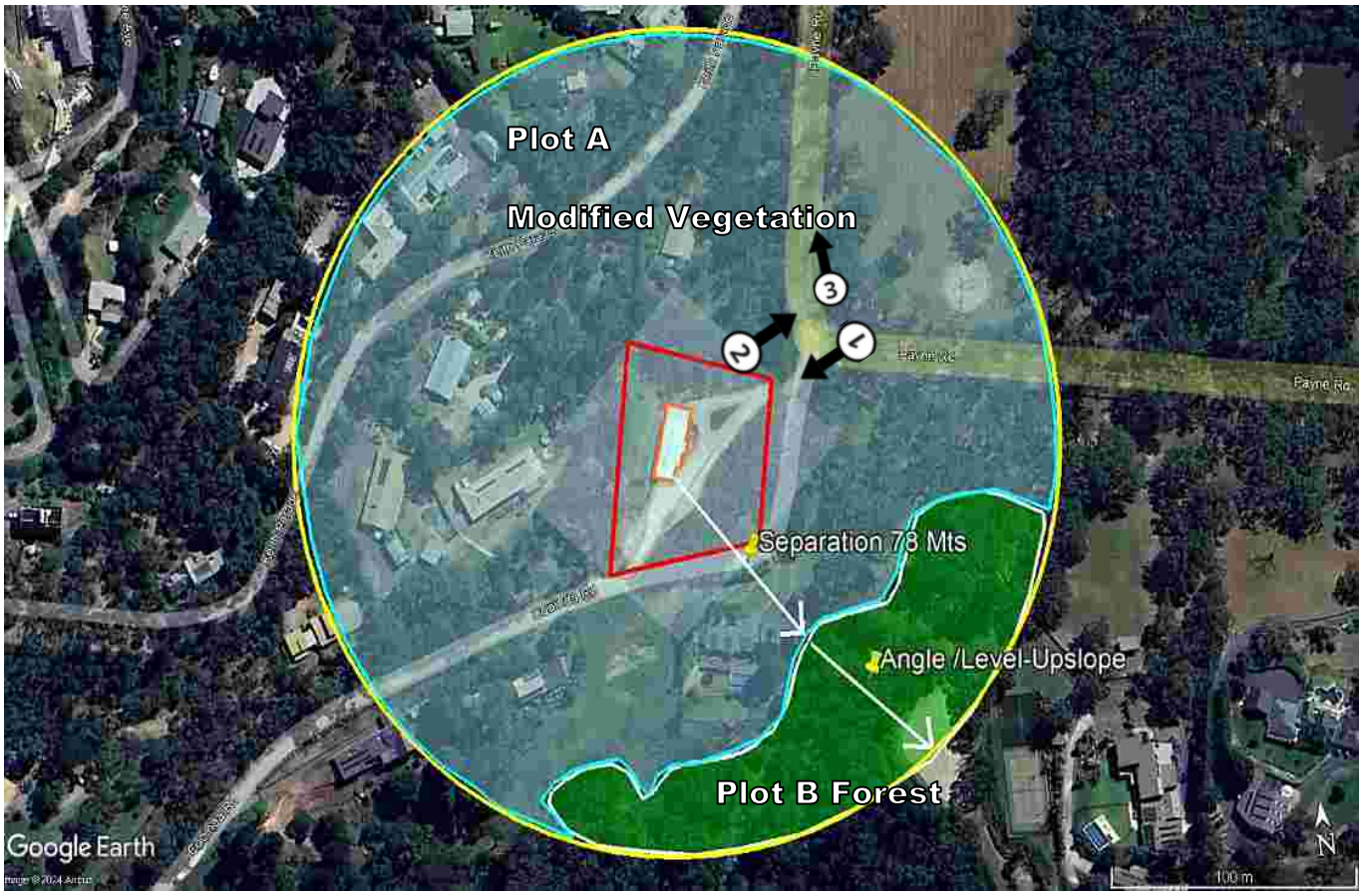
5. **The potential bushfire impact to the site / proposed development from each of the identified vegetation plots are identified below.**

Plot	Vegetation Classification	Effective Slope (°)	Separation (m)	BAL
A	Modified Vegetation	N/A	N/A	BAL 29
B	Forest	Level/Upslope	71mts	Bal 12.5

Summary:

- **Determined Bal for the building: Bal 29 as per the report.**
- **Access required for the building: Yes: 30mts plus as per report.**
- **Static water tank required: Yes: 10000 lts with CFA fittings.**
- **Defendable space required: Yes: 50 mts Table 1 and to the property boundary as per report.**

Bushfire Site Hazard Plan



Key

- Modified Vegetation
- Property Bounds
- 150m Radius
- Separation & Slope
- 1 Photo location / direction
- Proposed Building

N

Defendable Space and Water Tank Plan

Key

- Property boundary
- Defendable Space
- Building
- Water Tank
- Hydrant

N

Bushfire Management Statement

Clause 53.02-4.1 Landscape, Siting, and design objective

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

Approved Measures

Approved Measure (AM) 2.1 – Landscape

Requirement:

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

1. ***Answer. The foliage in the 150mt radius is modified vegetation with the understorey mown & managed with forest 71mts to the south east***

2. ***Answer. The 25klm/75klm Radius as per the map encompasses port Phillip bay/Bass Strait & foliage which BAL 29 should sustain ember attack & limited radiant heap.***

Have the requirements of AM 2.1 been met? **Yes**

Approved Measure (AM) 2.2 – Siting

Requirement:

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

1. ***Answer. The maximum separation distance between the building and the bushfire hazard with the building sited furthest from the potential risk to the north of the site.***

2. ***Answer. The building is near a public road.***

3. ***Answer. Access can be provided to the building for emergency service vehicles.***

Have the requirements of AM 2.2 been met? **Yes**

Approved Measure (AM) 2.3 – Building Design

Requirement:

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

1. External Walls. The external cladding is rated to BAL 29

2. Doors. The external doors are rated to BAL 29

3. Roof. The roofing material is rated to BAL 29.

4. Subfloor. The building is slab on ground.

5. Veranda. Any external timber is bushfire resistant.

6. Windows. The external windows & glazing are rated to BAL 29.

Have the requirements of AM 2.3 been met? Yes

Attachment No 2 Site Photos

.

Photo 1	***Classification*: Modified Vegetation.** **Modified vegetation may arise in parts of Victoria where fuel loads are high but the** **vegetation is altered because of urban development, gardens, the way the vegetation is** **configured (for example, limited or no understorey vegetation), or because the fuel loads.** **are different from the fuel loads assumed in AS3959. Modified vegetation may also arise.** **where the vegetation cannot be excluded as it is not low-threat or low-risk.** **Reference technical guide.**

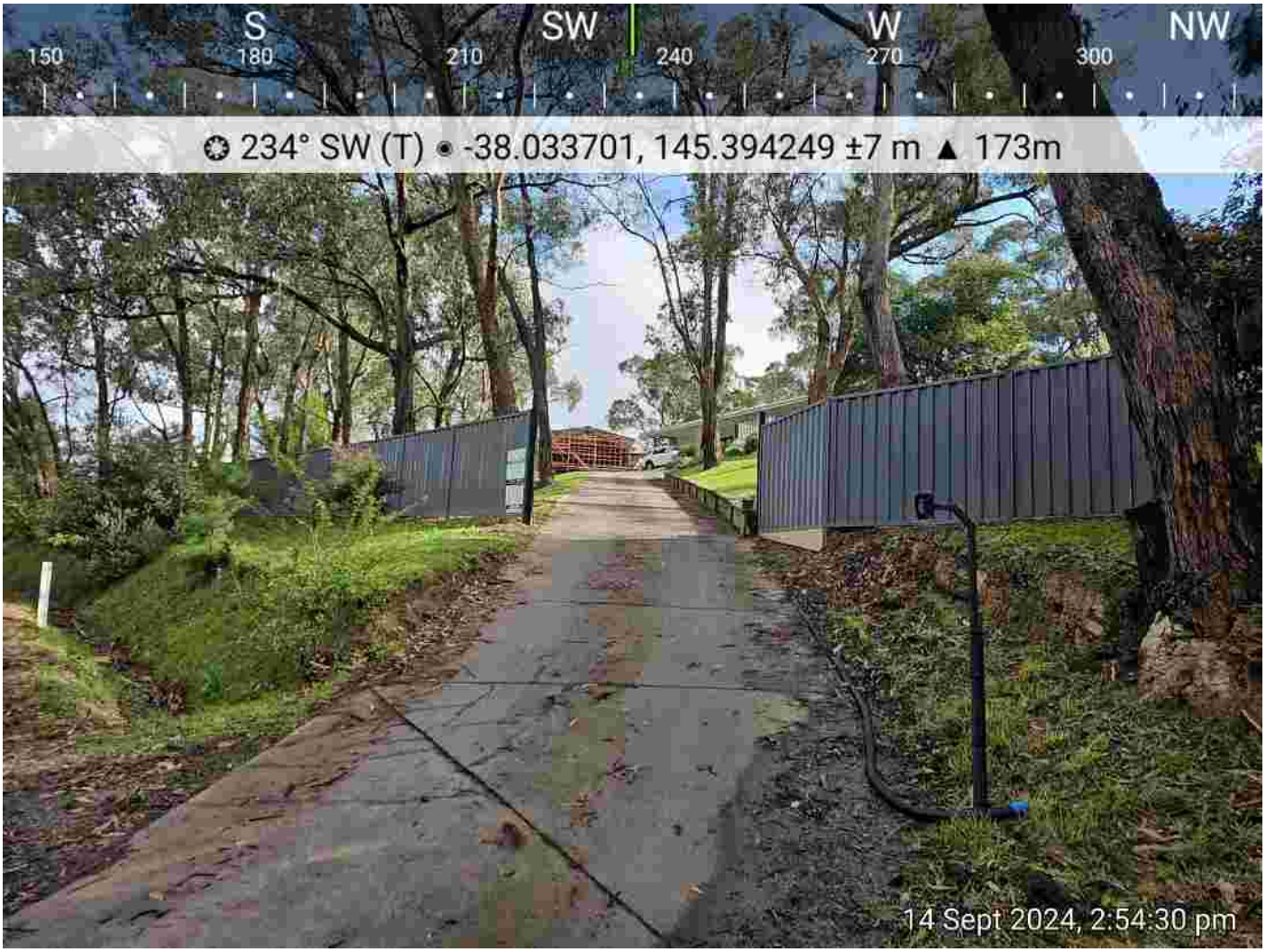


Photo 2	***Classification*: Modified Vegetation.** **Modified vegetation may arise in parts of Victoria where fuel loads are high but the** **vegetation is altered because of urban development, gardens, the way the vegetation is.** **configured (for example, limited or no understorey vegetation), or because the fuel loads.** **are different from the fuel loads assumed in AS3959. Modified vegetation may also arise.** **where the vegetation cannot be excluded as it is not low-threat or low-risk.** **Reference technical guide.**

Photo 3	***Description*: Modified vegetation.** **Modified vegetation may arise in parts of Victoria where fuel loads are high but the** **vegetation is altered because of urban development, gardens, the way the vegetation is** **configured (for example, limited or no understorey vegetation), or because the fuel loads.** **are different from the fuel loads assumed in AS3959. Modified vegetation may also arise.** **where the vegetation cannot be excluded as it is not low-threat or low-risk.** **Reference technical guide.**

53.02-4.2 Defendable Space and Construction Objective

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

Approved Measures

Approved Measure (AM) 3.1 – Bushfire Construction and Defendable Space

Requirement:

A building used for a dwelling (including an extension or alteration to a dwelling), a dependent person's unit, industry, office or retail premises is provided with defendable space in accordance with:

- Table 2 Columns A, B or C and Table 6 to Clause 53.02-5 wholly within the title boundaries of the land; or
- If there are significant siting constraints, Table 2 Column D and Table 6 to Clause 53.02-5.

The building is constructed to the bushfire attack level that corresponds to the defendable space provided in accordance with Table 2 to Clause 53.02-5.

The building will be provided with defendable space in accordance **Modified vegetation.**

The defendable space distance required is **50 mts from the building & to the property boundary.**

Table 6 of Clause 53.02-5 – Vegetation management requirement:

Vegetation management requirement	CONFIRM ACCEPTANCE
• **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.**	☑

Are there significant siting constraints that would allow Column D of Table 2 to Clause 53.02-5?

No

A building is constructed to the bushfire attack level :BAL 29

- That corresponds to the defendable space provided in accordance with Table 2 to Clause 53.02-5. The Addition will be constructed to **BAL 29**

Is the defendable space wholly contained within the boundaries of your property?

Yes

Have the requirements of AM 3.1 been met? Yes

Alternative Measures

Alternative Measure (AltM) 3.3 – Defendable Space on adjoining land

Requirement:

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

Has Alternative Measure (AltM) 3.3 been met? **N/A**

Alternative Measure (AltM) 3.4 – Calculate defendable space using Method 2 of AS3959-2018

Requirement:

Defendable space and the bushfire attack level is determined using Method 2 of AS3959:2018 Construction of buildings in bushfire prone areas (Standards Australia) subject to any guidance published by the relevant fire authority.

Has Alternative Measure (AltM) 3.4 been met? **N/A**

Alternative Measure (AltM) 3.5 – Dwellings subject to direct flame contact

Requirement:

A building used for a dwelling (including an extension or alteration to a dwelling) may provide defendable space to the property boundary where it can be demonstrated that:

- **The lot has access to urban, township or other areas where:**
  - **Protection can be provided from the impact of extreme bushfire behaviour.**
  - **Fuel is managed in a minimum fuel condition.**
  - **There is sufficient distance or shielding to protect people from direct flame contact or harmful levels of radiant heat.**
- **Less defendable space and higher construction standard is appropriate having regard to the bushfire hazard landscape assessment.**
- **The addition is to be constructed to a bushfire attack level of BAL-29**

This alternative measure only applies where the requirements of Approved Measure 3.1 cannot be met.

Has Alternative Measure (AltM) 3.5 been met? **N/A**

53.02-4.3 – Water Supply and Access Objectives

1. **A static water supply is provided to assist in protecting property.**
2. **Vehicle access is designed and constructed to enhance safety in the event of a bushfire.**

Approved Measure (AM) 4.1 – Water Supply and Access

Water Supply Requirement

A building used for a dwelling (including an extension or alteration to a dwelling), a dependant person's unit, industry, office, retail premises service station or warehouse is provided with a static water supply for firefighting and property protection purposes as specified in Table 4 to Clause 53.02-5. The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.

Lot Size (m^2)	Hydrant Available	Capacity (litres)	Fire Authority Fittings & Access Required	Select Response
Less than 500	Not Applicable	2,500	No	
500 – 1000	Yes	5,000	No	
500 – 1000	Yes	5,000	No	
1001 and above	Not Applicable	10,000	Yes	Yes

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

Confirm Static Water Supply 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 for firefighting purposes must be made of corrosive resistant metal.** **Include a separate outlet for occupant use.** **The following additional requirements apply when 10,000 litres of static water is required:** **1. Be readily identifiable from the building or appropriate identification signage to the satisfaction of CFA must be provided.** **2. Be located within 60 metres of the outer edge of the approved building.** **3. The outlet/s of the water tank must by within 4 metres of the accessway and unobstructed** **4. Incorporate a ball or gate valve (British Standard Pipe (BSP 65mm) and coupling (64mm CFA 3 thread per inch male fitting)** 5. **Any pipework and fittings must be a minimum of 65mm (excluding the CFA coupling)**

Has Approved Measure (AM) 4.1 (Water Supply) been met. Yes

- **Answer. A 10000 lt tank with CFA fittings is to be located as per the site map. meeting requirements and less than 4 mts from the access driveway.**

Access Requirement

A building used for a dwelling (including an extension or alteration to a dwelling), a dependant person's unit, industry, office, retail premises, service station or warehouse is provided with vehicle access designed and constructed as specified in Table 5 to Clause 53.02-5.

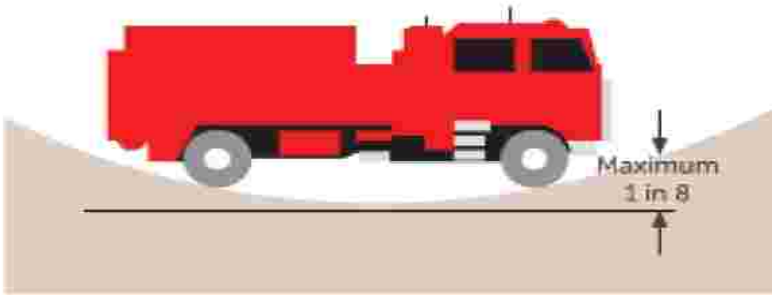
Column A	Column B
Length of access is less than 30 metres No	**There are no design and construction requirements if fire authority access to water supply is not required under AM 4.1**
Length of access is less than 30 metres No	**Where fire authority access to the water supply is required under AM 4.1 fire authority vehicles must be able to get within 4 metres of the water supply outlet.**
Length of access is greater than 30 metres. Yes	**The following design and construction requirements apply:** **All weather construction** **A load limit of at least 15 tonnes** **Provide a minimum trafficable width of 3.5 metres** **Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically** **Curves must have a minimum inner radius of 10 metres** **The average grade must be no more than 1 in 7 (14.4%)(8.1°) with a maximum grade of no more than 1 in 5 (20%)(11.3°) for no more than 50 metres** **Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle.**
Length of access is greater than 100 metres No	A **turning area for fire fighting vehicles must be provided close to the building by one of the following:** **A turning circle with a minimum radius of eight metres** **A driveway encircling the dwelling.** **The provision of other vehicle turning heads such as a T head or Y Head – which meet the specification of Austroad Design for an 8.8 metre service vehicle.**
Length of access is greater than 200 metres No	**Passing bays must be provided at least every 200 metres.** **Passing bays must be a minimum of 20 metres long with a minimum trafficable width of six metres.**

Has Approved Measure (AM) 4.1 (Access) been met? Yes

***Answer*. A all weather driveway more than 30 mts long to be installed meeting all the requirements in the table above & marked on the site map.**

Width

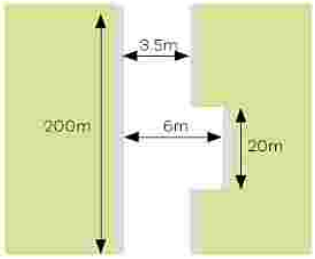
Dips and gradients



Access greater than 200 metres in length

In addition to the above, passing bays are required at least every 200 metres that are:

- a minimum of 20 metres long
- with a minimum trafficable width of 6 metres.

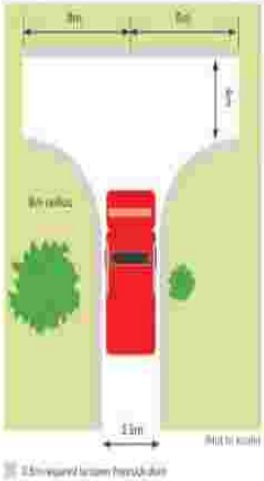


Access between 100 metres to 200 metres in length

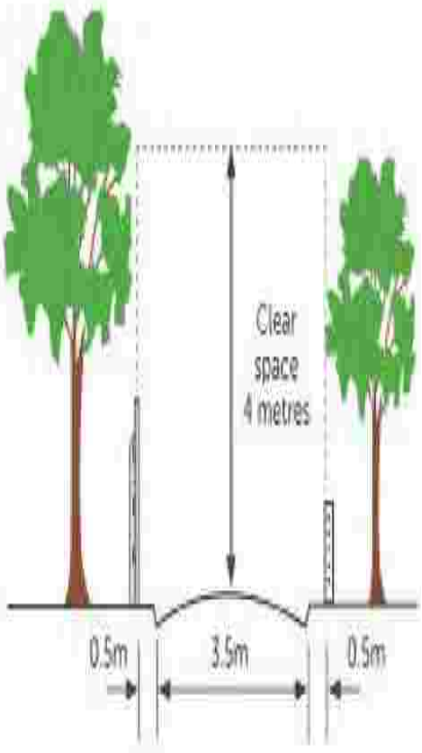
In addition to the above:

A turning area for fire fighting vehicles must be provided close to the building by one of the following:

- a turning circle with a minimum radius of 8 metres
- a driveway encircling the dwelling
- other vehicle turning heads such as a T or Y head which meet the specification of Austroad Design for an 8.8 metre service vehicle.



Encroachments



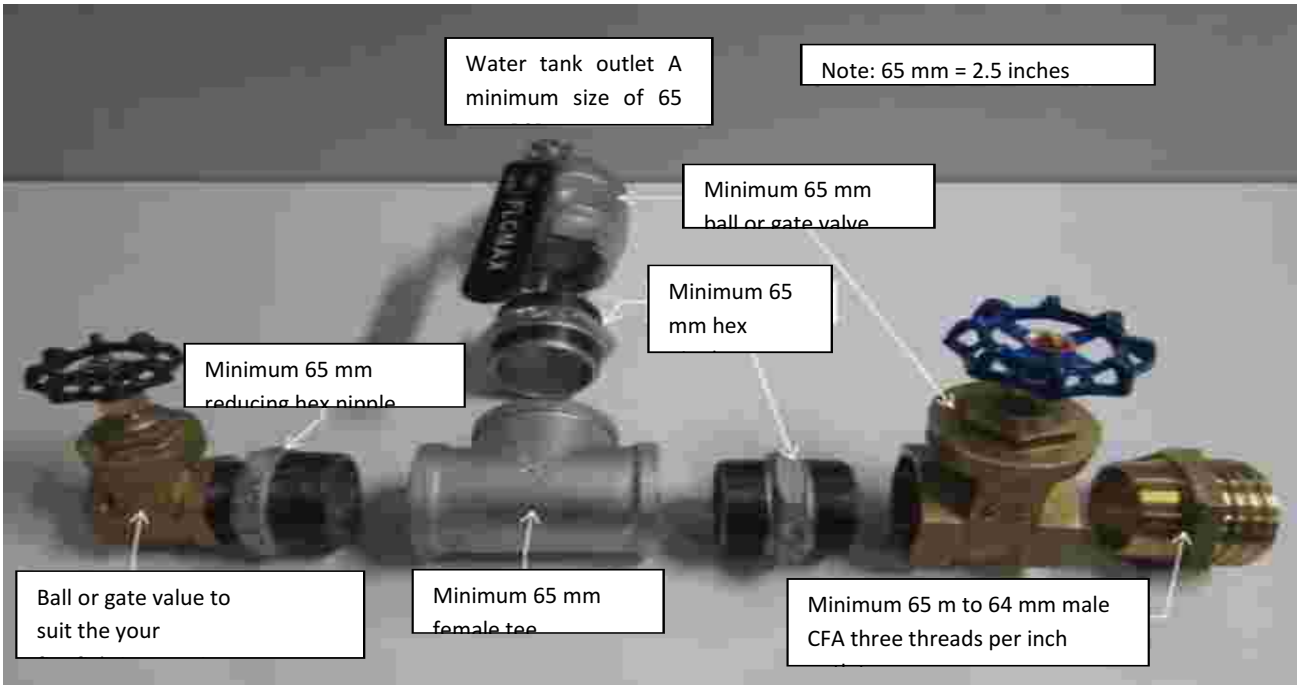
Attachment 3 – Water Tank Fittings

Connection Requirements

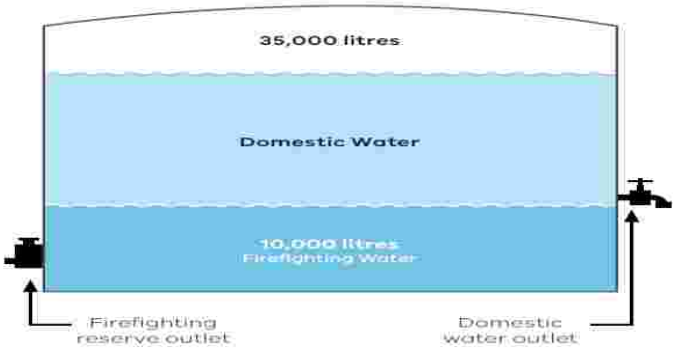
If specified within Table 4 to Clause 52.47-3 (if fire brigade access to your water supply is required), CFA's standard BMO permit conditions require the pipe work, fittings and tank outlet to be a minimum size of 64 mm.

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.

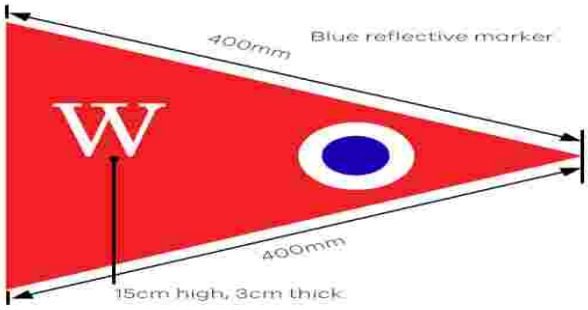
The diagram below shows some common tank fittings available at most plumbing suppliers which meet the connection requirements. It includes a 65 mm tank outlet, two 65 mm ball or gate valves with a 65 mm male to 64 mm CFA 3 threads per inch male coupling. This is a special fitting which allows the CFA 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.



Shared water tank



Water supply identification



SECTION 7 CONSTRUCTION REQUIREMENTS FOR BAL—29

7.1 GENERAL

A building assessed in Section 2 as being BAL—29 shall conform with Section 3 and Clauses 7.2 to 7.8.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 7.2 to 7.8 (see Clause 3.8).

NOTE: BAL—29 is primarily concerned with protection from ember attack and radiant heat greater than 19 kW/m^2 up to and including 29 kW/m^2.

7.2 SUB-FLOOR SUPPORTS

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—

(a) a wall that conforms with Clause 7.4, except that sarking is not required where specified in Clause 7.4.1(c); or

(b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(c) a combination of Items (a) and (b).

Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be—

(i) of non-combustible material; or

(ii) of bushfire-resisting timber (see Appendix F); or

(iii) a combination of Items (i) and (ii).

NOTE: This requirement applies to the subject building only and not to verandas, decks, steps, ramps and landings (see Clause 7.7).

C7.2 Combustible materials stored in the subfloor space may be ignited by embers and impact the building.

7.3 FLOORS

7.3.1 General

This Standard does not provide construction requirements for concrete slabs on the ground.

7.3.2 Elevated floors

7.3.2.1 *Enclosed subfloor space*

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with—

(a) a wall that conforms with Clause 7.4, except that sarking is not required where specified in Clause 7.4.1(c); or

(b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(c) a combination of Items (a) and (b).

7.3.2.2 *Unenclosed subfloor space*

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400 mm above finished ground level, shall be one of the following:

(a) Materials that conform with the following:

(i) Bearers and joints shall be—

(A) non-combustible; or

(B) bushfire-resisting timber (see Appendix F); or

(C) a combination of Items (A) and (B).

(ii) Flooring shall be—

(A) non-combustible; or

(B) bushfire-resisting timber (see Appendix F); or

(C) timber (other than bushfire- resisting timber), particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; or

(D) a combination of any of Items (A), (B) or (C).

or

(b) A system conforming with AS 1530.8.1.

This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level.

7.4 WALLS

7.4.1 General

The exposed components of external walls shall be as follows:

(a) Non-combustible material including the following provided the minimum thickness is 90 mm:

(i) Full masonry or masonry veneer walls with an outer leaf of clay, concrete, calcium silicate or natural stone.

(ii) Precast or in situ walls of concrete or aerated concrete.

(iii) Earth wall including mud brick.

or

(b) Timber logs of a species with a density of 680 kg/m^3 or greater at a 12% moisture content; of a minimum nominal overall thickness of 90 mm and a minimum thickness of 70 m (see Clause 3.11); and gauge planed.

or

(c) Cladding that is fixed externally to a timber-framed or a steel-framed wall that is sarked on the outside of the frame, and is—

(i) fibre-cement a minimum of 6 mm in thickness; or

(ii) steel sheet; or

(iii) bushfire-resisting timber (see Appendix F); or

(iv) a combination of any of Items (i), (ii) or (iii).

or

(d) A combination of any of Items (a), (b) or (c).

7.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed.

7.4.3 Vents and weepholes

Except for exclusions provided in Clause 3.6, vents and weepholes in external walls shall be screened with a mesh made of corrosion-resistant steel, bronze or aluminium.

7.5 EXTERNAL GLAZED ELEMENTS, ASSEMBLIES AND DOORS

7.5.1 Bushfire shutters

Where fitted, bushfire shutters shall conform with Clause 3.7 and be made from—

(a) non-combustible material; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.5.2 Screens for windows and doors

Where fitted, screens for windows and doors shall have a mesh or perforated sheet made of corrosion-resistant steel, bronze or aluminium.

The frame supporting the mesh or perforated sheet shall be made from—

(a) metal; or

(b) bushfire-resisting timber (see Appendix F).

Screen assemblies shall be attached using metal fixings.

7.5.3 Windows and sidelights

Windows assemblies shall—

(a) be completely protected by a bushfire shutter that conforms with Clause 3.7 and Clause 7.5.1;

or

(b) conform with the following:

(i) *Frame material* Window frames and window joinery shall be made from—

(A) bushfire-resisting timber (see Appendix F); or

(B) metal; or

(C) metal-reinforced uPVC and the reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

(ii) *Hardware* Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal.

C7.5.3 Components other than metal may be used provided they are shielded by the metal components of the window/door frame.

Trims or other components may use material other than metal.

(iii) *Glazing* Glazing shall be toughened glass a minimum of 5 mm thickness or glass blocks with no restriction on glazing methods.

NOTE: Where double-glazed assemblies are used, the requirements apply to the external pane of the glazed assembly only.

(iv) *Seals and weather strips* There are no specific requirements for seals and weather strips at this BAL level.

(v) *Screens* Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), the glazing shall be screened externally with a screen that conforms with Clause 3.6 and Clause 7.5.2.

(vi) *In all other cases except for Clause 7.5.3(b)(v)* The openable portions of windows shall be screened internally or externally with screens that conform with Clause 3.6 and Clause 7.5.2.

7.5.4 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall—

(a) be completely protected by bushfire shutters that conform with Clause 3.7 and Clause 7.5.1;

or

(b) be completely protected externally by screens that conform with Clause 3.6 and Clause 7.5.2;

or

(c) conform with the following:

(i) *Door panel material* Materials shall be—

(A) non-combustible; or

(B) solid timber, laminated timber or reconstituted timber, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or

(C) for fully framed glazed door panels, the framing shall be made from metal or from bushfire-resisting timber (see Appendix F) or uPVC.

(ii) *Door frame material* Door frame material shall be—

(A) bushfire resisting timber (see Appendix F); or

(B) metal; or

(C) metal-reinforced uPVC. The reinforcing members shall be made from aluminium, stainless steel, or corrosion resistant steel.

(iii) *Hardware* Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.

Trims or other components may be use materials other than metal.

(iv) *Glazing* Where doors incorporate glazing, the glazing shall be toughened glass a minimum of 6 mm in thickness.

(v) *Seals and weather strips* Weather strips, draught excluders or draught seals shall be installed.

(vi) *Screens* There is no requirement to screen the openable part of the door at this BAL level.

(vii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.

7.5.5 Doors—Sliding doors

Sliding doors shall—

(a) be completely protected by a bushfire shutter that conforms with Clause 3.7 and Clause 7.5.1;

or

(b) be completely protected externally by screens that conform with Clause 3.6 and Clause 7.5.2;

or

(c) conform with the following:

(i) *Frame material* The material for door frames, including fully framed glazed doors, shall be—

(A) bushfire-resisting timber (see Appendix F); or

(B) metal; or

(C) metal-reinforced uPVC and the reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

(ii) *Hardware* Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.

Trims or other components may use materials other than metal.

(iii) *Glazing* Where doors incorporate glazing, the glazing shall be toughened glass a minimum of 6 mm in thickness.

(iv) *Seals and weather strips* There are no specific requirements for seals and weather strips at this BAL level.

(v) *Screens* There is no requirement to screen the openable part of the sliding door at this BAL level.

(vi) *Sliding panels* Sliding panels shall be tight-fitting in the frames.

7.5.6 Doors—Vehicle access doors (garage doors)

The following applies to vehicle access doors:

(a) Vehicle access doors shall be made from—

(i) non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) fibre-cement sheet, a minimum of 6 mm thickness; or

(iv) a combination of any of Items (i), (ii) or (iii).

(b) All vehicle access doors shall be protected with suitable weather strips, draught excluders, draught seals or brushes. Door assemblies fitted with guide tracks do not need edge gap protection.

NOTES:

1 Refer to AS/NZS 4505 for door types.

2 Gaps of door edges or building elements should be protected as per Section 3.

C7.5.6(b) These guide tracks do not provide a direct passage for embers into the building.

(c) Weather strips, draught excluders, draught seals or brushes to protect edge gaps or thresholds shall be manufactured from materials having a flammability index not exceeding five.

(d) Vehicle access doors with ventilation slots shall be protected in accordance with Clause 3.6.

C7.5.6 Components other than metal may be used provided they are shielded by the metal components of the door assembly.

7.6 ROOFS (INCLUDING PENETRATIONS, EAVES, FASCIAS AND GABLES, AND GUTTERS AND DOWNPIPES)

7.6.1 General

The following applies to all types of roofs and roofing systems:

(a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.

(b) The roof/wall and roof/roof junction shall be sealed or otherwise protected in accordance with Clause 3.6.

(c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet conforming with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.

(d) A pipe or conduit that penetrates the roof covering shall be non-combustible.

(e) Only evaporative coolers manufactured in accordance with AS/NZS 60335.2.98 shall be used. Evaporative coolers with an internal damper to prevent the entry of embers into the roof space need not be screened externally.

7.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

(a) be located on top of the roof framing, except that the roof battens may be fixed above the sarking;

(b) cover the entire roof area including ridges and hips; and

(c) extend into gutters and valleys.

7.6.3 Sheet roofs

Sheet roofs shall—

(a) be fully sarked in accordance with Clause 7.6.2, except that foil-backed insulation blankets may be installed over the battens; or

(b) have any gaps sealed at the fascia or wall line, hips and ridges by—

(i) a mesh or perforated sheet that conforms with Clause 3.6 and that is made of corrosion-resistant steel, bronze or aluminium; or

(ii) mineral wool; or

(iii) other non-combustible material; or

(iv) a combination of any of Items (i), (ii) or (iii).

C7.6.3 Sarking is used as a secondary form of ember protection for the roof space to account for minor gaps that may develop in sheet roofing.

7.6.4 Veranda, carport and awning roof

The following applies to veranda, carport and awning roofs:

(a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 7.6.1 to 7.6.6.

(b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] conforming with Clause 7.4 shall have a non-combustible roof covering and the complete support structure shall be—

(i) of non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) timber rafters lined on the underside with fibre-cement sheeting a minimum of 6 mm in thickness, or with material conforming with AS 1530.8.1; or

(iv) a combination of any of Items (i), (ii) or (iii).

7.6.5 Roof penetrations

The following applies to roof penetrations:

(a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors or the like, shall be sealed. The material used to seal the penetration shall be non-combustible.

(b) Openings in vented roof lights, roof ventilators or vent pipes shall conform with Clause 3.6 and be made of corrosion-resistant steel, bronze or aluminium.

This requirement does not apply to a room sealed gas appliance.

NOTE: A gas appliance designed such that air for combustion does not enter from, or combustion products enter into, the room in which the appliance is located.

In the case of gas appliance flues, ember guards shall not be fitted.

NOTE: AS/NZS 5601 contains requirements for gas appliance flue systems and cowls. Advice can be obtained from manufacturers and State and Territory gas technical regulators.

(c) All overhead glazing shall be Grade A safety glass conforming with AS 1288.

(d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, conforming with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass of minimum 4 mm thickness shall be used in the outer pane of the IGU.

(e) Flashing elements of tubular skylights shall be non-combustible. However, they may be of an alternate material, provided the integrity of the roof covering is maintained by an under-flashing made of non-combustible material.

(f) Evaporative cooling units shall be fitted with non-combustible butterfly closers as close as practicable to the roof level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(g) External single plane glazed elements of roof lights and skylights, where the pitch of the glazed element is 18 degrees or less to the horizontal, shall be protected with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(h) Eaves lighting shall be adequately sealed and not compromise the performance of the element.

7.6.6 Eaves linings, fascias and gables

The following applies to eaves linings, fascias and gables:

(a) Gables shall conform with Clause 7.4.

(b) Fascias and bargeboards shall—

(i) where timber is used, be made from bushfire-resisting timber (see Appendix F); or

(ii) where made from metal, be fixed at 450 mm centres; or

(iii) be a combination of Items (i) and (ii).

(c) Eave linings shall be—

(i) fibre-cement sheet, a minimum 4.5 mm in thickness; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) a combination of Items (i) and (ii).

(d) Eave penetrations shall be protected as for roof penetrations as specified in Clause 7.6.5.

(e) Eave ventilation openings shall be fitted with ember guards in accordance with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.

(f) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

7.6.7 Gutters and downpipes

This Standard does not provide requirements for downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

With the exception of box gutters, gutters shall be metal or uPVC.

Box gutters shall be non-combustible and flashed at the junction with the roof, with non-combustible materials.

7.7 VERANDAS, DECKS, STEPS AND LANDINGS

7.7.1 General

Decking may be spaced.

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C7.7.1 Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0 mm–5 mm during service. It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacing of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

7.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

7.7.2.1 *Materials to enclose a subfloor space*

The subfloor spaces of verandas, decks, steps, ramps and landings are deemed to be "enclosed" when—

(a) the material used to enclose the subfloor space conforms with Clause 7.4, except that sarking is not required where specified in Clause 7.4.1(c); and

(b) all openings are protected in accordance with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.

7.7.2.2 *Supports*

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

7.7.2.3 *Framing*

This Standard does not provide construction requirements for the framing of verandas, pergolas, decks, ramps or landings (i.e. bearers and joists).

7.7.2.4 *Decking, stair treads and the trafficable surfaces of ramps and landings*

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

(a) of non-combustible material; or

(b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

7.7.3.1 *Supports*

Support posts, columns, stumps, stringers, piers and poles shall be—

(a) of non-combustible material; or

(b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.7.3.2 *Framing*

Framing of verandas, decks, ramps or landings (i.e. bearers and joists) shall be—

(a) of non-combustible material; or

(b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.7.3.3 Decking, stair treads and the trafficable surfaces of ramps and landings

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

(a) of non-combustible material; or

(b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.7.4 Balustrades, handrails or other barriers

Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be—

(a) of non-combustible material; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements.

7.7.5 Veranda posts

Shall be made from—

(a) non-combustible material; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a combination of any of Items (a) or (b).

7.8 WATER AND GAS SUPPLY PIPES

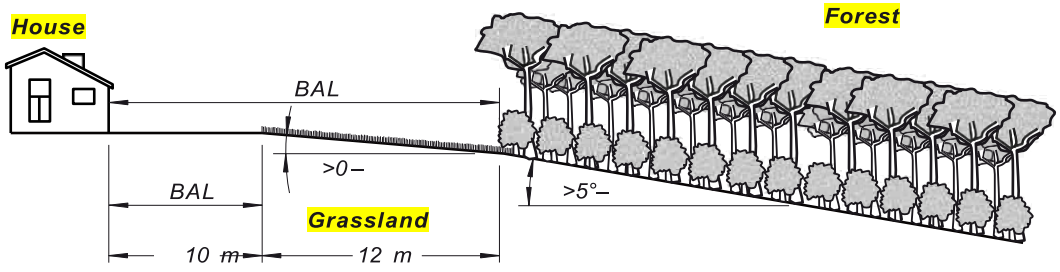
Above-ground, exposed water supply pipes shall be metal.

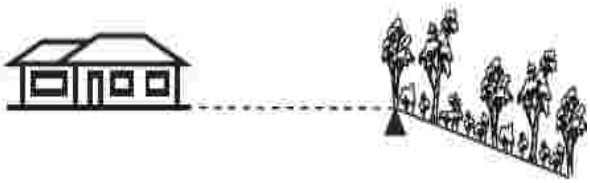
External gas pipes and fittings above ground shall be of steel or copper construction having a minimum wall thickness in accordance with gas regulations or 0.9 mm whichever is the greater. The metal pipe shall extend a minimum of 400 mm within the building and 100 mm below ground.

NOTE: Refer to State and Territory gas regulations, AS/NZS 5601.1 and AS/NZS 4645.1.

C7.8 Concern is raised for the protection of bottled gas installations. Location, shielding and venting of the gas bottles needs to be considered.

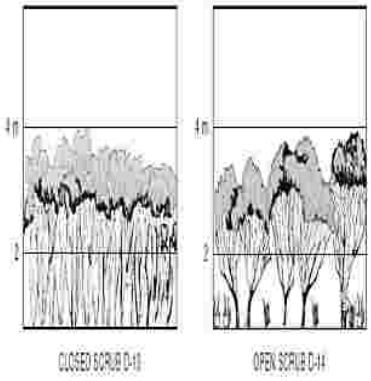
Appendix 5: – An example of downslope /foliage classification & separation distance



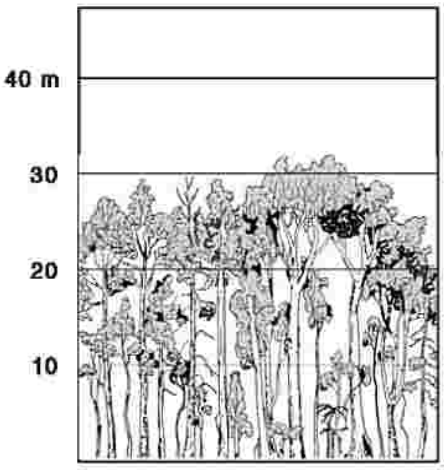


Downslope

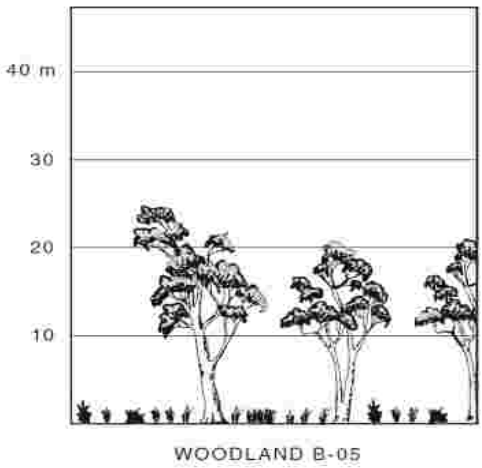
Level/Upslope



Scrub



Forest



Woodland

Bushfire resistant timber species TABLE FI

TABLE F 1 BUSHFIRE-RESISTANT SPECIES

Standard trade name	Botanical name
Ash, silvertop	*Eucalyptus sieberi*
Blackbutt	*Eucalyptus pilularis*
Gum, red, river	*Eucalyptus camaldulensis*
Gum, spotted	*Corymbia maculata*
Ironbark, red	*Eucalyptus sideroxylon*
Kwila (Merbau)	*Intsia bijuga*
Turpentine	*Syncarpia glomulifera*

Appendix 7: – FD1 Table 100 all of Victoria excluding alpine areas which are FDI 50

Vegetation classification	BALs				
	BAL—FZ	BAL—40	BAL—29	BAL—19	BAL—12.5
	Distance (m) of the site from the predominant vegetation class				
	All upslopes and flat land (0 degrees)				
A. Forest	<19	19–<25	25–<35	35–<48	48–<100
B. Woodland	<12	12–<16	16–<24	24–<33	33–<100
C. Shrubland	<7	7–<9	9–<13	13–<19	19–<100
D. Scrub	<10	10–<13	13–<19	19–<27	27–<100
E. Mallee/Mulga	<6	6–<8	8–<12	12–<17	17–<100
G. Grassland	<6	6–<9	9–<13	13–<19	19–50
	Downslope >0 to 5 degrees				
A. Forest	<24	24–<32	32–<43	43–<57	57–<100
B. Woodland	<15	15–<21	21–<29	29–<41	41–<100
C. Shrubland	<7	7–<10	10–<15	15–<22	22–<100
D. Scrub	<11	11–<15	15–<22	22–<31	31–<100
E. Mallee/Mulga	<7	7–<9	9–<13	13–<20	20–<100
G. Grassland	<7	7–<10	10–<15	15–<22	22–<50
	Downslope >5 to 10 degrees				
A. Forest	<31	31–<39	39–<53	53–<69	69–<100
B. Woodland	<20	20–<26	26–<37	37–<50	50–<100
C. Shrubland	<8	8–<11	11–<17	17–<25	25–<100
D. Scrub	<12	12–<17	17–<24	24–<35	35–<100
E. Mallee/Mulga	<7	7–<10	10–<15	15–<23	23–<100
G. Grassland	<8	8–<11	11–<17	17–<25	25–<50
	Downslope >10 to 15 degrees				
A. Forest	<39	39–<49	49–<64	64–<82	82–<100
B. Woodland	<25	25–<33	33–<45	45–<60	60–<100
C. Shrubland	<9	9–<13	13–<19	19–<28	28–<100
D. Scrub	<14	14–<19	19–<28	28–<39	39–<100
E. Mallee/Mulga	<8	8–<11	11–<18	18–<26	26–<100
G. Grassland	<9	9–<13	13–<20	20–<28	28–<50
	Downslope >15 to 20 degrees				
A. Forest	<50	50–<61	61–<78	78–<98	98–<100
B. Woodland	<32	32–<41	41–<56	56–<73	73–<100
C. Shrubland	<10	10–<15	15–<22	22–<31	31–<100
D. Scrub	<15	15–<21	21–<31	31–<43	43–<100
E. Mallee/Mulga	<9	9–<13	13–<20	20–<29	29–<100
G. Grassland	<11	11–<15	15–<23	23–<32	32–<50

- Whether the risk arising from the broader landscape can be mitigated to an acceptable level or warrants the development not proceeding.

53.02-5 31/07/2018 VC148

Tables : Defendable space, construction, water supply, vehicle access, vegetation management and outbuilding construction requirements

Table 1 Defendable space and construction

Slope	Vegetation type	Defendable space distance from building facade (metres)				
		Column A	Column B	Column C	Column D	Column E
All upslopes and flat land (0 degrees)	Forest	48	35	25	19	< 19
	Woodland	33	24	16	12	< 12
	Scrub	27	19	13	10	< 10
	Shrubland	19	13	9	7	< 7
	Mallee/ Mulga	17	12	8	6	< 6
	Rainforest	23	16	11	8	< 8
	Grassland	19	13	9	6	< 6
Downslope >0 to 5 degrees	Forest	57	43	32	24	< 24
	Woodland	41	29	21	15	< 15
	Scrub	31	22	15	11	< 11
	Shrubland	22	15	10	7	< 7
	Mallee/ Mulga	20	13	9	7	< 7
	Rainforest	29	20	14	10	< 10
		BAL 12.5	**BAL19**	**BAL29**	**BAL40**	**BALFZ**
	Grassland	22	15	10	7	< 7
Downslope >5 to 10 degrees	Forest	69	53	39	31	< 31
	Woodland	50	37	26	20	< 20
	Scrub	35	24	17	12	< 12
	Shrubland	25	17	11	8	< 8
	Mallee/ Mulga	23	15	10	7	< 7

Appendix 8: – Clause 53.03-5 Tables for defendable Space

Slope	Vegetation type	Defendable space distance from building facade (metres)				
		Column A	Column B	Column C	Column D	Column E
	Rainforest	36	26	18	13	< 13
	Grassland	25	17	11	8	< 8
Downslope >10 to 15 degrees	Forest	82	64	49	39	< 39
	Woodland	60	45	33	25	< 25
	Scrub	39	28	19	14	< 14
	Shrubland	28	19	13	9	< 9
	Mallee/ Mulga	26	18	11	8	< 8
	Rainforest	45	33	23	17	< 17
	Grassland	28	20	13	9	< 9
Downslope >15 to 20 degrees	Forest	98	78	61	50	< 50
	Woodland	73	56	41	32	< 32
	Scrub	43	31	21	15	< 15
	Shrubland	31	22	15	10	< 10
	Mallee/ Mulga	29	20	13	9	< 9
	Rainforest	56	42	29	22	< 22
	Grassland	32	23	15	11	< 11
		BAL 12.5	BAL19	BAL29	BAL40	BALFZ
Downslope >20 degrees	All vegetation	Defendable space and the bushfire attack level is determined using Method 2 of AS3959:2009 Construction of buildings in bushfire prones areas (Standards Australia) subject to any guidance published by the relevant fire authority.				
All slopes	Low threat vegetation	Defendable space is to be provided for a distance of 50 metres, or the property boundary whichever is the lesser, for buildings constructed to all bushfire attack levels. The minimum construction standard is BAL 12.5.				
All slopes	Modified vegetation	Defendable space is to be provided for a distance of 50 metres, or the property boundary whichever is the lesser, for buildings constructed to all bushfire attack levels. The minimum construction standard is BAL 29.				

Note 1: Slope and vegetation type is determined through the bushfire hazard site assessment.

Bushfire Management Plan – 127 Cooinda Road Beaconsfield

[redacted] Bpad Accreditation no 48305.

Prepared By:

Version: 1.0

Date: 30th September 2024

Defendable Space

Building

Property Boundary

Access

WaterTank

Bushfire Protection Measures

Mandatory Condition

The bushfire protection measures forming part of this permit or shown on the endorsed plans, including those relating to construction standards, defendable space, water supply and access, must be maintained to the satisfaction of the responsible authority on a continuing basis. This condition continues to have force and effect after the development authorised by this permit has been completed.

a) Defendable Space

"Defendable Space for 50 mts round the proposed building or to the property boundary. whichever is lesser the lessor distance, must be provided were vegetation. (and other flammable materials) (will be modified 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 3m 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 sq. 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.**

b) Construction Standard

Dwelling designed and constructed to a minimum Bushfire Attack Level of BAL – 29

c) Water Supply

The following requirements apply:

- **An effective capacity of 10000 litres**
- **Be stored in an above ground water tank constructed of concrete or metal.**
- **Have all fixed above ground water pipes and fittings required for firefighting purposes made of corrosive resistant metal.**
- **Include a separate outlet for occupant use.**

Where a 10000-litre water supply is required, the following fire authority fittings and access must be provided:

- **Be readily identifiable from the building or appropriate identification signage to the satisfaction of the relevant fire authority.**
- **Be located within 60 metres of the outer edge of the approved building.**
- **The outlet/s of the water tank must be within 4 metres of the access way and unobstructed.**
- **Incorporate a separate ball or gate valve (British Standard Pipe (BSP 65 millimetre) and coupling (64-millimetre CFA 3 thread per inch male fitting).**
- **Any pipe work and fittings must be a minimum of 65 millimetres (excluding the CFA coupling)**

d) Access

Access Required: **Yes**

The following design and construction requirements apply:

- **All-weather construction**
- **A load limit of at least 15 tonnes**
- **Provide a minimum trafficable width of 3.5 metres.**
- **Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically.**
- **Curves must have a minimum inner radius of 10 metres.**
- **The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres.**
- **Dips must have no more than a 1 in 8 (12.5%) (7.1%) entry and exit angle.**

Length of Access is greater than 100 metres: **No**

Where length of access id greater than 100 metres the following design and construction requirements apply:

- **A turning circle with a minimum radius of eight metres, or**
- **A driveway encircling the building, or**
- **The provision of other vehicle turning heads – such as a T or Y Head – which meet the specification of Austroads Design for an 8.8 metre Service Vehicle.**

Length of driveway is greater than 200 metres: **No**

Where length of access id greater than 200 metres the following design and construction requirement applies:

- **Passing bays are required at least every 200 metres that are a minimum 20 metres long and a minimum trafficable width of 6 metres.**

[redacted]

LAND CAPABILITY ASSESSMENT
FOR
ON-SITE WASTEWATER MANAGEMENT
AT
127 COOINDA ROAD, BEACONSFIELD VIC 3807

REPORT No. LCA19082024 AUGUST/2024

By

[redacted], M.Agricultural Sc.
Land Capability Assessment
CONSULTANTS IN THE AGRICULTURAL SCIENCES

IMPORTANT NOTE

The land capability assessment report consists of this cover sheet, two written sections, three drawings and four appendices.
The report elements are not to be read or interpreted in isolation.

TABLE OF CONTENTS

(ii) **Assessor's Qualifications & Insurance**

(iii) **Executive Summary**

APPENDIX A1
Soil Permeability and Soil Test Results

APPENDIX A2
Soil Profile Photographs

APPENDIX A3
Logs of Boreholes

APPENDIX B
Water and Nutrient Balance and Rainfall Data

APPENDIX C
Land Capability Assessment Table

APPENDIX D
Management Plan

DRAWING 1
Location of Subject Site

DRAWING 2
Location of Proposed Development

DRAWING MP1
Cut-off Drain Detail for 20/30 Standard
Effluent Irrigation Fields

ASSESSOR'S ACADEMIC & PROFESSIONAL QUALIFICATIONS

[redacted] is the principal Soil Scientist at Land Capability Assessment.
She has a Masters Degree in Applied Science (General Agriculture) (awarded in 2003).

All fieldwork and analyses are undertaken by, or directly supervised by [redacted]

ASSESSOR'S PROFESSIONAL INDEMNITY INSURANCE

Policy Number:	BZF2004488
Period of Cover:	09/08/2024 – 09/08/2025
Geographical Coverage:	Australia
Retro-active Date:	Unlimited
Limit of Indemnity:	$2,000,000

EXECUTIVE SUMMARY

The proposed development at 127 Cooinda Road, Beaconsfield VIC is suitable for sustainable on-site effluent disposal.

The site of 4359m^2 is located in the Green Wedge Zone and is not in a Special Water Supply Catchment. It is proposed to alter the existing house to a 4-bedroom (equivalent) residence. The site is not sewered.

Our field testing which included soil profile logging and sampling, laboratory testing and subsequent reporting including water and nutrient balance modelling has revealed that on-site effluent disposal is rational and sustainable.

The assessment has been made in the context of prioritising public and environmental health with a design compromise between rational wastewater reuse and sustainable wastewater disposal.

Effluent shall be treated to at least the 20/30 standard and distributed by pressure compensated subsurface irrigation utilising the processes of evapotranspiration and deep seepage.

The irrigation area has been determined for the mean wet year and satisfies the requirements of *SEPPs (Waters of Victoria)* in that the effluent irrigation system cannot have any detrimental impact on the beneficial use of surface waters or groundwater.

For the proposed development the available area is not limiting and continuous or long-term increases in effluent volume above 600 litres/day (4-bedroom equivalent residence with onsite roof water tank supply as per EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-1) are possible.

With regard to density of development and cumulative risk the assessment has considered risk associated with subsurface flows and surface flows.

In regard to subsurface flows, it is clear that provided the on-site system is adequately designed, constructed, operated and maintained the risk to surface and ground waters is negligible. Once the effluent is placed underground, the extraordinary long travel times via ground water to surface waters ensures adequate nutrient attenuation.

In regard to surface flows, it is clear that provided the on-site system is adequately designed, constructed, operated and maintained, the risk to surface and ground waters is no greater than for a sewered development.

Proposed use requires AWTS or a septic tank with a sand filter (or any other treatment system that is capable of producing secondary standard effluent and has current AS/NZS accreditation) and pressure compensated subsurface irrigation.

The LCA recommends a conservative, scientifically based, well founded wastewater management system with inherent multiple barriers of safety.

Cumulative risk from the development is extremely low. The risk of serious or irreversible damage is extremely low.

All requirements of *SEPP (Waters of Victoria)* have been met.

Land Capability Assessment
ABN 22800734479
[redacted]
CONSULTANTS IN THE AGRICULTURAL SCIENCES

53 Telford Drive, Berwick VIC 3806
Email: info@lcavictoria.com.au

LCA19082024 – AUGUST/2024

LAND CAPABILITY ASSESSMENT FOR ON-SITE WASTEWATER MANAGEMENT AT 127 COOINDA ROAD, BEACONSFIELD VIC 3807

SECTION 1. SITE INVESTIGATION

1.1 INTRODUCTION

On instruction from the landowner, an investigation was undertaken to assess land capability for on-site effluent disposal/reuse for a 4-bedroom (equivalent) residence at 127 Cooinda Road, Beaconsfield VIC.

