PP207/2019-1

35 Forest Street ELLIMINYT

Lot: 1 PS: 441080 V/F: 10625/001

Three (3) Subdivision of Land

Rod Bright & Associates Pty Ltd & A Lamanna & G E Lamanna

Officer - Ian Williams

EXHIBITION FILE

Submissions to this planning application will be accepted until a decision is made on the application.

If you would like to make a submission relating to a planning permit application, you must do so in writing to the Planning Department

ROD BRIGHT & ASSOCIATES PTY. LTD.
LAND SURVEYORS & TOWN PLANNERS
A.C.N. 007 206 975 A.B.N. 50 007 206 975

26 Murray Street,
Colac 3250
P.O. Box 371

Tel. (03) 5231 4883
Fax. (03) 5231 4883

5th September 2019.

REF: 19-27

Planning Coordinator,
Colac Otway Shire,
P.O. Box 283,
COLAC...VIC. 3250

Dear Sir,

RE: PLAN OF PROPOSED SUBDIVISION
PART OF CROWN ALLOTMENT 51
PARISH OF ELLIMINYT
35 FOREST STREET SOUTH, ELLIMINYT
RE: A. & G.E. LAMANNA AND M. & L.J. NEWCOMBE

Please find enclosed a summary page of the application for a Planning Permit of the Plan of Proposed Subdivision for the above property, which has been submitted to Colac Otway Shire using **SPEAR.**

The application comprises the following documents:

- Copy of Title;
- Plan of Proposed Subdivision;
- Existing Conditions Diagram;
- Site Description & Design Response;

We have attached our clients' cheque for $1318.10 covering Planning Permit fees.

We kindly await receipt of the Planning Permit in due course.

Yours faithfully,

.....

A.E.Bright,
ROD BRIGHT & ASSOCIATES
encl.
copy: A. & G.E. Lamanna
M. & L.J. Newcombe

Application for Planning Permit for a Subdivision

Supplied by	Brett Quickensted
Submitted Date	05/09/2019

Application Details

Application Type	Planning Permit for a Subdivision Version 1
Applicant Reference Number	19-27
Application name or Estate name	Lamanna & Newcombe
Responsible Authority Name	Colac Otway Shire
Responsible Authority Reference Number(s)	(Not Supplied)
SPEAR Reference Number	S146621M
Application Status	Lodged with Responsible Authority
Planning Permit Issue Date	NA
Planning Permit Expiry Date	NA

The Land

Primary Parcel

35 FOREST STREET, ELLIMINYT VIC 3250
Lot 1/Plan PS441080
Volume 10625/Folio 001
SPI 1\PS441080
CPN 21827

Zone:	32.03 Low Density Residential
Overlay:	44.01 Erosion Management
	42.03 Significant Landscape
	42.02 Vegetation Protection

The Proposal

Plan Number	(Not Supplied)
Number of lots	2
Proposal Description	Three (3) Lot Subdivision
Estimated cost of the development for which a permit is required $	0

Existing Conditions

Existing Conditions Description	Cleared vacant grazing land.
Title Information - Does the proposal breach an encumbrance on Title?	The proposal does not breach an encumbrance on title, such as a restrictive covenant, section 173 agreement or other obligation such as an easement or building envelope.

Applicant Contact

Applicant Contact

Mr Anthony Bright
Rod Bright and Associates Pty Ltd
26 Murray Street, Colac, VIC, 3250
Business Phone: 03 5231 4883
Email: rodbright@iprimus.com.au

Applicant

Applicant

A. & G.E. Lamanna
223 Aireys Street, Elliminyt, VIC, 3250 Australia
Mobile Phone: 0427824607
Email: lamanna.adz@gmail.com

Owner

Owner 1

(Owner details as per Applicant)

Owner 2

M. & L.J. Newcombe
223 Aireys Street, Elliminyt, VIC, 3250 Australia
Mobile Phone: 0439032808

Declaration

I, Brett Quickensted, declare that the owner (if not myself) has been notified about this application.

I, Brett Quickensted, declare that all the information supplied is true.

Authorised by

Brett Quickensted

Organisation

Rod Bright and Associates Pty Ltd

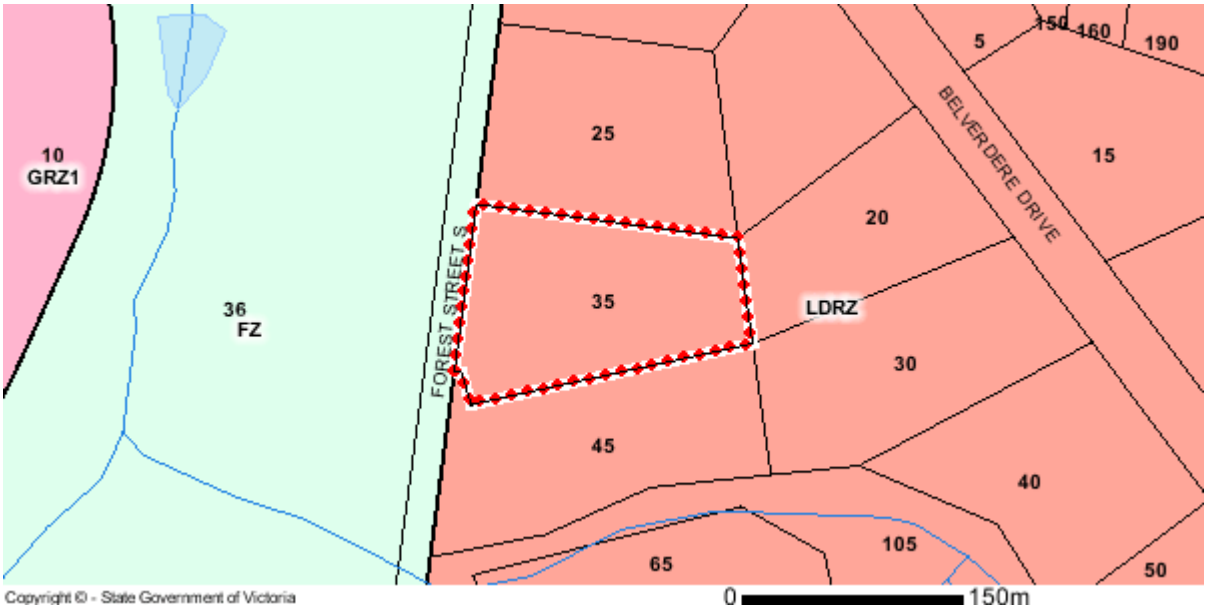
Planning Property Report

from www.planning.vic.gov.au on 05 September 2019 04:06 PM

Lot and Plan Number: Lot 1 PS441080
Address: 35 FOREST STREET SOUTH ELLIMINYT 3250
Local Government (Council): COLAC OTWAY **Council Property Number:** 21827
Directory Reference: VicRoads 92 B7

Planning Zone

LOW DENSITY RESIDENTIAL ZONE (LDRZ)
SCHEDULE TO THE LOW DENSITY RESIDENTIAL ZONE (LDRZ)



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

Zones Legend

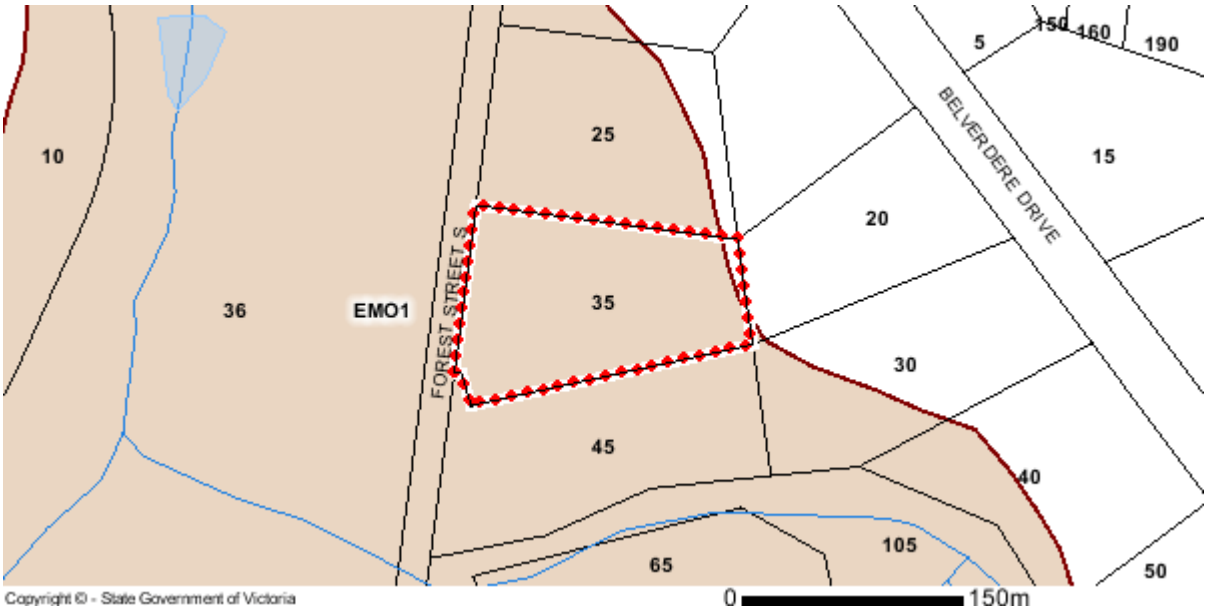
- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
- C1Z - Commercial 1
- C2Z - Commercial 2
- CA - Commonwealth Land
- CCZ - Capital City
- CDZ - Comprehensive Development
- DZ - Dockland
- ERZ - Environmental Rural
- FZ - Farming
- GRZ - General Residential
- GWAZ - Green Wedge A
- GWZ - Green Wedge
- IN1Z - Industrial 1
- IN2Z - Industrial 2
- IN3Z - Industrial 3
- LDRZ - Low Density Residential
- MUZ - Mixed Use
- NRZ - Neighbourhood Residential
- PCRZ - Public Conservation & Resource
- PDZ - Priority Development
- PPRZ - Public Park & Recreation
- PUZ1 - Public Use - Service & Utility
- PUZ2 - Public Use - Education
- PUZ3 - Public Use - Health Community
- PUZ4 - Public Use - Transport
- PUZ5 - Public Use - Cemetery/Crematorium
- PUZ6 - Public Use - Local Government
- PUZ7 - Public Use - Other Public Use
- PZ - Port
- R1Z - General Residential
- R2Z - General Residential
- R3Z - General Residential
- RAZ - Rural Activity
- RCZ - Rural Conservation
- RDZ1 - Road - Category 1
- RDZ2 - Road - Category 2
- RGZ - Residential Growth
- RLZ - Rural Living
- RUZ - Rural
- SUZ - Special Use
- TZ - Township
- UFZ - Urban Floodway
- UGZ - Urban Growth
- Urban Growth Boundary

Railway Tram River, stream Lake, waterbody

Planning Overlays

EROSION MANAGEMENT OVERLAY (EMO)

EROSION MANAGEMENT OVERLAY - SCHEDULE 1 (EMO1)



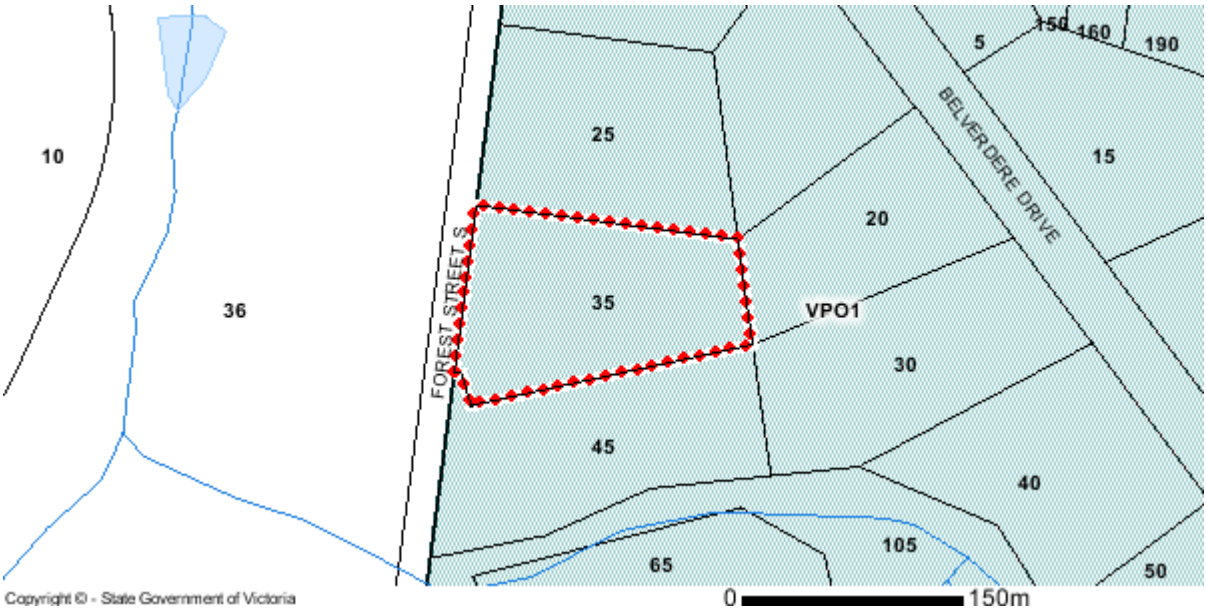
SIGNIFICANT LANDSCAPE OVERLAY (SLO)

SIGNIFICANT LANDSCAPE OVERLAY - SCHEDULE 1 (SLO1)

Planning Overlays

VEGETATION PROTECTION OVERLAY (VPO)

VEGETATION PROTECTION OVERLAY - SCHEDULE 1 (VPO1)

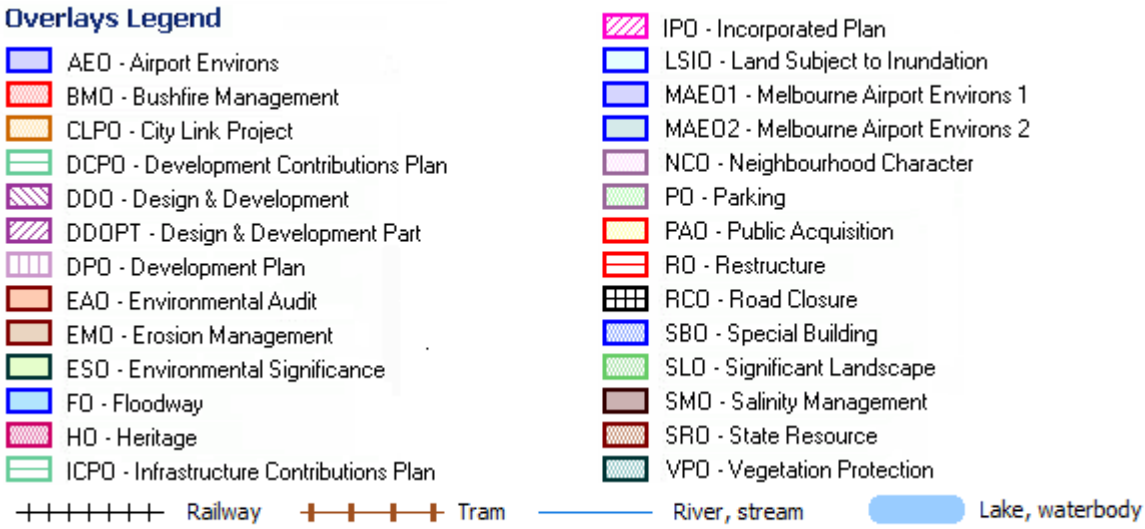


OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

DESIGN AND DEVELOPMENT OVERLAY (DDO)

Planning Overlays Legend



Note: due to overlaps some colours on the maps may not match those in the legend.

Further Planning Information

Planning scheme data last updated on 4 September 2019.

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

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the *Planning and Environment Act 1987.*
It does not include information about exhibited planning scheme amendments, or zonings that may abut the land.
To obtain a Planning Certificate go to Titles and Property Certificates

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

To view planning zones, overlay and heritage information in an interactive format visit Planning Maps Online

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

PLAN OF PROPOSED SUBDIVISION
PART OF CROWN ALLOTMENT 51
PARISH OF ELLIMINYT
COUNTY OF POLWARTH
RE: A. & G.E. LAMANNA & M. & L.J. NEWCOMBE
SCALE 1:1000 (Original Sheet Size A3)

ROD BRIGHT & ASSOCIATES PTY LTD
LICENSED SURVEYORS & TOWN PLANNERS
26 MURRAY STREET COLAC 3250
TEL 5231 4883 ACN 007 206 975

NOTE:
Certain dimensions shown hereon are subject to survey.
Certain areas shown hereon are subject to survey.
Land contained within C/T Vol. 10625 Fol. 001
E-1 denotes Drainage Easement in favour of Shire of Colac
E-2 denotes Drainage Easement in favour of Colac Otway Shire Council
It is anticipated that drainage for the new Lot 3 (where it exists) is to be directed along the 16 metre access to a legal point of discharge on Forest Street.
(See Plan of Subdivision PS441080P for full easement descriptions)

denotes Proposed Building Envelope
denotes Proposed Effluent Envelope
denotes Proposed Driveway Envelope

Existing Conditions Diagram

N
AMG ZONE 54

REF. 19-27

Version 2
Amended 9th October 2019.

PLAN OF PROPOSED SUBDIVISION
PART OF CROWN ALLOTMENT 51
PARISH OF ELLIMINYT
COUNTY OF POLWARTH
RE: A. & G.E. LAMANNA & M. & L.J. NEWCOMBE
SCALE 1:1000 (Original Sheet Size A3)

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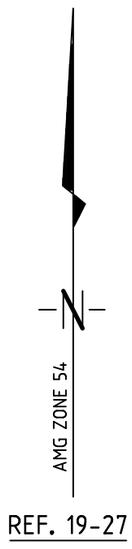
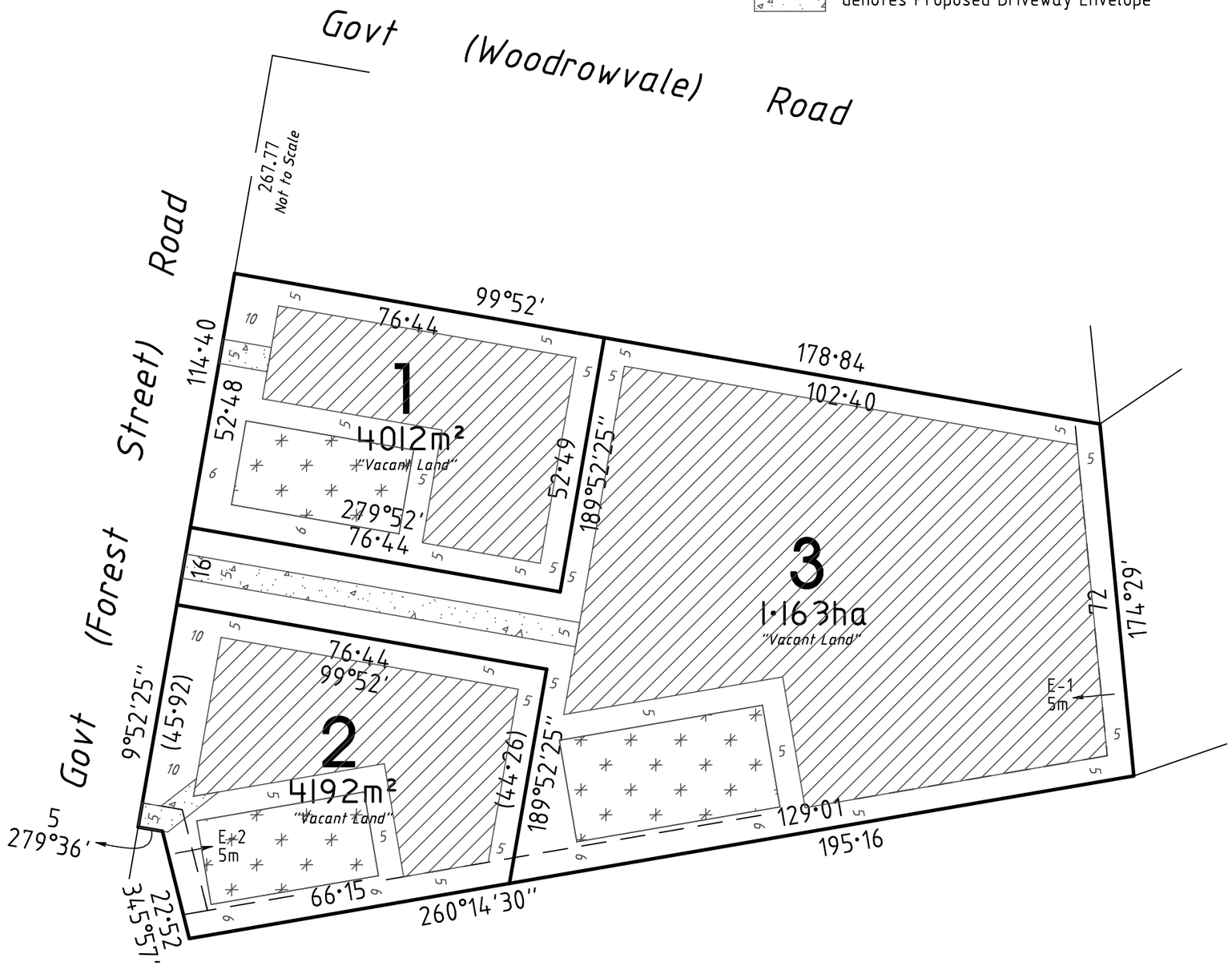


REF. 19-27



Version 2
Amended 9th October 2019.

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

VOLUME 10625 FOLIO 001

Security no : 124079119821X
Produced 03/09/2019 11:39 AM

LAND DESCRIPTION

Lot 1 on Plan of Subdivision 441080P.
PARENT TITLES :
Volume 10218 Folio 987 to Volume 10218 Folio 988
Created by instrument PS441080P 27/12/2001

REGISTERED PROPRIETOR

Estate Fee Simple
TENANTS IN COMMON
As to 1 of a total of 2 equal undivided shares
Joint Proprietors
LORNA JEAN NEWCOMBE
MURRAY NEWCOMBE both of 223 AIREYS STREET ELLIMINYT VIC 3250
As to 1 of a total of 2 equal undivided shares
Joint Proprietors
ADAM LAMANNA
GEMMA ELIZABETH LAMANNA both of 35 FOREST STREET SOUTH ELLIMINYT VIC 3250
AS176490R 17/05/2019

ENCUMBRANCES, CAVEATS AND NOTICES

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

DIAGRAM LOCATION

SEE PS441080P FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NUMBER		STATUS	DATE
AS176489A (E)	DISCHARGE OF MORTGAGE	Registered	17/05/2019
AS176490R (E)	TRANSFER	Registered	17/05/2019

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

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

Street Address: 35 FOREST STREET SOUTH ELLIMINYT VIC 3250

DOCUMENT END

Site Description & Design Response

Proposed 3 Lot Subdivision

35 Forest Street South, Elliminyt

A. & G.E. Lamanna & M. & L.J. Newcombe

September 2019

Rod Bright & Associates Pty Ltd
Licensed Land Surveyors and Planners
26 Murray St Colac 3250
Ph (03) 5231 4883
www.rodbrightlds.com.au

Table of Contents

1.0 Subdivision site and context description

The following information is provided in accordance with clause 56.01-1 Colac Otway Planning Scheme – Neighbourhood site and context description.

1.1 Title particulars and location

Address: 35 Forest Street South, Elliminyt.

Comprising allotment: Lot 1 on PS441080P - Vol. 10625 Fol. 001.

The land comprises an area of 1.983ha.

There are existing drainage easements on title.

The land fronts Forest Street South, Elliminyt.

Figure 1: Site context plan. Image source: (https://mapshare.vic.gov.au/vicplan/)

1.2 Land use

The land is currently vacant cleared grazing land with a native gum plantation on the western most boundary fronting Forest Street.

1.3 Physical landform

The allotment comprises of open pasture. The site is located in an elevated area of Elliminyt and slopes towards the west.

There are no identifiable contaminated soils on the site.

There are views over the surrounding farmland available from the site.

Refer to the attached plans for dimensions and relevant site information.

1.4 Surrounding land use

Surrounding land is used for low density residential and farming, with lots sizes varying from approximately 5000m^2 to approximately 67ha.

The land is located approximately 5km from Colac CBD, 3km from the nearest primary school (Elliminyt Primary School), 2.9km to the nearest secondary school (Colac Secondary College, Library & Bluewater Fitness Centre) and 3km from the nearest shop (Hearn Street Milk Bar).

1.5 Services

Power, telecommunications and reticulated water are available to the site.

Reticulated sewer and gas are not available.

Refer to attached servicing information in Section 3.

1.6 Colac Otway Planning Scheme

1.6.1 Zone

The land is zoned Low Density Residential (LDRZ).

The zone's purposes are:

- To implement the Municipal Planning Strategy and the Planning Policy Framework.
  To provide for low-density residential development on lots which, in the absence of reticulated sewerage, can treat and retain all wastewater.

A permit is required to subdivide land.

Each lot must be at least the area specified for the land in a schedule to this zone. Any area specified must be at least:

- 0.4 hectare for each lot where reticulated sewerage is not connected. If no area is specified each lot must be at least 0.4 hectare.

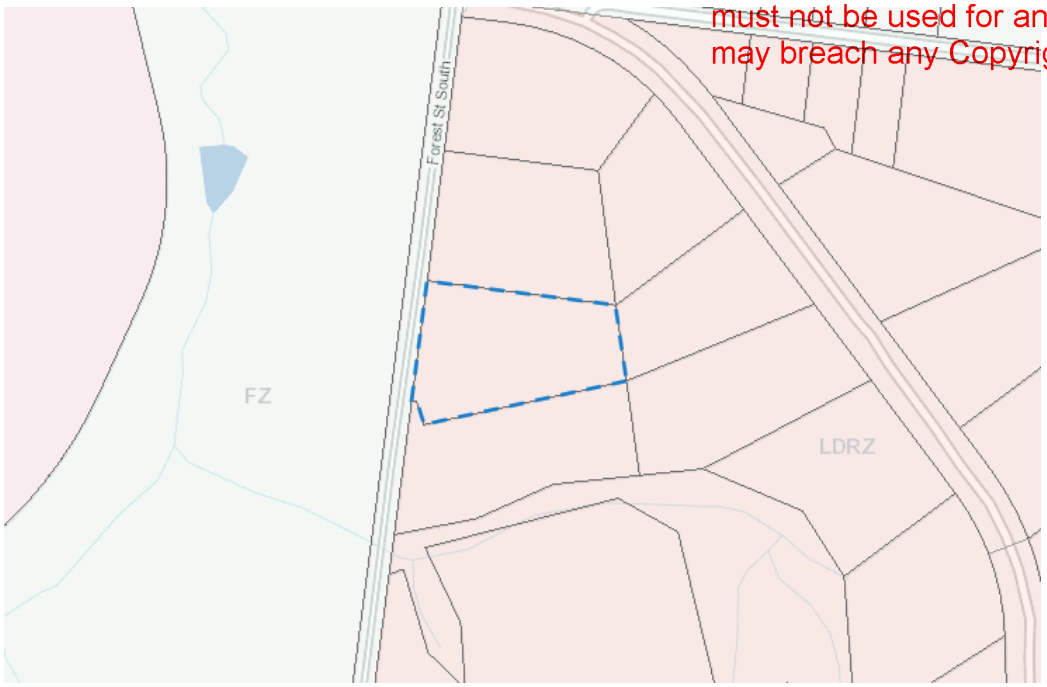


Figure 2: Planning Zone. (https://mapshare.vic.gov.au/vicplan/)

1.6.2 Overlays

Erosion Management Overlay (EMO1)

The overlay has the intention to protect areas prone to landslip or other soil degradation processes, by minimising land disturbance and inappropriate development. The overlay requires a permit for subdivision and Schedule 1 to the EMO requires the application to be accompanied by a Land Stability Assessment prepared by a professionally qualified consultant. Our client has engaged the services of 2020 Engineering Solutions. A copy of the Land Capability Assessment accompanies this application.

Significant Landscape Overlay (SLO1)

The purpose of this overlay is to implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.

- To identify significant landscapes.
- To conserve and enhance the character of significant landscapes.

A landscaping plan should be submitted with an application for buildings and works, or to remove, destroy or lop vegetation, utilizing appropriate species and demonstrating how the affected area will be remediated after development.

As there is no development or works planned as part of this subdivision, this proposal in no way affects this overlay.

Vegetation Protection Overlay (VPO1)

The site is affected by the Vegetation Protection Overlay (VPO1).

The purpose of this overlay is to implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.

- To protect areas of significant vegetation.
- To ensure that development minimises loss of vegetation.
- To preserve existing trees and other vegetation.
- To recognise vegetation protection areas as locations of special significance, natural beauty, interest and importance.
- To maintain and enhance habitat and habitat corridors for indigenous fauna.
- To encourage the regeneration of native vegetation.

A permit is required to remove, destroy or lop any vegetation specified in the schedule. As this application does not seek consent to remove, destroy or lop vegetation, a permit is not required under the provisions.

1.6.3 Planning Policy Framework

Relevant planning scheme policies are listed below and are referred to later within this document:

Clauses	
11	SETTLEMENT
11.01-1R	Settlement – Geelong G21
11.02	Managing Growth
11.02-1S	Supply of Urban Land
11.02-2S	Structure Planning
15	BUILT ENVIRONMENT AND HERITAGE
15.01	Built Environment
15.01-1S	Urban Design
15.01-3S	Subdivision Design
15.01-4S	Healthy Neighbourhoods
15.01-5S	Neighbourhood Character
15.03-2S	Aboriginal Cultural Heritage
19	INFRASTRUCTURE
19.03	Development Infrastructure
19.03-03S	Integrated Water Management
19.03-04S	Telecommunications
19.03-2S	Infrastructure Design and Provision
19.03-5S	Waste and Resource Recovery
20	LOCAL PLANNING POLICY FRAMEWORK
21	MUNICIPAL STRATEGIC STATEMENT

21.01	Municipal Profile
21.02	Vision
21.03	Settlement
21.03-2	Colac

2.0 Residential Subdivision - Design Response (56.01-2)

2.1 Subdivision Design

The subdivision proposes the creation of 3 new allotments, Proposed Lot 2 having existing access from Forest Street, Proposed Lots 1 & 3 do not currently have existing access.

Lot 1 will comprise of cleared grazing land on approximately 4047m^2. Lot 2 will comprise of cleared grazing land on approximately 4262m^2. Lot 3 will comprise of approximately 1.152ha and is also cleared grazing land.

2.2 Design Response

The design response responds to the site and context description by way of the following:

- The proposed 3 lot subdivision with allotment sizes of approximately 4047m^2 (Lot 1) 4262m^2 (Lot 2) and 1.152ha (Lot 3) is an appropriate response to the surrounding pattern of development which comprises of a mix of medium and low-density development.
- The lot sizes will enable suitable area for compliance with the Residential Subdivision (clause 56) objectives of the planning scheme.
- There is no significant vegetation or site features within the allotments which require protection and consideration as part of the subdivision.
- There is an existing cross-over for the proposed Lot 2.
- There are no specific site and context features for the area identified in a local planning policy or a Neighbourhood Character Overlay.

All lots are designed to cater for traditional residential development with single dwellings on each allotment and adequate private open space and solar access.

Compliance with the relevant objectives of Clause 56 is demonstrated below.

An application to subdivide land, other than an application to subdivide land into lots each containing an existing dwelling or car parking space, must meet the requirements of Clause 56 and:

- Must meet all of the objectives included in the clauses specified in the following table.
- Should meet all of the standards included in the clauses specified in the following table.

Class of subdivision	Objectives and standards to be met
60 or more lots	All except Clause 56.03-5.
16 – 59 lots	All except Clauses 56.03-1 to 56.03-3, 56.03-5, 56.06-1 and 56.06-3.
3 – 15 lots	All except Clauses 56.02-1, 56.03-1 to 56.03-4, 56.05-2, 56.06-1, 56.06-3 and 56.06-6.
2 lots	Clauses 56.03-5, 56.04-2, 56.04-3, 56.04-5, 56.06-8 to 56.09-2.

56.03 LIVABLE AND SUSTAINABLE COMMUNITIES

56.03-4 Built Environment Objective

To create urban places with identity and character

Standard C5

The built environment should:

Implement any relevant urban design strategy, plan or policy for the area set out in this scheme.

Provide living and working environments that are functional, safe and attractive.

Provide an integrated layout, built form and urban landscape,

Contribute to a sense of place and cultural identity.

An application should describe the identity and character to be achieved and the elements that contribute to that identity and character.

Response:

The proposed subdivision is consistent with the above objective by:

There is no urban design strategy, plan or policy for this area.

The identity and character of the area will evolve through the construction of new dwellings with ample space for the planting of canopy trees and gardens.

56.03-5 Neighbourhood Character:

56.03-5 Neighbourhood Character Objective

To design subdivisions that respond to neighbourhood character

Standard C6

Subdivision should:

- Respect the existing neighbourhood character or achieve a preferred neighbourhood character consistent with any relevant neighbourhood character objective, policy or statement set out in this scheme.

- Respond to and integrate with the surrounding urban environment.
- Protect significant vegetation and site features.

Response:

The proposed subdivision is consistent with the above objective by:

A preferred neighbourhood character is not identified for this area of Elliminyt. An absence of formal kerb & channel or footpath on Forest Street, along with the use of the adjoining land for grazing or pasture creates a rural aesthetic. Houses within Forest Street are single modern dwellings, recently constructed.

Neighbourhood character in the area is developing and will evolve in response to this new development.

56.04 LOT DESIGN

56.04-1 Lot diversity and Distribution objectives:

To achieve housing densities that support compact and walkable neighbourhoods and the efficient provision of public transport services.

To provide higher housing densities within walking distance of activity centres.

To achieve increased housing densities in designated growth areas.

To provide a range of lot sizes to suit a variety of dwelling and household types.

Standard C7:

A subdivision should implement any relevant housing strategy, plan or policy for the area set out in this scheme.

Lot sizes and mix should achieve the average net residential density specified in any zone or overlay that applies to the land or in any relevant policy for the area set out in this scheme.

A range and mix of lot sizes should be provided including lots suitable for the development of: single dwellings, two dwellings or more, higher density housing, residential buildings and retirement villages.

Unless the site is constrained by topography or other site conditions, lot distribution should provide for 95% of dwellings to be located no more than 400m street walking distance from the nearest existing or proposed bus stop, 600m street walking distance from the nearest existing or proposed tram stop and 800 metres street walking distance from the nearest existing or proposed railway station.

Lots of 300 square metres or less in area, lots suitable for the development of 2 dwellings or more, lots suitable for higher density housing and lots suitable for residential buildings and retirement villages should be located in and within 400 metres street walking distance of an activity centre.

Response:

The proposed subdivision is consistent with the above objective by:

The site is approximately 5km from Colac's CBD.

The lots are designed for traditional single dwellings, catering for current demand for sizable dwellings on larger allotments.

56.04-2 Lot area and building envelopes objective

To provide lots with dimensions and areas that enable the appropriate siting and construction of a dwelling, solar access, private open space, vehicle access and parking, water management, easement and the retention of significant vegetation and site features.

Standard C8

Lots greater than 500m^2 should be able to contain a rectangle measuring 10m by 15m and may contain a building envelope.

A building envelope may specify or incorporate any relevant siting and design requirement. Any requirement should meet the relevant standards of Clause 54, unless:

- The objectives of the relevant standard are met, and
- The building envelope is shown as a restriction on a PS registered under the Subdivision Act 1988 or is specified as a covenant in an agreement under Section 173 of the Act.

Where a lot with a building envelope adjoins a lot that is not on the same plan of subdivision or is not subject to the same agreement relating to the relevant building envelope:

- The building envelope must meet Standards A10 and A11 of Clause 54 in relation to the adjoining lot, and
- The building envelope must not regulate siting matters covered by Standards A12 to A15 (inclusive) of Clause 54 in relation to the adjoining lot. This should be specified in the relevant PS or agreement.

Lot dimensions and building envelopes should protect:

- Solar access for future dwellings and supports the siting and design of dwellings that achieve the energy rating requirement of the building regulations.
- Existing and proposed easement on lots.
- Significant vegetation and site features.

Response:

The proposed subdivision is consistent with the above objective by:

- All proposed lots are capable of containing a building envelope exceeding 10m by 15m.
- Building envelopes have not been designated on the lots to enable flexibility in dwelling design and placement.

56.04-3 Solar orientation of lots objective

To provide good solar orientation of lots and solar access for future dwellings.

Standard C9

Unless the site is constrained by topography or other site conditions, at least 70 percent of lots should have appropriate solar orientation.

Lots have appropriate solar orientation when:

- The long axis of lots are within the range north 20 degrees west to north 30 degrees east, or east 20 degrees north to east 30 degrees south.
- Dimensions of lots are adequate to protect solar access to the lot, taking into account likely dwelling size and the relationship of each lot to the street.

Response:

The proposed subdivision is consistent with the above objective by:

- Lots will retain solar access due to their size and absence of large-scale development.

56.04-4 Street orientation objective

To provide a lot layout that contributes to community social interaction, personal safety and property security.

Standard C10

Subdivision should increase viability and surveillance by:

- Ensuring lots front all roads and streets and avoid the side or rear of lots being oriented to connector streets and arterial roads.
- Providing lots of 300m2 or less in area and lots for 2 or more dwellings around activity centres and public open space.
- Ensuring streets and houses look onto public open space and avoiding sides and rears of lots along public open space boundaries.
- Providing roads and streets along public open space boundaries.

Response:

All lots facilitate observation of Forest Street.

There are no adjoining areas of open space.

56.04-5 Common area objectives

To identify common areas and the purpose for which the area is commonly held.

To ensure the provision for common area is appropriate and that necessary management arrangements are in place.

To maintain direct public access throughout the neighbourhood street network.

Standard C11

An application to subdivide land that creates common land must be accompanied by a plan and a report identifying:

- The common area to be owned by the body corporate, including any streets and open space.
- The reasons why the area should be commonly held.
- Lots participating in the body corporate.
- The proposed management arrangements including maintenance standards for streets and open spaces to be commonly held.

Response:

Common areas are not proposed as part of this subdivision.

56.05 URBAN LANDSCAPE

56.05-1 Integrated urban landscape objective

To provide attractive and continuous landscaping in streets and public open spaces that contribute to the character and identity of new neighbourhoods and urban places or to existing or preferred neighbourhood character in existing urban areas.

To incorporate natural and cultural features in the design of streets and public open space where appropriate.

To protect and enhance native habitat and discourage the planting and spread of noxious weeds.

To provide for integrated water management systems and contribute to drinking water conservation.

Standards C12

An application for subdivision that creates streets or public open space should be accompanied by a landscape design……

Response:

As we are not creating any new streets or areas of public open space, a Landscape Plan is not required.

56.06 ACCESS & MOBILITY MANAGEMENT

56.06-2 Walking and cycling network objectives

To contribute to community health and wellbeing by encouraging walking and cycling as part of the daily lives of residents, employees and visitors.

To provide safe and direct movement through and between neighbourhoods by pedestrians and cyclists.

To reduce car use, greenhouse emissions and air pollution.

Standard C15

The walking and cycling network should be designed to:

- Implement any relevant regional and local walking and cycling strategy, plan or policy for the area set out in this scheme.
- Link to any existing pedestrian and cycling networks.
- Provide safe walkable distances to activity centres, community facilities, public transport stops and open spaces.
- Provide an interconnected and continuous network of safe, efficient and convenient footpaths, shared paths, cycle paths and cycle lanes based primarily on the network of arterial roads, neighbourhood streets and regional public open spaces,
- Provide direct cycling routes of regional journeys to major activity centre, community facilities, public transport and other regional activities and for regional recreational cycling.
- Ensure safe street and road crossings including the provision of traffic controls where required.
- Provide an appropriate level of priority or pedestrians and cyclists.
- Have natural surveillance along streets and from abutting dwellings and be designed for personal safety and security particularly at night.
- Be accessible to people with disabilities.

Response:

A walking and cycling network has not been established in this part of Elliminyt, which has no footpaths. It is outside the scope of this subdivision to alter the current arrangements.

56.06-4 Neighbourhood street network objectives

56.06-5 Walking and cycling network detail objectives

56.06-6 Public transport network detail objectives

56.06-7 Neighbourhood street network objective.

Standards C17-C20

Response:

The cross overs and driveways will be designed and constructed in accordance with Council requirements and Australian Standards.

There is no public transport for this area of Elliminyt.

56.06-8 Lot access objective

To provide for safe vehicle access between roads and lots

Standard C21

Vehicle access to lots abutting arterial roads should be provided from service roads, side or rear access lanes, access places or access streets where appropriate and in accordance with the access management requirements of the relevant road's authority.

Vehicle access to lots of 300 square metres or less in area and lots with a frontage of 7.5 metres or less should be provided via rear or side access lanes, places or streets.

The design and construction of a crossover should meet the requirements of the relevant road authority.

Response:

The design and construction of new cross overs for the lots created will be in accordance with the requirements of Colac Otway Shire as specified by planning permit as conditions.

56.07 INTEGRATED WATER MANAGEMENT

56.07-1 Drinking Water Supply Objective

To reduce the use of drinking water.

To provide an adequate, cost-effective supply of drinking water.

Standard C22

The supply of drinking water must be:

Designed and constructed in accordance with the requirements and to the satisfaction of the relevant water authority.

Provided to the boundary of all lots in the subdivision to the satisfaction for the relevant water authority.

