

10 July 2026

Our Ref: TED 2025-3070

Attention: Josh Hutchins
13 Loyola Drive
Mansfield, VIC 3722

Dear Josh,

RE: Land Capability Assessment (LCA) Addendum

This report is provided to address a request for information from Goulburn Murray Water (GMW) in a letter dated 4 March 2025, referring to planning application P095-24 associated with a proposed third dwelling.

Introduction

The purpose of the report is to assess on-site wastewater management for the third dwelling at 13 Loyola Drive in Mansfield, Victoria situated within the Gazetted Special Water Catchment of Lake Eildon Environs, with property frontage onto Lake Eildon.

An existing 4-bedroom plus study main residential dwelling and 1-bedroom dependant persons unit features an approved domestic wastewater system, designed for under 5,000 litres per day and endorsed by Mansfield Shire Council on 8 February 2023. Refer Attachment 1.

This Land Capability Assessment Addendum (LCAA) supplements the approved LCA compiled by Statewide Geotechnical dated 20 November 2022 and adds to a Taylor Consulting Engineers addendum dated July 2024. Refer Attachment 1.

As requested in the GMW letter dated 4 March 2025, this report provides a revised land application design associated with the third dwelling, including a Tier 2 semi-quantitative risk assessment to evaluate residual risks to human health and environment where the land application area does not meet the 300 m setback distance defined EPA Guideline for Onsite Wastewater Management (May 2024).

Key findings include:

- This 2.63-hectare, rural living zone property sits within the Lake Eildon Environs Special Water Supply Catchment and can sustainably accommodate on-site effluent disposal for the three dwellings.
- Connection of all dwellings to an existing Taylex ABS 1500 poly Aerated Wastewater Treatment System (AWTS) with extension of the existing sub-soil irrigation field is the preferred option.

Site and Development Overview

Client:	Josh Hutchins
Proposal:	1-bedroom third dwelling
Property Size:	2.63 ha
Property Status:	Existing 4-bedroom dwelling plus study, and Existing 1 bedroom dependant persons unit
Municipality:	Mansfield Shire Council
Property Zoning:	Rural Living Zone (RLZ)
Planning Overlays:	Environmental Significance Overlay (ESO2) Designated Bushfire Prone Area
Declared Water Supply Catchment:	Lake Eildon Environs
Reticulated Water Supply Available:	No – rainwater collection only
Reticulated Sewer Available:	No – area unlikely to be sewerred due to low density development and distance from existing combined wastewater services.

Tier 2 Evaluation

Where the site is assessed as having medium risk to human health and environment: -

- Within 300 m of Lake Eildon,
- EPA GOWM setback distances *are not met at the LAA*
- Property size less than 10 ha

A Tier 2 evaluation is included below to evaluate residual risk in the use of septic systems.

Semi-Quantitative Alternative Setback Distance Risk Assessment

While Table 4-10 of the [EPA Guidelines](#) and AS/NZS 1547:2012 provide typical Tier 1 values for preliminary assessment, they are not intended as a comprehensive, site-specific evaluation of all conditions and associated risks. Therefore, for sites not meeting EPA setback criteria and identified as presenting medium or high risks require further, detailed investigation.

In line with the risk and performance based approach outlined in Table 24 of the EPA Guideline for Onsite Wastewater Effluent Dispersal and Recycling Systems ([GOWERS 2024](#)), where default setback distances cannot be achieved, any proposed alternative setbacks must be justified through a semi-quantitative assessment of relevant site and system characteristics, as outlined in AS/NZS 1547:2012 Appendix R (Tables R1 and R2).

Table R1 of AS/NZS 1547:2012 specifies a setback range of 15–100 m from surface waters, with Note 4 advising that setback distances must be confirmed with the relevant water authority—in this case, Goulburn-Murray Water who have referred Table 4-10 of the [EPA Guidelines](#) setback to reservoirs.

Taylor Consulting Engineers has undertaken a site-specific Appendix R assessment to evaluate alternative setback distances. The results, presented in Attachment 2 **confirm a medium risk classification**—consistent with both the Mansfield Shire Onsite Wastewater Management Plan and previous EDIS model results (refer Attachment 1).

Pathogen Die-Off Modelling

To evaluate the available setback reduction and assess the potential risk of pathogen transport from the Land Application Area (LAA) a 1-dimensional viral die-off model was employed. This model, first developed by Beavers and Gardner (1993), later refined by Cromer Beavers and Gardner in 2001, quantifies viral movement in saturated soils, representing a conservative estimate for pathogen transport. A detailed methodology is available from <https://www.williamccromer.com/>.

It is important to note that the Trench model applies to saturated soil conditions, which provides a conservative maximum pathogen transport distance for fine soils. In unsaturated soils, such as those tested at the site, travel distances would be significantly shorter. The model also excludes the presence of trees and vegetation which provide an effective barrier to pathogen travel due to moisture extraction and development of negative pore pressure / soil suction effects.

Trench model assumptions:

- Bacteria die-off occurs more rapidly than viral die-off, and
- A six-log reduction in viral concentration is applied for primary treatment systems
- A three-log reduction in viral concentration is applied for secondary treatment systems
- A one-log reduction in viral concentration is applied for advanced secondary treatment systems with disinfection

The minimum mean annual temperature of 7.6° centigrade was derived from [Silo Data](#) mean annual minimum temperature, and a range between 9.13° and 18.5° at a depth of 1 m was obtained from [Earth Engine](#). The minimum wastewater temperature calculable in Trench is 9°. Lower temperatures result in longer viral persistence and potentially greater travel distances, and therefore 9° was applied as a conservative annual sub-soil temperature.

Tier 2 Summary Alternative Waterway Setback

As shown in Table 1 below, the calculated minimum in-ground pathogen die-off distance when adopting a secondary treatment system is 19 m. A setback of over 185 m to Lake Eildon is provided and is acceptable based on these criteria, with a resulting low residual risk to human health or environment.

Attachment 2 contains detail regarding the modelling methodology and complete results.

Table 1: Tier 2 summary outputs - Appendix R & Pathogen Die-Off Setback

	MIN (m)	MAX (m)	CALCULATED ALTERNATIVE SETBACK (m)
EPA GOWM – Reservoir	50	300	175
AS/NZ 1547 – 2012 Waterway	15	100	58
EPA GOWM – Waterway	50	100	65
EPA GOWM – Farm Dam	30	60	45
EPA GOWM – Drainage Line	20	40	30
EPA GOWM – Open Stormwater Drain	10	30	30
Viral Die-Off			19
Available setback distance			> 185

Existing Onsite Wastewater Treatment and Disposal

The existing treatment system is understood to be a Taylex Polyethylene ABS 1500 secondary all waste wastewater treatment system. The existing treatment system caters for both black and grey water (all wastes). The Taylex ABS1500 is designed to treat up to 1,500 Litres per day and has a holding capacity of 7,108 Litres and an operating capacity of 6,066 Litres, and carries JAS-ANZ (The Joint Accreditation System of Australia and New Zealand) Certification to AS1546 in certificate 7297-3039-01.

The endorsed existing land application area (LAA) is understood to be two 213 m² zones totalling 426 m² of pressure compensated drip irrigation field.

Electronic copies of the permit to alter, & certificate of approval for onsite wastewater as endorsed by Mansfield Shire Council are included in Attachment 1.

The existing secondary treatment system installed in 2023 is understood to be operating satisfactorily with no sign of surcharge. We understand the owner will provide an [appropriate licenced plumbers report](#) with the septic permit [application](#) associated with the proposed habitable outbuilding.

Water Balance Calculations for Amended Wastewater System

In accordance with the EPA Guidelines (Table 4-3, note 8), the number of people is equal to the number of bedrooms plus one. Additionally, Table 4-1 nominates flow rates for households with onsite roof water tank supply and standard water fixtures is 150 litres per person per day.

The proposed third dwelling has now been remodelled as a 1-bedroom dwelling, reducing from the original 2-bedroom floor plan, therefore:

- Main dwelling: (4 bedroom + study + 1) x 150 = 900 litres per day, and
- Second dwelling: (1 + 1) x 150 = 300 litres per day, and
- Third dwelling: (1 + 1) x 150 = 300 litres per day

Total daily wastewater flow: 900 + 300 + 300 = **1,500 litres per day**

Proposed Wastewater System

Where the volume of wastewater generated is within the capacity of the existing Taylex Poly ABS 1500, it is proposed to simply direct all wastewater to the AWTS and extend the pressure compensated drip irrigation dispersal field.

To calculate the size of the required land application area (LAA) I used the published Municipal Association of Victoria (MAV) Land Capability Assessment Framework (VLCAF) spreadsheet "[VLCAF irrigation area sizing](#)" and imported the average rainfall data for the nearest Bureau of Metrology Station – Mansfield Post Office (station 083019) and nearest monthly pan evaporation data from Lake Eildon (Station 088023).

As per the 2024 Addendum, using daily irrigation rates (DIR) of 4 mm per day with a flow of 1,050 litres per day, the existing dispersal field calculates as 413 m². This reasonably matches the existing endorsed dispersal field of 425 m² installed as two 213 m² zones.

As requested in the GMW letter dated 4 March 2025, a review of the LAA using a design irrigation rate of 3 mm per day for the Category 5 limiting soil horizon (AS1547:2014 Table M1), with a flow of 1,050 litres per day, the existing dispersal field would be 679 m². This would affect a 64% increase in area. Here we informed the existing endorsed 426 m² LAA is has been performing without issue with all plumbing inspections reports noting satisfactory ongoing performance of the existing dispersal field.

Calculations for the prosed flow load of **1,500 litres per day** result in values of: -

Treatment Type	LAA Type	Design Irrigation Rate (mm/day) Category 5 Soil AS1547:2012 Table 5.2	Area Required Flow Rate 1,500 L/day	Typical LAA Arrangement
Taylex ABS1500 Secondary (AWTS)	Subsoil Irrigation	4 (effective existing) (+ water balance)	589 m ²	589/213 = 3 zones
	Subsoil Irrigation	3 (+ water balance)	969 m ²	969/213 = 4.55 zones
	Alt option ETA Beds	12 (linear loading rate)	1,500/12 = 125 m ²	125 m ² x 1.0 m 5 No. 25 m x 1.0 m
Nutrient Balance		30 mg/L N (nutrient balance)	597 m ²	

Calculations for 1,050 and 1,500 litres per day are provided in Attachment 2 & 3 respectively.

The author notes that proper adjustment of [rotator valve] effluent dosing across multiple zones requires the zones to be of similar size, with my recommendation to add one or two similarly sized 213 m² irrigation fields taking the LAA area to 639m² or 852 m² rather than a new field of 163 m² (589-426) or an additional 543m² (969-426).

Due to the performance of the system to date, where all three dwellings are currently successfully utilising 426 m² sub soil drip irrigation without surcharge issues, to more than double the system may simply add redundancy, reducing drip irrigation field effectiveness leading to problems with operation and maintenance from issues such as blockages from soil and root intrusion. Simply there may not be enough flow within the system to effectively pressurise pipelines and dose the soil.