The site of 4359m^2 is in the Green Wedge Zone and is not located in a Special Water Supply Catchment. The site is not sewered. It is proposed to alter the existing house to a 4-bedroom (equivalent) residence.

The assessment has been made in the context of prioritising public and environmental health with a design compromise between rational wastewater reuse and sustainable wastewater disposal. The existing residence is served by a primary wastewater treatment system and absorption trenches. The proposed site development represents a significant environmental gain when compared to the existing site development.

1.2 INVESTIGATION METHOD

The site investigation was carried out in accordance with *SEPPs (Waters of Victoria) and related documents. This report is in accordance with* current *SEPPs (Waters of Victoria), EPA Victoria - Guideline for onsite wastewater management (May 2024)* and *EPA Victoria - Guideline for onsite wastewater effluent dispersal and recycling systems (May 2024)*. Guidance has been sought from *AS/NZS 1547:2012, Guidelines for Wastewater Irrigation*, E.P.A. Publication 168, April 1991, *Wastewater Subsurface Drip Distribution*, Tennessee Valley Authority, March, 2004, *AS 2223, AS 1726, AS 1289, AS 2870* and *Australian Laboratory Handbook of Soil and Water Chemical Methods*.

Our capability assessment involved the mapping of unique land-soil unit(s) which were defined in terms of significant attributes including; climate, slope, aspect, vegetation, soil profile characteristics (including soil reaction trend, electrical conductivity and colloid stability), depth to rock, proximity to surface waters and escarpments, transient soil moisture characteristics and hydraulic conductivity.

Exploratory auger drilling was undertaken to enable profile characterization and sampling. Onsite dispersion index testing revealed significant dispersion. Hence, insitu permeability testing was not considered rational.

Water balance analysis was based on the mean wet year calculated from the mean monthly rainfall data and mean annual rainfall data for Berwick and mean evaporation data for Scoresby Research Inst. and was undertaken in accordance with *Guidelines for Wastewater Irrigation, E.P.A.* Publication 168, April 1991 (Part), *AS/NZS 1547:2012* and in-house methods.

The rainfall and evaporation data were obtained from the National Climate Centre, Bureau of Meteorology. The data was subsequently analysed and applied to our water balance analysis.

The results of the water balance analysis are given in Appendix B, to this report.

The results of the investigation and *in situ* and laboratory testing are given in Section 1.3, below, and in Appendix A, to this report.

1.3 CAPABILITY ASSESSMENT

We have used the attributes determined by the investigation to define one (1) land-soil unit, as follows:-

1.3.1 Land-Soil Unit A.

This land-soil unit consists of moderately sloping terrain, as shown in Figure 1.

The salient land-soil attributes and constraints are summarised in Appendix C.

1.3.1.1 Climate.

The general area receives a mean annual rainfall of 915mm and a mean annual evaporation of 1197mm. Mean evaporation exceeds the mean rainfall in October through April.

Rainfall and evaporation data are presented in Appendix B, to this report.

1.3.1.2 Slope and Aspect.

The natural ground surface over the proposed land application area slopes to the east between 13%-15%, generally, as shown in Figure 1.

The unit is somewhat protected from the prevailing winds and is subject to partial shade from nearby trees.

1.3.1.3 Vegetation and Land Use.

The unit is vegetated with pasture grasses and Eucalypt trees as shown in Figure 1. The land is currently unused.

The land application area has been designed for pasture grass (rye/clover equivalent).

1.3.1.4. Slope Stability.

For the encountered subsurface conditions, slope degree and geometry and for the proposed range of hydraulic loadings, the stability of the ground slopes within the disposal areas are unlikely to be compromised.

1.3.1.5 Subsurface Profile.

The following interpretation of the general subsurface profile assumes conditions similar to those encountered in the boreholes are typical of the investigation area.

Note: If subsurface conditions substantially different from those encountered in the investigation are encountered during soil renovation works, all work should cease, and this office notified immediately.

The unit is underlain by alluvial materials of Late Ordovician to Middle Devonian Age.

The subsurface profiles consist of:

Borehole 2:

- A topsoil (A_1-horizon) layer of dark grey-brown grey-brown, moist, medium-dense loam, with a soil reaction trend of 5.5pH and electrical conductivity (EC_{SE}) of 0.10dS/m, containing a root zone, to a depth of 0.20m, overlying,

- A topsoil (A_2-horizon) layer of grey-brown light grey-brown, moist, medium-dense loam with a soil reaction trend of 5.5pH, electrical conductivity (EC_{SE}) of 0.10dS/m, to a depth of 0.40m, overlying,

- An alluvial soil (B_1-horizon) layer of light grey-brown, moist, silty clay (light clay) of low plasticity, with a soil reaction trend of 5.1pH, electrical conductivity (EC_{SE}) of 0.45dS/m and a free swell[a] of 0%, to a depth of 0.60m, overlying,

[a] After Holtz (measures swell potential of fraction passing 450 micron sieve)

- An alluvial soil (B_2-horizon) layer of orange-brown, moist, silty clay (light clay) of low plasticity, with a soil reaction trend of 5.4pH, electrical conductivity (EC_{SE}) of 1.35dS/m and a free swell of 30%, to a depth of 0.90m, overlying,

- An alluvial soil (B_3-horizon) layer of brown, moist, silty clay (light clay), with a soil reaction trend of 4.7pH, electrical conductivity (EC_{SE}) of 0.18dS/m, to a depth of 1.05m, overlying,

- An alluvial soil (BC-horizon) layer of light grey with orange, moist, silty clay (light clay), with a soil reaction trend of 5.4pH, electrical conductivity (EC_{SE}) of 0.99dS/m, to a depth of 1.35m.

Soil test results, soil profile photographs and logs of boreholes are summarised in Appendix A. For location of boreholes refer Drawing 2.

1.3.1.6 Soil Permeability.

Where the soils are dispersive and/or have high shrink-swell potential *insitu* permeability testing realises inaccurate, low or nil results.

The hydraulic conductivity can be estimated by using test waters containing calcium chloride and/or by laboratory assessment of colloid stability and determination of ameliorant quantities (e.g. gypsum/lime requirement) and swell potential.

A conservative estimate of permeability has been deduced as follows (from soil texture, structure and swell potential tests):-

Profile analysis in accordance with AS/NZS 1547:2012 and our laboratory determined dispersion and swell potential shows the alluvial clay soils to be dispersive silty light to medium clays (Type 6 soils) with saturated hydraulic conductivity less than 0.06m/day.

Similar dispersive soils have responded positively (with sufficiently improved hydraulic capability) following applications of gypsum.

For the limiting moderately structured clay soils and assuming renovation by gypsum application (at the rate of 1kg/m^2), we have adopted an estimated and conservative design saturated hydraulic conductivity of 0.05m/day.

Peak deep seepage is conservatively estimated at 3.6mm/day. Average daily deep seepage is 2.4mm.

1.3.1.7 Basement Rock Permeability.

From the literature and from examination of rock profiles and rock mass defect character in the vicinity, the hydraulic conductivity of the basement rocks would be in excess of 0.05m/day (adopt 1m/day for buffer design).

1.3.1.8 Colloid Stability.

The results of the Emerson Crumb and Dispersion Index Tests indicate that the soil materials are dispersive. The alluvial clay soils have Emerson Classes of 1 and 2 and Dispersion Indexes of 9 to 15.

The salting potential has been assessed by inspection of the ground surface for salt tolerant and/or salt affected vegetation and the electrical conductivity has been determined for the A and B horizons using a 1:5 soil/water extract and converted to EC (saturation extract). Also reaction trend and free swell potential have been determined.

The determined electrical conductivity (EC_{SE}) ranged from 0.10dS/m to 1.35dS/m for all materials. The reaction trend ranged from 4.7pH to 5.5pH, while the free swell potential was 0% and 30%.

We recommend amelioration in the form of gypsum application to create and maintain stable peds under saline irrigation.

1.3.1.9 AS1547:2012 Soil Classification.

In accordance with *AS/NZS1547:2012* the alluvial clay materials can be classified as Type 6 soils (dispersive silty light to medium clays).

After allocating proportional vertical and lateral flows and allowing for the potential for perched water mounding, we have adopted a daily peak water balance seepage rate[b] of 3.6mm for 20/30 standard effluent. The theoretical average daily seepage rate is 2.4mm.

1.3.1.10 Surface Drainage.

Site surface drainage is to the east. The nearest surface waters are located at least 340m distant.

1.3.1.11 Groundwater.

No seepage was encountered in any of the boreholes. Subsurface flow direction will generally reflect natural surface flow direction (i.e. an easterly direction).

There are no groundwater bores within a significant distance of the site (the closest bore is approximately in 680m distance).

The Visualising Victoria's Groundwater database indicates that the groundwater is between 20-50 metres of the surface.

Regionally the groundwater is of low yield and poor quality (3500-7000mg/litre TDS) with beneficial use including some stock.

1.3.1.12 Nutrient Attenuation.

Clayey soils (as found on this site) can fix large amounts of phosphorous. Phosphate-rich effluent seeping through these soils will lose most of the phosphorous within a few metres.

The limiting nutrient for this site is nitrogen. No phosphorous balance is required.

Nitrogen, contained in organic compounds and ammonia, forms nitrate-N and small amounts of nitrite-N when processed in an aerated treatment plant. Several processes affect nitrogen levels within soil after irrigation. Alternate periods of wetting and drying with the presence of organic matter promote reduction to nitrogen gas (denitrification). Plant roots absorb nitrates at varying rates depending on the plant species (see Appendix B), however nitrate is highly mobile, readily leached, and can enter groundwater via deep seepage and surface waters via overland flow and near-surface lateral flow.

Based on the water and nutrient balance (see Appendix B), and assuming 30mg/litre N in the effluent (general case) and 20mg/litre P, a denitrification rate of 20%, with N uptake of 220 kg/ha/year for an appropriate grass cover equivalent to a rye/clover mix and sequential zoned dosing of the irrigation area, a conservative estimate can be made of the nitrogen content in the deep seepage and lateral flow.

For the general case, and without taking into account further expected denitrification below the root zone and in the groundwater (reported to be in the vicinity of 80%), denitrification in the lateral flow (external to the irrigation areas but within the curtilage of the allotment) and plant uptake in the lateral flow, the irrigation area would need to be 239m^2 for 600 litres/day of effluent for complete attenuation.

The hydraulic component of the water balance has shown that an irrigation area of 300m^2 would be required to limit surface rainwater flows to episodic rain events. but for slopes between 10% and 20% the size of the Land Application Area should be increased by 20% (300m^2 x 1.2 = 360m^2)

For a 4-bedroom (equivalent) residence and to 20/30 secondary effluent standard and to satisfactorily attenuate nitrogen on-site and to accommodate the design hydraulic loading and after adjusting for slope, the irrigation area should be at least 360m^2 with an application rate of 1.7mm/day.

1.3.1.13 Sand filter.

A sand filter of 12m^2 would be required for a wastewater flow of 600l/day. For the dosage rate of 50L/m^2/day in the sand filter the clay and fine silt content shall be less than 5%, the effective size shall be between 0.4 and 1.0 and the uniformity coefficient shall be less than 4.

[b] The peak water balance seepage loss rate is based on being <10% of the measured/estimated hydraulic conductivity (of the limiting horizon) plus a lateral flow component, effluent type and the effects of soil characteristics including profile thickness (flow paths and storage), shrink-swell, dispersivity, soil reaction trend and assumes renovation.

1.4 RISK MANAGEMENT & MITIGATION

SEPP (Waters of Victoria) requires that the proposal be assessed on a risk-weighted basis and that cumulative effects be considered.

A multiple barrier approach is used in assessing this development, with components listed below:

1.4.1 Water Usage.

Current best practice allows for a (continuous) daily effluent flow of 600 litres (a 4-bedroom equivalent residence with WELS scheme fixtures and fittings and with onsite roof water tank supply) as per EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-1)

1.4.2 Secondary Treatment.

The LCA recommends AWTS or a septic tank with a sand filter (or any other treatment system that is capable of producing secondary standard effluent and has current AS/NZS accreditation) and pressure compensated subsurface irrigation. These systems generate a much higher quality of effluent than septic systems.

1.4.3 Block Size.

Many under-performing effluent fields are placed on blocks where area is limited. Limited area can lead to inadequately sized or inappropriately placed effluent fields and a lack of options should the daily effluent volumes increase.

In the subject site, size is not a constraining factor for a 4-bedroom (equivalent) residence.

1.4.4 Management Plan.

Historically, inadequate maintenance has played a major part in the failure of onsite effluent disposal systems. There is a management plan within the LCA (see Appendix D). This plan gives guidance on the implementation of mandatory operation, maintenance and inspection procedures.

1.4.5 Sizing of Treatment Systems.

No specific treatment system is recommended, however the treatment system must have current AS/NZS accreditation, which match effluent volumes with plant capacity.

1.4.6 Load Balancing.

Surge flows are possible due to parties, gatherings, etc (if any). Under these conditions the systems may become overwhelmed for a period. This potential problem can be eliminated by installing a plant with a load balancing facility (or equivalent function) which enables short-term storage and sustainable flows to the distribution area over extended time. The load balancing facility also provides temporary storage should the plant fail or if there is a power outage.

1.4.7 Zoned Dosing.

The LCA stipulates that the effluent area is (automatically) irrigated sequentially by zones to promote the creation of transient aerobic and anaerobic soil conditions.

The effluent field is sized conservatively for nitrogen attenuation, using pasture grass (rye/clover eq mix), which has a nitrogen uptake of 220 kg/ha/year. Zoned dosing will increase the efficiency of the field for removing nitrogen from the soil.
Undersized effluent fields are at risk of becoming anaerobic for long periods, with the risk of microbial build-up. This leads to secretion of microbial polysaccharides, which coat soil particles and restrict the ability of the soil to adsorb nutrients and attenuate pathogens. Polysaccharides can also coat the interior of pipes and block drainage holes if drainage is slow due to the field being overloaded with effluent. This can lead to effluent surcharge from the ends of the drainage pipes, forming preferential flow paths through overlying soil and draining overland to nearby surface waters.

The alternating aerobic and anaerobic conditions created by zoned dosing prevent the build-up of microbial polysaccharides, and ensures efficient renovation of effluent.

1.4.8 Pressure Compensated Subsurface Disposal.

Conservatively sized irrigation areas with pressure compensated subsurface disposal and zoned dosing deliver effluent directly into the soil. Under saturated conditions, water flow is downwards in the direction of maximum hydraulic gradient. For a surface flow containing effluent to occur, the effluent would have to rise, *against gravity*, through at least 150mm of soil. Under unsaturated conditions, water flow is multi-directional due to capillary forces and matrix suction. The atmosphere provides a capillary break with capillary forces and matrix suction reducing to zero at the air/soil interface. Gravitational forces outweigh the capillary forces and matrix suction long before the surface is reached. Hence, any surface flow from the effluent area cannot contain any effluent, regardless of the intensity and duration of rain events. Surface flow can only consist of **rainfall** in excess of soil storage capacity and hydraulic conductivity.

Note: For a pressure compensated distribution network to function properly, lines must be placed parallel to contours and/or horizontal for even effluent distribution. This requirement, alone, requires a high level of quality assurance at the design and construction phases.

1.4.9 Oversized Effluent Areas.

Design effluent areas are based on conservative estimates of renovation and complete attenuation of nitrogen. After amelioration the deep seepage rate will be lower than the hydraulic conductivity of the limiting layer (<10%).

1.4.10 Reserve Areas.

Although reserve areas are not required for subsurface irrigation there is sufficient area available for extension of the irrigation area. The reserve area is a spare effluent field, which is left undeveloped, but can be commissioned in the case of increase in daily effluent production due to contingencies through the chain of ownership.

1.4.11 Buffer Distances.

Buffer distances are set out in the *EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-10* to allow for attenuation of pathogens and nutrients, should an effluent surcharge occur, either overland or subsurface.

All effluent areas are located at least 340m from surface waters.

The time taken for groundwater to reach the nearest potable surface waters can be estimated by using the Darcy equation (which states that velocity is the product of the hydraulic conductivity and the hydraulic gradient). From the literature, the regional gradient is about0.003.

Flow times can be estimated for groundwater to flow the 340m (minimum) to the nearest surface waters at this site.

For a conservative basement hydraulic conductivity of 1m/day[c] with a hydraulic gradient of 0.003, the time taken for groundwater to flow a distance of 340m is over 300 years.

1.4.12 System Failure.

A properly designed and constructed onsite effluent system consisting of the treatment plant and the irrigation area can suffer degrees of failure.

Failure can take the form of mechanical (plant), accidental (toilet blockages, damaged irrigation lines, high BOD influent), operational (power outage, overloading) and maintenance (failure to check filters, failure to participate in maintenance programme).

1.4.12.1 Mechanical Breakdown.

Mechanical plant breakdown typically involves compressor and pump malfunction causing no aeration and high water levels, respectively. Both of these situations are alarmed (both audible and visual). The proposed

[c] This is a conservatively high figure to demonstrate maximum possible flow rates. A conservatively low figure was used for calculation of effluent application rates (see recommendations) to demonstrate irrigation sustainability.

plants will benefit from a service contract providing 24 hour repair cycles. If the alarms were ignored (or malfunctioned) and the household continued to produce waste until the load balancing tank and plant capacities were exceeded (at least 3 days), a mixture of septic and raw effluent would back up to the interior of the residence and/or surcharge through the plant hatches. It is difficult to imagine how this outcome could be allowed to manifest. In addition, a plant malfunction with the residents absent could not cause an effluent surcharge because no influent would be produced during this period.

1.4.12.2 Accidents.

Toilet blockages and accidentally damaged irrigation lines could allow localised surface surcharge of treated effluent. This is why minimum buffers to surface waters have been maintained. High BOD influent (e.g. dairy or orange juice) can realise a lesser quality than 20/30 standard for some weeks. Provided the high BOD influent is not continuous, the soils will continue to satisfactorily renovate the effluent.

1.4.12.3 Operational Breakdown.

Operational failures including power outages and transient hydraulic overloading are accommodated by the load balancing facility, as described in Section 1.4.6, above.

1.4.12.4 Maintenance Breakdown.

Maintenance breakdowns such as failure to clean line filters can lead to expensive pump repairs and in extreme cases leakage (of 20/30 secondary standard effluent) from the outlet pipe. This leakage would occur in proximity to the dwelling and would be noticed and acted on.

Refusal to participate in the management programme would be acted on by the responsible authority within one maintenance cycle.

AWTSs and pumped systems have mechanical components which can malfunction and will age. The management plan including the maintenance and monitoring programmes are essential to ensure safe onsite effluent disposal.

A prepaid maintenance, monitoring and reporting programme involving a certified and insured entity (i.e. external audit) would ensure safe onsite effluent disposal and reduce the responsible authority's burden of responsibility.

1.4.13 Risk Summary.

With regard to density of development and cumulative risk the assessment has considered risk associated with subsurface flows and surface flows.

In regard to subsurface flows, it is clear that provided the on-site system is adequately designed, constructed, operated and maintained (see items 1.4.1 through 1.4.12.4), the risk to surface and ground waters is negligible. Once the effluent is placed underground, the extraordinary long travel times via ground water to surface waters ensures adequate nutrient attenuation.

In regard to surface flows, it is clear that provided the on-site system is adequately designed, constructed, operated and maintained (see items 1.4.1 through 1.4.12.4), the risk to surface and ground waters is no greater than for a sewered development. Indeed, it could be considered that the risk is less than for a sewered development because there can be no mains failure (because there is no mains).
The LCA recommends a conservative, scientifically based, well founded wastewater management system with inherent multiple barriers of safety.

Cumulative risk from the development is extremely low. The risk of serious or irreversible damage is extremely low. All requirements of *SEPP (Waters of Victoria)* have been met.

Figure 1:. Land-soil unit A (proposed effluent area) viewed from northeast to southwest.

SECTION 2. RECOMMENDATIONS

2.1 APPLICATION

The following recommendations are based on the results of our assessment, and are made in accordance with *SEPPs (Waters of Victoria),* the *EPA Victoria - Guideline for onsite wastewater management (May 2024)* and *EPA Victoria - Guideline for onsite wastewater effluent dispersal and recycling systems (May 2024)*, *AS 1726*, and *AS/NZS 1547:2012*.

They are based on the estimated hydraulic conductivity of the limiting clay materials and are designed to demonstrate the viability of on-site effluent disposal for a 4-bedroom (equivalent) residence and a daily effluent production of up to 600 litres and are considered to be conservative.

2.2 SUBSURFACE IRRIGATION

2.2.1 General.

Based on the results of the water balance analysis and considering the prevailing surficial and subsurface conditions including soil profile thickness and slope and on condition that adequate site drainage is provided (as described in Section 2.4, below), on-site irrigation systems are appropriate for effluent disposal for land-soil unit A.

2.2.2 Effluent.

Effluent will be generated from a 4-bedroom (equivalent) residence and will include black and grey water (all wastes).

2.2.2.1 Effluent Quality.

Effluent shall be treated to a standard that meets or exceeds the water quality requirements of the 20/30 standard for BOD/SS.

Operation and maintenance shall be carried out in accordance with *AS/NZS 1547:2012* and a ”system specific” JAS/ANZ accreditation, as appropriate.

2.2.2.2 Effluent Quantity.

The daily effluent volume of 600 litres has been calculated from *EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-1)* and assumes a 4-bedroom (equivalent) residence with onsite roof water tank supply and WELS-rated water-reduction fixtures and fittings – minimum 4 Stars for dual-flush toilets, shower-flow restrictors, aerator taps, flow/pressure control valves and minimum 3 Stars for all appliances.

2.2.2.3 Load Balancing.

Transient hydraulic loads in excess of the expected daily load may occur (e.g. holidays, entertaining, overnight guests etc (if any)). In addition, and in the case of power outages and/or mechanical breakdown, the load balancing tank can act as a temporary storage.

We recommend that the effluent treatment system be fitted with a load balancing facility **or equivalent function** to allow transient high hydraulic loads to be retained and distributed to the irrigation area during periods of low load.

2.2.3 Application Rates and Irrigation Areas.

An irrigation area and application rate has been determined from the results of the water and nutrient balance analyses and *AS/NZS 1547:2012, Appendix M*.

2.2.3.1 Hydraulic Loading.

To satisfy the requirement for no surface discharge in the mean wet year and after adjusting for slope, effluent shall be applied at an application rate not exceeding 1.7mm/day.

2.2.3.2 Nutrient Loading.

The requirements of *SEPPs (Waters of Victoria)* would be satisfied with effluent applied at an application rate not exceeding 2.5mm/day.

2.2.3.3 Design Loading.

For a daily effluent flow of 600 litres and to satisfy the requirement for no surface flows in the mean wet year and on-site attenuation of nutrients (and as adjusted for slope) the effluent shall be applied to an area of 360m^2 at a rate not exceeding 1.7mm/day.

2.2.4 General Requirements.

For subsurface irrigation, it is assumed that the design, construction, operation and maintenance are carried out in accordance with *AS/NZS1547:2012* and a "system specific" JAS/NZS accreditation, as appropriate.

The irrigation area is to be a dedicated area. To prevent stock and vehicular movements (if any) over the area, the effluent area shall be "fenced".

2.2.5 Subsurface Distribution System.

A distribution network design similar to that shown in *AS/NZS1547:2012, Figure M1* is appropriate.

2.2.5.1 Ground Preparation and Excavations.

Preparation of the ground is to include the smoothing of the land application surface by the redistribution of topsoil to form a free draining, at least 200mm deep, loamy surface over the land application area. Pipe excavations shall only be undertaken in drier periods when soil moisture contents are relatively low and when heavy rainfall and storms are not normally expected.

2.2.5.2 Pump System and Pipe works.

Uniform delivery pressure of the effluent throughout the distribution system is essential. Percolation or drip rates shall not vary by more than 10% from the design rate over the whole of the system (i.e. pressure compensated).

The distribution pipes shall be placed coincident with slope contours. The dripper system is to provide an effective even distribution of effluent over the whole of the design area. Line spacing shall be no closer than 1000mm.

2.2.6 Sequential Zoned Irrigation.

The efficiency of irrigation effluent disposal systems can be highly variable. We recommend that as part of the daily irrigation process, the effluent area be irrigated sequentially by zones to promote the creation of transient aerobic and anaerobic soil conditions.

The inspection regime described in Section 2.2.7, below, is to be strictly adhered to.

2.2.7 Inspections and Monitoring.

We recommend that the mandatory testing and reporting as described in the *EPA Victoria - Guideline for onsite wastewater management (May 2024) Section 6*, include an annual (post spring) report on the functioning and integrity of the distribution system and on the functioning and integrity of the cut-off drains, outfall areas and soil media.

It is expected that the frequency of inspections and monitoring will intensify as systems age.

2.2.8 Soil Renovation.

Soils are dispersive and require amelioration. To create and maintain water-stable peds (under irrigation with saline effluent), soil renovation in the form of gypsum application is required at the rate of 1kg/m^2. Initially, prior to the installation and operation of the effluent irrigation system gypsum is to be broadcast over the land application area at the rate of 0.5kg/m^2. Following that gypsum shall be broadcast again over the effluent area

at the rate of 0.25 kg/m^2 in every two winter months and 0.25kg/m^2 in every 3 summer months until the determined gypsum application of 1kg/m^2 is reached.

If the determined gypsum application of 1kg/m^2 is not reached by the time of the installation and operation of the effluent irrigation system gypsum shall be broadcast again over the effluent area at the rate of 0.25 kg/m^2 in every winter month and 0.25kg/m^2 in every 1.5 summer months.

After reaching the determined gypsum application of 1kg/m^2 we recommend sampling and testing to assess the effectiveness of the gypsum application. This testing will determine future application rate and frequency of application.

Gypsum requirement assumes the gypsum contains 19% Calcium and 15% Sulphur. Gypsum is to be fine ground "Grade 1" agricultural quality. Gypsum shall be reapplied every 3 years at the rate of 0.5kg/m^2.

2.2.9 Effects of Irrigation on Existing Trees.

A study[d] by Dr Nick O'Brien (Melbourne University) regarding impacts of 20/30 standard irrigation on remnant *Eucalyptus* forest at Ringwood North has shown that trees would not be adversely affected by subsurface 20/30 standard irrigation provided the distribution slots did not exceed about 150mm in depth.

2.3 RESERVE AREA

The expected design life of fifteen years may vary due to construction and maintenance vagaries and possible effluent volume increases through the chain of ownership.

There is sufficient available area for extension of the effluent area.

2.4 SITE DRAINAGE.

Our recommendations for on-site effluent disposal have allowed for incident rainfall only (not surface flow or lateral subsurface flow) and are conditional on the installation of a shallow cut-off drain, which shall be placed upslope of the disposal area.

Care shall be taken to ensure that the intercepted and diverted surface waters are discharged well away and down slope of the disposal field.

Locations of the cut-off drains and a drain detail are shown in Drawings 2 and MP1.

The owner shall also ensure that any upslope site works do not divert and/or concentrate surface water flows onto the disposal area.

2.5 BUFFER DISTANCES

The water balance analysis has shown that potential surface (rain water) flows from the effluent area would be restricted to episodic events.

The estimated hydraulic properties of the upper soil materials and hydraulic gradient have been used to evaluate (via Darcy's Law) the buffer distances with respect to subsurface flows.

Our risk analysis and evaluation has shown that the default setback distances given in *EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-10* are conservative and can be applied without amendment, as shown in Drawing 2.

For a building located downslope of an effluent field, your engineer shall evaluate the integrity of building foundations with respect to the assigned buffer distance.

[d] Dr Nick O'Brien (Research Fellow, School of Botany, University of Melbourne, 2000: *Comment on the irrigation of remnant native vegetation with municipal effluent associated with the proposed subdivision at the rear of 111 Hall Road, North Ringwood.*

2.6 SUMMARY OF RECOMMENDATIONS

Our capability assessment has shown that at least one rational and sustainable on-site effluent disposal method (20/30 standard subsurface irrigation) is appropriate for the proposed development, subject to specific design criteria, described above.

A management plan is presented in Appendix D, to this report.

[redacted]

Land Capability Assessment
Principal Soil Scientist

[redacted]

APPENDIX A1

SOIL PERMEABILITY

Where the soils are dispersive and/or have high shrink-swell potential *insitu* permeability testing realises inaccurate, low or nil results.

The hydraulic conductivity can be estimated by using test waters containing calcium chloride and/or by laboratory assessment of colloid stability and determination of ameliorant quantities (e.g. gypsum/lime requirement) and swell potential.

A conservative estimate of permeability has been deduced as follows (from soil texture, structure and free swell potential tests):-

Profile analysis in accordance with AS/NZS 1547:2012 and our laboratory determined dispersion and swell potential shows the alluvial soils to be dispersive silty light to medium clays (i.e. Type 6 soils) with saturated hydraulic conductivity less than 0.06m/day.

Similar dispersive soils have responded positively (with sufficiently improved hydraulic capability) following applications of gypsum.

The limiting moderately structured silty light to medium clay soils require amelioration in the form of gypsum application at the rate of 1kg/m^2.

Peak deep seepage is conservatively estimated at 3.6mm/day. Average daily deep seepage rate is 2.4mm.

SOIL TEST RESULTS

Project: Beaconsfield			Date of sampling: 01/08/24			Date of Lab test:				BH: 1
horizon (cm)	pH	$EC_{1:5}$	EC_{SE}	disp 10 min	disp 2 hours	disp total	Emers 2 hours	Emers 20 hours	free swell %	texture
0-20				0	0	0	4,5,6	4,5,6		loam
20-40				0	1	9	2	2		clay loam
40-75				1	2	11	2	2		silty light to medium clay
75-110				0	0	0	8	2		silty light clay
110-130				0	0	0	4,5,6	4,5,6		silty light clay

Project: Beaconsfield			Date of sampling: 01/08/24			Date of Lab test:				BH: 2
horizon (cm)	pH	$EC_{1:5}$	EC_{SE}	disp 10 min	disp 2 hours	disp total	Emers 2 hours	Emers 20 hours	free swell %	texture
0-20	5.5	0.01	0.10	0	0	0	4,5,6	4,5,6		loam
20-40	5.5	0.01	0.10	0	1	9	2	2		loam
40-60	5.1	0.05	0.45	3	4	15	1	1	0	silty light clay
60-90	5.4	0.15	1.35	1	2	11	2	2	30	silty light clay
90-105	4.7	0.02	0.18	0	0	0	4,5,6	4,5,6		silty light clay
105-135	5.4	0.11	0.99	0	0	0	4,5,6	4,5,6		silty light clay

APPENDIX A2

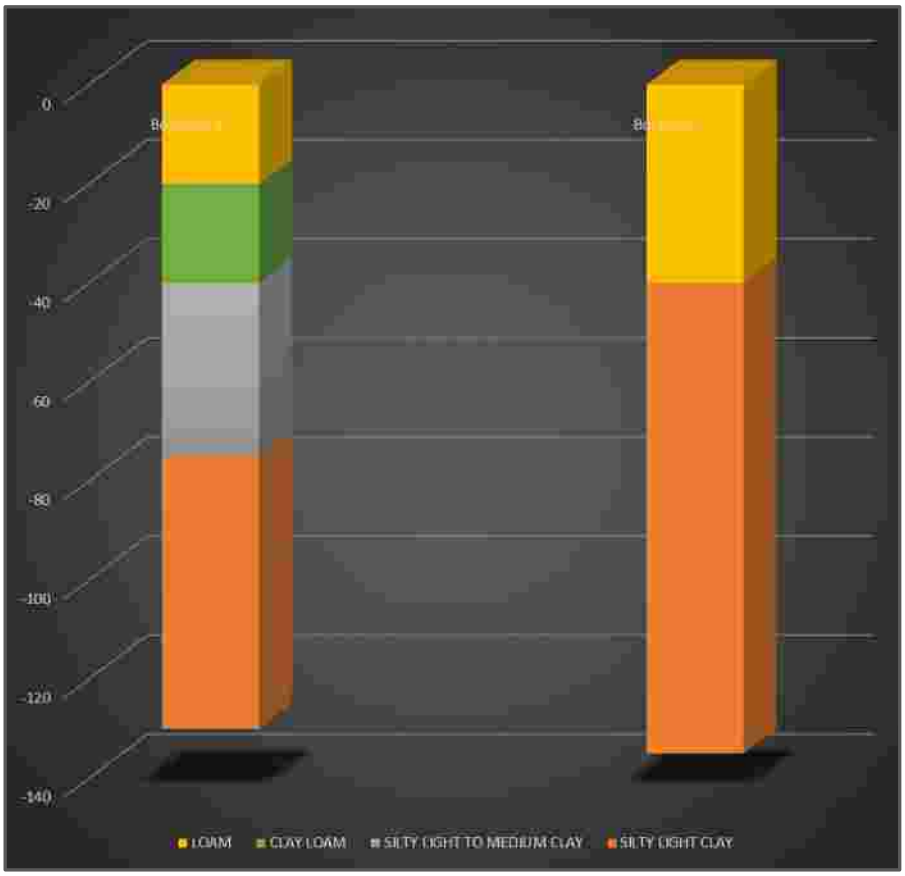
SOIL PROFILE PHOTOGRAPHS

BOREHOLE 1

BOREHOLE 2

APPENDIX A3

LOGS OF BOREHOLES



For location of boreholes refer Drawing 2.

APPENDIX B

WATER AND NUTRIENT BALANCE

Land Capability Assessment (Spreadsheet used with permission)

WATER/NITROGEN BALANCE (20/30 irrigation): With no wet month storage

LCA19082024

Rainfall Station: Berwick / **Evaporation Station:** Scoresby Research Inst.

Location: Beaconsfield
Date: August, 2024
Client: Heath & Tiffany White

ITEM	UNIT	#	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Days in month:		D	31	28	31	30	31	30	31	31	30	31	30	31	365
Evaporation (Mean)	mm	A	174	154	124	81	53	39	43	59	78	105	132	155	1197
Rainfall (mean)	mm	B1	62	54	55	79	76	85	81	84	85	92	86	76	915.3
Effective rainfall	mm	B2	46	41	41	59	57	64	61	63	64	69	65	57	686
Peak seepage Loss[1]	mm	B3	112	101	112	108	112	108	112	112	108	112	108	112	1314
Evapotranspiration(KA)	mm	C1	78	69	56	36	24	18	20	27	35	47	59	70	539
Waste Loading(C1+B3-B2)	mm	C2	143	129	126	85	78	62	70	75	79	90	103	125	1166
Net evaporation from lagoons (10(0.8A-B1xlagoon area(ha)))	L	NL	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume of Wastew ater	L	E	18600	16800	18600	18000	18600	18000	18600	18600	18000	18600	18000	18600	219000
Total Irrigation Water(E-NL)/G	mm	F	62	56	62	60	62	60	62	62	60	62	60	62	730
Irrigation Area(E/C2)annual.	m^2	G													**300**
Surcharge/Storage	mm	H	-81	-73	-64	-25	-16	-1	-8	-13	-19	-28	-43	-63	**0**
Actual seepage loss	mm	J	30	27	47	83	96	107	103	98	89	83	65	49	878
Direct Crop Coefficient:		I	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	Shade:

Rainfall Retained:	75	%	K
Lagoon Area:	0	ha	L
Wastew ater(Irrigation):	600	L	M
Seepage Loss (Peak):	3.6	mm	N
Irrig'n Area(No storage):	**300**	m^2	P2
Application Rate:	**2.0**	mm	Q
Nitrogen in Effluent:	30	mg/L	R
Denitrification Rate:	20	%	S
Plant Uptake:	220	kg/ha/y	T
Average daily seepage:	2.4	mm	U
Annual N load:	5.26	kg/yr	V
Area for N uptake:	**239**	m^2	W
Application Rate:	**2.5**	mm	X
Irrig'n Area (slopes 10%-20%)	**360**	m2	Z
Application Rate:	**1.7**	mm	Z1

1. Seepage loss (peak) equals deep seepage plus lateral flow : 3.6mm

CROP FACTOR

Pasture:	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7
Shade:	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Fescue:	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Woodlot	1	1	1	1	1	1	1	1	1	1	1	1

NITROGEN UPTAKE:

Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH
Ryegrass	200	5.6-8.5	Bent grass	170	5.6-6.9	Grapes	200	6.1-7.9
Eucalyptus	90	5.6-6.9	Couch grass	280	6.1-6.9	Lemons	90	6.1-6.9
Lucerne	220	6.1-7.9	Clover	180	6.1-6.9	C cunn'a	220	6.1-7.9
Tall fescue	150-320	6.1-6.9	Buffalo (soft)	280	6.1-6.9	P radiata	150	5.6-6.9
Rye/clover	220		Sorghum	90	5.6-6.9	Poplars	115	5.6-8.5

RAINFALL DATA

Station: Berwick (Buchanan Road) Number: 86299 Opened: 1979 Now: Open
Lat: 38.02° S Lon: 145.36° E Elevation: 85 m

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	61.7	54.3	54.9	79.2	76.3	85.4	81.1	84.0	84.9	91.7	86.1	75.7	936.8
Lowest	2.4	2.0	11.2	23.4	24.2	16.8	20.8	37.2	32.8	19.8	20.4	9.4	577.2
5th %ile	10.8	2.7	18.4	24.6	25.8	41.1	30.6	38.8	42.3	35.0	33.9	20.8	722.7
10th %ile	14.6	5.9	20.8	30.4	30.6	45.3	40.1	47.9	48.3	43.1	40.1	27.4	743.1
Median	57.5	34.6	56.6	77.4	78.6	83.4	72.8	84.0	79.0	88.8	81.0	66.9	963.2
90th %ile	108.3	127.0	83.3	126.6	118.0	129.8	120.5	117.2	133.8	141.6	144.1	136.4	1112.9
95th %ile	119.1	152.2	95.1	149.3	128.1	143.4	130.7	121.9	166.9	160.7	159.8	168.1	1153.4
Highest	158.8	235.6	106.0	187.4	164.6	167.8	162.0	149.0	193.8	192.2	182.2	187.8	1163.9

APPENDIX C

LAND CAPABILITY ASSESSMENT TABLE
(Non-Potable Water Supply Catchments)

LAND FEATURE	LAND CAPABILITY RISK RATING				AMELIORATIVE MEASURES & RISK REDUCTION
	LOW	MEDIUM	HIGH	LIMITING	
Available land for LAA	Exceeds LAA and duplicate LAA requirements	Meets LAA and duplicate LAA requirements	Meets LAA and partial duplicate LAA requirements	Insufficient LAA area	Limiting for trenches & beds: Full reserve area not available. Non-limiting for subsurface irrigation.
Aspect	North, north-east and north-west	East, west, south-east, south-west	South	South, full shade	Eastern aspect.
Exposure	Full sun and/or high wind or minimal shading	Dappled light (partial shade)	Limited light, little wind to heavily shaded all day	Perpetual shade	Partial shade from nearby trees.
Slope Form	Convex or divergent side slopes	Straight sided slopes	Concave or convergent side slopes	Locally depressed	Free draining, however finished LAA surface requires smoothing and redistribution of topsoil.
Slope gradient:					
Subsurface irrigation	<10%	10% to 30%	30% to 40%	>40%	13%-15% Non-limiting for subsurface irrigation.
Site drainage: runoff/run-on	LAA backs onto crest or ridge	Moderate likelihood	High likelihood	Cut-off drain not possible	Unremarkable. Cut-off drain required up-slope.
Landslip[1]	Potential	Potential	Potential	Existing	Unremarkable.
Erosion potential	Low	Moderate	High	No practical amelioration	All runoff to be dispersed without concentrating flows. LAA stabilised with gypsum (dispersive soils).
Flood/inundation	Never		<1%AEP	>5% AEP	Unremarkable.
Distance to surface waters (m)	Buffer distance complies with Guideline requirements		Buffer distance does not comply with Guidelinee requirements	Reduce buffer distance not acceptable	340 metres to watercourse.
Distance to groundwater bores (m)	No bores on site or within a significant distance	Buffer distances comply with Guideline	Buffer distances do not comply with Guideline	No suitable treatment method	No bores within a significant distance (680m).
Vegetation	Plentiful/healthy vegetation	Moderate vegetation	Sparse or no vegetation	Propagation not possible	Existing grasses require over-sowing with a rye/clover mix.
Depth to water table (potentiometric) (m)	>2	2 to 1.5	<1.5	Surface	Water table is between 20-50m.
Depth to water table (seasonal perched) (m)	>1.5	<0.5	0.5 to 1.5	Surface	Perching unlikely.
Rainfall[2] (Mean) (mm)	<500	500-750	750-1500	>1500	915mm. Non-limiting for subsurface irrigation – Design by water balance.
Pan evaporation (mean) (mm)	>1250	1000 to 1250	750 to 1000	<750	1197mm. Design by water balance.
SOIL PROFILE CHARACTERISTICS					
Structure	High or moderately structured	Weakly structured	Structureless, massive or hardpan		Maintain structure by gypsum application (dispersive soils).
Fill materials	Nil or mapped good quality topsoil	Mapped variable depth and quality materials	Variable quality and/or uncontrolled filling	Uncontrolled poor quality/unsuitable filling	No fill present.
Thickness: (m)					
Subsurface irrigation	1.5+	1.0 to 1.5	0.75-1.0	<0.75	Non-limiting for irrigation systems.
Permeability[3] (limiting horizon) (m/day)	0.15-0.3	0.03-0.15 0.3-0.6	0.01-0.03 0.6-3.0	>3.0 <0.03	Non-limiting for irrigation but requires renovation.
Permeability[4] (buffer evaluation) (m/day)	<0.3	0.3-3	3 to 5	>5.0	Evaluate flow times via Darcy's Law (assume 1m/day for alluvial materials).
Stoniness (%)	<10	10 to 20	>20		Unremarkable
Emerson number	4, 5, 6, 8	7	2, 3	1	Non-dispersive topsoil, dispersive subsoils. Apply gypsum to improve ksat and to create and maintain stable peds.
Dispersion Index	0	1-8	8-15	>15	Non-dispersive topsoil, dispersive subsoils. Apply gypsum to improve ksat and to create and maintain stable peds.
Reaction trend (pH)	5.5 to 8	4.5 to 5.5	<4.5>8		5.5pH in topsoil. Ideal range for grasses.
E.C. (dS/m)	<0.8	0.8 to 2	>2	>2.0	Non-restrictive.
Sodicity (ESP) (%)	<6	6 to 8	>8	>14	Sodic. Inferred from Emerson, Dispersion Index and Free swell.
Free swell (%)	<30	30-80	80-120	>120	0%-30%. Non- to low-swelling soils.

There are no limiting factors for secondary effluent subsurface irrigation (after renovation with gypsum).

Evaluation of buffer distances via Darcy's Law shows EPA default buffer distances to be adequate.

Hence, in terms of the design engineering and management inputs required for sustainable on-site effluent disposal are rational and easily achieved without significant impost on the landowner.

[1] Landslip assessment based on proposed hydraulic loading, slope, profile characteristics and past and present land use.
[2] Mean monthly rainfalls used in water balance analyses.
[3] Saturated hydraulic conductivity estimated from data base and laboratory tests.
[4] Saturated hydraulic conductivity estimated from AS/NZS1547:2012 and data base.

APPENDIX D

MANAGEMENT PLAN

Land Capability Assessment
ABN 22800734479 [redacted]
CONSULTANTS IN THE AGRICULTURAL SCIENCES

53 Telford Drive, Berwick VIC 3806
Email: info@lcavictoria.com.au

LCA19082024 – AUGUST/2024

MANAGEMENT PLAN
FOR
ON-SITE EFFLUENT DISPOSAL VIA SUBSURFACE IRRIGATION
AT
127 COOINDA ROAD, BEACONSFIELD VIC 3807

1. INTRODUCTION

This document identifies the significant land-soil unit constraints (as identified in LCA19082024) and their management and day-to-day operation and management of the on-site effluent system.

This management plan is to be read in conjunction with our land capability assessment for this land-soil unit (LCA19082024).

2. SIGNIFICANT LAND-SOIL UNIT CONSTRAINTS

2.1 Allotment Size. The day-to-day operation and management of on-site effluent systems, as described below, is not constrained by lot size or geometry.

Although all requirements of *SEPPs* have been met or exceeded through conservative design, prudence dictates that individual lot owners assiduously follow the management programme given in Section 4, below.

2.2 Nitrogen Attenuation. To reduce nitrates to insignificant levels, the effluent should not contain more than 30mg/litre total nitrogen.

Provided the irrigation areas are at least as large as those required to satisfy the nitrogen loading, as described in LCA19082024 Sections 1.3.1.12 and 2.2.3.2, and that the (specified) grass is cut and (periodically) harvested, nitrogen will be attenuated on-site.

2.3 Hydraulic Conductivity. The soils of this site are dispersive silty light to medium clays with a non- to low swelling potential and a low hydraulic conductivity. The hydraulic conductivity is significantly influenced by soil structure, soil colloid stability and swell characteristics. Breakdown or reduction of these soil parameters over time may manifest as reduced performance of the irrigation system. The monitoring and inspection regime detailed in Section 4.7.2, below, should be adhered to.

2.4 Site Drainage. Our recommendations for on-site effluent disposal have allowed for incident rainfall only (not surface flow or lateral subsurface flow) and are conditional on the installation of a cut-off drain, which should be placed upslope of the disposal area. Care should be taken to ensure that the intercepted and diverted surface waters are discharged well away and down slope of the disposal field (see LCA19082024 Drawings 2 and MP1).

This diverted water should also be discharged in a manner to avoid scouring and/or erosion. It may be appropriate to discharge the water onto a stone/rubble dissipation area.

The owner should also ensure that any upslope land-soil unit works do not divert and/or concentrate surface water flows onto the disposal area.

2.5 Vegetation. Existing vegetation is suitable however requires over-sowing with a rye/clover mix. The effluent disposal areas have been sized via water and nutrient balance analyses utilising crop factors for pasture (rye/clover mix) under conditions of partial shade.

3. THE ONSITE EFFLUENT SYSTEM

The onsite effluent system consists of the influent (kitchen, laundry, bathrooms and toilets), a load balancing tank/facility (if any), the treatment plant (a device to treat the effluent to at least the secondary effluent standard (20/30)), the irrigation area including effluent distribution system (delivery pipes and drippers), prescribed irrigation area vegetation, associated infrastructure (cut-off drain, outfall areas, fencing (if any)), a service and maintenance programme and on-going management.

4. MANAGEMENT

The owner is required to understand (and ensure that tenants understand) that sustainable operation of the onsite effluent system is not automatic. Sustainable operation requires on-going management, as outlined below.

4.1 Effluent. Effluent will be generated from a 4-bedroom (equivalent) residence and will include black and grey water (all wastes).

4.1.2 Effluent Quality. Effluent should be treated to a standard that meets or exceeds the water quality requirements of the secondary effluent standard (20/30 standard for BOD/SS).

Operation and maintenance shall be carried out in accordance with *AS/NZS 1547:2012* and a ”system specific” JAS/ANZ accreditation, as appropriate.

4.1.3 Effluent Quantity. The daily effluent volume of 600 litres has been calculated from *EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-1* and assumes a 4-bedroom (equivalent) residence with onsite roof water tank supply and WELS-rated water-reduction fixtures and fittings – minimum 4 Stars for dual-flush toilets, shower-flow restrictors, aerator taps, flow/pressure control valves and minimum 3 Stars for all appliances.

4.2 Treatment System. No specific treatment system is recommended, however, the treatment system must have current AS/NZS accreditation, which match effluent volumes with plant capacity. For subsurface irrigation, it is assumed that the design, construction, operation and maintenance are carried out in accordance with *AS/NZS1547:2012* and a “system specific” JAS/NZS accreditation.

4.3 Irrigation Area. The irrigation area has been determined from the results of the water and nutrient balance analyses and AS/NZS 1547:*2012*, *Appendix M*.

4.3.1 Effluent Area Requirement. For a daily effluent flow of 600 litres and to satisfy the requirement for no surface rainwater flow in the mean wet year, on-site attenuation of nutrients and after adjusting for slope the effluent should be applied to an irrigation area of 360m^2.

Effluent distribution is as detailed in Section 4.3.2, below.

Any landscaping and/or planting proposals require endorsement from the Cardinia Shire Council.

4.3.2 Distribution System. The distribution system must achieve controlled and uniform dosing over the irrigation area. A small volume of treated effluent should be dosed at predetermined time intervals throughout the day via a pressurised piping network that achieves uniform distribution over the entire irrigation area.

Uniform delivery pressure of the effluent throughout the distribution system is essential. Drip rates should not vary by more than 10% from the design rate over the whole of the system.

To minimise uneven post-dripper seepage, the distribution pipes must be placed parallel with slope contours.

Line spacing shall be not closer than 1000mm under any circumstances.

To facilitate the creation of transient aerobic and anaerobic soil conditions we recommend that as part of the daily irrigation process, the effluent area be irrigated sequentially by zones.

4.3.3. Soil Renovation: Soils are dispersive and require amelioration. To create and maintain water-stable peds (under irrigation with saline effluent), soil renovation in the form of gypsum application is required at the rate of 1kg/m^2. Initially, prior to the installation and operation of the effluent irrigation system gypsum is to be broadcast over the land application area at the rate of 0.5kg/m^2. Following that gypsum shall be broadcast

again over the effluent area at the rate of 0.25 kg/m^2 in every two winter months and 0.25kg/m^2 in every 3 summer months until the determined gypsum application of 1kg/m^2 is reached.

If the determined gypsum application of 1kg/m^2 is not reached by the time of the installation and operation of the effluent irrigation system gypsum shall be broadcast again over the effluent area at the rate of 0.25 kg/m^2 in every winter month and 0.25kg/m^2 in every 1.5 summer months.

After reaching the determined gypsum application of 1kg/m^2 we recommend sampling and testing to assess the effectiveness of the gypsum application. This testing will determine future application rate and frequency of application.

Gypsum requirement assumes the gypsum contains 19% Calcium and 15% Sulphur. Gypsum is to be fine ground “Grade 1” agricultural quality. Gypsum shall be reapplied every 3 years at the rate of 0.5kg/m^2.

4.3.4 Buffer Distances. The water balance analysis has shown that potential surface rainwater flows from the effluent area would be restricted to episodic events.

The estimated hydraulic properties of the upper soil materials and hydraulic gradient (equivalent to the ground slope and regional gradients) have been used to evaluate (via Darcy’s Law) the buffer distances with respect to subsurface flows.

Our analysis and evaluation have shown that the default setback distances given in *EPA Victoria - Guideline for onsite wastewater management (May 2024)*, *Table 4-10* are conservative and can be applied without amendment.

For a building located downslope of an effluent field, your engineer should evaluate the integrity of building foundations with respect to the assigned buffer distance.

Buffer distances are to be applied exclusive of the irrigation area.

4.3.5 Buffer Planting. All downslope (Title inclusive) buffers may be required to filter and renovate abnormal surface discharges. Hence, they are to be maintained with existing or equivalent groundcover vegetation.

4.3.6 Buffer Trafficking. On all allotments, buffer trafficking should be minimised to avoid damage to vegetation and/or rutting of the surface soils.

Traffic should be restricted to ‘turf’ wheeled mowing equipment and to maintenance, monitoring and inspections by pedestrians, where possible.

4.4 Vegetation. The system design for on-site disposal includes the planting and maintenance of suitable vegetation, as specified in LCA19082024 and/or similar documents.

Specifically, this irrigation area has been sized (in part) utilising crop factors and annual nitrogen uptake for a rye/clover eq mix.

The grass needs to be harvested (mown and periodically removed from the irrigation area).

Where a variation to recommended grass species is proposed, it must be demonstrated that the nitrogen uptake and crop factors (as specified in LCA19082024 Appendix B – water and nutrient balance) are met or exceeded.

4.5 Verification. The Council is to be satisfied that the effluent system has been constructed as designed with appropriate engineering endorsement and underwriting.

4.6 Associated Infrastructure. The following items are an integral part of the onsite effluent system.

4.6.1 Cut-off drains. Cut-off drains are designed to prevent surface water flows from entering the effluent area. They should be constructed and placed around the effluent area, as shown in Drawings 2 and MP1.

4.6.2 Outfall areas. All pipe outfalls should be at grade and designed to eliminate scour and erosion.

A grassed outfall would normally be adequate. However, should monitoring and inspections reveal rill or scour formation, the outfall will need to be constructed so that energy is satisfactorily dissipated.

Should this situation occur, professional advice is to be sought.

4.6.3 Fencing. The disposal area is to be a dedicated area. Adequate fencing must be provided to prevent stock, excessive pedestrian and vehicular movements (if any) over the area.

4.7 Service and Maintenance Programme. The minimum requirements for servicing and maintenance are set out in the relevant JAS/ANZ accreditation and the manufacturer's recommendations.

4.7.1 Treatment Plant. Aerated treatment plants and sand filters should be serviced at least one time per year (or as recommended in the JAS/ANZ accreditation) and the effluent should be sampled and analysed as required by the JAS/ANZ accreditation). The local authority is to ensure compliance.

The manufacturer's recommendations are to be followed. Generally, low phosphorous and low sodium (liquid) detergents should be used. Plastics and other non-degradable items should not be placed into the tanks. Paints, hydrocarbons, poisons etc should not be disposed of in sinks or toilets. Advice from a plumber should be obtained prior to using drain cleaners, chemicals and conditioners. It is important to ensure that grease does not accumulate in the tanks or pipes. Grease and similar products should be disposed of by methods other than via the on-site effluent system.

4.7.2 Monitoring and Inspections. We recommend that the mandatory testing and reporting as described in the *EPA Victoria - Guideline for onsite wastewater management (May 2024) Section 6*, include an annual (post spring) and post periods of heavy and/or prolonged rainfall report on the functioning and integrity of the distribution system and on the functioning and integrity of the cut-off drains, outfall areas and soil media.