Response:

The supply of drinking water will be provided to the boundary of all the lots in the development in accordance with the requirements of Barwon Water as specified by planning permit conditions.

56.07-2 Reused and recycled water objective

To provide for the substitution of drinking water for non-drinking purposes with reused and recycled water.

Standard C23

Reused and recycled water systems must be:

Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority, EPA and DHS.

Provided to the boundary of all lots in the subdivision where required by the relevant water authority.

Response:

Reused and recycled water systems will be provided and designed if required by Barwon Water as permit conditions.

56.07-3 Waste water management objective

To provide a waste water system that is adequate for the maintenance of public health and the management of effluent in an environmentally friendly manner.

Standard C24

Waste water systems must be:

Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority and the EPA.

Consistent with any relevant approved domestic waste water management plan.

Reticulated waste water systems must be provided to the boundary of all lots in the subdivision where required by the relevant water authority.

Response:

There is no reticulated waste water supply in this area of Elliminyt. The proposed allotments are large enough for all wastewater to be retained and treated on site as shown in the accompanying LCA.

56.07-4 Stormwater management objectives

To minimise damage to properties and inconvenience to residents from stormwater.

To ensure that the street operates adequately during major storm events and provides for public safety

To minimise increases in stormwater and protect the environmental values and physical characteristics of receiving waters from degradation by stormwater.

To encourage stormwater management that maximises the retention and reuse of stormwater.

To encourage stormwater management that contributes to cooling, local habitat improvements and provision of attractive and enjoyable spaces.

Standard C25

The stormwater management system must be designed and managed in accordance with the requirements and to the satisfaction of the relevant drainage authority……and in accordance with standards and specifications detailed under this clause.

Response:

Connection to the existing stormwater system will be provided to the new lots and in accordance with the requirements of the Colac Otway Shire Council.

Excess runoff will be directed into the appropriate legal point of discharge, as required by Colac Otway Shire Council, through planning permit conditions.

56.08 SITE MANAGEMENT

56.08 Site Management objectives

To protect drainage infrastructure and receiving waters from sedimentation and contamination.

To protect the site and surrounding area from environmental degradation ort nuisance prior to and during construction of subdivision works.

To encourage the re-use of materials from the site and recycled materials in the construction of subdivision where practicable….

Standard C26

A subdivision site must describe how the site will be managed prior to and during the construction period and may set out requirements from managing erosion and sediment, dust, run-off, litter concrete and other construction wastes, chemical contamination, vegetation and natural features planned for retention.

Response:

A site management plan (including erosion management) will be submitted to Colac Otway Shire prior to commencement of works.

56.09 UTILITIES

56.09-1 Shared Trenching Objective

To maximise the opportunities for shared trenching

To minimise constrains on landscaping within street reserves……

Standard C27

Reticulated services for water, gas, electricity and telecommunications should be provided in shared trenching to minimise construction costs and land allocation for underground services

Response:

Shared trenching will be utilised where possible during any construction.

56.09-2 Electricity, communications and gas objectives

To provide public utilities to each lot in a timely, efficient and cost-effective manner.

To reduce greenhouse gas emissions by supporting generation and use of electricity from renewable sources.

Standard C28

The electricity supply system must be designed in accordance with the requirements of the relevant electricity supply agency and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant electricity authority.

The telecommunications system must be designed in accordance with the requirements of the relevant telecommunications servicing agency…….and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant telecommunications servicing authority.

Where available, the reticulated gas supply system must be designed in accordance with the requirements of the relevant gas supply agency and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant gas supply agency.

Response:

Electricity and telecommunications will be supplied to the lots in accordance with relevant permit requirements of the relevant infrastructure providers.

56.09-3 Fire hydrants objective

To provide fire hydrants and fire plugs in positions that enable fire fighters to access water safely, effectively and efficiently.

Standard C29

Fire hydrants should be provided:

- A maximum distance of 120 metres from the rear of each lot.
- No more than 200 metres apart.

Hydrants and fire plugs must be compatible with the relevant fire service equipment. Where the provision of fire hydrants and fire plugs does not comply with the requirements of standard C29, fire hydrants must be provided to the satisfaction of the relevant fire authority.

Response:

Hydrants and fire plugs, if required, will be planned for and included as required to comply with this standard and the requirements of the CFA.

56.09-4 Public lighting objective

To provide public lighting to ensure the safety of pedestrians, cyclists and vehicles.

To provide pedestrians with a sense of personal safety at night.

To contribute to reducing greenhouse gas emissions and to saving energy.

Standard C30

Public lighting should be provided to streets, footpaths, public telephones, public transport stops and to major pedestrian and cycle paths including public open spaces that are likely to be well used at night to assist in providing safe passage for pedestrians, cyclists and vehicles.

Public lighting should be designed in accordance with the relevant Australian Standards.

Public lighting should be consistent with any strategy, policy or plan for the use of renewable energy and energy efficient fittings.

Response:

Not applicable as no new roads or common property is proposed as part of this subdivision.

2.3 General Policy and Decision Guidelines Assessment

The proposal is consistent with relevant planning scheme policies and strategies, the purpose and decision guidelines of the relevant zone and applicable overlays, as described below.

Planning Policy Framework

11) Settlement (11.01-1R, 11.02, 11.02-1S, 11.02-2S)

The subdivision of the site provides the following outcomes responding to the above planning policies and strategies:

- Enables sustainable growth at a location where utility, transport, commercial and social infrastructure and services are available.
- The subdivision builds on existing infrastructure, availability of services and the existing road network.

15) Built Environment & Heritage (15.01, 15.01-1S, 15.01-3S, 15.01-4S, 15.01-5S, 15.03-2S)

The subdivision of the site provides the following outcomes responding to the above planning policies and strategies:

- The subdivision responds to its surrounding landscape and character,
- The development considers the natural, cultural and strategic context of its location.

- The design of the subdivision provides lot sizes to suit a variety of dwelling and household types to meet the needs and aspirations of different groups of people.
- Provides an opportunity for increased residential density to help consolidate urban areas.

19) Infrastructure (19.03, 19.03-03S, 19.03-04S, 19.03-2S, 19.03-5S)

- The subdivision enables infill development in an existing low-density residential area, thus contributing to efficiencies in infrastructure and service provision.
- Public open space contributions will be provided in accordance with the contributions scheme if required.

20) Local Planning Policy Framework including MSS, municipal profile and vision (21.03-2 Colac Framework Plan)

The subdivision of the site provides the following outcomes responding to the above planning policies and strategies:

- The current MSS in relation to Elliminyt does not provide any relevant direction regarding residential infill development opportunities.

Clause 65.02 Colac Otway Planning Scheme
Subdivision Decision Guidelines

The design, development, subdivision and use of the site, as proposed, provide the following outcomes responding to the above decision guidelines, (if not referred to elsewhere in this document):

- The land is suitable for subdivision, with the development enabling infill development in an established area of Elliminyt.
- Engineering design will ensure that the stormwater drainage from the development will not detrimentally impact surrounding land or the existing stormwater system.
- The proposed subdivision pattern is consistent with traditional low-density residential development.
- The subdivision will not be staged. No common property areas are proposed.

3.0 Service asset locations

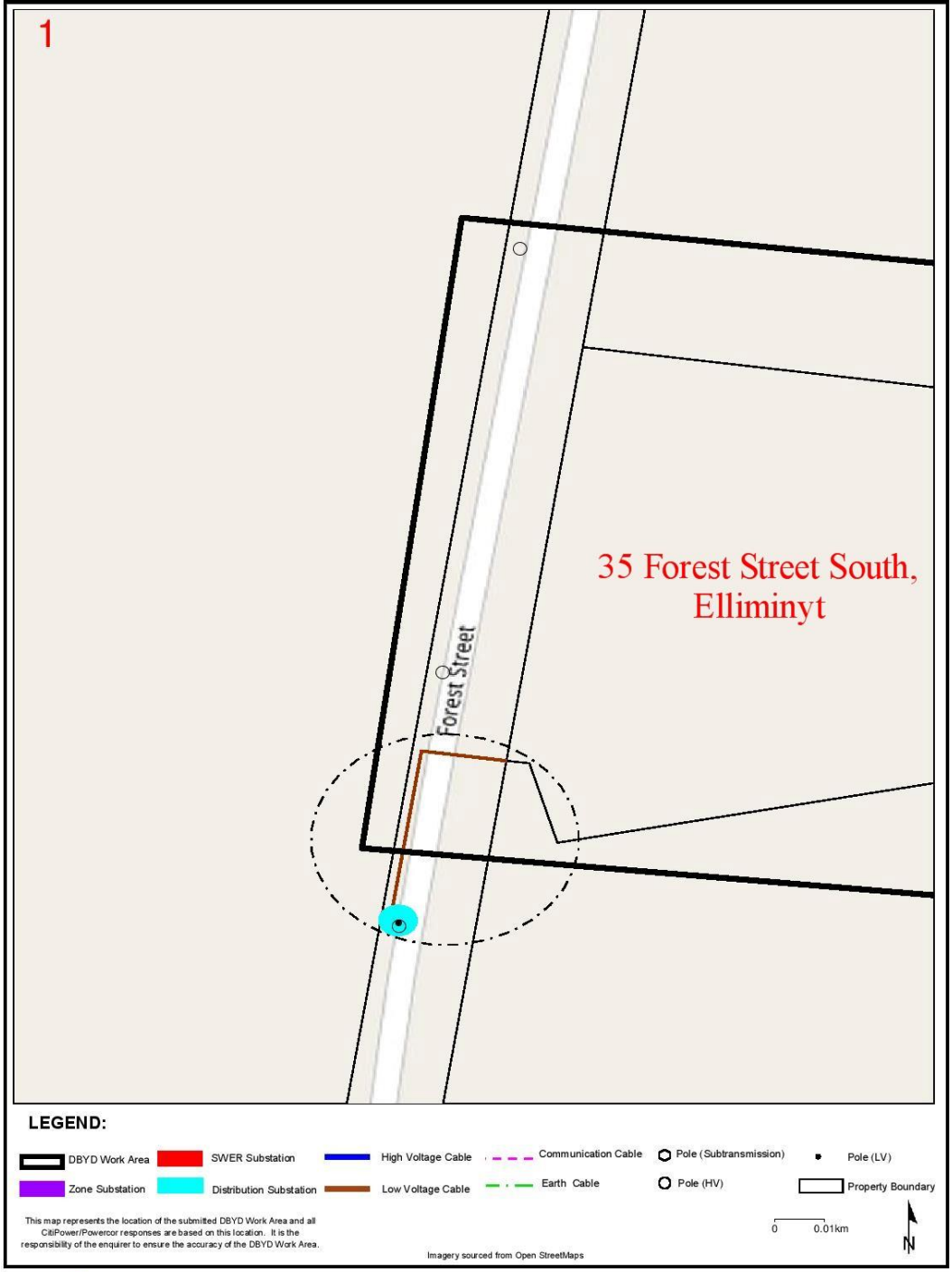
Date: 02/09/2019

CitiPower Powercor AUSTRALIA **Map 1**

Sequence No: 88554641

35 Forest street south Elliminyt

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



Powered by dbyd

4

Colac Otway SHIRE

Sequence No: 88554640
Job No: 18031313
Location: 35 Forest street south, Elliminyt, VIC 3250

DIAL BEFORE YOU DIG 1100.com.au The Essential First Step.

Legend | Scale: 1:1694

N

Stormwater Pit
Bore Hole
Stormwater Pipe
Minor Road
Local Road
Arterial Road
Property Boundary
Crown Land
Waterway
Landfill

Colac Otway Shire Council
2-6 Rae Street,
COLAC VIC 3250
Ph: 03 5232 9400
Fax: 03 5232 1046
Email: inq@colacotway.vic.gov.au
Web: www.colacotway.vic.gov.au

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Colac Otway Shire Council or PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

Incorporates Vicmap Data: http://creativecommons.org/licenses/by/4.0/

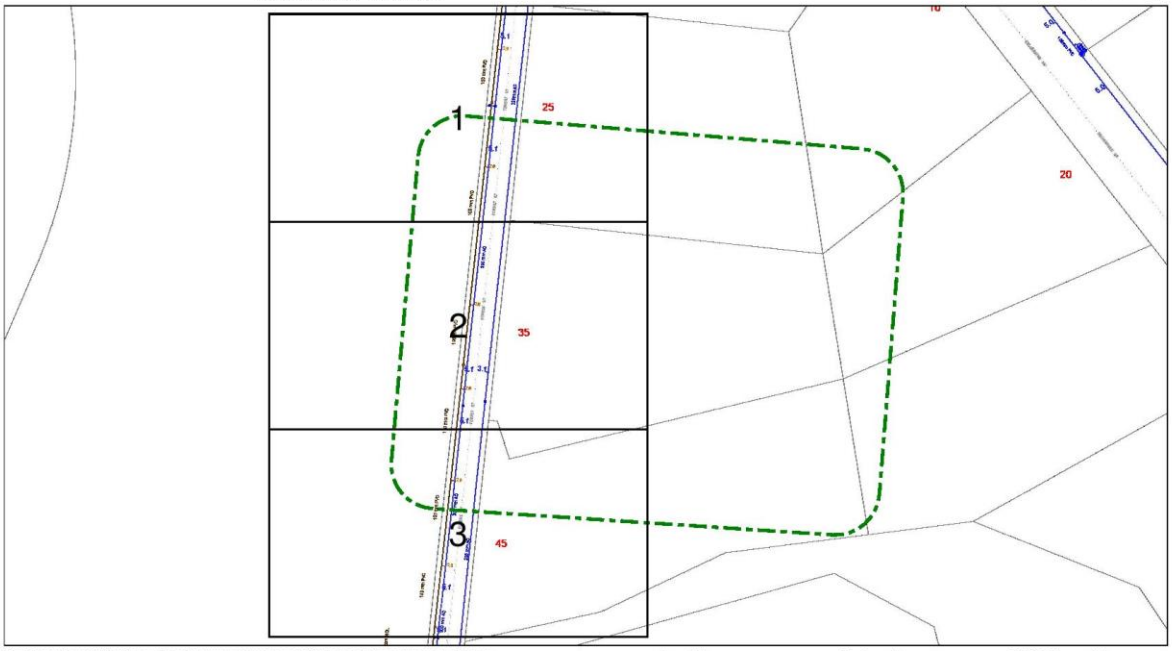
Plans generated 02/09/2019 by Pelicancorp TicketAccess Software | www.pelicancorp.com

AU.Colac Otway SC - Overview Plan.docx (29 Jun 2018)

BarwonWater

Sequence Number: 88554644 **Job Number: 18031313**
Location: 35 Forest street south, Elliminyt VIC 3250
Date Generated: 02/09/2019

DIAL BEFORE YOU DIG 1100.com.au The Essential First Step.



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PLANS MUST BE PRINTED IN COLOUR

N

Scale: 1:2306
Overview

Asset Types
Water
Recycled Water
Gravity Sewer
Pressure Sewer

Feature Types
Pipes
Decommissioned Pipe
Fitting / Manhole
2.0 Offset

OH&S Hazard Types
Cracked AC Pipe
Asbestos in Wrapping
Benzene Detected
LEL Detected
Contaminated Ground

Plans generated by PelicanCorp TicketDP Software www.pelicancorp.com

Barwon Water Plan v3.0.docx (01/11/2017)

4.0 Summary

The proposal for a low-density residential subdivision is a positive outcome for this area of Elliminyt, which is currently evolving to meet increased growth demand for differing lot sizes.

Overall, the proposal is consistent with relevant planning policies.

LAND CAPABILITY ASSESSMENT

Lot 1/35 Forest St. Sth. Elliminyt Victoria

2020Engineering Solutions Report ES19153
8/9/2019

Welcome to our new format LCA.

Section 1.

Contains relevant information is presented in a concise, logical, trail following from regional perspective to site specific characteristics. Sample water balance calculations are incorporated to inform the Land Application Area tables

Section 2.

Contains the balance of information required under the DWMP, MAV and EPA 891.4

Section 3.

Property Management Report.

Report synopsis

This Report is to Lot 3 of the proposed subdivision of the subject land. Lot 1 comprises a 0.4047Ha portion of the 1.9829Ha property.

As a result of the site, soil and surrounds investigation it is our opinion that the proposed allotment can support the development of up to a 3 bedroom dwelling.

REPORT CONTENTS

REPORT SUMMARY/EXECUTIVE SUMMARY

This Report is to a possible 3 bedroom dwelling on Lot 1 of a proposed subdivision of the subject land. Lot 1 comprises a total of 4047m2.

In the absence of more specific guidelines development will be limited such that no more than 15% of the allotment will be set aside for wastewater disposal. This equates to an area of 606m2.

As a result wastewater disposal should be via a secondary treatment plant coupled to 240m of ETA trenches covering not less than 300m2.

SECTION ONE

1.0 INTRODUCTION & BACKGROUND

Fig 1. Subject Land site location and surrounding land use (Planning Maps Online)

2.0 PLANNING REPORT

PLANNING PROPERTY REPORT

VICTORIA State Government | Environment, Land, Water and Planning

From www.planning.vic.gov.au on 16 July 2019 05:58 PM

PROPERTY DETAILS

Address:	35 FOREST STREET SOUTH ELLIMINYT 3250
Lot and Plan Number:	Lot 1 PS441080
Standard Parcel Identifier (SPI):	1\PS441080
Local Government Area (Council):	COLAC OTWAY www.colacotway.vic.gov.au
Council Property Number:	21827
Planning Scheme:	Colac Otway planning-schemes.delwp.vic.gov.au/schemes/colacotway
Directory Reference:	VicRoads 92 B7

UTILITIES

Rural Water Corporation:	Southern Rural Water
Urban Water Corporation:	Barwon Water
Melbourne Water:	outside drainage boundary
Power Distributor:	POWERCOR

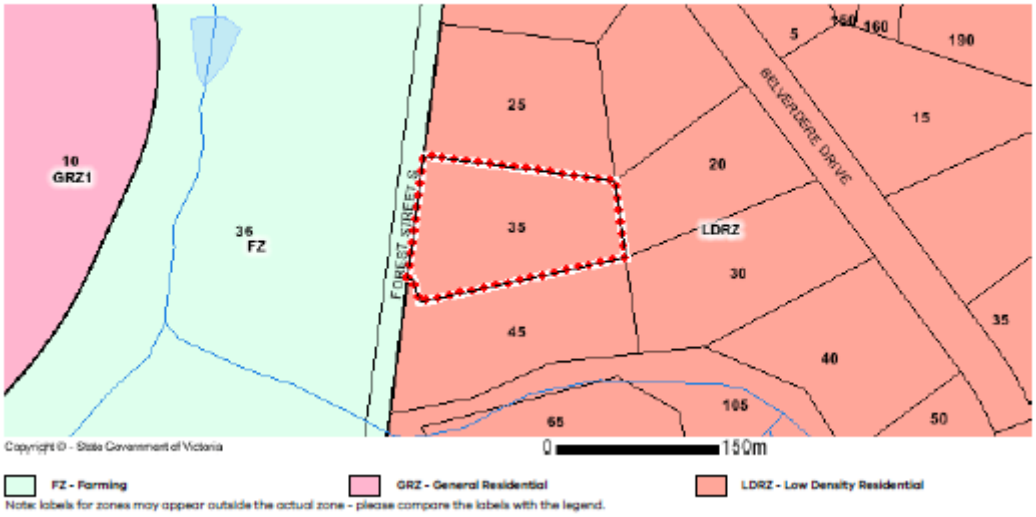
STATE ELECTORATES

Legislative Council:	WESTERN VICTORIA
Legislative Assembly:	POLWARTH

Planning Zones

LOW DENSITY RESIDENTIAL ZONE (LDRZ)

SCHEDULE TO THE LOW DENSITY RESIDENTIAL ZONE (LDRZ)



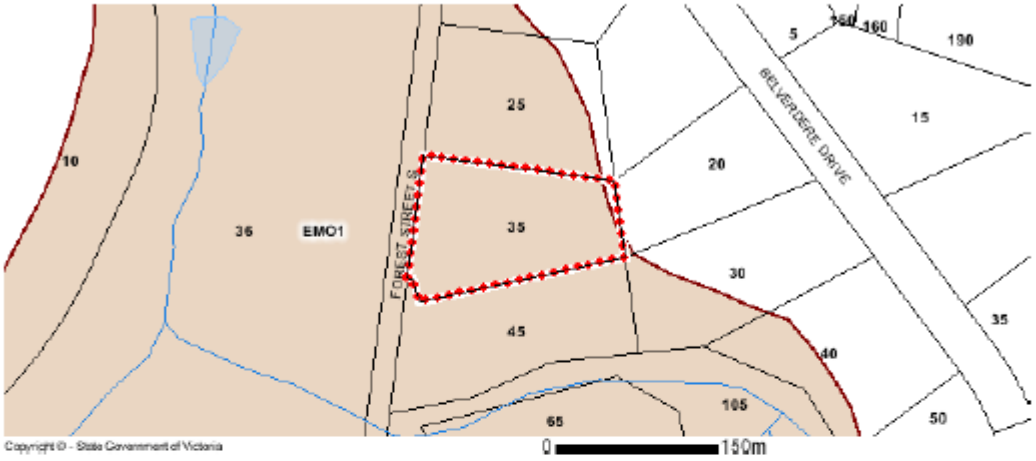
Subject land zoned Low Density Rural Living Zone

PLANNING PROPERTY REPORT

Planning Overlays

EROSION MANAGEMENT OVERLAY (EMO)

EROSION MANAGEMENT OVERLAY - SCHEDULE 1 (EMO1)

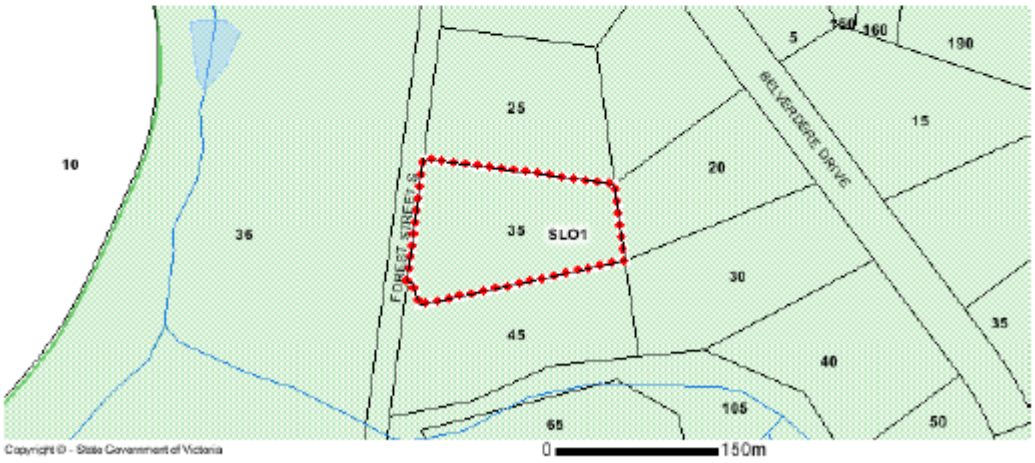


EMO - Erosion Management

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

SIGNIFICANT LANDSCAPE OVERLAY (SLO)

SIGNIFICANT LANDSCAPE OVERLAY - SCHEDULE 1 (SLO1)



SLO - Significant Landscape

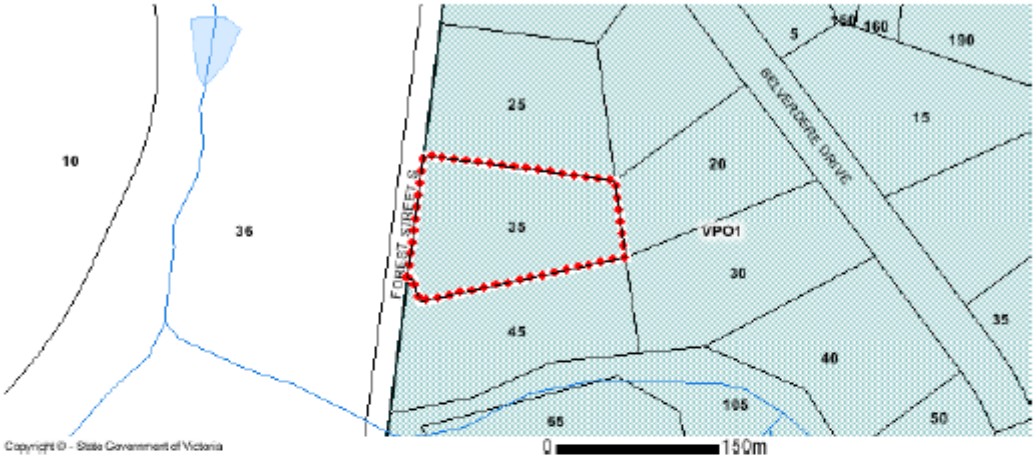
Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend.

PLANNING PROPERTY REPORT

Planning Overlays

VEGETATION PROTECTION OVERLAY (VPO)

VEGETATION PROTECTION OVERLAY - SCHEDULE 1 (VPO1)



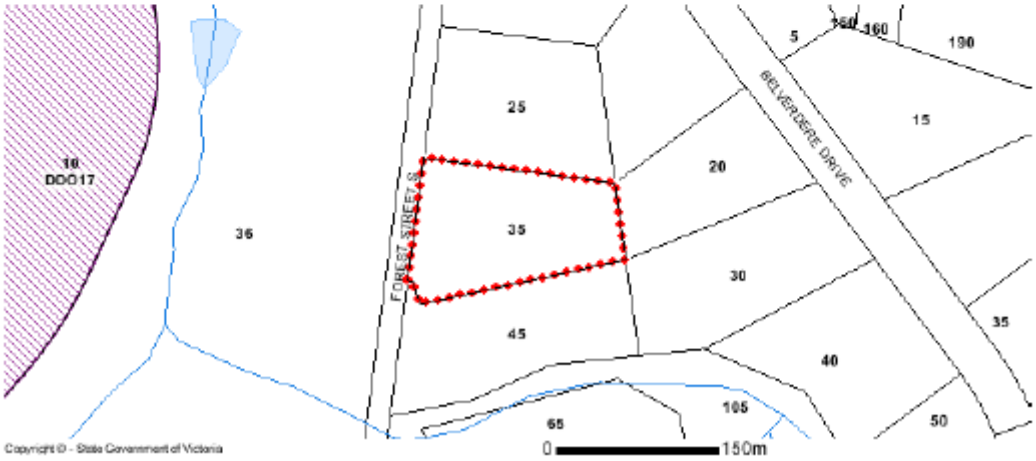
VPO - Vegetation Protection

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

OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

DESIGN AND DEVELOPMENT OVERLAY (DDO)



DDO - Design and Development

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

Overlays

EMO SLO VPO

3.0 DECLARED WATER CATCHMENT AREA

Site is not within DWCA (DWMP)

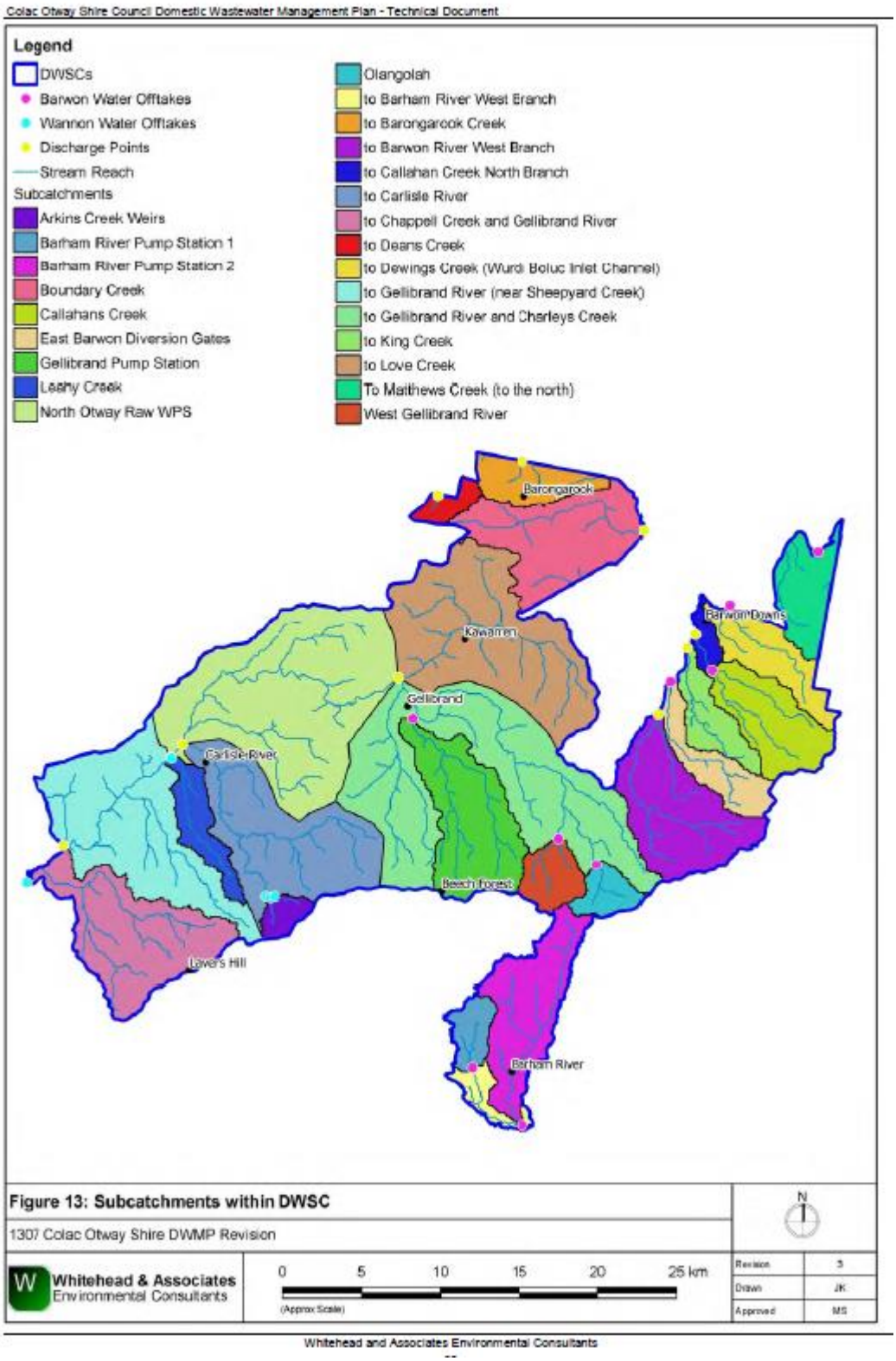


Fig 2. DWSC map (DWMP)

PROPOSAL

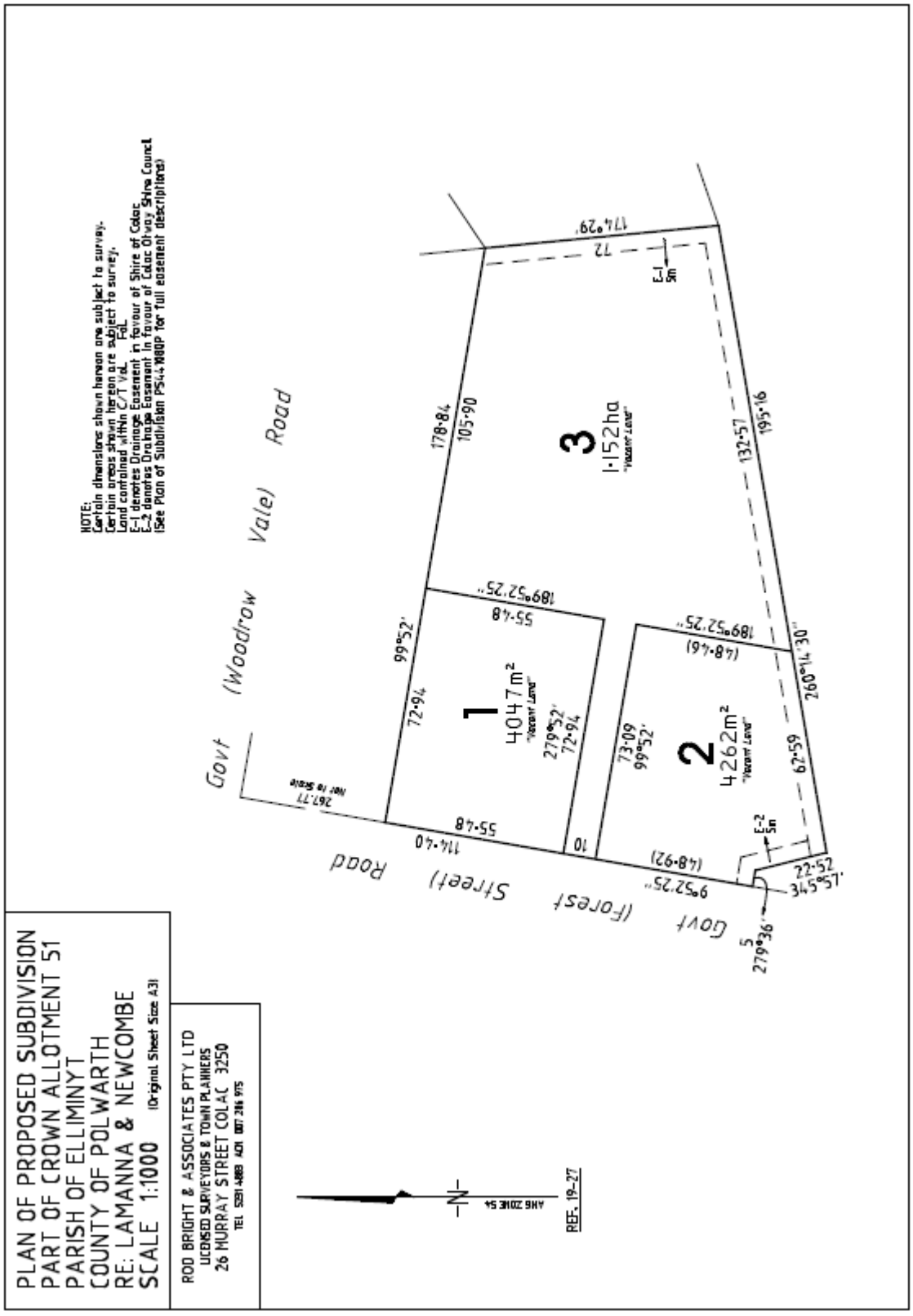


Fig 3. Proposed plan of subdivision (Rod Bright & Ass.)

4.0 TOPOGRAPHY (PLANNING MAPS ON LINE)

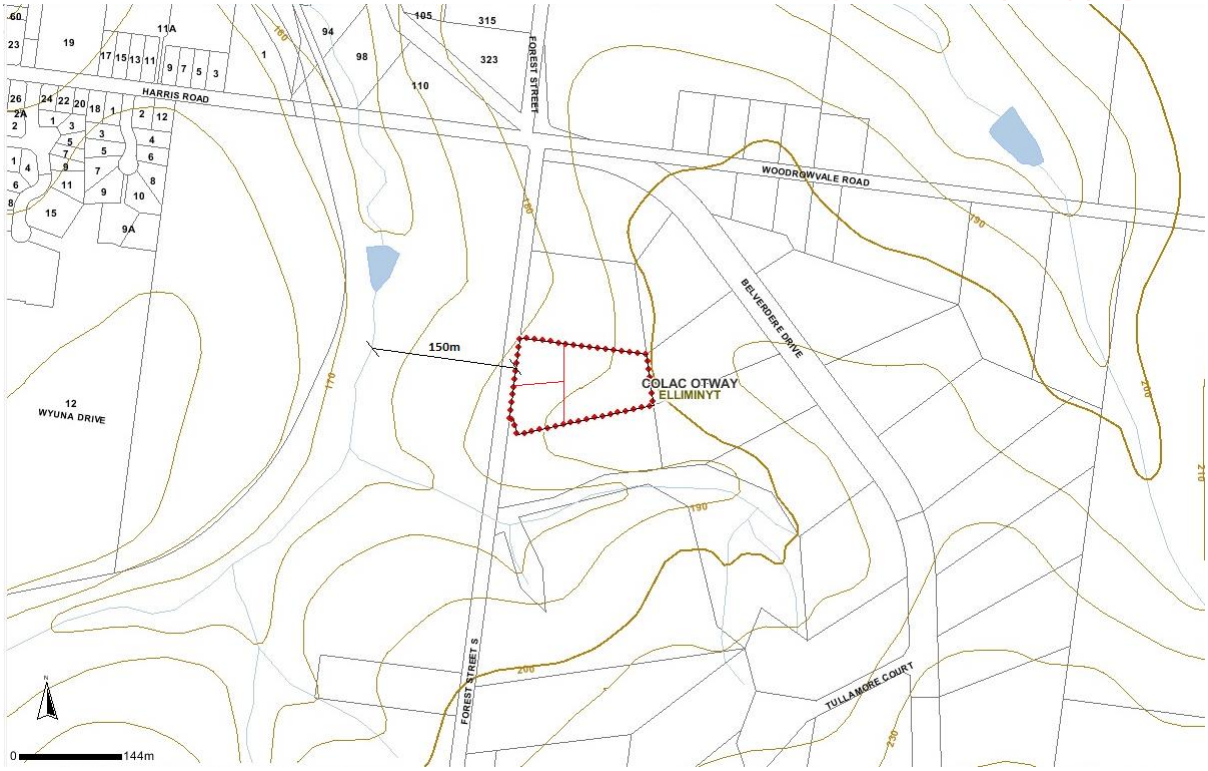


Fig 4 Topography and surface water/s. (Planning Maps On Line)

Comment

Generally the subject land comprises an elevated portion of a broad hillside and displays a western aspect with good solar and wind exposure.

The boundary of the property in the area of Lot 1 is about 150m from the nearest surface waters, however overland flow path would be much longer.

5.0 GROUNDWATER BORES (VVG)

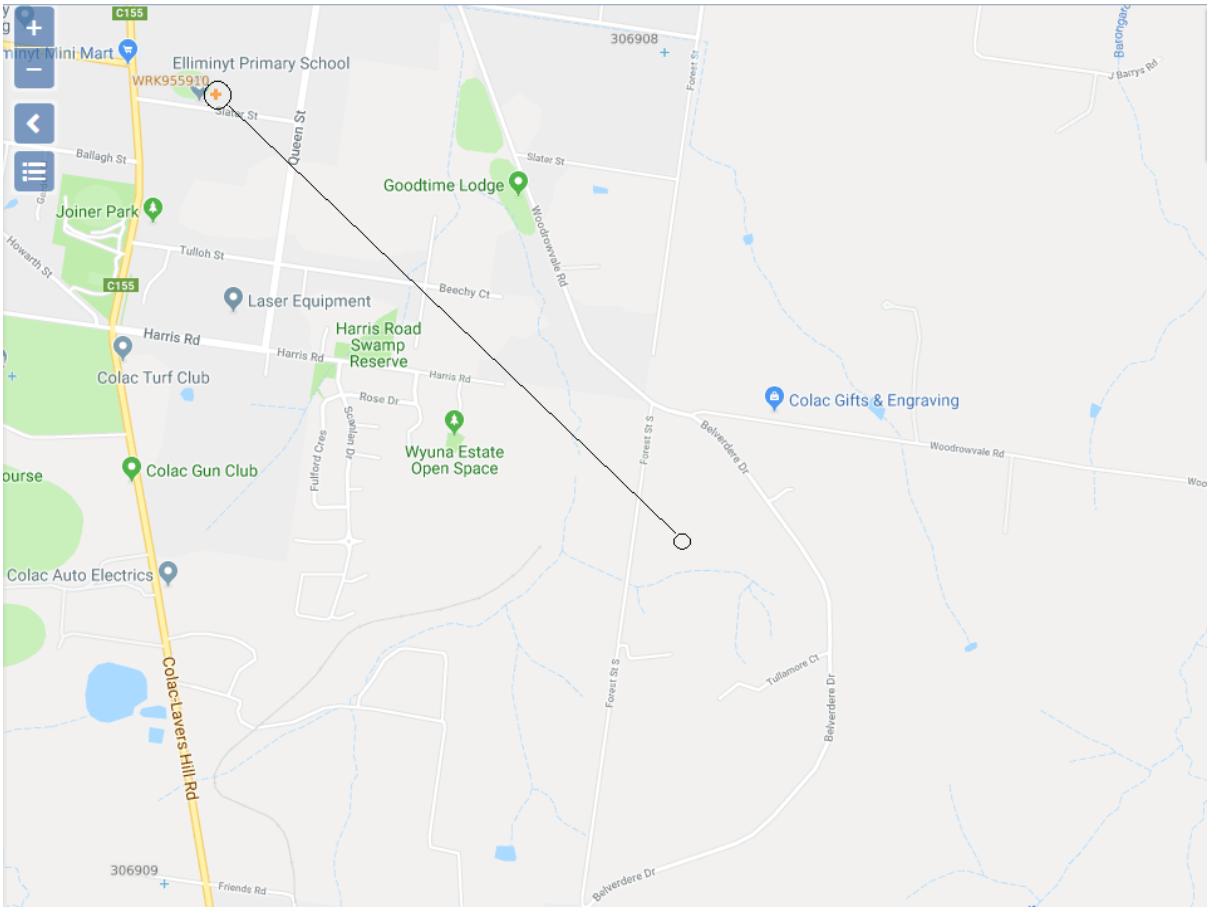


Fig 5. No bores near or within buffer zones of proposed LAA, closest 2.60klm to NW.