As such I propose an additional zone - 213 m² LAA extension, with a noted caveat that should Mansfield Shire be informed of surcharge issues (via quarterly inspection reports or Shire inspection) then a fourth zone be installed. Refer Attachment 4.

CONCLUSIONS

It is proposed to add to the existing approved and operational onsite wastewater system as described above to provide a system capable of treating and dispersing additional wastewater generated by the proposed third dwelling at 13 Loyola Drive, Mansfield.

REFERENCES

- Beavers, P.D. and Gardner, E.A. (1993) 'Soil physical factors affecting onsite wastewater disposal', Australian Journal of Soil Research, 31(4), pp. 575–589.
- Cromer, W.C., Beavers, P.D. and Gardner, E.A. (2001) 'Site and soil evaluation for onsite wastewater management', in On-site '01 Conference: Advancing On-site Wastewater Systems. Armidale, NSW: University of New England, pp. 95–102.
- Edis, R. 2014, Approaches for risk analysis of development with on-site wastewater disposal in open potable water catchments, report prepared for the Mansfield Shire Domestic Wastewater Management Plan Pilot Project, Mansfield Shire Council, Mansfield, Victoria.
- Environment Protection Act 2017 (Vic) (2017) Melbourne: Victorian Government. Available at: Victorian Legislation website.
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- Field, D.J., McKenzie, D.C. and Koppi, A.J. (1997) 'Development of an improved Vertisol stability test for SOILpak', Australian Journal of Soil Research, 35(4), pp. 843–852. doi:10.1071/S96118.
- Mansfield Shire Council (2022) On-site Wastewater Management Plan. Mansfield, VIC: Mansfield Shire Council. Available at: Mansfield Shire Council website
- Standards Australia (2012) On-site domestic wastewater management. AS 1547:2012. Sydney: Standards Australia.
- Talsma, T. and Hallam, P.M. (1980) 'Hydraulic conductivity measurement of forest catchment soils', Australian Journal of Soil Research, 18(2), pp. 139–148.
- WaterNSW (2019) Designing and installing on-site wastewater systems: current recommended practice. Sydney, NSW: WaterNSW. Available at: www.waternsw.com.au

Appendices

Attachment 1: Existing Reports

Attachment 2: Tier 2 Risk

Attachment 3: Land Application Area Based on Hydraulic Load

Attachment 4: Site Plan & Proposed Works

DISCLAIMER

It is important to note there is potential for the Council and Goulburn Murray Water to not agree to the proposed development and installation of an onsite wastewater disposal system.

This document presents a proposal for onsite wastewater disposal requirements for a specific site; this document does not guarantee that development will be approved.

This report is provided without any express or implied warranties. While Taylor Consulting Engineers has made diligent efforts to ensure the accuracy and currency of the information contained herein, we disclaim all liability for any errors or omissions.

Assessors Qualifications:

Based in Mansfield and serving Northeast Victoria's High Country, Toby Creighton is the Field Services Manager at Taylor Consulting Engineers. He holds a degree in Earth Science from the University of Plymouth (1999) and a Master's in Geotechnical Engineering from UNSW (2010), bringing over two decades of experience in civil infrastructure and geotechnical risk assessment.

Since relocating from Melbourne in 2020, Toby has focused on the region's unique terrain, specialising in soil and rock analysis for a range of applications, including on-site wastewater management. His capabilities are further enhanced by the recent completion of the CET Land Capability Assessment for On-site Wastewater Management course (November 2024).

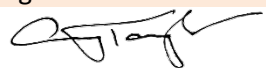
All fieldwork and assessments are carried out or directly supervised by Toby, ensuring both technical rigour and a deep understanding of local conditions.

Assessors Professional Indemnity Insurance:

Policy Number: PA212600001PI
Period of cover: From 4:00 pm on 1/02/2026 to 4:00 pm 1/02/2027
Limit and indemnity: \$2,000,000
Insurer: Liberty Mutual Insurance Company, Australia Branch (ABN 61086 083 605)

Document Control

Revision No.	Author	Reviewer	Date
1	T. Creighton	G.P. Taylor	9 July 2026

Approved for Issue by:	Date	Signature
Guy Phillip Taylor	9 July 2026	

Attachment 1: Existing Reports

LAND CAPABILITY ASSESSMENT - ADDENDUM

13 LOYOLA DRIVE, MANSFIELD

1. INTRODUCTION

The property owner for 13 Loyola Drive Mansfield is proposing a third dwelling comprising a two-bed relocatable on the subject site. The property currently includes an existing 4 bed dwelling, 1 bedroom dependant persons unit and existing shedding.

Taylor Consulting Engineers have been engaged to provide a Land Capability Assessment (LCA) addendum to support the Planning Permit application. This addendum report is based upon and supplements the LCA report compiled by Statewide Geotechnical dated 20 November 2022 compiled to support the septic permit application for the second dwelling and is provided in **Attachment A**.

This letter report has been prepared with reference to the requirements of EPA Guidelines for onsite wastewater management and effluent dispersal and recycling systems, AS/NZS 1547 Onsite domestic wastewater management, the Mansfield Shire Onsite Wastewater Management Plan (OWMP) and State Environment Protection Policy (SEPP's Waters).

2. SITE AND DEVELOPMENT OVERVIEW

Address	13 Loyola Drive, Mansfield
Lot Plan	7 \ PS312772
Owner/Developer	Josh Hutchins
Proposal	Two bedroom relocatable unit
Property Size	26,307 m ²
Property Status	Existing dwelling, dependant persons unit, shedding. Dam to west and managed grassland.
Municipality	Mansfield Shire Council
Property Zoning	Rural living zone
Overlays	Environmental Significance (ESO2)
Housing Density	20-40 per km ²
Declared Water Supply Catchment	Upper Goulburn
Sub Catchment (if applicable)	Not applicable
Reticulated Water Supply Available	None – onsite roof water collection only

3. EXISTING ONSITE WASTEWATER TREATMENT AND DISPOSAL

The existing system is understood to be a Taylex Poly ABS 1500 secondary all waste wastewater treatment system. The Taylex ABS1500 is designed to treat up to 1,500 Litres per day and has a holding capacity of 9,320 Litres and an operating capacity of 5,880 Litres. The endorsed existing system is understood to be dispersing effluent into 425 m² of pressure compensated drip irrigation field.

Electronic copies of the permit to alter, & certificate of approval for onsite wastewater as endorsed by Mansfield Shire Council are included in **Attachment 2**.

The existing secondary treatment system installed in 2023 is understood to be operating satisfactorily with no sign of surcharge. We understand the owner will provide an [appropriate licenced plumbers report](#) with the septic permit [application](#) associated with the proposed third dwelling.

4. EDIS ALGORITHM

Table 1. EDIS Algorithm

Risk rating for values of individual site factors (R)					Score
	Factor	LOW (1)	MODERATE (2)	HIGH (3)	
R1	Distance to reservoir	>15 km	2 – 15 km	<2 km	3
R2	Soil type rating	1	2	3	2
R3	Distance to river	>80 m	40 – 80 m	< 40 m	1
R4	Distance to stream	>80 m	40 – 80 m	< 40 m	1
R5	Distance to drain	>40 m	10 – 40 m	< 10 m	1
R6	Lot size	>10 ha	2 – 10 ha	0.2 – 2 ha	2
R7	Density (houses/km ²)	<20 / km ²	20 – 40 / km ²	>40 / km ²	2
R8	LCA Rating	1	2	3-4	2
R9	System fail rate	<5%	5-10%	>10%	2

$$\begin{aligned} Rn &= ((R1 + R2) \times (R3 + R4 + R5 + R6) + (2 \times R8) + (3 \times R9 \times R7))/10 \\ &= ((3 + 2) \times (1 + 1 + 1 + 2) + (2 \times 2) + (3 \times 2 \times 2))/10 \\ &= ((5 \times 5) + 4 + 12)/10 \end{aligned}$$

$$Rn = 4.1$$

Low Risk individual site rating: An Rn value less than 2.5

Moderate Risk individual site rating: An Rn value of 2.5 – 5

High Risk individual site rating: An Rn value greater than 5

SITE RATING = MODERATE RISK

5. WATER BALANCE CALCULATIONS FOR AMENDED WASTEWATER SYSTEM

5.1 WASTEWATER GENERATION

The secondary treatment system caters for both black and grey water (all wastes).

The proposed additional dwelling has 2 bedrooms.

According to Table 4 EPA Guidelines of Practice Onsite Wastewater Management of the Minimum daily wastewater flow rates and organic flow rates, the Design hydraulic flow rates for Households with full water reduction features is 150 litres per person per day.

The following calculation determines the total anticipated wastewater flow rate (Q):

- (No. of bedrooms 1 + 1) x 150 litres flow per person per day = Q (litres flow per day)

Therefore:

- Primary dwelling: $(4 + 1) \times 150 = 750$ litres per day, plus
- Secondary dwelling: $(1 + 1) \times 150 = 300$ litres per day, plus
- Proposed dwelling: $(2 + 1) \times 150 = 450$ litres per day
 - **Total daily wastewater flow = 750 + 300 + 450 = 1500 litres per day**

5.2 PROPOSED WASTEWATER MANAGEMENT SYSTEM

Where the volume of wastewater generated is within the capacity of the existing Taylex Poly ABS 1500 secondary all waste wastewater treatment system, it is proposed to simply direct all wastewater to the AWTs and extend the pressure compensated drip irrigation dispersal field.

To calculate the size of the required dispersal field I used the published Municipal Association of Victoria (MAV) Land Capability Assessment Framework (VLCAF) spreadsheet "[VLCAF irrigation area sizing](#)", and imported the average rainfall data for the nearest Bureau of Metrology Station – Mansfield Post Office (station 083019) and nearest monthly pan evaporation data from Lake Eildon (Station 088023).

An initial calculation for the effluent field with 1500 litres per day using daily irrigation rates of 3 mm per day for the Category 5 limiting soil horizon (AS1547:2014 Table M1), a nitrogen loading of 80 g/m³ ((AS1547:2014 Appendix S Table S1) with an input of 1050 litres per day, the existing dispersal field would be 680 m² to accommodate wastewater loading and 1115 m² to accommodate the nitrogen loading. This contrasts with the endorsed existing dispersal field of 425 m².

As such a back-calculation check of the existing 425 m² dispersal field for an input of 1050 litres per day system determines a daily irrigation rate of 4 mm per day for the Category 3 upper soil horizon (AS1547:2014 Table M1) and a nitrogen loading of 30 g/m³ ((AS1547:2014 Appendix S Table S1). Using an input of 1050 litres per day results in a similar sized dispersal field for 413 m² to accommodate water loading and 418 m² to accommodate the nitrogen loading.

Where we are informed plumbing inspections reports have determined satisfactory ongoing performance of the existing dispersal field, this report will consistently use the parameter values for the revised 1500 litre per day input - a DIR of 4 mm per day and nitrogen loading of 30 g/m³.