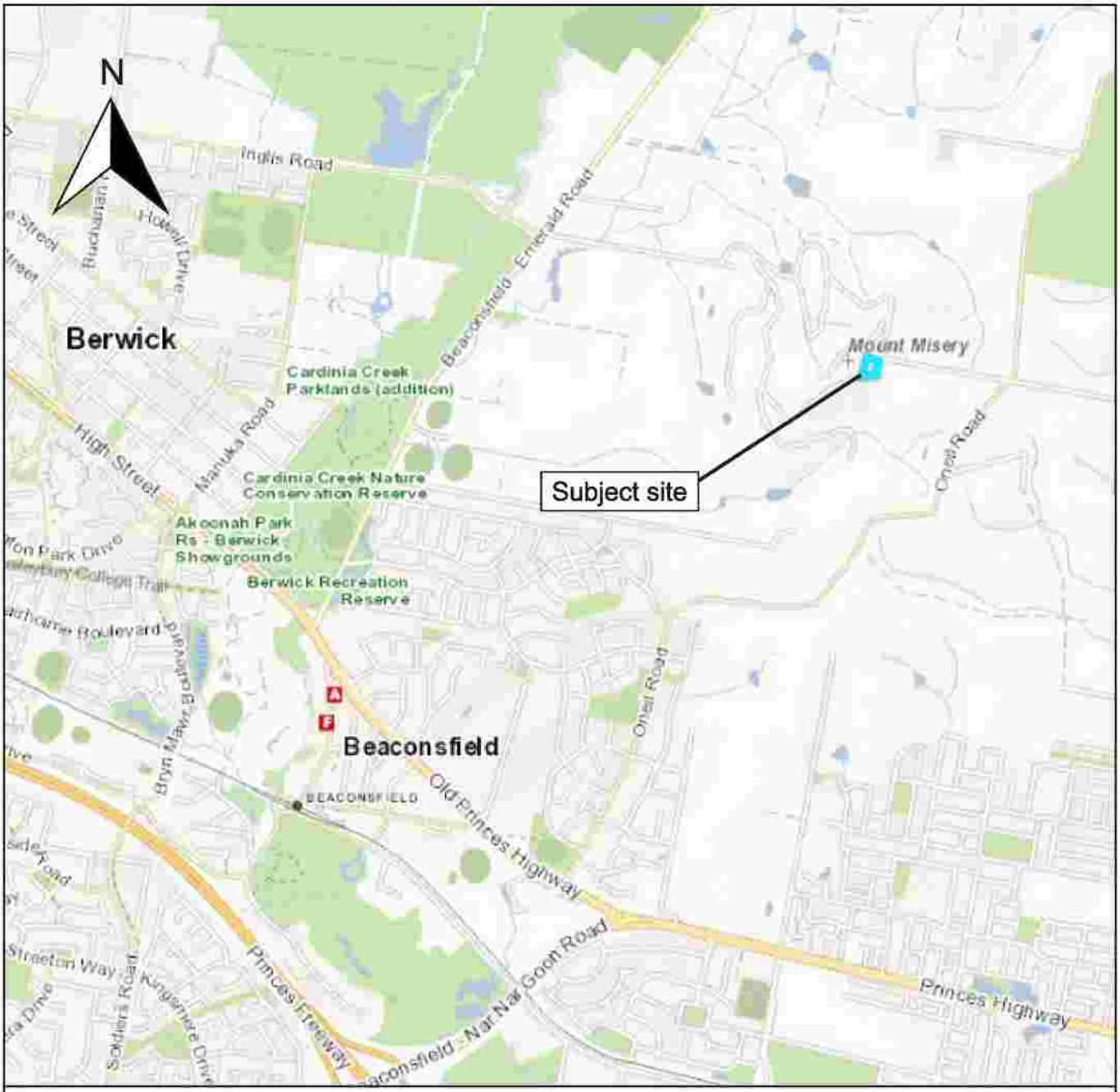
The effluent areas should be regularly inspected for excessively wet areas and vegetation integrity.

The inspection regime described in LCA19082024, Section 2.2.7, should be strictly adhered to.

[redacted]

PRINCIPAL SOIL SCIENTIST
LAND CAPABILITY ASSESSMENT

[redacted]

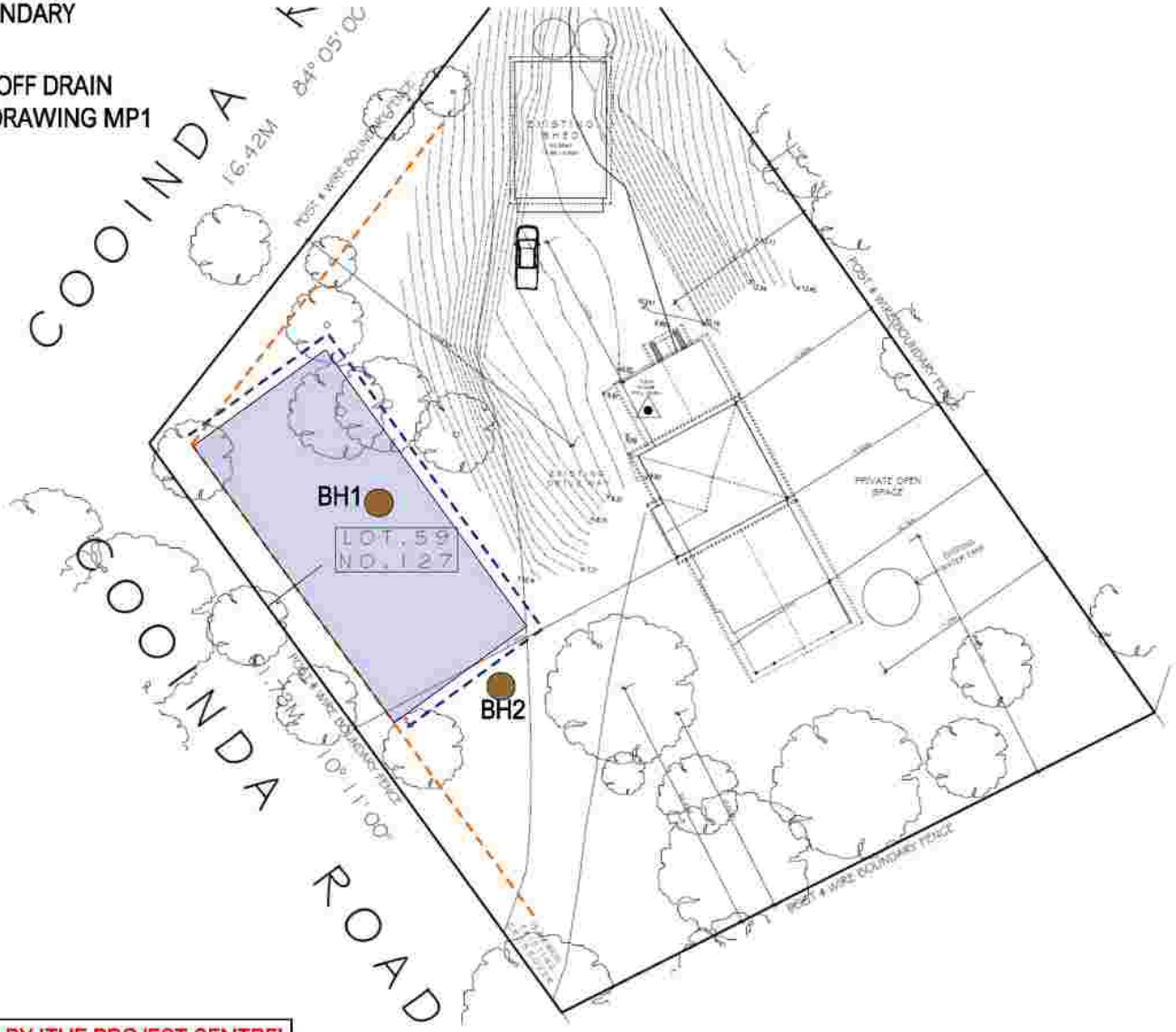


LOCATION OF SUBJECT SITE	
127 COOINDA ROAD, BEACONSFIELD VIC 3807	
[redacted]	
Drawn [redacted]	Report number: LCA19082024
Date: August 2024.	Drawing number: 1

360m² PRIMARY IRRIGATION AREA

3m BUFFER FROM ALLOTMENT BOUNDARY

CUT-OFF DRAIN SEE DRAWING MP1



BASE MAP SUPPLIED BY 'THE PROJECT CENTRE'

LOCATION OF PROPOSED DEVELOPMENT SHOWING CONTOURS

127 COOINDA ROAD, BEACONSFIELD VIC 3807

[redacted]

DRAWN: LAND CAPABILITY ASSESSMENT

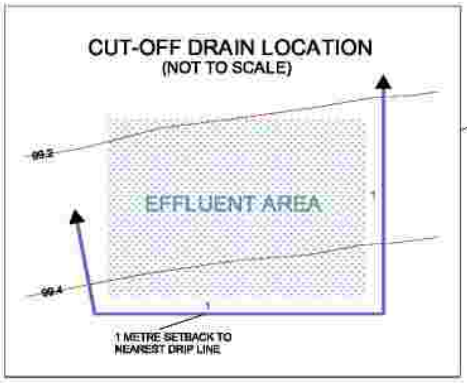
DATE: AUGUST 2024

REPORT NUMBER: LCA19082024

DRAWING NUMBER: 2

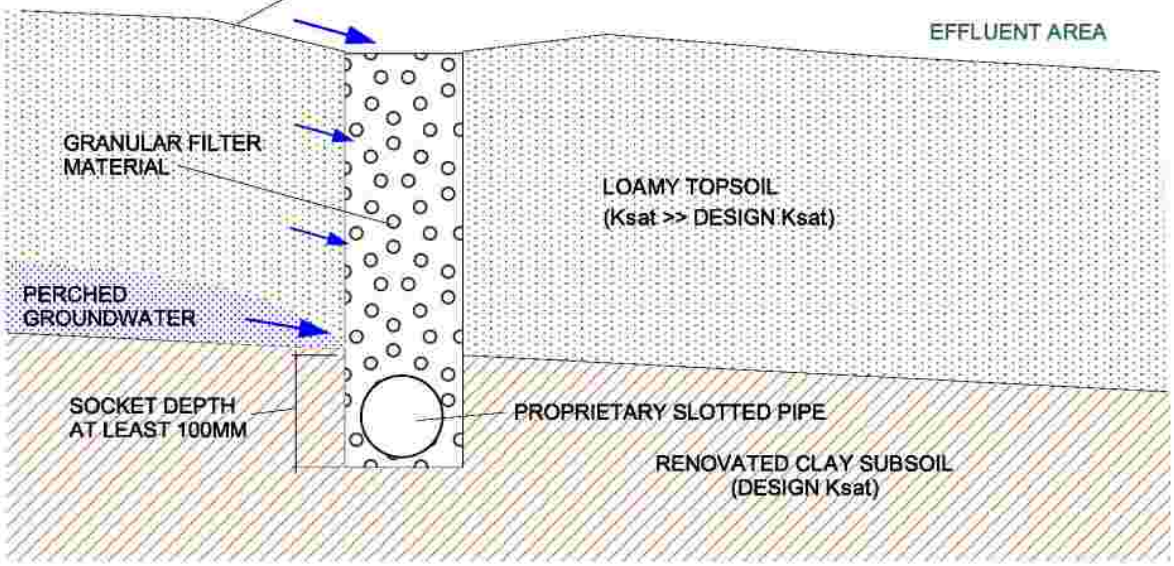
SCALE: 1:600

N



NOTE: CUT-OFF DRAIN LOCATION IS SCHEMATIC ONLY. FINAL LOCATION TO BE DETERMINED BY DESIGN ENGINEER AS PART OF SITE DRAINAGE DESIGN.

SURFACE REGRADED BY CUTTING TO FACILITATE COLLECTION OF SURFACE FLOWS - DEGREE OF CUT SLOPE LIMITED BY REQUIREMENTS FOR SAFE & EFFICIENT MOWING/MAINTENANCE



NOTES:
1. DRAIN TO BE DESIGNED, CONSTRUCTED & MAINTAINED TO ENSURE THAT NO SURFACE & PERCHED GROUNDWATER FLOWS ENTER THE IRRIGATION AREA.
2. DRAIN TO BE LOCATED ON ALL UPSLOPE SIDES OF IRRIGATION AREA (NO CLOSER THAN 1M FROM NEAREST SUBSURFACE DISTRIBUTION LINE).
3. DRAIN TO HAVE UNSPECIFIED FALL.
4. MINIMUM SOCKET DEPTH OF 100MM INTO CLAY SUBSOIL (WHERE ENCOUNTERED) OR AT LEAST 200MM DEEP.
5. DRAIN CROSS SECTIONAL AREA RELATED TO DESIGN FLOWS AS DETERMINED BY A SUITABLY QUALIFIED AND EXPERIENCED ENGINEER.
6. OFF-SITE DRAIN OUTFALL TO LEGAL POINT OF DISCHARGE SUBJECT TO LOCAL AUTHORITY REQUIREMENTS.
7. ON-SITE DRAIN OUTFALL TO INCLUDE APPROPRIATE ENERGY DISSIPATION TO AVOID EROSION.
8. ALL DRAINS AND OUTFALL AREAS SUBJECT TO POST-SPRING INSPECTION.

NOTE: DRAWING NOT TO BE USED FOR SET-OUT PURPOSES

CUT-OFF DRAIN DETAIL FOR EFFLUENT DISPOSAL FIELDS

127 COOINDA ROAD, BEACONSFIELD VIC 3807

[redacted]

Scale: 1:10 (Approximately)	Drawn: P.R.W.	Report Number: LCA19082024
Contour Interval: N/A	Date: August 2024	Drawing Number: MP1

Tax Invoice \ Receipt

19-Jun-2024 10:52 am

[redacted]

Cardinia Shire Council
ABN: 32 210 906 807

Taya Seddon

Payment Details

$2,059.10 [redacted]

Receipt Details

LF $1,383.30
800000-0-1140-1000-4225
5 : Planning Permit Fee
(No GST)
127 Cooinda Road Beaconsfield T240270

127 Cooinda Road Beaconsfield
T240270,3795552512

LF $675.80
800000-0-1140-1000-4225
5 : Planning Permit Fee
(No GST)
30 Sharpfield Road Beaconsfield Upper
T240271
30 Sharpfield Road Beaconsfield Upper
T240271,3795552512

Receipt Total $2,059.10

GST amount = $0.00

This receipt will fade over time if exposed to light.

-

Cardinia Shire Council

Request to amend a current planning permit application

Cardinia

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.:	T240270 PA
Address of the Land:	Lot 59, No 127 Cooinda Road Beaconsfield

APPLICANT DETAILS

Name:	[redacted]
Organisation:	
Address:	
Phone:	
Email:	

AMENDMENT TYPE

Under which section of the Act is this amendment being made? (select one)	
Section 50 – Amendment to application at request of applicant **before** notice:	✔
Section 50A - Amendment to application at request of responsible authority **before** notice:	☐
Section 57A – Amendment to application **after** notice is given:	☐

AMENDMENT DETAILS

What is being amended? (select all that apply)		
What is being applied for ✔	Plans / other documents ☐	Applicant / owner details ☐
Land affected ✔	Other ☐	

Describe the changes. If you need more space, please attach a separate page.
Tree removal and pruning as per requirements for dependable space in relation to BMO. As per attached documents.

Specify the estimated cost of any development for which the permit is required:		
Not applicable ☑	Unchanged ☐	New amount $

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:	[redacted]
Signature:	
Date:	17-04-25

LODGEMENT

Please submit this form, including all amended plans/documents, to 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*.

Greenwood Consulting P/L

Address: 172 Ridge Road Mt Dandenong Vic 3767
Phone: (03) 9754 8334
Mobile: 0457 462 663
Email: shane.s@rgc.net.au
A.B.N. 54 170 171 876
Web: www.rgc.net.au

For

The Project Centre

Site location

127 Cooinda Road
Beaconsfield

Report type

Arboricultural
Construction Impact Assessment

Prepared by

[redacted]

Diploma in Arboriculture (AQF 5).
Tree Risk Assessment Qualification (TRAQ)
Quantified Tree Risk Assessment (QTRA)

Monday 14th April 2025

Ref: 8158 250414 CIR PC Cooinda Beaconsfield 127 Rd

Table of contents

1. Summary

This report was commissioned by The Project Centre to assess the condition of 5 trees located on or adjacent to 127 Cooinda Road, Beaconsfield and to evaluate the impacts on these trees arising from the proposed development on this site.

This report has been modified by Roger Greenwood based on the data captured and previously presented by Shane Simons.

The species identification at this site has been modified based on a further site inspection undertaken by Roger Greenwood on Thursday 10th April 2025.

Of the 65 trees assessed:

1. 28 trees were located within the subject site
2. 37 trees were located on the road reserve and adjoining properties.
3. Eight (8) trees will suffer a construction impact of Low.
    a. These trees will remain viable within the proposed development.
4. Six (6) trees will suffer a construction impact of Moderate.
    a. These trees are likely to remain viable within the proposed development provided that the recommendations of this report are adopted and effectively implemented.
5. Eight (8) trees are likely to suffer a construction impact of High.
    a. These trees are unlikely to remain viable within the proposed development.
6. The remaining 43 trees assessed are unlikely to be impacted from the proposed development.

The Country Fire Authority (CFA) Bushfire Management Overlay (BMO) canopy separation actions for trees within the defendable space are as follows:

- Six (6) trees (Trees 1, 9, 15, 17, 26 & 65) require 'No Action'
- Eleven (11) trees (Trees 3, 4, 6, 12, 13, 14, 19, 20, 21, 22, 24, 27 and 64) will require Pruning to achieve a canopy separation of 5 metres.
- Ten (10) trees (Trees 2, 5, 7, 8, 10, 11, 16, 18, 23 and 25) will require Removal to meet the CFA canopy clearance requirements.

2. Document control

File reference	File type	Modifications	Author	Date
8158 250120	*CIR*	Original document. Construction impact assessment for 64 trees.	SRS	20/01/2025
8158 250219	*CIR*	Amended for BMO action assessment.	SRS	19/02/2025
8158 250406	*CIR*	Amended for effluent envelope and associated cut off trench.	RGG	06/04/2025
8158 250414	*CIR*	Amended for species ID error and one (1) additional tree added.	RGG	14/04/2025

3. Introduction

This report was commissioned by The Project Centre to assess the condition of 64 trees located on or adjacent to 127 Cooinda Road, Beaconsfield and to evaluate the impacts on these trees arising from the proposed development on this site.

This report has been modified by Roger Greenwood based on the data captured and previously presented by Shane Simons.

Specifically, the report addresses the following issues:

- The health and structural condition of the trees.
- The suitability of these trees for retention on the site in light of the proposed development.
- The impact of the development on these trees.
- Recommendations for the protection of these trees.

This report is based, in part, on the plans provided and the accuracy of these plans is assumed. Inaccuracies in the plans provided may invalidate all or parts of this report.

The location of services within the site is not known and the possible impact of any services installation on the retained trees at this site is not included within this report.

The site was inspected by Shane Simons and Roger Greenwood of this office on Tuesday 14th January 2025 and on Thursday 10th April 2025.

4. Documents reviewed

The following documents were reviewed in the preparation of this report.

Date	Title	Author	Company
4th April 2024	Extension – PC220506, Sheet 1-6	T Seddon	The Project Centre
30th September 2024	Bushfire Management Plan – 127 Cooinda Road, Beaconsfield	Brett Woodward	BPAD
30th September 2024	Bushfire Management Statement – 127 Cooinda Road, Beaconsfield. Version 1	Brett Woodward	BPAD
August 2024	Land Capability Assessment for On Site Waste Water Management at 127 Cooinda Rd Beaconsfield (Ref: LCA19082024)	Beata Lorincz	Land Capability Assessment.

5. Scope

All of those trees that are considered significant to the site and that are located either on the site or within four metres of the site boundaries are addressed in this report.

Significant trees are generally those that are greater than five metres in height and/or with a Diameter at Breast Height (DBH) of greater than 15 cm.

6. Site context

This site is located within a Green Wedge A Zone within the municipal area of Cardinia.

The following town planning overlays are applicable to this site:

1. *Green Wedge A Zone (GWAZ1) – Schedule 1*
2. *Environmental Significance Overlay (ESO1) – Schedule 1*
    a. *A permit will be required to prune or remove vegetation in accordance with ESO1.*
3. *Bushfire Management Overlay (BMO)*

7. Methodology

This assessment was carried out from the ground and will generally include assessment of trees within the subject site, on the road reserve/s and on adjoining properties as set out in Section 5 Scope.

The following fields of information were documented:

7. Genus / species & common name.
8. Height, width and DBH (Diameter at Breast Height).
9. Origin of the species (Native, endemic, or exotic).
10. Assessment of health, structure, and general condition.
11. Estimate of Useful Life Expectancy (ULE).
12. Assessment of the amenity value to the site and canopy form.

Digital images were captured of each tree on site.

DBH measurements were taken using a diameter tape.

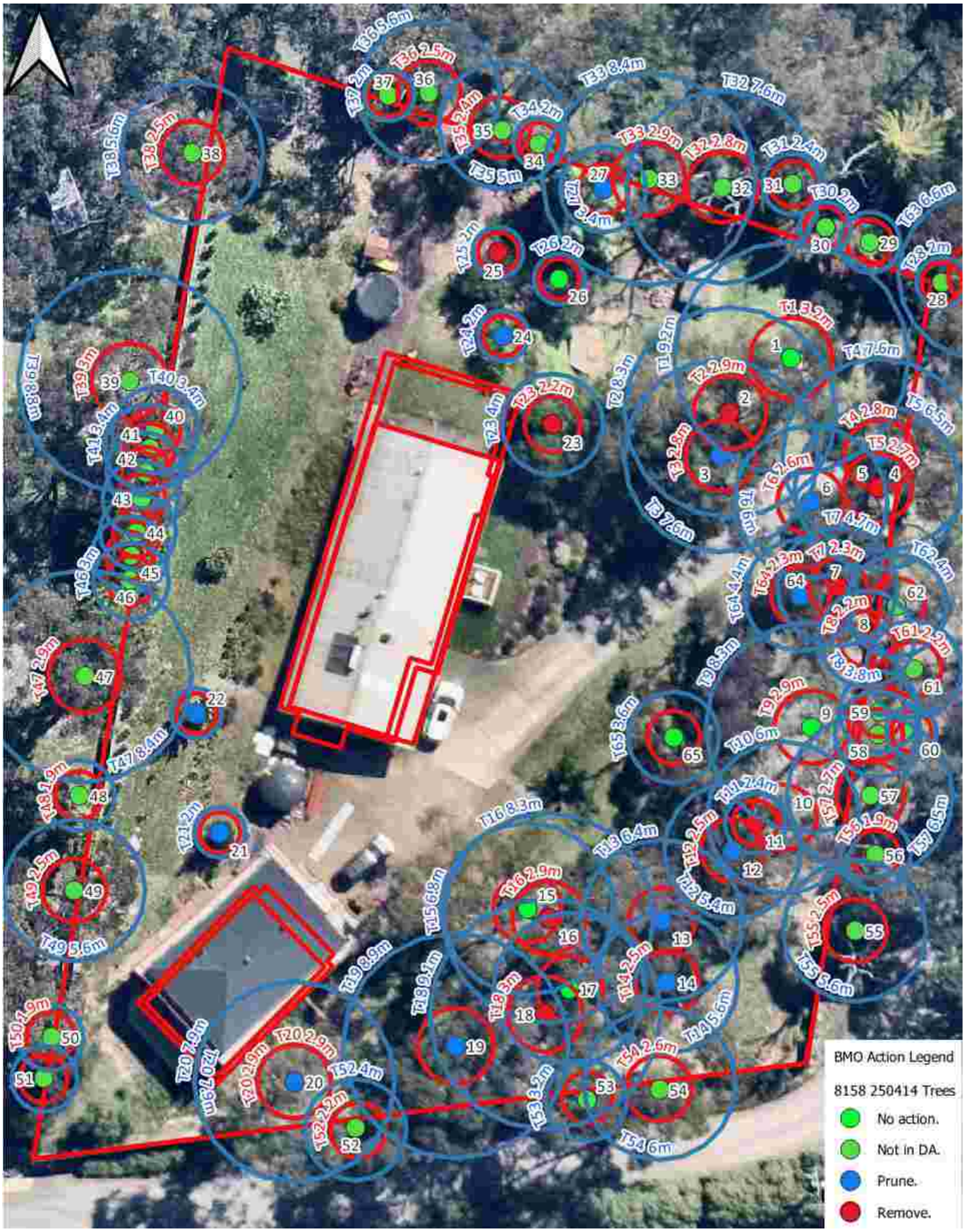
Distances and tree heights were measured using a laser range finder and inclinometer.

8. Notes

1. The original species identification at this site appears to be incorrect and a review of the species at this site found that it is very unlikely that *Eucalyptus fulgens* (Green Scent Bark) is present at this site.
    a. The Eucalyptus species identified at this site are *Eucalyptus goniocalyx* (Long Leafed Box)*, Eucalyptus obliqua* (Messmate) and *Eucalyptus radiata* (Narrow Leafed Peppermint)
    b. The species id in this report has been updated based on the latest site inspection.
2. Trees that have a BMO management requirement of “Remove” are considered to be “Removed” as a part of the proposed works.
3. The column label “**ID”** is used in all the tables throughout this report. This refers to the tree identification number and to the tree numbering found on the “Site plan”. This number is the same as the **“Tree ID”** found in the “Tree data” section of the report.

9. Site plan - BMO action

10. Site plan – TPZ / SRZ



11. Tree summary data

This table contains a summary of data pertaining to all trees shown and numbered on the enclosed feature and levels survey.

Underlined and italicised species names have not been assessed. Generally these trees are <5m tall, not found or stumps. The construction impact values are blank for these records.

1. **Retention value**: The retention value of the tree to the site.
    a. Tree number and species name are **Bold** for High and Very high values trees.
2. **Retained?:** Indicates whether the tree is proposed to be retained on the site.
3. **Construction impact:** Indicates the impact of the proposed development on the tree.
    a. **None:** Works do not intrude onto the tree's TPZ.
    b. **Low:** Construction intrusion is less than 10% of TPZ and contiguous area exists to compensate for any loss.
    c. **Moderate:** Construction intrusion exceeds 10% of TPZ but construction methods or other factors make tree retention possible.
    d. **High:** Construction intrusion is excessive and tree retention is generally considered not possible within the development as currently proposed.
    e. **Blank:** The tree has not been assessed.
4. **Location:** Whether the tree is located on the site or adjacent to the site.
    a. **Site:** the tree is located on the site.
    b. **Off site:** the tree is located on land adjoining the site.
        i. Trees in this category should generally be preserved without significant impact.

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
1	**Eucalyptus goniocalyx**	High	Retained	None	Site	3.2	9.2	22/242
2	Eucalyptus goniocalyx	Moderate	Removed	High	Site	2.9	8.3	10/217
3	Eucalyptus obliqua	Moderate	Retained	None	Site	2.8	7.6	16/198
4	Eucalyptus goniocalyx	Moderate	Retained	None	Site	2.8	7.6	17/198
5	Eucalyptus obliqua	Moderate	Removed	High	Site	2.7	6.5	10/170
6	Eucalyptus radiata	Moderate	Retained	None	Site	2.6	6	17/157
7	Eucalyptus goniocalyx	Moderate	Removed	High	Site	2.3	4.7	16/123
8	Eucalyptus obliqua	Low	Removed	High	Site	2.2	3.8	16/101
9	**Eucalyptus obliqua**	High	Retained	Low	Site	2.9	8.3	23/217
10	**Eucalyptus baxterii**	High	Removed	High	Site	2.6	6	19/157
11	Exocarpus cupressiformis	Low	Removed	High	Site	1.8	2.4	5/63
12	Eucalyptus goniocalyx	Moderate	Retained	Moderate	Site	2.5	5.4	12/141
13	**Eucalyptus radiata**	High	Retained	Moderate	Site	2.6	6.4	14/167
14	Eucalyptus goniocalyx	Moderate	Retained	Moderate	Site	2.5	5.6	12/148
15	Eucalyptus goniocalyx	Moderate	Retained	Low	Site	2.7	6.8	16/179

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
16	**Eucalyptus goniocalyx**	High	Removed	High	Site	2.9	8.3	20/217
17	**Eucalyptus goniocalyx**	High	Retained	Moderate	Site	2.6	6	19/157
18	**Eucalyptus goniocalyx**	High	Removed	High	Site	3	9.1	19/239
19	**Eucalyptus goniocalyx**	High	Retained	Low	Site	3	8.9	17/233
20	Eucalyptus obliqua	Moderate	Retained	Low	Site	2.9	7.9	16/207
20	Eucalyptus obliqua	Moderate	Retained	Low	Site	2.9	7.9	16/207
21	Pinus radiata	Low	Retained	None	Site	1.6	2	6/35
22	Pinus radiata	Low	Retained	None	Site	1.6	2	7/31
23	Cotoneaster sp.	Low	Removed	Low	Site	2.2	4	6/104
24	Hibiscus sp.	Low	Retained	None	Site	1.6	2	3/47
25	Betula pendula	Low	Removed	None	Site	1.6	2	5/47
26	Melaleuca sp.	Low	Retained	None	Site	1.6	2	5/50
27	Pittosporum eugenioides 'Variegatum'	Low	Retained	None	Site	2	3.4	7/88
28	Photinia serrulata	Low	Retained	None	Off site	1.6	2	6/47
29	Photinia serrulata	Low	Retained	None	Off site	1.8	2.4	7/63
30	Photinia serrulata	Low	Retained	None	Off site	1.6	2	5/47
31	Exocarpus cupressiformis	Moderate	Retained	None	Off site	1.8	2.4	8/63
32	Eucalyptus obliqua	Very low	Retained	None	Off site	2.8	7.6	17/198
33	**Eucalyptus obliqua**	High	Retained	None	Off site	2.9	8.4	22/220
34	Pittosporum undulatum	Low	Retained	None	Off site	1.6	2	5/44
35	Eucalyptus goniocalyx	Low	Retained	None	Off site	2.4	5	18/132
36	Eucalyptus obliqua	Moderate	Retained	None	Off site	2.5	5.6	19/148
37	Pittosporum undulatum	Low	Retained	None	Off site	1.7	2	8/53
38	**Eucalyptus goniocalyx**	High	Retained	None	Off site	2.5	5.6	19/148
39	**Eucalyptus goniocalyx**	High	Retained	None	Off site	3	8.8	18/229
40	Hesperocyparis macrocarpa	Low	Retained	None	Off site	2	3.4	8/88
41	Hesperocyparis macrocarpa	Low	Retained	None	Off site	2	3.4	8/88
42	Hesperocyparis macrocarpa	Low	Retained	None	Off site	1.9	3	8/79
43	Hesperocyparis macrocarpa	Low	Retained	None	Off site	1.9	3	8/79
44	Hesperocyparis macrocarpa	Low	Retained	None	Off site	1.9	3	8/79
45	Hesperocyparis macrocarpa	Low	Retained	None	Off site	1.9	3	8/79
46	Hesperocyparis macrocarpa	Low	Retained	None	Off site	1.9	3	8/79
47	**Eucalyptus obliqua**	High	Retained	None	Off site	2.9	8.4	21/220
48	Hesperocyparis macrocarpa	Moderate	Retained	None	Off site	1.9	2.8	7/72
49	Eucalyptus goniocalyx	Moderate	Retained	None	Off site	2.5	5.6	17/148
50	Acacia dealbata	Moderate	Retained	None	Off site	1.9	2.6	8/69
51	Ligustrum sp.	Low	Retained	None	Off site	1.9	2.6	8/69
52	Eucalyptus goniocalyx	Moderate	Retained	None	Off site	2.2	4	14/104
53	Acacia dealbata	Moderate	Retained	None	Off site	2	3.2	9/85

ID:	Genus / Species:	Retention Value:	Retained?:	Construction Impact:	Location:	SRZ:	TPZ:	Height (m) / Trunk circ (cm):
54	**Eucalyptus goniocalyx**	High	Retained	Low	Off site	2.6	6	18/157
55	Eucalyptus sp.	Very low	Retained	Low	Off site	2.5	5.6	16/148
56	Eucalyptus goniocalyx	Low	Retained	None	Off site	1.9	2.8	6/72
57	Eucalyptus obliqua	Moderate	Retained	Low	Off site	2.7	6.5	10/170
58	Eucalyptus goniocalyx	Moderate	Retained	None	Off site	2	3.4	10/88
59	Eucalyptus radiata	Moderate	Retained	None	Off site	2	3.2	12/85
60	Eucalyptus goniocalyx	Low	Retained	None	Off site	1.6	2	8/44
61	Eucalyptus goniocalyx	Low	Retained	None	Off site	2.2	3.8	8/101
62	Eucalyptus obliqua	Low	Retained	None	Off site	2.2	4	9/104
63	**Eucalyptus obliqua**	High	Retained	None	Off site	2.7	6.6	17/173
64	Eucalyptus obliqua	Moderate	Retained	Moderate	Site	2.3	4.4	10/116
65	Eucalyptus goniocalyx	Moderate	Retained		Site	2.1	3.6	11/94

Total number of tree/s referred to in this report(Total): 66

12. BMO summary tree data

The following table contains a summary of the data for all trees shown and numbered on the enclosed site plan

Underlined and italicised species name entries in this list have not been assessed. Generally, these trees are <5m tall, were not found at the site or are stumps.

1. **Retention value:** The relative value of the tree to the site and surrounding area.
    a. Tree number and species name are **Bold** for High and Very high retention value trees.
2. **Location:** Indicates whether the tree is location on the subject site or on adjoining properties (including road reserves).
3. **BMO action:** Indicates the action required to achieve the required canopy clearances under the BMO.
    a. **Remove:** The tree must be removed to achieve the required clearances.
    b. **Remove understorey:** Remove understorey trees and shrubs to achieve specified clearances.
    c. **Prune:** The tree must be pruned to achieve the specified clearances.
        i. These clearances are usually more or less horizontal between canopies.
    d. **Remove selected:** Selected shrubs must be removed to achieve the required clearances.
    e. **No action:** No action is required to achieve the required clearances.

ID:	Genus / Species:	Retention Value:	Location:	Retained:
1	**Eucalyptus goniocalyx**	High	Site	Retained
BMO Action:	No action.			
2	Eucalyptus goniocalyx	Moderate	Site	Removed
BMO Action:	Remove.			
3	Eucalyptus obliqua	Moderate	Site	Retained
BMO Action:	Prune.			
4	Eucalyptus goniocalyx	Moderate	Site	Retained
BMO Action:	Prune.			
5	Eucalyptus obliqua	Moderate	Site	Removed
BMO Action:	Remove.			
6	Eucalyptus radiata	Moderate	Site	Retained
BMO Action:	Prune.			

ID:	Genus / Species:	Retention Value:	Location:	Retained:
7	Eucalyptus goniocalyx	Moderate	Site	Removed
BMO Action:	Remove.			
8	Eucalyptus obliqua	Low	Site	Removed
BMO Action:	Remove.			
9	**Eucalyptus obliqua**	High	Site	Retained
BMO Action:	No action.			
10	**Eucalyptus baxterii**	High	Site	Removed
BMO Action:	Remove.			
11	Exocarpus cupressiformis	Low	Site	Removed
BMO Action:	Remove.			
12	Eucalyptus goniocalyx	Moderate	Site	Retained
BMO Action:	Prune.			
13	**Eucalyptus radiata**	High	Site	Retained
BMO Action:	Prune.			
14	Eucalyptus goniocalyx	Moderate	Site	Retained
BMO Action:	Prune.			
15	Eucalyptus goniocalyx	Moderate	Site	Retained
BMO Action:	No action.			
16	**Eucalyptus goniocalyx**	High	Site	Removed
BMO Action:	Remove.			
17	**Eucalyptus goniocalyx**	High	Site	Retained
BMO Action:	No action.			
18	**Eucalyptus goniocalyx**	High	Site	Removed
BMO Action:	Remove.			
19	**Eucalyptus goniocalyx**	High	Site	Retained
BMO Action:	Prune.			
20	Eucalyptus obliqua	Moderate	Site	Retained
BMO Action:	Prune.			
20	Eucalyptus obliqua	Moderate	Site	Retained
BMO Action:	Prune.			
21	Pinus radiata	Low	Site	Retained
BMO Action:	No action.			
22	Pinus radiata	Low	Site	Retained
BMO Action:	No action.			
23	Cotoneaster sp.	Low	Site	Removed
BMO Action:	Remove.			
24	Hibiscus sp.	Low	Site	Retained
BMO Action:	Prune.			
25	Betula pendula	Low	Site	Removed
BMO Action:	Remove.			

ID:	Genus / Species:	Retention Value:	Location:	Retained:
26	Melaleuca sp.	Low	Site	Retained
BMO Action:	No action.			
27	Pittosporum eugenioides 'Variegatu	Low	Site	Retained
BMO Action:	Prune.			
28	Photinia serrulata	Low	Off site	Retained
BMO Action:	Not in DA.			
29	Photinia serrulata	Low	Off site	Retained
BMO Action:	Not in DA.			
30	Photinia serrulata	Low	Off site	Retained
BMO Action:	Not in DA.			
31	Exocarpus cupressiformis	Moderate	Off site	Retained
BMO Action:	Not in DA.			
32	Eucalyptus obliqua	Very low	Off site	Retained
BMO Action:	Not in DA.			
33	**Eucalyptus obliqua**	High	Off site	Retained
BMO Action:	Not in DA.			
34	Pittosporum undulatum	Low	Off site	Retained
BMO Action:	Not in DA.			
35	Eucalyptus goniocalyx	Low	Off site	Retained
BMO Action:	Not in DA.			
36	Eucalyptus obliqua	Moderate	Off site	Retained
BMO Action:	Not in DA.			
37	Pittosporum undulatum	Low	Off site	Retained
BMO Action:	Not in DA.			
38	**Eucalyptus goniocalyx**	High	Off site	Retained
BMO Action:	Not in DA.			
39	**Eucalyptus goniocalyx**	High	Off site	Retained
BMO Action:	Not in DA.			
40	Hesperocyparis macrocarpa	Low	Off site	Retained
BMO Action:	Not in DA.			
41	Hesperocyparis macrocarpa	Low	Off site	Retained
BMO Action:	Not in DA.			
42	Hesperocyparis macrocarpa	Low	Off site	Retained
BMO Action:	Not in DA.			
43	Hesperocyparis macrocarpa	Low	Off site	Retained
BMO Action:	Not in DA.			
44	Hesperocyparis macrocarpa	Low	Off site	Retained
BMO Action:	Not in DA.			
45	Hesperocyparis macrocarpa	Low	Off site	Retained
BMO Action:	Not in DA.			

ID:	Genus / Species:	Retention Value:	Location:	Retained:
46	Hesperocyparis macrocarpa	Low	Off site	Retained
BMO Action:	Not in DA.			
47	**Eucalyptus obliqua**	High	Off site	Retained
BMO Action:	Not in DA.			
48	Hesperocyparis macrocarpa	Moderate	Off site	Retained
BMO Action:	Not in DA.			
49	Eucalyptus goniocalyx	Moderate	Off site	Retained
BMO Action:	Not in DA.			
50	Acacia dealbata	Moderate	Off site	Retained
BMO Action:	Not in DA.			
51	Ligustrum sp.	Low	Off site	Retained
BMO Action:	Not in DA.			
52	Eucalyptus goniocalyx	Moderate	Off site	Retained
BMO Action:	Not in DA.			
53	Acacia dealbata	Moderate	Off site	Retained
BMO Action:	Not in DA.			
54	**Eucalyptus goniocalyx**	High	Off site	Retained
BMO Action:	Not in DA.			
55	Eucalyptus sp.	Very low	Off site	Retained
BMO Action:	Not in DA.			
56	Eucalyptus goniocalyx	Low	Off site	Retained
BMO Action:	Not in DA.			
57	Eucalyptus obliqua	Moderate	Off site	Retained
BMO Action:	Not in DA.			
58	Eucalyptus goniocalyx	Moderate	Off site	Retained
BMO Action:	Not in DA.			
59	Eucalyptus radiata	Moderate	Off site	Retained
BMO Action:	Not in DA.			
60	Eucalyptus goniocalyx	Low	Off site	Retained
BMO Action:	Not in DA.			
61	Eucalyptus goniocalyx	Low	Off site	Retained
BMO Action:	Not in DA.			
62	Eucalyptus obliqua	Low	Off site	Retained
BMO Action:	Not in DA.			
63	**Eucalyptus obliqua**	High	Off site	Retained
BMO Action:	Not in DA.			
64	Eucalyptus obliqua	Moderate	Site	Retained
BMO Action:	Prune.			
65	Eucalyptus goniocalyx	Moderate	Site	Retained
BMO Action:	No action.			

Total number of tree/s referred to in this report(Total): 66

13. Construction impact

The following trees are regarded as being suitable for retention and are located within close proximity to elements of the proposed development. The successful retention of those trees that are proposed to be retained may require additional care and the adoption of the following recommendations.

Note: The following table presents data for the effluent envelop and BMO requirement impacts.

ID	Genus / species	DBH	SRZ	TPZ	TPZ	Impact	Ret Value	Retained?
The following 9 tree/s are shown as Removed on the plans provided.								
2	*Eucalyptus goniocalyx*	69	2.9	8.3		High	Moderate	Removed
5	*Eucalyptus obliqua*	54	2.7	6.5		High	Moderate	Removed
7	*Eucalyptus goniocalyx*	39	2.3	4.7		High	Moderate	Removed
8	*Eucalyptus obliqua*	32	2.2	3.8		High	Low	Removed
10	*Eucalyptus baxterii*	50	2.6	6.0		High	High	Removed
11	*Exocarpus cupressiformis*	20	1.8	2.4		High	Low	Removed
16	*Eucalyptus goniocalyx*	69	2.9	8.3		High	High	Removed
18	*Eucalyptus goniocalyx*	76	3	9.1		High	High	Removed
23	*Cotoneaster sp.*	33	2.2	4.0		Low	Low	Removed
The following 13 tree/s are shown as Retained on the plans provided.								
9	*Eucalyptus obliqua*	69	2.9	8.3		Low	High	Retained
12	*Eucalyptus goniocalyx*	45	2.5	5.4		Moderate	Moderate	Retained
13	*Eucalyptus radiata*	53	2.6	6.4		Moderate	High	Retained
14	*Eucalyptus goniocalyx*	47	2.5	5.6		Moderate	Moderate	Retained
15	*Eucalyptus goniocalyx*	57	2.7	6.8		Low	Moderate	Retained
17	*Eucalyptus goniocalyx*	50	2.6	6.0		Moderate	High	Retained
19	*Eucalyptus goniocalyx*	74	3	8.9		Low	High	Retained
20	*Eucalyptus obliqua*	66	2.9	7.9		Low	Moderate	Retained
20	*Eucalyptus obliqua*	66	2.9	7.9		Low	Moderate	Retained
54	*Eucalyptus goniocalyx*	50	2.6	6.0		Low	High	Retained
55	*Eucalyptus sp.*	47	2.5	5.6		Low	Very low	Retained
57	*Eucalyptus obliqua*	54	2.7	6.5		Low	Moderate	Retained
64	*Eucalyptus obliqua*	37	2.3	4.4		Moderate	Moderate	Retained

SRZ: Structural Root Zone. TPZ: Tree Protection Zone. mTPZ: Tree Protection Zone.(Canopy) ConP: Construction Proximity.

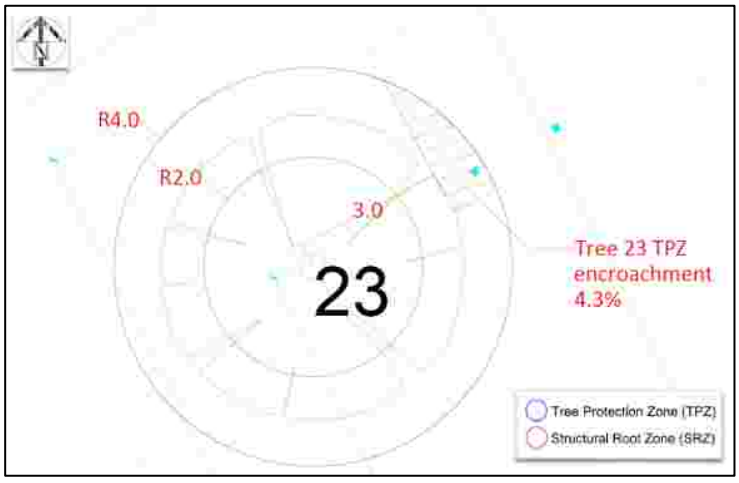
Number of trees in this section (total): 22

13.1. Tree 23

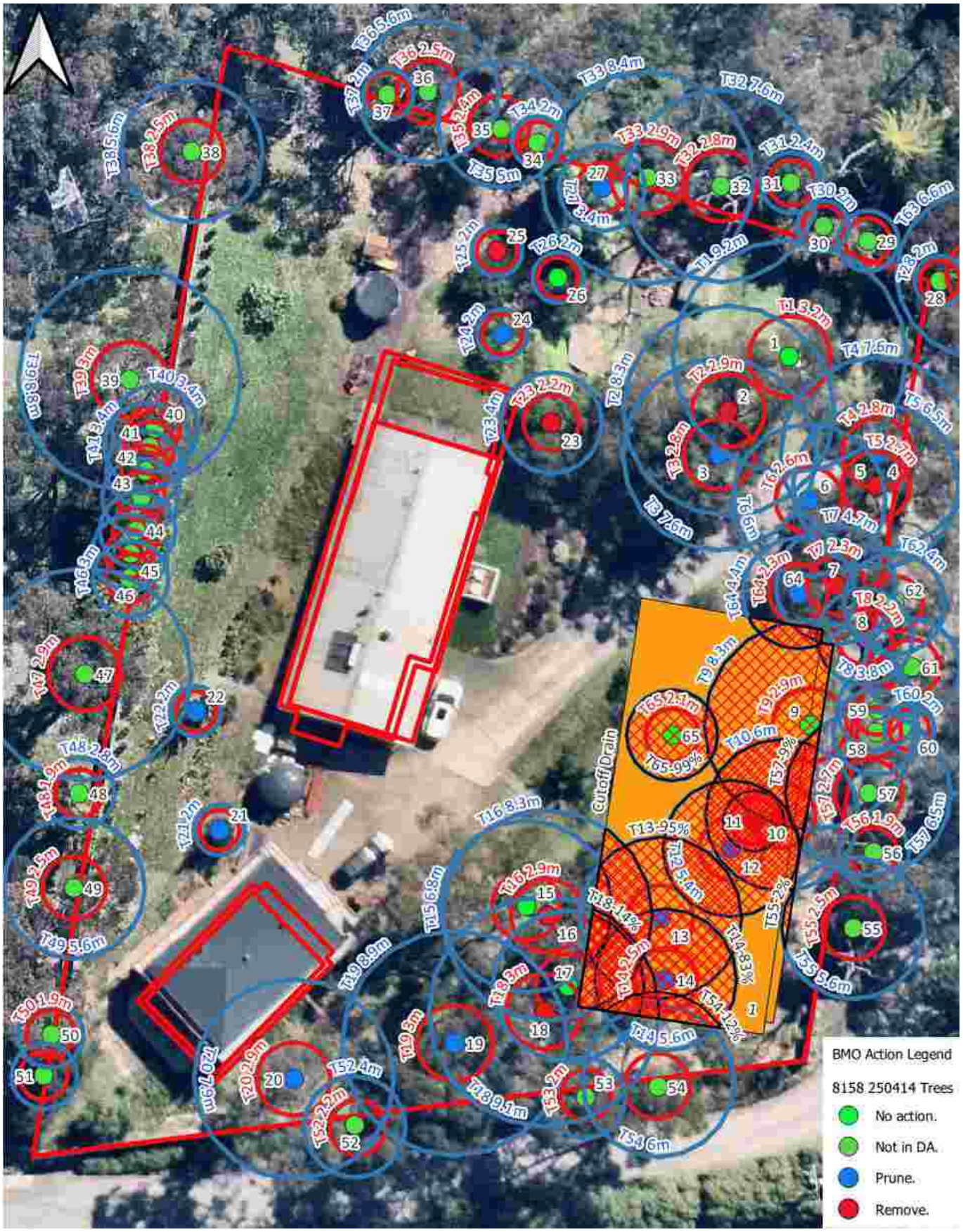
Tree 23 is a mature Cotoneaster sp. (Cotoneaster) that exhibits Good health and Fair structure and has a Useful Life Expectancy of 15 - 30 years. It is located on the subject site and has a retention value of Low.

This tree has a DBH of 33 cm, an SRZ of 2.2 m, a TPZ of 4 m and a construction impact of Low.

This tree will remain viable within the current development.



14. Effluent envelope & cut off drain impacts



The proposed effluent envelope for the treatment plant at this site is located at the south eastern corner of the site and will impact a number of trees in this area.

A cut off drain is proposed as a part of the effluent envelope and, while the depth of this cut off drain is not specified in the Land Capability Report August 2024), it is understood that the drain must be at least 200mm below existing grade. The depth of the proposed cutoff drain should be verified with Land Capability.

The impacts of the proposed cutoff drain and the effluent envelope are quite different and must be considered separately within this assessment.

The cutoff drain, if open trenched to a depth of 200 – 300mm will could be expected to have a significant impact on tree root systems within the soil volumes that is traverses. All roots that it transects to the excavated depth could be expected to be severed.

If it is assumed that the total root zone depth for these trees may be 800mm the a cutoff drain excavation depth of 200 – 300mm will impact approximately 25 = 40% of the root systems within the affected areas.

The root mass below the level of the cutoff drain will remain intact.

And, if the cutoff trench can be excavated using non destructive excavation (NDE) methods, then the impact of the cut off drain may well be very low.

The impact of the effluent envelope on the retained trees is related to the extent to which additional nutrients and water within the soil volume impact the trees that are located within the effluent envelop, or which have significant proportion of their TPZ within the effluent envelope.

The species in this area are most *Eucalyptus goniocalyx* (Long Leafed Box)*, Eucalyptus obliqua* (Messmate) and *Eucalyptus radiata* (Narrow Leafed Peppermint) and, while the capacity of this species to tolerate the additional nutrients and water from the effluent system is not known, it is likely that the trees of these species will tolerate the additional water and nutrients with low to moderate reduction in Useful Life Expectancy.

These species are all found in relatively high rainfall areas and wet areas and it is likely that the additional soil moisture from the effluent treatment plant will not unduly impact these trees.

It is understood that Cardinia Shire Council has specified that, if an effluent envelope TPZ intrusion of greater than 10% exists for any tree then that tree must be considered to be lost.

However, AS 4970 2009 *Preservation of Trees on Development Sites* notes that, if any TPZ intrusion exceeds 10%, then it must be demonstrated that tree will remain viable.

While there is little information on the tolerance of individual trees species to effluent dispersal and the impact assessment for these trees is speculative, it is very likely that TPZ intrusions of less than 50% will have very little impact on these trees and it is possible that trees with TPZ intrusions of greater than 50% will tolerate the effluent envelop impacts with only moderate reduction in their Useful Life Expectancy.

ID	Removed / retained	TPZ intrusion Cutoff drain	TPZ intrusion Effluent Envelope	Notes
7	Removed	N/A	N/A	BMO removal
8	Removed	N/A	N/A	BMO removal
9	Retained	1%	54.1%	
10	Removed	N/A	N/A	BMO removal
11	Removed	N/A	N/A	BMO removal
12	Retained	0%	98.4%	
13	Retained	5.1%	94.9%	
14	Retained	17.5%	82.5%	
15	Retained	5.9%	5.9%	
16	Removed	N/A	N/A	BMO removal
17	Retained	25.6%	25.6%	Significant SRZ intrusion
18	Removed	N/A	N/A	BMO removal
54	Retained	1.7%	0%	
55	Retained	0%	1.7%	
57	Retained	0%	9.0%	
64	Retained	13.8%	6%	
65	Retained	0%	100%	

14.1. Cut off drain impacts

Trees 14, 17 and 64 are likely to be significantly impacted by the proposed cut off drain (i.e. the cut off drain will transect more than 10% of the TPZ for each of these trees).

However, as noted above, the cut off drain impact could be reduced to a very low level by the use of non destructive excavation methods such a compressed air or hydro excavation.

Compressed air excavation is likely to be useful provided that the trench depth required for the cut off drain is not greater than 300 – 400mm below existing grade.

Hydro excavation could be used to depths deeper than 400mm below existing grade.

Non destructive excavation would only be required within the TPZ for the three trees listed above.

If NDE methods are used for these trees then the impact of the cut off drain for these three trees would be eliminated and these trees would not be significantly impacted by the proposed cut off trench.

The impacts of the effluent envelope will still affect some of trees as set out below.

14.2. Effluent envelope impacts

Trees 9, 12, 13, 14 & 17 have an effluent envelope intrusion of more than 10% of TPZ surface area.

Of these trees:

1. Trees 12 & 13 could be expected to suffer moderate impacts following the commissioning of the effluent treatment system.
2. Trees 9, 14, & 17 could be expected to suffer only a minor impact from the proposed effluent envelope.

The remaining trees in the area of the effluent envelope have TPZ intrusion of less than 10% and will not be significantly impacted by the proposed works. These trees will remain viable.

Trees 15, 17, 54, 55, 57 & 64 are likely to remain viable provided that the recommendations of this report are adopted and effectively implemented.

15. Recommendations

The following recommendations should be adopted to ensure the successful retention of those trees that are proposed to be retained.

1. A services plan should be created for this site and this construction impact report should be revised as required to ensure that services installation impacts on retained trees are avoided.
2. A Tree Management Plan should be created for this site to inform tree management guide construction within the Tree Protection Zones for retained trees.

15.1. Cut off drain & effluent envelope

3. Within the TPZ for retained trees, the cut off drain must be excavated using Non Destructive Excavation methods.
    a. Compressed air or hydro excavation would be suitable for this purpose.
    b. If this is not possible then any trees with a cut off trench TPZ intrusion of greater than 20% or where an SRZ intrusion exists, should be considered lost.

15.2. BMO pruning & removal

4. Tree pruning and removal to meet the CFA canopy separation requirements should be undertaken as set out above.

Construction – no impact

The following trees are regarded as being suitable for retention and are unlikely to suffer any significant impact from the proposed development.

While significant care may be required to successfully retain these trees, no modification of the plans or special precautions are likely to be required to ensure this outcome. If these trees are to be retained then they should be protected during construction as outlined in Section 21 - Tree Protection Guidelines.

ID	Genus / species	DBH	SRZ	TPZ:	mTPZ	Impact:	Ret Value	Retained
The following 1 tree/s are shown as Removed on the plans provided.								
25	*Betula pendula*	15	1.6	2.0		None	Low	Removed
The following 42 tree/s are shown as Retained on the plans provided.								
1	*Eucalyptus goniocalyx*	77	3.2	9.2		None	High	Retained
3	*Eucalyptus obliqua*	63	2.8	7.6		None	Moderate	Retained
4	*Eucalyptus goniocalyx*	63	2.8	7.6		None	Moderate	Retained
6	*Eucalyptus radiata*	50	2.6	6.0		None	Moderate	Retained
21	*Pinus radiata*	11	1.6	2.0		None	Low	Retained
22	*Pinus radiata*	10	1.6	2.0		None	Low	Retained
24	*Hibiscus sp.*	15	1.6	2.0		None	Low	Retained
26	*Melaleuca sp.*	16	1.6	2.0		None	Low	Retained
27	*Pittosporum eugenioides*	28	2	3.4		None	Low	Retained
28	*Photinia serrulata*	15	1.6	2.0		None	Low	Retained
29	*Photinia serrulata*	20	1.8	2.4		None	Low	Retained
30	*Photinia serrulata*	15	1.6	2.0		None	Low	Retained
31	*Exocarpus cupressiformis*	20	1.8	2.4		None	Moderate	Retained
32	*Eucalyptus obliqua*	63	2.8	7.6		None	Very low	Retained
33	*Eucalyptus obliqua*	70	2.9	8.4		None	High	Retained
34	*Pittosporum undulatum*	14	1.6	2.0		None	Low	Retained
35	*Eucalyptus goniocalyx*	42	2.4	5.0		None	Low	Retained
36	*Eucalyptus obliqua*	47	2.5	5.6		None	Moderate	Retained
37	*Pittosporum undulatum*	17	1.7	2.0		None	Low	Retained
38	*Eucalyptus goniocalyx*	47	2.5	5.6		None	High	Retained
39	*Eucalyptus goniocalyx*	73	3	8.8		None	High	Retained
40	*Hesperocyparis macrocarpa*	28	2	3.4		None	Low	Retained
41	*Hesperocyparis macrocarpa*	28	2	3.4		None	Low	Retained
42	*Hesperocyparis macrocarpa*	25	1.9	3.0		None	Low	Retained
43	*Hesperocyparis macrocarpa*	25	1.9	3.0		None	Low	Retained
44	*Hesperocyparis macrocarpa*	25	1.9	3.0		None	Low	Retained
45	*Hesperocyparis macrocarpa*	25	1.9	3.0		None	Low	Retained
46	*Hesperocyparis macrocarpa*	25	1.9	3.0		None	Low	Retained
47	*Eucalyptus obliqua*	70	2.9	8.4		None	High	Retained
48	*Hesperocyparis macrocarpa*	23	1.9	2.8		None	Moderate	Retained
49	*Eucalyptus goniocalyx*	47	2.5	5.6		None	Moderate	Retained
50	*Acacia dealbata*	22	1.9	2.6		None	Moderate	Retained
51	*Ligustrum sp.*	22	1.9	2.6		None	Low	Retained
52	*Eucalyptus goniocalyx*	33	2.2	4.0		None	Moderate	Retained
53	*Acacia dealbata*	27	2	3.2		None	Moderate	Retained
56	*Eucalyptus goniocalyx*	23	1.9	2.8		None	Low	Retained
58	*Eucalyptus goniocalyx*	28	2	3.4		None	Moderate	Retained
59	*Eucalyptus radiata*	27	2	3.2		None	Moderate	Retained
60	*Eucalyptus goniocalyx*	14	1.6	2.0		None	Low	Retained
61	*Eucalyptus goniocalyx*	32	2.2	3.8		None	Low	Retained
62	*Eucalyptus obliqua*	33	2.2	4.0		None	Low	Retained
63	*Eucalyptus obliqua*	55	2.7	6.6		None	High	Retained

SRZ: Structural Root Zone. TPZ: Tree Protection Zone. mTPZ: Tree Protection Zone.(Canopy) ConP: Construction Proximity.