5.1 Groundwater(VVG)

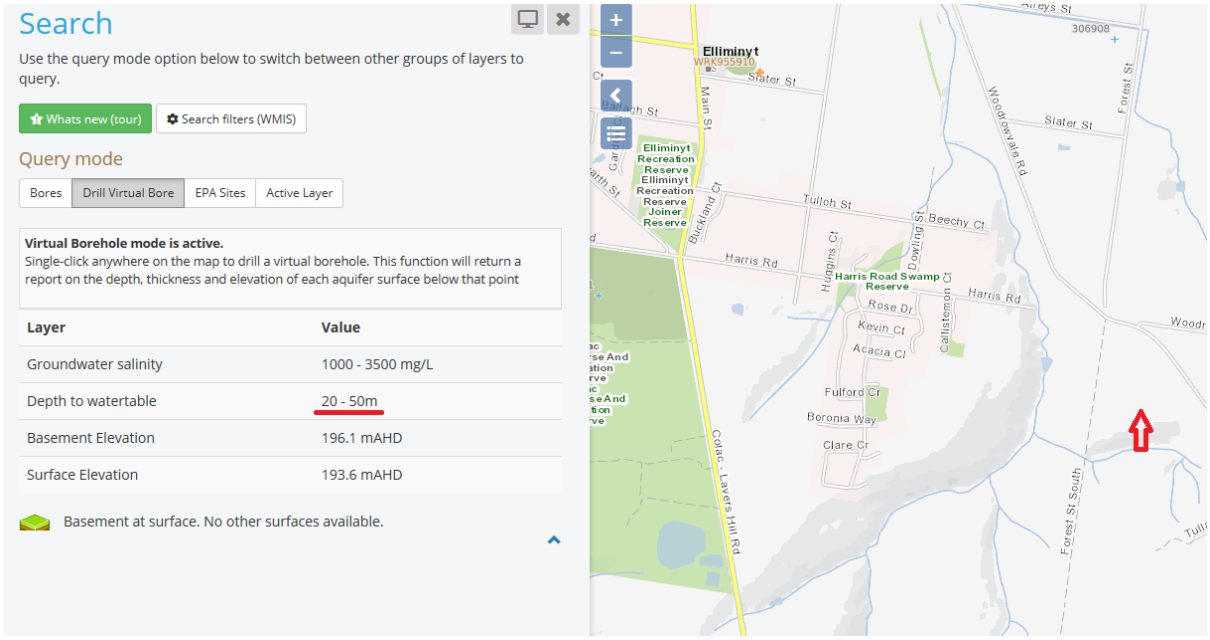


Fig 6 Subject land, tip red arrow, groundwater indicated at 20m-50m depth.

6.0 REGIONAL LAND USE

Fig 7.

Aerial image, subject land in red outline, indicates surrounding land use, principally grazing, with low density dwelling. (Planning Maps online)

Given the topography and low density residential zoning, off-site or cumulative impacts to adjoining property/s and or surface waters are not expected.

Currently the subject land is used for extensive grazing with minimal infrastructure aside from post and wire boundary fencing and plantation.

7.0 SITE INSPECTION & FIELD INVESTIGATIONS

Fig 8. View to NE, possible LAA Site features on proposed Lot 1. (Source; Author).

Surface comprises an open, flat, cleared area of grassland part of an extensive grazing operation.

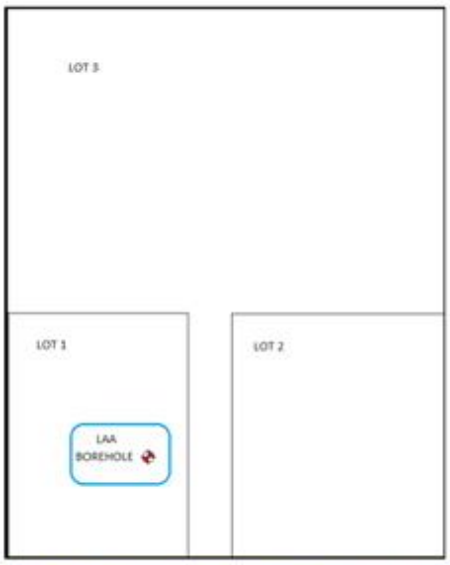
Site vegetation comprises grasses and weeds. No evidence of groundwater discharge or salinity was noted.

Proposed site displays moderate to good solar and wind exposure with some restrictions generated by the roadside plantation.

8.0 BORELOG

2020 ENGINEERING SOLUTIONS DATE 5 AUG 19
BORELOG REPORT ES19140 SITE; Lot 1 35 Forest St S.

Depth in mm				
000				Silty Sand 3b
550				Sandy Clay 5b
1800 END				



9.0 SOIL ANALYSIS

Nutrient Advantage®
Knowledge | Productivity | Responsibility

SOIL ANALYSIS REPORT

ASPAC

Report Number: 594140

2020 ENGINEERING SOLUTIONS L
DELAHUNTY
1745 COLAC FORREST RD
COLAC
VIC 3249

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Report Authorised
Paul Kennelly
Laboratory Manager
NATA Accredited Laboratory Number: 11958

Sample Number:	021908848	**Paddock Name:**	19140-1	**Date Sampled:**	1-Aug-2019
Test Code:	2014-022	**Sample Name:**	LOT 1	**Date Received:**	5-Aug-2019
Purchase Order No:	AS1289-1-2-1-1996	**Sample Depth:**	0 to 10 cm	**Date of Report:**	12-Aug-2019
Grower Name:	2020 ENGINEERING SOLUT				

Analyte	Result	Units	Method Code	Comments
Available Potassium ^	70	mg/kg	04-026-ICP8	Calculation
Emerson Class ^	2			Emerson, AS 1289.3.8.1
pH (1:5 CaCl2)	5.0		04-031-PH	1:5 soil/0.01M CaCl2
Potassium (Amm-acet.)	0.18	cmol(+)/kg	04-026-ICP8	
Calcium (Amm-acet.)	5.1	cmol(+)/kg	04-026-ICP8	
Magnesium (Amm-acet.)	1.6	cmol(+)/kg	04-026-ICP8	
Sodium (Amm-acet.)	0.28	cmol(+)/kg	04-026-ICP8	
Aluminium (KCl)	34	mg/kg	04-027-ICP9	
Aluminium (KCl)	0.37	cmol(+)/kg	04-027-ICP9	
Cation Exchange Capacity (Amm-acet.)	7.53	cmol(+)/kg	04-026-ICP8	Calculation
Sodium % of cations	3.7	%	04-026-ICP8	Calculation
Aluminium % of Cations	5.0	%	04-026-ICP8	Calculation
Calcium/Magnesium Ratio	3.2		04-026-ICP8	Calculation
pH (1:5 Water)	6.1		04-031-PH	1:5 soil/water
Electrical Conductivity (1:5 water)	0.05	dS/m	04-031-PH	1:5 soil/water

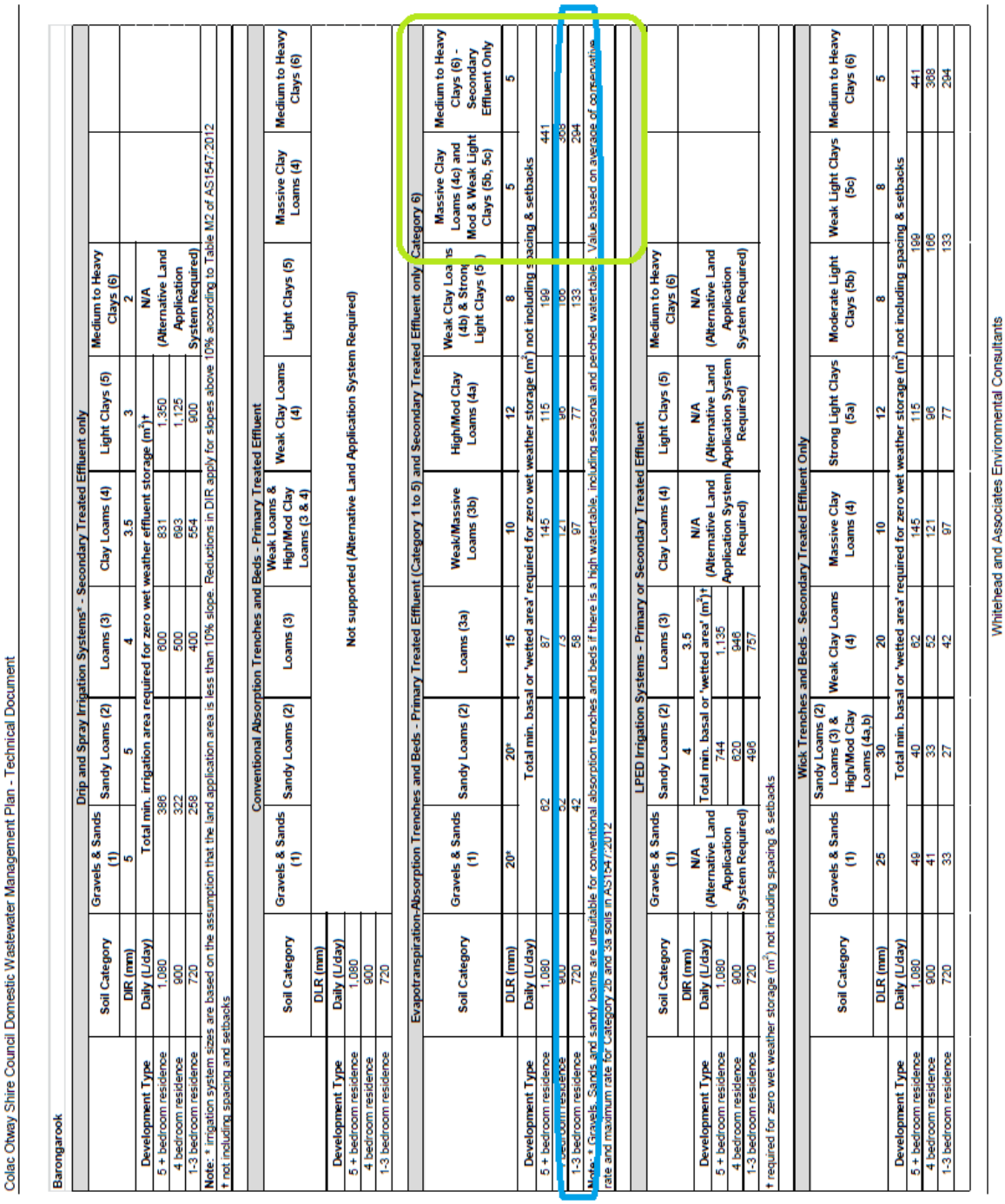
The results pertain only to the sample submitted.
This document shall not be reproduced except in full.
Analyses performed on soil dried at 40 °C and ground to 2mm or less.
^ NATA accreditation does not cover the performance of this service.
Accredited for compliance with ISO/IEC 17025 - Testing.
This results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national

Discussion

Results are typical for soils of this region and flag no concerns or constraints, individual results are discussed within MAV Tables in following sections.

10.0 SYSTEM SELECTION

10.1 DWMP Considerations



Colac Otway Shire Council Domestic Wastewater Management Plan - Technical Document

Barongarook

Drip and Spray Irrigation Systems* - Secondary Treated Effluent only

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)
	DIR (mm)	5	5	4	3.5	3	2
Development Type	Daily (L/day)	Total min. irrigation area required for zero wet weather effluent storage (m²)†					N/A
5 + bedroom residence	1,080	386	600	831	1,350	(Alternative Land Application System Required)	
4 bedroom residence	900	322	500	693	1,125		
1-3 bedroom residence	720	258	400	554	900		

Note: * Irrigation system sizes are based on the assumption that the land application area is less than 10% slope. Reductions in DIR apply for slopes above 10% according to Table M2 of AS1547:2012
† not including spacing and setbacks

Conventional Absorption Trenches and Beds - Primary Treated Effluent

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Weak Loams & High/Mod Clay Loams (3 & 4)	Weak Clay Loams (4)	Light Clays (5)	Massive Clay Loams (4)	Medium to Heavy Clays (6)
	DLR (mm)	20*	20*	15	10	12	8	5	5
Development Type	Daily (L/day)	Not supported (Alternative Land Application System Required)							
5 + bedroom residence	1,080								
4 bedroom residence	900								
1-3 bedroom residence	720								

Evapotranspiration-Absorption Trenches and Beds - Primary Treated Effluent (Category 1 to 5) and Secondary Treated Effluent only (Category 6)

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3a)	Weak/Massive Loams (3b)	High/Mod Clay Loams (4a)	Weak Clay Loams (4b) & Strong Light Clays (5)	Massive Clay Loams (4c) and Mod & Weak Light Clays (5b, 5c)	Medium to Heavy Clays (6) - Secondary Effluent Only
	DLR (mm)	20*	20*	15	10	12	8	5	5
Development Type	Daily (L/day)	Total min. basal or 'wetted area' required for zero wet weather storage (m²) not including spacing & setbacks							441
5 + bedroom residence	1,080	82		87	145	115	199	441	
4 bedroom residence	900	52		73	121	96	166	368	
1-3 bedroom residence	720	42		58	97	77	133	294	

Note: * Gravels, Sands and sandy loams are unsuitable for conventional absorption trenches and beds if there is a high watertable, including seasonal and perched watertable. Value based on average of conservative rate and maximum rate for Category 2b and 3a soils in AS1547:2012

LPED Irrigation Systems - Primary or Secondary Treated Effluent

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)
	DIR (mm)	N/A	4	3.5	N/A	N/A	N/A
Development Type	Daily (L/day)	(Alternative Land Application System Required)	Total min. basal or 'wetted area' (m²)†			(Alternative Land Application System Required)	(Alternative Land Application System Required)
5 + bedroom residence	1,080		744	1,135			
4 bedroom residence	900		620	946			
1-3 bedroom residence	720		496	757			

† required for zero wet weather storage (m³) not including spacing & setbacks

Wick Trenches and Beds - Secondary Treated Effluent Only

	Soil Category	Gravels & Sands (1)	Sandy Loams (2) & Loams (3) & High/Mod Clay Loams (4a,b)	Weak Clay Loams (4)	Massive Clay Loams (4)	Strong Light Clays (5a)	Moderate Light Clays (5b)	Weak Light Clays (5c)	Medium to Heavy Clays (6)
	DLR (mm)	25	30	20	10	12	8	8	5
Development Type	Daily (L/day)	Total min. basal or 'wetted area' required for zero wet weather storage (m²) not including spacing & setbacks							
5 + bedroom residence	1,080	49	40	62	145	115	199	199	441
4 bedroom residence	900	41	33	52	121	96	166	166	368
1-3 bedroom residence	720	33	27	42	97	77	133	133	294

Whitehead and Associates Environmental Consultants

Comment

Data from Barongarook is used as the closest available location, which will also provide a measure of safety as Barongarook has a higher rainfall. From the DWMP, the only supported disposal system is ETA trenches. Sizing table indicates 284m2 will be required, this is just under the allowable area of 300m2.

11.0 SIZING THE EFFLUENT DISPOSAL SYSTEM (MAV)

Irrigation area sizing using Nominated Area Water Balance for Zero Storage

Site Address: Forest St.s.

Date: Assessor: MD

INPUT DATA

Design Wastewater Flow	Q	720	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Irrigation Rate	DIR	5.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
Nominated Land Application Area	L	2000	m^2	[1]
Crop Factor	C	0.6-0.8	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type[2]
Rainfall Runoff Factor	RF	0.9	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff
Mean Monthly Rainfall Data		DWMP		BoM Station and number
Mean Monthly Pan Evaporation Data		DWMP		BoM Station and number

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365
Rainfall	R		mm/month	44	41	52	73	86	98	108	106	99	97	69	57	930
Evaporation	E		mm/month	133	110	91	54	34	22	26	37	55	81	98	121	862
Crop Factor	C		unitless	0.80	0.80	0.70	0.70	0.60	0.60	0.60	0.60	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	106	88	64	38	20	13	16	22	39	65	78	97	**645.8**
Percolation	B	DIRxD	mm/month	155.0	140	155.0	150.0	155.0	150.0	155.0	155.0	150.0	155.0	150.0	155.0	**1825.0**
Outputs		ET+B	mm/month	261.4	228	218.7	187.8	175.4	163.2	170.6	177.2	188.5	219.8	228.4	251.8	**2470.8**
INPUTS																
Retained Rainfall	RR	RxRF	mm/month	37.4	34.85	44.2	62.05	73.1	83.3	91.8	90.1	84.15	82.45	58.65	48.45	**790.5**
Applied Effluent	W	(QxD)/L	mm/month	11.2	10.1	11.2	10.8	11.2	10.8	11.2	11.2	10.8	11.2	10.8	11.2	**131.4**
Inputs		RR+W	mm/month	48.6	44.9	55.4	72.9	84.3	94.1	103.0	101.3	95.0	93.6	69.5	59.6	**921.9**
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-212.8	-183.1	-163.3	-115.0	-91.1	-69.1	-67.6	-75.9	-93.6	-126.2	-159.0	-192.2	
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Maximum Storage for Nominated Area	N		mm	0.00												
	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	100	104	128	172	218	270	283	256	207	163	127	110	

MINIMUM AREA REQUIRED FOR ZERO STORAGE: 284.0 m^2

CELLS

	Please enter data in blue cells
XX	Red cells are automatically populated by the spreadsheet
XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS

NOTES

[1] This value should be the largest of the following: land application area required based on the most limiting nutrient balance or minimum area required for zero storage

[2] Values selected are suitable for pasture grass in Victoria

Victorian Land Capability Assessment Framework

Trench & Bed Sizing

FORMULA FOR TRENCH AND BED SIZING				
L = Q/DLR x W			From AS/NZS 1547:2012	
Where:	Units			
L = Trench or bed length	m		Total trench or bed length required	
Q = Design Wastewater Flow	L/day		Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)	
DLR = Design Loading Rate	mm/day		Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)	
W = Trench or bed width	m		As selected by designer/installer	
INPUT DATA				
Design Wastewater Flow	Q	720	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Loading Rate	DLR	5.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
Trench basal area required	B	144.0	m^2	
Selected trench or bed width	W	0.6	m	As selected by designer/installer
OUTPUT				
Required trench or bed length	L	240.0	m	
CELLS				
		Please enter data in blue cells		
	XX	Red cells are automatically populated by the spreadsheet		
	XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS		

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet

Nitrogen Balance

Site Address:	Forest St.S.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE	239	m^2

INPUT DATA[1]

Wastewater Loading			Nutrient Crop Uptake					
Hydraulic Load	720	L/day	Crop N Uptake	220	kg/ha/yr	which equals	60.27	$mg/m^2/day$
Effluent N Concentration	25	mg/L						
% N Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal						
Total N Loss to Soil	3600	mg/day						
Remaining N Load after soil loss	14400	mg/day						

NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer			Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)		
Nitrogen	239	m^2	Nominated LAA Size	2000	m^2
			Predicted N Export from LAA	-38.74	kg/year
			Minimum Buffer Required for excess nutrient	0	m^2

CELLS

	Please enter data in blue cells
XX	Red cells are automatically populated by the spreadsheet
XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS

NOTES

[1] Model sensitivity to input parameters will affect the accuracy of the result obtained. Where possible site specific data should be used. Otherwise data should be obtained from a reliable source such as:

- *EPA Guidelines for Effluent Irrigation*
- *Appropriate Peer Reviewed Papers*
- *Environment and Health Protection Guidelines: Onsite Sewage Management for Single Households*
- *USEPA Onsite Systems Manual*

Comment

The foregoing DWMP Tables indicate disposal area of 284m2 while the MAV calculations indicate 240m of trench will be required. This would be for up to 3 bedrooms.

Nitrogen balance is less than water balance so is not a constraining factor.

For primary treated effluent, ETA trenches are the only supported disposal method, however with secondary treatment, wick trenches is an option but subsurface irrigation would require too much area.

12.0 Site Plan.

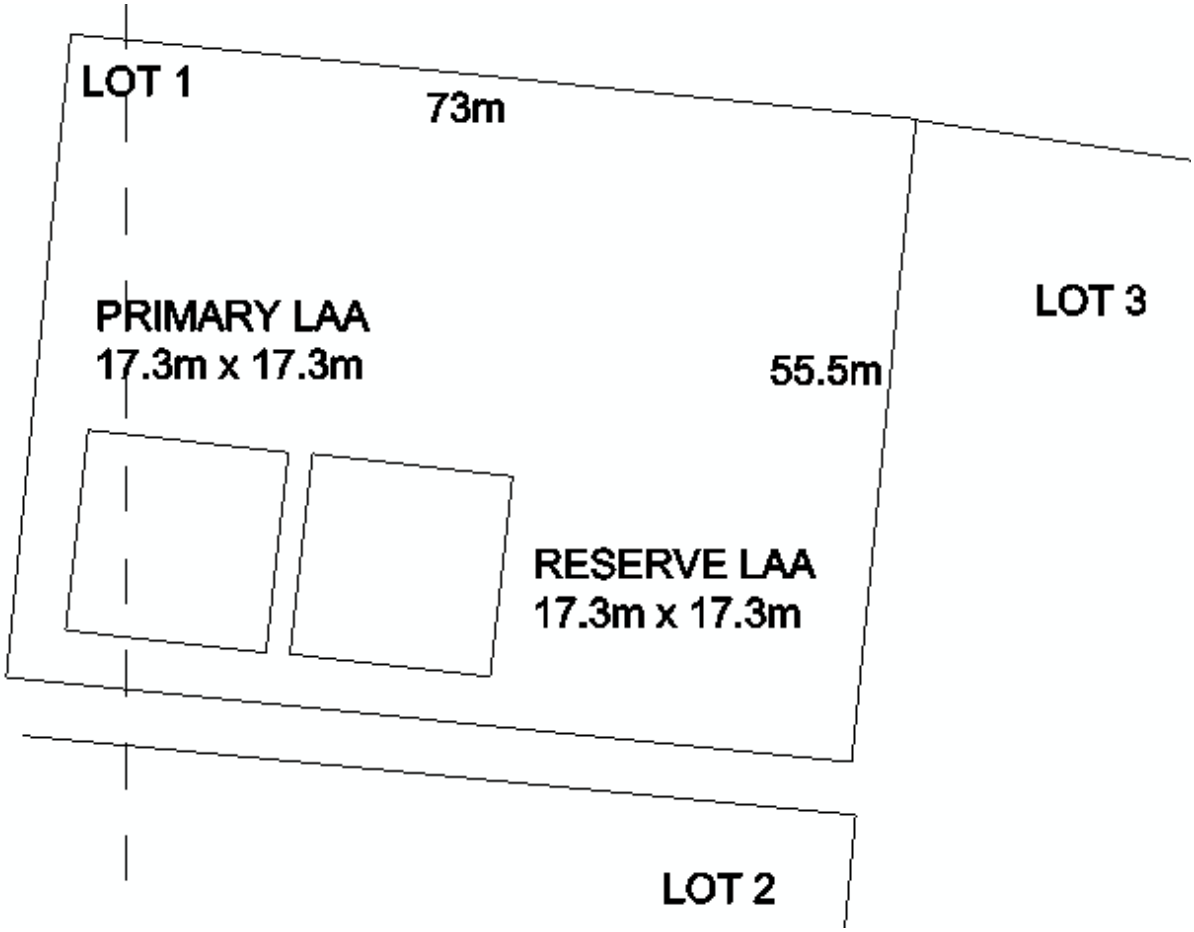


Fig 10. Site Plan

12.2 Applicable Setback Distances (from AS1547:2012)

Landscape Feature / Structure	* Setback Distances (m)					
	Primary Treated Effluent		Secondary Sewage &Grey water Effluent		Advanced Secondary Grey water Effluent	
BUILDING						
Wastewater field up-slope of building		6	x	3		3
Wastewater field down-slope of building		3	x	1.5		1.5
Wastewater field up-slope of cutting/escarpment		15	x	15		15
ALLOTMENT BOUNDARY						
Wastewater field up-slope of adjacent lot		6	x	3		1
Wastewater field down-slope of adjacent lot		3	x	1.5		0.5
SERVICES						
Water supply pipe		3	x	1.5		1.5
Wastewater field up-slope of potable supply channel		300	x	150		150
Wastewater field down-slope of potable supply channel		20	x	10		10
Gas supply pipe		3	x	1.5		1.5
In-ground water tank		15	x	4		3
Stormwater drain		6	x	3		2
RECREATION AREAS						
Children's grassed playground		6	x	3		2
In-ground swimming pool		6	x	3		2
SURFACE WATERS UP-SLOPE OF						
Dam, lake or reservoir (potable water supply)		300	x	150		150
Waterways (potable water supply)		100	x	100		50
Waterways, wetlands (continuous or ephemeral, non-potable); estuaries, ocean beach at high-tide mark; dams, lakes or reservoirs (stock & domestic, non-potable)		60	x	30		30
GROUNDWATER BORES						
Category 1 & 2a soils		NA		50		20
Category 2b – 6 soils		20	x	20		20
WATERTABLE						
Vertical depth from base of trench to highest seasonal water table		1.5	x	1.5		1.5
			x			
Vertical depth from irrigation pipes to highest seasonal water table		NA	x	1.5		1.5
			x			

*X indicates compliance can be achieved

SECTION TWO

MAV TABLES

Table 1: Key Site Features		
Feature	**Explanation**	**Assessment Process**
Aspect	The aspect or the direction that a slope is facing influences solar exposure.	Western aspect Excellent solar and wind exposure
Climate	Seasonal rainfall, evaporation and temperature patterns influence potential evapotranspiration in land application areas.	Incorporated into water balance spread sheet/s and LAA sizing.
Erosion and Landslip	Unstable areas (steep, unvegetated, dispersive soils etc.) are usually unsuitable for LAAs without mitigation.	No.
Fill (imported)	Capacity to assimilate effluent depends on the physical and chemical characteristics of the imported fill material(s).	No fill.
Flooding	Requirements for siting onsite wastewater infrastructure (including LAAs) away from areas subject to flooding can vary between Councils.	No, LAA set back and not in inundation zone.
Ground-water	Adequate depth of soil to protect groundwater resources largely depends on soil type and climate.	Not noted in boreholes VVG indicates at 20+m
LandSuitability	An LCA is used to determine which land is suitable and unsuitable for LAAs.	All land, except within buffer zones, suitable.
Landform	Landform shape and the position of LAAs on slopes influence drainage and runoff characteristics both onto any potential LAAs as well as downslope of them (i.e. will runoff be evenly shed, or concentrated or dispersed flows?).	See contour map attached Landscape with western aspect for LAA. Broad run-off

Feature	Explanation	Assessment Process
Rock Outcrops	Rock outcrops displace soil horizons and therefore can limit the assimilative capacity of LAAs for effluent. Outcrops can indicate shallow bedrock. Some rocks are strongly fissured and permeable and others are not.	No Rock
Setback Distances	Determining the most appropriate position for LAAs should be prioritised over placement of building areas.	See table from AS1547;2012 All compliant
Site Drainage	LAAs should be located in areas of good surface and subsurface (soil) drainage.	Good drainage, slight slope on land allowing slow run-off but no pooling.
Stormwater Run-on and Runoff	LAAs should not be located in areas with high run-on, without mitigation such as upslope diversion structures. Downslope runoff diversion may be useful.	Due to broad hillside, soil type and vegetation no concentrated run-on.
Slope	Land application of effluent becomes increasingly constrained with increasing slope gradient, increasing the chances of effluent runoff or subsurface seepage.	Slope of LAA land generally around 5.0%
Surface Waters	Whether the setback distances specified in the Code can be achieved from LAAs.	Adequate setback from surface water/inundation zones.
Vegetation	Good vegetation cover is important to prevent erosion as well as for uptake of water and nutrients from effluent.	Grasses.

Table 2: Description of Key Chemical and Physical Soil Features		
Feature	**Explanation**	**Assessment Process**
Cation Exchange Capacity	Influences the ability of the soil to hold and exchange cations; a major controlling agent for soil structural stability, nutrient availability for plants and the soil's reaction to fertilisers and other ameliorants (refer to Hazelton & Murphy, 2007).	7.53cmol(+)/kg No constraint
Colour and Mottling	Gleyed soils indicate permanent saturation (permanent watertable), while orange, yellow and red mottles indicate seasonal saturation with intermittent periods of drying (perched or seasonal watertable).	No mottling noted
Electrical Conductivity **(EC)**	EC test result infers the salinity of the soil and its potential impact on plant growth on the LAA. Refer to Hazelton & Murphy (2007) for interpretation of EC test results. Application of effluent increases salt content of soils over time.	0.05dS/m <0.2 dS/m No constraint Very low level of soil salinity.

Feature	Explanation	Assessment Process
Emerson Aggregate Class	EAC results infer dispersibility (as ped slaking, soil dispersion or both). LAAs should not be installed in soils with moderate or high dispersibility, without adequate mitigation (e.g. addition of gypsum, use of irrigation).	2 Dispersive probably due to high Al. Minor constraint overall as the pH is well within optimum range.
Permeability and Design Loading Rate	The rate at which water moves through the soil reflects the soil's permeability and determines the rate at which effluent is applied to land in litres per square metre per day (mm per day). The application rate for each type of land dispersal and recycling system is listed in Table 9 in the Code. Whilst the loading rate for LAA design is based on the permeability, it is less than the true permeability.	Adopted DIR, 5.
pH	Acid soils (pH <5) or alkaline soils (pH >8) may constrain plant growth and should be ameliorated by use of chemical additives (e.g. lime for acidity).	6.1 Close to neutral and within optimum range. Somewhat at odds with the Al levels but toxicity not noted.
Rock Fragments	Coarse rock fragments displace soil volume and therefore can limit assimilative capacity of soils.	No
Sodicity **[Exchangeable Sodium Percentage (ESP)]**	The percentage of sodium compounds on cation exchange sites on soil particles. ESP >6% may cause damage to the soil structure. Refer to Hazelton & Murphy (2007). Effluent and greywater contain sodium.	3.7% < 6% no constraint
Sodium Absorption Ratio (SAR)	The ratio of sodium to calcium and magnesium (beneficial elements) in the soil solution, with higher ratios potentially damaging to plants and soils.	23.9:1 High ratio of beneficial elements,

Feature	Explanation	Assessment Process
Soil Depth	Deeper soils generally have a greater assimilative capacity for effluent (depending on soil type).	>1.8m No constraint
Soil Texture	Soil textures are categorised as 1. Gravels and Sands 2. Sandy Loams 3. Loams 4. Clay Loams 5. Light Clays, or 6. Medium to Heavy Clays (AS/NZS1547:2012).	Light Clay No constraint
Watertable (depth to)	The required soil depth to protect groundwater depends on soil type; high permeability soils generally require a greater separation distance (soil depth).	+20m No constraint

Comment

No soil constraints, very low salinity and almost neutral pH.

Table 3: Risk Assessment of Site Characteristics

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Aspect (affects solar radiation received)	North / North-East / North-West	East / West / South-East / South-West	South	MODERATE
Climate (difference between annual rainfall and pan evaporation)	Excess of evaporation over rainfall in the wettest months	Rainfall approximates to evaporation	Excess of rainfall over evaporation in the wettest months	MODERATE
Erosion [1] (or potential for erosion)	Nil or minor	Moderate	Severe	NIL
Exposure to sun and wind	Full sun and/or high wind or minimal shading	Dappled light	Limited patches of light and little wind to heavily shaded all day	NIL
Fill [2] (imported)	No fill or minimal fill, or fill is good quality topsoil	Moderate coverage and fill is good quality	Extensive poor quality fill and variable quality fill	NIL
Flood frequency (ARI) [3]	Less than 1 in 100 years	Between 100 and 20 years	More than 1 in 20 years	NIL
Groundwater bores [4]	No bores onsite or on neighbouring properties	Setback distance from bore complies with requirements in EPA Code of Practice 891.3 (as amended)	Setback distance from bore does not comply with requirements in EPA Code of Practice 891.3 (as amended)	NIL

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Land area available for LAA	Exceeds LAA and duplicate LAA and buffer distance requirements	Meets LAA and duplicate LAA and buffer distance requirements	Insufficient area for LAA	NIL
Landslip (or landslip potential) [5]	Nil	Minor to moderate	High or Severe	NIL
Rock outcrops (% of surface)	<10%	10-20%	>20%	NIL
Slope Form (affects water shedding ability)	Convex or divergent side-slopes	Straight side-slopes	Concave or convergent side-slopes	NIL
Slope gradient [6] **(%)**				
(a) for absorption trenches and beds	<6%	6-15%	>15%	NIL
(b) for surface irrigation	<6%	6-10%	>10%	
(c) for subsurface irrigation	<10%	10-30%	>30%	
Soil Drainage [7] **(qualitative)**	No visible signs or likelihood of dampness, even in wet season	Some signs or likelihood of dampness	Wet soil, moisture-loving plants, standing water in pit; water ponding on surface, soil pit fills with water	NIL

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Stormwater run-on	Low likelihood of stormwater run-on		High likelihood of inundation by stormwater run-on	MINOR
Surface waters - setback distance (m) [3]	Setback distance complies with requirements in EPA Code of Practice 891.3 (as amended)		Setback distance does not comply with requirements in EPA Code of Practice 891.3 (as amended)	MINOR
Vegetation coverage over the site	Plentiful vegetation with healthy growth and good potential for nutrient uptake	Limited variety of vegetation	Sparse vegetation or no vegetation	MINOR

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Soil Drainage [8] (Field Handbook definitions)	Rapidly drained. Water removed from soil rapidly in relation to supply, excess water flows downward rapidly. No horizon remains wet for more than a few hours after addition	Well drained. Water removed from the soil readily, excess flows downward. Some horizons may remain wet for several days after addition	Moderately well drained. Water removed somewhat slowly in relation to supply, some horizons may remain wet for a week or more after addition	Imperfectly drained. Water removed very slowly in relation to supply, seasonal ponding, all horizons wet for periods of several months, some mottling	Poorly/Very poorly drained. Water remains at or near the surface for most of the year, strong gleying. All horizons wet for several months	MINOR

Comment;

The above MAV tables indicates two Moderate constraints, aspect and climate. Climate constraint mitigated by incorporating rainfall into LAA sizing. Aspect is difficult to mitigate but suitable moisture tolerant vegetation would be advisable.

SECTION THREE

SITE MANAGEMENT PLAN

Attached

[X] Yes [ ] No

2020 ENGINEERING SOLUTIONS

2020 Engineering Solutions

1745 Colac–Forrest Road

COLAC VIC 3249

Ph: 0428 141 441 Fax: (03) 5233 4608

ABN 57 215 499 312 ACN 11 9460 865

www.2020es.com

PROPERTY MANAGEMENT PLAN

SITE: 35 Forest St. S. Elliminyt

DEVELOPER: A & G Lamanna

REPORT NUMBER: ES19140

DATE: 10/08/2019

REPORTING TO: AS 1547:2012

On-site domestic wastewater management

EPA Publication 891.4 July 2016

Code of Practice Onsite Wastewater Management

Barwon Water / Wannon Water

CONTENTS

1 PREAMBLE

This Property Management Plan is intended for use by property ownersinBarwon/Wannon Water drinking water supply catchments. It is written for occupancies with onsite wastewater treatment systems, but also applies to other developments where management of risk to downstream water quality is required.

This document must not be considered a definitive plan or control for all properties and wastewater systems. The landowner property management plan is drafted with consideration to planning permit requirements, EPA Publication 891.4 “Code of Practice Onsite Wastewater Management”, the Land Capability Assessment, and AS1547:2012 “On-site domestic wastewater management”.

The plan must be maintained by the landowner and amended when required. Any increased loading on the property or system failure requires the review of the existing Land Capability Assessment and Waste Water Management System. Any amendment to the plan must be submitted to Barwon/Wannon Water for endorsement.

The plan must be kept on site and be available for inspection by Council or other government agencies.

1.1 Property Owner Responsibilities

Property owners and occupiers are responsible for reducing risks to downstream water quality that originate from their property. This includes:

- ensuring pipework & wastewater systems don’t leak;
- keeping wastewater systems well maintained & in good repair;
- appropriately managing herbicides, pesticides & other chemicals;
- minimising erosion & sediment movement;
- maintaining buffers of native vegetation around watercourses;
- compliance with Council and EPA requirements; and
- implementing this Property Management Plan.

2 EMERGENCY CONTACT NUMBERS

PROPERTY MANGEMENT PLAN	
EMERGENCY OR ONSITE WASTEWATER MAINTENANCE CONTACT NUMBERS	
POLICE, AMBULANCE, FIRE	000
PLUMBER	To be advised
ELECTRICIAN	To be advised
COUNCIL ENVIRONMENTAL HEALTH OFFICER	Golden Plans Shire
EPA	1300 372 842
SYSTEM SUPPLIER	COLAC CEMENT PRODUCTS 03 5231 5231
SYSTEM SERVICE AGENT	COLAC CEMENT PRODUCTS 03 5231 5231
SEPTIC PUMPOUT TANKER	RICHARDSON'S LIQUID WASTE 03 5234 6585
BARWON WATER	1300 656 007

If any of the following incidents, which could impact on downstream water quality, occur on site they should be reported to Barwon Water immediately:

Chemical spill Fuel spill Bushfire Landslip

3 SITE PLAN

Site plans drawn to scale (attached) show dimensions and include the following details:

- the site address, including lot number & street number;
- title boundaries;
- direction of north;
- location of groundwater bores on the site & adjacent properties;
- contour lines (at 1 - 10 m intervals), or direction of slope & slope in percent;
- location of dams & waterways onsite & within 100m of the property;
- drainage lines & springs;
- stormwater cut-off drains adjacent to land application area & treatment system;
- location of actual & proposed buildings, sheds, driveways, paths & paddocks;
- location of actual & proposed infrastructure, especially drains;
- location& dimensions of the wastewater treatment plan; and
- location& dimensions of the land application area.

The site plan must be amended when any of the above details change (including on issue of as-constructed drawings), and the amended plan must be provided to Barwon/Wannon Water.

4 DETAILS OF THE WASTEWATER TREATMENT SYSTEM

The plan requires the following details of the wastewater treatment system:

- manufacturer's manuals & spare parts list;
- as-installed drawings;
- copy of EPA Certificate of Approval;
- copy of Council wastewater system permit;
- description of the maintenance regime, to meet manufacturer's recommendations & the maintenance, monitoring & reporting requirements of the Council permit & the EPA certificate of approval; and
- in the case of a secondary treatment system, a copy of a current service contract with an accredited or experienced trained service technician to implement the maintenance regime.

All details relevant to the above will be available and submitted after issue of the permit as they are post developmental.

Sewage Treatment Plants

Envirosep SP2000 technology delivers low maintenance & operating costs

Through a continual research and development program, Envirosep have designed and manufactured the SP2000. A unit that meets and exceeds consumer demands of an efficient, low maintenance wastewater treatment system.

SP2000 Features and Benefits

Economical
The efficiency of an aerated wastewater treatment system is measured by the transfer of air to the micro-organisms used in the biological process to remove waste.

Quiet Operation
Smooth agitation to ensure there are no dead pockets where bio-solids can build up and timed aeration for minimal maintenance.

Easily Hidden
Below ground multiple light weight tank construction makes for easier access to your site and provides more options for layout where space is restricted.

Maintenance

Access service pit allows easier maintenance of system and large bio -solids storage tank reduces the frequency of bio-solids pump-outs.

Great for your garden
The efficient fine bubble aeration combined with a unique Biotube design enhances the treatment. This will provide enough recycled water to irrigate a small to medium lawn area.

Performance Guaranteed
Warranty is provided on all components from date of installation and two years on electrical components against defects in manufacture.

Approved by the EPA – CA 125/14
Commercial models are also available with additional bio-media, back-up air pumps and water pumps for heavy duty domestic and/or trade use applications.

Specifications

Capacity – Primary pre-treatment tank:	3,200 litres
Aeration chamber:	2,200 litres
Humus tank:	1,000 litres
Contact tank:	300 litres
Total capacity:	6,700 litres
Tank construction:	Concrete
Tank dimensions:	1750mm dia x 2300mm
Weight of tanks:	3 tonnes each
Weight of Pump Well	1.2 Tonnes

Recommended for:

- Commercial installations
- EPA Approved, up to 5000 Litre daily
- System upgrades
- Existing homes
- Extensions
- New homes

Warranty

The Envirosep SP 2000 is fully guaranteed against any defects in manufacture. Electrical components of the system are warranted against defects in manufacture for two years from date of installation**.**

Service and Repairs

For more information about Envirosep service and repairs please contact:

SSA – Septic Systems Australia

Postal Address:
P.O. Box 432,
Montrose, VIC, 3765
Australia

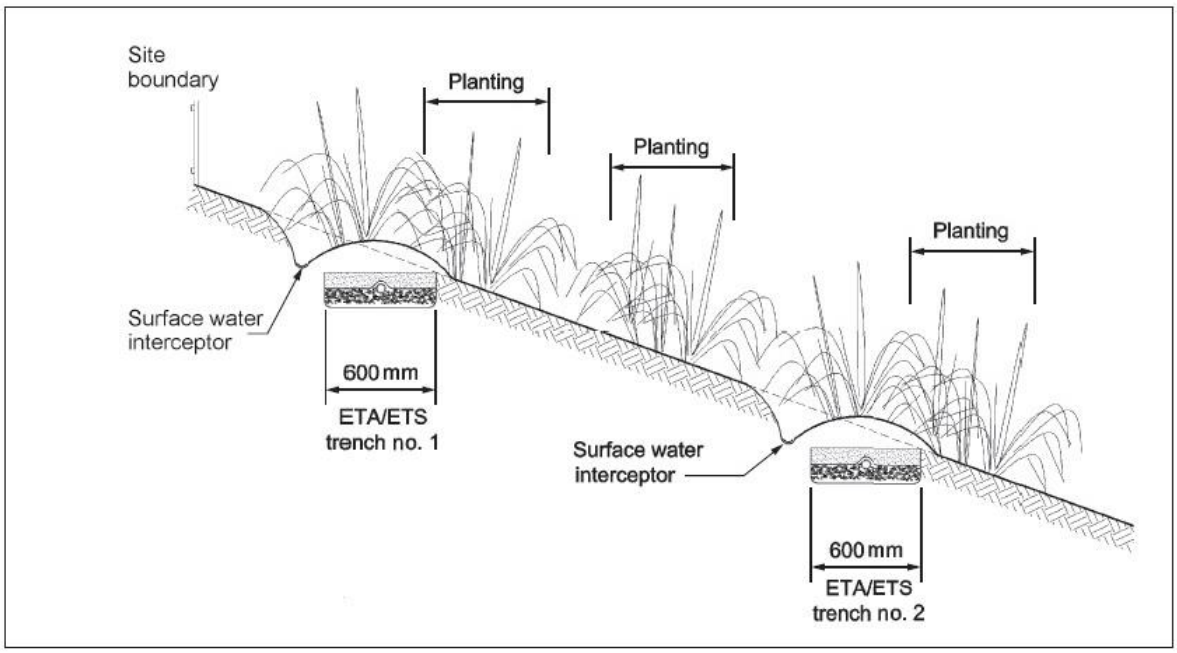
Phone: (03) 9509 6878
Fax: (03) 9509 6818
Mobile: 0438 118 445
Email:lmorley@septicsystemsaustralia.com.au

NOTE: Developer can supply treatment plant information post construction as most documentation relies upon approval to construct development and install a system. Included as example only. 2020Eng is independent and does not recommend particular systems.