Calculation checks for 1050 litres per day and proposed values for 1500 litres per day are provided in **Attachment 3**, MAV VLCAF Irrigation area sizing.

Where we are informed the existing 425 m² dispersal field is operating satisfactorily, it is proposed to install an additional 175 m² of absorption trench drain as per the amended proposed works plan (refer **Attachment 4**) and as extracted below in figure 1.

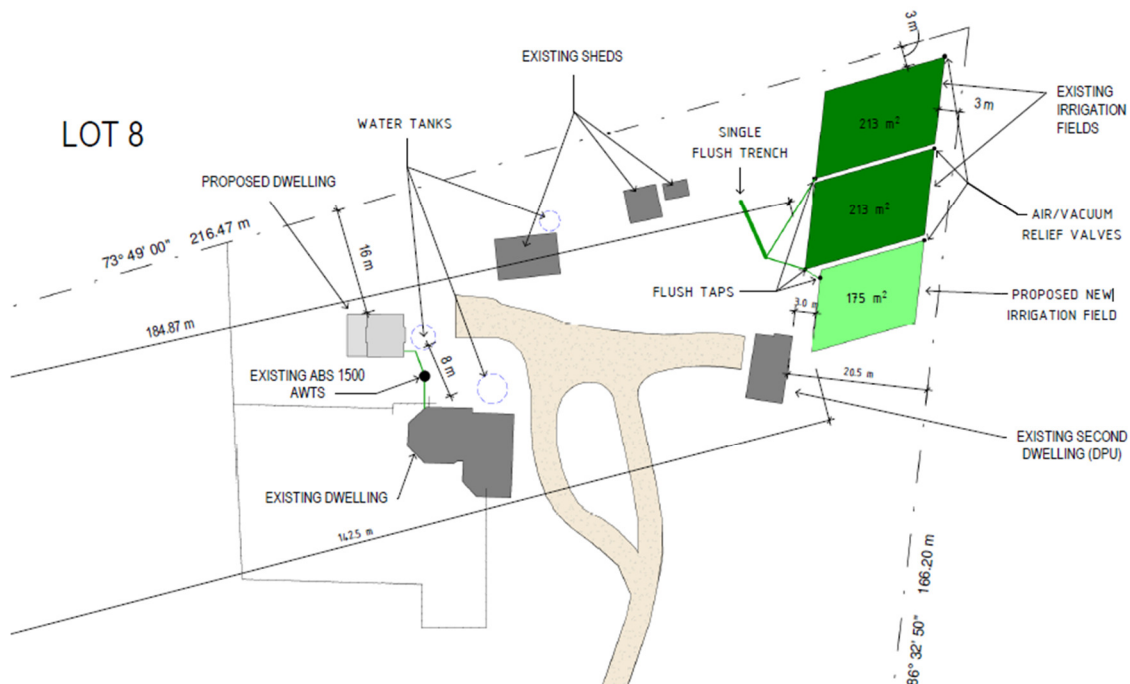


Figure 1: Proposed dispersal field amendment

5. CONCLUSIONS

It is proposed to alter the existing endorsed onsite wastewater system as described above to provide a system capable of treating and dispersing additional wastewater created by the proposed 2 bedroom dwelling at 13 Loyola Drive, Mansfield.

Before any work commences on installing the proposed system, a Permit to Alter an Onsite Wastewater Management System is required from Mansfield Shire Council.

6. ATTACHMENTS

1. PREVIOUS LCA
2. PERMIT TO ALTER, & CERTIFICATE OF APPROVAL FOR ONSITE WASTEWATER
3. VLCAF IRRIGATION AREA SIZING
4. PROPOSED WORKS PLAN

Toby Creighton

Manager Field Services

BSc (Hons) Earth Science, MEngSc Geotechnical Engineering and Engineering Geology

TAYLOR CONSULTING ENGINEERS

JULY 2024



Statewide Geotechnical
Geotechnical Engineers

LAND CAPABILITY ASSESSMENT REPORT

13 LOYOLA DRIVE, MANSFIELD



PREPARED FOR: PREMIER HOMES

CLIENT: JURGEN & WENDY LOCHTENBERG

PROPOSAL: DEPENDANT RELATIVE UNIT

PREPARED BY: MATTHEW COTTER
Senior Engineering Geologist, BSc (Geology)

REFERENCE No. 28934-5

DATE: 20th NOVEMBER 2022

Statewide Geotechnical (Aust) Pty Ltd

17-20 Summer Lane, Ringwood 3134

Phone: 03 9879 2999 Fax: 03 9879 6226 Email: geo@statewidedrilling.com.au

ABN: 73 113 017 799 ACN: 113 017 799

1.0 **INTRODUCTION**

1.1 **General**

Statewide Geotechnical (Aust) Pty Ltd was engaged to undertake an assessment of soil absorption capacity at 13 Loyola Drive, Mansfield.

Proposed Construction:

- It is proposed to construct a new single level Dependant Relative Unit. For the purpose of this report, it is understood that a proposed Dependant Relative Unit will have a **maximum of 1 bedroom**.

The aims of this investigation were as follows:

- Use background information and field data to provide guidance parameters for the design of a suitable system.
- Ascertain whether the test areas (proposed effluent disposal area) are suitable for the installation and maintenance of a satisfactory system.

Existing Dwelling:

- An existing four-bedroom clad frame dwelling. The existing dwelling is serviced by a standard septic tank / absorption trench system which was approved for use in 1999. According to a plumber's report this septic tank has an Outflow Field – total length of outflow field measures 110m at 600mm wide trenches, made up of 5 @22m with a pit at the end of each run (3 on one end 2 on the other end inside dog yard) outflow field is in very poor condition and every run is holding water. Recommendations for existing system – system is in very poor condition and will need to be upgraded, installation of new secondary treated system and installation of subsurface irrigation on the northeast boundary of property is recommended. This plumbers report is included in this report (refer to attachment 9.1).

Soil adsorption capacity testing has been used in conjunction with an evaluation of physical criteria detailed in the EPA Victoria publication (891.4, July 2016), "Code of Practice Onsite Domestic Wastewater Management", to determine the suitability of the site for the installation and maintenance of a sewage treatment system. Determination of soil adsorption (or percolation) rates is by "Constant Head Test" which is used as a measure of the hydraulic conductivity of the soil (refer to Australian Standard AS1547-2012).

The results of absorption testing are summarised in the following report. Site layout and absorption test locations are shown on the attached Figure 1.

1.2 Regional Geology

The site is identified on the Geological Survey of Victoria EILDON Sheet (1:50,000) as being located within the Province of Devonian 'Walhalla Group – Monty's Hut Formation' sandstone, mudstone and associated soil profiles. Reference: Geovic – Earth Resources.

2.0 SITE AND DEVELOPMENT OVERVIEW

The site is a large rural property covering 26307m², bounded to the east by Loyola Drive. An existing single storey brick veneer dwelling and a shed are centrally located onsite. The proposed construction envelope is located to the north-east of the existing dwelling. The site surface gradient was measured using a hand-held clinometer and ranged from 5-7° sloping towards the south-west.

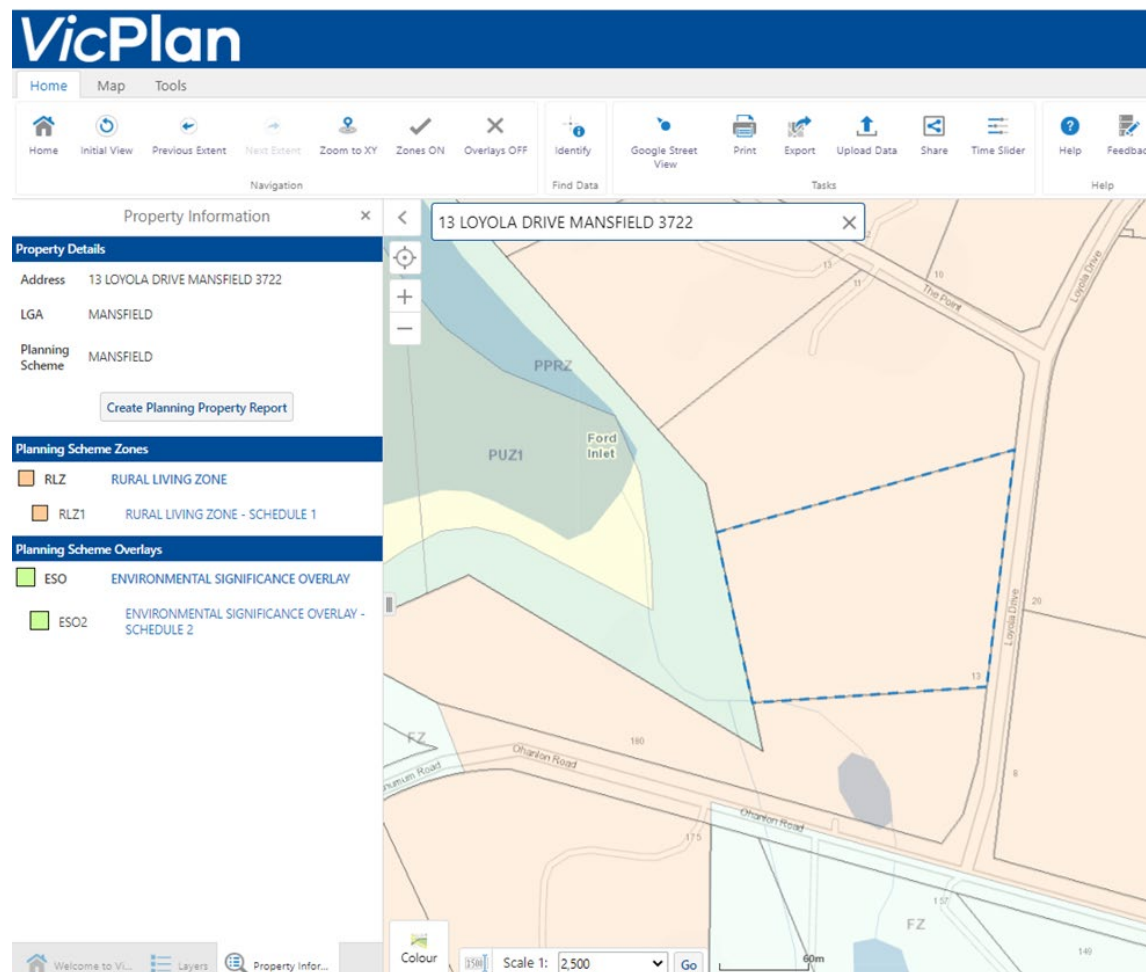


Satellite image of the entire property

The existing drainage in the area of the proposed dependant relative unit is surface runoff toward the the south-west. An existing dam is located approximately 125m to

the west of the proposed dependant relative unit. Lake Eildon is located approximately 300m to the west of the property and approximately 390m from the location of the proposed Dependant Relative Unit. The test points were situated to the south of the proposed dependant relative unit. For an illustration of the site layout and the location of the test points refer to Figure 1.