Number of trees in this section Total): 43

16. Trees shown as removed

ID	Genus / species	Common name	ULE	Ret value
The retention value for the following 3 tree/s is High				
10	*Eucalyptus baxterii*	Brown Stringybark	30 - 60	High
16	*Eucalyptus goniocalyx*	Long leaved Box	30 - 60	High
18	*Eucalyptus goniocalyx*	Long leaved Box	30 - 60	High
The retention value for the following 4 tree/s is Low				
8	*Eucalyptus obliqua*	Messmate	30 - 60	Low
11	*Exocarpus cupressiformis*	Cherry Ballart	15 - 30	Low
23	*Cotoneaster sp.*	Cotoneaster	15 - 30	Low
25	*Betula pendula*	Silver Birch	15 - 30	Low
The retention value for the following 3 tree/s is Moderate				
2	*Eucalyptus goniocalyx*	Long leaved Box	30 - 60	Moderate
5	*Eucalyptus obliqua*	Messmate	30 - 60	Moderate
7	*Eucalyptus goniocalyx*	Long leaved Box	30 - 60	Moderate
Number of tree/s in this section (Total): 10				

17. Trees recommended for removal

No trees are recommended for removal on this site.

18. Works required

No works are recommended on the trees to be retained on this site.

19. Weed species

The following trees are regarded by authorities as being environmental weeds (Muyt, 2001). Consideration should be given to the removal of these trees on the basis of their potential to contribute to environmental weed problems within the local area.

Trees located on adjoining properties are not included in this list.

ID	Genus / species	Common name	ULE	Ret value
21	*Pinus radiata*	Monterey Pine	30 - 60	Low
22	*Pinus radiata*	Monterey Pine	30 - 60	Low
Number of tree/s in this section (Total): 2				

22. Appendix 2 - Tree data

Note: Where **Retention value** = "**Remove**" only the arboricultural attributes of the tree (i.e. health, structure and ULE) are considered. Other factors that may affect the decision to retain or remove the tree are not considered.

- Where the **'Construction Proximity'** is larger than the **'Tree Protection Zone (TPZ)'** it is probable that the development will have **no significant impact on the health and longevity** of the tree.
- Where the '**Construction Proximity'** is larger than the '**Structural Root Zone (SRZ)'** it is probable that the development will have **no significant impact on the stability** of the tree.
- The following information should be read in conjunction with the **'Explanation of Terms'** and the **'Glossary / Notes'** sections found later in this report.

SRZ (m):	AS 4970-2009 Protection of trees on development sites. (Radius)	Total Number of trees
TPZ (m):	AS 4970-2009 Protection of trees on development sites (Radius)	65
mTPZ (m):	Modification to TPZ as required to protect canopy	
Construction Proximity:	0.1 indicates construction over or immediately adjacent to the tree	

Tree ID: 1

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	22	**Structure:**	Fair
Width (m):	8	**Health:**	Good
DBH (cm):	77 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 40
Retained?:	Retained	**Form:**	Good

Retention Value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: N/A.

SRZ (m): ***3.2*** **Works priority:** N/A

TPZ (m): ***9.2*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 2

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	10	**Structure:**	Fair
Width (m):	10	**Health:**	Good
DBH (cm):	69 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 40
Retained?:	Removed	**Form:**	Good

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2.9*** **Works priority:** N/A

TPZ (m): ***8.3*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 3

Genus / species: *Eucalyptus obliqua*

Evergreen Messmate

Height (m):	16	**Structure:**	Fair
Width (m):	12	**Health:**	Good
DBH (cm):	63 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m):	***2.8***	**Works priority:**	N/A
TPZ (m):	***7.6***	***Construction Proximity:***	***0.1***
mTPZ (m):			

Tree ID: 4

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	17	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	63 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m):	***2.8***	**Works priority:**	N/A
TPZ (m):	***7.6***	***Construction Proximity:***	***0.1***
mTPZ (m):			

Tree ID: 5

Genus / species: *Eucalyptus obliqua*

Evergreen Messmate

Height (m):	10	**Structure:**	Fair
Width (m):	12	**Health:**	Good
DBH (cm):	54 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Fair

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m):	***2.7***	**Works priority:**	N/A
TPZ (m):	***6.5***	***Construction Proximity:***	***0.1***
mTPZ (m):			

Tree ID: 6

Genus / species: *Eucalyptus radiata*

Evergreen Narrow-leaf Peppermint

Height (m):	17	**Structure:**	Poor
Width (m):	12	**Health:**	Fair
DBH (cm):	50 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Fair

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2.6*** ***Works priority:*** N/A

TPZ (m): ***6.0*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 7

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	16	**Structure:**	Good
Width (m):	12	**Health:**	Fair
DBH (cm):	39 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Fair

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2.3*** ***Works priority:*** N/A

TPZ (m): ***4.7*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 8

Genus / species: *Eucalyptus obliqua*

Evergreen Messmate

Height (m):	16	**Structure:**	Good
Width (m):	9	**Health:**	Fair
DBH (cm):	32 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Fair

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m): ***2.2*** ***Works priority:*** N/A

TPZ (m): ***3.8*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 9

Genus / species: *Eucalyptus obliqua*
Evergreen Messmate

Height (m):	23	**Structure:**	Good
Width (m):	14	**Health:**	Good
DBH (cm):	69 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: High
Removal / retention reason: N/A.
Amenity value: High
Works Required: N/A.

SRZ (m): ***2.9*** ***Works priority:*** N/A
TPZ (m): ***8.3*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 10

Genus / species: *Eucalyptus baxterii*
Evergreen Brown Stringybark

Height (m):	19	**Structure:**	Good
Width (m):	14	**Health:**	Good
DBH (cm):	50 Measured	**Maturity:**	Mature
Origin:	Victorian	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Fair

Retention Value: High
Removal / retention reason: N/A.
Amenity value: High
Works Required: N/A.

SRZ (m): ***2.6*** ***Works priority:*** N/A
TPZ (m): ***6.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 11

Genus / species: *Exocarpus cupressiformis*
Evergreen Cherry Ballart

Height (m):	5	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	20 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Removed	**Form:**	Good

Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.8*** ***Works priority:*** N/A
TPZ (m): ***2.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 12

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	12	**Structure:**	Good
Width (m):	16	**Health:**	Good
DBH (cm):	45 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2.5*** ***Works priority:*** N/A

TPZ (m): ***5.4*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 13

Genus / species: *Eucalyptus radiata*

Evergreen Narrow-leaf Peppermint

Height (m):	14	**Structure:**	Good
Width (m):	16	**Health:**	Good
DBH (cm):	53 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: High

Removal / retention reason: N/A.

Amenity value: High

Works Required: N/A.

SRZ (m): ***2.6*** ***Works priority:*** N/A

TPZ (m): ***6.4*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 14

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	12	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	47 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Poor

Retention Value: Moderate

Removal / retention reason: N/A.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2.5*** ***Works priority:*** N/A

TPZ (m): ***5.6*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 15

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	16	**Structure:**	Good
Width (m):	14	**Health:**	Good
DBH (cm):	57 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: Moderate
Removal / retention reason: N/A.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***2.7*** ***Works priority:*** N/A
TPZ (m): ***6.8*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 16

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	20	**Structure:**	Fair
Width (m):	16	**Health:**	Good
DBH (cm):	69 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Fair

Retention Value: High
Removal / retention reason: N/A.
Amenity value: High
Works Required: N/A.

SRZ (m): ***2.9*** ***Works priority:*** N/A
TPZ (m): ***8.3*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 17

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	19	**Structure:**	Good
Width (m):	18	**Health:**	Good
DBH (cm):	50 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: High
Removal / retention reason: N/A.
Amenity value: High
Works Required: N/A.

SRZ (m): ***2.6*** ***Works priority:*** N/A
TPZ (m): ***6.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 18

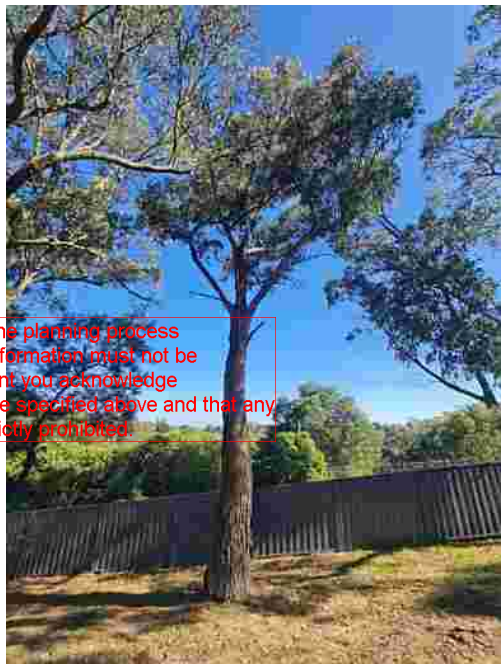
Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	19	**Structure:**	Good
Width (m):	18	**Health:**	Good
DBH (cm):	76 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Removed	**Form:**	Fair

Retention Value: High
Removal / retention reason: N/A.
Amenity value: High
Works Required: N/A.

SRZ (m): ***3*** **Works priority:** N/A
TPZ (m): ***9.1*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 19



Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	17	**Structure:**	Good
Width (m):	14	**Health:**	Good
DBH (cm):	74 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: High
Removal / retention reason: N/A.
Amenity value: High
Works Required: N/A.

SRZ (m): ***3*** **Works priority:** N/A
TPZ (m): ***8.9*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 20

Genus / species: *Eucalyptus obliqua*
Evergreen Messmate

Height (m):	16	**Structure:**	Good
Width (m):	16	**Health:**	Good
DBH (cm):	66 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: Moderate
Removal / retention reason: N/A.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***2.9*** **Works priority:** N/A
TPZ (m): ***7.9*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 21

Genus / species: *Pinus radiata*

Evergreen Monterey Pine

Height (m):	6	**Structure:**	Good
Width (m):	2	**Health:**	Good
DBH (cm):	11 Measured	**Maturity:**	Young
Origin:	Exotic	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** N/A

TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 22

Genus / species: *Pinus radiata*

Evergreen Monterey Pine

Height (m):	7	**Structure:**	Good
Width (m):	3	**Health:**	Good
DBH (cm):	10 Measured	**Maturity:**	Young
Origin:	Exotic	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** N/A

TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 23

Genus / species: *Cotoneaster sp.*

Evergreen Cotoneaster

Height (m):	6	**Structure:**	Fair
Width (m):	6	**Health:**	Good
DBH (cm):	33 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Removed	**Form:**	Good

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m): ***2.2*** ***Works priority:*** N/A

TPZ (m): ***4.0*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 24

Genus / species: *Hibiscus sp.*

Deciduous Hibiscus

Height (m):	3	**Structure:**	Fair
Width (m):	4	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m):	***1.6***	**Works priority:**	N/A
TPZ (m):	***2.0***	***Construction Proximity:***	***0.1***
mTPZ (m):			

Tree ID: 25

Genus / species: *Betula pendula*

Deciduous Silver Birch

Height (m):	5	**Structure:**	Fair
Width (m):	4	**Health:**	Good
DBH (cm):	15 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Removed	**Form:**	Good

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m):	***1.6***	**Works priority:**	N/A
TPZ (m):	***2.0***	***Construction Proximity:***	***0.1***
mTPZ (m):			

Tree ID: 26

Genus / species: *Melaleuca sp.*

Evergreen Paperbark

Height (m):	5	**Structure:**	Fair
Width (m):	6	**Health:**	Good
DBH (cm):	16 Measured	**Maturity:**	Mature
Origin:	Australian	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Low

Removal / retention reason: N/A.

Amenity value: Low

Works Required: N/A.

SRZ (m):	***1.6***	**Works priority:**	N/A
TPZ (m):	***2.0***	***Construction Proximity:***	***0.1***
mTPZ (m):			

Tree ID: 27

Genus / species: *Pittosporum eugenioides 'Variegatum'*
Evergreen Tarata

Height (m):	7	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	28 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Fair

Retention Value: Low
Removal / retention reason: N/A.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***2*** **Works priority:** N/A
TPZ (m): ***3.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 28

Genus / species: *Photinia serrulata*
Evergreen Chinese Hawthorn

Height (m):	6	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.6*** **Works priority:** N/A
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 29

Genus / species: *Photinia serrulata*
Evergreen Chinese Hawthorn

Height (m):	7	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	20 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.8*** **Works priority:** N/A
TPZ (m): ***2.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 30

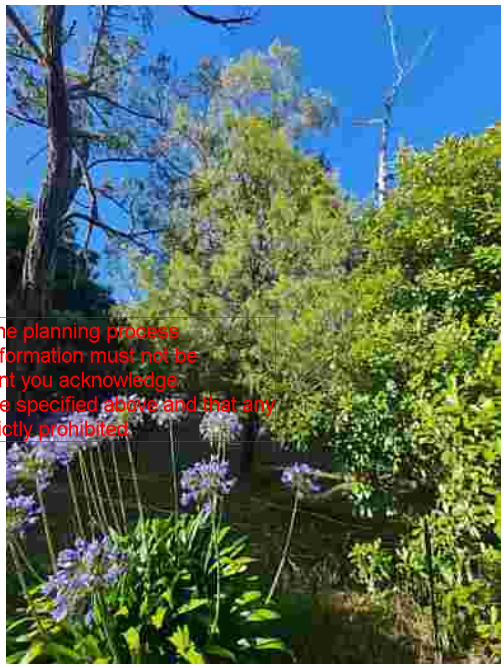
Genus / species: *Photinia serrulata*
Evergreen Chinese Hawthorn

Height (m):	5	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	15 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** N/A
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 31



Genus / species: *Exocarpus cupressiformis*
Evergreen Cherry Ballart

Height (m):	8	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	20 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Moderate
Removal / retention reason: Adjoining property.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***1.8*** ***Works priority:*** N/A
TPZ (m): ***2.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 32

Genus / species: *Eucalyptus obliqua*
Evergreen Messmate

Height (m):	17	**Structure:**	Fair
Width (m):	10	**Health:**	Dead
DBH (cm):	63 Estimated	**Maturity:**	Over mature
Origin:	Melbourne	**ULE (years):**	0
Retained?:	Retained	**Form:**	Good

Retention Value: Very low
Removal / retention reason: Adjoining property.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***2.8*** ***Works priority:*** N/A
TPZ (m): ***7.6*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 33

Genus / species: *Eucalyptus obliqua*

Evergreen Messmate

Height (m):	22	**Structure:**	Good
Width (m):	16	**Health:**	Good
DBH (cm):	70 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: High

Removal / retention reason: Adjoining property.

Amenity value: High

Works Required: N/A.

SRZ (m): ***2.9*** ***Works priority:*** N/A

TPZ (m): ***8.4*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 34

Genus / species: *Pittosporum undulatum*

Evergreen Sweet Pittosporum

Height (m):	5	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	14 Measured	**Maturity:**	Mature
Origin:	Victorian	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low

Removal / retention reason: Adjoining property.

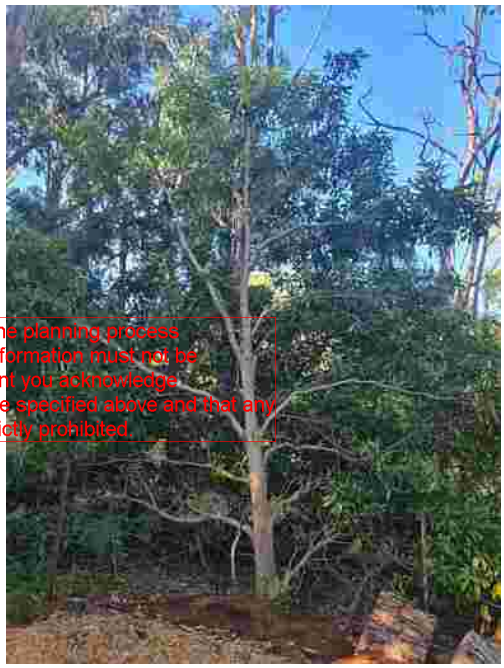
Amenity value: Low

Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** N/A

TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***

mTPZ (m):



Tree ID: 35

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	18	**Structure:**	Fair
Width (m):	6	**Health:**	Fair
DBH (cm):	42 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low

Removal / retention reason: Adjoining property.

Amenity value: Low

Works Required: N/A.

SRZ (m): ***2.4*** ***Works priority:*** N/A

TPZ (m): ***5.0*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: **36**

Genus / species: *Eucalyptus obliqua*

Evergreen Messmate

Height (m):	19	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	47 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Moderate

Removal / retention reason: Adjoining property.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2.5*** **Works priority:** N/A

TPZ (m): ***5.6*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: **37**

Genus / species: *Pittosporum undulatum*

Evergreen Sweet Pittosporum

Height (m):	8	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	17 Measured	**Maturity:**	Mature
Origin:	Victorian	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low

Removal / retention reason: Adjoining property.

Amenity value: Low

Works Required: N/A.

SRZ (m): ***1.7*** **Works priority:** N/A

TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: **38**

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	19	**Structure:**	Fair
Width (m):	10	**Health:**	Good
DBH (cm):	47 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: High

Removal / retention reason: Adjoining property.

Amenity value: High

Works Required: N/A.

SRZ (m): ***2.5*** **Works priority:** N/A

TPZ (m): ***5.6*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 39

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	18	**Structure:**	Fair
Width (m):	18	**Health:**	Good
DBH (cm):	73 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: High
Removal / retention reason: Adjoining property.
Amenity value: High
Works Required: N/A.

SRZ (m): ***3*** ***Works priority:*** N/A
TPZ (m): ***8.8*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 40

Genus / species: *Hesperocyparis macrocarpa*
Evergreen Monterey Cypress

Height (m):	8	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	28 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***2*** ***Works priority:*** N/A
TPZ (m): ***3.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 41

Genus / species: *Hesperocyparis macrocarpa*
Evergreen Monterey Cypress

Height (m):	8	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	28 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***2*** ***Works priority:*** N/A
TPZ (m): ***3.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **42**

Genus / species: *Hesperocyparis macrocarpa*
Evergreen Monterey Cypress

Height (m):	8	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	25 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.9*** ***Works priority:*** N/A
TPZ (m): ***3.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

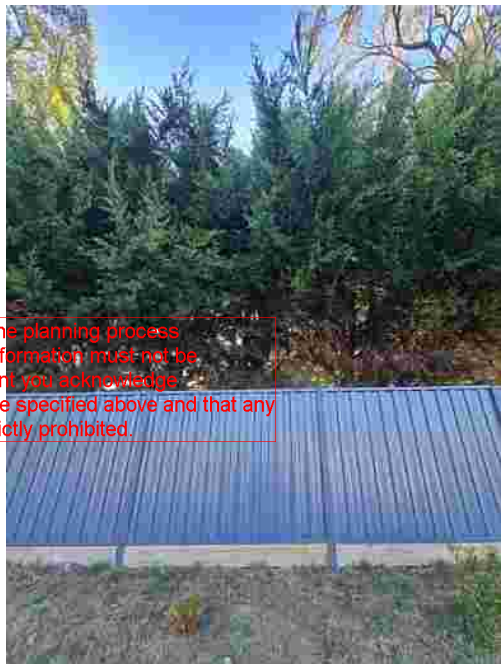
Tree ID: **43**

Genus / species: *Hesperocyparis macrocarpa*
Evergreen Monterey Cypress

Height (m):	8	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	25 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.9*** ***Works priority:*** N/A
TPZ (m): ***3.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):



Tree ID: **44**

Genus / species: *Hesperocyparis macrocarpa*
Evergreen Monterey Cypress

Height (m):	8	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	25 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.9*** ***Works priority:*** N/A
TPZ (m): ***3.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **45**

Genus / species: *Hesperocyparis macrocarpa*
Evergreen Monterey Cypress

Height (m):	8	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	25 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.9*** **Works priority:** N/A
TPZ (m): ***3.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **46**

Genus / species: *Hesperocyparis macrocarpa*
Evergreen Monterey Cypress

Height (m):	8	**Structure:**	Fair
Width (m):	5	**Health:**	Good
DBH (cm):	25 Measured	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Poor

Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.9*** **Works priority:** N/A
TPZ (m): ***3.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **47**

Genus / species: *Eucalyptus obliqua*
Evergreen Messmate

Height (m):	21	**Structure:**	Good
Width (m):	16	**Health:**	Fair
DBH (cm):	70 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Fair

Retention Value: High
Removal / retention reason: Adjoining property.
Amenity value: High
Works Required: N/A.

SRZ (m): ***2.9*** **Works priority:** N/A
TPZ (m): ***8.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 48

Genus / species: *Hesperocyparis macrocarpa*
Evergreen Monterey Cypress

Height (m):	7	**Structure:**	Good
Width (m):	8	**Health:**	Good
DBH (cm):	23 Estimated	**Maturity:**	Mature
Origin:	Exotic	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Fair

Retention Value: Moderate
Removal / retention reason: Adjoining property.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***1.9*** ***Works priority:*** N/A
TPZ (m): ***2.8*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

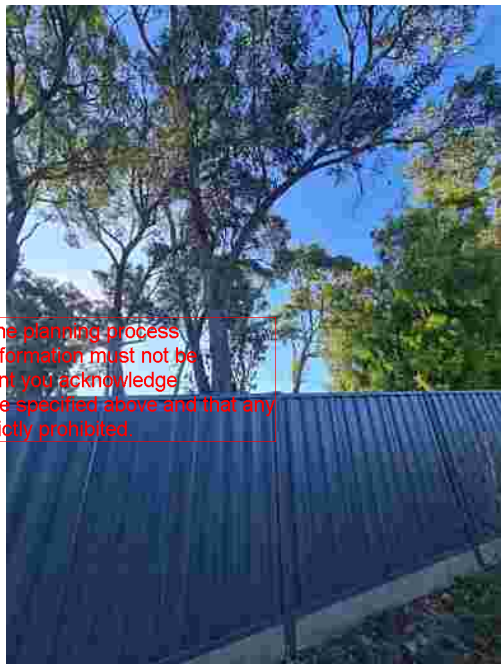
Tree ID: 49

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	17	**Structure:**	Poor
Width (m):	12	**Health:**	Good
DBH (cm):	47 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: Moderate
Removal / retention reason: Adjoining property.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***2.5*** ***Works priority:*** N/A
TPZ (m): ***5.6*** ***Construction Proximity:*** ***0.1***
mTPZ (m):



Tree ID: 50

Genus / species: *Acacia dealbata*
Evergreen Silver Wattle

Height (m):	8	**Structure:**	Good
Width (m):	8	**Health:**	Good
DBH (cm):	22 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Moderate
Removal / retention reason: Adjoining property.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***1.9*** ***Works priority:*** N/A
TPZ (m): ***2.6*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **51**

Genus / species: *Ligustrum sp.*
Evergreen Privet

Height (m): 8
Width (m): 8
DBH (cm): 22 Measured
Origin: Exotic
Retained?: Retained
Retention Value: Low
Removal / retention reason: Adjoining property.
Amenity value: Low
Works Required: N/A.

Structure: Good
Health: Good
Maturity: Mature
ULE (years): 15 - 30
Form: Fair

SRZ (m): ***1.9*** ***Works priority:*** N/A
TPZ (m): ***2.6*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **52**

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m): 14
Width (m): 10
DBH (cm): 33 Estimated
Origin: Melbourne
Retained?: Retained
Retention Value: Moderate
Removal / retention reason: Adjoining property.
Amenity value: Moderate
Works Required: N/A.

Structure: Fair
Health: Good
Maturity: Mature
ULE (years): 30 - 60
Form: Fair

SRZ (m): ***2.2*** ***Works priority:*** N/A
TPZ (m): ***4.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **53**

Genus / species: *Acacia dealbata*
Evergreen Silver Wattle

Height (m): 9
Width (m): 8
DBH (cm): 27 Estimated
Origin: Melbourne
Retained?: Retained
Retention Value: Moderate
Removal / retention reason: Adjoining property.
Amenity value: Moderate
Works Required: N/A.

Structure: Fair
Health: Good
Maturity: Mature
ULE (years): 30 - 60
Form: Fair

SRZ (m): ***2*** ***Works priority:*** N/A
TPZ (m): ***3.2*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: **54**

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	18	**Structure:**	Fair
Width (m):	12	**Health:**	Good
DBH (cm):	50 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Good

Retention Value: High

Removal / retention reason: Adjoining property.

Amenity value: High

Works Required: N/A.

SRZ (m): ***2.6*** ***Works priority:*** N/A

TPZ (m): ***6.0*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: **55**

Genus / species: *Eucalyptus sp.*

Evergreen Gum

Height (m):	16	**Structure:**	Fair
Width (m):	7	**Health:**	Dead
DBH (cm):	47 Measured	**Maturity:**	Over mature
Origin:	Australian	**ULE (years):**	0
Retained?:	Retained	**Form:**	Good

Retention Value: Very low

Removal / retention reason: Road reserve.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2.5*** ***Works priority:*** N/A

TPZ (m): ***5.6*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: **56**

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	6	**Structure:**	Good
Width (m):	10	**Health:**	Good
DBH (cm):	23 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Good

Retention Value: Low

Removal / retention reason: Road reserve.

Amenity value: Low

Works Required: N/A.

SRZ (m): ***1.9*** ***Works priority:*** N/A

TPZ (m): ***2.8*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: **57**

Genus / species: *Eucalyptus obliqua*

Evergreen Messmate

Height (m):	10	**Structure:**	Good
Width (m):	14	**Health:**	Good
DBH (cm):	54 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Poor

Retention Value: Moderate

Removal / retention reason: Road reserve.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2.7*** ***Works priority:*** N/A

TPZ (m): ***6.5*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: **58**

Genus / species: *Eucalyptus goniocalyx*

Evergreen Long leaved Box

Height (m):	10	**Structure:**	Fair
Width (m):	6	**Health:**	Good
DBH (cm):	28 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: Moderate

Removal / retention reason: Road reserve.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2*** ***Works priority:*** N/A

TPZ (m): ***3.4*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: **59**

Genus / species: *Eucalyptus radiata*

Evergreen Narrow-leaf Peppermint

Height (m):	12	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	27 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: Moderate

Removal / retention reason: Road reserve.

Amenity value: Moderate

Works Required: N/A.

SRZ (m): ***2*** ***Works priority:*** N/A

TPZ (m): ***3.2*** ***Construction Proximity:*** ***0.1***

mTPZ (m):

Tree ID: 60

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	8	**Structure:**	Good
Width (m):	4	**Health:**	Good
DBH (cm):	14 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: Low
Removal / retention reason: Road reserve.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***1.6*** ***Works priority:*** N/A
TPZ (m): ***2.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 61

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	8	**Structure:**	Good
Width (m):	6	**Health:**	Good
DBH (cm):	32 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: Low
Removal / retention reason: Road reserve.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***2.2*** ***Works priority:*** N/A
TPZ (m): ***3.8*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 62

Genus / species: *Eucalyptus obliqua*
Evergreen Messmate

Height (m):	9	**Structure:**	Fair
Width (m):	6	**Health:**	Good
DBH (cm):	33 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Poor

Retention Value: Low
Removal / retention reason: Road reserve.
Amenity value: Low
Works Required: N/A.

SRZ (m): ***2.2*** ***Works priority:*** N/A
TPZ (m): ***4.0*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 63

Genus / species: *Eucalyptus obliqua*
Evergreen Messmate

Height (m):	17	**Structure:**	Fair
Width (m):	14	**Health:**	Good
DBH (cm):	55 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Fair

Retention Value: High
Removal / retention reason: Road reserve.
Amenity value: High
Works Required: N/A.

SRZ (m): ***2.7*** ***Works priority:*** N/A
TPZ (m): ***6.6*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 64

Genus / species: *Eucalyptus obliqua*
Evergreen Messmate

Height (m):	10	**Structure:**	Fair
Width (m):	10	**Health:**	Fair
DBH (cm):	37 Measured	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	30 - 60
Retained?:	Retained	**Form:**	Poor

Retention Value: Moderate
Removal / retention reason: N/A.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***2.3*** ***Works priority:*** N/A
TPZ (m): ***4.4*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

Tree ID: 65

Genus / species: *Eucalyptus goniocalyx*
Evergreen Long leaved Box

Height (m):	11	**Structure:**	Fair
Width (m):	6	**Health:**	Fair
DBH (cm):	30 Estimated	**Maturity:**	Mature
Origin:	Melbourne	**ULE (years):**	15 - 30
Retained?:	Retained	**Form:**	Fair

Retention Value: Moderate
Removal / retention reason: N/A.
Amenity value: Moderate
Works Required: N/A.

SRZ (m): ***2.1*** ***Works priority:*** N/A
TPZ (m): ***3.6*** ***Construction Proximity:*** ***0.1***
mTPZ (m):

20. References

Coder, K.D 1996, Construction Damage Assessments, University of Georgia. http://www.forestry.uga.edu/warnell/service/library/for96-039a/index.html

Harris, R.W., Clark, J.R. & Matheny, N.P. 2004, *Arboriculture: Integrated management of landscape trees, shrubs and vines,* 4th edn., Prentice Hall, New Jersey, USA.

Hitchmough, J. D. 1994, *Urban Landscape Management*, Inkata Press, Chatswood, NSW.

Society for Growing Australian Plants Maroondah, 1991, *Flora of Melbourne*, *a guide to the indigenous plants of the greater Melbourne area,* Society for Growing Australian Plants, Maroondah.

Mattheck, C., Bethge, K. & Weber, K., 2015, *The body language of trees*, Karlsruhe Institute of Technology – Campus North, KS Druck GmbH, Germany.

Standards Australia, 2009, *AS 4970 - 2009 Protection of trees on development sites*, Standards Australia, Sydney.

21. Appendix 1 - Tree protection guidelines

The following tree protection guidelines should be observed as appropriate. Where it is not possible to comply with these recommendations alternative arrangements should be decided with a qualified arborist.

1. A site specific Tree Protection Report should be commissioned prior to the commencement of construction to guide construction activity around any retained trees on or adjacent to the site.
2. Clearly marked as being retained on the site to avoid confusion during the tree removal phase.
3. The stumps of removed trees should be ground out rather than pulled to avoid injury to adjacent trees.
4. Construction specifications should include the plan location of those trees that are to be retained.
5. Penalties should be included in the construction specifications for damage to trees that are to be retained.
6. The trees to be retained should be enclosed with a 1.8 meter high chain link fence supported on steel posts driven 0.6 meters into the ground.

    6.1. Tree protection fencing should be established as shown.

        6.1.1. If tree protection fencing is not detailed in the report it should enclose, at a minimum, the entire **Structural Root Zone** and as much of the **Tree Protection Zone** as possible.

    6.2. Access should be provided by a single gate that should be kept locked at all times except when required for tree inspection or maintenance.

    6.3. Tree protection fencing should be installed following the removal of trees and prior to any other works being commenced.

    6.4. The area inside the fence should be mulched to a depth of 0.15 meters with general arboricultural wood chip mulch or similar.

7. Where construction clearance is required and areas of the Tree Protection Zone cannot be fenced the ground in these areas should be protected from compaction with **Ground Protection.**

   7.1. **Ground Protection** can consist of any constructed platform that prevents point loads on the soil within the Tree Protection Zone. These could include:

      7.1.1. Industrial pallets joined together to form a platform.

      7.1.2. 12 mm plywood joined together to form a platform.

      7.1.3. Planks of timber joined together to form a platform.

   7.2. **Ground Protection** should be constructed with sufficient strength to allow it to survive the entire construction process.

   7.3. **Ground Protection** should be installed following the removal of trees and prior to any other works being commenced.

8. Excavation within the **Structural Root Zone** should be avoided unless absolutely necessary.

   8.1. Any excavation within the **Structural Root Zone** should be performed by hand.

   8.2. Any excavation within or tunnelling under the **Structural Root Zone** should be supervised by a qualified arborist.

   8.3. Any roots encountered from the retained trees should be pruned carefully and cleanly, preferably back to a branch root.

   8.4. Before any roots are pruned the effect of such pruning on the health and structural stability of the tree should be evaluated by a qualified arborist.

9. Excavation within the **Tree Protection Zone** should be avoided where possible.

   9.1. Any excavation within the **Tree Protection Zone** should be performed carefully to minimise root injury.

   9.2. Any roots encountered from the retained trees should be pruned carefully and cleanly, preferably back to a branch root.

   9.3. Before any excavation occurs the effect of such excavation on the health and structural stability of the tree should be evaluated by a qualified arborist.

10. Concrete and other washout or waste disposal areas should be kept well away from trees to be retained.

11. Where automatic irrigation systems are installed the amount of irrigation that is applied should be checked against the requirements of the existing trees on the site.

12. Any pruning works that are required to facilitate construction should be performed by a qualified arborist.

Adapted from Harris, Clark and Matheny (2004)

23. Appendix 3 – Arboricultural information

The following sections are presented to provide an introduction to the process of tree root system protection. A trees root system is the critical element to be protected during the development process and if the trees roots are adequately protected then the rest of the tree will generally survive without significant injury.

23.1. Root plate estimation

One of the primary purposes of this report is to estimate the impact of the development on the trees on this site. This is mainly achieved by estimating the extent of the root plate area of the trees that are proposed to be retained and the proportion of this area that is likely to be excised or affected during the construction process.

In this report two elements of the tree root area are described. These are:

23.1.1. Structural Root Zone

This is an estimate of the radius that is likely to encompass the major scaffold roots of the tree. These roots are critical to anchoring the tree and damage to these roots will increase the risk of entire tree failure (i.e. uprooting). This radius is based on AS 4970-2009.

23.1.2. Tree Protection Zone

This is an estimate of the radius that is likely to encompass enough of the smaller absorbing roots to allow the tree to obtain sufficient nutrients and water to allow it to survive in the long term. This is radius is based on AS 4970-2009 and is based on the size of the tree.

Estimation of the likely root plate radius for both methods are based on the DBH (Diameter at Breast Height) of each tree. This is usually measured but where the tree is inaccessible or has numerous trunks a visual estimation may be used. Whether the DBH is estimated or measured is noted within the ”Tree Data” section of the report.

The two elements of each trees’ root zone is transposed over the site survey and building footprint and the degree of root injury is calculated from this.

23.2. Tree rooting patterns

Contrary to common belief, trees usually have a broad flat plate of roots that may extend 1.5 – 3 times the radius of the canopy (Harris, Matheny & Clark, 1999; Coder, 1996; Hitchmough, 1994). Relatively few trees have deep roots and Harris, Matheny and Clark (2004) note that most tree roots will be found in the top 1.0 metre of the soil profile.

While the models used to approximate the size of tree root plates assume a uniformly radial root system, in highly disturbed urban soils root systems often develop in a highly asymmetric manner (Matheny & Clarke, 2004). This may require the modification of the models used where it is likely that the root system is asymmetric.

23.3. Construction impacts

Construction in the vicinity of trees can have several negative impacts on their health, longevity and structural stability. Harris, Matheny and Clark (2004) note that some level of tree root injury or root zone change is almost inevitable during construction around trees and maintain that the goal of tree preservation is to reduce the injury or change to a level that will enable the long term preservation of the retained trees.

Negative impacts can include:

- Root severance from trenching and grading activities. Damage to the transport and absorbing root system may deprive the tree of the ability to absorb nutrients and water and damage to the structural scaffold roots that support the tree may result in instability and uprooting. Depending on the percentage of the root plate affected and proximity to the tree, the affects can range from minor degradation of health through to total root plate failure (i.e. uprooting).
- Compaction and root injury. Most trees require a well aerated and friable soil to allow normal physiological processes to occur and to allow root growth. Soil compaction from pedestrian or vehicular traffic can result in direct injury to the roots, indirect injury through soil drainage changes, reduced soil aeration or decreased soil penetrability. If severe enough soil compaction can lead to a rapid decline in many tree species and may eventually result in instability and uprooting.
- Changes in drainage patterns. Changes in drainage patterns may result from hard surfacing, trenching, land shaping and other construction activities. These can result in either drought stress or waterlogging, both of which can cause a rapid decline in trees and may result in instability and uprooting.

24. Appendix 4 - AS 4970 *-2009*

This report generally conforms to *AS 4970 – 2009 Protection of Trees on Development Sites* except in the following areas.

1. AS 4970 notes that the project arborist should verify the accuracy of feature survey for the subject site.
    a. This is generally not feasible and the feature survey is taken as being an accurate representation of the features of the site.
    b. However, if trees are found on the site that are not represented in the feature survey then these trees will be added to the report plans based on a visual estimation of their location.
        i. Accordingly, the location of these trees may not be sufficiently accurate for the purposes of the report.
        ii. The location of these trees should verified by a qualified surveyor where appropriate.
2. *AS 4970-2009 Protection of Trees on Development Sites* makes no differentiation between the Tree Protection Zone (TPZ) derived from the trees DBH and the modified TPZ derived from the trees canopy where it extends past the DBH derived TPZ. As the two forms of TPZ are independent a differentiation between the two forms of TPZ needs to be made. In this report:
    a. “TPZ” refers to the DBH derived Tree Protection Zone (12 x DBH) and “mTPZ” pertains to the TPZ where it is modified to account for a canopy that extends beyond the DBH derived TPZ.
    b. The modified Tree Protection Zone (mTPZ) for all trees is taken as being identical to the Tree Protection Zone (TPZ) except where the canopy of the tree extends beyond the TPZ. Where this is the case the TPZ is shown on the site plans and any tree canopy impacts are addressed as required within the report. Otherwise the mTPZ is recorded within this report as “= TPZ”.

25. Appendix 2 - Explanation of terms

The assessment of Health, Structure, Condition, U.L.E. (Useful Life Expectancy), Origin, Maturity, Form and Retention value are based on the following definitions. In the case of health and structure these definitions encompass only the more common indicators for these assessments. Other indicators not included in these definitions may lead to the ascribing of a particular health or structure category.

25.1. Origin

The notation of "Origin" is based on the following categories.

1. Category	Description
2. **Melbourne**	Native to the greater Melbourne metropolitan area as defined by Flora of Melbourne (S. G. A. P. M., 1991).
3. **Victorian**	Native to Victoria but not the greater Melbourne Metropolitan area.
4. **Australian**	Native to Australia but not Victoria.
5. **Exotic**	Not native to Australia.

25.2. Maturity

The notation of "Maturity" is based on the following categories.

1. Category	Description
2. **Immature**	Less than 20% of the life expectancy for the species within the geographical area.
3. **Mature**	20 – 80% of the life expectancy for the species within the geographical area.
4. **Over mature**	> 80% of the life expectancy for the species within the geographical area.

25.3. Works required

The works required listed in this report are of a general nature only and should be reviewed following the completion of any works on the site.

Where a tree is recommended for removal (Recommendation) it is not listed in the Works required section of the report.

25.4. Priority

The priority accorded particular works is based on a projected increased site usage following the completion of a development on the site. The priority is of a general nature only and should be reviewed following the completion of any works on the site.

“Priority” is based on the following categories.

Category	Description
1. N/A.	No tree works are required
2. Very low	Tree works are optional and could be performed at any time.
3. Low	Works should be performed within five years.
4. Moderate	Works should be performed within 3 years.
5. High	Works should be performed within 12 months.
6. Urgent	Works should be performed immediately.

25.5. Retention value (RV) explanation

The Retention value ascribed to each tree in this report is not definitive and should be used as a guide only. Many factors influence the comparative value of a tree, and a number of these factors are outside the scope of arboricultural assessment. These factors cannot therefore be addressed in a single rating system.

Retention value is comprised of two parts. These are the Amenity Value of the tree rated as Very Low to Very high and the Useful Life Expectancy (ULE) rating of the tree.

The Amenity Value of the tree relates to the contribution of the tree to the aesthetic amenity of the area. The primary determinants of amenity value are tree health, size and form. Amenity value does not consider tree structure. In the context of Retention Value structure is considered in the ULE.

The Amenity Value is then modified by the ULE of the tree with short ULE values reducing the RV of the tree and long ULE values increasing the RV of the tree.

Trees that are listed on a register of heritage or significant trees are not accommodated within this rating system as these values are often independent of the arboricultural attributes of the tree. Heritage and significant trees may be ascribed a very low retention value despite their listing on any register. Where known, any heritage or significant tree register listing it will be noted in the report.

RV is assessed on each tree as a single entity. The value of a group of trees is not considered in this context and each tree within the group is assessed as an individual specimen.

25.6. Amenity value

Amenity value is based on the following categories and is ascribed an Amenity Value Value (AVV) ranging from 2 - 10.

Category	Example	AVV
1. Very high	Generally, a very large tree that exhibits excellent health and/or form or a tree that is listed on a heritage or significant tree register and taller than 25 metres tall.	10
2. High	Generally, a large tree that exhibits good health and/or form and between 15 and 25 metres tall.	8
3. Medium	Generally, a medium tree that exhibits good health and/or form and between 10 - 15 metres tall. May be a large tree that exhibits fair health and/or form.	6
4. Low	Generally, a small tree that exhibits good health and/or form and between 5 - 10 metres tall. May be a large or medium tree that exhibits fair or poor health and/or form..	4
5. Very low	Generally, a small tree that exhibits poor health and/or form. May be a large or medium tree that exhibits poor, or worse, health and/or form.	2

25.7. ULE

U.L.E. is based on the following categories each of which have a modifier (ULEM) ranging from 0 – 12.

Category	Example	ULEM
1. 0	The tree is dead or almost dead or constitutes an immediate and unacceptable risk of harm.	0
2. 1 – 5	The tree is unlikely to provide useful amenity for longer than 5 years. The tree is in serious decline, poses an unacceptable risk of harm and/or requires a level of maintenance disproportionate with its value.	4
3. 5 – 15	The tree is likely to provide useful amenity for between 5 and 15 years. The tree may be in serious decline, be a very short lived species and/or require excessively high levels of maintenance.	7
4. 15 – 30	The tree is likely to provide useful amenity for between 15 and 30 years. The tree may be in moderate decline and/or a short lived species.	10
5. 30 – 60	The tree is likely to provide useful amenity for between 30 and 60 years. The tree may be in fair to good condition, have a moderate life-span, present a low to moderate level of hazard and/or require moderate levels of maintenance.	11
6. > 60	The tree is likely to provide useful amenity for greater than 60 years. The tree may be in good to excellent condition, a long lived species, present a low level of hazard and/or require low levels of maintenance.	12

25.8. Retention value

Retention value is then derived from the multiplication of AVV by ULEM and the resulting score is categorised as Very high to Very low.

Retention value is only intended to guide arboricultural actions within the proposed report tree population and is not definitive in any way.

Category	Example	RV value
1. Very high	Every effort should be made to preserve trees in this category	96 - 120
2. High	These trees should be retained if at all possible	72 - 95
3. Moderate	These trees should be retained if they do not overly constrain development on the site.	48 - 71
4. Low	These trees should not create a material constraint on development of the site. These trees should be removed where they conflict with development of the site.	24 - 47
5. Very low	Generally, a small tree that exhibits poor health and/or form. May be a large or medium tree that exhibits poor, or worse, health and/or form. These trees should generally be removed.	1 – 23
6. Remove	These trees are not suitable for retention within the site and are recommended to be removed.	0

25.9. Health

Pertains to the health and vigour of the tree.

The notation of “Health” is based on the following categories.

Category	Example
1. Good	Crown full, with good foliage density. Foliage is entire with average colour, minimal or no pathogen damage. Above average growth indicators such as extension growth, leaf size and canopy density. Little or no canopy die-back. Generally no dead wood on the perimeter of the canopy. Good wound wood development. **Tree exhibits above average health and no works are required.**
2. Fair	Tree may have more than 30% dead wood, or may have minor canopy dieback. Foliage density may be slightly below average for the species. Foliage colour may be slightly lower than average and some discolouration may be present. Typical growth indicators, e.g. extension growth, leaf size, canopy density for species in location. Average wound wood development. **The tree exhibits below average health and remedial works may be employed to improve health.**
3. Poor	Tree may have more than 30% dead wood and canopy die back may be present. Leaves may be discoloured and/or distorted, often small, and excessive epicormic growth may be present. Pathogens and/or stress agents may be present that could lead, or are leading to, the decline of tree. Poor wound wood development. **The tree exhibits low health and remedial works or removal may be required.**
4. Very poor	The tree has more than 30% dead wood. Extensive canopy die back is present. Canopy is very sparse. Pathogens and/or stress agents are present that are leading to the decline of the tree. Very poor wound wood development. **The tree exhibits very poor health and remedial works or removal are required.**
5. Dead	**Tree is dead and generally should be removed.**

25.10.Structure

Pertains to the physical structure of the tree including the main scaffold branches and roots. Structure includes those attributes that may influence the probability of major trunk, root or limb failure.

The notation of “Structure” is based on the following categories.

Category	Example
1. Good	The tree has a well-defined and balanced crown. The tree is exhibits generally defect free scaffold branches, trunk/s and root plate. The tree is very unlikely to suffer root plate, trunk/s or branch failure under normal conditions. **The tree is considered a good example of the species.**
2. Fair	The tree has some minor structural defects of the scaffold branches, trunk or root plate. **These defects are not likely to result in catastrophic root plate, trunk or branch failure although some branch failure may occur under normal conditions.**
3. Poor	The tree has significant defects within the scaffold branches, trunk or root plate. **These defects may predispose the tree to major trunk or branch failure.**
4. Very poor	The tree has very significant defects within the scaffold branches, trunk or root plate. **These defects are likely to predispose the tree to root plate, trunk or scaffold limb failure.**

25.11.Form

The notation of “Form” pertains to the aesthetic qualities of the trees live canopy. Generally good form is indicative of a symmetrical, well-balanced canopy although this is dependent on the particular species. Some species naturally develop an asymmetric canopy and in this case a highly irregular canopy might be described as good.

The form of a tree is considered assuming that the tree stands in isolation from any surrounding trees. This may mean that a group of trees that exhibit good form as a group, may be described as having poor form as individuals.

The notation of “Form” is based on the following categories.

Category	Example
1. Very good	An outstanding specimen of that species. Generally, a very evenly balanced and symmetrical canopy with no deformation. If the development of that species is naturally irregular then an outstanding specimen of that species.
2. Good	A good specimen of that species. Generally, a well balanced and symmetrical canopy with minor deformation. If the development of that species is naturally irregular then a good specimen of that species.
3. Fair	An average specimen of that species. Generally, a balanced canopy with some minor to moderate asymmetry. If the development of that species is naturally irregular then an average specimen of that species.
4. Poor	A below average specimen of that species. Generally, a moderate to high degree of asymmetry. If the development of that species is naturally irregular then a poor specimen of that species.
5. Very poor	A very poor specimen of that species. Generally, a high to extreme degree of asymmetry. If the development of that species is naturally irregular then a very poor specimen of that species.

26. Glossary / notes

Tree Protection Zone (TPZ)	Is based on AS 4970-2009 *Protection of trees on development sites* and defines the soil volume that is likely to be required to encompass enough of the trees absorbing root system to ensure the long term survival of the tree. The radius specified as the TPZ is an estimate of the minimum distance from the tree that excavation or other activities that might result in root damage should occur to avoid negative impacts on the health and longevity of the tree. AS 4970 states that intrusion of up to 10% of the surface area of the TPZ may occur without further assessment or analysis.
Structural Root Zone (SRZ)	Is based on AS 4970-2009 (Protection of trees on development sites) and defines the likely spread of the trees scaffold root system. These roots are the primary anchoring roots for the tree and damage to these roots may render the tree liable to uprooting. SRZ is based on measurement of the trunk above the root flair (AS 4970) However in this report SRZ is based on the measured or estimated DBH and there should be taken as an estimate only. Additional measurement may be required if construction near the SRZ is expected to occur.
Modified Tree Protection Zone (mTPZ)	Is based on the TPZ and includes any requirement to protect the above ground parts of the tree that project beyond the TPZ. However generally the mTPZ will be equal to the TPZ. TPZ extension beyond the TPZ to protect the tree canopy will be shown on the site plan but will not be reflected in the TPZ radius measurements quoted in this report.
Diameter at Breast Height (DBH)	Is the diameter of the tree at approximately 1.4 meters above ground level and is used to calculate TPZ. Where a trunk is divided at or near 1.4 meters above ground the DBH is generally measured at the narrowest point of the trunk between ground level and 1.4 meters. Alternatively, where a higher level of accuracy is required with multi stemmed trees, DBH is derived from the combined cross sectional area of all trunks. The DBH of all accessible trees is measured unless otherwise stated in the Tree Data section of this report. The DBH of trees on adjoining properties is measured where access can be readily gained to the property, otherwise it is estimated.
Diameter above Buttress (DaB)	Diameter of the trunk or trunks above root flare and is used to calculate the SRZ for significant trees. This is generally the diameter of the trunk immediately above the root flare at ground level. DaB is generally only measured for significant trees and for smaller or otherwise low retention value trees DBH + 5% is used to calculate SRZ.
Measured	Indicates whether the DBH has been measured or estimated. DBH may be estimated for small low value multi stem trees or trees that are inaccessible.

Retained?	Indicates whether the tree is shown as being removed or retained on the plans provided. This is generally derived from the site plans provided but the removal or retention of trees might be communicated to the author by other means.
Recommendation reason	Pertains to the reason that removal or retention or other works are recommended. Other than trees on adjoining properties or road reserves a reason for retention is usually not given. In this case N/A is used.
Tree height & width	Tree height is generally measured for moderate, high and very high value trees using an infrared range finder / clinometer. The height of low and very low value trees is usually estimated. Canopy width is estimated unless otherwise stated.
Genus / species	The identification of trees is based on accessible visual characteristics and given that key identifying features are often not available at the time of assessment the accuracy of identification is not guaranteed. Where the species of any tree is not known, **sp.** is used.

27. Practice Note VCAT 2 — Expert Evidence

27.1. Name & address of consultant

Shane Simons of 172 Ridge Road, Mt Dandenong Vic 3767.

27.2. Qualifications & experience

Shane Simons has the following qualifications and experience:

6. Diploma in Arboriculture (AQF 5)
7. Tree Risk Assessment Qualification (TRAQ)
8. 11 years' experience in arboriculture.
    a. 5 years in local government involved in tree maintenance programmes, planting, pruning (young and mature trees), watering, risk mitigation.
    b. 5 years working as a vegetation clearance officer. This work involved supervising crew works as well as maintaining clearances around electrical infrastructure by removing vegetation to comply with legislation.
    c. 1 year as a consulting arborist.

27.3. Area of expertise

Shane Simons provides specialist technical advice in the field of arboriculture. This includes the provision of technical expertise relating to problem diagnosis, management programs, tree appraisal and valuation and the relationship between trees and the built environment.

27.4. Expertise to report

Shane Simons has, by training, education, experience and research, considerable knowledge relating to the care, maintenance and management of trees in a wide variety of contexts.

Significant areas of operation and expertise include the provision of tree and built structure conflict reports, hazard assessment, tree condition appraisal and broad scale tree inventories.

Considerable effort is expended in research to remain current with the latest advances in all areas relating to tree care.

27.5. Declaration

"I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Tribunal."

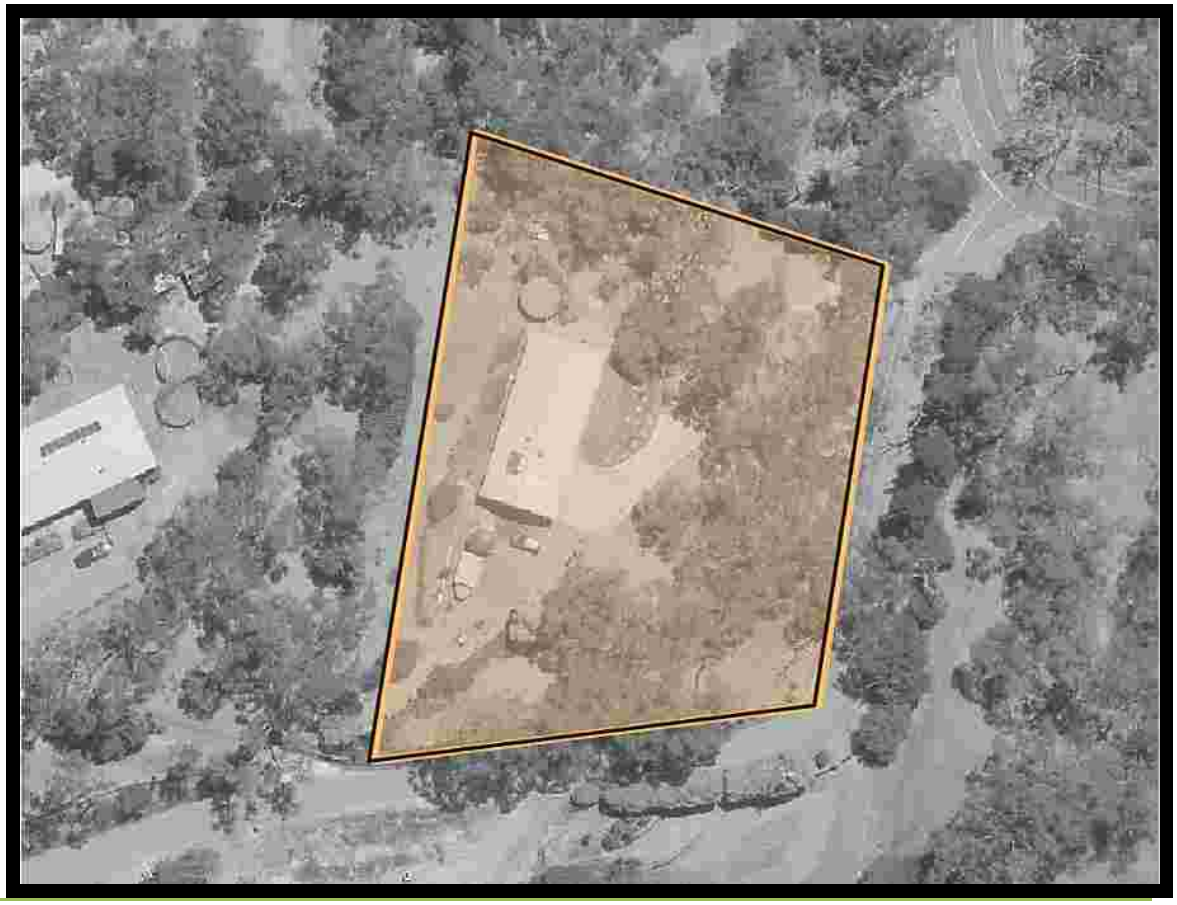
28. Assumptions & limiting conditions

1. R. Greenwood Consulting Pty Ltd (herein after referred to as Greenwood Consulting) contracts with you on the basis that you promise that all legal information which you provide, including land title and ownership of other property, are correct. Greenwood Consulting is not responsible for verifying or ascertaining any of these issues.
2. Greenwood Consulting contracts with you on the basis that your promise that all affected property complies with all applicable statutes and subordinate legislation.
3. Greenwood Consulting will take all reasonable care to obtain necessary information from reliable sources and to verify data. However, Greenwood Consulting neither guarantees nor is responsible for the accuracy of information provided by others.
4. If, after delivery of this report, you later require a representative of Greenwood Consulting to attend court to give evidence or to assist in the preparation for a hearing because of this report, you must pay an additional hourly fee at our then current rate for expert evidence.
5. Alteration of this report invalidates the entire report.
6. Greenwood Consulting retains the copyright in this report. Possession of the original or a copy of this report does not give you or anyone else any right of reproduction, publication or use without the written permission of Greenwood Consulting.
7. The contents of this report represent the professional opinion of the consultant. Greenwood Consulting's consultancy fee for the preparation of this report is in no way contingent upon the consultant reporting a particular conclusion of fact, nor upon the occurrence of a subsequent event.
8. Sketches, diagrams, graphs and photographs in this report are intended as visual aids, are not to scale unless stated to be so, and must not be construed as engineering or architectural reports or as surveys.
9. Unless expressly stated otherwise:
   9.1. The information in this report covers only those items which were examined and reflects the condition of those items at the time of the inspection.
   9.2. Our inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee, express or implied, that even if they were not present during our inspection, problems or defects in plants or property examined may not arise in the future.
10. This agreement supersedes all prior discussions and representations between Greenwood Consulting and the client on the subject, and is the entire agreement and understanding between us.