5 DETAILS OF THE EFFLUENT DISPOSAL SYSTEM

NOTE: An LPED line can be used to dose load the ETA/ETS bed.

FIGURE L6 ETA/ETS BED DETAILS



NOTES:
1 An LPED line can be used to dose load the ETA/ETS trenches.
2 Each ETA/ETS trench is constructed to disperse effluent into downslope topsoil so that plantings can provide assistance by evapotranspiration.

The plan requires the following details of the effluent disposal system:

- manufacturer's manuals & spare parts list for components including pumps, valves, and filters;
- as-installed drawings; and
- description of the maintenance regime, to meet manufacturer's recommendations & the maintenance, monitoring & reporting requirements of Council & the EPA. At a minimum, visual inspection of the land application area is required whenever the treatment system is inspected.

All details relevant to the above will be available and submitted after issue of the permit as they are post developmental.

6 WASTEWATER TREATEMENT SYSTEM MAINTENANCE

The waste water treatment system, including its pipework shall:

- be inspected & maintained as per the maintenance regime;
- be protected from vehicle, farm machinery or livestock damage;
- have any grease trap inspected at least quarterly & cleaned out regularly;
- have any vents kept clear & access covers in working order;
- be visually checked for damage especially after being pumped out - damage is to be repaired; and
- be replaced if not operating adequately.

Inspections of treatment units are to be recorded on the operation and maintenance log as well as any defects and repairs undertaken.

7 LAND APPLICATION AREA (Effluent Disposal) OPERATION & MAINTENANCE

The following measures shall be implemented:

- the land application area & disposal system shall be inspected & maintained as per the maintenance regime;
- any evapotranspiration areas shall be designed to exclude vehicle, farm machinery, or stock access;
- surface water diversion drains shall be maintained upslope of & around the land application area & kept clean; and
- roof water drainage / hard stand drainage must be diverted away from the land application area.

Evapotranspiration and irrigation areas shall:

- have their grass mown & plants maintained to ensure these areas take up nutrients with maximum efficiency;
- be checked for wet spots, uneven grass colour 7 symptoms of emitter blockage (evidenced by under-irrigated dry areas or over-irrigated wet areas); and
- have blocked or damaged irrigation lines replaced.

Equipment shall be checked in the following manner:

- the manufacturer's instructions for maintaining & cleaning pumps, siphons & septic tank & outlet filters shall be followed;

- disc filters or filter screens on irrigation-dosing equipment shall be cleaned at least annually by rinsing back into the primary wastewater treatment unit; and

- irrigation lines shall be flushed at least annually to scour out any accumulated sediment.

Inspections are to be recorded on the Operations Log as well as any defects and repairs undertaken.

8 HOUSEHOLD MANAGEMENT OF WASTEWATER

The following measures should be implemented for optimum performance of system.

8.1 Sludge Build Up Reduction

- food waste including fats, grease & oils shall be disposed of in composting bin or worm farm
- no food waste disposal unit shall be installed
- sanitary napkins & hygiene products shall be disposed of in garbage

8.2 Encourage Bacteria

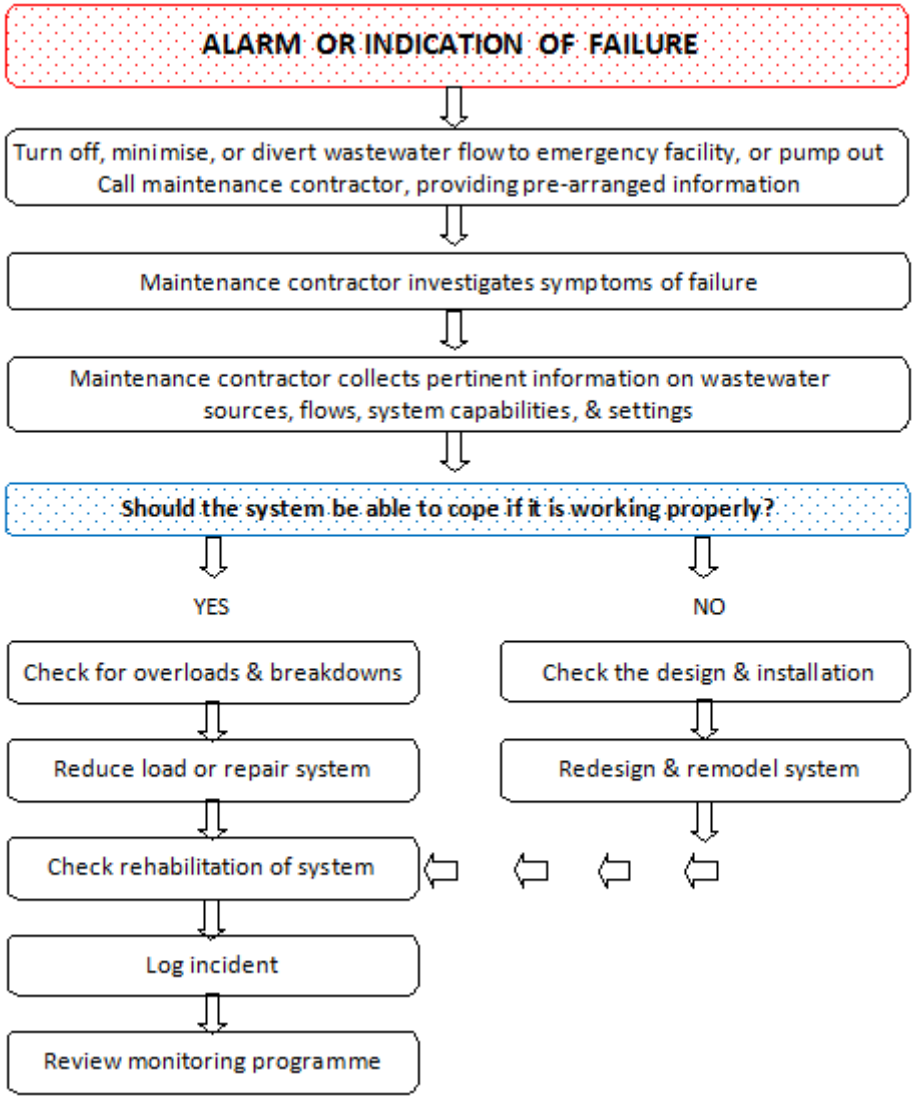
- use biodegradable soaps
- use low-phosphorus detergent
- use low-sodium detergent where soils are dispersive
- limit the use of cleaners such as bleaches, whiteners, nappy soakers & disinfectant, especially for toilet/shower cleaning
- do not put chemicals, thinners or paint down the drain or gulley trap

8.3 Reduce Effluent Volume Load

- install & use water conserving fittings ie. shower heads & appliances
- wash full loads only in dishwasher & washing machine
- avoid system overload ie. 1 washing machine load per day & run washing machine & dishwasher at different times
- do not install a spa bath

9 CONTINGENCY PLAN

The plan below shall be followed for a sudden failure of the wastewater system. A generalised flow chart of actions to be taken is:



(Figure 6.3 from AS1547:2012)

10 SITE OPERATIONS & MAINTENANCE LOG

A site operation and maintenance log shall be kept for any wastewater system. This will assist in the determination of recurring problems/trends. The maintenance log is to show when scheduled maintenance is due. Matters to be recorded in the log include:

- pump out records;

- service records;
- inspections; and
- records of all irregular operation & response actions.

Copies of programmed maintenance and pump out (desludging) works performed by maintenance contractors, as required by the Council (septic tank) permit, are to be forwarded to the Council Environmental Health Officer. A copy of the latest maintenance certificate is to be retained with this property management plan and recorded on the maintenance log.

11 IDENTIFICATION, RISK ASSESSMENT & CONTROLS FOR OTHER POTENTIAL THREATS TO DOWNSTREAM WATER QUALITY

The landholder is required to identify and assess the risk of other potential threats to downstream water quality, resulting from the development and use of the property ie.

- erosion risks; and
- risks from storage & application of chemicals.

Construction methods should be carried out in a manner which will minimise soil, sediment and nutrient movement from the property to water courses during development and use of the property. Potential sources of sediment movement to consider are:

- tracks& driveways;
- high traffic areas (vehicular, human, animal); and
- construction areas (occupancy, roads, fencing).

The design of stormwater run-off from the site should be described. Activities to encourage native vegetation retention and re-establishment within a 30 metre buffer zone along waterways, and to exclude stock from waterways, should be described. Activities to prevent the spread of noxious weeds should be described.

Chemicals such as herbicides and pesticides can be a risk to downstream water quality. The landowner should follow manufacturer's instructions and be familiar with the advice available from: http://www.depi.vic.gov.au/agriculture-and-food/farm-management/chemical-use. Procedures for chemical application and storage should be described in the Property Management Plan.

Businesses should contact Barwon/Wannon Water to determine if a water quality monitoring program immediately up and down stream of works that pose a significant threat to water quality is required. This may include:

- analytical monitoring of turbidity following large-scale activities that could potentially result in sediment movement (e.g. cultivation, harvesting); and
- monitoring of the active ingredients within herbicides and pesticides following intensive and broad scale herbicide/pesticide applications.

Appendix 1 Maintenance Log Template

Treatment System Inspections, Maintenance & Repairs			
Due Date (if scheduled)	Actual Date of Activity	Name of Inspector/ Contractor	Description of Work, Observations & Comments

Effluent Disposal Area Inspections, Maintenance & Repairs			
Due Date (if scheduled)	Actual Date of Activity	Name of Inspector/ Contractor	Description of Work, Observations & Comments

12 INSURANCE CERTIFICATE OF CURRENCY

Integro Insurance Brokers Limited
1st Floor • 71 Fenchurch Street • London
EC3A 4BS
Telephone: (0)20 7444 6000
Fax: (0)20 7444 6001
Website: www.integrouk.com

MONDAY, 03 SEPTEMBER 2018

CERTIFICATE OF CURRENCY

POLICY NUMBER:	**IL1805880**
TYPE:	PROFESSIONAL INDEMNITY INSURANCE as may be more fully defined in the policy wording.
INSURED:	2020 Engineering Solutions
ADDRESS:	1745 Colac-Forrest Road Colac VIC 3249 Australia
PERIOD OF INSURANCE:	From: 31st August 2018 To: 31st August 2019 Both days at 16:00 Hours Local Standard Time at the Principal Address of the Insured
LIMIT OF INDEMNITY:	AUD 2,000,000 any one Claim and in the aggregate including Costs and Expenses plus one reinstatement
PLACED WITH:	100% Certain Underwriters at Lloyd's

For and on behalf of Integro Insurance Brokers Limited

This certificate is a summary of the policy and is not intended to amend, extend, replace or override the policy terms and conditions. In the event of any consistency between this certificate and the policy, the policy prevails.

Authorised and regulated by the Financial Conduct Authority under reference number 305496
Registered Office: 1st Floor, 71 Fenchurch Street, London, EC3A 4BS
Registered Company No. 2957627

13 DISCLAIMER

2020 Engineering Solutions Pty Ltd ("2020")
Geotechnical Report Limitations

The report to which this document has been attached assesses risks arising from land slope instability and proposes risk minimisation solutions. Absolute risk avoidance cannot be assured, principally due to assessment cost factors. It is therefore necessary to rely on instructions and make assumptions.

Changed Conditions

The report may be invalidated by changed conditions including:-

1. topography.
2. soil moisture content.
3. above or below ground structures.
4. soil and substrate profiles.
5. location of site boundaries.

Causes of Changed Conditions

Changed conditions may occur due to:-

1. extreme conditions such as flood, drought, cold, heat or fire.
2. human activities.
3. natural processes.
4. planning or design requirements.

Client to inform 2020 of any changes

2020 will endeavour to identify any reasonably foreseeable risk factors on the site which may cause changed conditions. Samples are taken at reasonable intervals bearing in mind the cost to the client. In the absence of specific instructions or patent conditions it will be assumed that conditions observed in samples are consistent across the site.

This document is provided to inform the client that their responsibility for risk is shared with 2020. The client will be responsible for inaccurate instructions or failure to instruct in relation to changed conditions, events that may cause changed conditions or when it becomes evident that assumptions may be invalid. Failure to do so could result in substantial and costly damage and disputes.

Interpretation

The report must be considered in its entirety. Each part of the report may be dependent on other parts for meaningful interpretation. The report should also only be used by the client. It may not be relied upon by any other person without first conferring with 2020. The report should only be acted upon and interpreted by persons qualified and competent in the activities contemplated in the report.

130433 - 13 05 31 Geotechnical Report Limitation

LAND CAPABILITY ASSESSMENT

Lot 2/35 Forest St. Sth. Elliminyt Victoria

2020Engineering Solutions Report ES19153
8/12/2019

Welcome to our new format LCA.

Section 1.

Contains relevant information is presented in a concise, logical, trail following from regional perspective to site specific characteristics. Sample water balance calculations are incorporated to inform the Land Application Area tables

Section 2.

Contains the balance of information required under the DWMP, MAV and EPA 891.4

Section 3.

Property Management Report.

Report synopsis

This Report is to Lot 2 of the proposed subdivision of the subject land. Lot 2 comprises a 0.4262Ha portion of the 1.9829Ha property.

As a result of the site, soil and surrounds investigation it is our opinion that the proposed allotment can support the development of up to a 3 bedroom dwelling.

REPORT CONTENTS

REPORT SUMMARY/EXECUTIVE SUMMARY

This Report is to a possible 3 bedroom dwelling on Lot 2 of a proposed subdivision of the subject land. Lot 2 comprises a total of 4262m2.

In the absence of more specific guidelines development will be limited such that no more than 15% of the allotment will be set aside for wastewater disposal. This equates to an area of 639m2.

As a result wastewater disposal should be via a secondary treatment plant coupled to 240m of ETA trenches covering no less than 315m2.

SECTION ONE

1.0 INTRODUCTION & BACKGROUND

Fig 1. Subject Land site location and surrounding land use (Planning Maps Online)

2.0 PLANNING REPORT

PLANNING PROPERTY REPORT

VICTORIA State Government | Environment, Land, Water and Planning

From www.planning.vic.gov.au on 16 July 2019 05:58 PM

PROPERTY DETAILS

Address:	35 FOREST STREET SOUTH ELLIMINYT 3250	
Lot and Plan Number:	Lot 1 PS441080	
Standard Parcel Identifier (SPI):	1\PS441080	
Local Government Area (Council):	COLAC OTWAY	www.colacotway.vic.gov.au
Council Property Number:	21827	
Planning Scheme:	Colac Otway	planning-schemes.delwp.vic.gov.au/schemes/colacotway
Directory Reference:	VicRoads 92 B7	

UTILITIES

Rural Water Corporation:	Southern Rural Water
Urban Water Corporation:	Barwon Water
Melbourne Water:	outside drainage boundary
Power Distributor:	POWERCOR

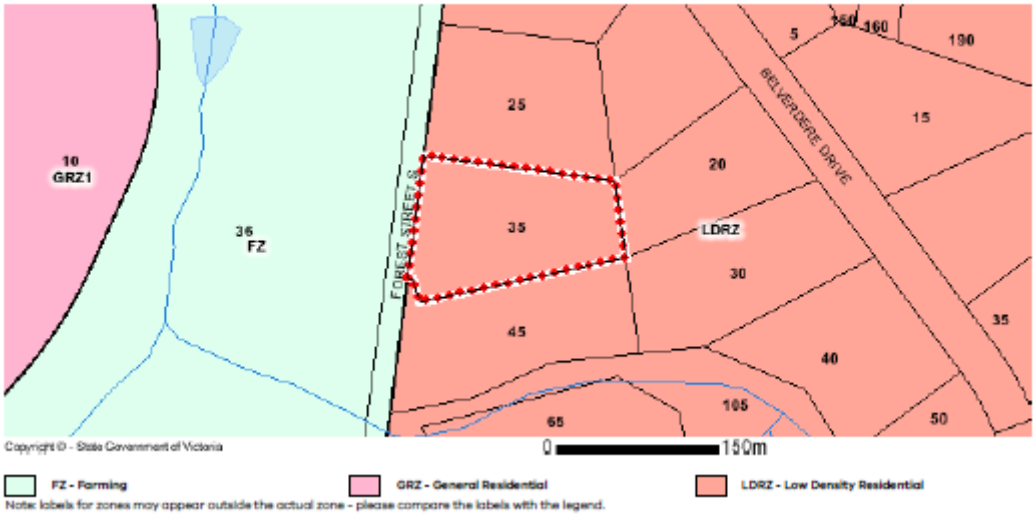
STATE ELECTORATES

Legislative Council:	WESTERN VICTORIA
Legislative Assembly:	POLWARTH

Planning Zones

LOW DENSITY RESIDENTIAL ZONE (LDRZ)

SCHEDULE TO THE LOW DENSITY RESIDENTIAL ZONE (LDRZ)



Copyright © - State Government of Victoria

FZ - Farming | GRZ - General Residential | LDRZ - Low Density Residential

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

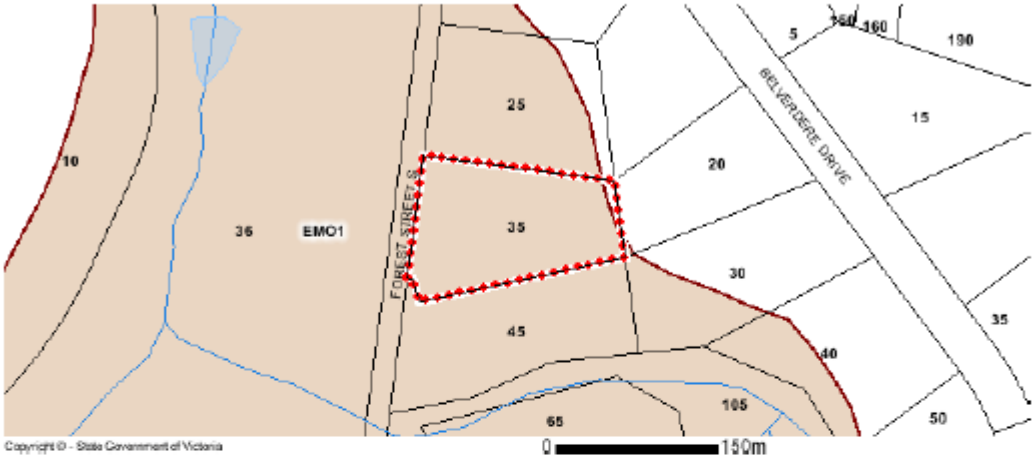
Subject land zoned Low Density Rural Living Zone

PLANNING PROPERTY REPORT

Planning Overlays

EROSION MANAGEMENT OVERLAY (EMO)

EROSION MANAGEMENT OVERLAY - SCHEDULE 1 (EMO1)

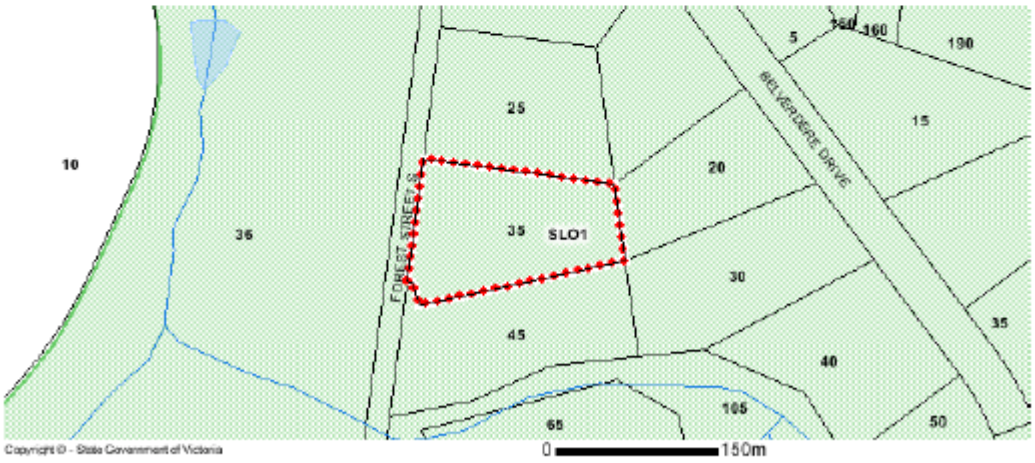


EMO - Erosion Management

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

SIGNIFICANT LANDSCAPE OVERLAY (SLO)

SIGNIFICANT LANDSCAPE OVERLAY - SCHEDULE 1 (SLO1)



SLO - Significant Landscape

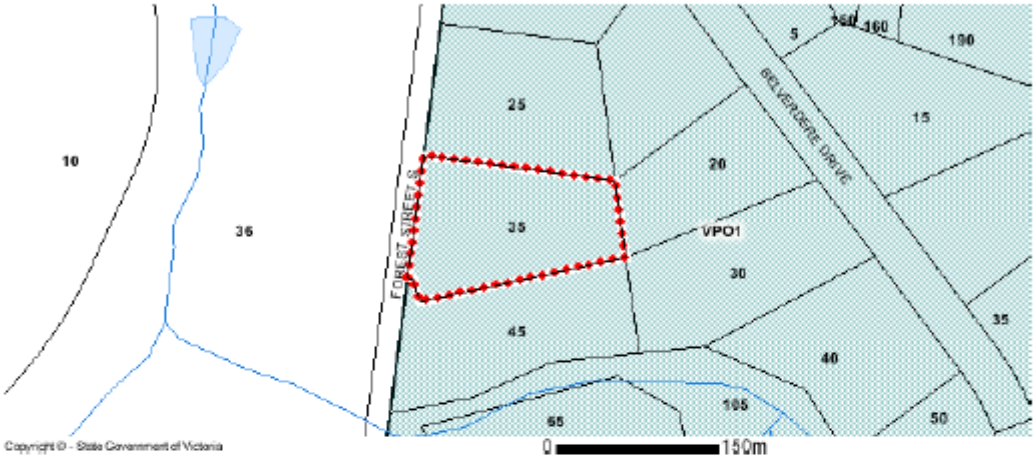
Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend.

PLANNING PROPERTY REPORT

Planning Overlays

VEGETATION PROTECTION OVERLAY (VPO)

VEGETATION PROTECTION OVERLAY - SCHEDULE 1 (VPO1)



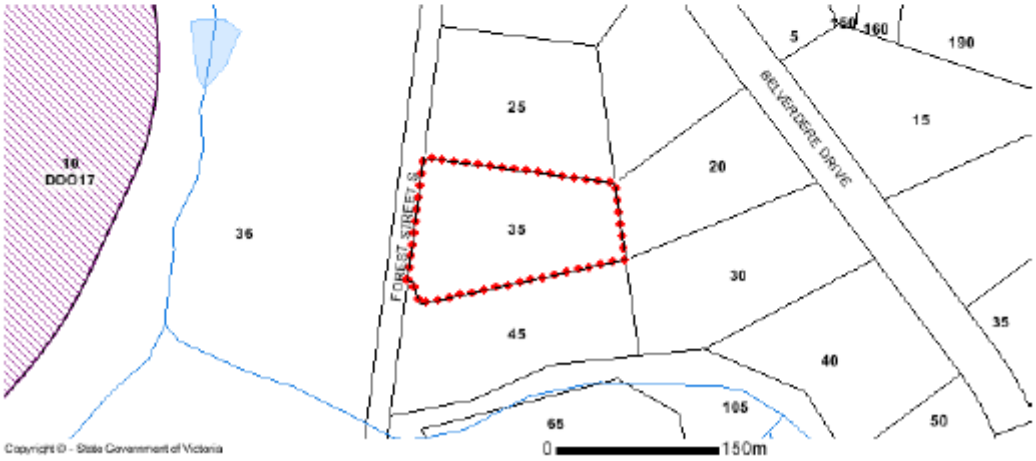
VPO - Vegetation Protection

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

OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

DESIGN AND DEVELOPMENT OVERLAY (DDO)



DDO - Design and Development

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

Overlays

EMO SLO VPO

3.0 DECLARED WATER CATCHMENT AREA

Site is not within DWCA (DWMP)

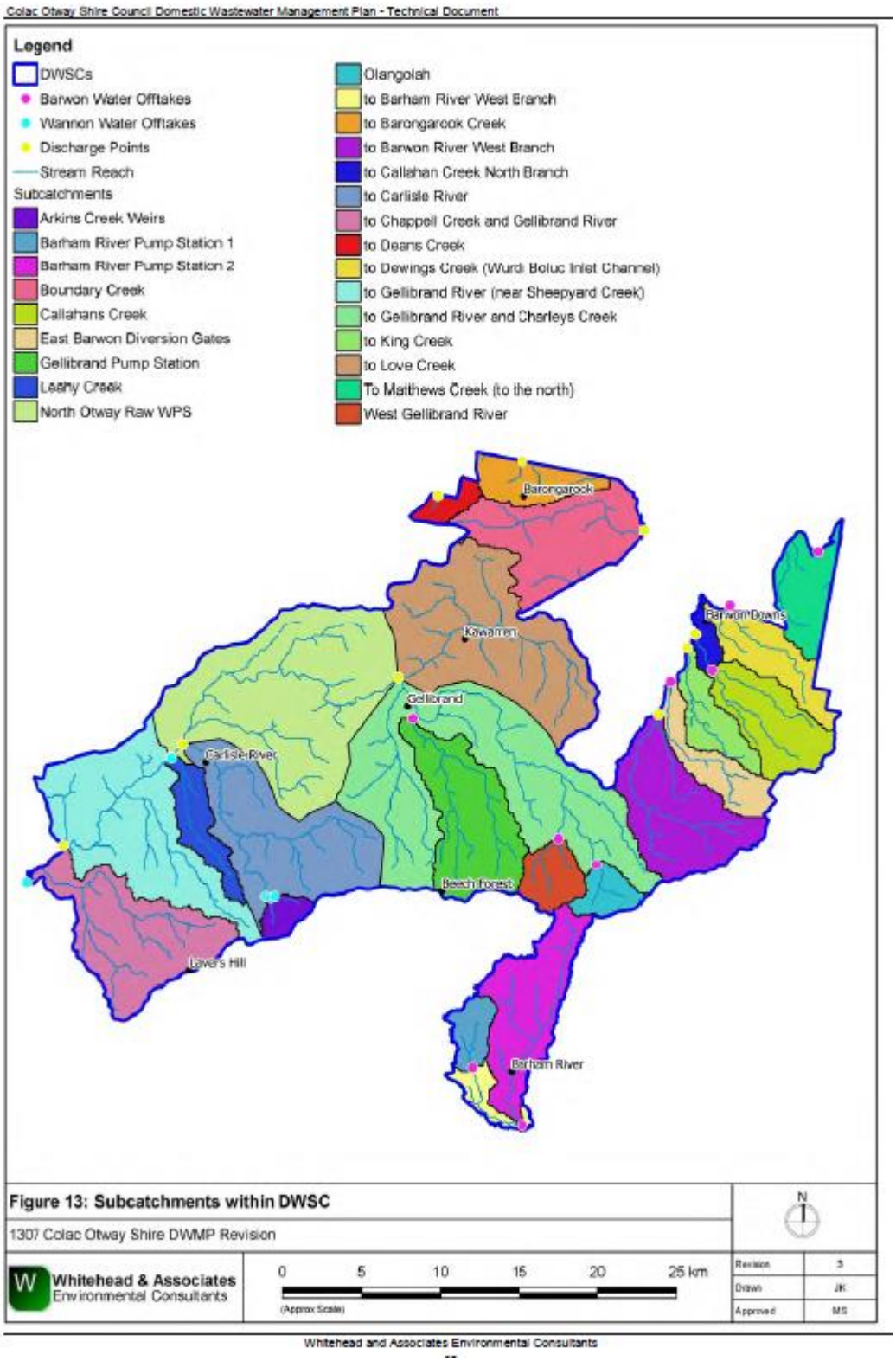


Fig 2.

PROPOSAL

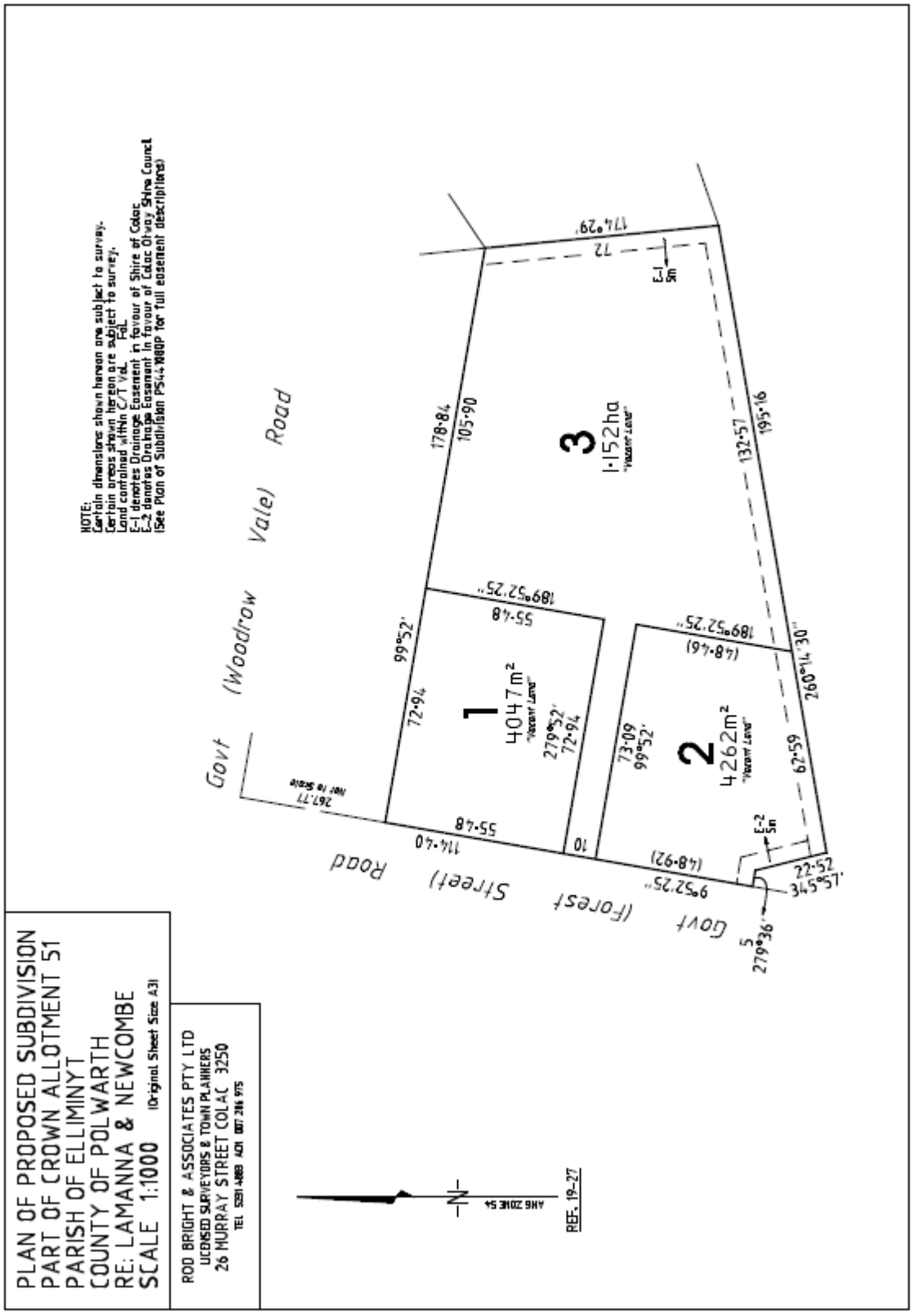


Fig 3. Proposed plan of subdivision (Rod Bright & Ass.)

4.0 TOPOGRAPHY (PLANNING MAPS ON LINE)

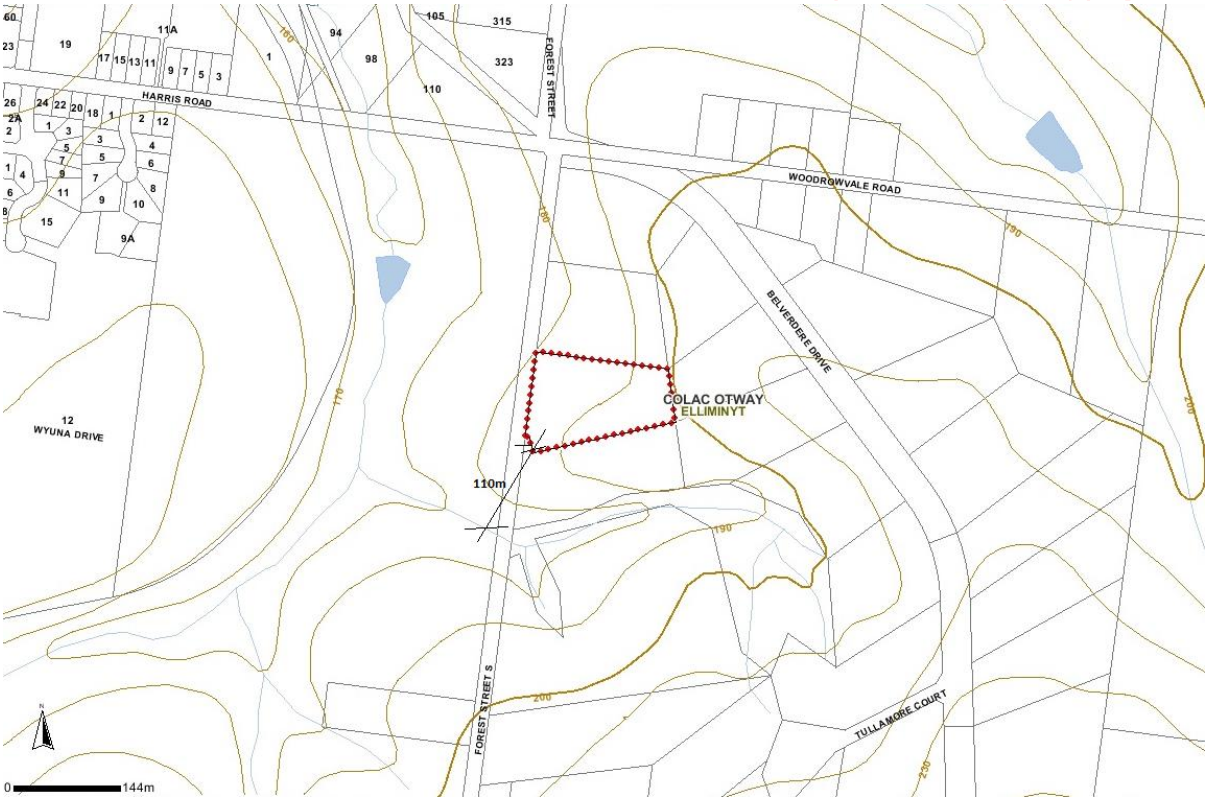


Fig 4 Topography and surface water/s. (Planning Maps On Line)

Comment

Generally the subject land comprises an elevated portion of a broad hillside and displays a western aspect with good solar and wind exposure.

The boundary of the property is about 110m from the nearest surface waters, however overland flow path would be much longer.

5.0 GROUNDWATER BORES (VVG)

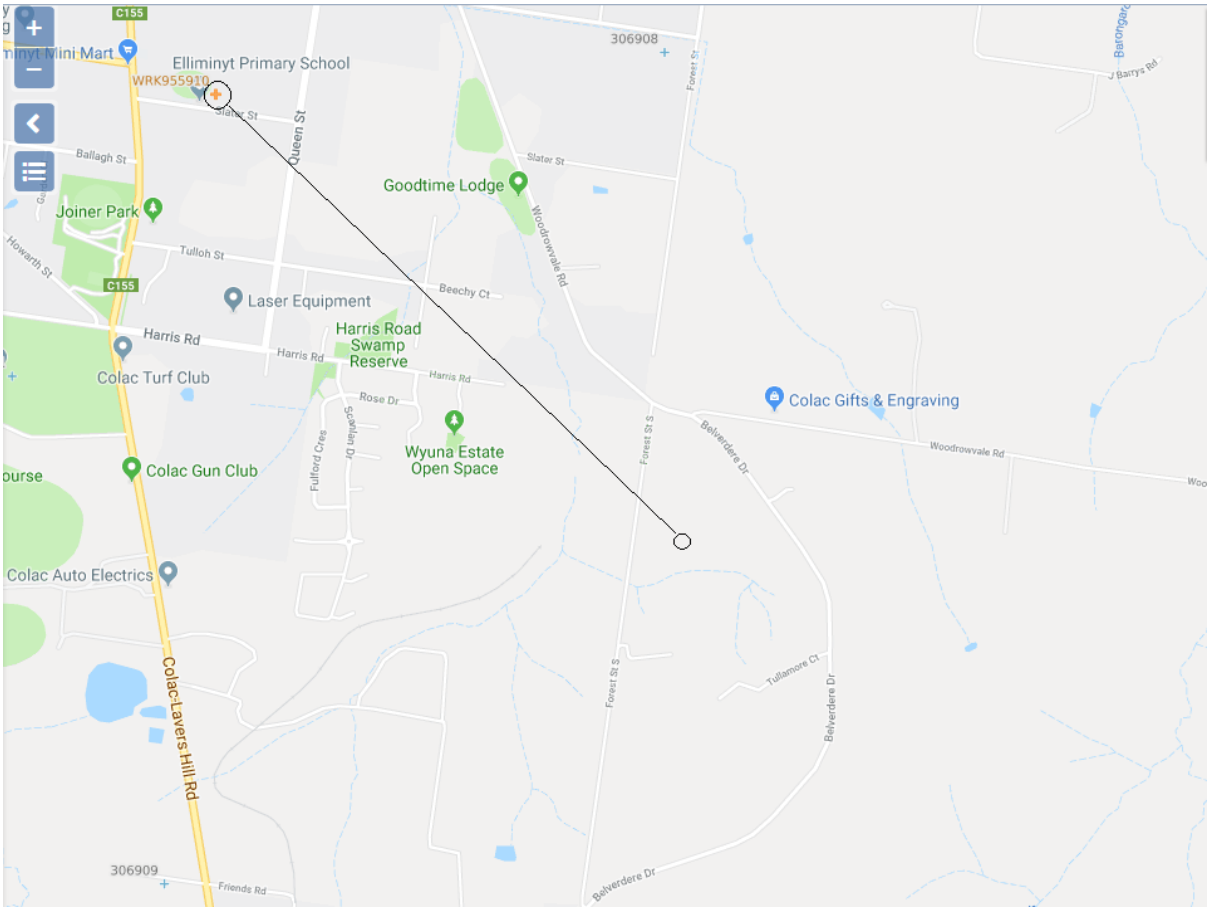


Fig 5. No bores near or within buffer zones of proposed LAA, closest 2.60klm to NW.

5.1 Groundwater(VVG)

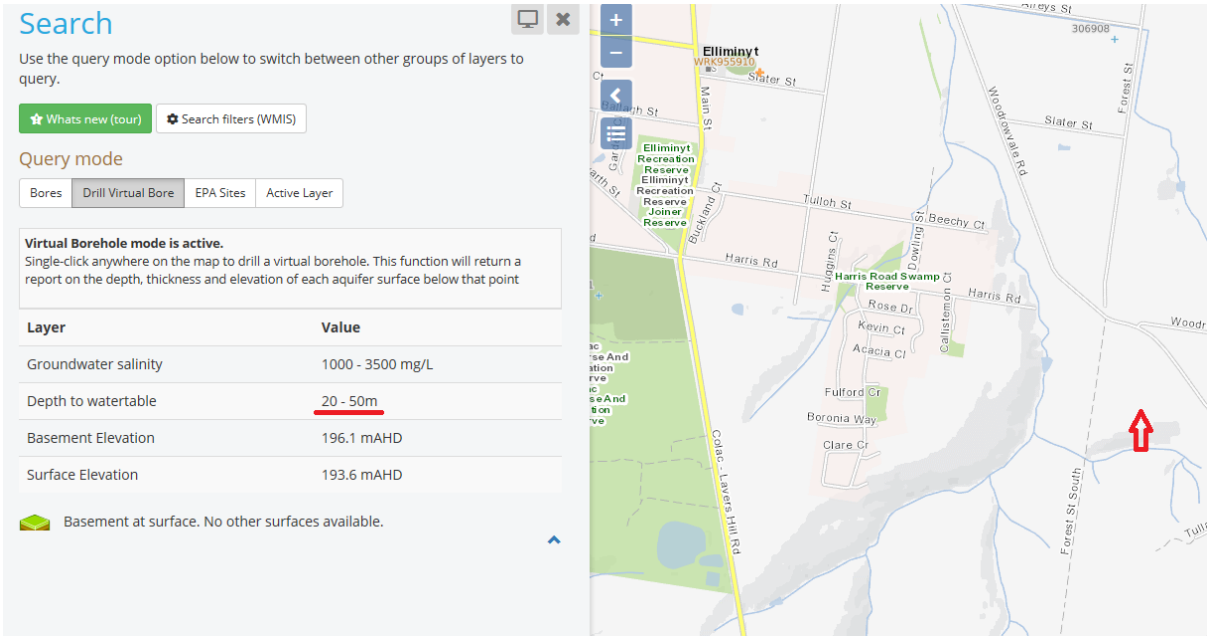


Fig 6 Subject land, tip red arrow, groundwater indicated at 20m-50m depth.