The property is classified as Planning Scheme Zone Rural Living Zone (RLZ), Rural Living Zone – Schedule 1 (RLZ1) with Planning Scheme Overlays of Environmental Significant Overlay (ESO) and Environmental Significant Overlay – Schedule 2 (ESO2). These planning zones and overlays are shown below and on the following page.



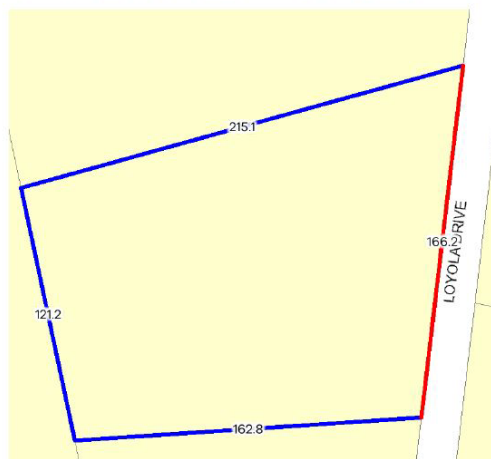
PROPERTY DETAILS

Address: **13 LOYOLA DRIVE MANSFIELD 3722**
Lot and Plan Number: **Lot 7 PS312772**
Standard Parcel Identifier (SPI): **7\PS312772**
Local Government Area (Council): **MANSFIELD**
Council Property Number: **A5619**
Directory Reference: **Vicroads 62 H3**

www.mansfield.vic.gov.au

SITE DIMENSIONS

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



Area: 26307 sq. m (2.63 ha)

Perimeter: 665 m

For this property:

— Site boundaries

— Road frontages

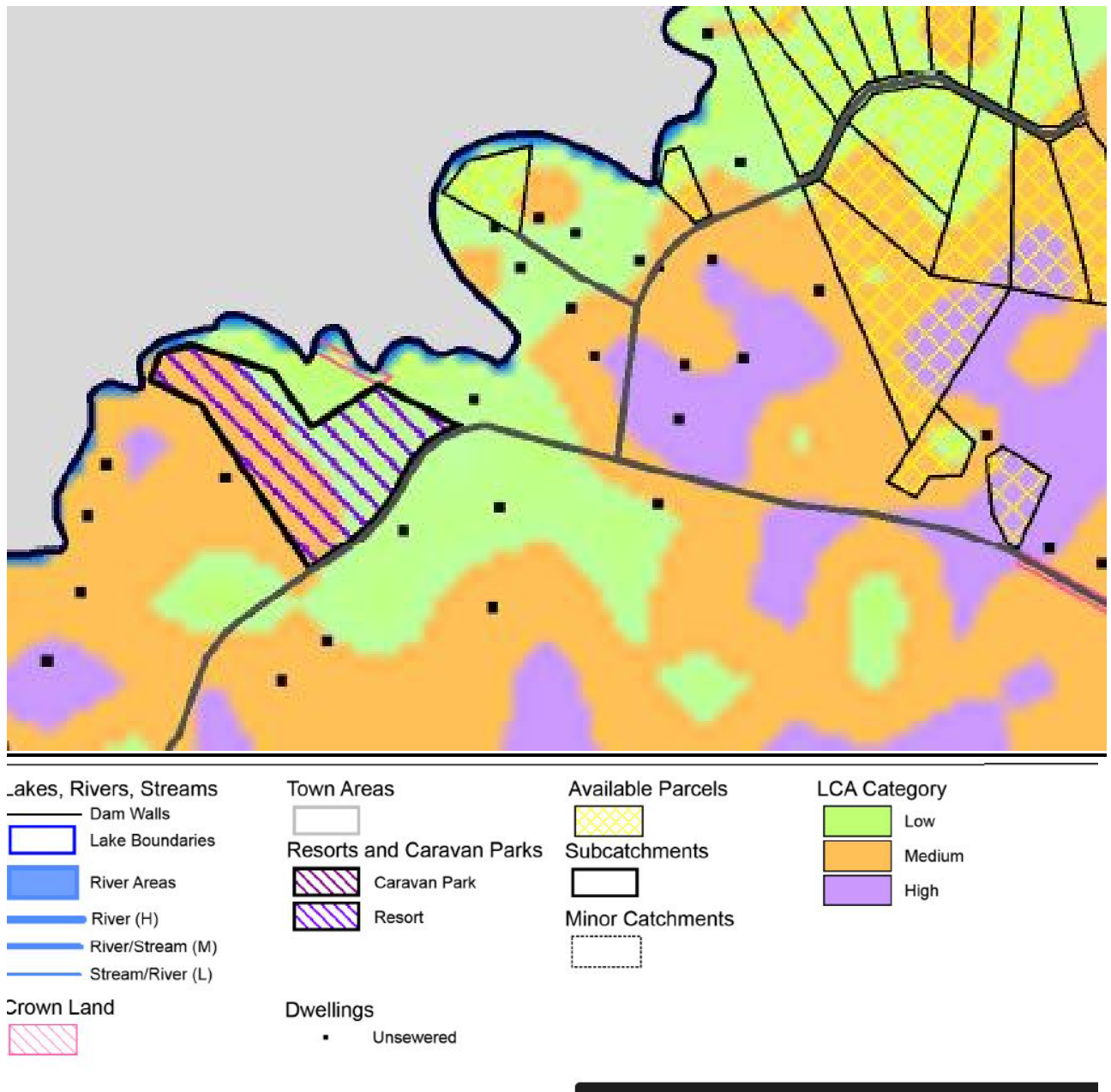
Dimensions for individual parcels require a separate search, but dimensions for individual units are generally not available.

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

For more accurate dimensions get copy of plan at [Title and Property Certificates](#)

Planning Scheme Zone and Overlays

The property is also classified as Medium Risk LCA Category, according to DWMP – Banumum Road – Subcatchment 22 – LCA Risk Map, as shown below.



According to the Visualising Victoria's Groundwater website, the depth to groundwater for this property is 5m to 10m.

3.0 INVESTIGATION METHOD

The test was conducted on 2nd September 2022 by engineering staff from our Ringwood office. A total of three (3) test points were installed to a specified maximum depth of 0.5 metres. Although the test points were installed to a depth of 0.5m, the soil profile was investigated to a depth of 2.0m to determine the most limiting soil characteristic (refer to section 4.1 of this report for details). The test bores were spread evenly to achieve a representative coverage of the proposed absorption area.

This report is a land capability assessment for on-site wastewater management undertaken in accordance with EPA Vic Publication 891.4 Code of Practice Onsite Waste Water Management (2016) and AS/NZ 1547:2012 On-site Domestic Wastewater management (2012) and the Mansfield Shire Onsite Wastewater Management Plan (OWMP August 2022).

Procedures adopted were in accordance with those described in “Code of Practice - On-Site Wastewater Management” (Environment Protection Authority, Publication 891.4, July 2016).

4.0 DESKTOP REVIEW AND SITE INVESTIGATION FINDINGS

4.1 Rainfall & Evaporation Data

Table 1: Redistribution of Rainfall													
Rainfall to be redistributed (9 th Decile)									889.3mm/yr				
Minimum mean rainfall									39.6mm				
9 th decile (annual) – mean rainfall (annual)									187.6mm				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (mm)
Mean rainfall (mm)	46.5	39.6	50.8	50.9	61.8	65.2	70.3	74.6	67.1	68.6	57.5	51.7	701.7
Deviation from minimum mean (mm)	57.3	50.3	74.9	60.4	66.2	65.8	65.6	77.6	68.2	76.1	66.9	67	796.3
Redistributed rainfall (mm)	50.3	39.6	58.5	58.8	79.4	86.0	95.6	103.8	93.3	92.4	71.3	60.3	889.3

Table 2: Weather Station and Rainfall Details													
Weather Station: Mansfield (Post Office)							Number: 83019						
Data timeframe: All years				Latitude: 37.05° S			Longitude: 146.09° E			Elevation: 316 m			
Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	46.5	39.6	50.8	50.9	61.8	65.2	70.3	74.6	67.1	68.6	57.5	51.7	701.7
Lowest	0.0	0.0	1.0	0.0	0.0	3.8	16.0	4.9	10.3	0.8	4.3	0.5	318.4
5 th %ile	3.5	1.8	6.4	7.5	16.0	23.1	31.7	21.9	21.7	16.0	12.2	9.0	450.6
10 th %ile	7.0	4.4	8.9	11.5	21.2	25.2	35.6	31.6	29.5	23.5	21.4	11.2	493.2
Median	37.4	28.0	39.2	42.0	56.0	63.2	66.8	72.3	66.2	68.1	50.4	41.2	723.2
90 th %ile	96.9	89.9	114.5	100.0	105.8	105.4	105.2	117.2	107.8	115.7	106.5	106.6	889.3
95 th %ile	112.5	105.7	133.5	132.0	123.7	123.8	122.8	131.4	121.6	134.7	113.4	126.0	987.0
Highest	190.6	212.6	193.8	227.4	178.7	158.4	156.8	174.9	163.0	169.2	173.3	263.3	1093.2

4.2 Slope and Aspect

The site surface gradient was measured using a hand-held clinometer and ranged from 2-3° sloping towards the south-west.

4.3 Slope Stability

Taking into account the surface gradient and subsurface profile, the existing ground surface appears stable.

4.4 Surface Drainage

The existing drainage in the area of the proposed dependant relative unit is surface runoff toward the the south-west. An existing dam is located approximately 125m to the west of the proposed dependant relative unit.

4.5 Existing Vegetation

Pasture grasses within the proposed construction envelope and proposed effluent absorption area. Some 3-10m high native and non-native trees around the perimeter of the site and around the existing dwelling.

4.6 Groundwater

Perched groundwater was intersected in the relatively permeable natural clayey silt soils which overlay the relatively impermeable natural silty clay.

According to the Victorian Groundwater Database, the depth to regional groundwater in this area is in the region of 5-10m depth.

The nearest groundwater bores are located at a campground approximately 750-800m to the south-west of the test area.

4.7 Soil Unit Types

Two distinct soil types were intersected during the site investigations. These soil types have been classified according to AS1547:2012 and EPA publication 891.4 and are summarised below:

- Clayey SILT – moderately structured loam, soil category 3
- Silty CLAY – weakly structured light clay, soil category 5

4.8 Subsurface Soil Profile

The subsurface profile is summarised below:

- Natural Clayey SILT (A horizon) from surface to 0.4m depth, grey / brown, medium dense, containing some gravel, moist becoming wet. Soil pH of 5.5-6.0, electrical conductivity of 0.1-0.2dS/m.
- Silty CLAY (B horizon) from 0.4-2.0m depth, brown / orange / grey, medium plasticity, stiff / very stiff, containing trace gravel, moist. Soil pH of 5.9, electrical conductivity of 0.11-0.19dS/m.