[redacted]

Diploma in Arboriculture (AQF 5)
ISA Tree Risk Assessment Qualification (TRAQ)
Quantified Tree Risk Assessment (QTRA)

RANGES Environmental



Native Vegetation Assessment

127 Cooinda Road Beaconsfield

April 2025

Report:	Native Vegetation Assessment -127 Cooinda Road Beaconsfield
Job no:	25014
Prepared for:	[redacted]
Author:	
Contact:	[redacted]
Date:	16 April 2025

1 Introduction

Ranges Environmental Consulting have been engaged by the landowner to conduct a Native Vegetation Assessment in relation to a proposed development at 127 Cooinda Road Beaconsfield. The development consists of an extension of the existing dwelling which requires vegetation removal for Defendable Space in accordance with the Bushfire Management Overlay (BMO).

The report addresses the following:

- Native vegetation regulations outlined in Clause 52.17 of the Cardinia Planning Scheme and the incorporated 'Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017) (referred to herein as the 'Native Vegetation Guidelines').
- Implications of the Environmental Significance Overlay

1.1 Site Context

The property is approximately 0.428 hectares and lies within the Green Wedge A Zone – Schedule 1 (GWAZ1) under the Cardinia Planning Scheme. The following overlays apply to the property:

- Bushfire Management Overlay (BMO)
- Environmental Significance Overlay – Schedule 1 (ESO1)

1.2 Permit Requirements and Exemptions

A range of local, state and federal regulations may apply to proposals to remove native vegetation in Victoria. Various permit requirements may or may not be triggered based on the land area, land tenure, local planning schemes (including the relevant planning zones, overlays or specific provisions) and permit exemptions. A summary of regulations that are considered in context of the proposed development is outlined below.

Level	Regulations	Description	Relevance to application
Victorian Planning Provisions	Clause 52.17	A permit is **required** for the removal of native vegetation	**Applicable**
	Clause 42.01	A permit is **required** for the removal of native vegetation	**Applicable**
State Legislation	The Flora and Fauna Guarantee Act 1988 (FFG Act)	Generally, applies to public land unless private land is listed as critical habitat for a species or ecological community.	**Not Applicable**
Federal Legislation	Environment Protection and	May apply to private land if a listed species or ecological community is present.	**Not applicable**

Level	Regulations	Description	Relevance to application
	Biodiversity Conservation Act 1999 (EPBC Act)		

Section 2 outlines the results of the vegetation assessment.

Section 3 provides implications of the proposed development in accordance with Clause 52.17 and the incorporated *Native Vegetation Guidelines.*

Section 4 provides implications of the proposed development in accordance with the ESO1

Appendix 1 Maps illustrate the existing conditions, trees, the development layout and proposed impacts to native vegetation.

Attachment 1 provides the Native Vegetation Removal (NVR) Report from DEECA

Attachment 2 provides a list of available native vegetation credits

2 Native Vegetation Assessment

A site assessment was undertaken by *Ranges Environmental Consulting* in April 2025. This assessment considered the development layout and associated impacts to trees and native vegetation.

The type and extent of native vegetation was mapped onsite using a GPS (within 1-2 metres accuracy).

2.1 Assessment Criteria

Native vegetation is assessed in accordance with the *Native Vegetation Guidelines* (DELWP 2017), which defines native vegetation in two categories:

Native vegetation patch

A patch of native vegetation is either:

- an area of vegetation where at least 25 per cent of the total perennial understory plant cover is native
- any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
- any mapped wetland included in the current wetlands map, available in DEECA systems and tools.

Scattered tree

A scattered tree is a native canopy tree that does not form part of a Native Vegetation Patch.

Note: A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type.

Vegetation that is neither a native vegetation patch nor a scattered tree is not applicable to the *Native Vegetation Guidelines* e.g. introduced pasture, planted woodlots and cultivated gardens.

Ecological Vegetation Classes

An Ecological Vegetation Class (EVC) is a native vegetation type classified based on its floristic, life form, environmental and ecological characteristics (DEPI 2013). The benchmark for an EVC describes the attributes of the vegetation type in its mature natural state, which reflects pre-settlement conditions.

Modelled pre-1750 EVCs produced by DEECA and accessible via ***Nature Kit Online***, indicate that Grassy Forest (EVC 128) of Highland Southern Fall Bioregion previously occurred on the property and in the surrounding landscape.

Onsite assessment of remnant native vegetation determined that, although modified from its original state, canopy trees in the property are indicative of Grassy Forest (EVC 128).

Site Condition Assessments

Site condition assessments are a key measure of native vegetation impact assessments and offset requirements. Where a native vegetation patch (or habitat zone) is identified, a site condition assessment can be attained by applying one of two methods below:

- The modelled site condition score using the NVIM online tool (not applied in this application)
- A Habitat Hectare assessment undertaken by an accredited Native Vegetation Assessor

Habitat Hectare (or Site Condition) assessments apply a defined EVC benchmark as per standardised methodology (DSE 2004). The assessment combines 7 site-based measures and 3 landscape-based measures to generate a site condition score between 0 and 1 that represents vegetation quality as a percentage of the optimum benchmark.

Native vegetation patches are separated where there is clear physical break between one patch and the next, or where two types of EVCs are observed or where there are significant differences in condition within a single EVC.

Large Tree Benchmark

The Large Tree benchmark for Grassy Forest is 70cm when measured at breast height (1.3m above the ground). Impact to large trees is a key consideration of the *Native Vegetation Guidelines.*

2.2 Flora Species

A total of 11 flora species were observed in the assessment area including 9 local native species, 2 species of exotic origin.

Limitations of the Flora Survey

The flora survey was undertaken in Autumn which limited the identification of seasonal herbs. Furthermore, the site groundstorey is heavily mown limiting the identification of native grasses and perennial herbs.

It is possible that more indigenous and introduced species would be detected in follow-up surveys if the garden maintenance activities cease. However, the brief survey provided a fair representation of the vegetation quality and plant diversity expected if surveyed over different times of the year, given the long-term disturbance associated with residential land use.

Threatened Flora

The Arboricultural Impact Assessment conducted by *Greenwood Consulting* in February 2025 initially identified 10 trees on the study site as *Eucalyptus fulgens*. However, a subsequent ecological assessment carried out by *Ranges Environmental Consulting* was unable to confirm the presence of *E. fulgens*. Instead, the trees were identified as common species in the area, including *Eucalyptus goniocalyx*, *Eucalyptus radiata*, *Eucalyptus dives*, *Eucalyptus obliqua*, and *Eucalyptus baxteri*. Following

this, the arboricultural consultants reviewed their initial assessment and formally acknowledged the revised species identifications.

2.3 Site Condition Assessment

Native vegetation was assessed in the vicinity of the proposed works and defendable space area. No scattered trees were observed given that native trees form a continuous canopy

Habitat Zone 1

Habitat Zone 1 is located from the central portion of the site to the property boundary, accounting for an area of 0.185 hectares. Habitat Zone 1 consists primarily of canopy trees such as Messmate Stringybark *Eucalyptus obliqua*, Narrow-leaf Peppermint *Eucalyptus radiata*, Long-leaf Box *Eucalyptus goniocalyx*, Broad-leaf Peppermint *Eucalyptus dives*, and Brown Stringybark *Eucalyptus baxteri*. Canopy cover is approximately 17% of benchmark levels and 5 large trees are present.

The understorey is almost inexistent, the few species found include an understorey tree Cherry ballart *Exocarpos cupressiformis*, patches of grass Wallaby Grass *Rytidosperma spp.*, and herbs are limited to Kidney-weed *Dichondra repens*.

Weed cover is moderate and predominantly consist of Agapanthus *Agapanthus praecox subsp. orientalis*, Kikuyu *Cenchrus clandestinus*, and Plantain *Plantago spp*. Organic Litter cover is low and logs are high due piling. Summing up the landscape components Habitat Zone 1 receives a condition score of 0.41% of the EVC benchmark.

[redacted] HZ1 facing east showing the canopy trees

[redacted] HZ1 - log piling and lone understorey tree (Cherry Ballart) beneath canopy.

[redacted] Logs in HZ1

[redacted] Kidney-weed in HZ1

Habitat Hectare Results

Table 1. Habitat Hectare Results

Habitat Zone			1
Benchmark criteria		Max. Score	EVC HSF (EVC 128)
Site condition	Large Old Trees	10	9
	Canopy cover	5	3
	Understorey	25	5
	Lack of weeds	15	7
	Recruitment	10	0
	Organic litter	5	0
	Logs	5	2
		1x	**23**
Multiplier		100%	**23**
	Patch Size		**8**
	Neighbourhood		**4**
	Distance to Core		**3**
			15
Habitat quality score[#]/100		**0.1**	**0.38**

Non-native Vegetation

The majority of the vegetation of the property is highly modified and consists of planted exotic trees shrubs, herbs and introduced grasses. The garden beds and grassy areas around the existing dwelling are dominated by Kikuyu *Pennisetum clandestinum*, Radiata Pine *Pinus Radiata*, Cotoneaster *Cotoneaster sp.*, Agapanthus *Agapanthus praecox*, and Sweet Pittosporum *Pittosporum undulatum*, Callistemon *Callistemon spp.*, Kikuyu *Cenchrus clandestinus,* and Ligustrum *Ligustrum spp.*

2.4 Tree Assessment Results

This section shows a summary of the tree assessment with updated species to be removed. The *Greenwood Consulting* document *Arboricultural Construction Impact Assessment*, provides the full extent of the assessment for both exotic and native trees.

Map 2 illustrates the 23 trees on the Habitat Zone 1, which include 9 trees to be removed to achieve defendable space requirements. As outlined in Table 2, the 9 trees proposed for removal consist of:

- 3 Large Trees
- 5 Small Indigenous Canopy Trees
- 1 Understorey Tree

Tree Removal

Table 2. Tree Removal Summary

CT – Indigenous Canopy Tree UT Understorey Tree DBH – Diameter at Breast Height

No.	Type	Species	Common Name	TPZ (m)	DBH (cm)	Size Class
2	CT	*Eucalyptus goniocalyx*	Long-leaf Box	8.4	70	Large
5	CT	*Eucalyptus obliqua*	Messmate	6.96	58	Small
7	CT	*Eucalyptus goniocalyx*	Long-leaf Box	4.68	39	Small
8	CT	*Eucalyptus obliqua*	Messmate	3.84	32	Small
10	CT	*Eucalyptus baxterii*	Broad-leaf Peppermint	6.14	51	Small
16	CT	*Eucalyptus goniocalyx*	Long-leaf Box	8.4	70	Large
18	CT	*Eucalyptus goniocalyx*	Long-leaf Box	9.36	78	Large

No.	Type	Species	Common Name	TPZ (m)	DBH (cm)	Size Class
11	UT	*Exocarpos cupressiformis*	Cherry Ballart	2.4	20	Small
12	CT	*Eucalyptus goniocalyx*	Long-leaf Box	5.279	44	Small

Impact to Tree Protection Zones

The proposed dwelling extension occurs outside the Tree Protection Zones of all trees to be retained. Therefore, no adverse impact to trees as a result of TPZ encroachment is expected. However, demolition and construction works and vehicles should remain outside of the TPZs of retained trees to ensure no further impacts, unless appropriate mitigation measures are implemented.

Tree protection recommendations are included in Section 6.1

TPZs of retained trees are shown on Map 3.

3 Implications under the Native Vegetation Removal Guidelines

Clause 52.17 is the principle clause under the Cardinia Planning Scheme that regulates native vegetation protection and permitted removal. The *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017) (the *Native Vegetation Guidelines)* is the primary reference document under this clause. Native Vegetation is regulated under all Victorian Planning Schemes and is defined in Clause 73 as:

'Plants that are indigenous to Victoria, including trees shrubs, herbs and grasses'.

Clause 52.17 regulates clearing of native vegetation by achieving no net loss to Victoria's biodiversity. This is achieved through the following approaches:

- Avoid the removal, destruction or lopping of native vegetation.
- Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
- Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation.
- To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation.

3.1 Native Vegetation Impact

As outlined in the Assessors Handbook (DELWP 2018), the Native Vegetation Impact assessment must account for direct, indirect and consequential native vegetation loss. Table 5 outlines all potential impacts as relevant to the development proposal.

Table 3. Accounting for native vegetation loss

Ancillary works and uses around a new dwelling assumes 100% loss of native vegetation within 10 metres from the building	✓
Impacts to Tree Protection Zones (generally ≥10% though exceptions may apply)	✓
The full canopy extent of all trees deemed to be impacted	✓
The need for firebreaks or defendable space to reduce bushfire risk	✓
Installation of services and utilities	-
Impacts of construction activity, compaction and excavation	✓
Septic treatment systems and stormwater runoff	N/A
Exemptions triggered from approved dwellings or subdivisions	N/A

Proposed Native Vegetation Removal

Total native vegetation impact proposed as a result of the development comes to a total of 0.046 hectares consisting of:

- 3 large canopy trees to comply with the defendable space
- 6 small canopy trees to comply with the defendable space
- 0.046 hectares of Grassy Forest (EVC 128) managed with minimal understory to comply with the defendable space requirements.

Native vegetation impact is based on the extent of canopy trees nominated for removal. As the understorey is minimal and there is already a permit exemption for removal (based on Clause 52.15 Bushfire Exemptions – 10/10 entitlement), only tree removal is subject to permit requirements and offsets.

Past Native Vegetation Removal

It is understood that no vegetation removal has occurred on the property or on contiguous properties under the same ownership in the last 5 years. Therefore, past removal does not apply to this application.

Application Category

The assessment category of an application is determined by its extent and location in accordance with Table 6. The location category is a biodiversity mapping unit that has been determined across Victoria and is represented in three categories:

- Location 3 – includes locations where the removal of less than 0.5 hectares of native vegetation could have a significant impact on habitat for a rare or threatened species.
- Location 2 – includes locations that are mapped as endangered EVCs and/or sensitive wetlands and coastal areas are not included in Location 3
- Location 1 – includes all remaining locations in Victoria.

Table 4. Determining the assessment Category

Extent of Native Vegetation	Location Category		
	Location 1	Location 2	Location 3
Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
Less than 0.5 hectares include one or more large trees	Intermediate	Intermediate	Detailed
0.5 hectares or more	Detailed	Detailed	Detailed

Source: Table 3, *Guidelines for the removal, destruction or lopping of native vegetation* (DEPI 2017)

The impact area is within Location 1 which indicates that this area is not typically characterised by threatened flora and fauna or endangered EVCs, furthermore the area is less than 0.5 hectares and includes 3 large trees.

3.1.1 Biodiversity Impact and Offset Requirements

The native vegetation removal (NVR) report was generated by DEECA based on provision of spatial data from the impact assessment. The offset requirement that applies to approved native vegetation removal is:

Offset Type	General Offset
Offset Amount	0.02 general habitat units
Vicinity	Melbourne Water CMA Region or Cardinia Shire Council Area
Minimum SBV Score	0.416
Large Trees	3

The DEECA NVR Report verifies the results of the impact and offset assessment and is provided in Attachment 1.

3.1.2 Offset Strategy

A native vegetation offset works on the principle of providing an ecological gain equivalent to the value of native vegetation loss. There are two ways in which an offset can be secured:

- Through legal protection, conservation management and forfeit of rights to the use the land (e.g. grazing and firewood collection) on the same property, providing sufficient areas of native vegetation is available or,
- Purchase of a third-party native vegetation offset. This is typically purchased through an accredited broker trading under the State's Native Vegetation Credit Register

Due to the small amount of native vegetation removal and associated offset, it is recommended that a third-party offset is sought. Several options are available and are included in Attachment 2.

3.1.3 Avoid and Minimise Statement

As required for all applications, an avoid and minimise statement is provided below to demonstrate how the application has reduced impacts on biodiversity and other values of native vegetation.

Strategic Level Planning[1]

Strategic Level Planning was considered in this assessment with references to:

1. VicPlan Online Vicplan (mapshare.vic.gov.au) which maintains records on planning scheme amendments or changes to zones or overlays (dating back to July 2017)
2. Native Vegetation Precinct Plans relevant to the municipality (as outlined in Schedules to Clause 52.16)
3. Sites under the Melbourne Strategic Assessment Levy Area

Based on these sources, no information is available that pertains to Strategic Level Planning initiatives that affect the subject site.

Site Level Planning[2]

1. The proposed buildings and works provide an extension to the existing dwelling within the existing residential curtilage.
2. Native canopy tree removal is exclusively a result of defendable space requirements
3. While a minimal amount of understorey impact is required, the proposal allows for the majority of remnant vegetation in Habitat Zone 1 to be retained.

There are no feasible opportunities to further avoid and minimise impacts on native vegetation without undermining the key objectives of the proposal.

[1] Strategic level planning is any regional or landscape scale planning process that the site has been subject to that avoided and minimised impacts on native vegetation across a region or landscape

[2] Site level planning refers to how the proposed use or development has been sited or designed to avoid and minimise impacts on native vegetation

4 Environmental Significance Overlay

Schedule 1: Northern Hills

The Schedule 1 to the Environmental Significance Overlay (ESO1) is designed to achieve the following objectives:

- 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.
- 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.

Under the ESO1, a permit is required to remove, destroy, or lop native vegetation including that required to be removed by the proposal. Table 7 outlines the permit application requirements of the ESO1 and responses.

Table 5. ESO1 Application Requirements and Responses

Requirement	Response
A photograph or site plan (drawn to scale) showing the boundaries of the site, existing vegetation and the vegetation to be removed.	Provided in Appendix 1 Maps.
A description of the vegetation including the understorey to be removed, including the species, extent, number and size (diameter at 1.3 metres above natural ground level) of any trees to be removed and the Ecological Vegetation Class of native vegetation.	Tree data provided in the Tree Assessment by *Greenwood Consulting* and Section 3 of this assessment. Other native vegetation data including understorey description and EVC included in Section 2.3.

Requirement	Response
Location of any hollow bearing trees.	All trees assessed were checked for hollows and no hollows were observed.
Topographic information, highlighting ridges, crests and hilltops, streams and waterways, slopes of more than 20 percent, drainage lines, low lying areas, saline discharge areas, and areas of existing erosion	Topographic information shown on features and levels survey by *Architectural Building Design & Permits Services* provided in Attachment 1.
A written explanation of the steps that have been taken to: – Avoid the removal of vegetation, where possible. – Minimise the removal of vegetation. – Appropriately replace and/ or compensate for the loss of vegetation, if required.	Provided in Section 3 Appendix 1 Map 3: shows Tree Protection Zones. Attachment 2 provides available options to compensate for the loss of native vegetation through a third-party offset.
A copy of any property vegetation plan that applies to the site.	NA
Where the removal, destruction or lopping of vegetation is to create defendable space, a statement explaining why removal, destruction or lopping of vegetation is required having regard to other available bushfire risk mitigation measures. This does not apply to the creation of defendable space in conjunction with an application under the Bushfire Management Overlay.	A Bushfire Management Statement prepared by *Fast Inspect Consulting*.
An environmental assessment report prepared by a suitably qualified person and to the satisfaction of the responsible authority.	This report includes an assessment by a VQA certified assessor (Greg James)

5 Conclusion and Recommendations

The proposed development will lead to removal of patch of 0.046 hectares of Grassy Forest (EVC 128), which includes 3 large trees.

5.1 Native Vegetation Offset Requirements

The loss of native vegetation generates the following offset requirement:

Offset Type	General Offset
Offset Amount	0.02 general habitat units
Large Trees	3
Minimum Strategic Biodiversity Value	0.416
Vicinity	Melbourne Water CMA or Cardinia Shire Council

A search for general habitat units through DEECA revealed several third party offset sites that are available for purchase. A list of these sites is included in Appendix 4.

5.2 Tree and Vegetation Protection

Tree protection zones apply to areas that are close to the approved construction footprint and vulnerable to inadvertent impacts including:

- Works within the TPZ. Typically, any works that exceed 10% incursion into the TPZ are potentially detrimental to tree health or stability
- Inappropriate machinery access or stockpiling that has an impact on a designated TPZ
- Damage to tree trunks from machinery such as excavators, bobcats and cranes

The following recommendations are provided below to ensure that native vegetation and trees allocated for retention are adequately protected during construction.

- Define the construction footprint to minimise the impact of the works to the fullest extent possible
- No construction activity is to be undertaken beyond the designated construction zone including but not limited to excavation, vehicle and equipment movement, storage, and stockpiling
- Trees and other native vegetation to be retained are to be secured by the installation of high visibility vegetation protection fencing or flagging set at the edge of the construction zones
- Vegetation protection fencing must be installed to protect Tree Protection Zones unless approved works are within these zones

- Plans in this report are to be provided to arborists and construction contractors along with clear instruction on the site constraints and areas to be protected
- Removal of trees or vegetation is to be limited to that specified in the permit or endorsed plans

5.3 Threatened Species

No threatened flora was observed within the study area and given the modified nature of the vegetation within the development area, it is expected that the proposal will not impact on threatened flora.

The tree canopy within Habitat Zone 1 may provide some hunting opportunities for locally-occurring threatened owls such as the Powerful Owl *Ninox strenua* and Sooty Owl *Tyto tenebricosa.* However, the proposal retains 14 substantial native canopy trees which will continue to provide an occasional foraging resource for owls and other species of birds and arboreal mammals. Furthermore, no tree hollows were observed and the understorey impact is extremely limited. It is therefore considered unlikely that the proposal will impact on threatened fauna.

6 References

DELWP (2017) Guidelines for the removal, destruction or lopping of native vegetation (the Department of Environment, Land, Water and Planning, December 2017)

DELWP (2017b) Assessors Handbook – Applications to remove, destroy or lop native vegetation (the Department of Environment, Land, Water and Planning, December 2017)

DELWP (2017c) Nature Kit Online. the Department of Environment, Land, Water and Planning, December 2017. http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit

DELWP (2017d) Native Vegetation Gain Scoring Manual the Department of Environment, Land, Water and Planning, December 2017)

DEPI (2014b) Ecological Vegetation Class (EVC) Benchmarks for each Bioregion. Department of Environment and Primary Industries, Government of Victoria. Accessed via: http://www.dse.vic.gov.au/conservation-and-environment/native-vegetation-groups-for-victoria/ecological-vegetation-class-evc-benchmarks-by-bioregion

DSE (2009) Vegetation Quality Assessment Manual–Guidelines for applying the habitat hectares scoring method. Version 1.3. Victorian Government Department of Sustainability and Environment, Melbourne.

Appendix 1. Maps

The following maps were produced using Quantum GIS (QGIS 3.2) and were developed from various datasets including:

- Aerial photography available through Google Earth (AusMap) and Nearmap
- VicMap layers (Parcel, Roads, Waterways and Local Government Boundaries)
- Development Drawings provided by SD Planning
- GPS based data collected in the field

Map 1 - Existing Conditions and Proposed Development

127 Cooinda Road
Beaconsfield

- Title Boundary
- Dwelling
- Shed
- 10m Buffer
- Extension

Trees

- In Remnant Patch
- Habitat Zone

Date: 11 [redacted]
Created [redacted]
Map Program: QGIS 3.20

Scale (A3) 1:350

0 8 16 m

N

RANGES Environmental
info@rangesconsulting.com

Map 2 - Development Layout and Vegetation Impact

127 Cooinda Road
Beaconsfield

- Title Boundary
- Dwelling
- Shed
- 10m Buffer
- Extension
- Remove
- Retain with Pruning
- Retain
- Impacted Habitat Zone

Date: 16 April 2025
Created by [redacted]
Map Program: QGIS 3.20

Scale (A3) 1:350

0 8 16 m

N

RANGES Environmental
info@rangesconsulting.com

Map 2 - Tree Proteciton

127 Cooinda Road
Beaconsfield

- Title Boundary
- Dwelling
- Shed
- 10m Buffer
- Extension
- TPZ Retain
- SRZ
- Remove
- Retain with Pruning
- Retain

Date: 11 April 2025
Created by [redacted]
Feautre Survey Provided
by Architectural Building Design &
Permit Services
Map Program: QGIS 3.20

Scale (A3) 1:300

11 0 m

N

RANGES
Environmental
info@rangesconsulting.com

Attachment 1. DEECA Native Vegetation Removal Report

The Native Vegetation Removal (NVR) Report on the overleaf was generated using spatial data from the site assessment and inputs into DEECA licensed software used to determine impact and offset requirements in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017).

Native Vegetation Removal Report

NVRR ID: 311_20250416_CV9

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. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Report details

Date created: 16/04/2025

Local Government Area: CARDINIA SHIRE

Shapefile name: 00000_NVR.shp

Site assessor name: Greg James

Registered Aboriginal Party: Bunurong

Coordinates: 145.39374, -38.03416

Address: 127 COOINDA ROAD BEACONSFIELD 3807

Regulator Notes

Removal polygons are located:

Summary of native vegetation to be removed

Assessment pathway	**Intermediate Assessment Pathway**		
Location category	Location 1 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.		
Total extent including past and proposed removal (ha) *Includes endangered EVCs (ha): 0*	**0.046**	*Extent of past removal (ha)*	*0*
		Extent of proposed removal - Patches (ha)	*0.046*
		Extent of proposed removal - Scattered Trees (ha)	*0.000*
No. Large Trees proposed to be removed	**3**	*No. Large Patch Trees*	*3*
		No. Large Scattered Trees	*0*
No. Small Scattered Trees	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 [1]	**0.02 General Habitat Units**
Minimum strategic biodiversity value score [2]	0.4160
Large Trees	3
Vicinity	Melbourne Water CMA or 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.
3. The Species Offset amount(s) required is the sum of all Species Habitat Units in Appendix 1.

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?

No

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, If the proposed defendable space is within the Bushfire Management Overlay (BMO), and in accordance with the 'Exemption to create defendable 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 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?

No

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)

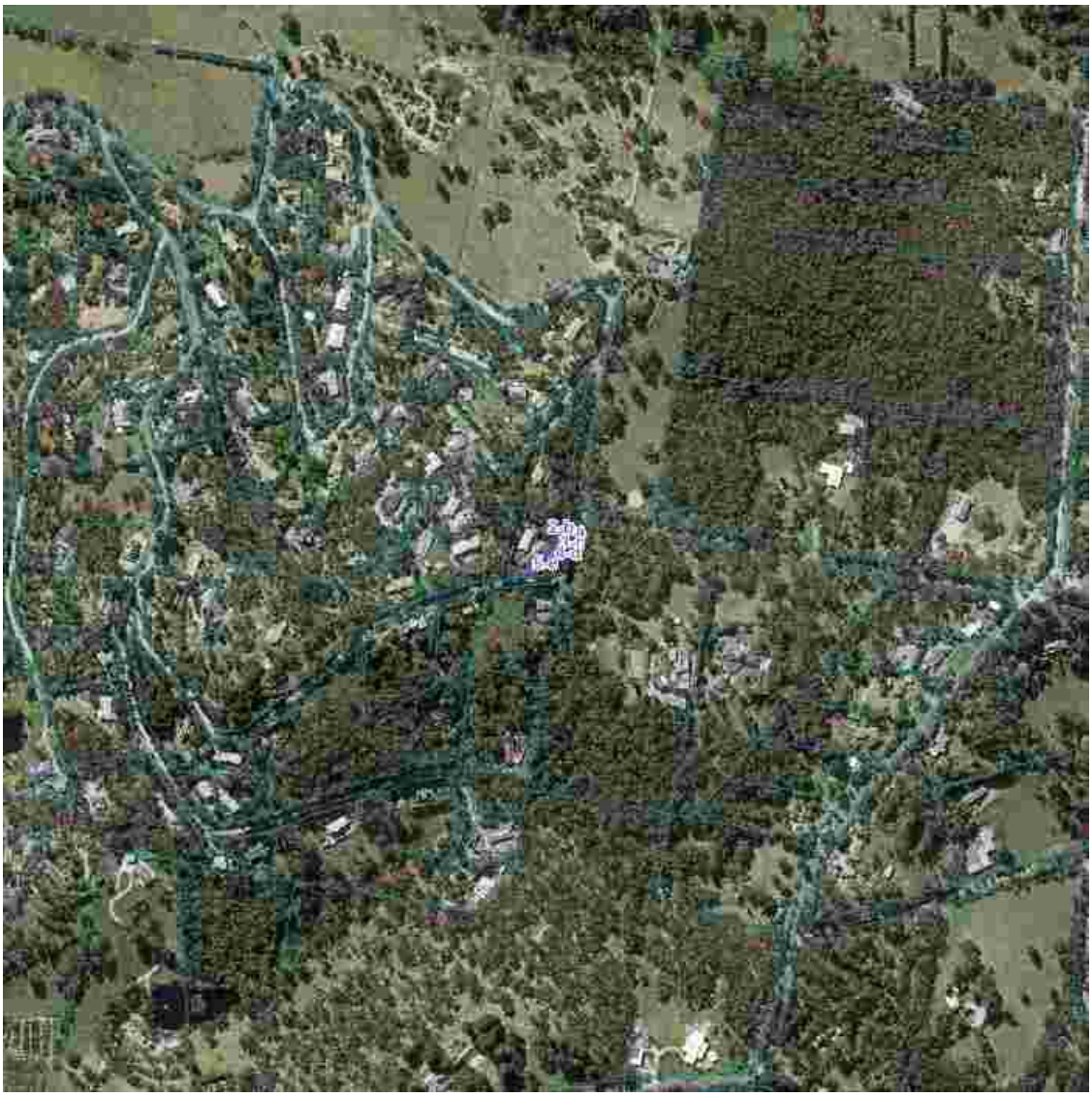
The General Offset amount required is the sum of all General Habitat Units per zone.

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**	**Bioregional conservation status**	**Partial Removal**	**Condition score**	**Large Tree(s)**	**Polygon extent (ha)**	**Extent without overlap (ha)**	**SBV score**	**General Habitat Units**
1-a	Patch	-	HSF_0128	Vulnerable	no	0.380	-	0.006	0.006	0.520	0.003
2-b	Patch	-	HSF_0128	Vulnerable	no	0.380	1	0.005	0.005	0.520	0.002
3-c	Patch	-	HSF_0128	Vulnerable	no	0.380	-	0.007	0.007	0.520	0.003
4-d	Patch	-	HSF_0128	Vulnerable	no	0.380	-	0.013	0.013	0.520	0.006
5-e	Patch	-	HSF_0128	Vulnerable	no	0.380	2	0.015	0.015	0.520	0.007

Appendix 2: Images of mapped native vegetation

1. Property in context



2. Aerial photograph showing mapped native vegetation

Proposed Removal
Past Removal
Partial Removal

N

35 m

3. Location Risk Map

4. Strategic Biodiversity Value Score Map

5. Condition Score Map

6. Endangered EVCs

Not Applicable

Attachment 2. Available Native Vegetation Credits

The report on the overleaf lists native vegetation credits available to purchase through the Native Vegetation Credit Register based on the minimum offset requirements for the proposed development.

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: 16/04/2025 03:09 **Report ID: 29366**

What was searched for?

General offset

General habitat units	Strategic biodiversity value	Large trees	Vicinity (Catchment Management Authority or Municipal district)	
0.02	0.416	3	CMA	Melbourne Water
			or LGA	Cardinia Shire

Details of available native vegetation credits on 16 April 2025 03:09

These sites meet your requirements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-0277	1.272	439	Melbourne Water	Mornington Peninsula Shire	No	Yes	No	Abezco, Ethos, VegLink
BBA-0670	13.399	70	Melbourne Water	Cardinia Shire	No	Yes	No	Abezco, VegLink
BBA-0677	3.292	1320	Melbourne Water	Whittlesea City	No	Yes	No	Abezco, VegLink
BBA-0678	37.507	2452	Melbourne Water	Nillumbik Shire	No	Yes	No	Abezco, VegLink
BBA-0678_02	0.562	58	Melbourne Water	Nillumbik Shire	No	Yes	No	Abezco, VegLink
BBA-2870	2.544	431	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
BBA-2871	13.901	1621	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
TFN-C1650	0.042	17	Melbourne Water	Yarra Ranges Shire	Yes	Yes	Yes	Yarra Ranges SC
TFN-C1664	0.026	17	Melbourne Water	Yarra Ranges Shire	Yes	Yes	Yes	Yarra Ranges SC
VC_CFL-0838_01	0.182	636	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3687_01	0.241	58	Melbourne Water	Baw Baw Shire	Yes	Yes	No	Baw Baw SC
VC_CFL-3708_01	0.185	460	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3709_01	0.120	291	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink

VC_CFL-3710_01	6.238	322	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3740_01	0.021	42	Melbourne Water	Cardinia Shire, Yarra Ranges Shire	Yes	Yes	No	Bio Offsets
VC_CFL-3740_01	0.059	14	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	Bio Offsets
VC_CFL-3744_01	1.164	349	Melbourne Water	Macedon Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3762_01	0.046	76	Melbourne Water	Moorabool Shire	Yes	Yes	No	VegLink
VC_CFL-3805_01	3.289	802	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)

There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements when applying the alternative arrangements as listed in section 11.2 of the Guidelines for the removal, destruction or lopping of native vegetation.

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	4.962	563	Melbourne Water	Macedon Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3792_01	14.025	1235	Melbourne Water	Macedon Ranges Shire	Yes	Yes	No	VegLink
VC_CFL-3816_01	10.827	596	Melbourne Water	Yarra Ranges Shire	Yes	Yes	No	Contact NVOR

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
	Fully traded			
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@deeca.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not avaliable
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

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

PART 5 1 (2)		
FLOOD PRONE REG 154:	YES ☐	NO ☒
FLOOD PRONE REG 153:	YES ☐	NO ☒
TERMITE PRONE:	YES ☒	NO ☐
BUSHFIRE PRONE:	YES ☒	NO ☐
WIND SPEED ASSESSMENT: N2 MAXIMUM DESIGN GUST WIND SPEED FOR THIS SITE IS:		

RELEVANT STANDARDS:	
A.S1288	GLAZING
A.S1684	TIMBER FRAMING
A.S2601	DEMOLITION
A.S2870	FOOTINGS
A.S3786	SMOKE DETECTORS
A.S3500.3	STORM WATER
A.S3700	MASONRY
A.S3740	WATERPROOFING
A.S4773	MASONRY
A.S3500.2	SANITARY PLUMBING

SMOKE DETECTORS

1. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE PLAN OF SURVEY (24948F1), THE GROUND FLOOR PLAN (24948P3), THE UPPER FLOOR LAYOUT PLAN (24948P4), THE BUILDING ELEVATIONS (24948P5), THE SHADOW DIAGRAMS (24948P6), THE PROPOSED SUBDIVISION PLAN (24948P7), THE GARDEN AREA PLAN (24948P8) AND THE LANDSCAPE PLAN (24948L01). IT HAS BEEN PREPARED AS PART OF A TOWN PLANNING SUBMISSION.
1. CAR PARKING & ACCESS-
   LOT 1- THE PROPOSED DOUBLE STOREY DWELLING HAS THREE BEDROOMS AND AN ATTACHED SINGLE GARAGE WITH A TANDEM CAR SPACE.
   LOT 2- THE PROPOSED DOUBLE STOREY DWELLING HAS TWO BEDROOMS AND AN ATTACHED SINGLE GARAGE.
   LOT 3- THE PROPOSED DOUBLE STOREY DWELLING HAS TWO BEDROOMS AND AN ATTACHED SINGLE GARAGE.
   LOT 4- THE PROPOSED DOUBLE STOREY DWELLING HAS FOUR BEDROOMS AND AN ATTACHED DOUBLE GARAGE.
   ACCESS - THE EXISTING CONCRETE CROSSOVER WILL PROVIDE ACCESS OFF MORRIS ROAD TO ALL LOTS VIA A PROPOSED COMMON PROPERTY DRIVEWAY.
3. OVERLOOKING -THE PROPOSED DWELLINGS HAVE BEEN DESIGNED TO OVERLOOK THEIR OWN INTERNAL OPEN SPACE, STREETS & DRIVEWAY. TRELLIS & OBSCURE GLAZING IS PROPOSED TO PREVENT OVERLOOKING AS REQUIRED. SCREENING VEGETATION WILL BE USED TO SOFTEN FENCE LINES AND FURTHER PREVENT OVERLOOKING WHERE CONSIDERED NECESSARY (SEE LANDSCAPE PLAN).
4. SHADOWS - REFER TO THE SHADOW DIAGRAMS (24948P6) FOR SOLAR ACCESS TO ALL LOTS.
5. DAYLIGHT TO HABITABLE WINDOWS - ADEQUATE DAYLIGHT IS AVAILABLE TO ALL EXISTING AND PROPOSED HABITABLE WINDOWS WITH 1M CLEAR TO THE SKY ACHIEVED FOR ALL.
6. SPOT LEVELS AND CONTOURS SHOWN ARE TO THE AUSTRALIAN HEIGHT DATUM.

SMOKE DETECTORS

- PROVIDE SMOKE DETECTORS AS DENOTED ON FLOOR PLAN AS REQUIRED IN ACCORD WITH A.S. 3786 (LATEST EDITION)
- SMOKE ALARMS TO NEW RESIDENCES ARE TO BE HARDWIRED TO SWITCHBOARD WITH BATTERY BACKUP.
- DENOTES LOCATION OF SMOKE ALARMS TO BE PROVIDED AND INSTALLED IN ACCORDANCE WITH A.S. 3786-2014. AND UNLESS INSTALLED IN AN EXISTING PART OF A CLASS 1, 2 OR 3 OR A CLASS 4 PART OF A BUILDING THE SMOKE ALARM SHALL BE HARD WIRED WITH A BATTERY BACK UP.

IN A CLASS 1A BUILDING, SMOKE ALARMS MUST BE LOCATED IN-
(A) ANY STOREY CONTAINING BEDROOMS; AND
(B) EVERY CORRIDOR OR HALLWAY ASSOCIATED WITH A BEDROOM, OR IF THERE IS NO CORRIDOR OR HALLWAY, IN AN AREA BETWEEN THE BEDROOMS AND THE REMAINDER OF THE BUILDING; AND
(C) EACH OTHER STOREY.

STAR ENERGY RATING

- REFER TO ENERGY RATING REPORT FOR REQUIREMENTS TO ACHIEVE THE RELEVANT STAR ENERGY RATING, IN ACCORDANCE WITH B.C.A.

GENERAL NOTES (NCC 2022 BCA VOL 2)

- ALL MATERIALS AND WORK PRACTICES SHALL COMPLY WITH, BUT NOT LIMITED TO THE BUILDING REGULATIONS 2018, NATIONAL CONSTRUCTION CODE SERIES 2022, THE BUILDING CODE OF AUSTRALIA VOL 2 AND ALL RELEVANT CURRENT AUSTRALIAN STANDARDS (AS AMENDED) REFERRED TO THEREIN.
- UNLESS OTHERWISE SPECIFIED THE TERM BCA SHALL REFER TO NATIONAL CONSTRUCTION CODE SERIES 2022 BUILDING CODE OF AUSTRALIA VOLUME 2.
- ALL MATERIALS AND CONSTRUCTION PRACTICE SHALL MEET THE DEEMED TO SATISFY OF THE BUILDING CODE OF AUSTRALIA. WHERE AN PERFORMANCE SOLUTION IS PROPOSED THEN, PRIOR TO IMPLEMENTATION OR INSTALLATION, IT FIRST MUST BE ASSESSED AND APPROVED BY THE RELEVANT BUILDING SURVEYOR AS MEETING THE PERFORMANCE REQUIREMENTS OF THE BCA.
- GLAZING INCLUDING SAFETY GLAZING SHALL BE INSTALLED TO A SIZE, TYPE & THICKNESS SO AS TO COMPLY WITH;
  - BCA PART 8.3 FOR CLASS 1 AND 10 BUILDINGS WITHIN A DESIGN WIND SPEED OF NOT MORE THAN N3, AND
  - WATERPROOFING OF WET AREAS, BEING BATHROOMS, SHOWERS, SHOWER ROOMS, LAUNDRIES, SANITARY COMPARTMENTS AND THE LIKE SHALL BE PROVIDED IN ACCORDANCE WITH AS 3740-2021: WATERPROOFING OF WET AREAS IN RESIDENTIAL BUILDINGS.
- WINDOW SIZES NOMINATED ARE NOMINAL ONLY. ACTUAL SIZE MAY VARY ACCORDING TO MANUFACTURER. WINDOWS TO BE FLASHED ALL AROUND.
- WHERE THE BUILDING (EXCLUDES A DETACHED CLASS 10) IS LOCATED IN A TERMITE PRONE AREA THE AREA TO UNDERSIDE OF BUILDING AND PERIMETER IS TO BE TREATED AGAINST TERMITE ATTACK.
- CONCRETE STUMPS: UP TO 1400MM LONG TO BE 100MM X 100MM (1 NO. H.D. WIRE) 1401MM TO 1800MM LONG TO BE 100MM X 100MM (2 NO. H.D. WIRES) 1801MM TO 3000MM LONG TO BE 125MM X 125MM (2 NO. H.D. WIRES) 100MM X 100MM STUMPS EXCEEDING 1200MM ABOVE GROUND LEVEL TO BE BRACED WHERE NO PERIMETER BASE BRICKWORK PROVIDED.
- FOR BUILDINGS IN MARINE OR OTHER EXPOSURE ENVIRONMENTS SHALL HAVE MASONRY UNITS, MORTAR AND ALL BUILT IN COMPONENTS AND THE LIKE COMPLYING WITH THE DURABILITY REQUIREMENTS OF TABLE 4.1 OF AS4773.1-2015 MASONRY IN SMALL BUILDINGS PART 1:DESIGN
- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT STRUCTURAL AND ALL OTHER CONSULTANTS DRAWINGS/ DETAILS AND WITH ANY OTHER WRITTEN INSTRUCTIONS ISSUED IN THE COURSE OF THE CONTRACT.
- SITE PLAN MEASUREMENTS IN MILLIMETERS - ALL OTHER MEASUREMENTS IN MILLIMETERS U.N.O. FIGURED DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS.
- THE BUILDER SHALL TAKE ALL STEPS NECESSARY TO ENSURE THE STABILITY AND GENERAL WATER TIGHTNESS OF ALL NEW AND/OR EXISTING STRUCTURES DURING ALL WORKS.
- THE BUILDER AND SUBCONTRACTORS SHALL CHECK AND VERIFY ALL DIMENSIONS, SETBACKS, LEVELS AND SPECIFICATIONS AND ALL OTHER RELEVANT DOCUMENTATION PRIOR TO THE COMMENCEMENT OF ANY WORKS. REPORT ALL DISCREPANCIES TO THIS OFFICE FOR CLARIFICATION.
- INSTALLATION OF ALL SERVICES SHALL COMPLY WITH THE RESPECTIVE SUPPLY AUTHORITY REQUIREMENTS.
- THE BUILDER AND SUBCONTRACTOR SHALL ENSURE THAT ALL STORM WATER DRAINS, SEWER PIPES AND THE LIKE ARE LOCATED AT A SUFFICIENT DISTANCE FROM ANY BUILDINGS FOOTING AND/OR SLAB EDGE BEAMS SO AS TO PREVENT GENERAL MOISTURE PENETRATION, DAMPNESS, WEAKENING AND UNDERMINING OF ANY BUILDING AND ITS FOOTING SYSTEM.
- THESE PLANS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE BY THE CLIENT OF THE PROJECT CENTRE ('THE DESIGNER') FOR THE PURPOSE EXPRESSLY NOTIFIED TO THE DESIGNER. ANY OTHER PERSON WHO USES OR RELIES ON THESE PLANS WITHOUT THE DESIGNER'S WRITTEN CONSENT DOES SO AT THEIR OWN RISK AND NO RESPONSIBILITY IS ACCEPTED BY THE DESIGNER FOR SUCH USE AND/ OR RELIANCE.
- THE APPROVAL BY THIS OFFICE OF A SUBSTITUTE MATERIAL, WORK PRACTICE, VARIATION OR THE LIKE IS NOT AN AUTHORIZATION FOR ITS USE OR A CONTRACT VARIATION. ANY SAID VARIATIONS MUST BE ACCEPTED BY ALL PARTIES TO THE AGREEMENT AND WHERE APPLICABLE THE RELEVANT BUILDING SURVEYOR PRIOR TO IMPLEMENTING THE SAID VARIATION.

STORMWATER:

- ALL STORM WATER TO BE TAKEN TO THE LEGAL POINT OF DISCHARGE TO THE RELEVANT AUTHORITIES APPROVAL.
- 90MM DIA. CLASS 6 UPVC STORM WATER LINE LAID TO A MINIMUM GRADE OF 1:100 AND CONNECTED TO THE LEGAL POINT OF STORM WATER DISCHARGE. PROVIDE INSPECTION OPENINGS AT 9000mm C/C AND AT EACH CHANGE OF DIRECTION.
- THE COVER TO UNDERGROUND STORM WATER DRAINS SHALL BE NOT LESS THAN
  - 100mm UNDER SOIL
  - 50mm UNDER PAVED OR CONCRETE AREAS
  - 100mm UNDER REINFORCED CONCRETE OR PAVED DRIVEWAYS
  - 75mm UNDER REINFORCED CONCRETE DRIVEWAYS
- A REGISTERED PLUMBER IS REQUIRED TO INSTALL ALL SHEET ROOFING, GUTTERS, DOWN PIPES & STORM WATER CONNECTION TO LEGAL POINT OF DISCHARGE. BE ADVISED THAT THE RESPONSIBLE BUILDING SURVEYOR MAY REQUIRE A PLUMBING CERTIFICATE TO BE PROVIDED.
- SLOTTED EXTERNAL GUTTERS ARE TO BE PROVIDED WHERE APPLICABLE.
- PROVIDE 100mm DIAMETER P.V.C STORM WATER DRAINS WITH MINIMUM 1:100 FALL AND MINIMUM 300mm COVER, CONNECTED TO LEGAL POINT OF DISCHARGE. STORM WATER DRAIN LAYOUT IS INDICATIVE ONLY AND WILL BE LAID AT THE DRAINERS' DISCRETION.
- PROVIDE SELECTED DOWN PIPES AT 12.0M MAXIMUM CENTERS.CONNECT STORM WATER TO LEGAL POINT OF DISCHARGE (LPOD).LEGAL POINT OF DISCHARGE IS LOCATED AT THE FRONT OF SITE. ALL DOWN PIPES TO BE JOINED WITH PVC SWD AT BASE OF WEEPHOLES.
- TEMPORARY DOWN PIPES CONNECTED TO THE STORMWATER SYSTEM SHALL BE INSTALLED AS SOON AS THE ROOF CLADDING IS COMPLETED.

STEPS & LANDINGS:

- STEP SIZES (OTHER THAN FOR SPIRAL STAIRS) TO BE: RISERS (R) 190mm MAXIMUM AND 115mm MINIMUM GOING (G) 355mm MAXIMUM AND 240mm MINIMUM 2R + 1G = 700mm MAXIMUM AND 550mm MINIMUM WITH LESS THAN 125mm MAXIMUM GAP TO OPEN TREADS ALL TREADS, LANDINGS AND THE LIKE TO HAVE NON SLIP FINISH OR SUITABLE NON-SKID STRIP NEAR EDGE OF NOSING.
- PROVIDE BALUSTRADES WHERE CHANGE IN LEVEL EXCEEDS 1000MM ABOVE THE SURFACE BENEATH LANDINGS, RAMPS AND/OR TREADS. BALUSTRADES (OTHER THAN TENSIONED WIRE BALUSTRADES) TO BE: 1000mm MIN. ABOVE FINISHED SURFACE LEVEL OF BALCONIES, LANDINGS OR THE LIKE, AND 865mm MIN. ABOVE FINISHED SURFACE LEVEL OF STAIR NOSING OR RAMP, AND VERTICAL WITH LESS THAN 125mm GAP BETWEEN, AND ANY HORIZONTAL ELEMENT WITHIN THE BALUSTRADE BETWEEN 150mm AND 760mm ABOVE THE FLOOR MUST NOT FACILITATE CLIMBING WHERE CHANGES IN LEVEL EXCEEDS 4000mm ABOVE THE SURFACE BENEATH LANDINGS, RAMPS AND/OR TREADS.
- WIRE BALUSTRADE CONSTRUCTION TO COMPLY WITH BCA PART 11.3.6 FOR CLASS 1 AND 10 BUILDINGS AND NCC 2022 BCA VOLUME 1 PART D2.16 FOR OTHER CLASSES OF BUILDINGS.
- TOP OF HAND RAILS TO BE 865mm MINIMUM ABOVE STAIR NOSING AND FLOOR SURFACE OF RAMPS.

SUSTAINABILITY MEASURES FOR NEW CLASS 1 BUILDINGS:

THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ANY HOUSE ENERGY RATING (HERS) REPORT AND SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STAMPED PLANS ENDORSED BY THE ACCREDITED THERMAL PERFORMANCE ASSESSOR WITHOUT ALTERATION.