6.0 REGIONAL LAND USE

Fig 7.

Aerial image, subject land in red outline, indicates surrounding land use, principally grazing, with low density dwelling. (Planning Maps online)

Given the topography and low density residential zoning, off-site or cumulative impacts to adjoining property/s and or surface waters are not expected.

Currently the subject land is used for extensive grazing with minimal infrastructure aside from post and wire boundary fencing and plantation.

7.0 SITE INSPECTION & FIELD INVESTIGATIONS

Fig 8. View to west, possible LAA Site features on proposed Lot 2. (Source; Author).

Surface comprises an open, flat, cleared area of grassland part of an extensive grazing operation.

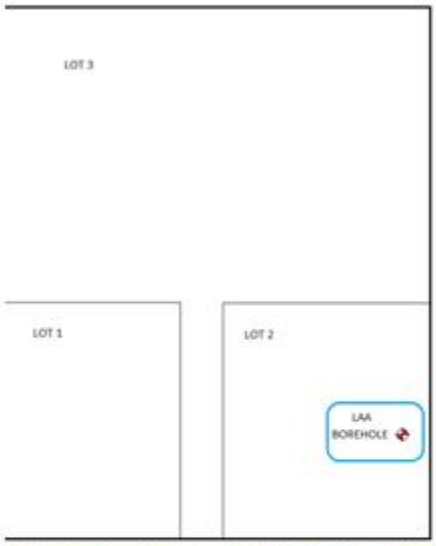
Site vegetation comprises grasses and weeds. No evidence of groundwater discharge or salinity was noted.

Proposed site displays moderate to good solar and wind exposure with some restrictions generated by the roadside plantation.

8.0 BORELOG

2020 ENGINEERING SOLUTIONS DATE 5 AUG 19
BORELOG REPORT ES19154 SITE; Lot 2 35 Forest St S.

Depth in mm			
000			Silty Sand 3b
550			Sandy Clay 5b
1800 END			



9.0 SOIL ANALYSIS

Nutrient Advantage®
Knowledge | Productivity | Responsibility

SOIL ANALYSIS REPORT

ASPAC

Report Number: 594141

2020 ENGINEERING SOLUTIONS L
DELAHUNTY
1745 COLAC FORREST RD
COLAC
VIC 3249

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Report Authorised
Paul Kennelly
Laboratory Manager
NATA Accredited Laboratory Number: 11958

Sample Number:	021908847	**Paddock Name:**	19140-2	**Date Sampled:**	1-Aug-2019
Test Code:	2014-022	**Sample Name:**	LOT 2	**Date Received:**	5-Aug-2019
Purchase Order No:	AS1289-1-2-1-1998	**Sample Depth:**	0 to 10 cm	**Date of Report:**	12-Aug-2019
Grower Name:	2020 ENGINEERING SOLUT				

Analyte	Result	Units	Method Code	Comments
Available Potassium ^	95	mg/kg	04-026-ICP8	Calculation
Emerson Class ^	3			Emerson, AS 1289.3.8.1
pH (1:5 CaCl2)	4.6		04-031-PH	1:5 soil/0.01M CaCl2
Potassium (Amm-acet.)	0.24	cmol(+)/kg	04-026-ICP8	
Calcium (Amm-acet.)	4.3	cmol(+)/kg	04-026-ICP8	
Magnesium (Amm-acet.)	1.8	cmol(+)/kg	04-026-ICP8	
Sodium (Amm-acet.)	0.46	cmol(+)/kg	04-026-ICP8	
Aluminium (KCl)	56	mg/kg	04-027-ICP9	
Aluminium (KCl)	0.63	cmol(+)/kg	04-027-ICP9	
Cation Exchange Capacity (Amm-acet.)	7.44	cmol(+)/kg	04-026-ICP8	Calculation
Sodium % of cations	6.2	%	04-026-ICP8	Calculation
Aluminium % of Cations	8.4	%	04-026-ICP8	Calculation
Calcium/Magnesium Ratio	2.4		04-026-ICP8	Calculation
pH (1:5 Water)	5.9		04-031-PH	1:5 soil/water
Electrical Conductivity (1:5 water)	0.05	dS/m	04-031-PH	1:5 soil/water

The results pertain only to the sample submitted.
This document shall not be reproduced except in full.
Analyses performed on soil dried at 40 °C and ground to 2mm or less.
^ NATA accreditation does not cover the performance of this service.
Accredited for compliance with ISO/IEC 17025 - Testing.
This results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national

Discussion

Results are typical for soils of this region and flag no concerns or constraints, individual results are discussed within MAV Tables in following sections.

10.0 SYSTEM SELECTION

10.1 DWMP Considerations

Colac Otway Shire Council Domestic Wastewater Management Plan - Technical Document

Barongarook

Drip and Spray Irrigation Systems* - Secondary Treated Effluent only

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)
	DIR (mm)	5	5	4	3.5	3	2
Development Type	Daily (L/day)	Total min. irrigation area required for zero wet weather effluent storage (m²)†					N/A
5 + bedroom residence	1,080	386		600	831	1,350	(Alternative Land Application System Required)
4 bedroom residence	900	322		500	693	1,125	
1-3 bedroom residence	720	258		400	554	900	

Note: * Irrigation system sizes are based on the assumption that the land application area is less than 10% slope. Reductions in DIR apply for slopes above 10% according to Table M2 of AS1547:2012
† not including spacing and setbacks

Conventional Absorption Trenches and Beds - Primary Treated Effluent

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Weak Loams & High/Mod Clay Loams (3 & 4)	Weak Clay Loams (4)	Light Clays (5)	Massive Clay Loams (4)	Medium to Heavy Clays (6)
	DLR (mm)	20*	20*	15	10				
Development Type	Daily (L/day)	Not supported (Alternative Land Application System Required)							
5 + bedroom residence	1,080								
4 bedroom residence	900								
1-3 bedroom residence	720								

Evapotranspiration-Absorption Trenches and Beds - Primary Treated Effluent (Category 1 to 5) and Secondary Treated Effluent only (Category 6)

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3a)	Weak/Massive Loams (3b)	High/Mod Clay Loams (4a)	Weak Clay Loams (4b) & Strong Light Clays (5)	Massive Clay Loams (4c) and Mod & Weak Light Clays (5b, 5c)	Medium to Heavy Clays (6) - Secondary Effluent Only
	DLR (mm)	20*	20*	15	10	12	8	5	5
Development Type	Daily (L/day)	Total min. basal or 'wetted area' required for zero wet weather storage (m²) not including spacing & setbacks							441
5 + bedroom residence	1,080	82		87	145	115	199	441	
4 bedroom residence	900	52		73	121	96	166	368	
1-3 bedroom residence	720	42		58	97	77	133	294	

Note: * Gravels, Sands and sandy loams are unsuitable for conventional absorption trenches and beds if there is a high watertable, including seasonal and perched watertable. Value based on average of conservative rate and maximum rate for Category 2b and 3a soils in AS1547:2012

LPED Irrigation Systems - Primary or Secondary Treated Effluent

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)
	DIR (mm)	N/A	4	3.5	N/A	N/A	N/A
Development Type	Daily (L/day)	(Alternative Land Application System Required)	Total min. basal or 'wetted area' (m²)†		(Alternative Land Application System Required)	(Alternative Land Application System Required)	(Alternative Land Application System Required)
5 + bedroom residence	1,080		744	1,135			
4 bedroom residence	900		620	946			
1-3 bedroom residence	720		496	757			

† required for zero wet weather storage (m³) not including spacing & setbacks

Wick Trenches and Beds - Secondary Treated Effluent Only

	Soil Category	Gravels & Sands (1)	Sandy Loams (2) Loams (3) & High/Mod Clay Loams (4a,b)	Weak Clay Loams (4)	Massive Clay Loams (4)	Strong Light Clays (5a)	Moderate Light Clays (5b)	Weak Light Clays (5c)	Medium to Heavy Clays (6)
	DLR (mm)	25	30	20	10	12	8	8	5
Development Type	Daily (L/day)	Total min. basal or 'wetted area' required for zero wet weather storage (m²) not including spacing & setbacks							441
5 + bedroom residence	1,080	49	40	62	145	115	199	199	
4 bedroom residence	900	41	33	52	121	96	166	166	368
1-3 bedroom residence	720	33	27	42	97	77	133	133	294

Whitehead and Associates Environmental Consultants

Comment

Data from Barongarook is used as the closest available location, which will also provide a measure of safety as Barongarook has a higher rainfall. From the DWMP, the only supported disposal system is ETA trenches. Sizing table indicates 284m2 will be required, this is under the allowable area of 315m2.

11.0 SIZING THE EFFLUENT DISPOSAL SYSTEM (MAV)

Irrigation area sizing using Nominated Area Water Balance for Zero Storage

Site Address: Forest St.S.

Date: Assessor: MD

INPUT DATA

Design Wastewater Flow	Q	720	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Irrigation Rate	DIR	5.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
Nominated Land Application Area	L	2000	m^2	[1]
Crop Factor	C	0.6-0.8	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type[2]
Rainfall Runoff Factor	RF	0.9	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff
Mean Monthly Rainfall Data		DWMP		BoM Station and number
Mean Monthly Pan Evaporation Data		DWMP		BoM Station and number

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
OUTPUTS																
Days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	**365**
Evapotranspiration	ET	ExC	mm/month	106	88	64	38	20	13	16	22	39	65	78	97	**645.8**
Percolation	B	DIRxD	mm/month	155.0	140	155.0	150.0	155.0	150.0	155.0	155.0	150.0	155.0	150.0	155.0	**1825.0**
Outputs		ET+B	mm/month	261.4	228	218.7	187.8	175.4	163.2	170.6	177.2	188.5	219.8	228.4	251.8	**2470.8**
Rainfall	R		mm/month	44	41	52	73	86	98	108	106	99	97	69	57	**930**
Evaporation	E		mm/month	133	110	91	54	34	22	26	37	55	81	98	121	**862**
Crop Factor	C		unitless	0.80	0.80	0.70	0.70	0.60	0.60	0.60	0.60	0.70	0.80	0.80	0.80	
INPUTS																
Retained Rainfall	RR	RxRF	mm/month	37.4	34.85	44.2	62.05	73.1	83.3	91.8	90.1	84.15	82.45	58.65	48.45	**790.5**
Applied Effluent	W	(QxD)/L	mm/month	11.2	10.1	11.2	10.8	11.2	10.8	11.2	11.2	10.8	11.2	10.8	11.2	**131.4**
Inputs		RR+W	mm/month	48.6	44.9	55.4	72.9	84.3	94.1	103.0	101.3	95.0	93.6	69.5	59.6	**921.9**
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-212.8	-183.1	-163.3	-115.0	-91.1	-69.1	-67.6	-75.9	-93.6	-126.2	-159.0	-192.2	
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Maximum Storage for Nominated Area	N		mm	0.00												
	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	100	104	128	172	218	270	283	256	207	163	127	110	

MINIMUM AREA REQUIRED FOR ZERO STORAGE: 284.0 m^2

CELLS

	Please enter data in blue cells
XX	Red cells are automatically populated by the spreadsheet
XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS

NOTES

[1] This value should be the largest of the following: land application area required based on the most limiting nutrient balance or minimum area required for zero storage

[2] Values selected are suitable for pasture grass in Victoria

Victorian Land Capability Assessment Framework

Trench & Bed Sizing

FORMULA FOR TRENCH AND BED SIZING				
L = Q/DLR x W			From AS/NZS 1547:2012	
Where:	Units			
L = Trench or bed length	m		Total trench or bed length required	
Q = Design Wastewater Flow	L/day		Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)	
DLR = Design Loading Rate	mm/day		Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)	
W = Trench or bed width	m		As selected by designer/installer	
INPUT DATA				
Design Wastewater Flow	Q	720	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Loading Rate	DLR	5.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
Trench basal area required	B	144.0	m^2	
Selected trench or bed width	W	0.6	m	As selected by designer/installer
OUTPUT				
Required trench or bed length	L	240.0	m	
CELLS				
		Please enter data in blue cells		
	XX	Red cells are automatically populated by the spreadsheet		
	XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS		

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet

Nitrogen Balance

Site Address: Forest St.S.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE 239 m^2

INPUT DATA[1]

Wastewater Loading			Nutrient Crop Uptake					
Hydraulic Load	720	L/day	Crop N Uptake	220	kg/ha/yr	which equals	60.27	$mg/m^2/day$
Effluent N Concentration	25	mg/L						
% N Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal						
Total N Loss to Soil	3600	mg/day						
Remaining N Load after soil loss	14400	mg/day						

NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer			Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)		
Nitrogen	239	m^2	Nominated LAA Size	2000	m^2
			Predicted N Export from LAA	-38.74	kg/year
			Minimum Buffer Required for excess nutrient	0	m^2

CELLS

	Please enter data in blue cells
XX	Red cells are automatically populated by the spreadsheet
XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS

NOTES

[1] Model sensitivity to input parameters will affect the accuracy of the result obtained. Where possible site specific data should be used. Otherwise data should be obtained from a reliable source such as:

- *EPA Guidelines for Effluent Irrigation*
- *Appropriate Peer Reviewed Papers*
- *Environment and Health Protection Guidelines: Onsite Sewage Management for Single Households*
- *USEPA Onsite Systems Manual*

Comment

The foregoing DWMP Tables indicate disposal area of 284m2 while the MAV calculations indicate 240m of trench will be required. This would be for up to 3 bedrooms.

Nitrogen balance is less than water balance so is not a constraining factor.

For primary treated effluent, ETA trenches are the only supported disposal method, however with secondary treatment, wick trenches is an option but subsurface irrigation would require too much area.

12.0 Site Plan.

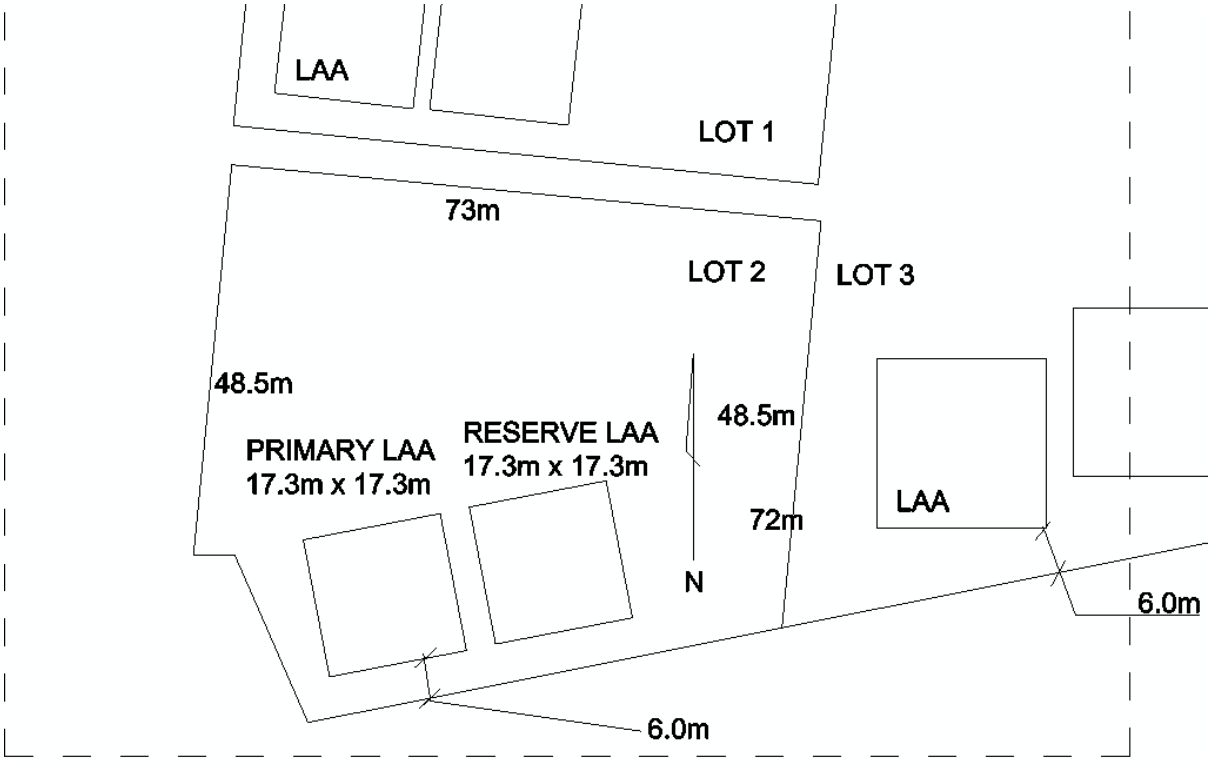


Fig 10. Site Plan

Probable location of primary LAA and reserve LAA which occupy less than 15% of proposed allotment.

Final location and position of dwelling, treatment plant, shedding etc will be at direction of developer.

12.1 Applicable Setback Distances (from AS1547:2012)

Landscape Feature / Structure	* Setback Distances (m)					
	Primary Treated Effluent		Secondary Sewage &Grey water Effluent		Advanced Secondary Grey water Effluent	
BUILDING						
Wastewater field up-slope of building		6	x	3		3
Wastewater field down-slope of building		3	x	1.5		1.5
Wastewater field up-slope of cutting/escarpment		15	x	15		15
ALLOTMENT BOUNDARY						
Wastewater field up-slope of adjacent lot		6	x	3		1
Wastewater field down-slope of adjacent lot		3	x	1.5		0.5
SERVICES						
Water supply pipe		3	x	1.5		1.5
Wastewater field up-slope of potable supply channel		300	x	150		150
Wastewater field down-slope of potable supply channel		20	x	10		10
Gas supply pipe		3	x	1.5		1.5
In-ground water tank		15	x	4		3
Stormwater drain		6	x	3		2
RECREATION AREAS						
Children's grassed playground		6	x	3		2
In-ground swimming pool		6	x	3		2
SURFACE WATERS UP-SLOPE OF						
Dam, lake or reservoir (potable water supply)		300	x	150		150
Waterways (potable water supply)		100	x	100		50
Waterways, wetlands (continuous or ephemeral, non-potable); estuaries, ocean beach at high-tide mark; dams, lakes or reservoirs (stock & domestic, non-potable)		60	x	30		30
GROUNDWATER BORES						
Category 1 & 2a soils		NA		50		20
Category 2b – 6 soils		20	x	20		20
WATERTABLE						
Vertical depth from base of trench to highest seasonal water table		1.5	x	1.5		1.5
			x			
Vertical depth from irrigation pipes to highest seasonal water table		NA	x	1.5		1.5
			x			

*X indicates compliance can be achieved

SECTION TWO

MAV TABLES

Table 1: Key Site Features		
Feature	**Explanation**	**Assessment Process**
Aspect	The aspect or the direction that a slope is facing influences solar exposure.	Western aspect Excellent solar and wind exposure
Climate	Seasonal rainfall, evaporation and temperature patterns influence potential evapotranspiration in land application areas.	Incorporated into water balance spread sheet/s and LAA sizing.
Erosion and Landslip	Unstable areas (steep, unvegetated, dispersive soils etc.) are usually unsuitable for LAAs without mitigation.	No.
Fill (imported)	Capacity to assimilate effluent depends on the physical and chemical characteristics of the imported fill material(s).	No fill.
Flooding	Requirements for siting onsite wastewater infrastructure (including LAAs) away from areas subject to flooding can vary between Councils.	No, LAA set back and not in inundation zone.
Ground-water	Adequate depth of soil to protect groundwater resources largely depends on soil type and climate.	Not noted in boreholes VVG indicates at 20+m
LandSuitability	An LCA is used to determine which land is suitable and unsuitable for LAAs.	All land, except within buffer zones, suitable.
Landform	Landform shape and the position of LAAs on slopes influence drainage and runoff characteristics both onto any potential LAAs as well as downslope of them (i.e. will runoff be evenly shed, or concentrated or dispersed flows?).	See contour map attached Landscape with western aspect for LAA. Broad run-off

Feature	Explanation	Assessment Process
Rock Outcrops	Rock outcrops displace soil horizons and therefore can limit the assimilative capacity of LAAs for effluent. Outcrops can indicate shallow bedrock. Some rocks are strongly fissured and permeable and others are not.	No Rock
Setback Distances	Determining the most appropriate position for LAAs should be prioritised over placement of building areas.	See table from AS1547;2012 All compliant
Site Drainage	LAAs should be located in areas of good surface and subsurface (soil) drainage.	Good drainage, slight slope on land allowing slow run-off but no pooling.
Stormwater Run-on and Runoff	LAAs should not be located in areas with high run-on, without mitigation such as upslope diversion structures. Downslope runoff diversion may be useful.	Due to broad hillside, soil type and vegetation no concentrated run-on.
Slope	Land application of effluent becomes increasingly constrained with increasing slope gradient, increasing the chances of effluent runoff or subsurface seepage.	Slope of LAA land generally around 5.0%
Surface Waters	Whether the setback distances specified in the Code can be achieved from LAAs.	Adequate setback from surface water/inundation zones.
Vegetation	Good vegetation cover is important to prevent erosion as well as for uptake of water and nutrients from effluent.	Grasses.

Table 2: Description of Key Chemical and Physical Soil Features		
Feature	**Explanation**	**Assessment Process**
Cation Exchange Capacity	Influences the ability of the soil to hold and exchange cations; a major controlling agent for soil structural stability, nutrient availability for plants and the soil's reaction to fertilisers and other ameliorants (refer to Hazelton & Murphy, 2007).	7.44cmol(+)/kg No constraint
Colour and Mottling	Gleyed soils indicate permanent saturation (permanent watertable), while orange, yellow and red mottles indicate seasonal saturation with intermittent periods of drying (perched or seasonal watertable).	No mottling noted
Electrical Conductivity **(EC)**	EC test result infers the salinity of the soil and its potential impact on plant growth on the LAA. Refer to Hazelton & Murphy (2007) for interpretation of EC test results. Application of effluent increases salt content of soils over time.	0.05dS/m <0.2 dS/m No constraint Very low level of soil salinity.

Feature	Explanation	Assessment Process
Emerson Aggregate Class	EAC results infer dispersibility (as ped slaking, soil dispersion or both). LAAs should not be installed in soils with moderate or high dispersibility, without adequate mitigation (e.g. addition of gypsum, use of irrigation).	3 Slightly dispersive probably due to moderate levels of Al. Minor constraint overall as the pH is within optimum range.
Permeability and Design Loading Rate	The rate at which water moves through the soil reflects the soil's permeability and determines the rate at which effluent is applied to land in litres per square metre per day (mm per day). The application rate for each type of land dispersal and recycling system is listed in Table 9 in the Code. Whilst the loading rate for LAA design is based on the permeability, it is less than the true permeability.	Adopted DIR, 5.
pH	Acid soils (pH <5) or alkaline soils (pH >8) may constrain plant growth and should be ameliorated by use of chemical additives (e.g. lime for acidity).	5.9 Slightly more acid than the adjoining allotments however within optimum range of 5.5-7.5
Rock Fragments	Coarse rock fragments displace soil volume and therefore can limit assimilative capacity of soils.	No
Sodicity **[Exchangeable Sodium Percentage (ESP)]**	The percentage of sodium compounds on cation exchange sites on soil particles. ESP >6% may cause damage to the soil structure. Refer to Hazelton & Murphy (2007). Effluent and greywater contain sodium.	6.2% > 6% minor constraint mitigated by application of gypsum to LAA soil
Sodium Absorption Ratio (SAR)	The ratio of sodium to calcium and magnesium (beneficial elements) in the soil solution, with higher ratios potentially damaging to plants and soils.	72:1 High ratio of beneficial elements, but high level of Al.

Feature	Explanation	Assessment Process
Soil Depth	Deeper soils generally have a greater assimilative capacity for effluent (depending on soil type).	>1.8m No constraint
Soil Texture	Soil textures are categorised as 1. Gravels and Sands 2. Sandy Loams 3. Loams 4. Clay Loams 5. Light Clays, or 6. Medium to Heavy Clays (AS/NZS1547:2012).	Light Clay No constraint
Watertable (depth to)	The required soil depth to protect groundwater depends on soil type; high permeability soils generally require a greater separation distance (soil depth).	+20m No constraint

Comment;

Minor constraint due to high percentage of sodium cations, mitigation by application of gypsum (F. Baker, and C. Gourley Agnote 2011).

Application rate will depend upon type of gypsum, dry/hydrated/granular, and depend upon advice from supplier.

Table 3: Risk Assessment of Site Characteristics

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Aspect (affects solar radiation received)	North / North-East / North-West	East / West / South-East / South-West	South	MODERATE
Climate (difference between annual rainfall and pan evaporation)	Excess of evaporation over rainfall in the wettest months	Rainfall approximates to evaporation	Excess of rainfall over evaporation in the wettest months	MODERATE
Erosion [1] (or potential for erosion)	Nil or minor	Moderate	Severe	NIL
Exposure to sun and wind	Full sun and/or high wind or minimal shading	Dappled light	Limited patches of light and little wind to heavily shaded all day	NIL
Fill [2] (imported)	No fill or minimal fill, or fill is good quality topsoil	Moderate coverage and fill is good quality	Extensive poor quality fill and variable quality fill	NIL
Flood frequency (ARI) [3]	Less than 1 in 100 years	Between 100 and 20 years	More than 1 in 20 years	NIL
Groundwater bores [4]	No bores onsite or on neighbouring properties	Setback distance from bore complies with requirements in EPA Code of Practice 891.3 (as amended)	Setback distance from bore does not comply with requirements in EPA Code of Practice 891.3 (as amended)	NIL

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Land area available for LAA	Exceeds LAA and duplicate LAA and buffer distance requirements	Meets LAA and duplicate LAA and buffer distance requirements	Insufficient area for LAA	NIL
Landslip (or landslip potential) [5]	Nil	Minor to moderate	High or Severe	NIL
Rock outcrops (% of surface)	<10%	10-20%	>20%	NIL
Slope Form (affects water shedding ability)	Convex or divergent side-slopes	Straight side-slopes	Concave or convergent side-slopes	NIL
Slope gradient [6] **(%)**				
(a) for absorption trenches and beds	<6%	6-15%	>15%	NIL
(b) for surface irrigation	<6%	6-10%	>10%	
(c) for subsurface irrigation	<10%	10-30%	>30%	
Soil Drainage [7] **(qualitative)**	No visible signs or likelihood of dampness, even in wet season	Some signs or likelihood of dampness	Wet soil, moisture-loving plants, standing water in pit; water ponding on surface, soil pit fills with water	NIL

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Stormwater run-on	Low likelihood of stormwater run-on		High likelihood of inundation by stormwater run-on	MINOR
Surface waters - setback distance (m) [3]	Setback distance complies with requirements in EPA Code of Practice 891.3 (as amended)		Setback distance does not comply with requirements in EPA Code of Practice 891.3 (as amended)	MINOR
Vegetation coverage over the site	Plentiful vegetation with healthy growth and good potential for nutrient uptake	Limited variety of vegetation	Sparse vegetation or no vegetation	MINOR

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Soil Drainage [8] (Field Handbook definitions)	Rapidly drained. Water removed from soil rapidly in relation to supply, excess water flows downward rapidly. No horizon remains wet for more than a few hours after addition	Well drained. Water removed from the soil readily, excess flows downward. Some horizons may remain wet for several days after addition	Moderately well drained. Water removed somewhat slowly in relation to supply, some horizons may remain wet for a week or more after addition	Imperfectly drained. Water removed very slowly in relation to supply, seasonal ponding, all horizons wet for periods of several months, some mottling	Poorly/Very poorly drained. Water remains at or near the surface for most of the year, strong gleying. All horizons wet for several months	MINOR

Comment;

The above MAV tables indicates two Moderate constraints, aspect and climate. Climate constraint mitigated by incorporating rainfall into LAA sizing. Aspect is difficult to mitigate but suitable moisture tolerant vegetation would be advisable whilst being mindful of the slight tendency to acidity.

SECTION THREE

SITE MANAGEMENT PLAN

Attached

[X] Yes [ ] No

2020 ENGINEERING SOLUTIONS

2020 Engineering Solutions

1745 Colac–Forrest Road

COLAC VIC 3249

Ph: 0428 141 441 Fax: (03) 5233 4608

ABN 57 215 499 312 ACN 11 9460 865

www.2020es.com

PROPERTY MANAGEMENT PLAN

SITE: 35 Forest St. S. Elliminyt

DEVELOPER: A & G Lamanna

REPORT NUMBER: ES19140

DATE: 10/08/2019

REPORTING TO: AS 1547:2012

On-site domestic wastewater management

EPA Publication 891.4 July 2016

Code of Practice Onsite Wastewater Management

Barwon Water / Wannon Water

CONTENTS

1 PREAMBLE

This Property Management Plan is intended for use by property owners in Barwon/Wannon Water drinking water supply catchments. It is written for occupancies with onsite wastewater treatment systems, but also applies to other developments where management of risk to downstream water quality is required.

This document must not be considered a definitive plan or control for all properties and wastewater systems. The landowner property management plan is drafted with consideration to planning permit requirements, EPA Publication 891.4 "Code of Practice Onsite Wastewater Management", the Land Capability Assessment, and AS1547:2012 "On-site domestic wastewater management".

The plan must be maintained by the landowner and amended when required. Any increased loading on the property or system failure requires the review of the existing Land Capability Assessment and Waste Water Management System. Any amendment to the plan must be submitted to Barwon/Wannon Water for endorsement.

The plan must be kept on site and be available for inspection by Council or other government agencies.

1.1 Property Owner Responsibilities

Property owners and occupiers are responsible for reducing risks to downstream water quality that originate from their property. This includes:

- ensuring pipework & wastewater systems don't leak;
- keeping wastewater systems well maintained & in good repair;
- appropriately managing herbicides, pesticides & other chemicals;
- minimising erosion & sediment movement;
- maintaining buffers of native vegetation around watercourses;
- compliance with Council and EPA requirements; and
- implementing this Property Management Plan.

2 EMERGENCY CONTACT NUMBERS

PROPERTY MANGEMENT PLAN	
EMERGENCY OR ONSITE WASTEWATER MAINTENANCE CONTACT NUMBERS	
POLICE, AMBULANCE, FIRE	000
PLUMBER	To be advised
ELECTRICIAN	To be advised
COUNCIL ENVIRONMENTAL HEALTH OFFICER	Golden Plans Shire
EPA	1300 372 842
SYSTEM SUPPLIER	COLAC CEMENT PRODUCTS 03 5231 5231
SYSTEM SERVICE AGENT	COLAC CEMENT PRODUCTS 03 5231 5231
SEPTIC PUMPOUT TANKER	RICHARDSON'S LIQUID WASTE 03 5234 6585
BARWON WATER	1300 656 007

If any of the following incidents, which could impact on downstream water quality, occur on site they should be reported to Barwon Water immediately:

Chemical spill Fuel spill Bushfire Landslip

3 SITE PLAN

Site plans drawn to scale (attached) show dimensions and include the following details:

- the site address, including lot number & street number;
- title boundaries;
- direction of north;
- location of groundwater bores on the site & adjacent properties;
- contour lines (at 1 - 10 m intervals), or direction of slope & slope in percent;
- location of dams & waterways onsite & within 100m of the property;
- drainage lines & springs;
- stormwater cut-off drains adjacent to land application area & treatment system;
- location of actual & proposed buildings, sheds, driveways, paths & paddocks;
- location of actual & proposed infrastructure, especially drains;
- location& dimensions of the wastewater treatment plan; and
- location& dimensions of the land application area.

The site plan must be amended when any of the above details change (including on issue of as-constructed drawings), and the amended plan must be provided to Barwon/Wannon Water.

4 DETAILS OF THE WASTEWATER TREATMENT SYSTEM

The plan requires the following details of the wastewater treatment system:

- manufacturer's manuals & spare parts list;
- as-installed drawings;
- copy of EPA Certificate of Approval;
- copy of Council wastewater system permit;
- description of the maintenance regime, to meet manufacturer's recommendations & the maintenance, monitoring & reporting requirements of the Council permit & the EPA certificate of approval; and
- in the case of a secondary treatment system, a copy of a current service contract with an accredited or experienced trained service technician to implement the maintenance regime.

All details relevant to the above will be available and submitted after issue of the permit as they are post developmental.

Sewage Treatment Plants

Envirosep SP2000 technology delivers low maintenance & operating costs

Through a continual research and development program, Envirosep have designed and manufactured the SP2000. A unit that meets and exceeds consumer demands of an efficient, low maintenance wastewater treatment system.

SP2000 Features and Benefits

Economical
The efficiency of an aerated wastewater treatment system is measured by the transfer of air to the micro-organisms used in the biological process to remove waste.

Quiet Operation
Smooth agitation to ensure there are no dead pockets where bio-solids can build up and timed aeration for minimal maintenance.

Easily Hidden
Below ground multiple light weight tank construction makes for easier access to your site and provides more options for layout where space is restricted.

Maintenance

Access service pit allows easier maintenance of system and large bio -solids storage tank reduces the frequency of bio-solids pump-outs.

Great for your garden
The efficient fine bubble aeration combined with a unique Biotube design enhances the treatment. This will provide enough recycled water to irrigate a small to medium lawn area.

Performance Guaranteed
Warranty is provided on all components from date of installation and two years on electrical components against defects in manufacture.

Approved by the EPA – CA 125/14
Commercial models are also available with additional bio-media, back-up air pumps and water pumps for heavy duty domestic and/or trade use applications.

Specifications

Capacity – Primary pre-treatment tank:	3,200 litres
Aeration chamber:	2,200 litres
Humus tank:	1,000 litres
Contact tank:	300 litres
Total capacity:	6,700 litres
Tank construction:	Concrete
Tank dimensions:	1750mm dia x 2300mm
Weight of tanks:	3 tonnes each
Weight of Pump Well	1.2 Tonnes

Recommended for:

- Commercial installations
- EPA Approved, up to 5000 Litre daily
- System upgrades
- Existing homes
- Extensions
- New homes

Warranty

The Envirosep SP 2000 is fully guaranteed against any defects in manufacture. Electrical components of the system are warranted against defects in manufacture for two years from date of installation**.**

Service and Repairs

For more information about Envirosep service and repairs please contact:

SSA – Septic Systems Australia

Postal Address:
P.O. Box 432,
Montrose, VIC, 3765
Australia

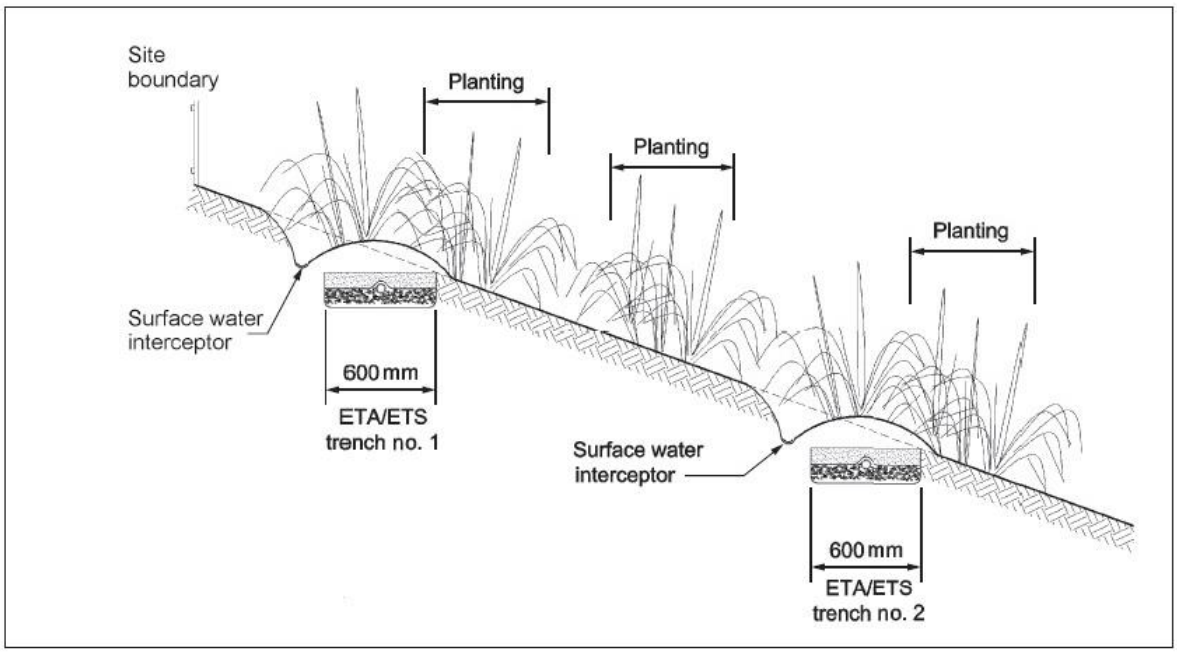
Phone: (03) 9509 6878
Fax: (03) 9509 6818
Mobile: 0438 118 445
Email:lmorley@septicsystemsaustralia.com.au

NOTE: Developer can supply treatment plant information post construction as most documentation relies upon approval to construct development and install a system. Included as example only. 2020Eng is independent and does not recommend particular systems.

5 DETAILS OF THE EFFLUENT DISPOSAL SYSTEM

NOTE: An LPED line can be used to dose load the ETA/ETS bed.

FIGURE L6 ETA/ETS BED DETAILS



NOTES:
1 An LPED line can be used to dose load the ETA/ETS trenches.
2 Each ETA/ETS trench is constructed to disperse effluent into downslope topsoil so that plantings can provide assistance by evapotranspiration.

The plan requires the following details of the effluent disposal system:

- manufacturer's manuals & spare parts list for components including pumps, valves, and filters;
- as-installed drawings; and
- description of the maintenance regime, to meet manufacturer's recommendations & the maintenance, monitoring & reporting requirements of Council & the EPA. At a minimum, visual inspection of the land application area is required whenever the treatment system is inspected.

All details relevant to the above will be available and submitted after issue of the permit as they are post developmental.

6 WASTEWATER TREATEMENT SYSTEM MAINTENANCE

The waste water treatment system, including its pipework shall:

- be inspected & maintained as per the maintenance regime;
- be protected from vehicle, farm machinery or livestock damage;
- have any grease trap inspected at least quarterly & cleaned out regularly;
- have any vents kept clear & access covers in working order;
- be visually checked for damage especially after being pumped out - damage is to be repaired; and
- be replaced if not operating adequately.

Inspections of treatment units are to be recorded on the operation and maintenance log as well as any defects and repairs undertaken.

7 LAND APPLICATION AREA (Effluent Disposal) OPERATION & MAINTENANCE

The following measures shall be implemented:

- the land application area & disposal system shall be inspected & maintained as per the maintenance regime;
- any evapotranspiration areas shall be designed to exclude vehicle, farm machinery, or stock access;
- surface water diversion drains shall be maintained upslope of & around the land application area & kept clean; and
- roof water drainage / hard stand drainage must be diverted away from the land application area.

Evapotranspiration and irrigation areas shall:

- have their grass mown & plants maintained to ensure these areas take up nutrients with maximum efficiency;
- be checked for wet spots, uneven grass colour 7 symptoms of emitter blockage (evidenced by under-irrigated dry areas or over-irrigated wet areas); and
- have blocked or damaged irrigation lines replaced.

Equipment shall be checked in the following manner:

- the manufacturer's instructions for maintaining & cleaning pumps, siphons & septic tank & outlet filters shall be followed;

- disc filters or filter screens on irrigation-dosing equipment shall be cleaned at least annually by rinsing back into the primary wastewater treatment unit; and

- irrigation lines shall be flushed at least annually to scour out any accumulated sediment.

Inspections are to be recorded on the Operations Log as well as any defects and repairs undertaken.

8 HOUSEHOLD MANAGEMENT OF WASTEWATER

The following measures should be implemented for optimum performance of system.