4.9 Soil Permeability

The table below shows the soil permeability results of the limiting horizon, namely the silty clay (B horizon).

Table 3: Determination of Saturated Hydraulic Conductivity (Ksat) – Silty CLAY (B horizon)						
Test No.	Depth (cm)	Radius (cm)	Depth to rock (cm)	Head (cm)	Q (cm³ / min)	Ksat (m / day)
P1	50	2.5	>2.0m	30	0.131	0.0012
P2	60	2.5	>2.0m	40	0.393	0.0023
P3	50	2.5	>2.0m	30	0.262	0.0024
Geometric Mean						0.0019

Due to the relatively saturated nature of the clayey silt (A horizon), in-situ permeability testing within this soil unit was unable to be conducted.

4.10 Basement Permeability

The basement material in this property is expected to be Devonian sandstone and mudstone (GeoVic.com and Geological Survey of Victoria). The permeability of sandstone and mudstone is considered to be essentially impermeable (Handbook of Geotechnical Investigation and Design Tables, Burt Look, 2007).

4.11 Colloid Stability

Emerson crumb tests and dispersions tests were conducted on both soil types intersected during the investigation and are summarised below.

- For the clayey SILT (A horizon), Emerson Class 3, Dispersive Index 1.
- For the Silty CLAY (B horizon), Emerson Class 3, Dispersive Index 1.

4.12 Soil Classification

In accordance with EPA Code of Practice – Onsite wastewater Management – Table 9, publication 891.4), the clayey silt (A horizon) is classified as moderately structured loam, soil category 3. The silty clay (B horizon) is classified as weakly structured light clay, soil category 5.

4.13 Nutrient Attenuation

The nutrient and water balance results are calculated in the Table 4 spreadsheet in section 4.14 of this report.

Nitrogen balance results have resulted in a minimum area for N uptake of 419m² with an application rate of 2.6mm.

Water balance calculations have resulted in a minimum irrigation area of 302m² with an application rate of 3.5mm.

The most limiting of both the nitrogen balance and water balance results is that of the Nitrogen balance which requires a minimum area of 419m² for a wastewater volume of 1050L.

4.14 Wastewater Generation Calculation

The wastewater volume used in the nutrient and water balance spreadsheet (refer to table 4) are based on the following:

- Existing dwelling – 4 bedrooms, using the Number of Bedrooms + 1 X 150 litres per bedroom = 750 litres / day.
- Proposed Dependant Relative Unit – 1 bedroom, using the Number of Bedrooms + 1 X 150 litres per bedroom = 300 litres / day.
- Total Wastewater Volume = 1050 litres / day.

TABLE 4 - WATER NUTRIENT BALANCE																		
SITE LOCATION - 13 LOYOLA DRIVE, MANSFIELD																		
RAINFALL DATA: Mansfield (Post Office) 083019																		
EVAPORATION DATA: Lake Eildon 088023																		
ITEM	UNIT	#	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Y			
Days in Month		D	31	28	31	30	31	30	31	31	30	31	30	31	30	31	31	
Evaporation (Mean daily)	mm		5.3	4.9	3.5	1.9	1	0.6	0.6	1	1.7	2.7	3.9	4.7				
Evaporation (Mean monthly)	mm	A	164.3	137.2	108.5	57	31	18	18.6	31	51	83.7	117	145.7				
Rainfall (9th decile wet year adjusted)	mm	B1	50.3	39.6	58.5	58.8	79.4	86	95.6	103.8	93.3	92.4	71.3	60.3				
Effective Rainfall	mm	B2	41	32	47	48	64	69	77	84	75	74	58	49				
Peak Seepage Loss ¹	mm	B3	155	140	155	150	155	150	155	155	150	155	150	155				
Evapotranspiration (IXA)	mm	C1	342	286	198	104	49	29	30	49	93	175	244	304				
Waste Loading (C1+B3-B2)	mm	C2	456	394	306	206	140	110	108	120	168	256	336	410				
Net evaporation from lagoons (10(0.8A-B1x(lagoon area(ha))))	L	NL	0	0	0	0	0	0	0	0	0	0	0	0				
Volume of Wastewater	L	E	32550	29400	32550	31500	32550	31500	32550	32550	31500	32550	31500	32550				
Total Irrigation Water (E-NL)/G	mm	F	453	392	305	206	140	110	108	120	168	255	336	407				
Irrigation Area (E/C2)annual	m ²	G	72	75	107	153	233	287	302	272	188	128	94	80				
Surcharge / Storage	mm	H	-3	-2	-1	0	0	0	0	0	0	-1	0	-3				
Actual Seepage Loss	mm	J	158	142	156	150	155	150	155	155	150	156	150	158				
Direct Crop Coefficient:		I	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8				
Rainfall Retained:	80 %	K		1. Seepage loss (peak) equals deep seepage plus lateral flow:5mm (<10% ksat after renovation)														5 mm
Lagoon Area:	0 ha	L																
Wastewater (Irrigation):	1050 L	M	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7				Pas
Seepage Loss (Peak):	5 mm	N	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4				Sha
Irrig'n Area (No storage):	302 m ²	P2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8				Fes
Application Rate:	3.476821 mm	Q	1	1	1	1	1	1	1	1	1	1	1	1				Wo
Nitrogen in Effluent:	30 mg/L	R	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8				MA
Denitrification Rate:	20 %	S																
Plant Uptake:	220 kg/ha/y	T																
Average Daily Seepage:	2.5 mm	U																
Annual N Load:	9.198 kg/y	V																
Area for N Uptake:	419 m2	W																
Application Rate:	2.6 mm	X																
LAA (for slope 10-20%)	mm	Ø																
Design application rate	mm	Ø1																

5.0 LAND CAPABILITY ASSESSMENT SUMMARY

LAND	LAND CAPABILITY RISK RATING				AMELIORATIVE MEASURES & RISK REDUCTION
FEATURE	LOW	MEDIUM	HIGH	LIMITING / UNSUITABLE	
Available land for LAA	Exceeds LAA and duplicate LAA requirements	Meets LAA and duplicate LAA requirements	Exceeds LAA and partial duplicate LAA requirements	Insufficient LAA area	
Aspect	North, north-east or north-west	East, west or south-west	South or south-east	South - full shade	
Exposure	Full sun and / or high wind or minimal shading	Partial shade	Limited light, little wind, heavily shaded area	Perpetual shade	
Slope form	Convex or divergent side slopes	Straight sided slopes	Concave or convergent side slopes	Locally depressed	
Slope Gradient Trenches & beds	<5%	5-10%	10-15%	>15%	
Slope gradient Subsurface Irrigation	<10%	10-30%	30-40%	>40%	
Site drainage Run off / run on	LAA backs onto crest or ridge	Moderate likelihood	High likelihood	Cut-off drain not possible	
Landslip	Potential	Potential	Potential	Existing	
Erosion Potential	Low	Moderate	High	No practical amelioration	
Flood / inundation	Never	<1 AEP	5% AEP	>5% AEP	
Distance to surface waters (m)	Buffer distances exceeds all Code requirements	Buffer distances complies with all Code requirements	Buffer distances do not comply with all / some Code requirements	<40 metres	
Vegetation	Plentiful / healthy vegetation	Moderate Vegetation	Sparse or limited vegetation	Propagation not possible	
Depth to water table (potentiometric) (m)	>2m	2-1.5m	1.5m	1.5m - Surface	

Depth to water table (seasonal parched) (m)	>1.5m	<0.5m	0.5 - 1.5m	0.5m - Surface	
Rainfall (9 th decile) (mm)	<500mm	500 – 750mm	750 – 1000mm	>1000mm	
Pan evaporation (mean) (mm)	1250 – 1500mm	1000 – 1250mm	750 – 1000mm	<750mm	
SOIL PROFILE CHARACTERISTICS					
Structure	High or moderately structured	Weakly structured	Structureless, massive or hardpan		
Fill materials	Nil or mapped good quality topsoil	Mapped variable depth and quality materials	Variable quality and / or uncontrolled filling	Uncontrolled poor quality / unsuitable filling	
THICKNESS OF SOIL (m) AT THE LOCATION OF:					
Trenches & beds	>1.4m	>1.4m	<1.4m	<1.2m	
Subsurface Irrigation	>1.5m	1 – 1.5m	0.75m	<0.75m	
PERMEABILITY					
Permeability (limiting horizon) (m/day)	0.15-0.3	0.03-0.15 0.3-0.5	0.01-0.03 0.6-3.0	>3.0 <0.03	
Permeability (buffer evaluation) (m/day)	<0.3	0.3-3	3-5	>5	

5.1 Calculation of Edis Algorithm

LAND FEATURE	LAND CAPABILITY RISK RATING				COMMENTS
	LOW (Rating of 1)	MEDIUM (Rating of 2)	HIGH (Rating of 3)	RISK RATING SCORE	
R res Distance to reservoir (km)	>15km	2-15km	<2km	3	
R soil Soil type rating (from Edis report)	1	2	3	2	
R riv Distance to River (m)	>80m	40-80m	<80m	1	
R str Distance to Stream (m)	>80m	40-80m	<40m	1	
R drain Distance to Drain (m)	>40m	10-40m	<10m	1	
R lot Lot size (ha)	>10ha	2-10ha	0.2-2ha	2	
R LCA LCA rating (from table 5)	1-2	3	4-5	3	
R fail System fail rate (%)	<5%	5-10%	>10%	2	
R dens Density (dwellings/km ²)	<20	20-40	>40	1	

$$R_n = ((R_{\text{res}} + R_{\text{soil}}) \times (R_{\text{riv}} + R_{\text{str}} + R_{\text{drain}} + R_{\text{lot}}) + (2 \times R_{\text{LCA}}) + (3 \times R_{\text{fail}} \times R_{\text{dens}})) / 10$$

5.2 Risk Mitigation and Management Measures

Low Risk = R_n of <2.5

Medium Risk = R_n of 2.5-5

High Risk = R_n of >5

The risk rating for this site is 4.2 – Medium Risk

6.0 SYSTEM TYPE AND DESIGN

The existing dwelling is served by a standard septic tank and absorption trench system which is in a poor condition and is performing inadequately. A plumber's report (refer to Attachment 9.1 of this report) recommends upgrading the existing system with a secondary treatment system with subsurface irrigation.

Based on this plumber's report, current EPA and AS/NZS 1547:2012 guidelines; and the minimum requirements outlined specified by Mansfield Shire in their Onsite Wastewater Management Plan, it is recommended that the existing septic system be upgraded to a new secondary treatment system with subsurface irrigation which will service both the existing dwelling and the proposed dependant relative unit.

The most limiting factor in sizing the required irrigation area is the nitrogen balance results which require **419m²**.

Due to the dispersive nature of the soil, gypsum (CaSO₄) should be spread applied at 1.5 kg/m² over the effluent irrigation area. This will reduce the tendency for slaking and dispersion that may follow from the application of wastewater.