PROPOSED: EXTENSION
CLIENT: [redacted]
ADDRESS: [redacted]

REVISION:
(A)
(B)
(C)
(D)
(E)
(F)

JOB REF: PC220506
SCALE: N.A
SHEET NO: 1 OF 6
DATE: 4TH OF APRIL 2024

MELWAYS [redacted]
PREPARED
CHECKED
DP - AD 44979

ARCHITECTURAL BUILDING DESIGN & PERMIT SERVICES
52 Star Crescent, Hallam, Vic 3803
www.projectcentre.com.au
THE PROJECT CENTRE

SITE PLAN - PROPOSED

(EXISTING) SITE COVERAGE:	
SITE AREA	4282.15 m2
EXISTING DWELLING	223.73 m2
EXISTING SHED	96.00 m2
TOTAL EXISTING	319.73 m2
TOTAL COVERAGE	7.46 %
PRIVATE OPEN SPACE	3612042 m2
PERMEABLE SURFACE	13.80 %
IMPERMEABLE SURFACE	350.00 m2
GARDEN AREA	84.36 %

(PROPOSED) SITE COVERAGE:	
SITE AREA	4282.15 m2
EXISTING DWELLING	223.73 m2
EXISTING SHED	96.00 m2
(GROUND FLOOR)	
PROPOSED EXTENSION	24.38 m2
TOTAL GROUND FLOOR	293.68 m2
PROPOSED PORCH	5.11 m2
PROPOSED ALFRESCO	39.46 m2
TOTAL PROPOSED	68.95 m2
(FIRST FLOOR)	
PROPOSED EXTENSION	98.57m2
TOTAL EXTENSION ROOF AREA	167.52 m2
TOTAL BUILDINGS	391.25 m2
TOTAL COVERAGE	9.13 %
PRIVATE OPEN SPACE	3937.04 m2
PERMEABLE SURFACE	16.23 %
IMPERMEABLE SURFACE	350.00 m2
GARDEN AREA	83.77 %

EXISTING DWELLING	223.73 m2
TOTAL EXTENSION ROOF AREA	167.52 m2
TOTAL %	74.87 %

COLOUR SCHEDULE:
GROUND FLOOR CLADDING:
PREMIER PANEL VERTICAL SETOUT
COLOUR: MONUMENT MATT
GROUND FLOOR CLADDING:
PREMIER PANEL VERTICAL SETOUT
COLOUR: MONUMENT MATT
GUTTERING:
COLORBOND
COLOUR: MONUMENT MATT
FASCIA:
COLORBOND
COLOUR: MONUMENT MATT
DOWNPIPES:
COLORBOND
COLOUR: MONUMENT MATT
ROOF CLADDING:
COLORBOND TRIMDECK
COLOUR: MONUMENT MATT
WINDOW FRAMES:
ALUMINIUM
COLOUR: MONUMENT MATT
DOOR FRAMES:
ALUMINIUM
COLOUR: MONUMENT MATT
ALFRESCO BEAMS:
TIMBER PAINTED FINISH
COLOUR: MONUMENT MATT
ALFRESCO CEILING:
TIMBER SPOTTED GUM LINING BOARDS
COLOUR: NATURAL STAIN ON TIMBER
ALFRESCO REAR WALL:
TIMBER SPOTTED GUM LINING BOARDS
COLOUR: NATURAL STAIN ON TIMBER

TREE REMOVAL / TREE LOPING AS PER ARBORICULTURAL CONSTRUCTION IMPACT ASSESSMENT REF: 815825021 9 DATED: 19TH OF FEB 2025

NO EARTH WORKS (CUT OR FILL) TO TAKE PLACE FOR PROPOSED WORKS

CURRENT CONDITIONS:
THERE ARE NO EXISTING TREE'S OR VEGETATION WITHIN 3.0M FROM PROPOSED WORKS

COOINDA ROAD

16.42M 84° 05' 00"

POST & WIRE BOUNDARY FENCE

EXISTING SHED

ADJOINING RESIDENCE

ADJOINING PRIVATE OPEN SPACE

87.99M 191° 04' 00"

POST & WIRE BOUNDARY FENCE

EXISTING DRIVE WAY

PRIVATE OPEN SPACE

LOT. 59
NO. 127

EXISTING WATER TANK

COOINDA ROAD

91.73M 10° 11' 00"

POST & WIRE BOUNDARY FENCE

EXISTING CROSSOVER

58.38M 289° 16' 00"

POST & WIRE BOUNDARY FENCE

ADJOINING PRIVATE OPEN SPACE

NORTH

PROPOSED: [redacted]
CLIENT:
ADDRESS:

REVISION:
(A)
(B)
(C)
(D)
(E)
(F)

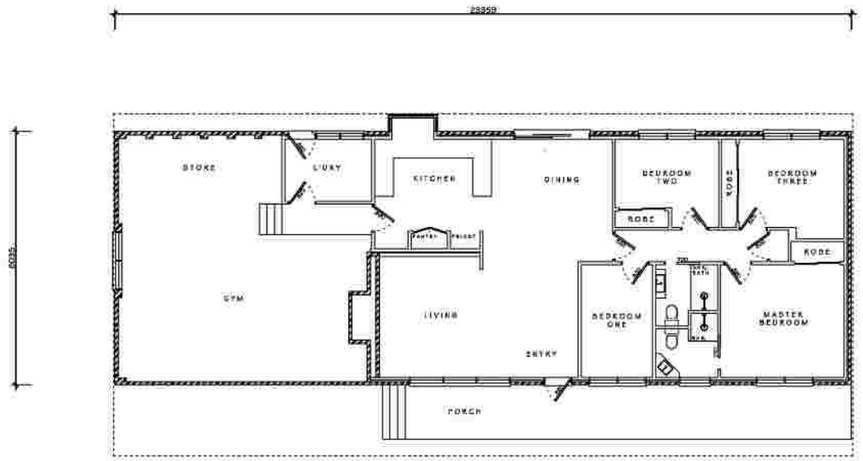
JOB REF: PC220506	
SCALE: 1 : 200	
SHEET NO: 2 OF 6	
DATE: 4TH OF APRIL 2024	

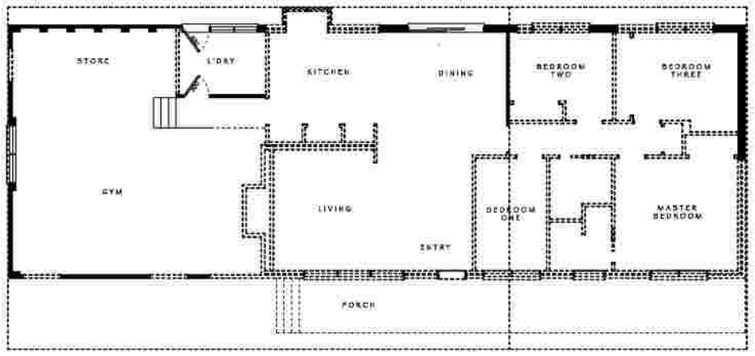
MELWAYS REF: 212 E8	
PREPARED BY: [redacted]	
CHECKED BY: [redacted]	DP - AD 44979

ARCHITECTURAL BUILDING DESIGN & PERMIT SERVICES
52 Star Crescent, Hallam, Vic 3803
www.projectcentre.com.au
THE PROJECT CENTRE

GROUND FLOOR PLAN - EXISTING & DEMOLISHMENT

NO EARTH WORKS (CUT OR FILL) TO TAKE PLACE FOR PROPOSED WORKS





LEGEND:	
EXISTING DWELLING TO REMAIN	▬
EXISTING DWELLING TO BE DEMOLISHED	- - - -

EXISTING DWELLING IS TO HAVE ALTERATIONS AND THE EXTENSION IS EXTENDING OFF THE EXISTING DWELLING REMAINING FRAME / SLAB

PROPOSED: EXTENSION
CLIENT: [redacted]
ADDRESS:

REVISION:
(A)
(B)
(C)
(D)
(E)
(F)

JOB REF: PC220506
SCALE: 1 : 100
SHEET NO: 3 OF 6
DATE: 4TH OF APRIL 2024

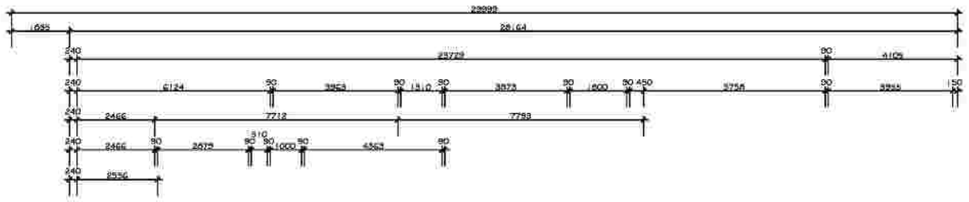
MELWAYS REF: 212 E8
PREPARED B[redacted]
CHECKED BY

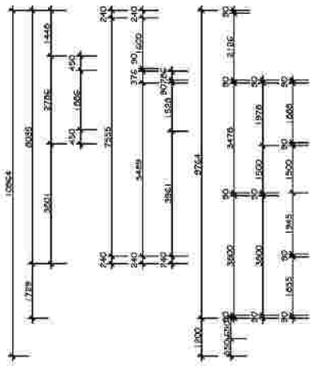
NORTH

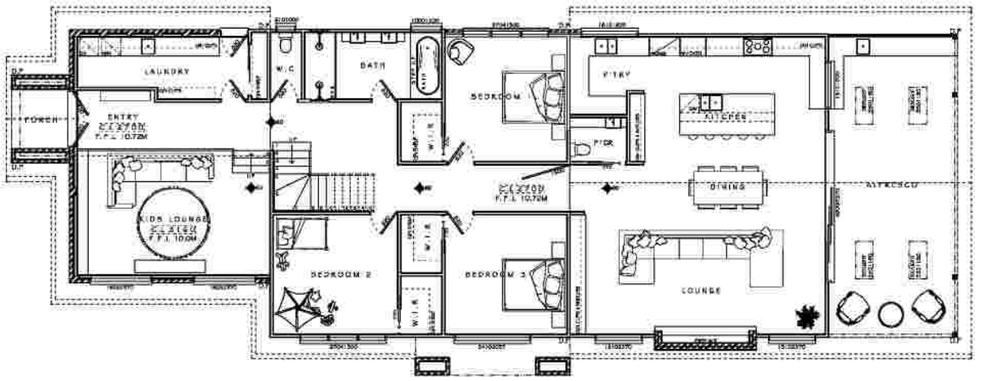
ARCHITECTURAL BUILDING DESIGN & PERMIT SERVICES
52 Star Crescent, Hallam, Vic 3803
www.projectcentre.com.au
THE PROJECT CENTRE

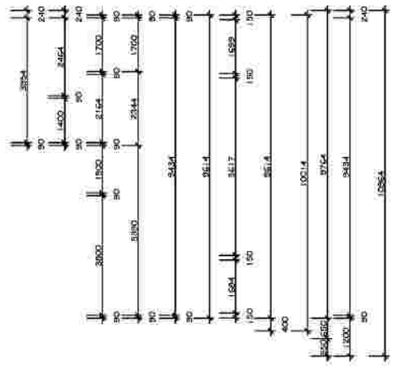
GROUND FLOOR PLAN - PROPOSED

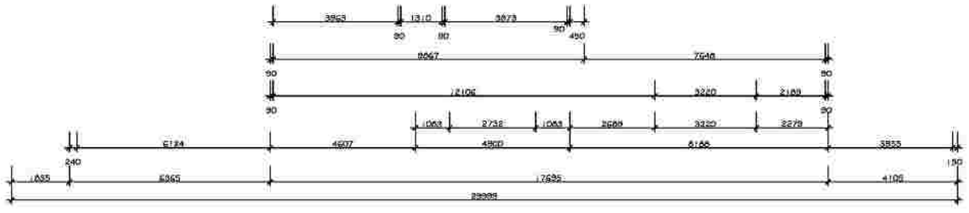
NO EARTH WORKS (CUT OR FILL) TO TAKE PLACE FOR PROPOSED WORKS











PROPOSED:	EXTENSION
CLIENT:	[redacted]
ADDRESS:	127 COOINDA ROAD, BEACONSFIELD

REVISION:
(A)
(B)
(C)
(D)
(E)
(F)

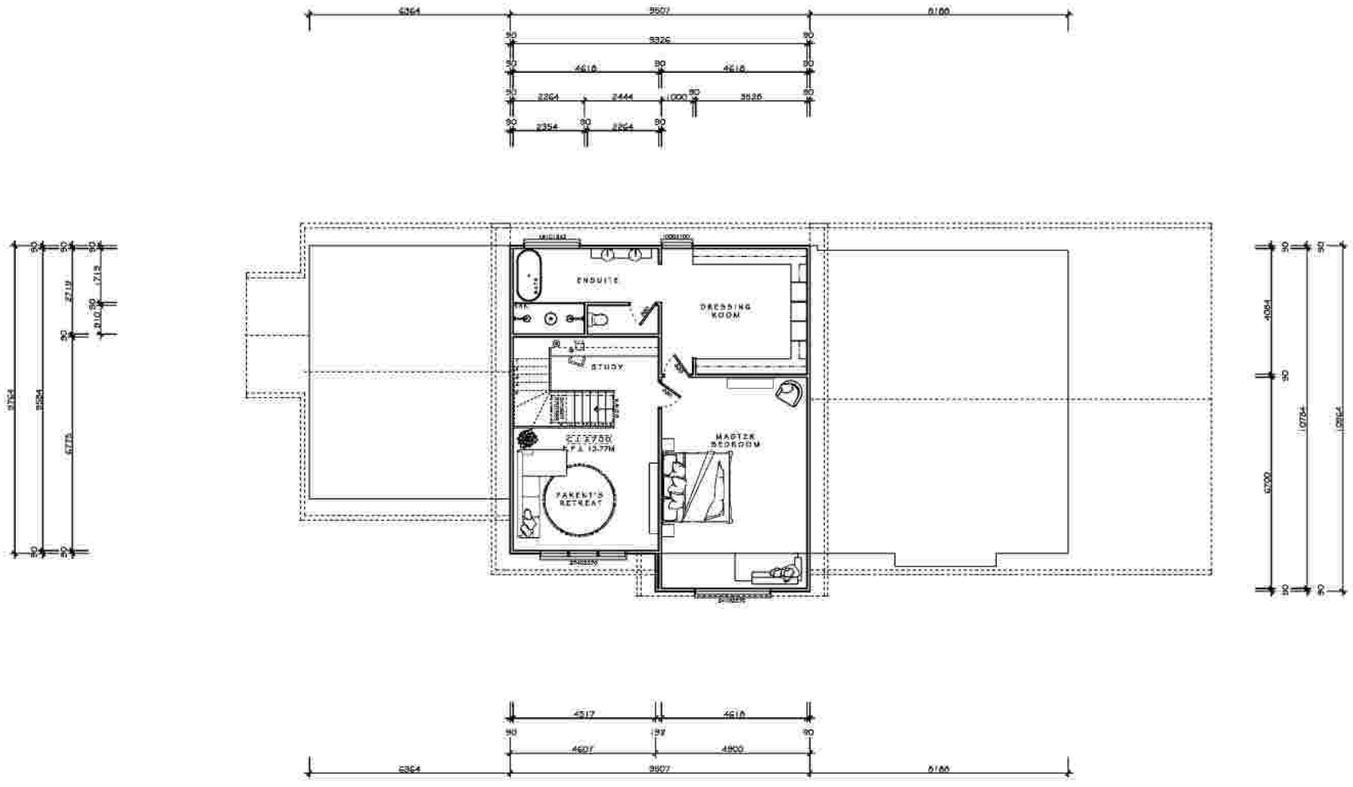
JOB REF: PC220506	MELWAYS REF: 212 E8
SCALE: 1 : 100	[redacted]
SHEET NO: 4 OF 6	DP - AD 44979
DATE: 4TH OF APRIL 2024	

NORTH

ARCHITECTURAL BUILDING DESIGN & PERMIT SERVICES
52 Star Crescent, Hallam, Vic 3803
www.projectcentre.com.au
THE PROJECT CENTRE

FIRST FLOOR PLAN - PROPOSED

NO EARTH WORKS (CUT OR FILL) TO TAKE PLACE FOR PROPOSED WORKS



PROPOSED: EXTENSION	REVISION:	JOB REF: PC220506	MELWAYS REF: 212 E8
CLIENT: [redacted]	(A)	SCALE: 1 : 100	[redacted]
ADDRESS: [redacted]	(B)	SHEET NO: 5 OF 6	
	(C)	DATE: 4TH OF APRIL 2024	
	(D)		
	(E)		
	(F)		

NORTH

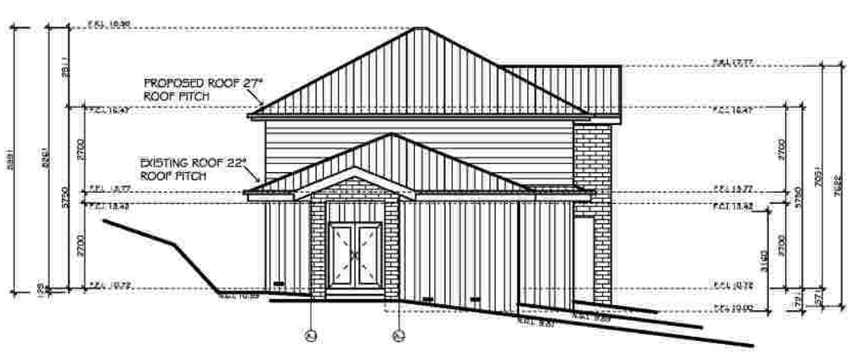
ARCHITECTURAL BUILDING DESIGN & PERMIT SERVICES
52 Star Crescent, Hallam, Vic 3803
www.projectcentre.com.au
THE PROJECT CENTRE

ELEVATIONS - PROPOSED

NO EARTH WORKS (CUT OR FILL) TO TAKE PLACE FOR PROPOSED WORKS

SOUTH ELEVATION

EAST ELEVATION



NORTH ELEVATION

WEST ELEVATION

COLOUR SCHEDULE:	ROOF CLADDING:
GROUND FLOOR CLADDING:	COLORBOND TRIMDECK
PREMIER PANEL VERTICAL SETOUT	COLOUR: MONUMENT MATT
COLOUR: MONUMENT MATT	WINDOW FRAMES:
GROUND FLOOR CLADDING:	ALUMINIUM
PREMIER PANEL VERTICAL SETOUT	COLOUR: MONUMENT MATT
COLOUR: MONUMENT MATT	DOOR FRAMES:
GUTTERING:	ALUMINIUM
COLORBOND	COLOUR: MONUMENT MATT
COLOUR: MONUMENT MATT	ALFRESCO BEAMS:
FASCIA:	TIMBER PAINTED FINISH
COLORBOND	COLOUR: MONUMENT MATT
COLOUR: MONUMENT MATT	ALFRESCO CEILING:
DOWNPIPES:	TIMBER SPOTTED GUM LINING BOARDS
COLORBOND	COLOUR: NATURAL STAIN ON TIMBER
COLOUR: MONUMENT MATT	ALFRESCO REAR WALL:
	TIMBER SPOTTED GUM LINING BOARDS
	COLOUR: NATURAL STAIN ON TIMBER

PROPOSED: EXTENSION
CLIENT: HEATH & TIFFANY WHITE
ADDRESS: [redacted] DEACONSFIELD

REVISION:
(A)
(B)
(C)
(D)
(E)
(F)

JOB REF: PC220506
SCALE: 1 : 100
SHEET NO: 6 OF 6
DATE: 4TH OF APRIL 2024

MELWAYS REF: 212 E8 [redacted]

ARCHITECTURAL BUILDING DESIGN & PERMIT SERVICES
52 Star Crescent, Hallam, Vic 3803
www.projectcentre.com.au
THE PROJECT CENTRE

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

VOLUME 05691 FOLIO 023

Security no : 124115735785M
Produced 12/06/2024 11:33 AM

LAND DESCRIPTION

Lot 59 on Plan of Subdivision 008240.
PARENT TITLE Volume 04224 Folio 781
Created by instrument 1466711 22/09/1930

REGISTERED PROPRIETOR

[redacted]

ENCUMBRANCES, CAVEATS AND NOTICES

[redacted]

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 or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE LP008240 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: 127 COOINDA ROAD BEACONSFIELD VIC 3807

ADMINISTRATIVE NOTICES

NIL

[redacted]

DOCUMENT END

Imaged Document Cover Sheet

The document following this cover sheet is an imaged document supplied by LANDATA®, Secure Electronic Registries Victoria.

Document Type	**Plan**
Document Identification	**LP008240**
Number of Pages (excluding this cover sheet)	**5**
Document Assembled	**12/06/2024 11:33**

PLAN OF SUBDIVISION
OF PART OF SUBDIVISION B
OF CROWN ALLOTMENT 56 & PART OF
CROWN ALLOTMENTS 56A,57A,57B2,&58B
PARISH OF PAKENHAM
COUNTY OF MORNINGTON

V4224 FOL781

LP 8240
EDITION 2
PLAN MAY BE LODGED
5-4-21

4 SHEETS
SHEET 1

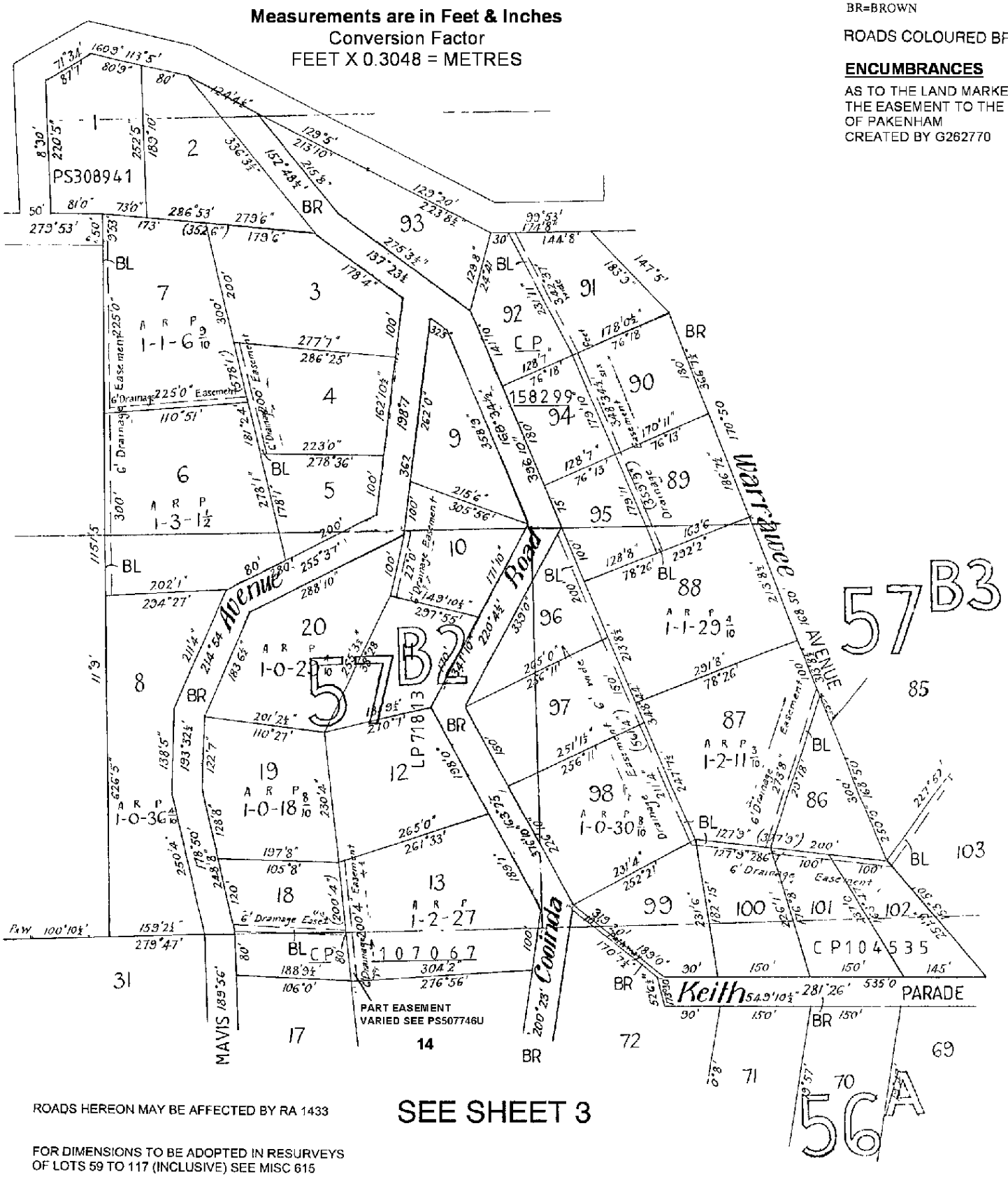
Measurements are in Feet & Inches
Conversion Factor
FEET X 0.3048 = METRES

COLOUR CODE
BL=BLUE
BR=BROWN

ROADS COLOURED BROWN

ENCUMBRANCES

AS TO THE LAND MARKED E-1
THE EASEMENT TO THE SHIRE
OF PAKENHAM
CREATED BY G262770



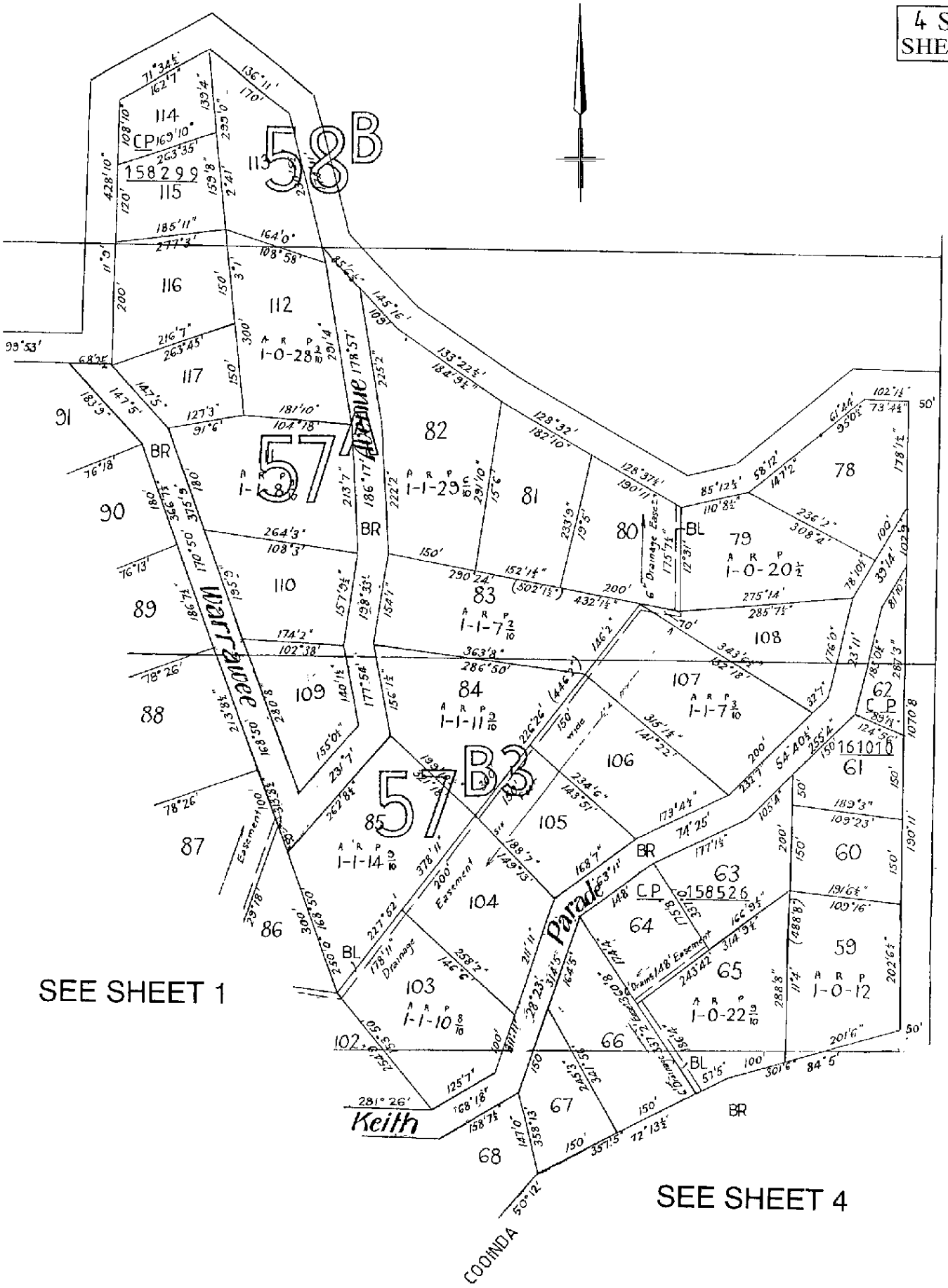
ROADS HEREON MAY BE AFFECTED BY RA 1433

SEE SHEET 3

FOR DIMENSIONS TO BE ADOPTED IN RESURVEYS
OF LOTS 59 TO 117 (INCLUSIVE) SEE MISC 615

LP 8240

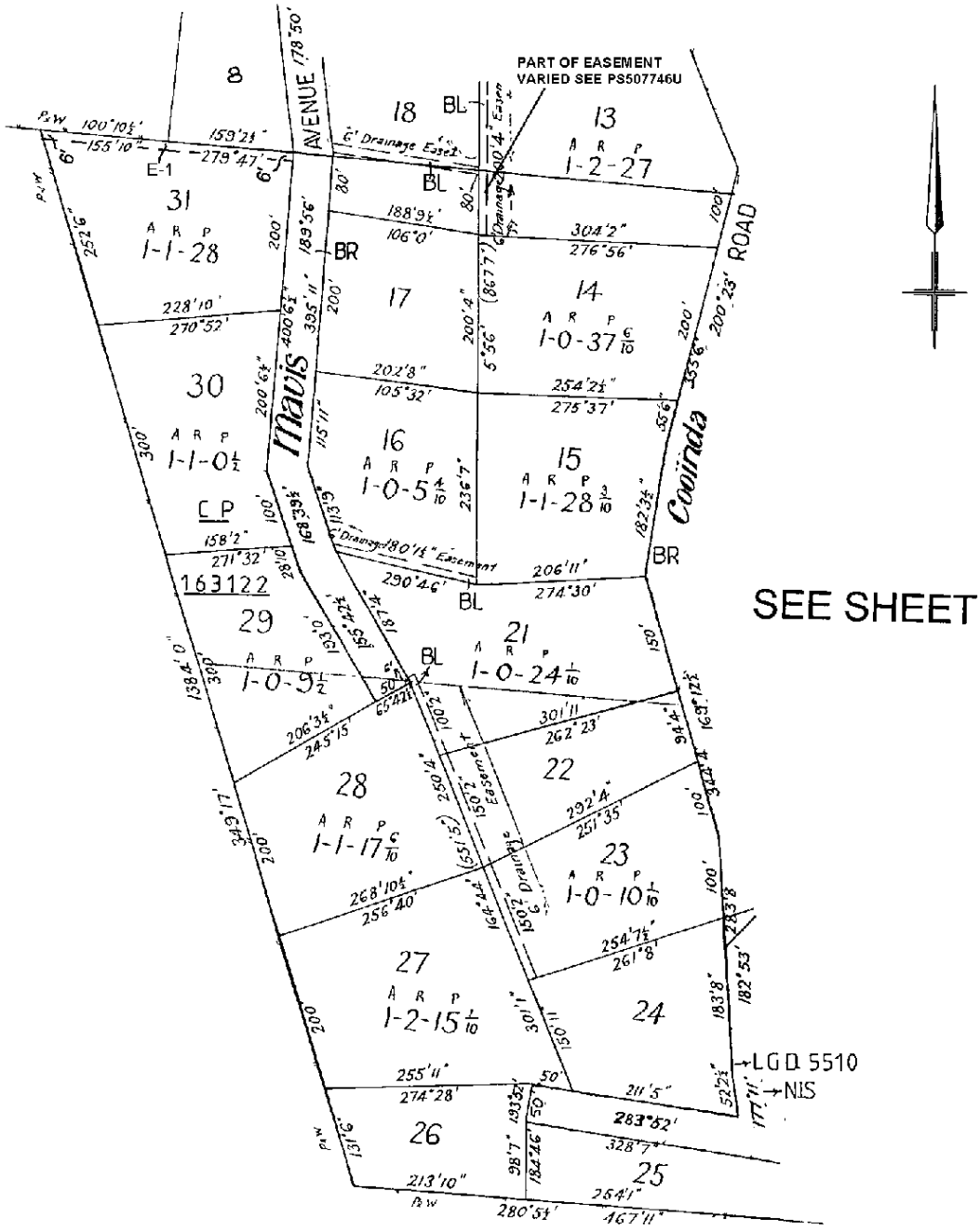
4 SHEETS
SHEET 2



LP 8240

4 SHEETS
SHEET 3

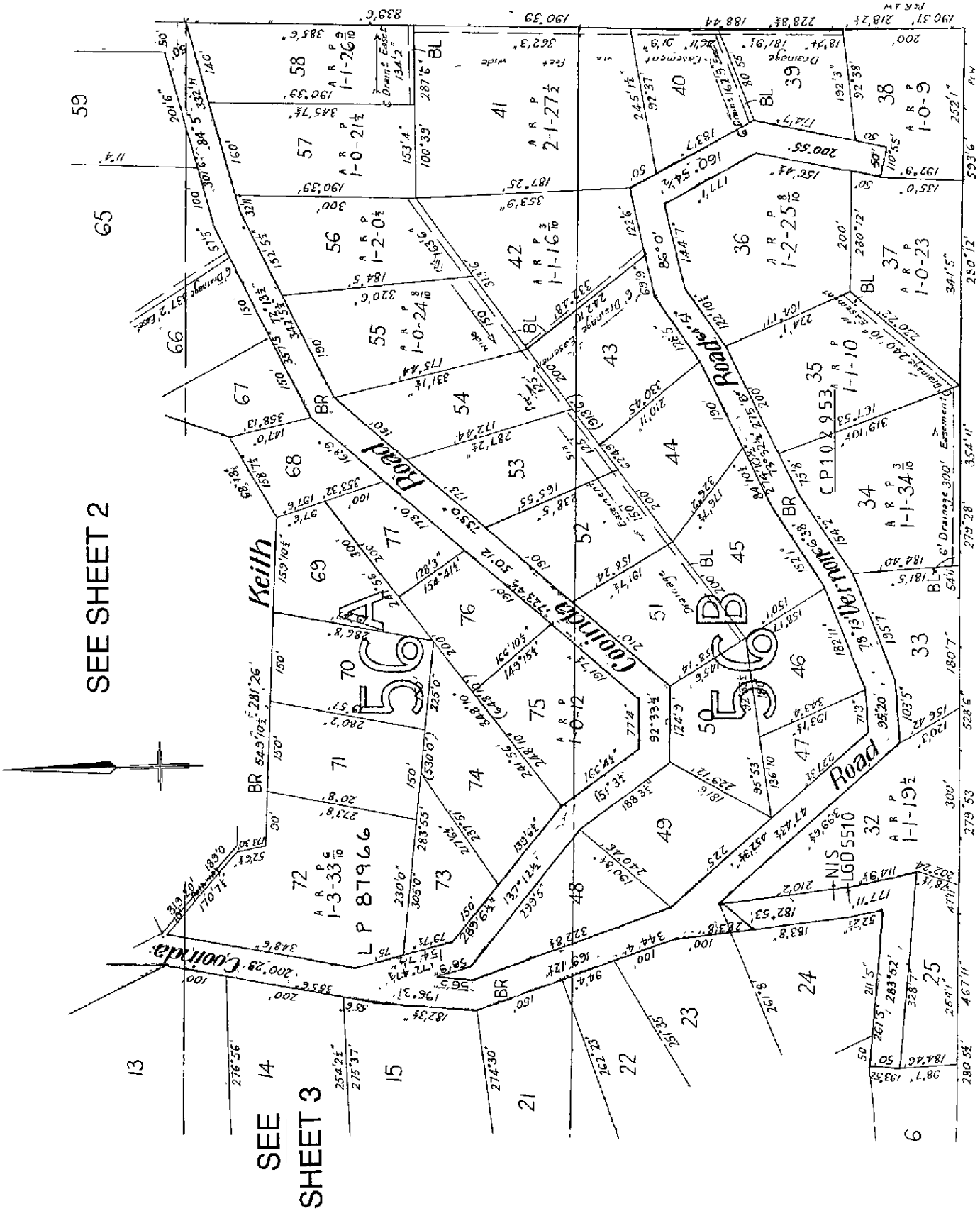
SEE SHEET 1



SEE SHEET 4

LP 8240

4 SHEETS
SHEET 4



MODIFICATION TABLE

RECORD OF ALL ADDITIONS OR CHANGES TO THE PLAN

PLAN NUMBER

LP 8240

AFFECTED LAND/PARCEL	LAND/PARCEL IDENTIFIER CREATED	MODIFICATION	DEALING NUMBER	DATE	EDITION NUMBER	ASSISTANT REGISTRAR OF TITLES
		ROAD DISCONTINUED	L.G.D.5510		1	
WARNING: THE IMAGE OF THIS DOCUMENT OF THE REGISTER HAS BEEN DIGITALLY AMENDED. NO FURTHER AMENDMENTS ARE TO BE MADE TO THE ORIGINAL DOCUMENT OF THE REGISTER.						
LOT 31	E-1	CREATION OF EASEMENT	G262770		2	AD

Bushfire Management Statement

Property Address:	**127 Cooinda Road Beaconsfield**
Local Government Area:	**Cardinia Shire Council**
Assessment Date:	**14th September 2024**
Report Date:	**30th September 2024 Ver 1**
Proposed works:	**A extension to an existing residential dwelling.**

Prepared By:	**Fast Inspect Consulting** ***Pty Ltd***
Name:	[redacted] **8350**
Telephone:	
Email:	
Signature:	

Introduction

This Bushfire Management Statement has been prepared in response to the requirements of Clause 44.06 – Bushfire Management Overlay, and in accordance with the application requirements of Clause 53.02 – Bushfire Planning.

The statement contains four components:

1. A **bushfire hazard landscape assessment** including a plan that describes the bushfire hazard of the general locality more than 150 metres from the site.25 Kilometres & 75 kilometres from the site.

2. A **bushfire hazard site assessment** including a plan that describes the bushfire hazard within 150 metres of the proposed development.

3. A **bushfire management statement** describing how the proposed development responds to the requirements of Clause 44.06 and 53.02.

4. A **Defendable space & water tank plan.**

Attachment 1- Site drawing in plan view

Attachment 2- Site photos

Attachment 3 - Table 6 of Clause 53.02-5 – Vegetation management

Attachment 4 – Building Requirements of the Bushfire Attack Level

Attachment 5– Example of foliage classification/downslope/separation.

Attachment 6 - CFA Water tank fittings.

Attachment 7- FDI 100 Table

Attachment 8- Clause 53.03-5 Tables for defendable Space

Bushfire Hazard Landscape Assessment

The bushfire hazard landscape assessment provides information on the bushfire hazard more than 150 metres away from a development site.

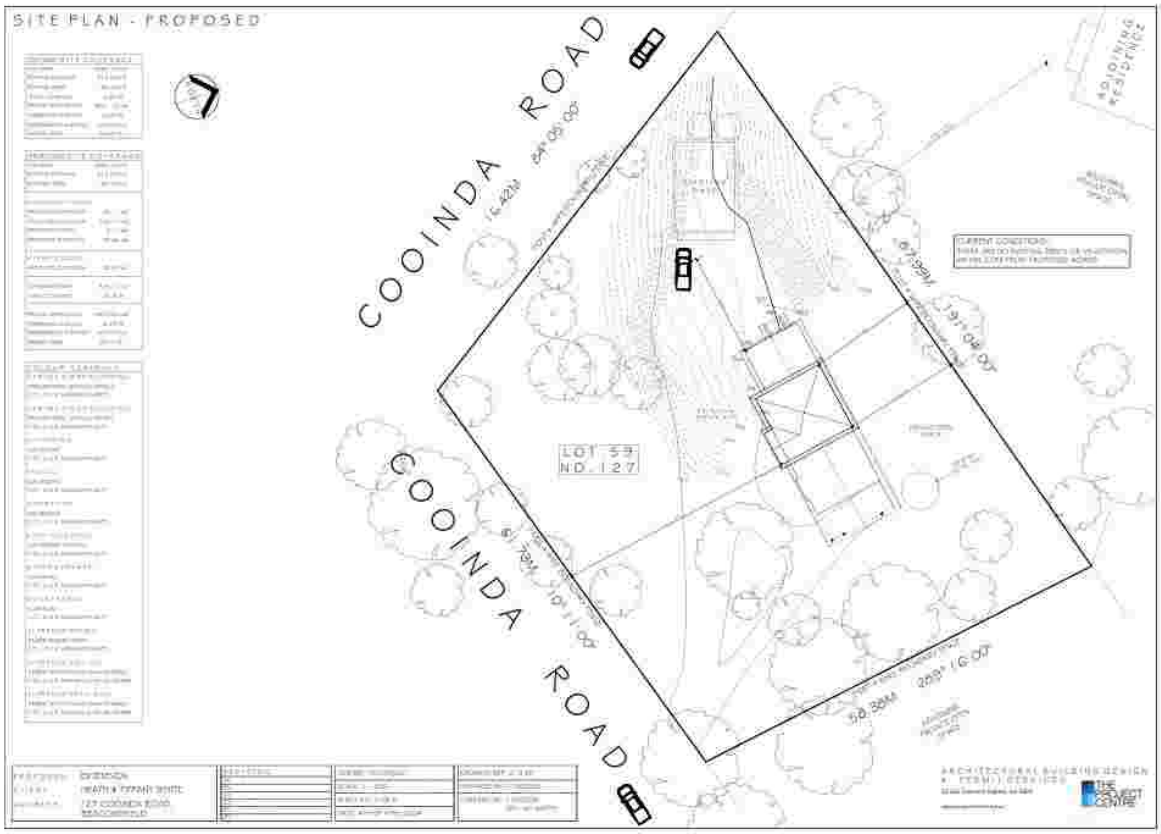
Considering bushfire from this broader landscape perspective is important as it affects the level of bushfire risk a development and its future occupants may be exposed to.

The landscape assessment:

- **provides information on the bushfire hazard (vegetation extent and slope)**
- **provides information on key features of the general locality that are relevant to better understanding the protection provided by the location.**
- **provides contextual information on a site.**

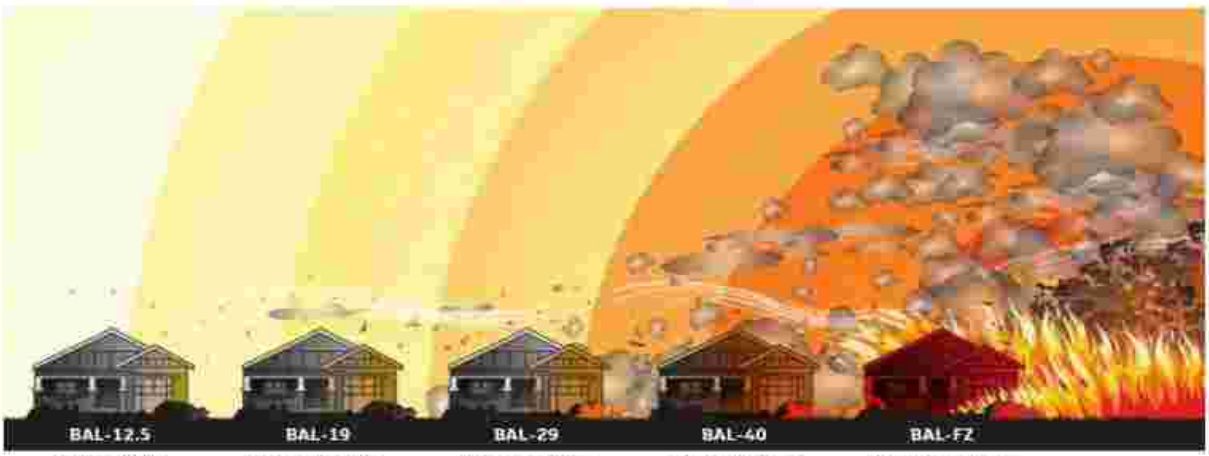
Landscape Scenario	Landscape Scenario 2
Description	• The property has foliage to the South & East of the proposed building which would subject the proposed building to ember attack in a North Eastly wind but not radiant heat. Which BAL 29 construction should sustain. • The type and extent of vegetation is unlikely to result in neighbourhood-scale destruction of property. • Immediate access is available to a place that provides shelter from bushfire.

SITE Drawing Attachment 1 BAL 29 construction

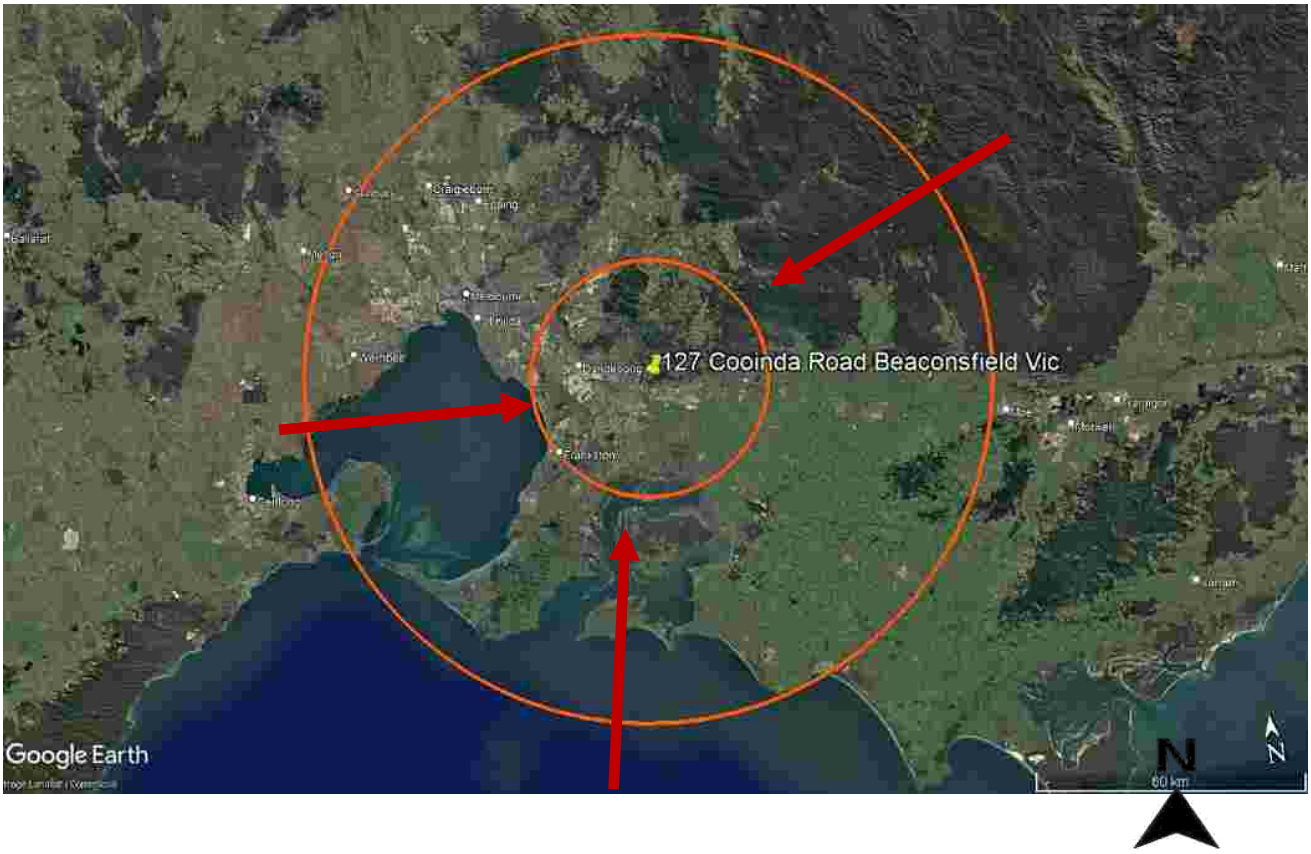


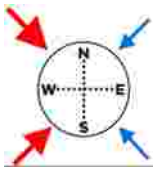
> Figure 9: **BAL construction levels respond to different levels of risk.**

withstand different levels of bushfire attack, as illustrated below.



Bushfire Landscape Assessment Plan





Key

25 Klm Radius

75 Klm Radius

Prevailing Winds

Bushfire Hazard Assessment

The bushfire hazard site assessment (the site assessment) documents the bushfire hazard on and near a site.

The assessment:

1. **provides information on the bushfire hazard (vegetation type and slope)**

2. **informs defendable space and building construction requirements.**

3. **Is informed by the methodology contained in Australian Standard AS3959:2018 Construction of buildings in bushfire prone areas (AS3959) to provide contextual information on a site.**

4. **Potential Bushfire Impacts**

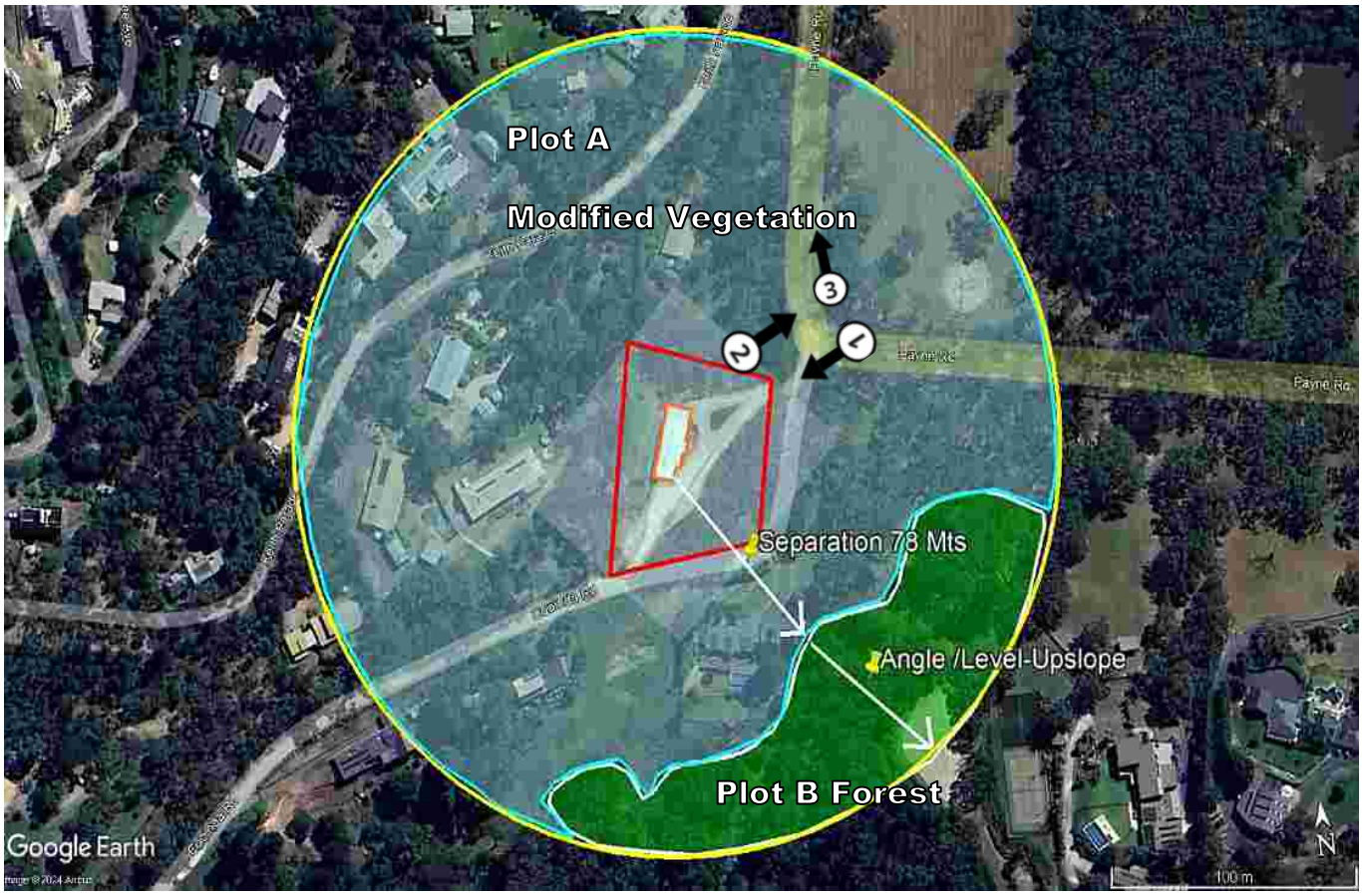
5. **The potential bushfire impact to the site / proposed development from each of the identified vegetation plots are identified below.**

Plot	Vegetation Classification	Effective Slope (°)	Separation (m)	BAL
A	Modified Vegetation	N/A	N/A	BAL 29
B	Forest	Level/Upslope	71mts	Bal 12.5

Summary:

- **Determined Bal for the building: Bal 29 as per the report.**
- **Access required for the building: Yes: 30mts plus as per report.**
- **Static water tank required: Yes: 10000 lts with CFA fittings.**
- **Defendable space required: Yes: 50 mts Table 1 and to the property boundary as per report.**

Bushfire Site Hazard Plan



Key

- Modified Vegetation
- Property Bounds
- 150m Radius
- Separation & Slope
- 1 Photo location / direction
- Proposed Building

N

Defendable Space and Water Tank Plan

Key

- Property boundary
- Defendable Space
- Building
- Water Tank
- Hydrant

N

Bushfire Management Statement

Clause 53.02-4.1 Landscape, Siting, and design objective

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

Approved Measures

Approved Measure (AM) 2.1 – Landscape

Requirement:

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

1. ***Answer. The foliage in the 150mt radius is modified vegetation with the understorey mown & managed with forest 71mts to the south east***

2. ***Answer. The 25klm/75klm Radius as per the map encompasses port Phillip bay/Bass Strait & foliage which BAL 29 should sustain ember attack & limited radiant heap.***

Have the requirements of AM 2.1 been met? **Yes**

Approved Measure (AM) 2.2 – Siting

Requirement:

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

1. ***Answer. The maximum separation distance between the building and the bushfire hazard with the building sited furthest from the potential risk to the north of the site.***

2. ***Answer. The building is near a public road.***

3. ***Answer. Access can be provided to the building for emergency service vehicles.***

Have the requirements of AM 2.2 been met? **Yes**

Approved Measure (AM) 2.3 – Building Design

Requirement:

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

1. External Walls. The external cladding is rated to BAL 29

2. Doors. The external doors are rated to BAL 29

3. Roof. The roofing material is rated to BAL 29.

4. Subfloor. The building is slab on ground.

5. Veranda. Any external timber is bushfire resistant.

6. Windows. The external windows & glazing are rated to BAL 29.

Have the requirements of AM 2.3 been met? Yes

Attachment No 2 Site Photos

.

Photo 1	***Classification*: Modified Vegetation.** **Modified vegetation may arise in parts of Victoria where fuel loads are high but the** **vegetation is altered because of urban development, gardens, the way the vegetation is** **configured (for example, limited or no understorey vegetation), or because the fuel loads.** **are different from the fuel loads assumed in AS3959. Modified vegetation may also arise.** **where the vegetation cannot be excluded as it is not low-threat or low-risk.** **Reference technical guide.**

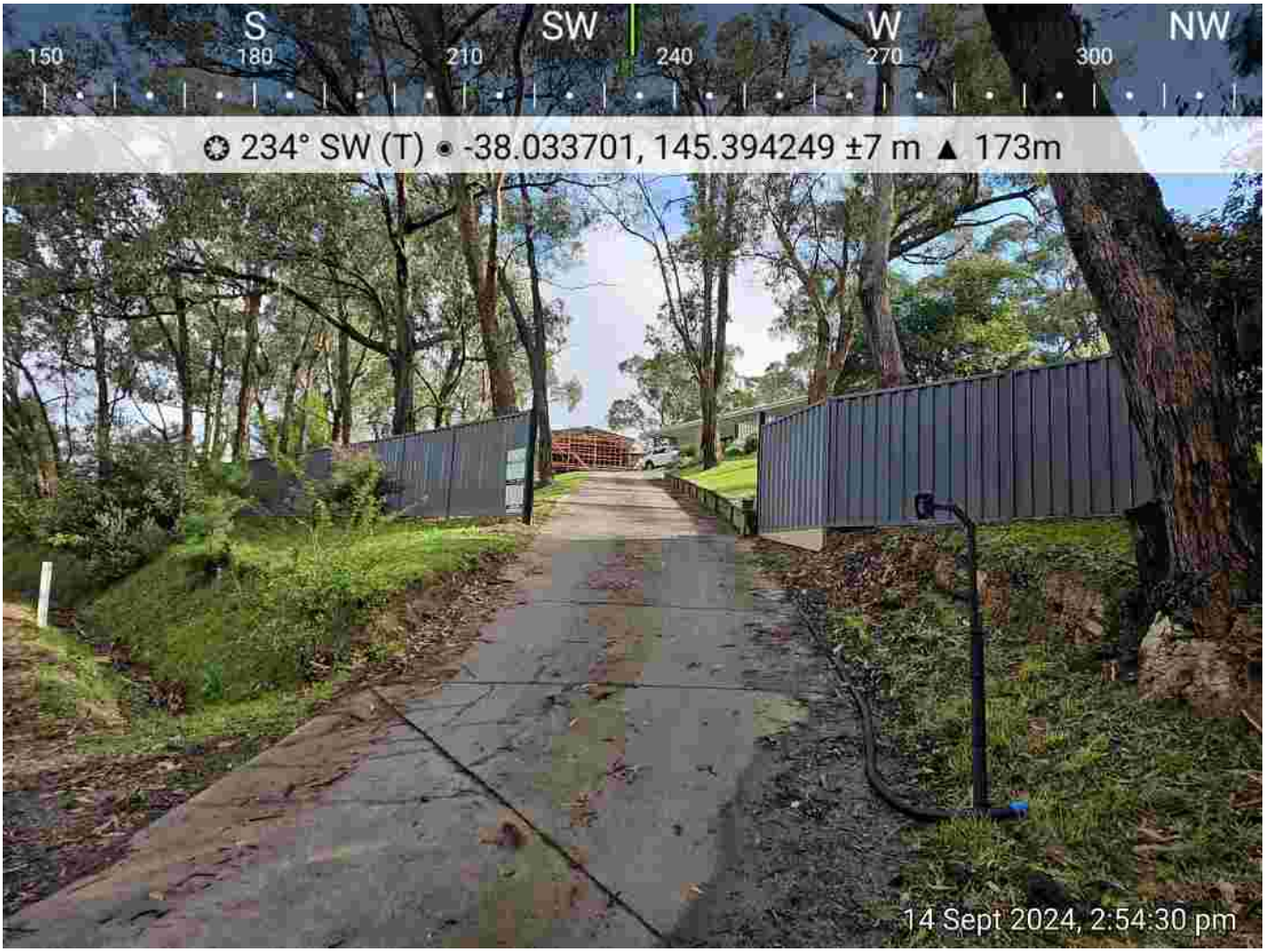


Photo 2	***Classification*: Modified Vegetation.** **Modified vegetation may arise in parts of Victoria where fuel loads are high but the** **vegetation is altered because of urban development, gardens, the way the vegetation is.** **configured (for example, limited or no understorey vegetation), or because the fuel loads.** **are different from the fuel loads assumed in AS3959. Modified vegetation may also arise.** **where the vegetation cannot be excluded as it is not low-threat or low-risk.** **Reference technical guide.**

Photo 3	***Description*: Modified vegetation.** **Modified vegetation may arise in parts of Victoria where fuel loads are high but the** **vegetation is altered because of urban development, gardens, the way the vegetation is** **configured (for example, limited or no understorey vegetation), or because the fuel loads.** **are different from the fuel loads assumed in AS3959. Modified vegetation may also arise.** **where the vegetation cannot be excluded as it is not low-threat or low-risk.** **Reference technical guide.**

53.02-4.2 Defendable Space and Construction Objective

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

Approved Measures

Approved Measure (AM) 3.1 – Bushfire Construction and Defendable Space

Requirement:

A building used for a dwelling (including an extension or alteration to a dwelling), a dependent person's unit, industry, office or retail premises is provided with defendable space in accordance with:

- Table 2 Columns A, B or C and Table 6 to Clause 53.02-5 wholly within the title boundaries of the land; or
- If there are significant siting constraints, Table 2 Column D and Table 6 to Clause 53.02-5.

The building is constructed to the bushfire attack level that corresponds to the defendable space provided in accordance with Table 2 to Clause 53.02-5.

The building will be provided with defendable space in accordance **Modified vegetation.**

The defendable space distance required is **50 mts from the building & to the property boundary.**

Table 6 of Clause 53.02-5 – Vegetation management requirement:

Vegetation management requirement	CONFIRM ACCEPTANCE
• **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.**	☑

Are there significant siting constraints that would allow Column D of Table 2 to Clause 53.02-5?