8.1 Sludge Build Up Reduction

- food waste including fats, grease & oils shall be disposed of in composting bin or worm farm
- no food waste disposal unit shall be installed
- sanitary napkins & hygiene products shall be disposed of in garbage

8.2 Encourage Bacteria

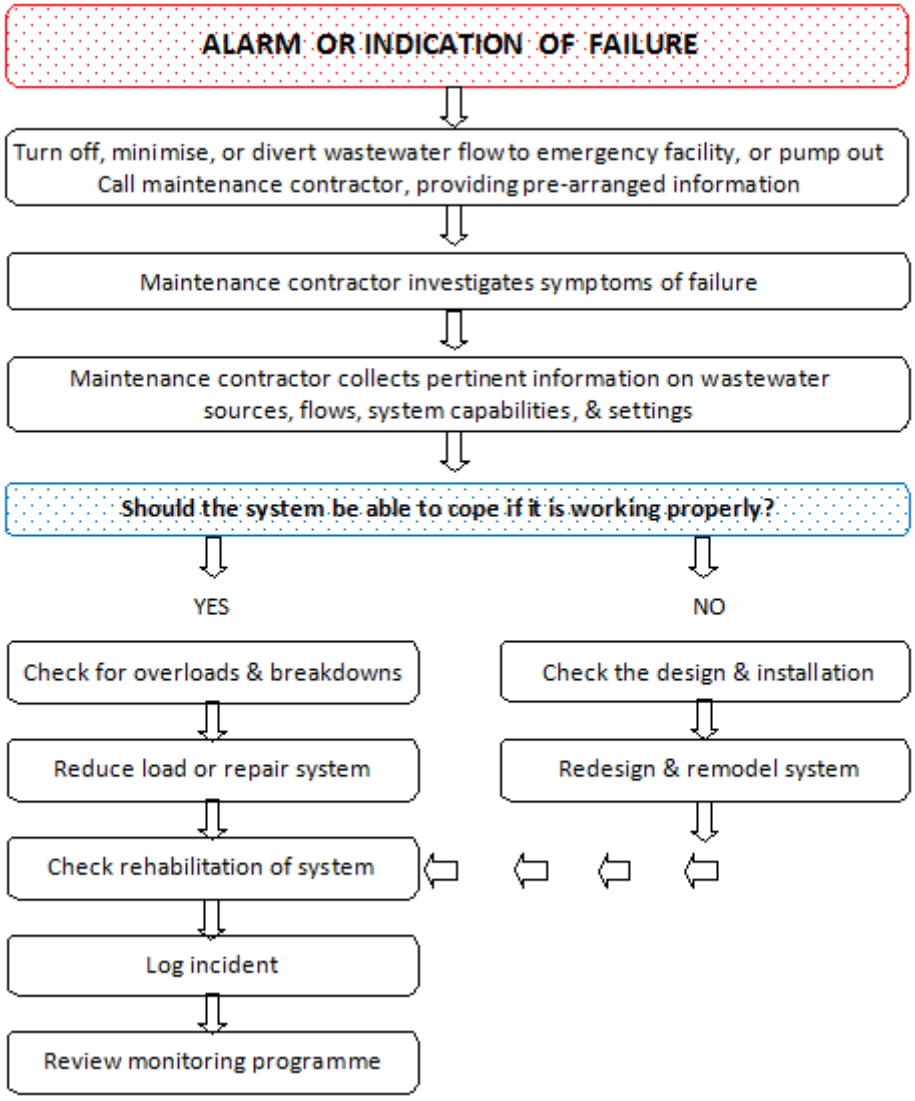
- use biodegradable soaps
- use low-phosphorus detergent
- use low-sodium detergent where soils are dispersive
- limit the use of cleaners such as bleaches, whiteners, nappy soakers & disinfectant, especially for toilet/shower cleaning
- do not put chemicals, thinners or paint down the drain or gulley trap

8.3 Reduce Effluent Volume Load

- install & use water conserving fittings ie. shower heads & appliances
- wash full loads only in dishwasher & washing machine
- avoid system overload ie. 1 washing machine load per day & run washing machine & dishwasher at different times
- do not install a spa bath

9 CONTINGENCY PLAN

The plan below shall be followed for a sudden failure of the wastewater system. A generalised flow chart of actions to be taken is:



(Figure 6.3 from AS1547:2012)

10 SITE OPERATIONS & MAINTENANCE LOG

A site operation and maintenance log shall be kept for any wastewater system. This will assist in the determination of recurring problems/trends. The maintenance log is to show when scheduled maintenance is due. Matters to be recorded in the log include:

- pump out records;

- service records;
- inspections; and
- records of all irregular operation & response actions.

Copies of programmed maintenance and pump out (desludging) works performed by maintenance contractors, as required by the Council (septic tank) permit, are to be forwarded to the Council Environmental Health Officer. A copy of the latest maintenance certificate is to be retained with this property management plan and recorded on the maintenance log.

11 IDENTIFICATION, RISK ASSESSMENT & CONTROLS FOR OTHER POTENTIAL THREATS TO DOWNSTREAM WATER QUALITY

The landholder is required to identify and assess the risk of other potential threats to downstream water quality, resulting from the development and use of the property ie.

- erosion risks; and
- risks from storage & application of chemicals.

Construction methods should be carried out in a manner which will minimise soil, sediment and nutrient movement from the property to water courses during development and use of the property. Potential sources of sediment movement to consider are:

- tracks& driveways;
- high traffic areas (vehicular, human, animal); and
- construction areas (occupancy, roads, fencing).

The design of stormwater run-off from the site should be described. Activities to encourage native vegetation retention and re-establishment within a 30 metre buffer zone along waterways, and to exclude stock from waterways, should be described. Activities to prevent the spread of noxious weeds should be described.

Chemicals such as herbicides and pesticides can be a risk to downstream water quality. The landowner should follow manufacturer's instructions and be familiar with the advice available from: http://www.depi.vic.gov.au/agriculture-and-food/farm-management/chemical-use. Procedures for chemical application and storage should be described in the Property Management Plan.

Businesses should contact Barwon/Wannon Water to determine if a water quality monitoring program immediately up and down stream of works that pose a significant threat to water quality is required. This may include:

- analytical monitoring of turbidity following large-scale activities that could potentially result in sediment movement (e.g. cultivation, harvesting); and
- monitoring of the active ingredients within herbicides and pesticides following intensive and broad scale herbicide/pesticide applications.

Appendix 1 Maintenance Log Template

Treatment System Inspections, Maintenance & Repairs			
Due Date (if scheduled)	Actual Date of Activity	Name of Inspector/ Contractor	Description of Work, Observations & Comments

Effluent Disposal Area Inspections, Maintenance & Repairs			
Due Date (if scheduled)	Actual Date of Activity	Name of Inspector/ Contractor	Description of Work, Observations & Comments

12 INSURANCE CERTIFICATE OF CURRENCY

Integro Insurance Brokers Limited
1st Floor • 71 Fenchurch Street • London
EC3A 4BS
Telephone: (0)20 7444 6000
Fax: (0)20 7444 6001
Website: www.integrouk.com

MONDAY, 03 SEPTEMBER 2018

CERTIFICATE OF CURRENCY

POLICY NUMBER:	**IL1805880**
TYPE:	PROFESSIONAL INDEMNITY INSURANCE as may be more fully defined in the policy wording.
INSURED:	2020 Engineering Solutions
ADDRESS:	1745 Colac-Forrest Road Colac VIC 3249 Australia
PERIOD OF INSURANCE:	From: 31st August 2018 To: 31st August 2019 Both days at 16:00 Hours Local Standard Time at the Principal Address of the Insured
LIMIT OF INDEMNITY:	AUD 2,000,000 any one Claim and in the aggregate including Costs and Expenses plus one reinstatement
PLACED WITH:	100% Certain Underwriters at Lloyd's

For and on behalf of Integro Insurance Brokers Limited

This certificate is a summary of the policy and is not intended to amend, extend, replace or override the policy terms and conditions. In the event of any consistency between this certificate and the policy, the policy prevails.

Authorised and regulated by the Financial Conduct Authority under reference number 305496
Registered Office: 1st Floor, 71 Fenchurch Street, London, EC3A 4BS
Registered Company No. 2957627

13 DISCLAIMER

2020 Engineering Solutions Pty Ltd ("2020")
Geotechnical Report Limitations

The report to which this document has been attached assesses risks arising from land slope instability and proposes risk minimisation solutions. Absolute risk avoidance cannot be assured, principally due to assessment cost factors. It is therefore necessary to rely on instructions and make assumptions.

Changed Conditions

The report may be invalidated by changed conditions including:-

1. topography.
2. soil moisture content.
3. above or below ground structures.
4. soil and substrate profiles.
5. location of site boundaries.

Causes of Changed Conditions

Changed conditions may occur due to:-

1. extreme conditions such as flood, drought, cold, heat or fire.
2. human activities.
3. natural processes.
4. planning or design requirements.

Client to inform 2020 of any changes

2020 will endeavour to identify any reasonably foreseeable risk factors on the site which may cause changed conditions. Samples are taken at reasonable intervals bearing in mind the cost to the client. In the absence of specific instructions or patent conditions it will be assumed that conditions observed in samples are consistent across the site.

This document is provided to inform the client that their responsibility for risk is shared with 2020. The client will be responsible for inaccurate instructions or failure to instruct in relation to changed conditions, events that may cause changed conditions or when it becomes evident that assumptions may be invalid. Failure to do so could result in substantial and costly damage and disputes.

Interpretation

The report must be considered in its entirety. Each part of the report may be dependent on other parts for meaningful interpretation. The report should also only be used by the client. It may not be relied upon by any other person without first conferring with 2020. The report should only be acted upon and interpreted by persons qualified and competent in the activities contemplated in the report.

130433 - 13 05 31 Geotechnical Report Limitation

LAND CAPABILITY ASSESSMENT

Lot 3/35 Forest St. Sth. Elliminyt Victoria

2020Engineering Solutions Report ES19140
8/9/2019

Welcome to our new format LCA.

Section 1.

Contains relevant information is presented in a concise, logical, trail following from regional perspective to site specific characteristics. Sample water balance calculations are incorporated to inform the Land Application Area tables

Section 2.

Contains the balance of information required under the DWMP, MAV and EPA 891.4

Section 3.

Property Management Report.

Report synopsis

This Report is to Lot 3 of the proposed subdivision of the subject land. Lot 3 comprises a 1.152Ha portion of the 1.9829Ha property.

As a result of the site, soil and surrounds investigation it is our opinion that the proposed allotment can support the development of up to a 5 bedroom dwelling.

REPORT CONTENTS

REPORT SUMMARY/EXECUTIVE SUMMARY

This Report is to a possible 5 bedroom dwelling on Lot 3 of a proposed subdivision of the subject land.

Wastewater disposal via primary treatment plant coupled to 300m of ETA trenches covering no less than 441m2.

With an equal sized reserve area the total disposal area comprises less than 10% of Lot 3.

SECTION ONE

1.0 INTRODUCTION & BACKGROUND

Fig 1. Subject Land site location and surrounding land use (Planning Maps Online)

2.0 PLANNING REPORT

PLANNING PROPERTY REPORT

VICTORIA State Government | Environment, Land, Water and Planning

From www.planning.vic.gov.au on 16 July 2019 05:58 PM

PROPERTY DETAILS

Address:	35 FOREST STREET SOUTH ELLIMINYT 3250
Lot and Plan Number:	Lot 1 PS441080
Standard Parcel Identifier (SPI):	1\PS441080
Local Government Area (Council):	COLAC OTWAY www.colacotway.vic.gov.au
Council Property Number:	21827
Planning Scheme:	Colac Otway planning-schemes.delwp.vic.gov.au/schemes/colacotway
Directory Reference:	VicRoads 92 B7

UTILITIES

Rural Water Corporation:	Southern Rural Water
Urban Water Corporation:	Barwon Water
Melbourne Water:	outside drainage boundary
Power Distributor:	POWERCOR

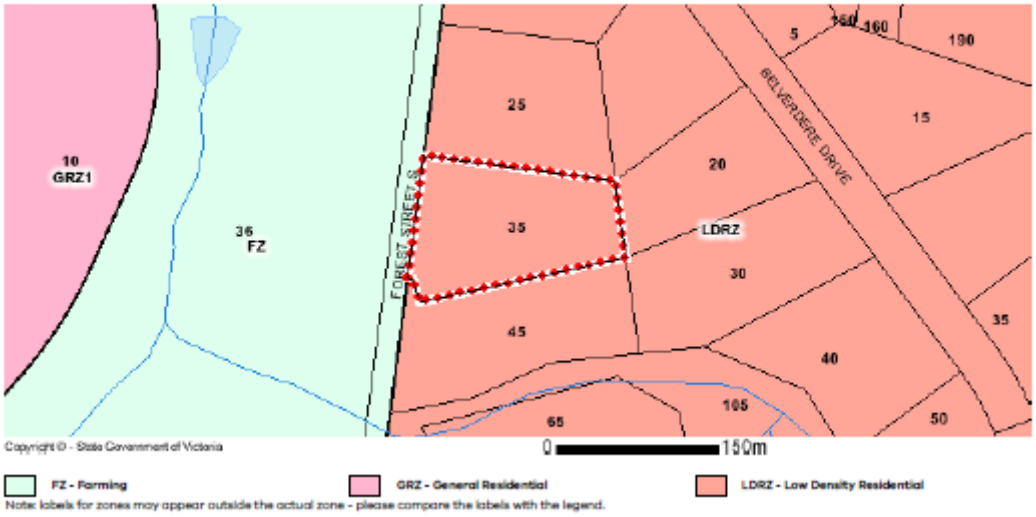
STATE ELECTORATES

Legislative Council:	WESTERN VICTORIA
Legislative Assembly:	POLWARTH

Planning Zones

LOW DENSITY RESIDENTIAL ZONE (LDRZ)

SCHEDULE TO THE LOW DENSITY RESIDENTIAL ZONE (LDRZ)



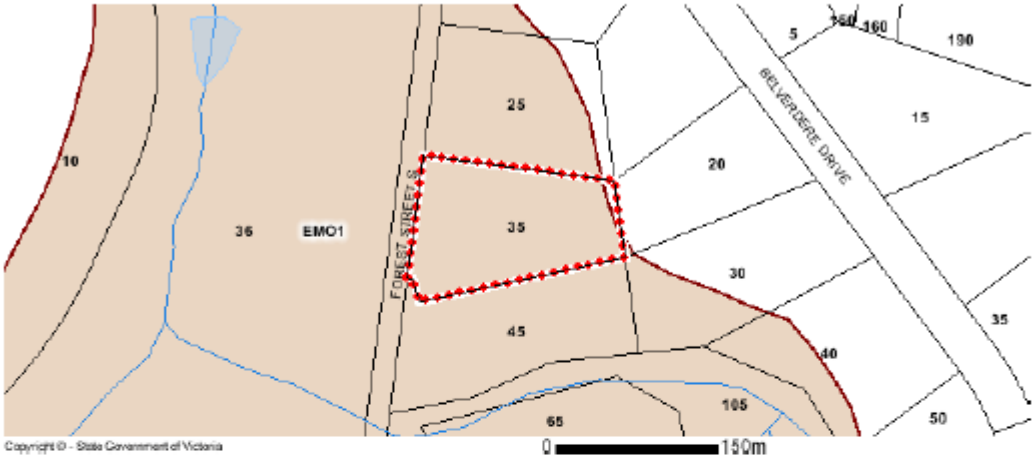
Subject land zoned Low Density Rural Living Zone

PLANNING PROPERTY REPORT

Planning Overlays

EROSION MANAGEMENT OVERLAY (EMO)

EROSION MANAGEMENT OVERLAY - SCHEDULE 1 (EMO1)

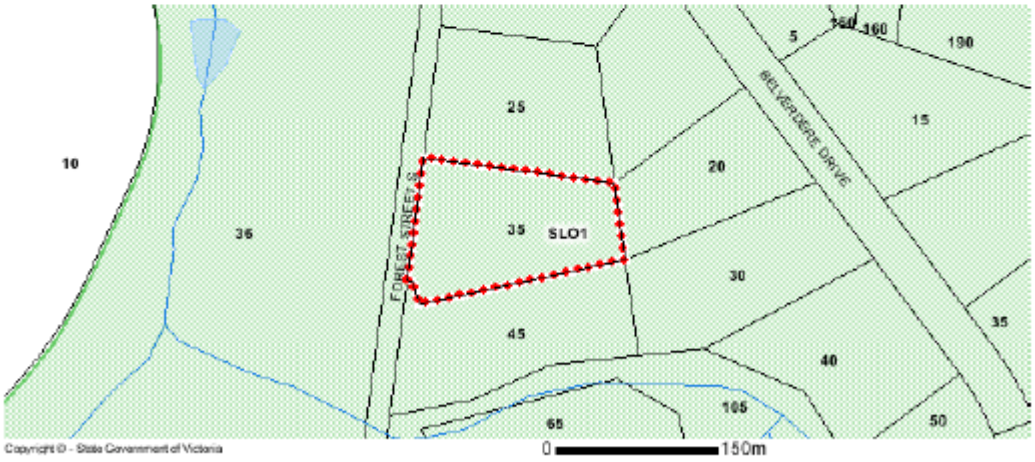


EMO - Erosion Management

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

SIGNIFICANT LANDSCAPE OVERLAY (SLO)

SIGNIFICANT LANDSCAPE OVERLAY - SCHEDULE 1 (SLO1)



SLO - Significant Landscape

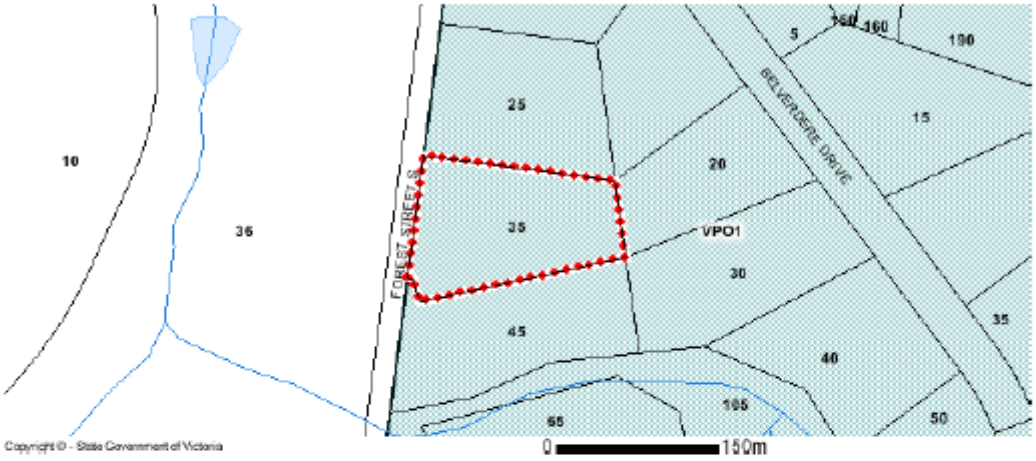
Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend.

PLANNING PROPERTY REPORT

Planning Overlays

VEGETATION PROTECTION OVERLAY (VPO)

VEGETATION PROTECTION OVERLAY - SCHEDULE 1 (VPO1)



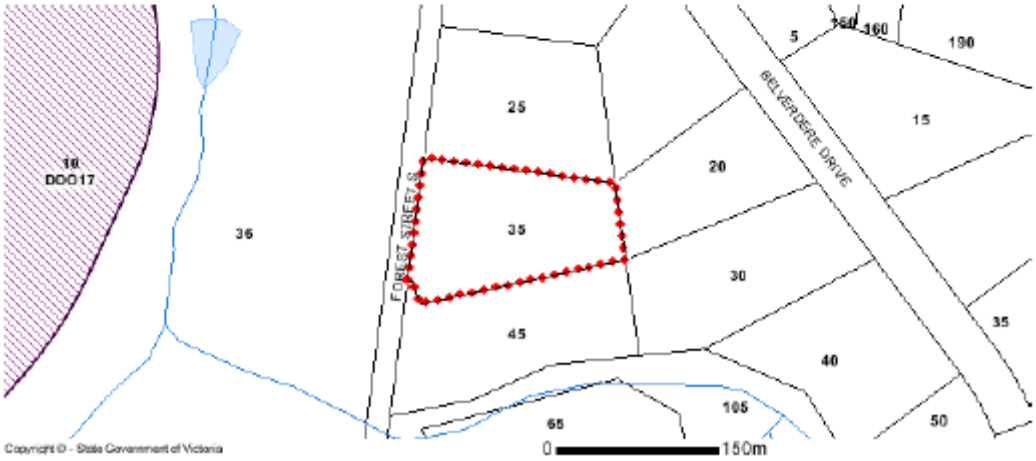
VPO - Vegetation Protection

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

OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

DESIGN AND DEVELOPMENT OVERLAY (DDO)



DDO - Design and Development

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

Overlays

EMO SLO VPO

3.0 DECLARED WATER CATCHMENT AREA

Site is not within DWCA (DWMP)

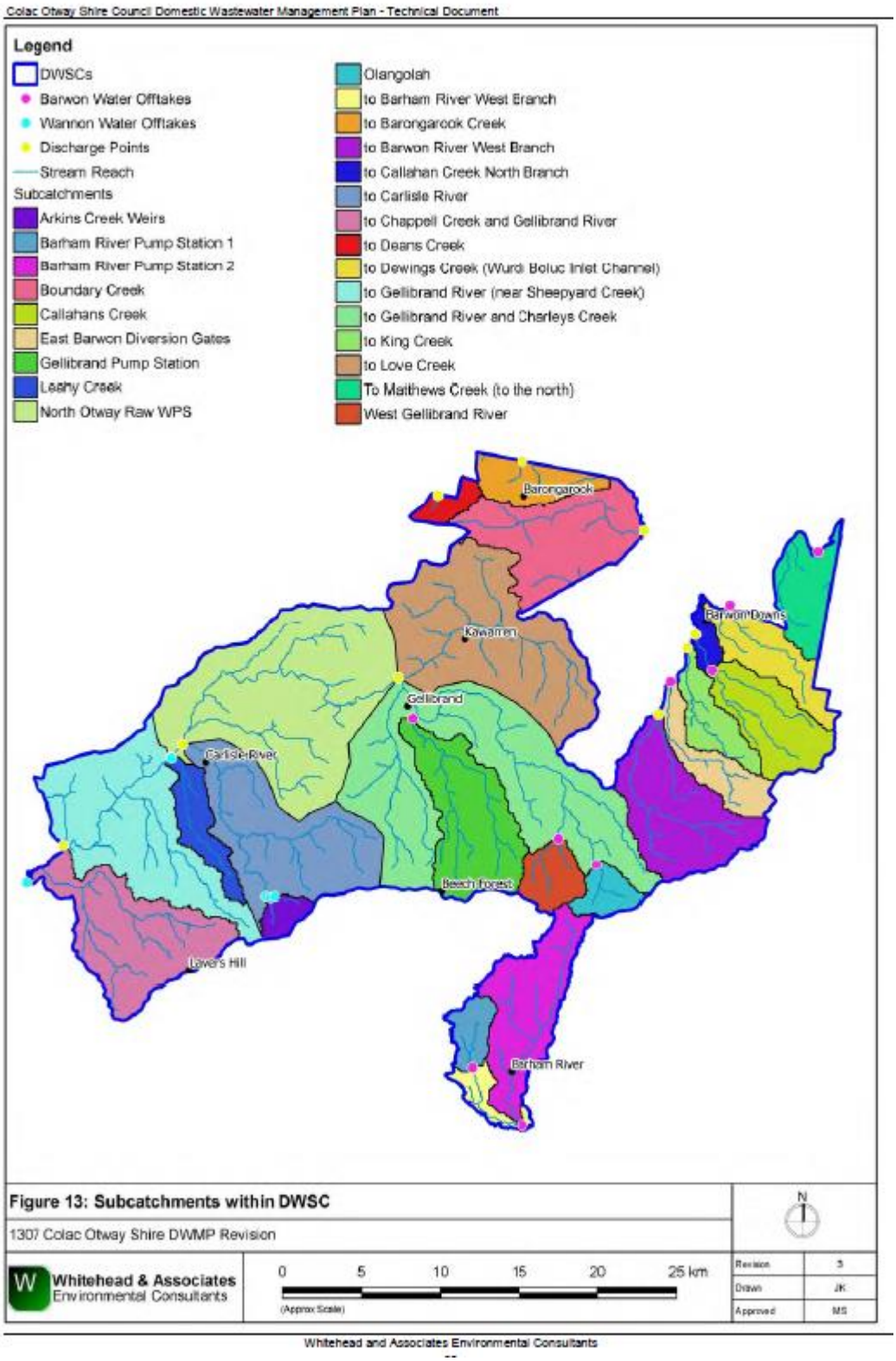


Fig 2.

PROPOSAL

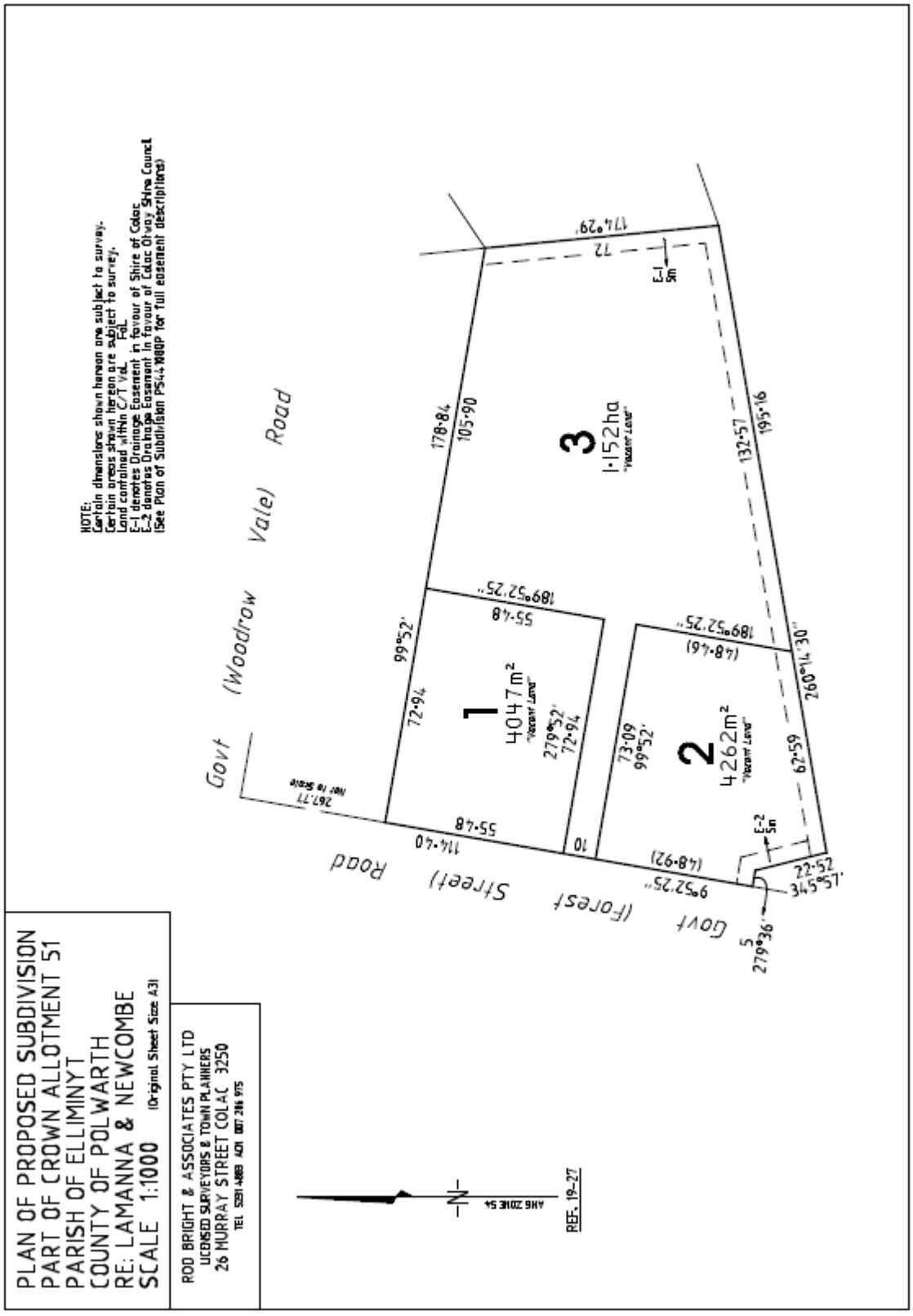


Fig 3. Proposed plan of subdivision (Rod Bright & Ass.)

4.0 TOPOGRAPHY (PLANNING MAPS ON LINE)

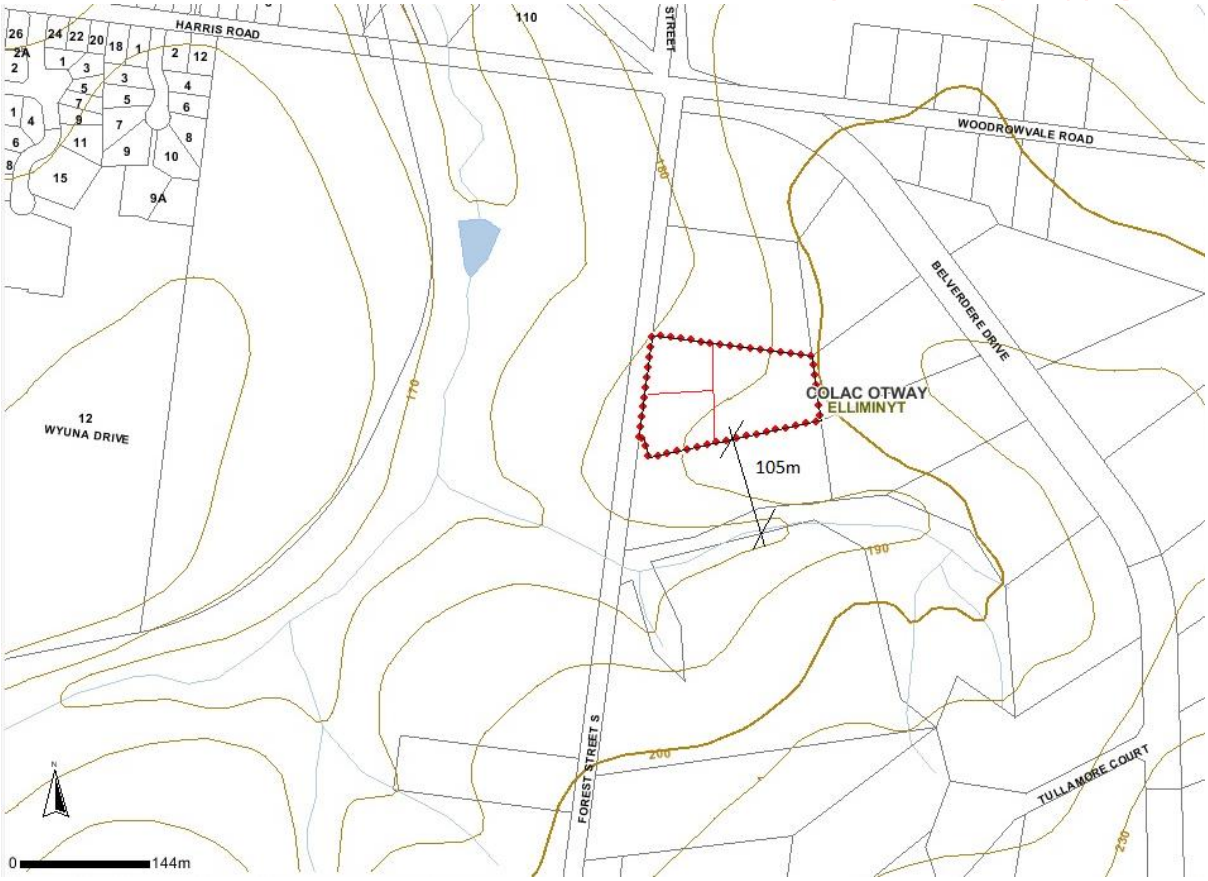


Fig 4 Topography and surface water/s. (Planning Maps On Line)

Comment

Generally Lot 3 comprises an elevated portion of a broad hillside and displays a western aspect with good solar and wind exposure.

The boundary of the property, and Lot 3, is about 105m from the nearest surface waters, however overland flow path would be much longer.

5.0 GROUNDWATER BORES (VVG)

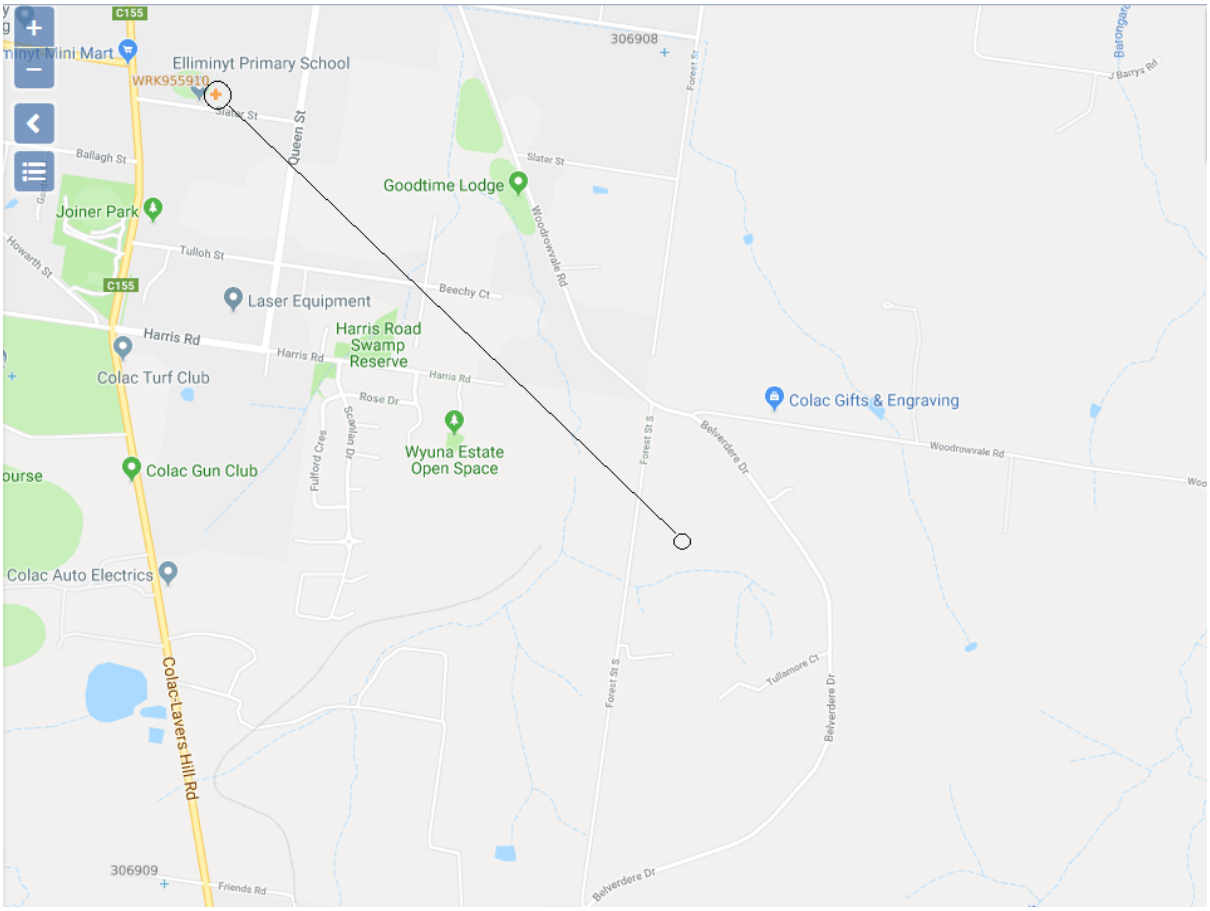


Fig 5. No bores near or within buffer zones of proposed LAA, closest 2.60klm to NW.

5.1 Groundwater(VVG)

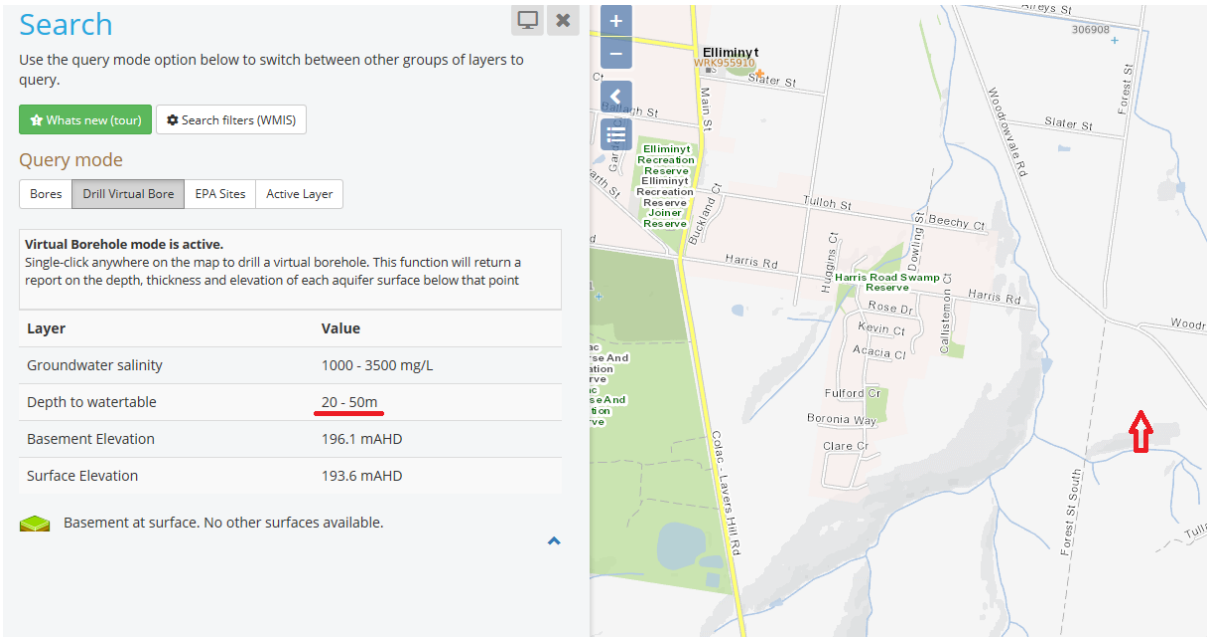


Fig 6 Subject land, tip red arrow, groundwater indicated at 20m-50m depth.

6.0 REGIONAL LAND USE

Fig 7.

Aerial image, subject land in red outline, indicates surrounding land use, principally grazing, with low density dwelling. (Planning Maps online)

Given the topography and low density residential zoning, off-site or cumulative impacts to adjoining property/s and or surface waters are not expected.

Currently the subject land is used for extensive grazing with minimal infrastructure.

7.0 SITE INSPECTION & FIELD INVESTIGATIONS

Fig 8. View to NE, possible LAA Site features on proposed Lot 3. (Source; Author).

Surface comprises an open, flat, cleared area of grassland part of an extensive grazing operation.

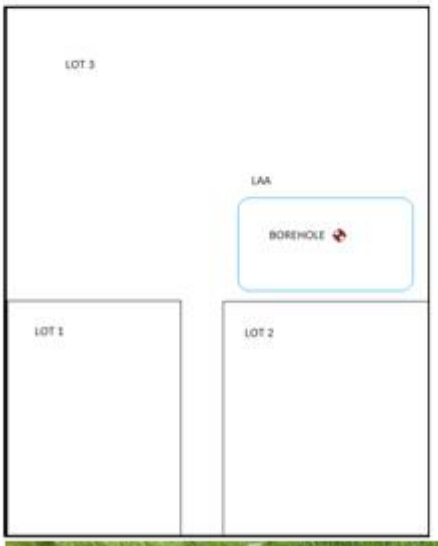
Site vegetation comprises grasses and weeds. No evidence of groundwater discharge or salinity was noted.

Proposed site displays good solar and wind exposure.

9.0 BORELOG

2020 ENGINEERING SOLUTIONS DATE 5 AUG 19
BORELOG REPORT ES19140 SITE; Lot 3 35 Forest St S.

Depth in mm			
000			Silty Sand 3b
500			Sandy Clay 5b
1800 END			



9.1 SOIL ANALYSIS

Nutrient Advantage
Knowledge | Productivity | Responsibility

SOIL ANALYSIS REPORT

ASPAC

Report Number: 594142

2020 ENGINEERING SOLUTIONS L
DELAHUNTY
1745 COLAC FORREST RD
COLAC
VIC 3249

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Report Authorised
Paul Kennelly
Laboratory Manager
NATA Accredited Laboratory Number: 11958

Sample Number:	021908846	**Paddock Name:**	19140-3	**Date Sampled:**	1-Aug-2019
Test Code:	2014-022	**Sample Name:**	LOT 3	**Date Received:**	5-Aug-2019
Purchase Order No:	AS1289-1-2-1-1998	**Sample Depth:**	0 to 10 cm	**Date of Report:**	12-Aug-2019
Grower Name:	2020 ENGINEERING SOLUT				

Analyte	Result	Units	Method Code	Comments
Available Potassium ^	120	mg/kg	04-026-ICP8	Calculation
Emerson Class ^	2			Emerson, AS 1289.3.8.1
pH (1:5 CaCl2)	4.9		04-031-PH	1:5 soil/0.01M CaCl2
Potassium (Amm-acet.)	0.31	cmol(+)/kg	04-026-ICP8	
Calcium (Amm-acet.)	4.9	cmol(+)/kg	04-026-ICP8	
Magnesium (Amm-acet.)	1.7	cmol(+)/kg	04-026-ICP8	
Sodium (Amm-acet.)	0.38	cmol(+)/kg	04-026-ICP8	
Aluminium (KCl)	26	mg/kg	04-027-ICP9	
Aluminium (KCl)	0.29	cmol(+)/kg	04-027-ICP9	
Cation Exchange Capacity (Amm-acet.)	7.60	cmol(+)/kg	04-026-ICP8	Calculation
Sodium % of cations	5.0	%	04-026-ICP8	Calculation
Aluminium % of Cations	3.8	%	04-026-ICP8	Calculation
Calcium/Magnesium Ratio	2.9		04-026-ICP8	Calculation
pH (1:5 Water)	6.0		04-031-PH	1:5 soil/water
Electrical Conductivity (1:5 water)	0.05	dS/m	04-031-PH	1:5 soil/water

The results pertain only to the sample submitted.
This document shall not be reproduced except in full.
Analyses performed on soil dried at 40 °C and ground to 2mm or less.
^ NATA accreditation does not cover the performance of this service.
Accredited for compliance with ISO/IEC 17025 - Testing.
This results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national

Nutrient Advantage Laboratory Services
Nutrient Advantage is a trademark of Incitec Pivot Limited
Incitec Pivot Limited - ABN 42 004 080 264
8 South Rd, Werribee Vic 3030
Toll-free: 1800 803 453 Fax: (61 3) 9974 0699

Page 1 of 1

Discussion

Results are typical for soils of this region and flag no concerns or constraints, individual results are discussed within MAV Tables in following sections.