Therefore, an irrigation area of 419m² is required for the both the existing dwelling and the proposed dependant relative unit.

Based on the minimum set-back distances outlined below, the irrigation area will be able to be located to the north, north-east and south-east of the existing dwelling and the proposed dependant relative unit, depending on the minimum setback distances as outlined in AS/NZS 1547:2012, On-site Domestic Wastewater Management.

It is assumed that a secondary level of treatment (a "20/30" Standard") has been achieved in a treatment plant prior to the effluent entering the distribution pipe lines.

Due to the flexibility of placement of surface evaporation systems it is generally economical to install the required lengths of piping for these systems provided there is enough area available.

All storm or surface water needs to be diverted away from the irrigation area.

The distribution pipelines must be pressurised sub surface irrigation. Surface spray irrigation by Victorian EPA regulations is not allowed.

The area needs to be marked with at least two warning signs which are visible at a distance of at least 3 metres.

The "20/30" Standard" wastewater may be used to irrigate turf, pasture, trees and a range of horticultural crops (not fruit or vegetables). Maintenance requirements of the

system need to be carefully considered and matched to the land use. Maintenance of the system is vital and is the responsibility of the owner of the property.

Subsurface drip systems can be 60 per cent more efficient than conventional surface spray systems in applying the moisture directly to the root zone.

Some constraints for the location of disposal fields are as follows ('AS/NZS 1547:2012, On-site Domestic Wastewater Management'):

1. Disposal areas shall be at least 3 metres on the low side of any building or boundary of any allotment.
2. Disposal areas shall be at least 6 metres on the high side of any building or boundary of any allotment.
1. Disposal areas shall be at least 3 metres from any water or gas pipe.
2. Disposal areas shall be at least 6 metres from either the stormwater system or a swimming pool.
3. Disposal areas shall be at least 15 metres away from a cutting or escarpment (particularly the gully to the south).
4. **Disposal areas shall be at least 60 metres away from a stream, channel or dam (continuous or ephemeral, non-potable).**

It is recommended to install water-saving appliances ('AA' or 'AAA' rated) including dual toilet flushes, aerator taps, suds saver trough and shower flow restrictors to minimise the total volume of effluent to be treated.

Drainage:

Natural drainage characteristics of the site soil are marginal and additional measures such as diverting and shedding incident rainfall and shallow subsurface seepage by the installation of a subsurface cut-off drain up-slope of the effluent disposal field should be considered.

Vegetation:

Generally, shrubs or trees should not be present across the absorption area itself due to possible blockage of drains. Suitable shallow rooting grasses or shrubs, however, may be planted in the spaces between the trenches. Suitable trees and shrubs may be planted in the vicinity of the proposed disposal field, as they will, over and above their ecological value, assist in soil absorption by way of evapotranspiration.

7.0 OWNERS INFORMATION – SYSTEM MANAGEMENT

Once a permit has been obtained the planned effluent disposal field should be protected to prevent deterioration by building activities and vehicular traffic. Maintenance of the system is vital and is the responsibility of the owner of the property. Check sludge levels, pumps and alarms regularly. Arrange for an inspection of the system at least annually. The system should be pumped out in accordance with the permit conditions.

Ensure that the system and disposal field are not built over or disturbed. The system and disposal field should be isolated from other domestic facilities.

8.0 ASSESSOR'S QUALIFICATIONS

Matthew Cotter has a Bachelor of Science degree majoring in engineering geology and has over 20 years' experience in geotechnical investigations and reporting including land capability assessments.

9.0 ATTACHMENTS

9.1 ATTACHMENT 1 – PLUMBERS REPORT AND PLAN OF EXISTING SEPTIC SYSTEM



18/11/2022

Premier Homes Pty/Ltd – re 13 LOYOLA DRIVE, MANSFIELD

Inspection on septic tank and outflow field

- Septic tank – located approximately 2700mm from the building on the north side parallel with rear wall of existing house. Tank is approximately 200mm underground with no riser to ground level, just covered in soil. Tank is in good condition and has just been cleaned.

- Outflow Field – total length of outflow field measures 110m at 600mm wide trenches, made up of 5 @22m with a pit at the end of each run (3 on one end 2 on the other end inside dog yard) outflow field is in very poor condition and every run is holding water.
- Recommendations for existing system – system is in very poor condition and will need to be upgraded, installation of new secondary treated system and installation of subsurface irrigation on the northeast boundary of property is recommended.

Any questions feel free to give us a call.

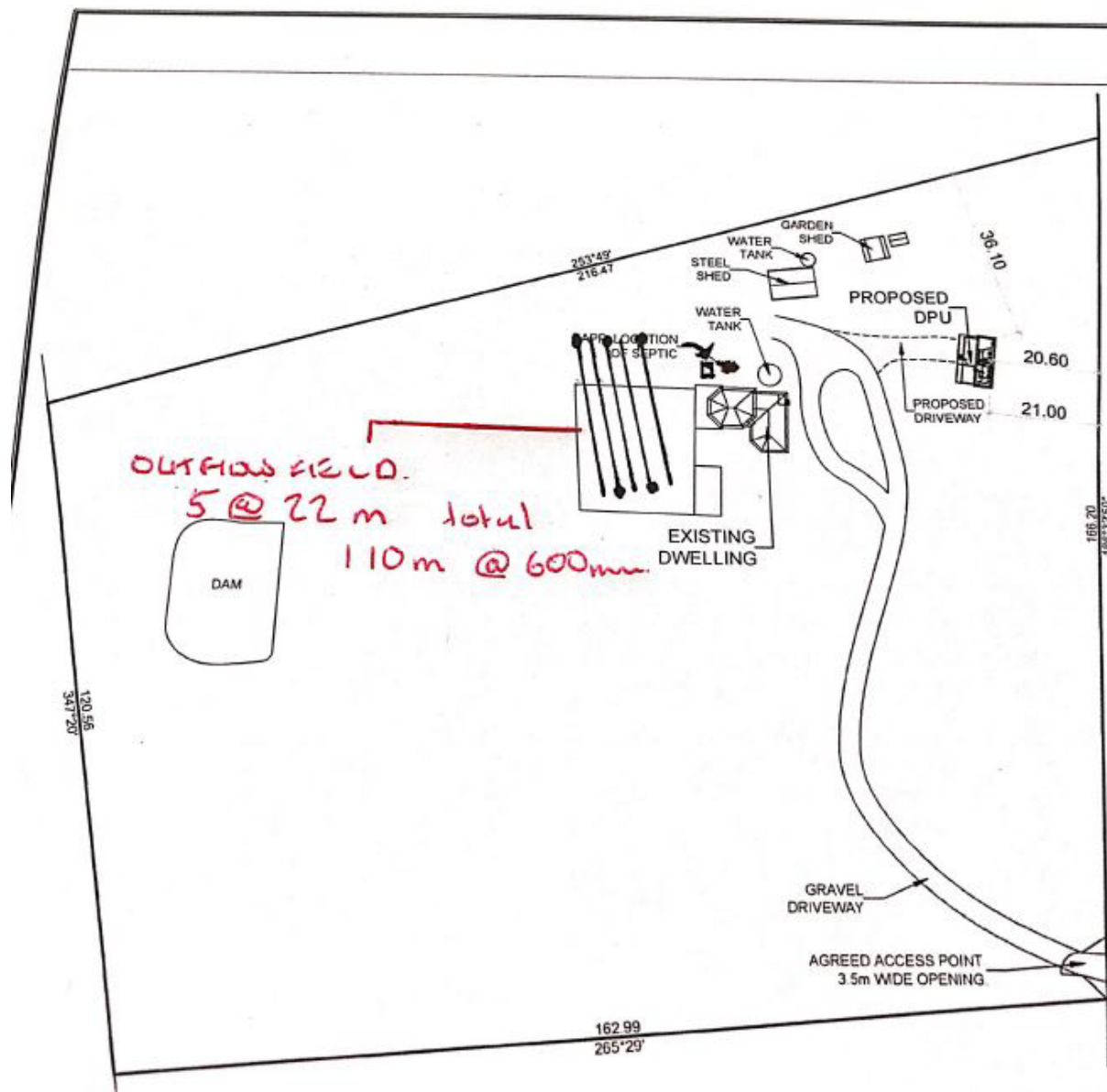
Barrel Plumbing Pty/Ltd

ABN 50 135 545 827

Licence number 44449

(03)5964-30333

ben@barrelplumbing.com



Existing Septic Tank and Outflow Field

For and on behalf of
Statewide Geotechnical (Aust) Pty Ltd

ML

Matthew Cotter BSc
Engineering Geologist
(Author)

[Signature]

David Alkemade B.Eng (Geo), MSc
Engineering Manager
(Reviewed By)

Certificate of Approval

Onsite Wastewater Management System

Aerated Wastewater Treatment System



Mansfield Shire

Jurgen & Wendy Lochtenberg
wombat462@hotmail.com

Copy to:
Ben Anderson
ben@barrelplumbing.com.au
Premier Homes VIC - Grace Higgs
grace@premierhomesvic.com.au

The onsite wastewater management system installed on the premises situated at:

A5619 - 13 Loyola Drive, MANSFIELD
File No.: DA938 Our Ref: 22/060

has been inspected and approved as being in accordance with the permit granted by Mansfield Shire Council. Permission is granted to use the said system subject to compliance with the provision of the *Environment Protection Act 2017* and the maintenance requirements endorsed hereon:-

System design is based on servicing a 4 bedroom dwelling and Dependant Person Unit. Endorsement is based on lodged support information.

SENIOR ENVIRONMENTAL HEALTH OFFICER..... 13 September 2023

MAINTENANCE REQUIREMENTS ASSOCIATED WITH ALL AERATED WASTEWATER TREATMENT SYSTEM APPROVALS:

The System

1. Desludging of the system must occur at least once every three (3) years.
2. The effluent from the treatment system must not exceed the following limits
For All Discharges
Biochemical Oxygen Demand 20 mg/L Suspended Solids 30 mg/L
A warning sign complying with AS1319 and AS 1547 regarding the use of recycled water must be posted within the disposal area.
3. The owner may be required by Council to cause or arrange a sample of the effluent to be taken and analysed by a person or laboratory registered by the National Association of Testing Authorities for the indicators listed above.
4. The system must be operated and maintained in accordance with the following conditions:
 - i. Inspection of the system by a competently trained person or servicing agent must be carried out at least once every three (3) months for Treatment Systems in accordance with the manufacturer's specifications, to ensure the ongoing effectiveness of the system operation.
 - ii. Copies of the inspection report (including any maintenance carried out) and analysis results must be submitted to the Mansfield Shire Council within 14 days of the inspection/analysis.
5. Recycled water is not to be used for growing fruit or vegetables.
6. No alteration is to be made to any part of the system without first obtaining consent. This includes extensions to the system and excavations in the close vicinity.