No

A building is constructed to the bushfire attack level :BAL 29

- That corresponds to the defendable space provided in accordance with Table 2 to Clause 53.02-5. The Addition will be constructed to **BAL 29**

Is the defendable space wholly contained within the boundaries of your property?

Yes

Have the requirements of AM 3.1 been met? Yes

Alternative Measures

Alternative Measure (AltM) 3.3 – Defendable Space on adjoining land

Requirement:

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

Has Alternative Measure (AltM) 3.3 been met? **N/A**

Alternative Measure (AltM) 3.4 – Calculate defendable space using Method 2 of AS3959-2018

Requirement:

Defendable space and the bushfire attack level is determined using Method 2 of AS3959:2018 Construction of buildings in bushfire prone areas (Standards Australia) subject to any guidance published by the relevant fire authority.

Has Alternative Measure (AltM) 3.4 been met? **N/A**

Alternative Measure (AltM) 3.5 – Dwellings subject to direct flame contact

Requirement:

A building used for a dwelling (including an extension or alteration to a dwelling) may provide defendable space to the property boundary where it can be demonstrated that:

- **The lot has access to urban, township or other areas where:**
  - **Protection can be provided from the impact of extreme bushfire behaviour.**
  - **Fuel is managed in a minimum fuel condition.**
  - **There is sufficient distance or shielding to protect people from direct flame contact or harmful levels of radiant heat.**
- **Less defendable space and higher construction standard is appropriate having regard to the bushfire hazard landscape assessment.**
- **The addition is to be constructed to a bushfire attack level of BAL-29**

This alternative measure only applies where the requirements of Approved Measure 3.1 cannot be met.

Has Alternative Measure (AltM) 3.5 been met? **N/A**

53.02-4.3 – Water Supply and Access Objectives

1. **A static water supply is provided to assist in protecting property.**
2. **Vehicle access is designed and constructed to enhance safety in the event of a bushfire.**

Approved Measure (AM) 4.1 – Water Supply and Access

Water Supply Requirement

A building used for a dwelling (including an extension or alteration to a dwelling), a dependant person's unit, industry, office, retail premises service station or warehouse is provided with a static water supply for firefighting and property protection purposes as specified in Table 4 to Clause 53.02-5. The water supply may be in the same tank as other water supplies provided that a separate outlet is reserved for firefighting water supplies.

Lot Size (m^2)	Hydrant Available	Capacity (litres)	Fire Authority Fittings & Access Required	Select Response
Less than 500	Not Applicable	2,500	No	
500 – 1000	Yes	5,000	No	
500 – 1000	Yes	5,000	No	
1001 and above	Not Applicable	10,000	Yes	Yes

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

Confirm Static Water Supply 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 for firefighting purposes must be made of corrosive resistant metal.** **Include a separate outlet for occupant use.** **The following additional requirements apply when 10,000 litres of static water is required:** **1. Be readily identifiable from the building or appropriate identification signage to the satisfaction of CFA must be provided.** **2. Be located within 60 metres of the outer edge of the approved building.** **3. The outlet/s of the water tank must by within 4 metres of the accessway and unobstructed** **4. Incorporate a ball or gate valve (British Standard Pipe (BSP 65mm) and coupling (64mm CFA 3 thread per inch male fitting)** 5. **Any pipework and fittings must be a minimum of 65mm (excluding the CFA coupling)**

Has Approved Measure (AM) 4.1 (Water Supply) been met. Yes

- **Answer. A 10000 lt tank with CFA fittings is to be located as per the site map. meeting requirements and less than 4 mts from the access driveway.**

Access Requirement

A building used for a dwelling (including an extension or alteration to a dwelling), a dependant person's unit, industry, office, retail premises, service station or warehouse is provided with vehicle access designed and constructed as specified in Table 5 to Clause 53.02-5.

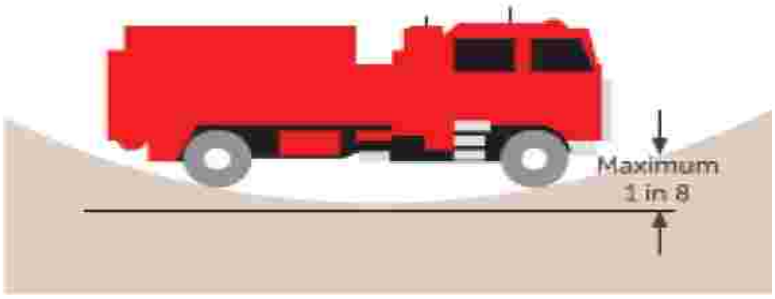
Column A	Column B
Length of access is less than 30 metres No	**There are no design and construction requirements if fire authority access to water supply is not required under AM 4.1**
Length of access is less than 30 metres No	**Where fire authority access to the water supply is required under AM 4.1 fire authority vehicles must be able to get within 4 metres of the water supply outlet.**
Length of access is greater than 30 metres. Yes	**The following design and construction requirements apply:** **All weather construction** **A load limit of at least 15 tonnes** **Provide a minimum trafficable width of 3.5 metres** **Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically** **Curves must have a minimum inner radius of 10 metres** **The average grade must be no more than 1 in 7 (14.4%)(8.1°) with a maximum grade of no more than 1 in 5 (20%)(11.3°) for no more than 50 metres** **Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle.**
Length of access is greater than 100 metres No	A **turning area for fire fighting vehicles must be provided close to the building by one of the following:** **A turning circle with a minimum radius of eight metres** **A driveway encircling the dwelling.** **The provision of other vehicle turning heads such as a T head or Y Head – which meet the specification of Austroad Design for an 8.8 metre service vehicle.**
Length of access is greater than 200 metres No	**Passing bays must be provided at least every 200 metres.** **Passing bays must be a minimum of 20 metres long with a minimum trafficable width of six metres.**

Has Approved Measure (AM) 4.1 (Access) been met? Yes

***Answer*. A all weather driveway more than 30 mts long to be installed meeting all the requirements in the table above & marked on the site map.**

Width

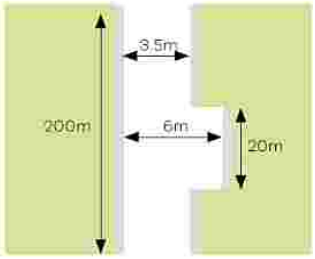
Dips and gradients



Access greater than 200 metres in length

In addition to the above, passing bays are required at least every 200 metres that are:

- a minimum of 20 metres long
- with a minimum trafficable width of 6 metres.

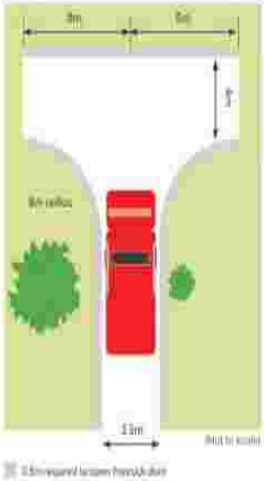


Access between 100 metres to 200 metres in length

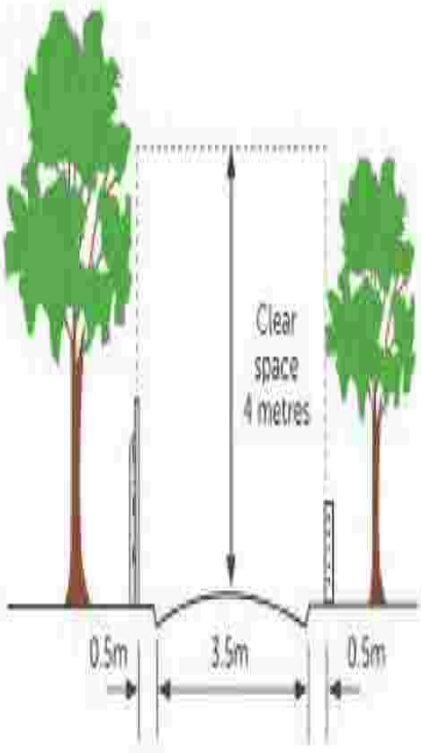
In addition to the above:

A turning area for fire fighting vehicles must be provided close to the building by one of the following:

- a turning circle with a minimum radius of 8 metres
- a driveway encircling the dwelling
- other vehicle turning heads such as a T or Y head which meet the specification of Austroad Design for an 8.8 metre service vehicle.



Encroachments



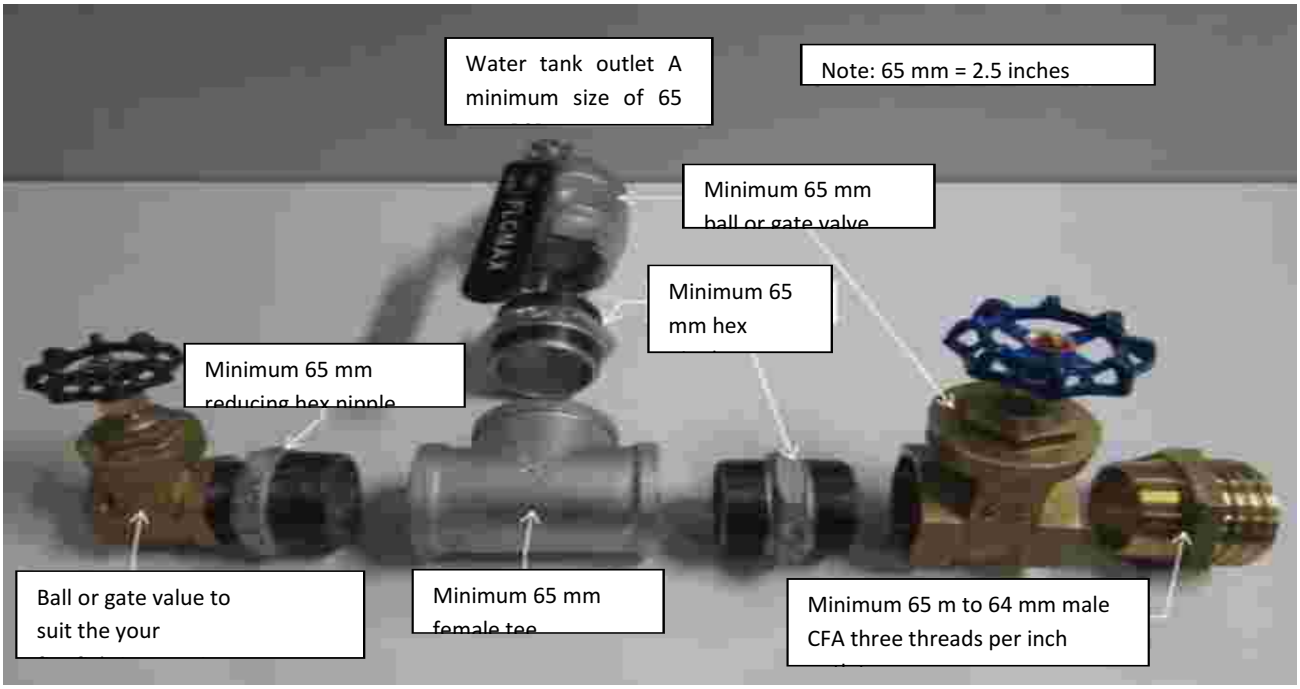
Attachment 3 – Water Tank Fittings

Connection Requirements

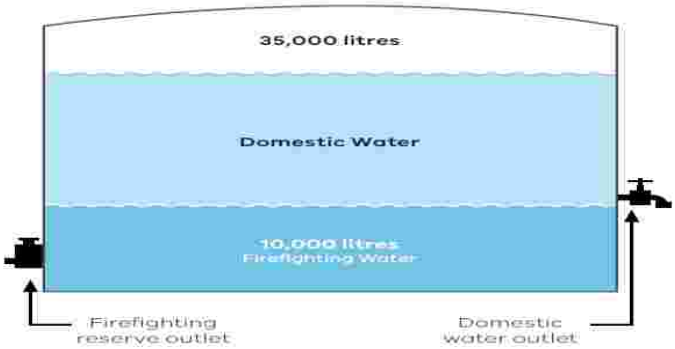
If specified within Table 4 to Clause 52.47-3 (if fire brigade access to your water supply is required), CFA's standard BMO permit conditions require the pipe work, fittings and tank outlet to be a minimum size of 64 mm.

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.

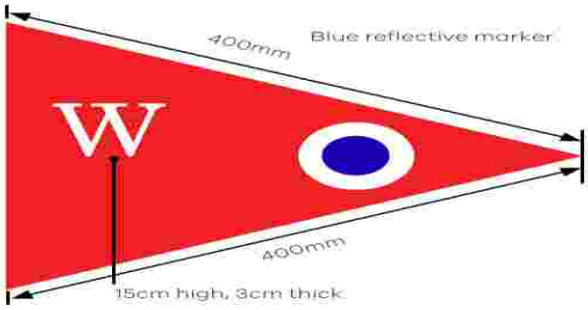
The diagram below shows some common tank fittings available at most plumbing suppliers which meet the connection requirements. It includes a 65 mm tank outlet, two 65 mm ball or gate valves with a 65 mm male to 64 mm CFA 3 threads per inch male coupling. This is a special fitting which allows the CFA 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.



Shared water tank



Water supply identification



SECTION 7 CONSTRUCTION REQUIREMENTS FOR BAL—29

7.1 GENERAL

A building assessed in Section 2 as being BAL—29 shall conform with Section 3 and Clauses 7.2 to 7.8.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 7.2 to 7.8 (see Clause 3.8).

NOTE: BAL—29 is primarily concerned with protection from ember attack and radiant heat greater than 19 kW/m^2 up to and including 29 kW/m^2.

7.2 SUB-FLOOR SUPPORTS

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—

(a) a wall that conforms with Clause 7.4, except that sarking is not required where specified in Clause 7.4.1(c); or

(b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(c) a combination of Items (a) and (b).

Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be—

(i) of non-combustible material; or

(ii) of bushfire-resisting timber (see Appendix F); or

(iii) a combination of Items (i) and (ii).

NOTE: This requirement applies to the subject building only and not to verandas, decks, steps, ramps and landings (see Clause 7.7).

C7.2 Combustible materials stored in the subfloor space may be ignited by embers and impact the building.

7.3 FLOORS

7.3.1 General

This Standard does not provide construction requirements for concrete slabs on the ground.

7.3.2 Elevated floors

7.3.2.1 *Enclosed subfloor space*

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with—

(a) a wall that conforms with Clause 7.4, except that sarking is not required where specified in Clause 7.4.1(c); or

(b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(c) a combination of Items (a) and (b).

7.3.2.2 *Unenclosed subfloor space*

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400 mm above finished ground level, shall be one of the following:

(a) Materials that conform with the following:

(i) Bearers and joints shall be—

(A) non-combustible; or

(B) bushfire-resisting timber (see Appendix F); or

(C) a combination of Items (A) and (B).

(ii) Flooring shall be—

(A) non-combustible; or

(B) bushfire-resisting timber (see Appendix F); or

(C) timber (other than bushfire- resisting timber), particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; or

(D) a combination of any of Items (A), (B) or (C).

or

(b) A system conforming with AS 1530.8.1.

This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level.

7.4 WALLS

7.4.1 General

The exposed components of external walls shall be as follows:

(a) Non-combustible material including the following provided the minimum thickness is 90 mm:

(i) Full masonry or masonry veneer walls with an outer leaf of clay, concrete, calcium silicate or natural stone.

(ii) Precast or in situ walls of concrete or aerated concrete.

(iii) Earth wall including mud brick.

or

(b) Timber logs of a species with a density of 680 kg/m^3 or greater at a 12% moisture content; of a minimum nominal overall thickness of 90 mm and a minimum thickness of 70 m (see Clause 3.11); and gauge planed.

or

(c) Cladding that is fixed externally to a timber-framed or a steel-framed wall that is sarked on the outside of the frame, and is—

(i) fibre-cement a minimum of 6 mm in thickness; or

(ii) steel sheet; or

(iii) bushfire-resisting timber (see Appendix F); or

(iv) a combination of any of Items (i), (ii) or (iii).

or

(d) A combination of any of Items (a), (b) or (c).

7.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed.

7.4.3 Vents and weepholes

Except for exclusions provided in Clause 3.6, vents and weepholes in external walls shall be screened with a mesh made of corrosion-resistant steel, bronze or aluminium.

7.5 EXTERNAL GLAZED ELEMENTS, ASSEMBLIES AND DOORS

7.5.1 Bushfire shutters

Where fitted, bushfire shutters shall conform with Clause 3.7 and be made from—

(a) non-combustible material; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.5.2 Screens for windows and doors

Where fitted, screens for windows and doors shall have a mesh or perforated sheet made of corrosion-resistant steel, bronze or aluminium.

The frame supporting the mesh or perforated sheet shall be made from—

(a) metal; or

(b) bushfire-resisting timber (see Appendix F).

Screen assemblies shall be attached using metal fixings.

7.5.3 Windows and sidelights

Windows assemblies shall—

(a) be completely protected by a bushfire shutter that conforms with Clause 3.7 and Clause 7.5.1;

or

(b) conform with the following:

(i) *Frame material* Window frames and window joinery shall be made from—

(A) bushfire-resisting timber (see Appendix F); or

(B) metal; or

(C) metal-reinforced uPVC and the reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

(ii) *Hardware* Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal.

C7.5.3 Components other than metal may be used provided they are shielded by the metal components of the window/door frame.

Trims or other components may use material other than metal.

(iii) *Glazing* Glazing shall be toughened glass a minimum of 5 mm thickness or glass blocks with no restriction on glazing methods.

NOTE: Where double-glazed assemblies are used, the requirements apply to the external pane of the glazed assembly only.

(iv) *Seals and weather strips* There are no specific requirements for seals and weather strips at this BAL level.

(v) *Screens* Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), the glazing shall be screened externally with a screen that conforms with Clause 3.6 and Clause 7.5.2.

(vi) *In all other cases except for Clause 7.5.3(b)(v)* The openable portions of windows shall be screened internally or externally with screens that conform with Clause 3.6 and Clause 7.5.2.

7.5.4 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall—

(a) be completely protected by bushfire shutters that conform with Clause 3.7 and Clause 7.5.1;

or

(b) be completely protected externally by screens that conform with Clause 3.6 and Clause 7.5.2;

or

(c) conform with the following:

(i) *Door panel material* Materials shall be—

(A) non-combustible; or

(B) solid timber, laminated timber or reconstituted timber, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or

(C) for fully framed glazed door panels, the framing shall be made from metal or from bushfire-resisting timber (see Appendix F) or uPVC.

(ii) *Door frame material* Door frame material shall be—

(A) bushfire resisting timber (see Appendix F); or

(B) metal; or

(C) metal-reinforced uPVC. The reinforcing members shall be made from aluminium, stainless steel, or corrosion resistant steel.

(iii) *Hardware* Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.

Trims or other components may be use materials other than metal.

(iv) *Glazing* Where doors incorporate glazing, the glazing shall be toughened glass a minimum of 6 mm in thickness.

(v) *Seals and weather strips* Weather strips, draught excluders or draught seals shall be installed.

(vi) *Screens* There is no requirement to screen the openable part of the door at this BAL level.

(vii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.

7.5.5 Doors—Sliding doors

Sliding doors shall—

(a) be completely protected by a bushfire shutter that conforms with Clause 3.7 and Clause 7.5.1;

or

(b) be completely protected externally by screens that conform with Clause 3.6 and Clause 7.5.2;

or

(c) conform with the following:

(i) *Frame material* The material for door frames, including fully framed glazed doors, shall be—

(A) bushfire-resisting timber (see Appendix F); or

(B) metal; or

(C) metal-reinforced uPVC and the reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

(ii) *Hardware* Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.

Trims or other components may use materials other than metal.

(iii) *Glazing* Where doors incorporate glazing, the glazing shall be toughened glass a minimum of 6 mm in thickness.

(iv) *Seals and weather strips* There are no specific requirements for seals and weather strips at this BAL level.

(v) *Screens* There is no requirement to screen the openable part of the sliding door at this BAL level.

(vi) *Sliding panels* Sliding panels shall be tight-fitting in the frames.

7.5.6 Doors—Vehicle access doors (garage doors)

The following applies to vehicle access doors:

(a) Vehicle access doors shall be made from—

(i) non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) fibre-cement sheet, a minimum of 6 mm thickness; or

(iv) a combination of any of Items (i), (ii) or (iii).

(b) All vehicle access doors shall be protected with suitable weather strips, draught excluders, draught seals or brushes. Door assemblies fitted with guide tracks do not need edge gap protection.

NOTES:

1 Refer to AS/NZS 4505 for door types.

2 Gaps of door edges or building elements should be protected as per Section 3.

C7.5.6(b) These guide tracks do not provide a direct passage for embers into the building.

(c) Weather strips, draught excluders, draught seals or brushes to protect edge gaps or thresholds shall be manufactured from materials having a flammability index not exceeding five.

(d) Vehicle access doors with ventilation slots shall be protected in accordance with Clause 3.6.

C7.5.6 Components other than metal may be used provided they are shielded by the metal components of the door assembly.

7.6 ROOFS (INCLUDING PENETRATIONS, EAVES, FASCIAS AND GABLES, AND GUTTERS AND DOWNPIPES)

7.6.1 General

The following applies to all types of roofs and roofing systems:

(a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.

(b) The roof/wall and roof/roof junction shall be sealed or otherwise protected in accordance with Clause 3.6.

(c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet conforming with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.

(d) A pipe or conduit that penetrates the roof covering shall be non-combustible.

(e) Only evaporative coolers manufactured in accordance with AS/NZS 60335.2.98 shall be used. Evaporative coolers with an internal damper to prevent the entry of embers into the roof space need not be screened externally.

7.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

(a) be located on top of the roof framing, except that the roof battens may be fixed above the sarking;

(b) cover the entire roof area including ridges and hips; and

(c) extend into gutters and valleys.

7.6.3 Sheet roofs

Sheet roofs shall—

(a) be fully sarked in accordance with Clause 7.6.2, except that foil-backed insulation blankets may be installed over the battens; or

(b) have any gaps sealed at the fascia or wall line, hips and ridges by—

(i) a mesh or perforated sheet that conforms with Clause 3.6 and that is made of corrosion-resistant steel, bronze or aluminium; or

(ii) mineral wool; or

(iii) other non-combustible material; or

(iv) a combination of any of Items (i), (ii) or (iii).

C7.6.3 Sarking is used as a secondary form of ember protection for the roof space to account for minor gaps that may develop in sheet roofing.

7.6.4 Veranda, carport and awning roof

The following applies to veranda, carport and awning roofs:

(a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 7.6.1 to 7.6.6.

(b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] conforming with Clause 7.4 shall have a non-combustible roof covering and the complete support structure shall be—

(i) of non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) timber rafters lined on the underside with fibre-cement sheeting a minimum of 6 mm in thickness, or with material conforming with AS 1530.8.1; or

(iv) a combination of any of Items (i), (ii) or (iii).

7.6.5 Roof penetrations

The following applies to roof penetrations:

(a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors or the like, shall be sealed. The material used to seal the penetration shall be non-combustible.

(b) Openings in vented roof lights, roof ventilators or vent pipes shall conform with Clause 3.6 and be made of corrosion-resistant steel, bronze or aluminium.

This requirement does not apply to a room sealed gas appliance.

NOTE: A gas appliance designed such that air for combustion does not enter from, or combustion products enter into, the room in which the appliance is located.

In the case of gas appliance flues, ember guards shall not be fitted.

NOTE: AS/NZS 5601 contains requirements for gas appliance flue systems and cowls. Advice can be obtained from manufacturers and State and Territory gas technical regulators.

(c) All overhead glazing shall be Grade A safety glass conforming with AS 1288.

(d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, conforming with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass of minimum 4 mm thickness shall be used in the outer pane of the IGU.

(e) Flashing elements of tubular skylights shall be non-combustible. However, they may be of an alternate material, provided the integrity of the roof covering is maintained by an under-flashing made of non-combustible material.

(f) Evaporative cooling units shall be fitted with non-combustible butterfly closers as close as practicable to the roof level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(g) External single plane glazed elements of roof lights and skylights, where the pitch of the glazed element is 18 degrees or less to the horizontal, shall be protected with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(h) Eaves lighting shall be adequately sealed and not compromise the performance of the element.

7.6.6 Eaves linings, fascias and gables

The following applies to eaves linings, fascias and gables:

(a) Gables shall conform with Clause 7.4.

(b) Fascias and bargeboards shall—

(i) where timber is used, be made from bushfire-resisting timber (see Appendix F); or

(ii) where made from metal, be fixed at 450 mm centres; or

(iii) be a combination of Items (i) and (ii).

(c) Eave linings shall be—

(i) fibre-cement sheet, a minimum 4.5 mm in thickness; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) a combination of Items (i) and (ii).

(d) Eave penetrations shall be protected as for roof penetrations as specified in Clause 7.6.5.

(e) Eave ventilation openings shall be fitted with ember guards in accordance with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.

(f) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

7.6.7 Gutters and downpipes

This Standard does not provide requirements for downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

With the exception of box gutters, gutters shall be metal or uPVC.

Box gutters shall be non-combustible and flashed at the junction with the roof, with non-combustible materials.

7.7 VERANDAS, DECKS, STEPS AND LANDINGS

7.7.1 General

Decking may be spaced.

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C7.7.1 Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0 mm–5 mm during service. It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacing of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

7.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

7.7.2.1 *Materials to enclose a subfloor space*

The subfloor spaces of verandas, decks, steps, ramps and landings are deemed to be "enclosed" when—

(a) the material used to enclose the subfloor space conforms with Clause 7.4, except that sarking is not required where specified in Clause 7.4.1(c); and

(b) all openings are protected in accordance with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.

7.7.2.2 *Supports*

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

7.7.2.3 *Framing*

This Standard does not provide construction requirements for the framing of verandas, pergolas, decks, ramps or landings (i.e. bearers and joists).

7.7.2.4 *Decking, stair treads and the trafficable surfaces of ramps and landings*

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

(a) of non-combustible material; or

(b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

7.7.3.1 *Supports*

Support posts, columns, stumps, stringers, piers and poles shall be—

(a) of non-combustible material; or

(b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.7.3.2 *Framing*

Framing of verandas, decks, ramps or landings (i.e. bearers and joists) shall be—

(a) of non-combustible material; or

(b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.7.3.3 Decking, stair treads and the trafficable surfaces of ramps and landings

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

(a) of non-combustible material; or

(b) of bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

7.7.4 Balustrades, handrails or other barriers

Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be—

(a) of non-combustible material; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a combination of Items (a) and (b).

Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements.

7.7.5 Veranda posts

Shall be made from—

(a) non-combustible material; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a combination of any of Items (a) or (b).

7.8 WATER AND GAS SUPPLY PIPES

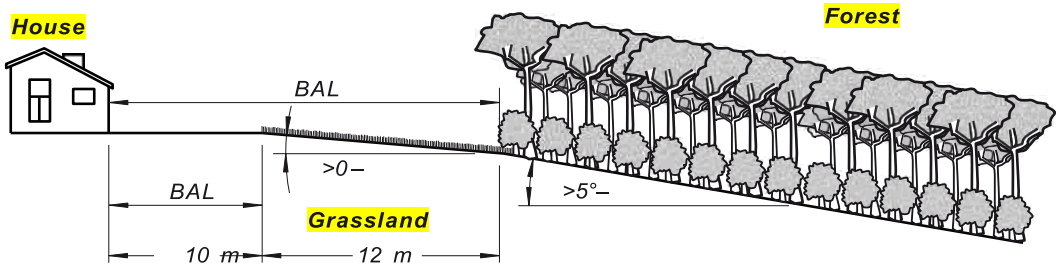
Above-ground, exposed water supply pipes shall be metal.

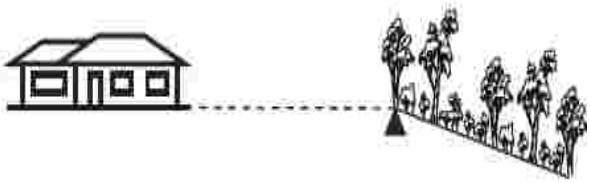
External gas pipes and fittings above ground shall be of steel or copper construction having a minimum wall thickness in accordance with gas regulations or 0.9 mm whichever is the greater. The metal pipe shall extend a minimum of 400 mm within the building and 100 mm below ground.

NOTE: Refer to State and Territory gas regulations, AS/NZS 5601.1 and AS/NZS 4645.1.

C7.8 Concern is raised for the protection of bottled gas installations. Location, shielding and venting of the gas bottles needs to be considered.

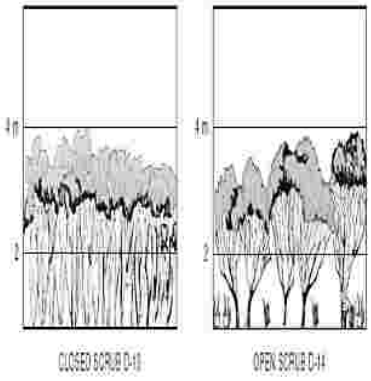
Appendix 5: – An example of downslope /foliage classification & separation distance



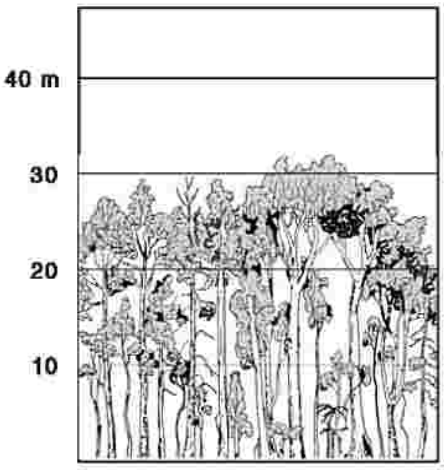


Downslope

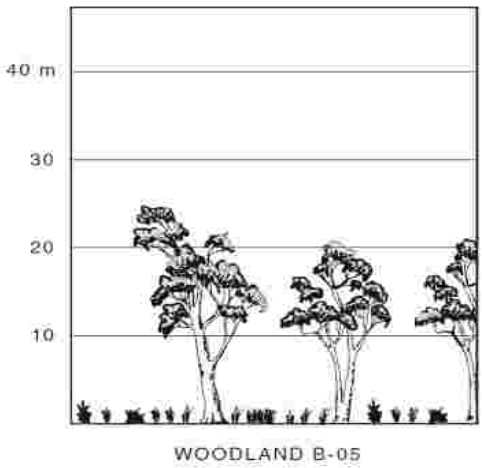
Level/Upslope



Scrub



Forest



Woodland

Bushfire resistant timber species TABLE FI

TABLE F 1 BUSHFIRE-RESISTANT SPECIES

Standard trade name	Botanical name
Ash, silvertop	*Eucalyptus sieberi*
Blackbutt	*Eucalyptus pilularis*
Gum, red, river	*Eucalyptus camaldulensis*
Gum, spotted	*Corymbia maculata*
Ironbark, red	*Eucalyptus sideroxylon*
Kwila (Merbau)	*Intsia bijuga*
Turpentine	*Syncarpia glomulifera*

Appendix 7: – FD1 Table 100 all of Victoria excluding alpine areas which are FDI 50

Vegetation classification	BALs				
	BAL—FZ	BAL—40	BAL—29	BAL—19	BAL—12.5
	Distance (m) of the site from the predominant vegetation class				
	All upslopes and flat land (0 degrees)				
A. Forest	<19	19–<25	25–<35	35–<48	48–<100
B. Woodland	<12	12–<16	16–<24	24–<33	33–<100
C. Shrubland	<7	7–<9	9–<13	13–<19	19–<100
D. Scrub	<10	10–<13	13–<19	19–<27	27–<100
E. Mallee/Mulga	<6	6–<8	8–<12	12–<17	17–<100
G. Grassland	<6	6–<9	9–<13	13–<19	19–50
	Downslope >0 to 5 degrees				
A. Forest	<24	24–<32	32–<43	43–<57	57–<100
B. Woodland	<15	15–<21	21–<29	29–<41	41–<100
C. Shrubland	<7	7–<10	10–<15	15–<22	22–<100
D. Scrub	<11	11–<15	15–<22	22–<31	31–<100
E. Mallee/Mulga	<7	7–<9	9–<13	13–<20	20–<100
G. Grassland	<7	7–<10	10–<15	15–<22	22–<50
	Downslope >5 to 10 degrees				
A. Forest	<31	31–<39	39–<53	53–<69	69–<100
B. Woodland	<20	20–<26	26–<37	37–<50	50–<100
C. Shrubland	<8	8–<11	11–<17	17–<25	25–<100
D. Scrub	<12	12–<17	17–<24	24–<35	35–<100
E. Mallee/Mulga	<7	7–<10	10–<15	15–<23	23–<100
G. Grassland	<8	8–<11	11–<17	17–<25	25–<50
	Downslope >10 to 15 degrees				
A. Forest	<39	39–<49	49–<64	64–<82	82–<100
B. Woodland	<25	25–<33	33–<45	45–<60	60–<100
C. Shrubland	<9	9–<13	13–<19	19–<28	28–<100
D. Scrub	<14	14–<19	19–<28	28–<39	39–<100
E. Mallee/Mulga	<8	8–<11	11–<18	18–<26	26–<100
G. Grassland	<9	9–<13	13–<20	20–<28	28–<50
	Downslope >15 to 20 degrees				
A. Forest	<50	50–<61	61–<78	78–<98	98–<100
B. Woodland	<32	32–<41	41–<56	56–<73	73–<100
C. Shrubland	<10	10–<15	15–<22	22–<31	31–<100
D. Scrub	<15	15–<21	21–<31	31–<43	43–<100
E. Mallee/Mulga	<9	9–<13	13–<20	20–<29	29–<100
G. Grassland	<11	11–<15	15–<23	23–<32	32–<50

- Whether the risk arising from the broader landscape can be mitigated to an acceptable level or warrants the development not proceeding.

53.02-5 31/07/2018 VC148

Tables : Defendable space, construction, water supply, vehicle access, vegetation management and outbuilding construction requirements

Table 1 Defendable space and construction

Slope	Vegetation type	Defendable space distance from building facade (metres)				
		Column A	Column B	Column C	Column D	Column E
All upslopes and flat land (0 degrees)	Forest	48	35	25	19	< 19
	Woodland	33	24	16	12	< 12
	Scrub	27	19	13	10	< 10
	Shrubland	19	13	9	7	< 7
	Mallee/ Mulga	17	12	8	6	< 6
	Rainforest	23	16	11	8	< 8
	Grassland	19	13	9	6	< 6
Downslope >0 to 5 degrees	Forest	57	43	32	24	< 24
	Woodland	41	29	21	15	< 15
	Scrub	31	22	15	11	< 11
	Shrubland	22	15	10	7	< 7
	Mallee/ Mulga	20	13	9	7	< 7
	Rainforest	29	20	14	10	< 10
		BAL 12.5	**BAL19**	**BAL29**	**BAL40**	**BALFZ**
	Grassland	22	15	10	7	< 7
Downslope >5 to 10 degrees	Forest	69	53	39	31	< 31
	Woodland	50	37	26	20	< 20
	Scrub	35	24	17	12	< 12
	Shrubland	25	17	11	8	< 8
	Mallee/ Mulga	23	15	10	7	< 7

Appendix 8: – Clause 53.03-5 Tables for defendable Space

Slope	Vegetation type	Defendable space distance from building facade (metres)				
		Column A	Column B	Column C	Column D	Column E
	Rainforest	36	26	18	13	< 13
	Grassland	25	17	11	8	< 8
Downslope >10 to 15 degrees	Forest	82	64	49	39	< 39
	Woodland	60	45	33	25	< 25
	Scrub	39	28	19	14	< 14
	Shrubland	28	19	13	9	< 9
	Mallee/ Mulga	26	18	11	8	< 8
	Rainforest	45	33	23	17	< 17
	Grassland	28	20	13	9	< 9
Downslope >15 to 20 degrees	Forest	98	78	61	50	< 50
	Woodland	73	56	41	32	< 32
	Scrub	43	31	21	15	< 15
	Shrubland	31	22	15	10	< 10
	Mallee/ Mulga	29	20	13	9	< 9
	Rainforest	56	42	29	22	< 22
	Grassland	32	23	15	11	< 11
		BAL 12.5	BAL19	BAL29	BAL40	BALFZ
Downslope >20 degrees	All vegetation	Defendable space and the bushfire attack level is determined using Method 2 of AS3959:2009 Construction of buildings in bushfire prones areas (Standards Australia) subject to any guidance published by the relevant fire authority.				
All slopes	Low threat vegetation	Defendable space is to be provided for a distance of 50 metres, or the property boundary whichever is the lesser, for buildings constructed to all bushfire attack levels. The minimum construction standard is BAL 12.5.				
All slopes	Modified vegetation	Defendable space is to be provided for a distance of 50 metres, or the property boundary whichever is the lesser, for buildings constructed to all bushfire attack levels. The minimum construction standard is BAL 29.				

Note 1: Slope and vegetation type is determined through the bushfire hazard site assessment.

Bushfire Management Plan – 127 Cooinda Road Beaconsfield

Prepared By: [redacted]5.

Version: 1.0

Date: 30th September 2024

Defendable Space

Building

Property Boundary

Access

WaterTank

Bushfire Protection Measures

Mandatory Condition

The bushfire protection measures forming part of this permit or shown on the endorsed plans, including those relating to construction standards, defendable space, water supply and access, must be maintained to the satisfaction of the responsible authority on a continuing basis. This condition continues to have force and effect after the development authorised by this permit has been completed.

a) Defendable Space

"Defendable Space for 50 mts round the proposed building or to the property boundary. whichever is lesser the lessor distance, must be provided were vegetation. (and other flammable materials) (will be modified 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 3m 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 sq. 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.**

b) Construction Standard

Dwelling designed and constructed to a minimum Bushfire Attack Level of BAL – 29

c) Water Supply

The following requirements apply:

- **An effective capacity of 10000 litres**
- **Be stored in an above ground water tank constructed of concrete or metal.**
- **Have all fixed above ground water pipes and fittings required for firefighting purposes made of corrosive resistant metal.**
- **Include a separate outlet for occupant use.**

Where a 10000-litre water supply is required, the following fire authority fittings and access must be provided:

- **Be readily identifiable from the building or appropriate identification signage to the satisfaction of the relevant fire authority.**
- **Be located within 60 metres of the outer edge of the approved building.**
- **The outlet/s of the water tank must be within 4 metres of the access way and unobstructed.**
- **Incorporate a separate ball or gate valve (British Standard Pipe (BSP 65 millimetre) and coupling (64-millimetre CFA 3 thread per inch male fitting).**
- **Any pipe work and fittings must be a minimum of 65 millimetres (excluding the CFA coupling)**

d) Access

Access Required: **Yes**

The following design and construction requirements apply:

- **All-weather construction**
- **A load limit of at least 15 tonnes**
- **Provide a minimum trafficable width of 3.5 metres.**
- **Be clear of encroachments for at least 0.5 metres on each side and at least 4 metres vertically.**
- **Curves must have a minimum inner radius of 10 metres.**
- **The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum grade of no more than 1 in 5 (20%) (11.3°) for no more than 50 metres.**
- **Dips must have no more than a 1 in 8 (12.5%) (7.1%) entry and exit angle.**

Length of Access is greater than 100 metres: **No**

Where length of access id greater than 100 metres the following design and construction requirements apply:

- **A turning circle with a minimum radius of eight metres, or**
- **A driveway encircling the building, or**
- **The provision of other vehicle turning heads – such as a T or Y Head – which meet the specification of Austroads Design for an 8.8 metre Service Vehicle.**

Length of driveway is greater than 200 metres: **No**

Where length of access id greater than 200 metres the following design and construction requirement applies:

- **Passing bays are required at least every 200 metres that are a minimum 20 metres long and a minimum trafficable width of 6 metres.**

[redacted]

LAND CAPABILITY ASSESSMENT
FOR
ON-SITE WASTEWATER MANAGEMENT
AT
127 COOINDA ROAD, BEACONSFIELD VIC 3807

REPORT No. LCA19082024 AUGUST/2024

By

[redacted]

Land Capability Assessment
CONSULTANTS IN THE AGRICULTURAL SCIENCES

IMPORTANT NOTE

The land capability assessment report consists of this cover sheet, two written sections, three drawings and four appendices.
The report elements are not to be read or interpreted in isolation.

TABLE OF CONTENTS

(ii) **Assessor's Qualifications & Insurance**

(iii) **Executive Summary**

APPENDIX A1
Soil Permeability and Soil Test Results

APPENDIX A2
Soil Profile Photographs

APPENDIX A3
Logs of Boreholes

APPENDIX B
Water and Nutrient Balance and Rainfall Data

APPENDIX C
Land Capability Assessment Table

APPENDIX D
Management Plan

DRAWING 1
Location of Subject Site

DRAWING 2
Location of Proposed Development

DRAWING MP1
Cut-off Drain Detail for 20/30 Standard
Effluent Irrigation Fields

ASSESSOR'S ACADEMIC & PROFESSIONAL QUALIFICATIONS

[redacted]

ASSESSOR'S PROFESSIONAL INDEMNITY INSURANCE

Policy Number:	BZF2004488
Period of Cover:	09/08/2024 – 09/08/2025
Geographical Coverage:	Australia
Retro-active Date:	Unlimited
Limit of Indemnity:	$2,000,000

EXECUTIVE SUMMARY

The proposed development at 127 Cooinda Road, Beaconsfield VIC is suitable for sustainable on-site effluent disposal.

The site of 4359m^2 is located in the Green Wedge Zone and is not in a Special Water Supply Catchment. It is proposed to alter the existing house to a 4-bedroom (equivalent) residence. The site is not sewered.

Our field testing which included soil profile logging and sampling, laboratory testing and subsequent reporting including water and nutrient balance modelling has revealed that on-site effluent disposal is rational and sustainable.

The assessment has been made in the context of prioritising public and environmental health with a design compromise between rational wastewater reuse and sustainable wastewater disposal.

Effluent shall be treated to at least the 20/30 standard and distributed by pressure compensated subsurface irrigation utilising the processes of evapotranspiration and deep seepage.

The irrigation area has been determined for the mean wet year and satisfies the requirements of *SEPPs (Waters of Victoria)* in that the effluent irrigation system cannot have any detrimental impact on the beneficial use of surface waters or groundwater.

For the proposed development the available area is not limiting and continuous or long-term increases in effluent volume above 600 litres/day (4-bedroom equivalent residence with onsite roof water tank supply as per EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-1) are possible.

With regard to density of development and cumulative risk the assessment has considered risk associated with subsurface flows and surface flows.

In regard to subsurface flows, it is clear that provided the on-site system is adequately designed, constructed, operated and maintained the risk to surface and ground waters is negligible. Once the effluent is placed underground, the extraordinary long travel times via ground water to surface waters ensures adequate nutrient attenuation.

In regard to surface flows, it is clear that provided the on-site system is adequately designed, constructed, operated and maintained, the risk to surface and ground waters is no greater than for a sewered development.

Proposed use requires AWTS or a septic tank with a sand filter (or any other treatment system that is capable of producing secondary standard effluent and has current AS/NZS accreditation) and pressure compensated subsurface irrigation.

The LCA recommends a conservative, scientifically based, well founded wastewater management system with inherent multiple barriers of safety.

Cumulative risk from the development is extremely low. The risk of serious or irreversible damage is extremely low.

All requirements of *SEPP (Waters of Victoria)* have been met.

Land Capability Assessment
ABN 22800734479
[redacted]
CONSULTANTS IN THE AGRICULTURAL SCIENCES

53 Telford Drive, Berwick VIC 3806
Email: info@lcavictoria.com.au

LCA19082024 – AUGUST/2024

LAND CAPABILITY ASSESSMENT FOR ON-SITE WASTEWATER MANAGEMENT AT 127 COOINDA ROAD, BEACONSFIELD VIC 3807

SECTION 1. SITE INVESTIGATION

1.1 INTRODUCTION

On instruction from the landowner, an investigation was undertaken to assess land capability for on-site effluent disposal/reuse for a 4-bedroom (equivalent) residence at 127 Cooinda Road, Beaconsfield VIC.

The site of 4359m^2 is in the Green Wedge Zone and is not located in a Special Water Supply Catchment. The site is not sewered. It is proposed to alter the existing house to a 4-bedroom (equivalent) residence.

The assessment has been made in the context of prioritising public and environmental health with a design compromise between rational wastewater reuse and sustainable wastewater disposal. The existing residence is served by a primary wastewater treatment system and absorption trenches. The proposed site development represents a significant environmental gain when compared to the existing site development.

1.2 INVESTIGATION METHOD

The site investigation was carried out in accordance with *SEPPs (Waters of Victoria) and related documents. This report is in accordance with* current *SEPPs (Waters of Victoria), EPA Victoria - Guideline for onsite wastewater management (May 2024)* and *EPA Victoria - Guideline for onsite wastewater effluent dispersal and recycling systems (May 2024)*. Guidance has been sought from *AS/NZS 1547:2012, Guidelines for Wastewater Irrigation*, E.P.A. Publication 168, April 1991, *Wastewater Subsurface Drip Distribution*, Tennessee Valley Authority, March, 2004, *AS 2223, AS 1726, AS 1289, AS 2870* and *Australian Laboratory Handbook of Soil and Water Chemical Methods*.

Our capability assessment involved the mapping of unique land-soil unit(s) which were defined in terms of significant attributes including; climate, slope, aspect, vegetation, soil profile characteristics (including soil reaction trend, electrical conductivity and colloid stability), depth to rock, proximity to surface waters and escarpments, transient soil moisture characteristics and hydraulic conductivity.

Exploratory auger drilling was undertaken to enable profile characterization and sampling. Onsite dispersion index testing revealed significant dispersion. Hence, insitu permeability testing was not considered rational.

Water balance analysis was based on the mean wet year calculated from the mean monthly rainfall data and mean annual rainfall data for Berwick and mean evaporation data for Scoresby Research Inst. and was undertaken in accordance with *Guidelines for Wastewater Irrigation, E.P.A.* Publication 168, April 1991 (Part), *AS/NZS 1547:2012* and in-house methods.

The rainfall and evaporation data were obtained from the National Climate Centre, Bureau of Meteorology. The data was subsequently analysed and applied to our water balance analysis.

The results of the water balance analysis are given in Appendix B, to this report.

The results of the investigation and *in situ* and laboratory testing are given in Section 1.3, below, and in Appendix A, to this report.

1.3 CAPABILITY ASSESSMENT

We have used the attributes determined by the investigation to define one (1) land-soil unit, as follows:-

1.3.1 Land-Soil Unit A.

This land-soil unit consists of moderately sloping terrain, as shown in Figure 1.

The salient land-soil attributes and constraints are summarised in Appendix C.

1.3.1.1 Climate.

The general area receives a mean annual rainfall of 915mm and a mean annual evaporation of 1197mm. Mean evaporation exceeds the mean rainfall in October through April.

Rainfall and evaporation data are presented in Appendix B, to this report.

1.3.1.2 Slope and Aspect.

The natural ground surface over the proposed land application area slopes to the east between 13%-15%, generally, as shown in Figure 1.

The unit is somewhat protected from the prevailing winds and is subject to partial shade from nearby trees.

1.3.1.3 Vegetation and Land Use.

The unit is vegetated with pasture grasses and Eucalypt trees as shown in Figure 1. The land is currently unused.

The land application area has been designed for pasture grass (rye/clover equivalent).

1.3.1.4. Slope Stability.

For the encountered subsurface conditions, slope degree and geometry and for the proposed range of hydraulic loadings, the stability of the ground slopes within the disposal areas are unlikely to be compromised.

1.3.1.5 Subsurface Profile.

The following interpretation of the general subsurface profile assumes conditions similar to those encountered in the boreholes are typical of the investigation area.

Note: If subsurface conditions substantially different from those encountered in the investigation are encountered during soil renovation works, all work should cease, and this office notified immediately.

The unit is underlain by alluvial materials of Late Ordovician to Middle Devonian Age.

The subsurface profiles consist of:

Borehole 2:

- A topsoil (A_1-horizon) layer of dark grey-brown grey-brown, moist, medium-dense loam, with a soil reaction trend of 5.5pH and electrical conductivity (EC_{SE}) of 0.10dS/m, containing a root zone, to a depth of 0.20m, overlying,

- A topsoil (A_2-horizon) layer of grey-brown light grey-brown, moist, medium-dense loam with a soil reaction trend of 5.5pH, electrical conductivity (EC_{SE}) of 0.10dS/m, to a depth of 0.40m, overlying,

- An alluvial soil (B_1-horizon) layer of light grey-brown, moist, silty clay (light clay) of low plasticity, with a soil reaction trend of 5.1pH, electrical conductivity (EC_{SE}) of 0.45dS/m and a free swell[a] of 0%, to a depth of 0.60m, overlying,

[a] After Holtz (measures swell potential of fraction passing 450 micron sieve)

- An alluvial soil (B_2-horizon) layer of orange-brown, moist, silty clay (light clay) of low plasticity, with a soil reaction trend of 5.4pH, electrical conductivity (EC_{SE}) of 1.35dS/m and a free swell of 30%, to a depth of 0.90m, overlying,

- An alluvial soil (B_3-horizon) layer of brown, moist, silty clay (light clay), with a soil reaction trend of 4.7pH, electrical conductivity (EC_{SE}) of 0.18dS/m, to a depth of 1.05m, overlying,

- An alluvial soil (BC-horizon) layer of light grey with orange, moist, silty clay (light clay), with a soil reaction trend of 5.4pH, electrical conductivity (EC_{SE}) of 0.99dS/m, to a depth of 1.35m.

Soil test results, soil profile photographs and logs of boreholes are summarised in Appendix A. For location of boreholes refer Drawing 2.

1.3.1.6 Soil Permeability.

Where the soils are dispersive and/or have high shrink-swell potential *insitu* permeability testing realises inaccurate, low or nil results.

The hydraulic conductivity can be estimated by using test waters containing calcium chloride and/or by laboratory assessment of colloid stability and determination of ameliorant quantities (e.g. gypsum/lime requirement) and swell potential.

A conservative estimate of permeability has been deduced as follows (from soil texture, structure and swell potential tests):-

Profile analysis in accordance with AS/NZS 1547:2012 and our laboratory determined dispersion and swell potential shows the alluvial clay soils to be dispersive silty light to medium clays (Type 6 soils) with saturated hydraulic conductivity less than 0.06m/day.

Similar dispersive soils have responded positively (with sufficiently improved hydraulic capability) following applications of gypsum.

For the limiting moderately structured clay soils and assuming renovation by gypsum application (at the rate of 1kg/m^2), we have adopted an estimated and conservative design saturated hydraulic conductivity of 0.05m/day.

Peak deep seepage is conservatively estimated at 3.6mm/day. Average daily deep seepage is 2.4mm.

1.3.1.7 Basement Rock Permeability.

From the literature and from examination of rock profiles and rock mass defect character in the vicinity, the hydraulic conductivity of the basement rocks would be in excess of 0.05m/day (adopt 1m/day for buffer design).

1.3.1.8 Colloid Stability.

The results of the Emerson Crumb and Dispersion Index Tests indicate that the soil materials are dispersive. The alluvial clay soils have Emerson Classes of 1 and 2 and Dispersion Indexes of 9 to 15.

The salting potential has been assessed by inspection of the ground surface for salt tolerant and/or salt affected vegetation and the electrical conductivity has been determined for the A and B horizons using a 1:5 soil/water extract and converted to EC (saturation extract). Also reaction trend and free swell potential have been determined.

The determined electrical conductivity (EC_{SE}) ranged from 0.10dS/m to 1.35dS/m for all materials. The reaction trend ranged from 4.7pH to 5.5pH, while the free swell potential was 0% and 30%.

We recommend amelioration in the form of gypsum application to create and maintain stable peds under saline irrigation.

1.3.1.9 AS1547:2012 Soil Classification.

In accordance with *AS/NZS1547:2012* the alluvial clay materials can be classified as Type 6 soils (dispersive silty light to medium clays).

After allocating proportional vertical and lateral flows and allowing for the potential for perched water mounding, we have adopted a daily peak water balance seepage rate[b] of 3.6mm for 20/30 standard effluent. The theoretical average daily seepage rate is 2.4mm.

1.3.1.10 Surface Drainage.

Site surface drainage is to the east. The nearest surface waters are located at least 340m distant.

1.3.1.11 Groundwater.

No seepage was encountered in any of the boreholes. Subsurface flow direction will generally reflect natural surface flow direction (i.e. an easterly direction).

There are no groundwater bores within a significant distance of the site (the closest bore is approximately in 680m distance).

The Visualising Victoria's Groundwater database indicates that the groundwater is between 20-50 metres of the surface.

Regionally the groundwater is of low yield and poor quality (3500-7000mg/litre TDS) with beneficial use including some stock.

1.3.1.12 Nutrient Attenuation.

Clayey soils (as found on this site) can fix large amounts of phosphorous. Phosphate-rich effluent seeping through these soils will lose most of the phosphorous within a few metres.

The limiting nutrient for this site is nitrogen. No phosphorous balance is required.

Nitrogen, contained in organic compounds and ammonia, forms nitrate-N and small amounts of nitrite-N when processed in an aerated treatment plant. Several processes affect nitrogen levels within soil after irrigation. Alternate periods of wetting and drying with the presence of organic matter promote reduction to nitrogen gas (denitrification). Plant roots absorb nitrates at varying rates depending on the plant species (see Appendix B), however nitrate is highly mobile, readily leached, and can enter groundwater via deep seepage and surface waters via overland flow and near-surface lateral flow.

Based on the water and nutrient balance (see Appendix B), and assuming 30mg/litre N in the effluent (general case) and 20mg/litre P, a denitrification rate of 20%, with N uptake of 220 kg/ha/year for an appropriate grass cover equivalent to a rye/clover mix and sequential zoned dosing of the irrigation area, a conservative estimate can be made of the nitrogen content in the deep seepage and lateral flow.

For the general case, and without taking into account further expected denitrification below the root zone and in the groundwater (reported to be in the vicinity of 80%), denitrification in the lateral flow (external to the irrigation areas but within the curtilage of the allotment) and plant uptake in the lateral flow, the irrigation area would need to be 239m^2 for 600 litres/day of effluent for complete attenuation.

The hydraulic component of the water balance has shown that an irrigation area of 300m^2 would be required to limit surface rainwater flows to episodic rain events. but for slopes between 10% and 20% the size of the Land Application Area should be increased by 20% (300m^2 x 1.2 = 360m^2)

For a 4-bedroom (equivalent) residence and to 20/30 secondary effluent standard and to satisfactorily attenuate nitrogen on-site and to accommodate the design hydraulic loading and after adjusting for slope, the irrigation area should be at least 360m^2 with an application rate of 1.7mm/day.

1.3.1.13 Sand filter.

A sand filter of 12m^2 would be required for a wastewater flow of 600l/day. For the dosage rate of 50L/m^2/day in the sand filter the clay and fine silt content shall be less than 5%, the effective size shall be between 0.4 and 1.0 and the uniformity coefficient shall be less than 4.

[b] The peak water balance seepage loss rate is based on being <10% of the measured/estimated hydraulic conductivity (of the limiting horizon) plus a lateral flow component, effluent type and the effects of soil characteristics including profile thickness (flow paths and storage), shrink-swell, dispersivity, soil reaction trend and assumes renovation.

1.4 RISK MANAGEMENT & MITIGATION

SEPP (Waters of Victoria) requires that the proposal be assessed on a risk-weighted basis and that cumulative effects be considered.

A multiple barrier approach is used in assessing this development, with components listed below:

1.4.1 Water Usage.

Current best practice allows for a (continuous) daily effluent flow of 600 litres (a 4-bedroom equivalent residence with WELS scheme fixtures and fittings and with onsite roof water tank supply) as per EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-1)

1.4.2 Secondary Treatment.

The LCA recommends AWTS or a septic tank with a sand filter (or any other treatment system that is capable of producing secondary standard effluent and has current AS/NZS accreditation) and pressure compensated subsurface irrigation. These systems generate a much higher quality of effluent than septic systems.