10.0 SYSTEM SELECTION

10.1 DWMP Considerations

Colac Otway Shire Council Domestic Wastewater Management Plan - Technical Document

Barongarook

Drip and Spray Irrigation Systems* - Secondary Treated Effluent only

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)	
	DIR (mm)	5	5	4	3.5	3	2	
Development Type	Daily (L/day)	Total min. irrigation area required for zero wet weather effluent storage (m²)†					N/A (Alternative Land Application System Required)	
5 + bedroom residence	1,080	388	600	831	1,350			
4 bedroom residence	900	322	500	693	1,125			
1-3 bedroom residence	720	258	400	554	900			

Note: * irrigation system sizes are based on the assumption that the land application area is less than 10% slope. Reductions in DIR apply for slopes above 10% according to Table M2 of AS1547:2012
† not including spacing and setbacks

Conventional Absorption Trenches and Beds - Primary Treated Effluent

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Weak Loams & High/Mod Clay Loams (3 & 4)	Weak Clay Loams (4)	Light Clays (5)	Massive Clay Loams (4)	Medium to Heavy Clays (6)
	DLR (mm)	Not supported (Alternative Land Application System Required)							
Development Type	Daily (L/day)								
5 + bedroom residence	1,080								
4 bedroom residence	900								
1-3 bedroom residence	720								

Evapotranspiration-Absorption Trenches and Beds - Primary Treated Effluent (Category 1 to 5) and Secondary Treated Effluent only (Category 6)

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3a)	Weak/Massive Loams (3b)	High/Mod Clay Loams (4a)	Weak Clay Loams (4b) & Strong Light Clays (5a)	Massive Clay Loams (4c) and Mod & Weak Light Clays (5b, 5c)	Medium to Heavy Clays (6) - Secondary Effluent Only
	DLR (mm)	20*	30*	45	40	45	9	5	5
Development Type	Daily (L/day)	Total min. basal or 'wetted area' required for zero wet weather storage (m²) not including spacing & setbacks							
5 + bedroom residence	1,080	62	87	145	115	199		441	
4 bedroom residence	900	52	73	121	96	166		368	
1-3 bedroom residence	720	42	58	97	77	133		294	

Note: * Gravels, Sands and sandy loams are unsuitable for conventional absorption trenches and beds if there is a high watertable, including seasonal and perched watertables. Value based on average of conservative rate and maximum rate for Category 2b and 3a soils in AS1547:2012

LPED Irrigation Systems - Primary or Secondary Treated Effluent

	Soil Category	Gravels & Sands (1)	Sandy Loams (2)	Loams (3)	Clay Loams (4)	Light Clays (5)	Medium to Heavy Clays (6)	
	DIR (mm)	N/A	4	3.5				
Development Type	Daily (L/day)	(Alternative Land Application System Required)	Total min. basal or 'wetted area' (m²)†		N/A (Alternative Land Application System Required)	N/A (Alternative Land Application System Required)	N/A (Alternative Land Application System Required)	
5 + bedroom residence	1,080		744	1,135				
4 bedroom residence	900		620	946				
1-3 bedroom residence	720		496	757				

† required for zero wet weather storage (m²) not including spacing & setbacks

Wick Trenches and Beds - Secondary Treated Effluent Only

	Soil Category	Gravels & Sands (1)	Sandy Loams (2) Loams (3) & High/Mod Clay Loams (4a,b)	Weak Clay Loams (4)	Massive Clay Loams (4)	Strong Light Clays (5a)	Moderate Light Clays (5b)	Weak Light Clays (5c)	Medium to Heavy Clays (6)
	DLR (mm)	25	30	20	10	12	8	8	5
Development Type	Daily (L/day)	Total min. basal or 'wetted area' required for zero wet weather storage (m²) not including spacing & setbacks							
5 + bedroom residence	1,080	49	40	62	145	115	199		441
4 bedroom residence	900	41	33	52	121	96	166		368
1-3 bedroom residence	720	33	27	42	97	77	133		294

Whitehead and Associates Environmental Consultants

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Comment

Data from Barongarook is used as the closest available location, which will also provide a measure of safety as Barongarook has a higher rainfall. From the DWMP, the only supported disposal system, from a primary treatment plant, is ETA trenches.

11.0 SIZING THE EFFLUENT DISPOSAL SYSTEM (MAV)

Victorian Land Capability Assessment Framework

Trench & Bed Sizing

FORMULA FOR TRENCH AND BED SIZING				
L = Q/DLR x W		From AS/NZS 1547:2012		
Where:	Units			
L = Trench or bed length	m	Total trench or bed length required		
Q = Design Wastewater Flow	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)		
DLR = Design Loading Rate	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)		
W = Trench or bed width	m	As selected by designer/installer		
INPUT DATA				
Design Wastewater Flow	Q	900	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Loading Rate	DLR	5.0	mm/day	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013)
Trench basal area required	B	180.0	m^2	
Selected trench or bed width	W	0.6	m	As selected by designer/installer
OUTPUT				
Required trench or bed length	L	300.0	m	
CELLS				
		Please enter data in blue cells		
	XX	Red cells are automatically populated by the spreadsheet		
	XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS		

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet

Nitrogen Balance

Site Address:	Forest St.S.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE	299	m^2

INPUT DATA[1]

Wastewater Loading			Nutrient Crop Uptake					
Hydraulic Load	900	L/day	Crop N Uptake	220	kg/ha/yr	which equals	60.27	$mg/m^2/day$
Effluent N Concentration	25	mg/L						
% N Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal						
Total N Loss to Soil	4500	mg/day						
Remaining N Load after soil loss	18000	mg/day						

NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer			Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)		
Nitrogen	299	m^2	Nominated LAA Size	2000	m^2
			Predicted N Export from LAA	-37.43	kg/year
			Minimum Buffer Required for excess nutrient	0	m^2

CELLS

	Please enter data in blue cells
XX	Red cells are automatically populated by the spreadsheet
XX	Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS

NOTES

[1] Model sensitivity to input parameters will affect the accuracy of the result obtained. Where possible site specific data should be used. Otherwise data should be obtained from a reliable source such as:

- *EPA Guidelines for Effluent Irrigation*
- *Appropriate Peer Reviewed Papers*
- *Environment and Health Protection Guidelines: Onsite Sewage Management for Single Households*
- *USEPA Onsite Systems Manual*

Comment

The foregoing DWMP Tables indicate disposal area of 441m2 while the MAV calculations indicate 300m of trench will be required.

Nitrogen balance is less than water balance so is not a constraining factor.

For primary treated effluent, ETA trenches are the only supported disposal method, if secondary treatment was selected, wick trenches and/or subsurface irrigation are options.

12.0 Site Plan.

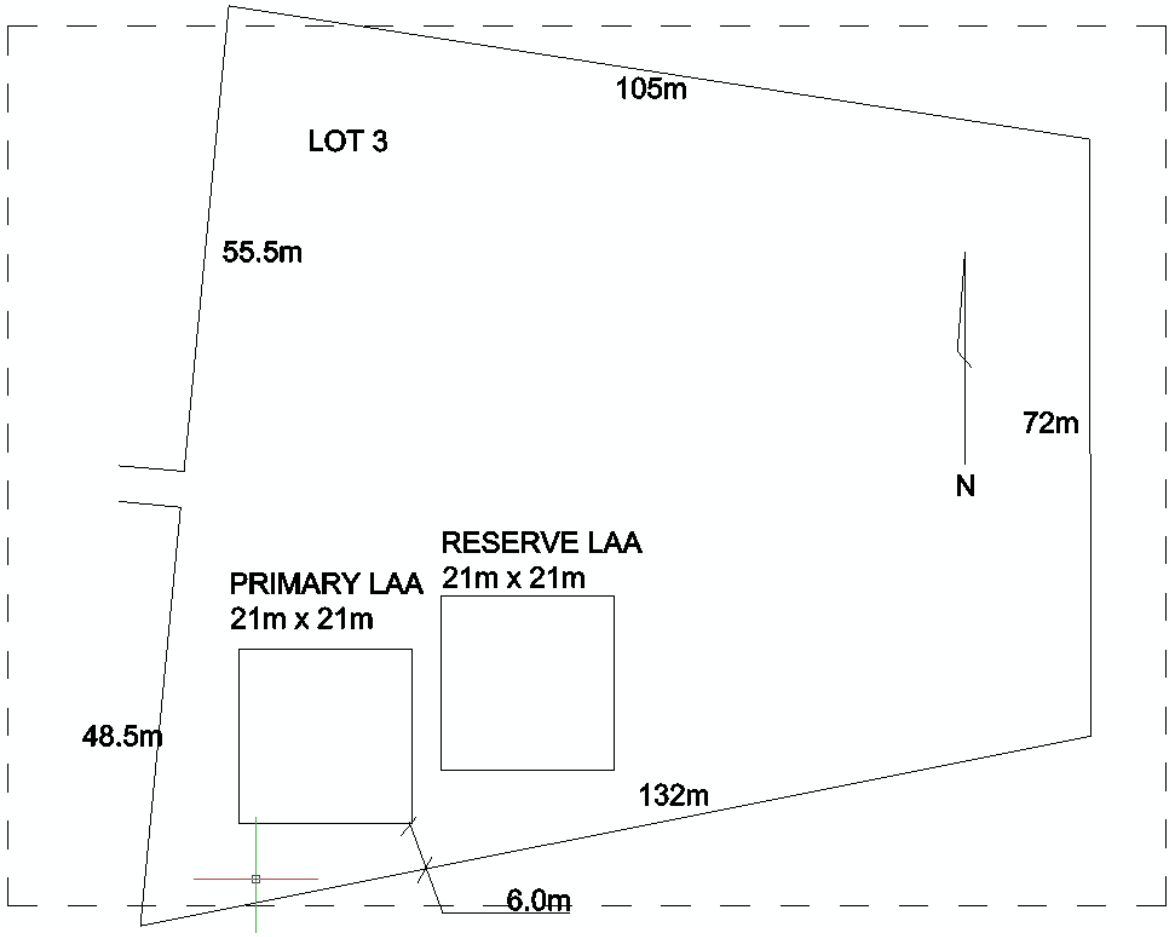

Fig 10

12.2 Applicable Setback Distances (from AS1547:2012)

Landscape Feature / Structure	* Setback Distances (m)					
	Primary Treated Effluent		Secondary Sewage &Grey water Effluent		Advanced Secondary Grey water Effluent	
BUILDING						
Wastewater field up-slope of building	x	6		3		3
Wastewater field down-slope of building	x	3		1.5		1.5
Wastewater field up-slope of cutting/escarpment	x	15		15		15
ALLOTMENT BOUNDARY						
Wastewater field up-slope of adjacent lot	x	6		3		1
Wastewater field down-slope of adjacent lot	x	3		1.5		0.5
SERVICES						
Water supply pipe	x	3		1.5		1.5
Wastewater field up-slope of potable supply channel	x	300		150		150
Wastewater field down-slope of potable supply channel	x	20		10		10
Gas supply pipe	x	3		1.5		1.5
In-ground water tank	x	15		4		3
Stormwater drain	x	6		3		2
RECREATION AREAS						
Children's grassed playground	x	6		3		2
In-ground swimming pool	x	6		3		2
SURFACE WATERS UP-SLOPE OF						
Dam, lake or reservoir (potable water supply)	x	300		150		150
Waterways (potable water supply)	x	100		100		50
Waterways, wetlands (continuous or ephemeral, non-potable); estuaries, ocean beach at high-tide mark; dams, lakes or reservoirs (stock & domestic, non-potable)	x	60		30		30
GROUNDWATER BORES						
Category 1 & 2a soils		NA		50		20
Category 2b – 6 soils	x	20		20		20
WATERTABLE						
Vertical depth from base of trench to highest seasonal water table		1.5		1.5		1.5
	x					
Vertical depth from irrigation pipes to highest seasonal water table		NA		1.5		1.5

*X indicates compliance can be achieved

SECTION TWO

MAV TABLES

Table 1: Key Site Features		
Feature	**Explanation**	**Assessment Process**
Aspect	The aspect or the direction that a slope is facing influences solar exposure.	Western aspect Excellent solar and wind exposure
Climate	Seasonal rainfall, evaporation and temperature patterns influence potential evapotranspiration in land application areas.	Incorporated into water balance spread sheet/s and LAA sizing.
Erosion and Landslip	Unstable areas (steep, unvegetated, dispersive soils etc.) are usually unsuitable for LAAs without mitigation.	No.
Fill (imported)	Capacity to assimilate effluent depends on the physical and chemical characteristics of the imported fill material(s).	No fill.
Flooding	Requirements for siting onsite wastewater infrastructure (including LAAs) away from areas subject to flooding can vary between Councils.	No, LAA set back and not in inundation zone.
Ground-water	Adequate depth of soil to protect groundwater resources largely depends on soil type and climate.	Not noted in boreholes VVG indicates at 20+m
LandSuitability	An LCA is used to determine which land is suitable and unsuitable for LAAs.	All land, except within buffer zones, suitable.
Landform	Landform shape and the position of LAAs on slopes influence drainage and runoff characteristics both onto any potential LAAs as well as downslope of them (i.e. will runoff be evenly shed, or concentrated or dispersed flows?).	See contour map attached Landscape with western aspect for LAA. Broad run-off

Feature	Explanation	Assessment Process
Rock Outcrops	Rock outcrops displace soil horizons and therefore can limit the assimilative capacity of LAAs for effluent. Outcrops can indicate shallow bedrock. Some rocks are strongly fissured and permeable and others are not.	No Rock
Setback Distances	Determining the most appropriate position for LAAs should be prioritised over placement of building areas.	See table from AS1547;2012 All compliant
Site Drainage	LAAs should be located in areas of good surface and subsurface (soil) drainage.	Good drainage, slight slope on land allowing slow run-off but no pooling.
Stormwater Run-on and Runoff	LAAs should not be located in areas with high run-on, without mitigation such as upslope diversion structures. Downslope runoff diversion may be useful.	Due to broad hillside, soil type and vegetation no concentrated run-on.
Slope	Land application of effluent becomes increasingly constrained with increasing slope gradient, increasing the chances of effluent runoff or subsurface seepage.	Slope of LAA land generally around 5.0%
Surface Waters	Whether the setback distances specified in the Code can be achieved from LAAs.	Adequate setback from surface water/inundation zones.
Vegetation	Good vegetation cover is important to prevent erosion as well as for uptake of water and nutrients from effluent.	Grasses.

Table 2: Description of Key Chemical and Physical Soil Features		
Feature	**Explanation**	**Assessment Process**
Cation Exchange Capacity	Influences the ability of the soil to hold and exchange cations; a major controlling agent for soil structural stability, nutrient availability for plants and the soil's reaction to fertilisers and other ameliorants (refer to Hazelton & Murphy, 2007).	7.60cmol(+)/kg No constraint
Colour and Mottling	Gleyed soils indicate permanent saturation (permanent watertable), while orange, yellow and red mottles indicate seasonal saturation with intermittent periods of drying (perched or seasonal watertable).	No mottling noted
Electrical Conductivity **(EC)**	EC test result infers the salinity of the soil and its potential impact on plant growth on the LAA. Refer to Hazelton & Murphy (2007) for interpretation of EC test results. Application of effluent increases salt content of soils over time.	0.05dS/m <0.2 dS/m No constraint Very low level of soil salinity.

Feature	Explanation	Assessment Process
Emerson Aggregate Class	EAC results infer dispersibility (as ped slaking, soil dispersion or both). LAAs should not be installed in soils with moderate or high dispersibility, without adequate mitigation (e.g. addition of gypsum, use of irrigation).	2 Dispersive probably due to high Al. Minor constraint overall as the pH is well within optimum range.
Permeability and Design Loading Rate	The rate at which water moves through the soil reflects the soil's permeability and determines the rate at which effluent is applied to land in litres per square metre per day (mm per day). The application rate for each type of land dispersal and recycling system is listed in Table 9 in the Code. Whilst the loading rate for LAA design is based on the permeability, it is less than the true permeability.	Adopted DIR, 5.
pH	Acid soils (pH <5) or alkaline soils (pH >8) may constrain plant growth and should be ameliorated by use of chemical additives (e.g. lime for acidity).	6.0 Close to neutral and within optimum range. Somewhat at odds with the Al levels but toxicity not noted.
Rock Fragments	Coarse rock fragments displace soil volume and therefore can limit assimilative capacity of soils.	No
Sodicity **[Exchangeable Sodium Percentage (ESP)]**	The percentage of sodium compounds on cation exchange sites on soil particles. ESP >6% may cause damage to the soil structure. Refer to Hazelton & Murphy (2007). Effluent and greywater contain sodium.	5.0% Elevated but less than constraint level. < 6% no constraint
Sodium Absorption Ratio (SAR)	The ratio of sodium to calcium and magnesium (beneficial elements) in the soil solution, with higher ratios potentially damaging to plants and soils.	17.4:1 High ratio of beneficial elements,

Feature	Explanation	Assessment Process
Soil Depth	Deeper soils generally have a greater assimilative capacity for effluent (depending on soil type).	>1.8m No constraint
Soil Texture	Soil textures are categorised as 1. Gravels and Sands 2. Sandy Loams 3. Loams 4. Clay Loams 5. Light Clays, or 6. Medium to Heavy Clays (AS/NZS1547:2012).	Light Clay No constraint
Watertable (depth to)	The required soil depth to protect groundwater depends on soil type; high permeability soils generally require a greater separation distance (soil depth).	+20m No constraint

Comment

Soil typical for region comprising extensive grazing, no evidence of salinity or acid soil.

Table 3: Risk Assessment of Site Characteristics

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Aspect (affects solar radiation received)	North / North-East / North-West	East / West / South-East / South-West	South	MODERATE
Climate (difference between annual rainfall and pan evaporation)	Excess of evaporation over rainfall in the wettest months	Rainfall approximates to evaporation	Excess of rainfall over evaporation in the wettest months	MODERATE
Erosion [1] (or potential for erosion)	Nil or minor	Moderate	Severe	NIL
Exposure to sun and wind	Full sun and/or high wind or minimal shading	Dappled light	Limited patches of light and little wind to heavily shaded all day	NIL
Fill [2] (imported)	No fill or minimal fill, or fill is good quality topsoil	Moderate coverage and fill is good quality	Extensive poor quality fill and variable quality fill	NIL
Flood frequency (ARI) [3]	Less than 1 in 100 years	Between 100 and 20 years	More than 1 in 20 years	NIL
Groundwater bores [4]	No bores onsite or on neighbouring properties	Setback distance from bore complies with requirements in EPA Code of Practice 891.3 (as amended)	Setback distance from bore does not comply with requirements in EPA Code of Practice 891.3 (as amended)	NIL

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Land area available for LAA	Exceeds LAA and duplicate LAA and buffer distance requirements	Meets LAA and duplicate LAA and buffer distance requirements	Insufficient area for LAA	NIL
Landslip (or landslip potential) [5]	Nil	Minor to moderate	High or Severe	NIL
Rock outcrops (% of surface)	<10%	10-20%	>20%	NIL
Slope Form (affects water shedding ability)	Convex or divergent side-slopes	Straight side-slopes	Concave or convergent side-slopes	NIL
Slope gradient [6] (%)				
(a) for absorption trenches and beds	<6%	6-15%	>15%	NIL
(b) for surface irrigation	<6%	6-10%	>10%	
(c) for subsurface irrigation	<10%	10-30%	>30%	
Soil Drainage [7] (qualitative)	No visible signs or likelihood of dampness, even in wet season	Some signs or likelihood of dampness	Wet soil, moisture-loving plants, standing water in pit; water ponding on surface, soil pit fills with water	NIL

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Stormwater run-on	Low likelihood of stormwater run-on		High likelihood of inundation by stormwater run-on	MINOR
Surface waters - setback distance (m) [3]	Setback distance complies with requirements in EPA Code of Practice 891.3 (as amended)		Setback distance does not comply with requirements in EPA Code of Practice 891.3 (as amended)	MINOR
Vegetation coverage over the site	Plentiful vegetation with healthy growth and good potential for nutrient uptake	Limited variety of vegetation	Sparse vegetation or no vegetation	MINOR

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Soil Drainage [8] (Field Handbook definitions)	Rapidly drained. Water removed from soil rapidly in relation to supply, excess water flows downward rapidly. No horizon remains wet for more than a few hours after addition	Well drained. Water removed from the soil readily, excess flows downward. Some horizons may remain wet for several days after addition	Moderately well drained. Water removed somewhat slowly in relation to supply, some horizons may remain wet for a week or more after addition	MINOR
			Imperfectly drained. Water removed very slowly in relation to supply, seasonal ponding, all horizons wet for periods of several months, some mottling	
			Poorly/Very poorly drained. Water remains at or near the surface for most of the year, strong gleying. All horizons wet for several months	

Comment;

The above MAV tables indicates two Moderate constraints, aspect and climate. Climate constraint mitigated by incorporating rainfall into LAA sizing. Aspect is difficult to mitigate but suitable moisture tolerant vegetation would be advisable.

SECTION THREE

SITE MANAGEMENT PLAN

Attached

[X] Yes [ ] No

2020 ENGINEERING SOLUTIONS

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PROPERTY MANAGEMENT PLAN

SITE: 35 Forest St. S. Elliminyt

DEVELOPER: A & G Lamanna

REPORT NUMBER: ES19140

DATE: 10/08/2019

REPORTING TO: AS 1547:2012

On-site domestic wastewater management

EPA Publication 891.4 July 2016

Code of Practice Onsite Wastewater Management

Barwon Water / Wannon Water

CONTENTS

1 PREAMBLE

This Property Management Plan is intended for use by property ownersinBarwon/Wannon Water drinking water supply catchments. It is written for occupancies with onsite wastewater treatment systems, but also applies to other developments where management of risk to downstream water quality is required.

This document must not be considered a definitive plan or control for all properties and wastewater systems. The landowner property management plan is drafted with consideration to planning permit requirements, EPA Publication 891.4 “Code of Practice Onsite Wastewater Management”, the Land Capability Assessment, and AS1547:2012 “On-site domestic wastewater management”.

The plan must be maintained by the landowner and amended when required. Any increased loading on the property or system failure requires the review of the existing Land Capability Assessment and Waste Water Management System. Any amendment to the plan must be submitted to Barwon/Wannon Water for endorsement.

The plan must be kept on site and be available for inspection by Council or other government agencies.

1.1 Property Owner Responsibilities

Property owners and occupiers are responsible for reducing risks to downstream water quality that originate from their property. This includes:

- ensuring pipework & wastewater systems don’t leak;
- keeping wastewater systems well maintained & in good repair;
- appropriately managing herbicides, pesticides & other chemicals;
- minimising erosion & sediment movement;
- maintaining buffers of native vegetation around watercourses;
- compliance with Council and EPA requirements; and
- implementing this Property Management Plan.

2 EMERGENCY CONTACT NUMBERS

PROPERTY MANGEMENT PLAN	
EMERGENCY OR ONSITE WASTEWATER MAINTENANCE CONTACT NUMBERS	
POLICE, AMBULANCE, FIRE	000
PLUMBER	To be advised
ELECTRICIAN	To be advised
COUNCIL ENVIRONMENTAL HEALTH OFFICER	Golden Plans Shire
EPA	1300 372 842
SYSTEM SUPPLIER	COLAC CEMENT PRODUCTS 03 5231 5231
SYSTEM SERVICE AGENT	COLAC CEMENT PRODUCTS 03 5231 5231
SEPTIC PUMPOUT TANKER	RICHARDSON'S LIQUID WASTE 03 5234 6585
BARWON WATER	1300 656 007

If any of the following incidents, which could impact on downstream water quality, occur on site they should be reported to Barwon Water immediately:

Chemical spill Fuel spill Bushfire Landslip

3 SITE PLAN

Site plans drawn to scale (attached) show dimensions and include the following details:

- the site address, including lot number & street number;
- title boundaries;
- direction of north;
- location of groundwater bores on the site & adjacent properties;
- contour lines (at 1 - 10 m intervals), or direction of slope & slope in percent;
- location of dams & waterways onsite & within 100m of the property;
- drainage lines & springs;
- stormwater cut-off drains adjacent to land application area & treatment system;
- location of actual & proposed buildings, sheds, driveways, paths & paddocks;
- location of actual & proposed infrastructure, especially drains;
- location& dimensions of the wastewater treatment plan; and
- location& dimensions of the land application area.

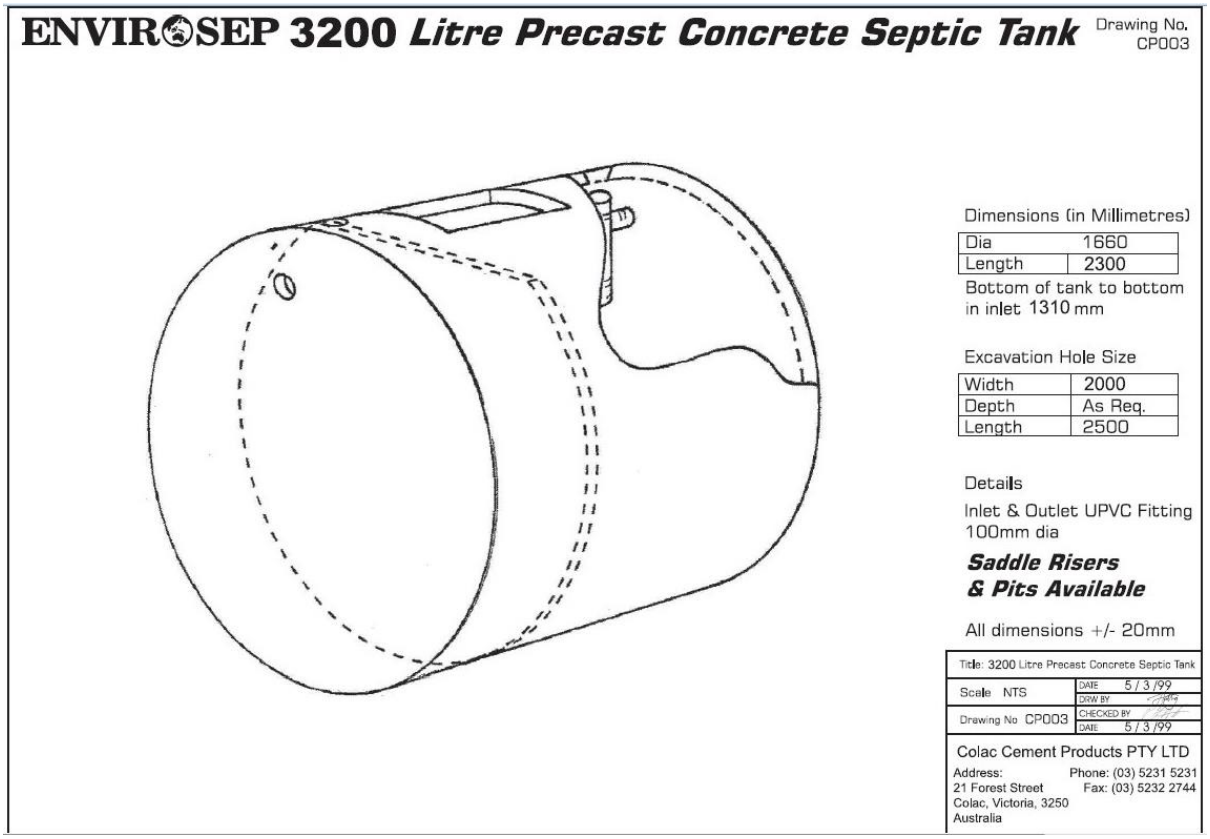
The site plan must be amended when any of the above details change (including on issue of as-constructed drawings), and the amended plan must be provided to Barwon/Wannon Water.

4 DETAILS OF THE WASTEWATER TREATMENT SYSTEM

The plan requires the following details of the wastewater treatment system:

- manufacturer's manuals & spare parts list;
- as-installed drawings;
- copy of EPA Certificate of Approval;
- copy of Council wastewater system permit;
- description of the maintenance regime, to meet manufacturer's recommendations & the maintenance, monitoring & reporting requirements of the Council permit & the EPA certificate of approval; and
- in the case of a secondary treatment system, a copy of a current service contract with an accredited or experienced trained service technician to implement the maintenance regime.

All details relevant to the above will be available and submitted after issue of the permit as they are post developmental.

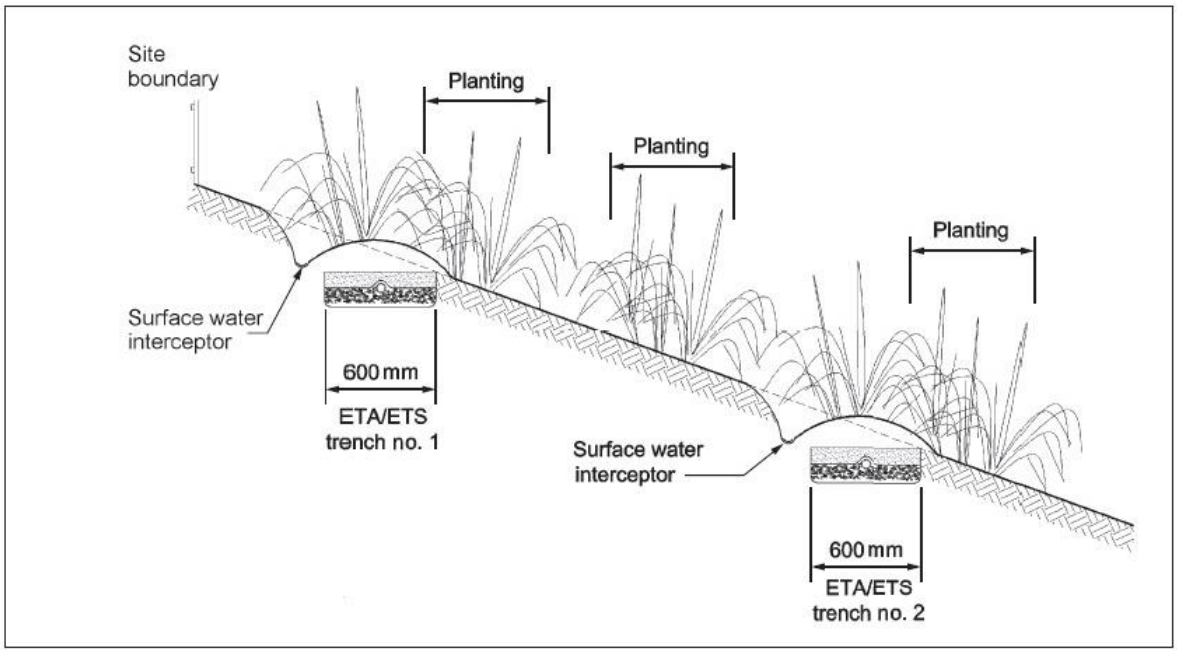


NOTE: Developer can supply treatment plant information post construction as most documentation relies upon approval to construct development and install a system. Included as example only. 2020Eng is independent and does not recommend particular systems.

5 DETAILS OF THE EFFLUENT DISPOSAL SYSTEM

NOTE: An LPED line can be used to dose load the ETA/ETS bed.

FIGURE L6 ETA/ETS BED DETAILS



NOTES:

1 An LPED line can be used to dose load the ETA/ETS trenches.

2 Each ETA/ETS trench is constructed to disperse effluent into downslope topsoil so that plantings can provide assistance by evapotranspiration.

The plan requires the following details of the effluent disposal system:

- manufacturer's manuals & spare parts list for components including pumps, valves, and filters;
- as-installed drawings; and
- description of the maintenance regime, to meet manufacturer's recommendations & the maintenance, monitoring & reporting requirements of Council & the EPA. At a minimum, visual inspection of the land application area is required whenever the treatment system is inspected.

All details relevant to the above will be available and submitted after issue of the permit as they are post developmental.

6 WASTEWATER TREATEMENT SYSTEM MAINTENANCE

The waste water treatment system, including its pipework shall:

- be inspected & maintained as per the maintenance regime;
- be protected from vehicle, farm machinery or livestock damage;
- have any grease trap inspected at least quarterly & cleaned out regularly;
- have any vents kept clear & access covers in working order;
- be visually checked for damage especially after being pumped out - damage is to be repaired; and
- be replaced if not operating adequately.

Inspections of treatment units are to be recorded on the operation and maintenance log as well as any defects and repairs undertaken.

7 LAND APPLICATION AREA (Effluent Disposal) OPERATION & MAINTENANCE

The following measures shall be implemented:

- the land application area & disposal system shall be inspected & maintained as per the maintenance regime;
- any evapotranspiration areas shall be designed to exclude vehicle, farm machinery, or stock access;
- surface water diversion drains shall be maintained upslope of & around the land application area & kept clean; and
- roof water drainage / hard stand drainage must be diverted away from the land application area.

Evapotranspiration and irrigation areas shall:

- have their grass mown & plants maintained to ensure these areas take up nutrients with maximum efficiency;
- be checked for wet spots, uneven grass colour 7 symptoms of emitter blockage (evidenced by under-irrigated dry areas or over-irrigated wet areas); and
- have blocked or damaged irrigation lines replaced.

Equipment shall be checked in the following manner:

- the manufacturer's instructions for maintaining & cleaning pumps, siphons & septic tank & outlet filters shall be followed;

- disc filters or filter screens on irrigation-dosing equipment shall be cleaned at least annually by rinsing back into the primary wastewater treatment unit, and

- irrigation lines shall be flushed at least annually to scour out any accumulated sediment.

Inspections are to be recorded on the Operations Log as well as any defects and repairs undertaken.

8 HOUSEHOLD MANAGEMENT OF WASTEWATER

The following measures should be implemented for optimum performance of system.

8.1 Sludge Build Up Reduction

- food waste including fats, grease & oils shall be disposed of in composting bin or worm farm
- no food waste disposal unit shall be installed
- sanitary napkins & hygiene products shall be disposed of in garbage

8.2 Encourage Bacteria

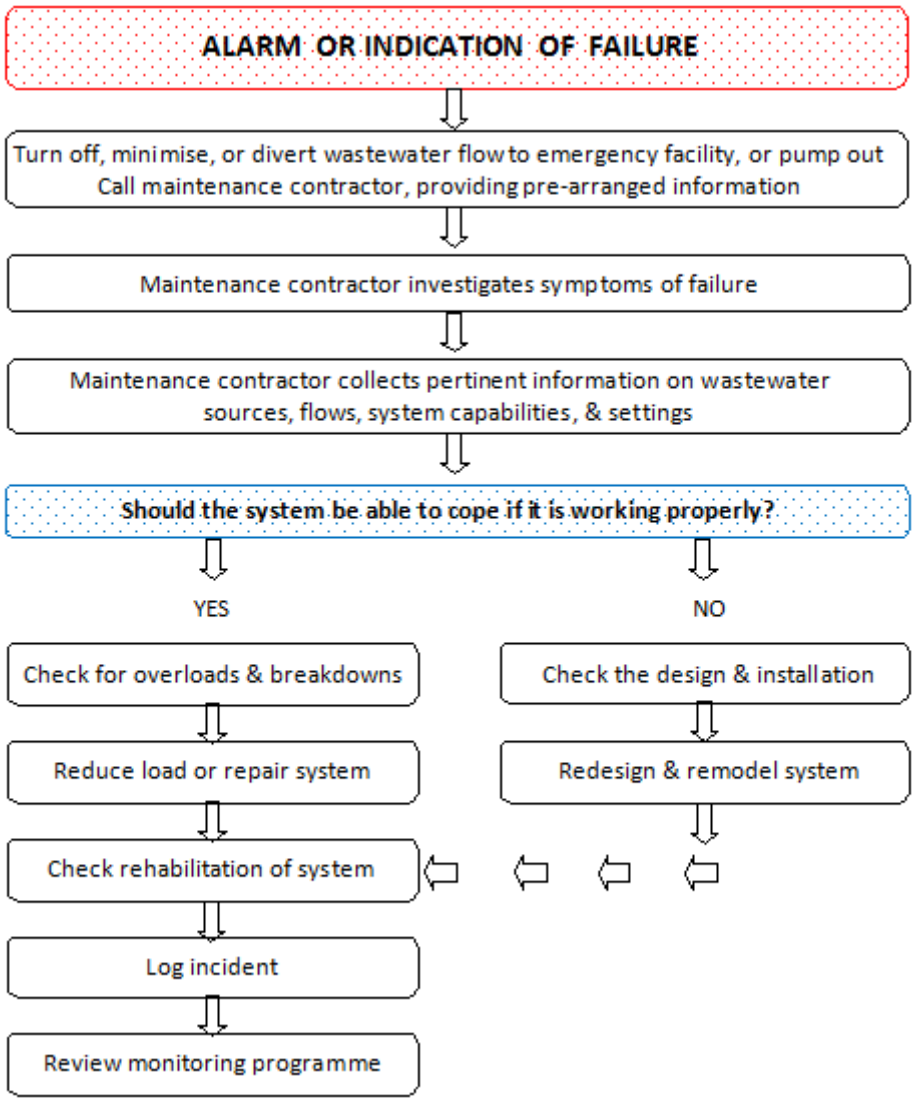
- use biodegradable soaps
- use low-phosphorus detergent
- use low-sodium detergent where soils are dispersive
- limit the use of cleaners such as bleaches, whiteners, nappy soakers & disinfectant, especially for toilet/shower cleaning
- do not put chemicals, thinners or paint down the drain or gulley trap

8.3 Reduce Effluent Volume Load

- install & use water conserving fittings ie. shower heads & appliances
- wash full loads only in dishwasher & washing machine
- avoid system overload ie. 1 washing machine load per day & run washing machine & dishwasher at different times
- do not install a spa bath

9 CONTINGENCY PLAN

The plan below shall be followed for a sudden failure of the wastewater system. A generalised flow chart of actions to be taken is:



(Figure 6.3 from AS1547:2012)

10 SITE OPERATIONS & MAINTENANCE LOG

A site operation and maintenance log shall be kept for any wastewater system. This will assist in the determination of recurring problems/trends. The maintenance log is to show when scheduled maintenance is due. Matters to be recorded in the log include:

- pump out records;
- service records;

- inspections; and
- records of all irregular operation & response actions.

Copies of programmed maintenance and pump out (desludging) works performed by maintenance contractors, as required by the Council (septic tank) permit, are to be forwarded to the Council Environmental Health Officer. A copy of the latest maintenance certificate is to be retained with this property management plan and recorded on the maintenance log.

11 IDENTIFICATION, RISK ASSESSMENT & CONTROLS FOR OTHER POTENTIAL THREATS TO DOWNSTREAM WATER QUALITY

The landholder is required to identify and assess the risk of other potential threats to downstream water quality, resulting from the development and use of the property ie.

- erosion risks; and
- risks from storage & application of chemicals.

Construction methods should be carried out in a manner which will minimise soil, sediment and nutrient movement from the property to water courses during development and use of the property. Potential sources of sediment movement to consider are:

- tracks& driveways;
- high traffic areas (vehicular, human, animal); and
- construction areas (occupancy, roads, fencing).

The design of stormwater run-off from the site should be described. Activities to encourage native vegetation retention and re-establishment within a 30 metre buffer zone along waterways, and to exclude stock from waterways, should be described. Activities to prevent the spread of noxious weeds should be described.

Chemicals such as herbicides and pesticides can be a risk to downstream water quality. The landowner should follow manufacturer's instructions and be familiar with the advice available from: http://www.depi.vic.gov.au/agriculture-and-food/farm-management/chemical-use. Procedures for chemical application and storage should be described in the Property Management Plan.

Businesses should contact Barwon/Wannon Water to determine if a water quality monitoring program immediately up and down stream of works that pose a significant threat to water quality is required. This may include:

- analytical monitoring of turbidity following large-scale activities that could potentially result in sediment movement (e.g. cultivation, harvesting); and

- monitoring of the active ingredients within herbicides and pesticides following intensive and broad scale herbicide/pesticide applications.

Appendix 1 Maintenance Log Template

Treatment System Inspections, Maintenance & Repairs			
Due Date (if scheduled)	Actual Date of Activity	Name of Inspector/ Contractor	Description of Work, Observations & Comments

Effluent Disposal Area Inspections, Maintenance & Repairs			
Due Date (if scheduled)	Actual Date of Activity	Name of Inspector/ Contractor	Description of Work, Observations & Comments

12 INSURANCE CERTIFICATE OF CURRENCY

Integro Insurance Brokers Limited
1st Floor • 71 Fenchurch Street • London
EC3A 4BS
Telephone: (0)20 7444 6000
Fax: (0)20 7444 6001
Website: www.integrouk.com

MONDAY, 03 SEPTEMBER 2018

CERTIFICATE OF CURRENCY

POLICY NUMBER:	**IL1805880**
TYPE:	PROFESSIONAL INDEMNITY INSURANCE as may be more fully defined in the policy wording.
INSURED:	2020 Engineering Solutions
ADDRESS:	1745 Colac-Forrest Road Colac VIC 3249 Australia
PERIOD OF INSURANCE:	From: 31st August 2018 To: 31st August 2019 Both days at 16:00 Hours Local Standard Time at the Principal Address of the Insured
LIMIT OF INDEMNITY:	AUD 2,000,000 any one Claim and in the aggregate including Costs and Expenses plus one reinstatement
PLACED WITH:	100% Certain Underwriters at Lloyd's

For and on behalf of Integro Insurance Brokers Limited

This certificate is a summary of the policy and is not intended to amend, extend, replace or override the policy terms and conditions. In the event of any consistency between this certificate and the policy, the policy prevails.