Effluent Disposal Area

1. After completion of the system, the ground surface over the effluent dispersal system should be kept domed to allow for settlement and surface water runoff. The effluent disposal area is to be grassed.
2. Shrubs should be planted adjacent to the effluent area to assist transpiration of water to the atmosphere.
3. Garden beds, driveways, swimming pools, tennis courts, pebble gardens, large trees, concrete or buildings shall not be placed in or on the effluent disposal area.
4. Cut off or open channel (water diversion) drains are to be regularly cleared to maintain maximum efficiency.
5. Vehicles are not to be driven on the effluent disposal area.

General Advice

1. If excessive odours arise from the vent pipe, flush a handful of garden lime daily into the toilet bowl. If problem continues for longer than 30 days, evaluate usage of septic system – poisoning of the system may be occurring; - reduce usage of dishwashing detergent and disinfectants.
2. Remind all users that the house is connected to an onsite wastewater system, not the sewer, so problems created will be your problems and may be costly to solve.

NOTE: If sewerage becomes available, connections must be made. Council retains the right to require additional works to be carried out at any time to rectify problems observed. Written directions will be provided.

Permit to Alter Onsite Wastewater Management System Aerated Wastewater Treatment System



Mansfield Shire

Jurgen & Wendy Lochtenberg
wombat462@hotmail.com

Copy to:
Ben Anderson
ben@barrelplumbing.com.au
Grace Higgs
grace@permierhomesvic.com.a

is hereby granted permission under the provision of Section 53 of the *Environment Protection Act 2017* to alter a septic tank system on the premises situated at:-

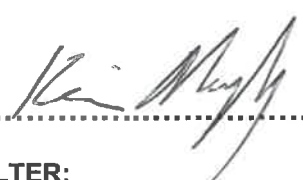
A5619 - 13 Loyola Drive, MANSFIELD
File No.: DA938 Our Ref: 22/060

such installation to be in accordance with the endorsed plans and specifications lodged with and approved by Mansfield Shire Council and to comply with the *Environment Protection Act 2017*, the Environmental Protection Regulations 2021, the EPA Code of Practice - Onsite Wastewater Management, relevant Certificate of Approvals, *Plumbing Regulations 1998*, Australian Standard AS3500-2-1 and the conditions endorsed hereon:-

SPECIAL CONDITIONS:

This permit pertains to the upgrade of the Onsite Wastewater Management System servicing the existing 4 Bedroom dwelling and the new Dependant Person Unit being installed at the property.

1. Block to be drained to Council's satisfaction. Drain where directed.
2. Effluent dispersal area is to be suitably fenced off from heavy stock and vehicle access.
3. A copy of the Plumbing Industry Commission "Certificate of Compliance" to be lodged on completion by the plumber and drainer.
4. A copy of the commissioning report from the agent installing the Packaged Treatment Plant must be supplied to Council prior to the completion of the project.
5. The pump well is to be fitted with an appropriate sized pump of sufficient capacity for normal and emergency storage and fitted with a high level alarm with alarm activating a light or buzzer at a suitable location to inform the household.
6. The sub-surface irrigation field is to be installed as pressure compensating irrigation lines dosed as a divided field with a dosing device fitted. The irrigation field of 425m² installed in accordance with manufacturers specifications including the provision of air relief valves and flush control valves. Max 3m fall over any zone.
7. Flush control to allow for periodic maintenance and containment of discharge, to discharge to a subsoil trench min. 6m x 0.5m with 0.4m layer aggregate.
8. The existing septic tank system is to be decommissioned. The existing Septic Tank will need to be desludged, holed and backfilled with inert materials. Evidence of desludging to be provided (invoice sufficient) and photos provided showing the decommissioned septic tank system.
9. As recommend for soil renovation, when installing irrigation lines, trench bases are to be ripped and gypsum applied at a rate of 1.5kg/m²- total 623 kgs.

SENIOR ENVIRONMENTAL HEALTH OFFICER.....  8th February 2023

CONDITIONS ASSOCIATED WITH ALL APPROVALS TO ALTER:

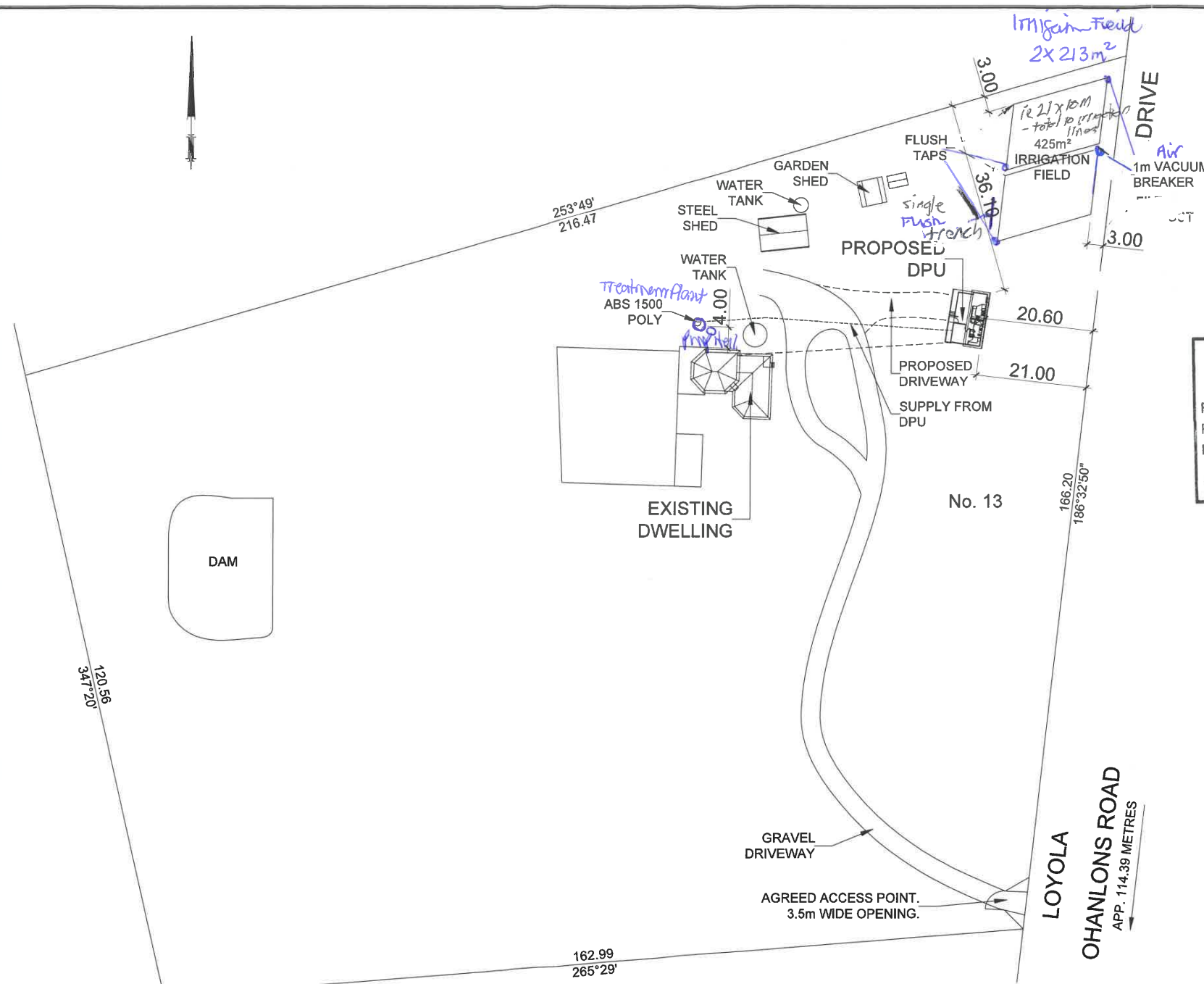
1. This permit will expire after two years from the date of issue unless an extension of time is obtained.
2. The system shall not be used prior to the issue of the "Certificate of Approval" to use the system.
3. The system layout shall not be altered from that shown on the accompanying stamped plan without the lodgement and approval of amended plans
4. The system must be installed with all inspection and access openings over all chambers being brought up to ground-surface level.
5. Effluent disposal systems shall **not** be backfilled with clay or heavy soil, use topsoil (150mm max).

6. A final inspection is to be arranged when the system has reached practical completion - i.e. wastewater system including drains installed, storm water drainage completed, fittings and venting completed.
7. Recycled water is not to be used for growing fruit or vegetables.
8. The effluent from the treatment system must not exceed the following limits:
 - For All Discharges*
 - Biochemical Oxygen Demand 20 mg/L
 - Suspended Solids 30 mg/L
 - For surface irrigation* (Chlorination required)
 - Faecal Coliforms 10 orgs/100ml
 - Free Residual Chlorine 1.0 mg/L

A minimum of two (2) warning signs complying with AS1319 and AS1547 regarding the use of recycled water must be posted within each irrigation bed or area.

The owner must cause or arrange a sample of the effluent to be taken and analysed by a person or laboratory registered by the National Association of Testing Authorities. The sample must be tested for the indicators listed above as directed by Council.
9. The wastewater system must be operated and maintained in accordance with the following:
 - i. Inspection of the system by a competently trained person or servicing agent must be carried out at least once every three (3) months for Packaged Treatment Plants in accordance with the manufacturer's specifications, to ensure the ongoing effectiveness of the system operation.
 - ii. Copies of the inspection report (including any maintenance carried out) and analysis results must be submitted to Mansfield Shire Council within 14 days of the inspection/analysis.
 - iii. Desludging of the system shall occur at least once every three years or as otherwise directed.
10. No modifications or variations to the system may be made unless approved by Mansfield Shire Council.

NOTE: The EP Act provides for on the spot fines and Court imposed fines for failure to comply.



NOTES:

EXISTING STORMWATER CONNECTION TO BE ADVISED.
CONNECT TO EXISTING STORMWATER SYSTEM
USING 90mm P.V.C.
LOCATION OF EXISTING STORMWATER TO BE
DETERMINED ON SITE.
1-90mm DOWNPIPE FOR EVERY 110 SQUARE METRES
OF ROOF AREA..

UNDER BEARER CLEARANCE TO BE 200mm MINIMUM.
LEVELS TO BE CHECKED PRIOR TO CONSTRUCTION.