1.4.3 Block Size.

Many under-performing effluent fields are placed on blocks where area is limited. Limited area can lead to inadequately sized or inappropriately placed effluent fields and a lack of options should the daily effluent volumes increase.

In the subject site, size is not a constraining factor for a 4-bedroom (equivalent) residence.

1.4.4 Management Plan.

Historically, inadequate maintenance has played a major part in the failure of onsite effluent disposal systems. There is a management plan within the LCA (see Appendix D). This plan gives guidance on the implementation of mandatory operation, maintenance and inspection procedures.

1.4.5 Sizing of Treatment Systems.

No specific treatment system is recommended, however the treatment system must have current AS/NZS accreditation, which match effluent volumes with plant capacity.

1.4.6 Load Balancing.

Surge flows are possible due to parties, gatherings, etc (if any). Under these conditions the systems may become overwhelmed for a period. This potential problem can be eliminated by installing a plant with a load balancing facility (or equivalent function) which enables short-term storage and sustainable flows to the distribution area over extended time. The load balancing facility also provides temporary storage should the plant fail or if there is a power outage.

1.4.7 Zoned Dosing.

The LCA stipulates that the effluent area is (automatically) irrigated sequentially by zones to promote the creation of transient aerobic and anaerobic soil conditions.

The effluent field is sized conservatively for nitrogen attenuation, using pasture grass (rye/clover eq mix), which has a nitrogen uptake of 220 kg/ha/year. Zoned dosing will increase the efficiency of the field for removing nitrogen from the soil.
Undersized effluent fields are at risk of becoming anaerobic for long periods, with the risk of microbial build-up. This leads to secretion of microbial polysaccharides, which coat soil particles and restrict the ability of the soil to adsorb nutrients and attenuate pathogens. Polysaccharides can also coat the interior of pipes and block drainage holes if drainage is slow due to the field being overloaded with effluent. This can lead to effluent surcharge from the ends of the drainage pipes, forming preferential flow paths through overlying soil and draining overland to nearby surface waters.

The alternating aerobic and anaerobic conditions created by zoned dosing prevent the build-up of microbial polysaccharides, and ensures efficient renovation of effluent.

1.4.8 Pressure Compensated Subsurface Disposal.

Conservatively sized irrigation areas with pressure compensated subsurface disposal and zoned dosing deliver effluent directly into the soil. Under saturated conditions, water flow is downwards in the direction of maximum hydraulic gradient. For a surface flow containing effluent to occur, the effluent would have to rise, *against gravity*, through at least 150mm of soil. Under unsaturated conditions, water flow is multi-directional due to capillary forces and matrix suction. The atmosphere provides a capillary break with capillary forces and matrix suction reducing to zero at the air/soil interface. Gravitational forces outweigh the capillary forces and matrix suction long before the surface is reached. Hence, any surface flow from the effluent area cannot contain any effluent, regardless of the intensity and duration of rain events. Surface flow can only consist of **rainfall** in excess of soil storage capacity and hydraulic conductivity.

Note: For a pressure compensated distribution network to function properly, lines must be placed parallel to contours and/or horizontal for even effluent distribution. This requirement, alone, requires a high level of quality assurance at the design and construction phases.

1.4.9 Oversized Effluent Areas.

Design effluent areas are based on conservative estimates of renovation and complete attenuation of nitrogen. After amelioration the deep seepage rate will be lower than the hydraulic conductivity of the limiting layer (<10%).

1.4.10 Reserve Areas.

Although reserve areas are not required for subsurface irrigation there is sufficient area available for extension of the irrigation area. The reserve area is a spare effluent field, which is left undeveloped, but can be commissioned in the case of increase in daily effluent production due to contingencies through the chain of ownership.

1.4.11 Buffer Distances.

Buffer distances are set out in the *EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-10* to allow for attenuation of pathogens and nutrients, should an effluent surcharge occur, either overland or subsurface.

All effluent areas are located at least 340m from surface waters.

The time taken for groundwater to reach the nearest potable surface waters can be estimated by using the Darcy equation (which states that velocity is the product of the hydraulic conductivity and the hydraulic gradient). From the literature, the regional gradient is about0.003.

Flow times can be estimated for groundwater to flow the 340m (minimum) to the nearest surface waters at this site.

For a conservative basement hydraulic conductivity of 1m/day[c] with a hydraulic gradient of 0.003, the time taken for groundwater to flow a distance of 340m is over 300 years.

1.4.12 System Failure.

A properly designed and constructed onsite effluent system consisting of the treatment plant and the irrigation area can suffer degrees of failure.

Failure can take the form of mechanical (plant), accidental (toilet blockages, damaged irrigation lines, high BOD influent), operational (power outage, overloading) and maintenance (failure to check filters, failure to participate in maintenance programme).

1.4.12.1 Mechanical Breakdown.

Mechanical plant breakdown typically involves compressor and pump malfunction causing no aeration and high water levels, respectively. Both of these situations are alarmed (both audible and visual). The proposed

[c] This is a conservatively high figure to demonstrate maximum possible flow rates. A conservatively low figure was used for calculation of effluent application rates (see recommendations) to demonstrate irrigation sustainability.

plants will benefit from a service contract providing 24 hour repair cycles. If the alarms were ignored (or malfunctioned) and the household continued to produce waste until the load balancing tank and plant capacities were exceeded (at least 3 days), a mixture of septic and raw effluent would back up to the interior of the residence and/or surcharge through the plant hatches. It is difficult to imagine how this outcome could be allowed to manifest. In addition, a plant malfunction with the residents absent could not cause an effluent surcharge because no influent would be produced during this period.

1.4.12.2 Accidents.

Toilet blockages and accidentally damaged irrigation lines could allow localised surface surcharge of treated effluent. This is why minimum buffers to surface waters have been maintained. High BOD influent (e.g. dairy or orange juice) can realise a lesser quality than 20/30 standard for some weeks. Provided the high BOD influent is not continuous, the soils will continue to satisfactorily renovate the effluent.

1.4.12.3 Operational Breakdown.

Operational failures including power outages and transient hydraulic overloading are accommodated by the load balancing facility, as described in Section 1.4.6, above.

1.4.12.4 Maintenance Breakdown.

Maintenance breakdowns such as failure to clean line filters can lead to expensive pump repairs and in extreme cases leakage (of 20/30 secondary standard effluent) from the outlet pipe. This leakage would occur in proximity to the dwelling and would be noticed and acted on.

Refusal to participate in the management programme would be acted on by the responsible authority within one maintenance cycle.

AWTSs and pumped systems have mechanical components which can malfunction and will age. The management plan including the maintenance and monitoring programmes are essential to ensure safe onsite effluent disposal.

A prepaid maintenance, monitoring and reporting programme involving a certified and insured entity (i.e. external audit) would ensure safe onsite effluent disposal and reduce the responsible authority's burden of responsibility.

1.4.13 Risk Summary.

With regard to density of development and cumulative risk the assessment has considered risk associated with subsurface flows and surface flows.

In regard to subsurface flows, it is clear that provided the on-site system is adequately designed, constructed, operated and maintained (see items 1.4.1 through 1.4.12.4), the risk to surface and ground waters is negligible. Once the effluent is placed underground, the extraordinary long travel times via ground water to surface waters ensures adequate nutrient attenuation.

In regard to surface flows, it is clear that provided the on-site system is adequately designed, constructed, operated and maintained (see items 1.4.1 through 1.4.12.4), the risk to surface and ground waters is no greater than for a sewered development. Indeed, it could be considered that the risk is less than for a sewered development because there can be no mains failure (because there is no mains).
The LCA recommends a conservative, scientifically based, well founded wastewater management system with inherent multiple barriers of safety.

Cumulative risk from the development is extremely low. The risk of serious or irreversible damage is extremely low. All requirements of *SEPP (Waters of Victoria)* have been met.

Figure 1:. Land-soil unit A (proposed effluent area) viewed from northeast to southwest.

SECTION 2. RECOMMENDATIONS

2.1 APPLICATION

The following recommendations are based on the results of our assessment, and are made in accordance with *SEPPs (Waters of Victoria),* the *EPA Victoria - Guideline for onsite wastewater management (May 2024)* and *EPA Victoria - Guideline for onsite wastewater effluent dispersal and recycling systems (May 2024)*, *AS 1726*, and *AS/NZS 1547:2012*.

They are based on the estimated hydraulic conductivity of the limiting clay materials and are designed to demonstrate the viability of on-site effluent disposal for a 4-bedroom (equivalent) residence and a daily effluent production of up to 600 litres and are considered to be conservative.

2.2 SUBSURFACE IRRIGATION

2.2.1 General.

Based on the results of the water balance analysis and considering the prevailing surficial and subsurface conditions including soil profile thickness and slope and on condition that adequate site drainage is provided (as described in Section 2.4, below), on-site irrigation systems are appropriate for effluent disposal for land-soil unit A.

2.2.2 Effluent.

Effluent will be generated from a 4-bedroom (equivalent) residence and will include black and grey water (all wastes).

2.2.2.1 Effluent Quality.

Effluent shall be treated to a standard that meets or exceeds the water quality requirements of the 20/30 standard for BOD/SS.

Operation and maintenance shall be carried out in accordance with *AS/NZS 1547:2012* and a ”system specific” JAS/ANZ accreditation, as appropriate.

2.2.2.2 Effluent Quantity.

The daily effluent volume of 600 litres has been calculated from *EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-1)* and assumes a 4-bedroom (equivalent) residence with onsite roof water tank supply and WELS-rated water-reduction fixtures and fittings – minimum 4 Stars for dual-flush toilets, shower-flow restrictors, aerator taps, flow/pressure control valves and minimum 3 Stars for all appliances.

2.2.2.3 Load Balancing.

Transient hydraulic loads in excess of the expected daily load may occur (e.g. holidays, entertaining, overnight guests etc (if any)). In addition, and in the case of power outages and/or mechanical breakdown, the load balancing tank can act as a temporary storage.

We recommend that the effluent treatment system be fitted with a load balancing facility **or equivalent function** to allow transient high hydraulic loads to be retained and distributed to the irrigation area during periods of low load.

2.2.3 Application Rates and Irrigation Areas.

An irrigation area and application rate has been determined from the results of the water and nutrient balance analyses and *AS/NZS 1547:2012, Appendix M*.

2.2.3.1 Hydraulic Loading.

To satisfy the requirement for no surface discharge in the mean wet year and after adjusting for slope, effluent shall be applied at an application rate not exceeding 1.7mm/day.

2.2.3.2 Nutrient Loading.

The requirements of *SEPPs (Waters of Victoria)* would be satisfied with effluent applied at an application rate not exceeding 2.5mm/day.

2.2.3.3 Design Loading.

For a daily effluent flow of 600 litres and to satisfy the requirement for no surface flows in the mean wet year and on-site attenuation of nutrients (and as adjusted for slope) the effluent shall be applied to an area of 360m^2 at a rate not exceeding 1.7mm/day.

2.2.4 General Requirements.

For subsurface irrigation, it is assumed that the design, construction, operation and maintenance are carried out in accordance with *AS/NZS1547:2012* and a "system specific" JAS/NZS accreditation, as appropriate.

The irrigation area is to be a dedicated area. To prevent stock and vehicular movements (if any) over the area, the effluent area shall be "fenced".

2.2.5 Subsurface Distribution System.

A distribution network design similar to that shown in *AS/NZS1547:2012, Figure M1* is appropriate.

2.2.5.1 Ground Preparation and Excavations.

Preparation of the ground is to include the smoothing of the land application surface by the redistribution of topsoil to form a free draining, at least 200mm deep, loamy surface over the land application area. Pipe excavations shall only be undertaken in drier periods when soil moisture contents are relatively low and when heavy rainfall and storms are not normally expected.

2.2.5.2 Pump System and Pipe works.

Uniform delivery pressure of the effluent throughout the distribution system is essential. Percolation or drip rates shall not vary by more than 10% from the design rate over the whole of the system (i.e. pressure compensated).

The distribution pipes shall be placed coincident with slope contours. The dripper system is to provide an effective even distribution of effluent over the whole of the design area. Line spacing shall be no closer than 1000mm.

2.2.6 Sequential Zoned Irrigation.

The efficiency of irrigation effluent disposal systems can be highly variable. We recommend that as part of the daily irrigation process, the effluent area be irrigated sequentially by zones to promote the creation of transient aerobic and anaerobic soil conditions.

The inspection regime described in Section 2.2.7, below, is to be strictly adhered to.

2.2.7 Inspections and Monitoring.

We recommend that the mandatory testing and reporting as described in the *EPA Victoria - Guideline for onsite wastewater management (May 2024) Section 6*, include an annual (post spring) report on the functioning and integrity of the distribution system and on the functioning and integrity of the cut-off drains, outfall areas and soil media.

It is expected that the frequency of inspections and monitoring will intensify as systems age.

2.2.8 Soil Renovation.

Soils are dispersive and require amelioration. To create and maintain water-stable peds (under irrigation with saline effluent), soil renovation in the form of gypsum application is required at the rate of 1kg/m^2. Initially, prior to the installation and operation of the effluent irrigation system gypsum is to be broadcast over the land application area at the rate of 0.5kg/m^2. Following that gypsum shall be broadcast again over the effluent area

at the rate of 0.25 kg/m^2 in every two winter months and 0.25kg/m^2 in every 3 summer months until the determined gypsum application of 1kg/m^2 is reached.

If the determined gypsum application of 1kg/m^2 is not reached by the time of the installation and operation of the effluent irrigation system gypsum shall be broadcast again over the effluent area at the rate of 0.25 kg/m^2 in every winter month and 0.25kg/m^2 in every 1.5 summer months.

After reaching the determined gypsum application of 1kg/m^2 we recommend sampling and testing to assess the effectiveness of the gypsum application. This testing will determine future application rate and frequency of application.

Gypsum requirement assumes the gypsum contains 19% Calcium and 15% Sulphur. Gypsum is to be fine ground "Grade 1" agricultural quality. Gypsum shall be reapplied every 3 years at the rate of 0.5kg/m^2.

2.2.9 Effects of Irrigation on Existing Trees.

A study[d] by Dr Nick O'Brien (Melbourne University) regarding impacts of 20/30 standard irrigation on remnant *Eucalyptus* forest at Ringwood North has shown that trees would not be adversely affected by subsurface 20/30 standard irrigation provided the distribution slots did not exceed about 150mm in depth.

2.3 RESERVE AREA

The expected design life of fifteen years may vary due to construction and maintenance vagaries and possible effluent volume increases through the chain of ownership.

There is sufficient available area for extension of the effluent area.

2.4 SITE DRAINAGE.

Our recommendations for on-site effluent disposal have allowed for incident rainfall only (not surface flow or lateral subsurface flow) and are conditional on the installation of a shallow cut-off drain, which shall be placed upslope of the disposal area.

Care shall be taken to ensure that the intercepted and diverted surface waters are discharged well away and down slope of the disposal field.

Locations of the cut-off drains and a drain detail are shown in Drawings 2 and MP1.

The owner shall also ensure that any upslope site works do not divert and/or concentrate surface water flows onto the disposal area.

2.5 BUFFER DISTANCES

The water balance analysis has shown that potential surface (rain water) flows from the effluent area would be restricted to episodic events.

The estimated hydraulic properties of the upper soil materials and hydraulic gradient have been used to evaluate (via Darcy's Law) the buffer distances with respect to subsurface flows.

Our risk analysis and evaluation has shown that the default setback distances given in *EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-10* are conservative and can be applied without amendment, as shown in Drawing 2.

For a building located downslope of an effluent field, your engineer shall evaluate the integrity of building foundations with respect to the assigned buffer distance.

[d] Dr Nick O'Brien (Research Fellow, School of Botany, University of Melbourne, 2000: *Comment on the irrigation of remnant native vegetation with municipal effluent associated with the proposed subdivision at the rear of 111 Hall Road, North Ringwood.*

2.6 SUMMARY OF RECOMMENDATIONS

Our capability assessment has shown that at least one rational and sustainable on-site effluent disposal method (20/30 standard subsurface irrigation) is appropriate for the proposed development, subject to specific design criteria, described above.

A management plan is presented in Appendix D, to this report.

[redacted]

[redacted]

Land Capability Assessment
Principal Soil Scientist

APPENDIX A1

SOIL PERMEABILITY

Where the soils are dispersive and/or have high shrink-swell potential *insitu* permeability testing realises inaccurate, low or nil results.

The hydraulic conductivity can be estimated by using test waters containing calcium chloride and/or by laboratory assessment of colloid stability and determination of ameliorant quantities (e.g. gypsum/lime requirement) and swell potential.

A conservative estimate of permeability has been deduced as follows (from soil texture, structure and free swell potential tests):-

Profile analysis in accordance with AS/NZS 1547:2012 and our laboratory determined dispersion and swell potential shows the alluvial soils to be dispersive silty light to medium clays (i.e. Type 6 soils) with saturated hydraulic conductivity less than 0.06m/day.

Similar dispersive soils have responded positively (with sufficiently improved hydraulic capability) following applications of gypsum.

The limiting moderately structured silty light to medium clay soils require amelioration in the form of gypsum application at the rate of 1kg/m^2.

Peak deep seepage is conservatively estimated at 3.6mm/day. Average daily deep seepage rate is 2.4mm.

SOIL TEST RESULTS

Project: Beaconsfield			Date of sampling: 01/08/24			Date of Lab test:				BH: 1
horizon (cm)	pH	$EC_{1:5}$	EC_{SE}	disp 10 min	disp 2 hours	disp total	Emers 2 hours	Emers 20 hours	free swell %	texture
0-20				0	0	0	4,5,6	4,5,6		loam
20-40				0	1	9	2	2		clay loam
40-75				1	2	11	2	2		silty light to medium clay
75-110				0	0	0	8	2		silty light clay
110-130				0	0	0	4,5,6	4,5,6		silty light clay

Project: Beaconsfield			Date of sampling: 01/08/24			Date of Lab test:				BH: 2
horizon (cm)	pH	$EC_{1:5}$	EC_{SE}	disp 10 min	disp 2 hours	disp total	Emers 2 hours	Emers 20 hours	free swell %	texture
0-20	5.5	0.01	0.10	0	0	0	4,5,6	4,5,6		loam
20-40	5.5	0.01	0.10	0	1	9	2	2		loam
40-60	5.1	0.05	0.45	3	4	15	1	1	0	silty light clay
60-90	5.4	0.15	1.35	1	2	11	2	2	30	silty light clay
90-105	4.7	0.02	0.18	0	0	0	4,5,6	4,5,6		silty light clay
105-135	5.4	0.11	0.99	0	0	0	4,5,6	4,5,6		silty light clay

APPENDIX A2

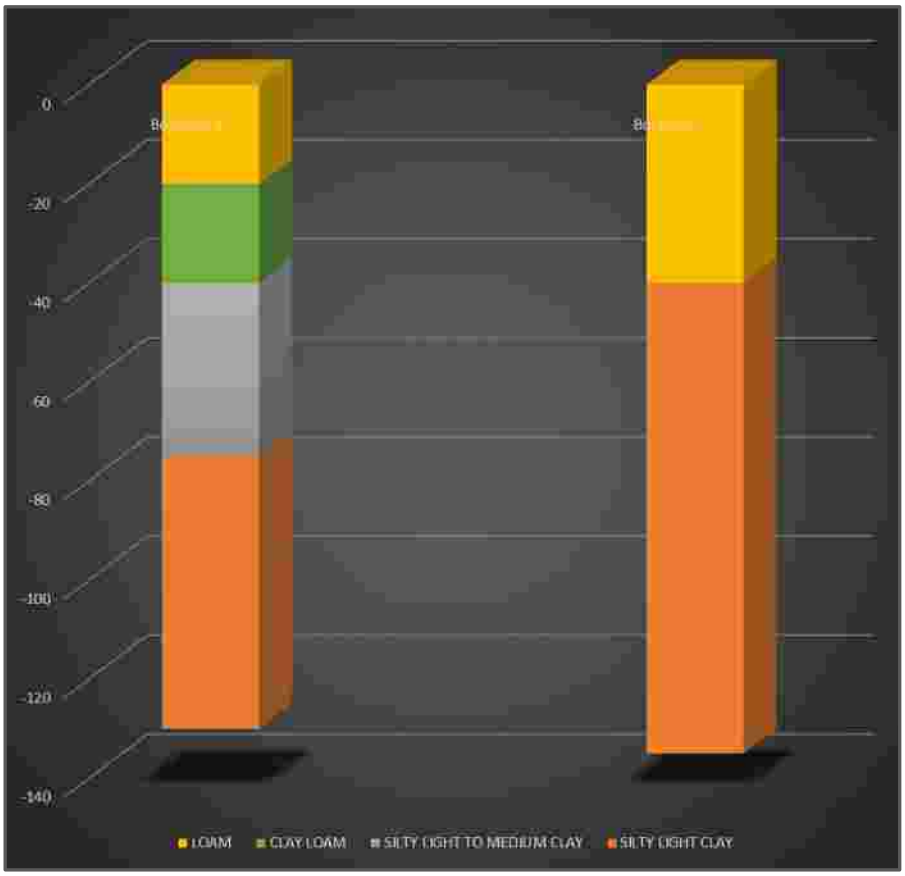
SOIL PROFILE PHOTOGRAPHS

BOREHOLE 1

BOREHOLE 2

APPENDIX A3

LOGS OF BOREHOLES



For location of boreholes refer Drawing 2.

APPENDIX B

WATER AND NUTRIENT BALANCE

Land Capability Assessment (Spreadsheet used with permission)

WATER/NITROGEN BALANCE (20/30 irrigation): With no wet month storage

LCA19082024

Rainfall Station: Berwick / **Evaporation Station:** Scoresby Research Inst.

Location: Beaconsfield
Date: August, 2024
Client: Heath & Tiffany White

ITEM	UNIT	#	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Days in month:		D	31	28	31	30	31	30	31	31	30	31	30	31	365
Evaporation (Mean)	mm	A	174	154	124	81	53	39	43	59	78	105	132	155	1197
Rainfall (mean)	mm	B1	62	54	55	79	76	85	81	84	85	92	86	76	915.3
Effective rainfall	mm	B2	46	41	41	59	57	64	61	63	64	69	65	57	686
Peak seepage Loss[1]	mm	B3	112	101	112	108	112	108	112	112	108	112	108	112	1314
Evapotranspiration(KA)	mm	C1	78	69	56	36	24	18	20	27	35	47	59	70	539
Waste Loading(C1+B3-B2)	mm	C2	143	129	126	85	78	62	70	75	79	90	103	125	1166
Net evaporation from lagoons (10(0.8A-B1xlagoon area(ha)))	L	NL	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume of Wastew ater	L	E	18600	16800	18600	18000	18600	18000	18600	18600	18000	18600	18000	18600	219000
Total Irrigation Water(E-NL)/G	mm	F	62	56	62	60	62	60	62	62	60	62	60	62	730
Irrigation Area(E/C2)annual.	m^2	G													**300**
Surcharge/Storage	mm	H	-81	-73	-64	-25	-16	-1	-8	-13	-19	-28	-43	-63	**0**
Actual seepage loss	mm	J	30	27	47	83	96	107	103	98	89	83	65	49	878
Direct Crop Coefficient:		I	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	Shade:

Rainfall Retained:	75	%	K	1. Seepage loss (peak) equals deep seepage plus lateral flow : 3.6mm
Lagoon Area:	0	ha	L	CROP FACTOR
Wastew ater(Irrigation):	600	L	M	0.7 0.7 0.7 0.6 0.5 0.45 0.4 0.45 0.55 0.65 0.7 0.7 Pasture:
Seepage Loss (Peak):	3.6	mm	N	0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 Shade:
Irrig'n Area(No storage):	**300**	m^2	P2	0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 Fescue:
Application Rate:	**2.0**	mm	Q	1 1 1 1 1 1 1 1 1 1 1 1 Woodlot
Nitrogen in Effluent:	30	mg/L	R	
Denitrification Rate:	20	%	S	
Plant Uptake:	220	kg/ha/y	T	
Average daily seepage:	2.4	mm	U	
Annual N load:	5.26	kg/yr	V	
Area for N uptake:	**239**	m^2	W	
Application Rate:	**2.5**	mm	X	
Irrig'n Area (slopes 10%-20%)	**360**	m2	Z	
Application Rate:	**1.7**	mm	Z1	

NITROGEN UPTAKE:

Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH	Species:	Kg/ha.yr	pH
Ryegrass	200	5.6-8.5	Bent grass	170	5.6-6.9	Grapes	200	6.1-7.9
Eucalyptus	90	5.6-6.9	Couch grass	280	6.1-6.9	Lemons	90	6.1-6.9
Lucerne	220	6.1-7.9	Clover	180	6.1-6.9	C cunn'a	220	6.1-7.9
Tall fescue	150-320	6.1-6.9	Buffalo (soft)	280	6.1-6.9	P radiata	150	5.6-6.9
Rye/clover	220		Sorghum	90	5.6-6.9	Poplars	115	5.6-8.5

RAINFALL DATA

Station: Berwick (Buchanan Road) Number: 86299 Opened: 1979 Now: Open
Lat: 38.02° S Lon: 145.36° E Elevation: 85 m

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	61.7	54.3	54.9	79.2	76.3	85.4	81.1	84.0	84.9	91.7	86.1	75.7	936.8
Lowest	2.4	2.0	11.2	23.4	24.2	16.8	20.8	37.2	32.8	19.8	20.4	9.4	577.2
5th %ile	10.8	2.7	18.4	24.6	25.8	41.1	30.6	38.8	42.3	35.0	33.9	20.8	722.7
10th %ile	14.6	5.9	20.8	30.4	30.6	45.3	40.1	47.9	48.3	43.1	40.1	27.4	743.1
Median	57.5	34.6	56.6	77.4	78.6	83.4	72.8	84.0	79.0	88.8	81.0	66.9	963.2
90th %ile	108.3	127.0	83.3	126.6	118.0	129.8	120.5	117.2	133.8	141.6	144.1	136.4	1112.9
95th %ile	119.1	152.2	95.1	149.3	128.1	143.4	130.7	121.9	166.9	160.7	159.8	168.1	1153.4
Highest	158.8	235.6	106.0	187.4	164.6	167.8	162.0	149.0	193.8	192.2	182.2	187.8	1163.9

APPENDIX C

LAND CAPABILITY ASSESSMENT TABLE
(Non-Potable Water Supply Catchments)

LAND FEATURE	LAND CAPABILITY RISK RATING				AMELIORATIVE MEASURES & RISK REDUCTION
	LOW	MEDIUM	HIGH	LIMITING	
Available land for LAA	Exceeds LAA and duplicate LAA requirements	Meets LAA and duplicate LAA requirements	Meets LAA and partial duplicate LAA requirements	Insufficient LAA area	Limiting for trenches & beds: Full reserve area not available. Non-limiting for subsurface irrigation.
Aspect	North, north-east and north-west	East, west, south-east, south-west	South	South, full shade	Eastern aspect.
Exposure	Full sun and/or high wind or minimal shading	Dappled light (partial shade)	Limited light, little wind to heavily shaded all day	Perpetual shade	Partial shade from nearby trees.
Slope Form	Convex or divergent side slopes	Straight sided slopes	Concave or convergent side slopes	Locally depressed	Free draining, however finished LAA surface requires smoothing and redistribution of topsoil.
Slope gradient:					
Subsurface irrigation	<10%	10% to 30%	30% to 40%	>40%	13%-15% Non-limiting for subsurface irrigation.
Site drainage: runoff/run-on	LAA backs onto crest or ridge	Moderate likelihood	High likelihood	Cut-off drain not possible	Unremarkable. Cut-off drain required up-slope.
Landslip[1]	Potential	Potential	Potential	Existing	Unremarkable.
Erosion potential	Low	Moderate	High	No practical amelioration	All runoff to be dispersed without concentrating flows. LAA stabilised with gypsum (dispersive soils).
Flood/inundation	Never		<1%AEP	>5% AEP	Unremarkable.
Distance to surface waters (m)	Buffer distance complies with Guideline requirements		Buffer distance does not comply with Guidelinee requirements	Reduce buffer distance not acceptable	340 metres to watercourse.
Distance to groundwater bores (m)	No bores on site or within a significant distance	Buffer distances comply with Guideline	Buffer distances do not comply with Guideline	No suitable treatment method	No bores within a significant distance (680m).
Vegetation	Plentiful/healthy vegetation	Moderate vegetation	Sparse or no vegetation	Propagation not possible	Existing grasses require over-sowing with a rye/clover mix.
Depth to water table (potentiometric) (m)	>2	2 to 1.5	<1.5	Surface	Water table is between 20-50m.
Depth to water table (seasonal perched) (m)	>1.5	<0.5	0.5 to 1.5	Surface	Perching unlikely.
Rainfall[2] (Mean) (mm)	<500	500-750	750-1500	>1500	915mm. Non-limiting for subsurface irrigation – Design by water balance.
Pan evaporation (mean) (mm)	>1250	1000 to 1250	750 to 1000	<750	1197mm. Design by water balance.
SOIL PROFILE CHARACTERISTICS					
Structure	High or moderately structured	Weakly structured	Structureless, massive or hardpan		Maintain structure by gypsum application (dispersive soils).
Fill materials	Nil or mapped good quality topsoil	Mapped variable depth and quality materials	Variable quality and/or uncontrolled filling	Uncontrolled poor quality/unsuitable filling	No fill present.
Thickness: (m)					
Subsurface irrigation	1.5+	1.0 to 1.5	0.75-1.0	<0.75	Non-limiting for irrigation systems.
Permeability[3] (limiting horizon) (m/day)	0.15-0.3	0.03-0.15 0.3-0.6	0.01-0.03 0.6-3.0	>3.0 <0.03	Non-limiting for irrigation but requires renovation.
Permeability[4] (buffer evaluation) (m/day)	<0.3	0.3-3	3 to 5	>5.0	Evaluate flow times via Darcy's Law (assume 1m/day for alluvial materials).
Stoniness (%)	<10	10 to 20	>20		Unremarkable
Emerson number	4, 5, 6, 8	7	2, 3	1	Non-dispersive topsoil, dispersive subsoils. Apply gypsum to improve ksat and to create and maintain stable peds.
Dispersion Index	0	1-8	8-15	>15	Non-dispersive topsoil, dispersive subsoils. Apply gypsum to improve ksat and to create and maintain stable peds.
Reaction trend (pH)	5.5 to 8	4.5 to 5.5	<4.5>8		5.5pH in topsoil. Ideal range for grasses.
E.C. (dS/m)	<0.8	0.8 to 2	>2	>2.0	Non-restrictive.
Sodicity (ESP) (%)	<6	6 to 8	>8	>14	Sodic. Inferred from Emerson, Dispersion Index and Free swell.
Free swell (%)	<30	30-80	80-120	>120	0%-30%. Non- to low-swelling soils.

There are no limiting factors for secondary effluent subsurface irrigation (after renovation with gypsum).

Evaluation of buffer distances via Darcy's Law shows EPA default buffer distances to be adequate.

Hence, in terms of the design engineering and management inputs required for sustainable on-site effluent disposal are rational and easily achieved without significant impost on the landowner.

[1] Landslip assessment based on proposed hydraulic loading, slope, profile characteristics and past and present land use.
[2] Mean monthly rainfalls used in water balance analyses.
[3] Saturated hydraulic conductivity estimated from data base and laboratory tests.
[4] Saturated hydraulic conductivity estimated from AS/NZS1547:2012 and data base.

APPENDIX D

MANAGEMENT PLAN

Land Capability Assessment
[redacted]
CONSULTANTS IN THE AGRICULTURAL SCIENCES

53 Telford Drive, Berwick VIC 3806
Email: info@lcavictoria.com.au

LCA19082024 – AUGUST/2024

MANAGEMENT PLAN
FOR
ON-SITE EFFLUENT DISPOSAL VIA SUBSURFACE IRRIGATION
AT
127 COOINDA ROAD, BEACONSFIELD VIC 3807

1. INTRODUCTION

This document identifies the significant land-soil unit constraints (as identified in LCA19082024) and their management and day-to-day operation and management of the on-site effluent system.

This management plan is to be read in conjunction with our land capability assessment for this land-soil unit (LCA19082024).

2. SIGNIFICANT LAND-SOIL UNIT CONSTRAINTS

2.1 Allotment Size. The day-to-day operation and management of on-site effluent systems, as described below, is not constrained by lot size or geometry.

Although all requirements of *SEPPs* have been met or exceeded through conservative design, prudence dictates that individual lot owners assiduously follow the management programme given in Section 4, below.

2.2 Nitrogen Attenuation. To reduce nitrates to insignificant levels, the effluent should not contain more than 30mg/litre total nitrogen.

Provided the irrigation areas are at least as large as those required to satisfy the nitrogen loading, as described in LCA19082024 Sections 1.3.1.12 and 2.2.3.2, and that the (specified) grass is cut and (periodically) harvested, nitrogen will be attenuated on-site.

2.3 Hydraulic Conductivity. The soils of this site are dispersive silty light to medium clays with a non- to low swelling potential and a low hydraulic conductivity. The hydraulic conductivity is significantly influenced by soil structure, soil colloid stability and swell characteristics. Breakdown or reduction of these soil parameters over time may manifest as reduced performance of the irrigation system. The monitoring and inspection regime detailed in Section 4.7.2, below, should be adhered to.

2.4 Site Drainage. Our recommendations for on-site effluent disposal have allowed for incident rainfall only (not surface flow or lateral subsurface flow) and are conditional on the installation of a cut-off drain, which should be placed upslope of the disposal area. Care should be taken to ensure that the intercepted and diverted surface waters are discharged well away and down slope of the disposal field (see LCA19082024 Drawings 2 and MP1).

This diverted water should also be discharged in a manner to avoid scouring and/or erosion. It may be appropriate to discharge the water onto a stone/rubble dissipation area.

The owner should also ensure that any upslope land-soil unit works do not divert and/or concentrate surface water flows onto the disposal area.

2.5 Vegetation. Existing vegetation is suitable however requires over-sowing with a rye/clover mix. The effluent disposal areas have been sized via water and nutrient balance analyses utilising crop factors for pasture (rye/clover mix) under conditions of partial shade.

3. THE ONSITE EFFLUENT SYSTEM

The onsite effluent system consists of the influent (kitchen, laundry, bathrooms and toilets), a load balancing tank/facility (if any), the treatment plant (a device to treat the effluent to at least the secondary effluent standard (20/30)), the irrigation area including effluent distribution system (delivery pipes and drippers), prescribed irrigation area vegetation, associated infrastructure (cut-off drain, outfall areas, fencing (if any)), a service and maintenance programme and on-going management.

4. MANAGEMENT

The owner is required to understand (and ensure that tenants understand) that sustainable operation of the onsite effluent system is not automatic. Sustainable operation requires on-going management, as outlined below.

4.1 Effluent. Effluent will be generated from a 4-bedroom (equivalent) residence and will include black and grey water (all wastes).

4.1.2 Effluent Quality. Effluent should be treated to a standard that meets or exceeds the water quality requirements of the secondary effluent standard (20/30 standard for BOD/SS).

Operation and maintenance shall be carried out in accordance with *AS/NZS 1547:2012* and a ”system specific” JAS/ANZ accreditation, as appropriate.

4.1.3 Effluent Quantity. The daily effluent volume of 600 litres has been calculated from *EPA Victoria - Guideline for onsite wastewater management (May 2024) Table 4-1* and assumes a 4-bedroom (equivalent) residence with onsite roof water tank supply and WELS-rated water-reduction fixtures and fittings – minimum 4 Stars for dual-flush toilets, shower-flow restrictors, aerator taps, flow/pressure control valves and minimum 3 Stars for all appliances.

4.2 Treatment System. No specific treatment system is recommended, however, the treatment system must have current AS/NZS accreditation, which match effluent volumes with plant capacity. For subsurface irrigation, it is assumed that the design, construction, operation and maintenance are carried out in accordance with *AS/NZS1547:2012* and a “system specific” JAS/NZS accreditation.

4.3 Irrigation Area. The irrigation area has been determined from the results of the water and nutrient balance analyses and AS/NZS 1547:*2012*, *Appendix M*.

4.3.1 Effluent Area Requirement. For a daily effluent flow of 600 litres and to satisfy the requirement for no surface rainwater flow in the mean wet year, on-site attenuation of nutrients and after adjusting for slope the effluent should be applied to an irrigation area of 360m^2.

Effluent distribution is as detailed in Section 4.3.2, below.

Any landscaping and/or planting proposals require endorsement from the Cardinia Shire Council.

4.3.2 Distribution System. The distribution system must achieve controlled and uniform dosing over the irrigation area. A small volume of treated effluent should be dosed at predetermined time intervals throughout the day via a pressurised piping network that achieves uniform distribution over the entire irrigation area.

Uniform delivery pressure of the effluent throughout the distribution system is essential. Drip rates should not vary by more than 10% from the design rate over the whole of the system.

To minimise uneven post-dripper seepage, the distribution pipes must be placed parallel with slope contours.

Line spacing shall be not closer than 1000mm under any circumstances.

To facilitate the creation of transient aerobic and anaerobic soil conditions we recommend that as part of the daily irrigation process, the effluent area be irrigated sequentially by zones.

4.3.3. Soil Renovation: Soils are dispersive and require amelioration. To create and maintain water-stable peds (under irrigation with saline effluent), soil renovation in the form of gypsum application is required at the rate of 1kg/m^2. Initially, prior to the installation and operation of the effluent irrigation system gypsum is to be broadcast over the land application area at the rate of 0.5kg/m^2. Following that gypsum shall be broadcast

again over the effluent area at the rate of 0.25 kg/m^2 in every two winter months and 0.25kg/m^2 in every 3 summer months until the determined gypsum application of 1kg/m^2 is reached.

If the determined gypsum application of 1kg/m^2 is not reached by the time of the installation and operation of the effluent irrigation system gypsum shall be broadcast again over the effluent area at the rate of 0.25 kg/m^2 in every winter month and 0.25kg/m^2 in every 1.5 summer months.

After reaching the determined gypsum application of 1kg/m^2 we recommend sampling and testing to assess the effectiveness of the gypsum application. This testing will determine future application rate and frequency of application.

Gypsum requirement assumes the gypsum contains 19% Calcium and 15% Sulphur. Gypsum is to be fine ground “Grade 1” agricultural quality. Gypsum shall be reapplied every 3 years at the rate of 0.5kg/m^2.

4.3.4 Buffer Distances. The water balance analysis has shown that potential surface rainwater flows from the effluent area would be restricted to episodic events.

The estimated hydraulic properties of the upper soil materials and hydraulic gradient (equivalent to the ground slope and regional gradients) have been used to evaluate (via Darcy’s Law) the buffer distances with respect to subsurface flows.

Our analysis and evaluation have shown that the default setback distances given in *EPA Victoria - Guideline for onsite wastewater management (May 2024)*, *Table 4-10* are conservative and can be applied without amendment.

For a building located downslope of an effluent field, your engineer should evaluate the integrity of building foundations with respect to the assigned buffer distance.

Buffer distances are to be applied exclusive of the irrigation area.

4.3.5 Buffer Planting. All downslope (Title inclusive) buffers may be required to filter and renovate abnormal surface discharges. Hence, they are to be maintained with existing or equivalent groundcover vegetation.

4.3.6 Buffer Trafficking. On all allotments, buffer trafficking should be minimised to avoid damage to vegetation and/or rutting of the surface soils.

Traffic should be restricted to ‘turf’ wheeled mowing equipment and to maintenance, monitoring and inspections by pedestrians, where possible.

4.4 Vegetation. The system design for on-site disposal includes the planting and maintenance of suitable vegetation, as specified in LCA19082024 and/or similar documents.

Specifically, this irrigation area has been sized (in part) utilising crop factors and annual nitrogen uptake for a rye/clover eq mix.

The grass needs to be harvested (mown and periodically removed from the irrigation area).

Where a variation to recommended grass species is proposed, it must be demonstrated that the nitrogen uptake and crop factors (as specified in LCA19082024 Appendix B – water and nutrient balance) are met or exceeded.

4.5 Verification. The Council is to be satisfied that the effluent system has been constructed as designed with appropriate engineering endorsement and underwriting.

4.6 Associated Infrastructure. The following items are an integral part of the onsite effluent system.

4.6.1 Cut-off drains. Cut-off drains are designed to prevent surface water flows from entering the effluent area. They should be constructed and placed around the effluent area, as shown in Drawings 2 and MP1.

4.6.2 Outfall areas. All pipe outfalls should be at grade and designed to eliminate scour and erosion.

A grassed outfall would normally be adequate. However, should monitoring and inspections reveal rill or scour formation, the outfall will need to be constructed so that energy is satisfactorily dissipated.

Should this situation occur, professional advice is to be sought.

4.6.3 Fencing. The disposal area is to be a dedicated area. Adequate fencing must be provided to prevent stock, excessive pedestrian and vehicular movements (if any) over the area.

4.7 Service and Maintenance Programme. The minimum requirements for servicing and maintenance are set out in the relevant JAS/ANZ accreditation and the manufacturer's recommendations.

4.7.1 Treatment Plant. Aerated treatment plants and sand filters should be serviced at least one time per year (or as recommended in the JAS/ANZ accreditation) and the effluent should be sampled and analysed as required by the JAS/ANZ accreditation). The local authority is to ensure compliance.

The manufacturer's recommendations are to be followed. Generally, low phosphorous and low sodium (liquid) detergents should be used. Plastics and other non-degradable items should not be placed into the tanks. Paints, hydrocarbons, poisons etc should not be disposed of in sinks or toilets. Advice from a plumber should be obtained prior to using drain cleaners, chemicals and conditioners. It is important to ensure that grease does not accumulate in the tanks or pipes. Grease and similar products should be disposed of by methods other than via the on-site effluent system.

4.7.2 Monitoring and Inspections. We recommend that the mandatory testing and reporting as described in the *EPA Victoria - Guideline for onsite wastewater management (May 2024) Section 6*, include an annual (post spring) and post periods of heavy and/or prolonged rainfall report on the functioning and integrity of the distribution system and on the functioning and integrity of the cut-off drains, outfall areas and soil media.

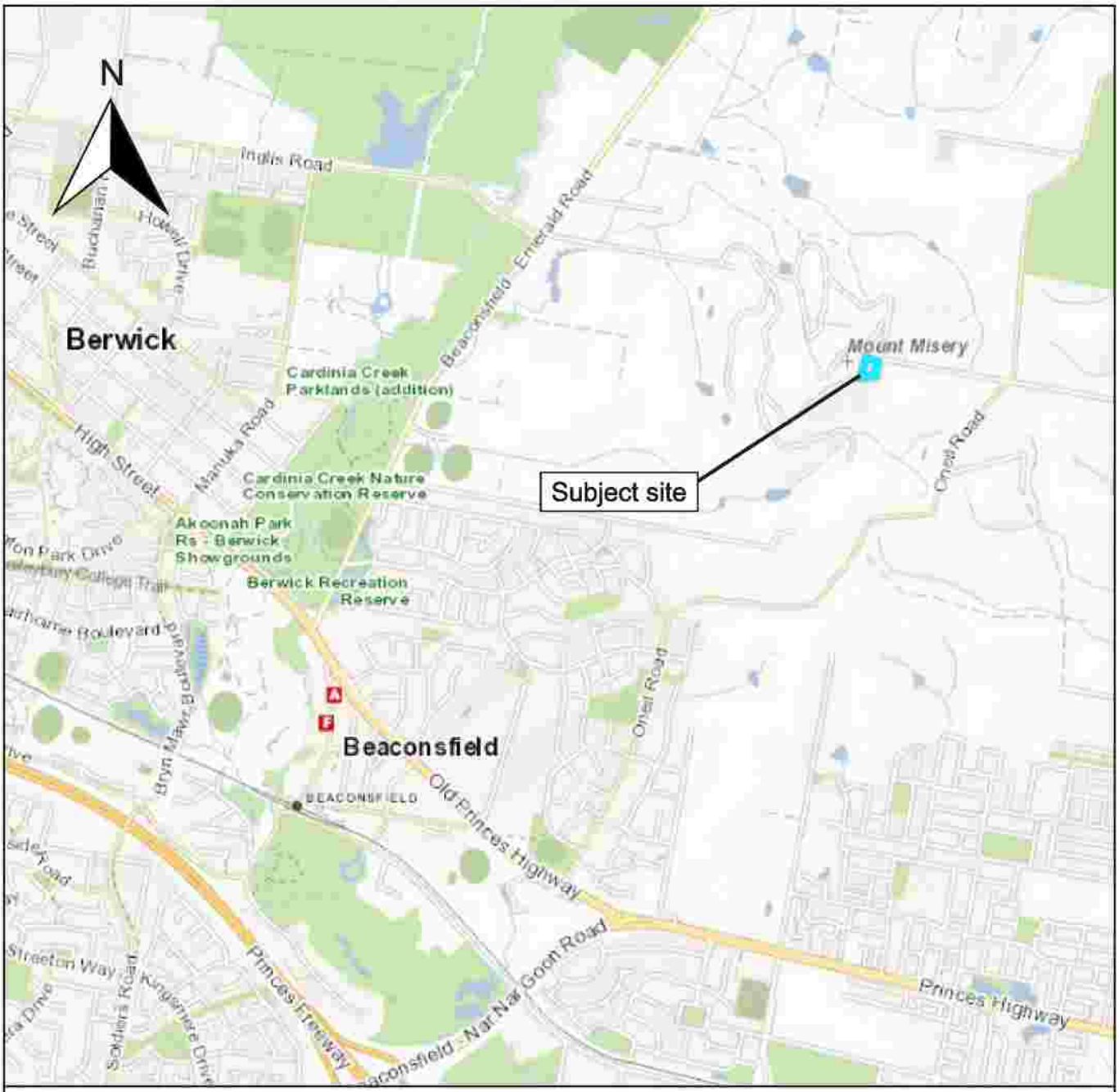
The effluent areas should be regularly inspected for excessively wet areas and vegetation integrity.

The inspection regime described in LCA19082024, Section 2.2.7, should be strictly adhered to.

[redacted]

PRINCIPAL SOIL SCIENTIST
LAND CAPABILITY ASSESSMENT

[redacted]

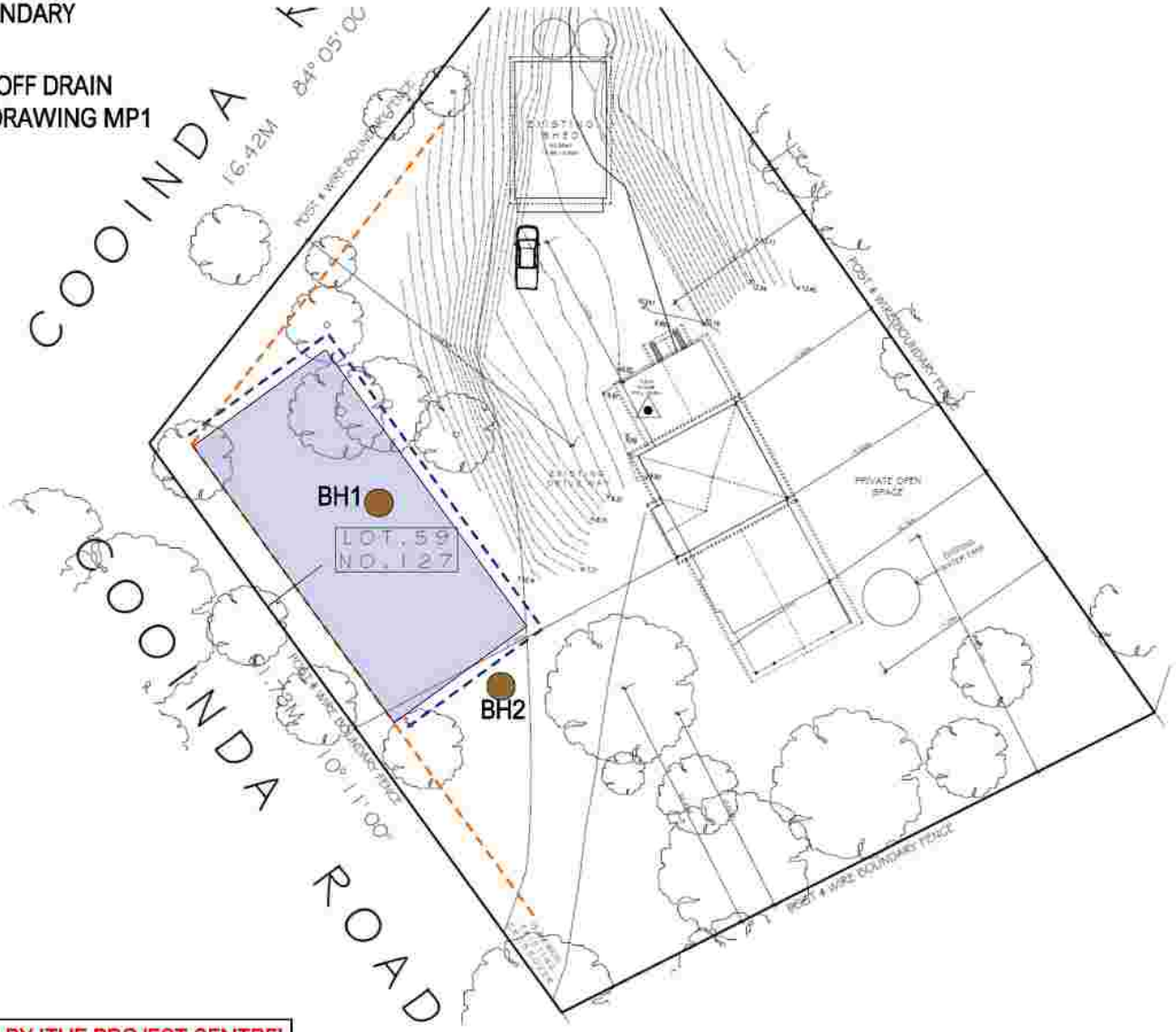


LOCATION OF SUBJECT SITE	
127 COOINDA ROAD, BEACONSFIELD VIC 3807	
[redacted]	
Drawn: [redacted]	Report number: LCA19082024
Date: August 2024.	Drawing number: 1

360m² PRIMARY IRRIGATION AREA

3m BUFFER FROM ALLOTMENT BOUNDARY

CUT-OFF DRAIN SEE DRAWING MP1



BASE MAP SUPPLIED BY 'THE PROJECT CENTRE'

LOCATION OF PROPOSED DEVELOPMENT SHOWING CONTOURS

127 COOINDA ROAD, BEACONSFIELD VIC 3807

[redacted]

DRAWN: LAND CAPABILITY ASSESSMENT

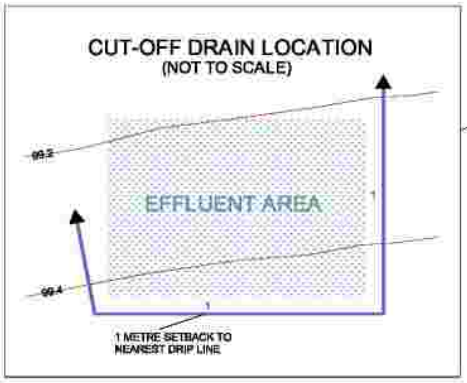
DATE: AUGUST 2024

REPORT NUMBER: LCA19082024

DRAWING NUMBER: 2

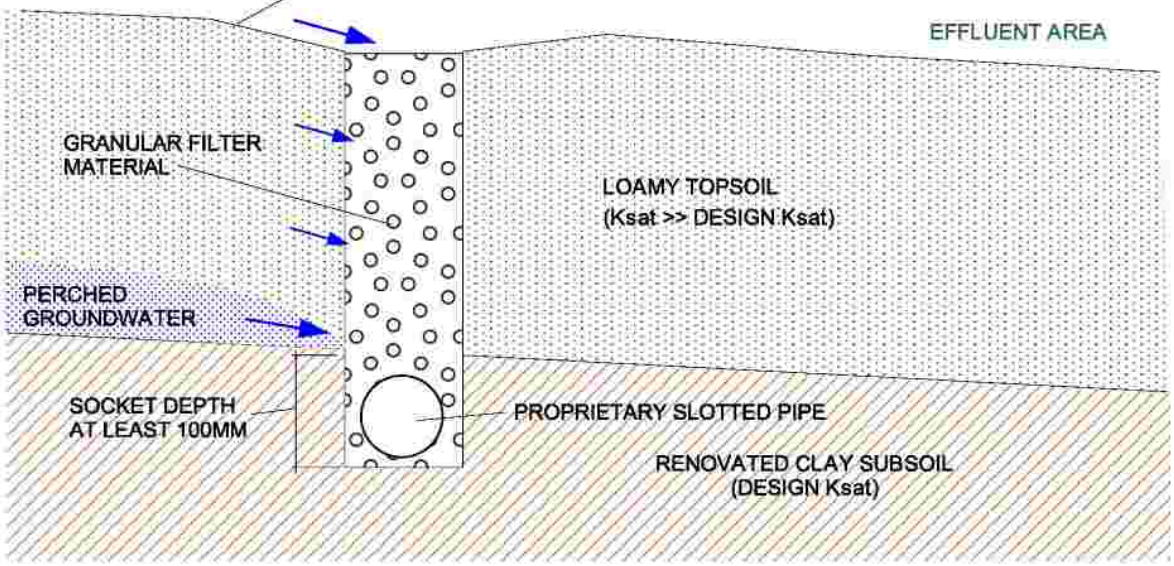
SCALE: 1:600

N



NOTE: CUT-OFF DRAIN LOCATION IS SCHEMATIC ONLY. FINAL LOCATION TO BE DETERMINED BY DESIGN ENGINEER AS PART OF SITE DRAINAGE DESIGN.

SURFACE REGRADED BY CUTTING TO FACILITATE COLLECTION OF SURFACE FLOWS - DEGREE OF CUT SLOPE LIMITED BY REQUIREMENTS FOR SAFE & EFFICIENT MOWING/MAINTENANCE



NOTES:
1. DRAIN TO BE DESIGNED, CONSTRUCTED & MAINTAINED TO ENSURE THAT NO SURFACE & PERCHED GROUNDWATER FLOWS ENTER THE IRRIGATION AREA.
2. DRAIN TO BE LOCATED ON ALL UPSLOPE SIDES OF IRRIGATION AREA (NO CLOSER THAN 1M FROM NEAREST SUBSURFACE DISTRIBUTION LINE).
3. DRAIN TO HAVE UNSPECIFIED FALL.
4. MINIMUM SOCKET DEPTH OF 100MM INTO CLAY SUBSOIL (WHERE ENCOUNTERED) OR AT LEAST 200MM DEEP.
5. DRAIN CROSS SECTIONAL AREA RELATED TO DESIGN FLOWS AS DETERMINED BY A SUITABLY QUALIFIED AND EXPERIENCED ENGINEER.
6. OFF-SITE DRAIN OUTFALL TO LEGAL POINT OF DISCHARGE SUBJECT TO LOCAL AUTHORITY REQUIREMENTS.
7. ON-SITE DRAIN OUTFALL TO INCLUDE APPROPRIATE ENERGY DISSIPATION TO AVOID EROSION.
8. ALL DRAINS AND OUTFALL AREAS SUBJECT TO POST-SPRING INSPECTION.

NOTE: DRAWING NOT TO BE USED FOR SET-OUT PURPOSES

CUT-OFF DRAIN DETAIL FOR EFFLUENT DISPOSAL FIELDS

127 COOINDA ROAD, BEACONSFIELD VIC 3807

[redacted]

Scale: 1:10 (Approximately)	Drawn: P.R.W.	Report Number: LCA19082024
Contour Interval: N/A	Date: August 2024	Drawing Number: MP1