Authorised and regulated by the Financial Conduct Authority under reference number 305496
Registered Office: 1st Floor, 71 Fenchurch Street, London, EC3A 4BS
Registered Company No. 2957627

13 DISCLAIMER

2020 Engineering Solutions Pty Ltd ("2020")
Geotechnical Report Limitations

The report to which this document has been attached assesses risks arising from land slope instability and proposes risk minimisation solutions. Absolute risk avoidance cannot be assured, principally due to assessment cost factors. It is therefore necessary to rely on instructions and make assumptions.

Changed Conditions

The report may be invalidated by changed conditions including:-

1. topography.
2. soil moisture content.
3. above or below ground structures.
4. soil and substrate profiles.
5. location of site boundaries.

Causes of Changed Conditions

Changed conditions may occur due to:-

1. extreme conditions such as flood, drought, cold, heat or fire.
2. human activities.
3. natural processes.
4. planning or design requirements.

Client to inform 2020 of any changes

2020 will endeavour to identify any reasonably foreseeable risk factors on the site which may cause changed conditions. Samples are taken at reasonable intervals bearing in mind the cost to the client. In the absence of specific instructions or patent conditions it will be assumed that conditions observed in samples are consistent across the site.

This document is provided to inform the client that their responsibility for risk is shared with 2020. The client will be responsible for inaccurate instructions or failure to instruct in relation to changed conditions, events that may cause changed conditions or when it becomes evident that assumptions may be invalid. Failure to do so could result in substantial and costly damage and disputes.

Interpretation

The report must be considered in its entirety. Each part of the report may be dependent on other parts for meaningful interpretation. The report should also only be used by the client. It may not be relied upon by any other person without first conferring with 2020. The report should only be acted upon and interpreted by persons qualified and competent in the activities contemplated in the report.

130433 - 13 05 31 Geotechnical Report Limitation

2020
ENGINEERING
SOLUTIONS

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ABN 57 215 499 312ACN 11 9460 865
info@2020es.com

GEOTECHNICAL ASSESSMENT

SITE; 35 Forest Street South
Elliminyt Victoria 3250

DEVELOPER; A & G Lamanna

REPORT NUMBER; ES19167

DATE; 14/08/2019

REPORTING TO; COLAC OTWAY SHIRE
Planning Scheme, Erosion Management
Overlay Procedures (EMO), 2013. Amendment C68

*Cover, Site condition, view from Forest St. S.

CONTENTS

Executive Summary

The assessed Maximum Annual probability of loss of life from the proposal is Barely Credible. This figure is below the advised acceptable limit

Property Risk from the proposal would be Very Low. Overall the risk to property is below the advised acceptable limit.

The proposed subdivision generates allotments which contain areas that could be considered as safe building envelopes.

Succinct Recommendations

a) The various aspects of the proposal be allowed as the calculated risk is within the acceptable ranges for Life and Property

b) A Landslip Risk Assessment it is not required due to the low risk to Life and Property and the topography and geology being below trigger levels.

Preamble

Note; This document reports to Schedule One to the Erosion Management Overlay as in operation at the time of commissioning.

The Shire contains areas of land that are susceptible to landslip..... In areas susceptible to landslips, it is necessary to assess the potential impact of buildings, works and vegetation removal on the environment, in order to minimise risk to life and property. (EMO Policy Basis)

The proposal comprises a three lot subdivision.

This report considers the geotechnical implications of the proposal and makes comment as to possible future development/s.

1.0 Consultant

Michael Daniel Delahunty
'Culliamurra'
1745 Colac – Forrest Road
Colac Victoria Australia. 3249

1.1 Details of Qualifications, Experience and Expertise

Bachelor Degree in Mining Engineering University of Ballarat.

2001-2003 Civiltest, Geotechnical technologist

2006- to current 2020Engineering Solutions P/L
Managing Director, Principal Engineer

Member Institute of Engineers Australia Member # 2274072

1.2 Specific Expertise

Over the past eighteen years I have personally conducted several hundred site and soil investigations across SW Victoria. This work, along with academic qualifications, has equipped me with an understanding of typical and atypical sub-soil conditions.

The author has valid professional indemnity insurance at the time of inspection and reporting. As part of a commitment to on-going professional development the author is undertaking the process of accreditation and attainment of chartered status.

1.3 Equipment

Kobelco 007 hydraulic mounted auger
100mm hand auger
GMC Digital spirit level
Manual measuring devices
Computer hardware and software

2.0 Date of Assessment

01th Aug 2019

2.1 Reporting Date

14th Aug 2019

3.0 Site Description

The subject property comprises an undulating, cleared portion of land on the western side of a large, curved, ridge. Principally displaying a ground cover of grasses the land has been used for extensive grazing.(See cover).

3.1 Address

35 Forest St. S. Elliminyt Victoria.

3.2 Title Details (Planning Maps On line)

PLANNING PROPERTY REPORT

VICTORIA State Government | Environment, Land, Water and Planning

From www.planning.vic.gov.au on 16 July 2019 05:58 PM

PROPERTY DETAILS

Address:	35 FOREST STREET SOUTH ELLIMINYT 3250
Lot and Plan Number:	Lot 1 PS441080
Standard Parcel Identifier (SPI):	1\PS441080
Local Government Area (Council):	COLAC OTWAY www.colacotway.vic.gov.au
Council Property Number:	21827
Planning Scheme:	Colac Otway planning-schemes.delwp.vic.gov.au/schemes/colacotway
Directory Reference:	VicRoads 92 B7

UTILITIES

Rural Water Corporation:	Southern Rural Water
Urban Water Corporation:	Barwon Water
Melbourne Water:	outside drainage boundary
Power Distributor:	POWERCOR

STATE ELECTORATES

Legislative Council:	WESTERN VICTORIA
Legislative Assembly:	POLWARTH

Planning Zones

LOW DENSITY RESIDENTIAL ZONE (LDRZ)

SCHEDULE TO THE LOW DENSITY RESIDENTIAL ZONE (LDRZ)

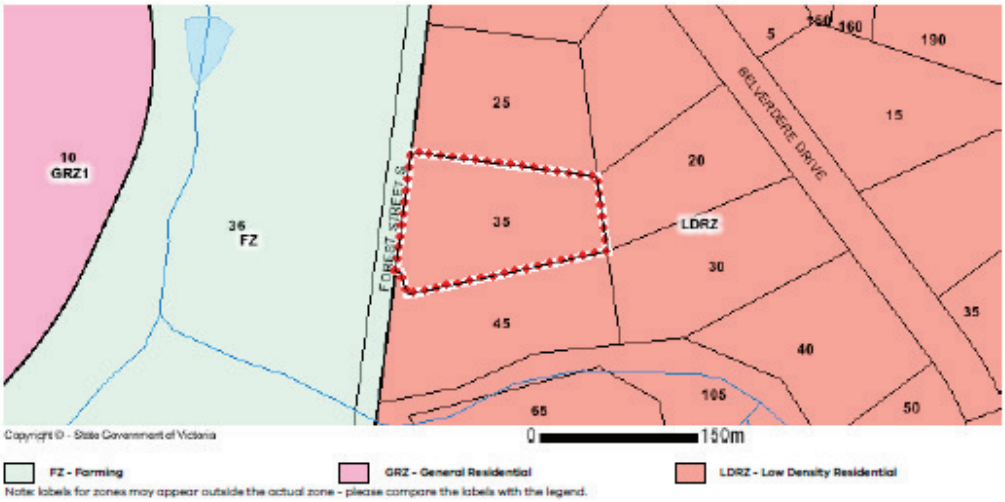

Fig 1 Location and planning details EMO (Planning Maps Online)

3.2.1 Overlays

EMO

BMO

SLO

VPO

3.2.2 Property Owner

A & G Lamanna

3.3 Developer

A & G Lamanna

3.4 Responsible Authority

Colac Otway Shire
Rae St Colac 3250

4.0 Proposed Plan of Subdivision (Rod Bright & Ass)

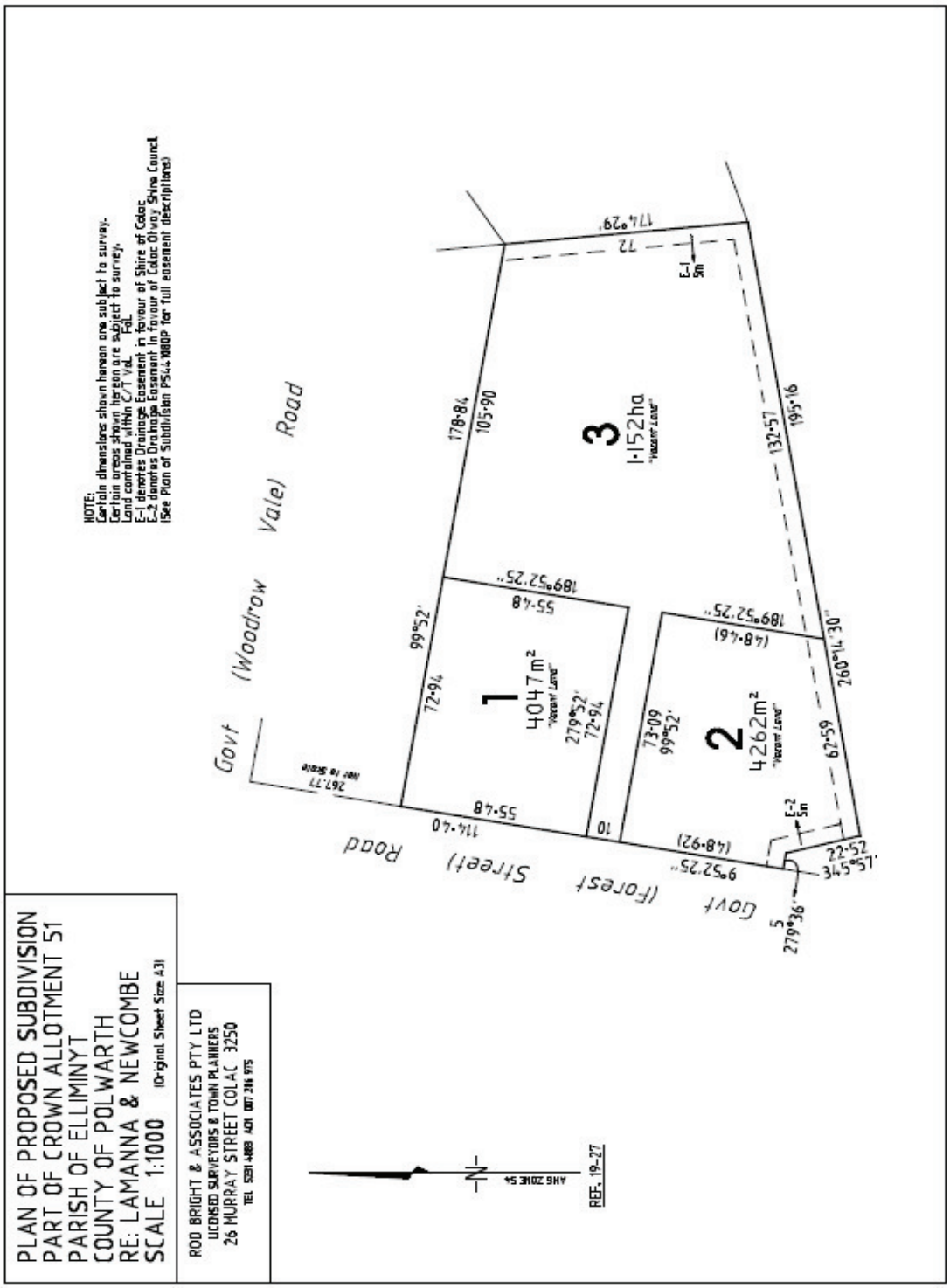

Fig 2.Proposed development.

5.0 Geology

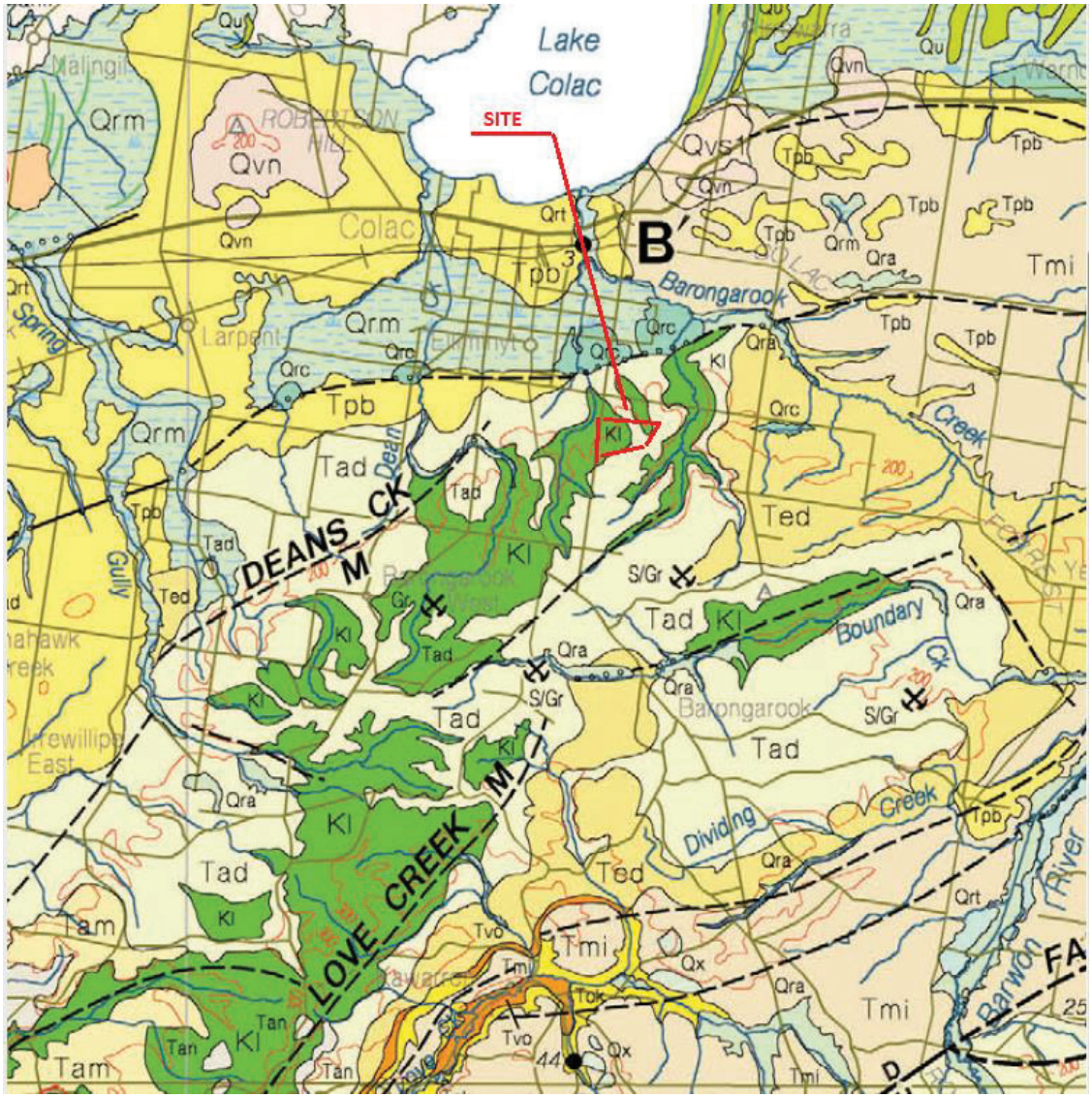

Fig 3. Regional geology, subject site,in red.(GeoVic).

Published maps indicated subject land contains principally CRETACEOUS AGE Eumeralla Formation material, part of the Otway group with some Tertiary Age Dilwyn Formation material, part of the Wangerrip Group.

The Colac Monocline and the Deans Creek Monocline are the principal structural features of the region.

5.1 Surface Conditions

As per the site description the subject land contains a surface covering of grasses.

Fig 4 Site condition photo showing slope and grass ground cover (Author)

5.1.1 Topography

Fig 5. Regional Topography (GeoVic)
Overall subject land displays a slope down to west at a slight to moderate 5.7^0.

5.2 Subsurface Conditions

Based upon a drilling programme conducted across the site, the subsurface profile displayed a weathered–in-situ Silty Sand over a Sandy Clay. Given the age of the material, deep weathering could be expected.

5.3 Groundwater

No discharge areas were noted on the subject land. VVG indicates ground water at 10-20m.

5.4 Geomorphic Process

The foregoing geological mapping indicates that the subject land is located within an area of Dlywyn Formation and a somewhat isolated portion of the Otway group Eumeralla formation. The Otway Group material is prone to instability, (EMO supporting documents), however generally in the higher rainfall areas.

6.0 Regional Instability
6.1 Mapped

Fig 6.COS Mapped landslides, indicates the subject land does not contain, nor is located within impact distance of landslides.

6.2 Unmapped

No evidence of soil instability was noted during the site inspection

7.0 Assessment Methodology

The principal assessment methodology of instability analysis for this development was visual with observed soil profile providing input for the following slope model.

7.1 Slope Model

Given the nature of the proposal, a sub-division and very low angle overall slope, a slope model was developed was developed along the cross section as indicated below.

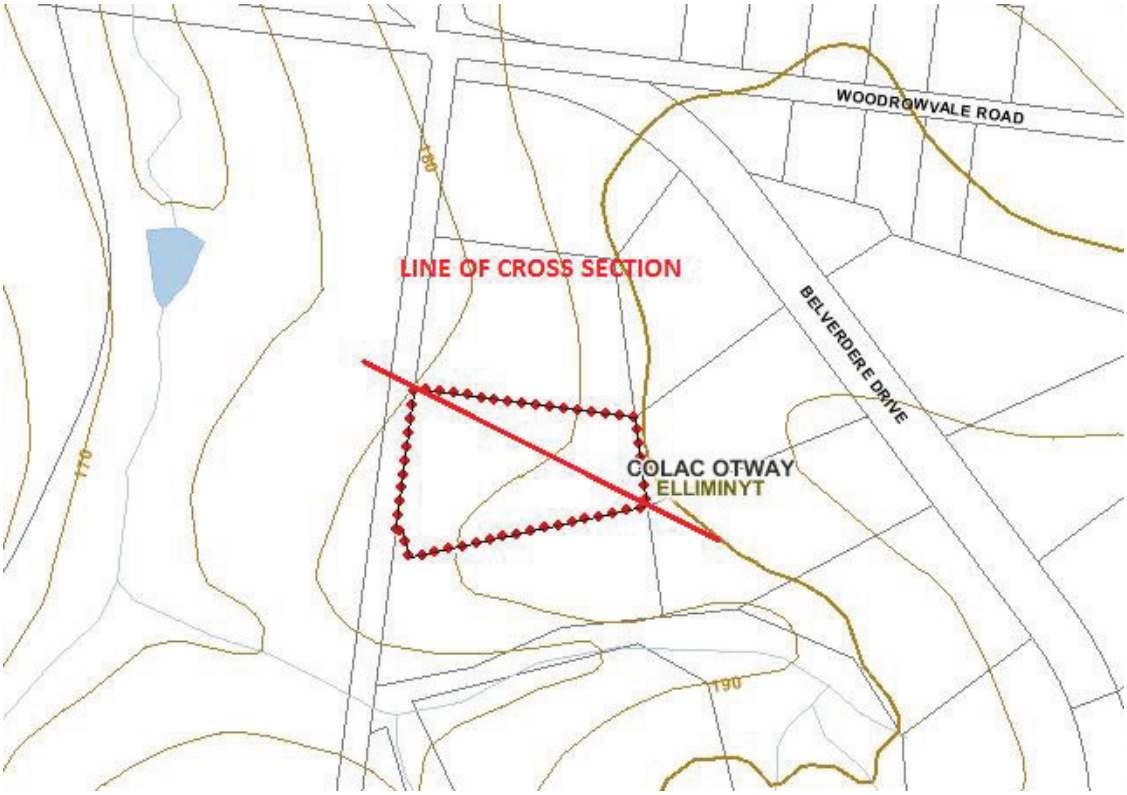

Fig 7. Line of slope cross section. (Author)

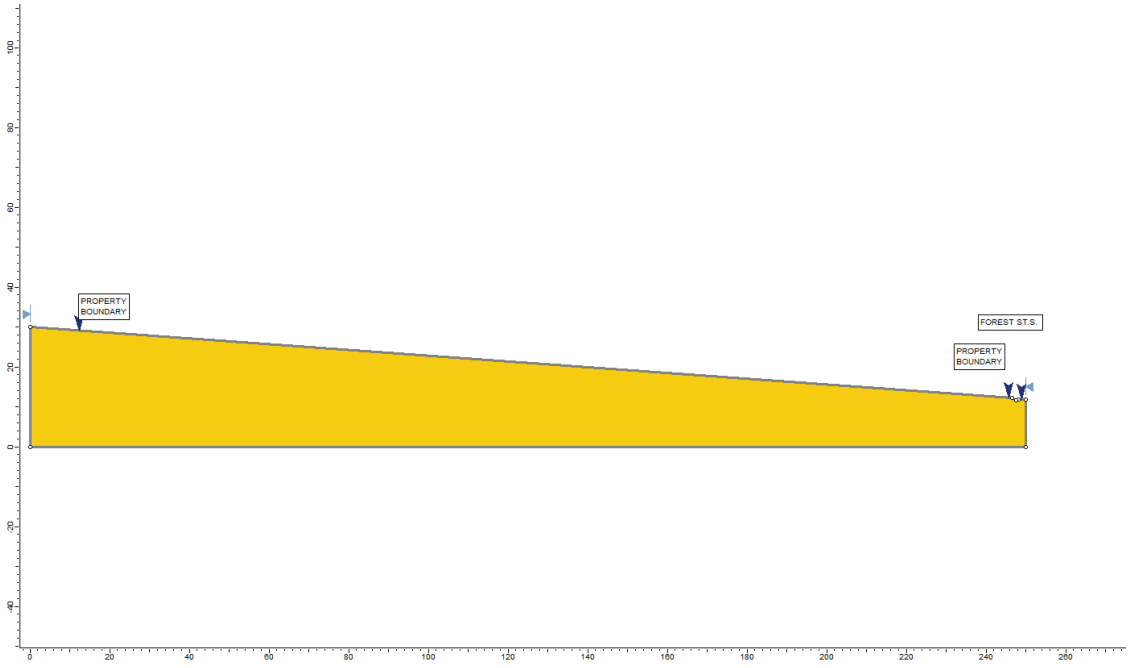

Fig 8. Slope model with property boundaries and roadway (Author)

(Soil profile detail not visible at this scale).

8.0 Plausible Failure Modes

Of the 10 types of landslide systems, AGS Figure B1, and with reference to the information obtained during the site investigation, there are no plausible failure modes with the remote possibility of affecting the proposed development.

Specific future developments may require detailed slope analysis.

8.1Elements at risk

As the proposal is for a sub-division, Life would not be a risk element, but property would be at very low risk.

8.2 Failure analysis

Based upon the foregoing assessment, and site inspection, there is no plausible failure mechanism.

9.0 Risk Analysis

Risk Analysis brings together Probability and Consequence.

9.1 Consequence Analysis

In the absence of a plausible failure mode there can be no consequences

9.2 Probability Analysis

The annual probability of a slope failure affecting this development will be considered Rare, 10^{-6}. This value is based upon the annual probability of a failure of such a low moderate angle slope.

9.3 Vulnerability Analysis

Vulnerability for Property would be unity with Life at 0.0.

9.4 Spatial Factor

Due to the nature of the proposed development, spatial factor would be assigned a value of 0.0.

9.5Risk analysis

The assessed Maximum Annual probability of loss of life from the proposal is Barely Credible. This figure is below the advised acceptable limit

Property Risk from the proposal would be Very Low. Overall the risk to property is below the advised acceptable limit.

The proposed subdivision generates allotments which contain areas that could be considered as safe building envelopes.

10.1 Footing structure and Foundation Materials

N/A

10.2 Cut and Fill Earthworks

None anticipated.

10.3 Soil Retention Structures

None anticipated

10.4 Drainage

N/A

10.5 Building Design and Structural System

N/A

10.6 Vegetation

At the time of inspection the site contained asurface covering of grasses, there are no trees proposed for removal.

10.7 Wastewater Management

N/A

10.8 On-going Maintenance and Mitigation Measures

This report does not recommend specific on-going erosion mitigation measures.

10.9 Development Timeframe

There is no geotechnical timeline for this development.

10.10 Additional Geotechnical Requirements

Additional geotechnical requirements not required.

11.0 Landslip Risk Assessment Statement

Landslip Risk Assessment is not required due to the slight to moderate slope angles displayed by the subject land and that annual risk to Life of Barely Credible is applicable to an acceptable level for an existing slope.

12. Report Recommendations

Proposal be approved as the sub-division can be considered safe from the hazard of landslip.

It should also be noted that each proposed allotment contains areas that could be considered as safe building envelopes.

13. Report Restrictions

Should the final proposal differ substantially from the assessed proposal, the testing and resultant recommendations, may not be valid. It also assumes the 'as tested' conditions are consistent across the site. If this is not the case, the client would be advised to contact the author, should encountered conditions vary from those reported.

2020Engineering Solutions takes no responsibility for errors or omissions contained in sourced material. This report should be read in entirety and not selectively reproduced.

14. Professional Compliance Statement

The author has valid professional indemnity insurance at the time of inspection and reporting. As part of a commitment to on-going professional development the author is undertaking the process of accreditation and attainment of chartered status.

15 Controlling and Referenced Documents;

AS1726-1993 (incorporating amendments to #2-1994)
AS4360-2005 Risk Management Set
AS4200-2000 General Conditions of Contract for Engagement of Consultants
AS2870-2011 Residential Slabs and Footings
Colac Otway Shire
Planning Scheme, Erosion Management Overlay Procedures (EMO)
Schedule 1
Geographic Information System (GIS) Data base
Geological Survey of Victoria (GSV)
Colac 7621-3 Zone 54
1:50,000 Map Series
Tickell S.J. 1990.
Report 103 (Department of Agriculture, Energy and Minerals)
2020ES JSA 01.01.08.19
www.dse.vic.gov.au

16. Site Condition Photo.

Fig 9. Surface conditions of subject land showing grass surface and slight slope angle. (Author)

17.Geotechnical Declaration

ES19167

FORM	A	Geotechnical Declaration and Verification Development Application
Office Use Only		Colac Otway SHIRE

To be submitted with planning application. It must accompany the Geotechnical Assessment and/or Landslip Risk Assessment. This form is essential to verify that the Geotechnical Assessment and/or Landslip Risk Assessment has been prepared in accordance with Cl 44.01 of the Colac Otway Planning Scheme and that the author of the Assessment/s is a geotechnical engineer or engineering geologist as defined by this clause.

Section 1	Related Application	
Planning Application Number (if known)	TO BE ADVISED	
Site Address	35 FOREST STREET, STH, ELLIMINYT 3250	
Applicant	A & G LAMANNA	
Section 2	**Geotechnical Assessment and /or Landslip Risk Assessment**	
Details	Report Title: GEOTECHNICAL ASSESSMENT	
	Author's Company/ Organisation Name: 2020 ENGINEERING SOLUTIONS	Report Reference No: ES19167
	Author: MR MICHAEL DELAHUNTY	Dated: 16/08/2019

Section 3		Checklist
Geotechnical Requirements (Tick as appropriate either Yes or No)		**The following checklist covers the minimum requirements to be addressed in a Geotechnical Assessment and/or Landslip Risk Assessment. The report must also cover any additional matters required by Clause 44.01. This checklist must accompany each report. Each item is to be cross-referenced to the section or page of the Geotechnical Assessment and/or Landslip Risk Assessment which addresses that item.**
☒ Yes	☐ No	A review of readily available history of slope instability in the site or related land as per <SECTION 6 >
☒ Yes	☐ No	An assessment of the risk posed by all reasonably identifiable geotechnical hazards as per <SECTION 6.1 >
☒ Yes	☐ No	Plans and sections of the site and related land as per <SECTIONS 17 >
☒ Yes	☐ No	Presentation of a geological model as per <SECTION 8 >
☒ Yes	☐ No	Photographs and/or drawings of the site as per < SECTION 16 >
☒ Yes	☐ No	A conclusion as to whether the site is suitable for the development proposed to be carried out either conditionally or unconditionally as per <SECTION 12 >
☒ Yes	☐ No	If any items above are ticked No, an explanation is to be included in the report to justify why < >
		Is the approval subject to recommendations and conditions relevant to:
☒ Yes	☐ No	Selection and construction of footing systems.
☒ Yes	☐ No	Earthworks.
☒ Yes	☐ No	Surface and sub surface drainage.
☒ Yes	☐ No	Recommendations for the selection of structural systems consistent with the geotechnical assessment of the risk.
☒ Yes	☐ No	Any conditions that may be required for the ongoing mitigation and maintenance of the site and the proposal from a geotechnical viewpoint.
☒ Yes	☐ No	Highlighting and detailing the inspection regime to provide the <PCA> and builder with adequate notification for all necessary inspections.
FIFTY Years		State the Design Life of the Structure adopted in the Geotechnical Assessment and/or the Landslip Risk Assessment.
☒ Yes	☐ No	Are the risk mitigation measures as recommended in the Geotechnical Assessment and/or the Landslip Risk Assessment suitable for the design life of the structure?
NOTE:		<Add Reference> - Add in the relevant section or page number of the listed Geotechnical Assessment and/or Landslip Risk Assessment which addresses each item

FORM A	Geotechnical Declaration and Verification Development Application

Section 4 List of Drawings referenced in Geotechnical Assessment and/or Landslip Risk Assessment

Design Documents	Description	Plan or Document No.	Revision or Version No.	Date	Author
	LOCATION & PLANNING DETAILS	FIG 1.		PLANNING MAPS ON LINE	
	PLAN OF SUB DIVISION	FIG 2.		(ROD BRIGHT & ASSOC)	
	SITE GEOLOGY	FIG 3.			GEOVIC
	TOPOGRAPHY	FIG 5.			GEOVIC
	MAPPED SLIP SYSTEMS	FIG 6.			COS
	LINE OF SLOPE CROSS SECTION	FIG 7.		AUG 2019	M DELAHUNTY
	BLOCK ANALYSIS	FIG 8		AUG 2019	M DELAHUNTY

Section 5 Declaration

Declaration (Tick all that apply)		
☒ Yes	☐ No	I am a geotechnical engineer or engineering geologist as defined by the Colac Otway Planning Scheme and on behalf of the company below:
☒ Yes	☐ No	I am aware that the Geotechnical Assessment and/or Landslip Risk Assessment I have either prepared or am technically verifying (referenced above) is to be submitted in support of a planning application for the proposed development site (referenced above) and its findings will be relied upon by the Colac Otway Shire Council in determining the planning application
☒ Yes	☐ N/A	I prepared the Geotechnical Assessment and/or Landslip Risk Assessment referenced above in accordance with the Colac Otway Planning Scheme and the AGS Guidelines 2007 as defined in the planning scheme.
☒ Yes	☐ N/A	I technically verify that the Geotechnical Assessment and/or Landslip Risk Assessment referenced above has been prepared in accordance with the Colac Otway Planning Scheme and the AGS Guidelines 2007 as appropriate.
☒ Yes	☐ No	I technically verify that the Geotechnical Assessment prepared for the planning application for the site confirms the land can meet the acceptable risk criteria specified in the schedule to Clause 44.01 of the Colac Otway Planning Scheme taking into account the total development and site disturbance proposed.
☐ Yes	☐ No ☒ N/A	I technically verify that the Landslip Risk Assessment prepared for the planning application for the site confirms the land can meet the tolerable risk criteria specified in the schedule to Clause 44.01 of the Colac Otway Planning Scheme taking into account the total development and site disturbance proposed.

Section 6 Geotechnical Engineer or Engineering Geologist Details

Company/ Organisation Name	2020 ENGINEERING SOLUTIONS PTY LTD	
Name (Company Representative)	Surname: DELAHUNTY	Dr / Mr / Mrs / Ms / Miss
	Given Name(s) MICHAEL	
	Chartered Professional Status	Registration Number
Signature		Dated: 16/08/2019

Reference: AGS Guidelines 2007c *"Practice Note Guidelines for Landslide Risk Management"*, Australian Geomechanics Society, Australian Geomechanics. V42. N1 March 2007.

Note: N/A = Not Applicable

April 2013.

18.*The Geotechnical Assessment*

The initial level of assessment requires a report known as a "Geotechnical Assessment". A primary purpose of the Geotechnical Assessment is the collection of base information about the site. This is to include:

- A detailed site description typically including aspects of the site geomorphology, site drainage and site physiography including slope and aspect.
- It is expected that the site description also includes other site features such as existing development, access roads, retaining walls and site excavations and/or fills.
- Site assessment plans and cross sections of the subject site and related lands that may contribute to or be affected by instability at the site. This should include contours and ground slopes drawn to scale and dimensioned from a survey and recent field measurements. The plan and section should be separate from any geological model or stability model provided as additional analysis/assessment information.
- A detailed assessment of subsurface conditions including both surface and subsurface geology. Such information is vital in developing a geological model for the site and should include any exposures or outcrops as well as groundwater discharges or seeps
- The above information should then be summarised in a description of a geological/ geotechnical model for the site
- Details of all site investigations and any other information used in developing the Geotechnical Assessment.

The purpose of the base information is to effectively describe key aspects of the site in detail so as to clearly establish a context for the site conditions prior to the proposed development.

The next aim of the Geotechnical Assessment is to establish relevant features of the slope stability conditions of the site. This should include:

- A statement indicating whether there are natural slopes on or immediately adjacent to the subject lot which exhibit evidence of possible or past slope instability such as landslide, rockfall or erosion.
- The Geotechnical Assessment should list all credible, potential modes of failure.

By combining an understanding of the site conditions and aspects of slope stability, a primary finding from the Geotechnical Assessment must be:

- A statement indicating risks for all slope stability hazards identified are of an ACCEPTABLE RISK level (as defined by the schedule) and that these risks will remain at an ACCEPTABLE RISK level over the design life of the development.

An ACCEPTABLE RISK level by necessity must be defined by COS, but is expected to be in line with risk levels recommended in the Australian Geomechanics Society's (AGS) Landslide Risk Management Guidelines (AGS 2007c and d). For a typical low rise residential development, ACCEPTABLE levels of risk as recommended by AGS are as follows:

Risk Type for low rise residential development	**ACCETABLE RISK level (as per AGS 2007 c and d)**
Risk to Property and Infrastructure (Qualitative Assessment)	LOW
Risk to Life for existing slopes and development (Quantitative Assessment)	1 x 10-5
Risk to Life for new slopes and new development (Quantitative Assessment)	1 x 10-6

Note other combinations of building importance and slope conditions can result in different levels of ACCEPTABLE risk (e.g. a hay shed has less stringent criteria whilst heavily used building such as schools or recreation centers will require more stringent criteria). The AGS guidelines offer detailed recommendations on this aspect of ACCEPTABLE RISK.

If the Geotechnical Assessment <u>cannot</u> make the statement regarding ACCEPTABLE RISK levels for <u>all slope hazards,</u> then the assessment must proceed to a second more detailed assessment known as a "Landslide Risk Assessment".

It is generally not expected that detailed risk calculations would be included in a Geotechnical Assessment however a consultant may choose to include some calculations if they feel the need to justify the required statement regarding ACCEPTABLE RISK levels.

Other recommendations regarding the development must also be included in the Geotechnical Assessment where they have influence on the final recommendation for approval. These include:

- Determination of appropriate founding depths
- Location and depth of cuts and fills,
- Construction of retention systems
- Details of surface and sub-surface drainage
- Vegetation retention
- Drainage and effluent disposal
- Need for ongoing mitigation measures
- Timeframes for completion of works
- Any other geotechnical approvals

Received
5 September 2019

Finally the Geotechnical Assessment must include a statement on whether or not the next level assessment i.e. a Landslip Risk Assessment is required.

The Landslip Risk Assessment

A Landslip Risk Assessment may be required in one of two ways:

1. Where the Geotechnical Assessment cannot make the statement regarding all potential slope hazards are at an ACCEPTABLE risk level and hence the call for a more detailed assessment or;
2. Where landform data indicates the natural slopes on or immediately adjacent to the subject lot exceed certain slope angle thresholds for various geologic units (as defined in the schedule). In the case of the spatially extensive Eumeralla Formation (Otway Group) this threshold angle is 14°.

The Landslip Risk Assessment must include the initial Geotechnical Assessment OR must include all information required in a Geotechnical Assessment where the initial level of assessment was bypassed by the slope threshold requirement.

The Landslide Risk Assessment then requires a full risk assessment in accordance with the requirements of the AGS2007 guidelines.
This includes an assessment for risks for all reasonably identified geotechnical hazards and must be undertaken for risks to life and risk to property/infrastructure. Qualitative and quantitative calculations must be included in this assessment.

The Landslip Risk Assessment must include a specific statement as follows:

- A statement that the subject lots are suitable or can be made suitable for the proposed development and that the subject lot or the proposed development can meet the TOLERABLE RISK criteria as defined in the schedule.

As before, a TOLERABLE RISK level will need to be defined by COS but is again expected to be in line with risk levels recommended in the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007c and d). For a typical low rise residential development TOLERABLE levels of risk as recommended by AGS are as follows:

Risk Type for low rise residential development	**TOLERABLE RISK level (as per AGS 2007 c and d)**
Risk to Property and Infrastructure (Qualitative Assessment)	MODERATE
Risk to Life for existing slopes and development (Quantitative Assessment)	1 x 10-4
Risk to Life for new slopes and new development (Quantitative Assessment)	1 x 10-5

It is again noted that different combinations of building importance and slope conditions may result in different levels of tolerable risk.

19. Report Limitations

2020 Engineering Solutions Pty Ltd ("2020")
Geotechnical Report Limitations

The report to which this document has been attached assesses risks arising from land slope instability and proposes risk minimisation solutions. Absolute risk avoidance cannot be assured, principally due to assessment cost factors. It is therefore necessary to rely on instructions and make assumptions.

Changed Conditions

The report may be invalidated by changed conditions including:-

1. topography.
2. soil moisture content.
3. above or below ground structures.
4. soil and substrate profiles.
5. location of site boundaries.

Causes of Changed Conditions

Changed conditions may occur due to:-

1. extreme conditions such as flood, drought, cold, heat or fire.
2. human activities.
3. natural processes.
4. planning or design requirements.

Client to inform 2020 of any changes

2020 will endeavour to identify any reasonably foreseeable risk factors on the site which may cause changed conditions. Samples are taken at reasonable intervals bearing in mind the cost to the client. In the absence of specific instructions or patent conditions it will be assumed that conditions observed in samples are consistent across the site.

This document is provided to inform the client that their responsibility for risk is shared with 2020. The client will be responsible for inaccurate instructions or failure to instruct in relation to changed conditions, events that may cause changed conditions or when it becomes evident that assumptions may be invalid. Failure to do so could result in substantial and costly damage and disputes.

Interpretation

The report must be considered in its entirety. Each part of the report may be dependent on other parts for meaningful interpretation. The report should also only be used by the client. It may not be relied upon by any other person without first conferring with 2020. The report should only be acted upon and interpreted by persons qualified and competent in the activities contemplated in the report.

130433 - 13 05 31 Geotechnical Report Limitation

ROD BRIGHT & ASSOCIATES PTY. LTD.
LAND SURVEYORS & TOWN PLANNERS
A.C.N. 007 206 975 A.B.N. 50 007 206 975

26 Murray Street,
Colac 3250
P.O. Box 371

Tel. (03) 5231 4883
Fax. (03) 5231 4883

10th October 2019

REF: 19-27

Mr I. Williams,
Statutory Planner,
Colac Otway Shire,
P.O. Box 283,
COLAC …VIC. 3250

Dear Sir,

RE: PLAN OF SUBDIVISION PROPOSED SUBDIVISION
35 FOREST STREET, ELLIMINYT
PLANNING PERMIT No. PP207/2019
RE: A. & G.E. LAMANNA and M. & L.J. NEWCOMBE

Further to your correspondence of the 19th September we advise:

1. The Plan for Endorsement, along with the Plan with Aerial Image Overlaid has been amended to increase the width of the access to Lot 3 to 16 metres as requested by council's Infrastructure Department and submitted to council via SPEAR.
2. Our client has held discussions with the council Infrastructure Department and accordingly advise that Lots 1 – 3 are all large in area and accordingly have high potential for absorption. It is anticipated that should it be required the new Lot 3 will be drained along the access way out to Forest Street, the legal point of discharge.

We note council's comment regarding *"a sewer line running past the front of the property"* and advise this is highly unlikely, but understand that should this be the case, our client will be required to connect into said sewer in accordance with the relevant legislation and policy applied by Barwon Water.

We trust that we have been of assistance in this matter and await receipt of the Planning Permit in due course.

Yours faithfully,

.....

A.E.Bright,
ROD BRIGHT & ASSOCIATES

encl.
copy: A. & G.E. Lamanna
M. & L.J Newcombe