MANSFIELD SHIRE COUNCIL
SEPTIC SYSTEM APPROVED
FOR INSTALLATION ONLY

FILE REF: DA 938
PERMIT No: 22-080
DATE: 8/2/23
16.11.23
AUTHORISED OFFICER

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	OAD File LOCHTENBERG.dwg		Drawn P. YOSIFIDIS		Date Printed 30.01.23		Client JURGEN ANTONIUS DOMINICUS & WENDY ELIZABETH LOCHTENBERG	
	Builder PREMIER HOMES (VIC.) PTY. LTD.		Scale 1:500		Rev C		Date 22.06.22	
	all correspondence to: P.O. Box 202 Bayswater VIC 3153 tel: (03) 9761 6833		Rev Date: 30.01.23		Drawing No. J4097-08			

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet

Irrigation area sizing using Nominated Area Water Balance for Zero Storage

Site Address: 13 Loyola Drive, Mansfield

Date: Friday, 30 August 2024

Assessor: T. Creighton

INPUT DATA

Design Wastewater Flow	Q	1,050	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Irrigation Rate	DIR	4.0	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	600	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	0.8	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff
Mean Monthly Rainfall Data	Mansfield Post Office (83019)			BoM Station and number
Mean Monthly Pan Evaporation Data	Lake Eildon (088023)			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	47	39.2	50.8	50.9	61.9	65.8	70.2	74.3	66.8	69.4	58.1	52.3	706.7
Evaporation	E		mm/month	164.3	137.2	108.5	57	31	18	18.6	31	51	83.7	117	145.7	963
Evaporation	E		mm/day	5.3	4.9	3.5	1.9	1	0.6	0.6	1	1.7	2.7	3.9	4.7	
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	131	110	76	40	19	11	11	19	36	67	94	117	729.03
Percolation	B	DIRxD	mm/month	124.0	112	124.0	120.0	124.0	120.0	124.0	124.0	120.0	124.0	120.0	124.0	1460.0
Outputs		ET+B	mm/month	255.4	221.76	200.0	159.9	142.6	130.8	135.2	142.6	155.7	191.0	213.6	240.6	2189.0

INPUTS

Retained Rainfall	RR	RxRF	mm/month	37.6	31.36	40.64	40.72	49.52	52.64	56.16	59.44	53.44	55.52	46.48	41.84	565.36
Applied Effluent	W	(QxD)/L	mm/month	54.3	49.0	54.3	52.5	54.3	52.5	54.3	54.3	52.5	54.3	52.5	54.3	638.8
Inputs		RR+W	mm/month	91.9	80.4	94.9	93.2	103.8	105.1	110.4	113.7	105.9	109.8	99.0	96.1	1204.1

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	-163.6	-141.4	-105.1	-66.7	-38.8	-25.7	-24.8	-28.9	-49.8	-81.2	-114.6	-144.5	
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 m² 149 154 204 264 350 403 412 391 308 240 188 164

MINIMUM AREA REQUIRED FOR ZERO STORAGE:

413.0 m²

CELLS

	Please enter data in blue cells
	Data in white cells are calculated by the spreadsheet, DO NOT ALTER THESE CELLS
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

Please read the notes before using this spreadsheet

Nitrogen Balance

Site Address: 13 Loyola Drive, Mansfield

SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE

418

m²

INPUT DATA¹

Wastewater Loading			Nutrient Crop Uptake					
Hydraulic Load	1050	L/day	Crop N Uptake	220	kg/ha/yr	which equals	60.27	mg/m ² /day
Effluent N Concentration	30	mg/L						
% N Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal						
Total N Loss to Soil	6300	mg/day						
Remaining N Load after soil loss	25200	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	418	m ²	Nominated LAA Size	600	m ²
			Predicted N Export from LAA	-4.00	kg/year
			Minimum Buffer Required for excess nutrient	0	m ²

CELLS

XX

Please enter data in blue cells

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

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet

Irrigation area sizing using Nominated Area Water Balance for Zero Storage

Site Address: 13 Loyola Drive, Mansfield

Date: Friday, 30 August 2024

Assessor: T. Creighton

INPUT DATA

Design Wastewater Flow	Q	1,500	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Irrigation Rate	DIR	4.0	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	600	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	0.8	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff
Mean Monthly Rainfall Data	Mansfield Post Office (83019)			BoM Station and number
Mean Monthly Pan Evaporation Data	Lake Eildon (088023)			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	47	39.2	50.8	50.9	61.9	65.8	70.2	74.3	66.8	69.4	58.1	52.3	706.7
Evaporation	E		mm/month	164.3	137.2	108.5	57	31	18	18.6	31	51	83.7	117	145.7	963
Evaporation	E		mm/day	5.3	4.9	3.5	1.9	1	0.6	0.6	1	1.7	2.7	3.9	4.7	
Crop Factor	C		unitless	0.80	0.80	0.70	0.70	0.80	0.60	0.60	0.60	0.70	0.80	0.80	0.80	

OUTPUTS

Evapotranspiration	ET	ExC	mm/month	131	110	76	40	19	11	11	19	36	67	94	117	729.03
Percolation	B	DIRxD	mm/month	124.0	112	124.0	120.0	124.0	120.0	124.0	124.0	120.0	124.0	120.0	124.0	1460.0
Outputs		ET+B	mm/month	255.4	221.76	200.0	159.9	142.6	130.8	135.2	142.6	155.7	191.0	213.6	240.6	2189.0

INPUTS

Retained Rainfall	RR	RxRF	mm/month	37.6	31.36	40.64	40.72	49.52	52.64	56.16	59.44	53.44	55.52	46.48	41.84	565.36
Applied Effluent	W	(QxD)/L	mm/month	77.5	70.0	77.5	75.0	77.5	75.0	77.5	77.5	75.0	77.5	75.0	77.5	912.5
Inputs		RR+W	mm/month	115.1	101.4	118.1	115.7	127.0	127.6	133.7	136.9	128.4	133.0	121.5	119.3	1477.9

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	-140.3	-120.4	-81.8	-44.2	-15.6	-3.2	-1.5	-5.7	-27.3	-57.9	-92.1	-121.2	
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 m² 213 221 292 378 500 576 589 559 440 343 269 234

MINIMUM AREA REQUIRED FOR ZERO STORAGE:

589.0 m²

CELLS

	Please enter data in blue cells
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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

Please read the notes before using this spreadsheet

Nitrogen Balance

Site Address: 13 Loyola Drive, Mansfield

SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE

597

m²

INPUT DATA¹

Wastewater Loading			Nutrient Crop Uptake				
Hydraulic Load	1500	L/day	Crop N Uptake	220	kg/ha/yr	which equals	60.27 mg/m ² /day
Effluent N Concentration	30	mg/L					
% N Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal					
Total N Loss to Soil	9000	mg/day					
Remaining N Load after soil loss	36000	mg/day					

NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer

597

m²

Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)

Nitrogen

Nominated LAA Size

600

m²

Predicted N Export from LAA

-0.06

kg/year

Minimum Buffer Required for excess nutrient

0

m²

CELLS

XX

Please enter data in blue cells

Data in yellow cells is calculated by the spreadsheet, DO NOT ALTER THESE CELLS

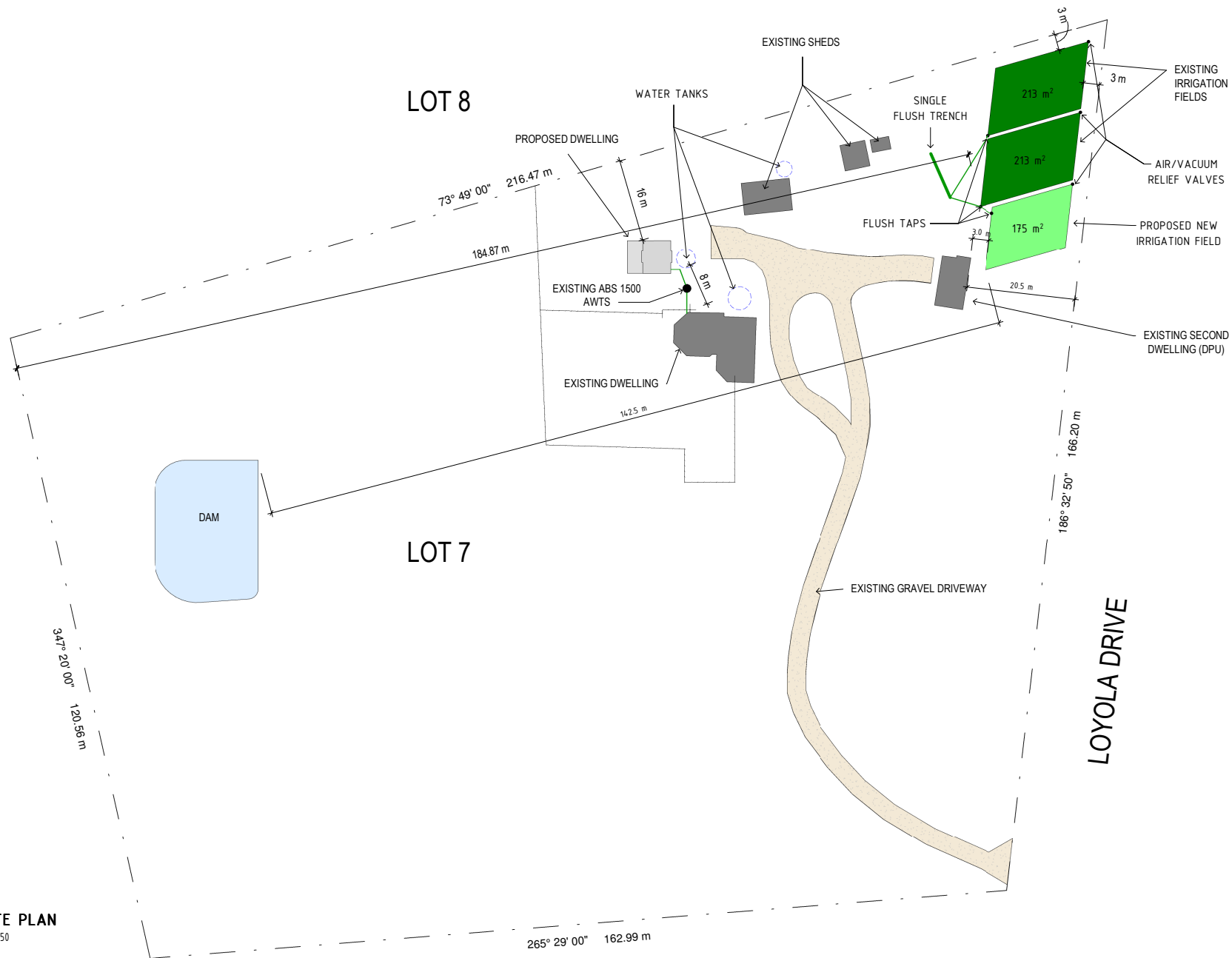
NOTES

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



NORTH



SITE PLAN
1 : 750

TAYLOR
CONSULTING ENGINEERS

PH: (03) 5753 6607
WWW.TAYLORENG.COM.AU
2/269 DEAD HORSE LANE, MANSFIELD, VIC 3722

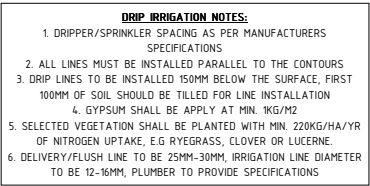
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CLIENT:
JOSH HUTCHINS

SITE ADDRESS:
13 LOYOLA DRIVE, MANSFIELD

REVISION SCHEDULE		
REV.	DESCRIPTION	DATE
1	FOR REVIEW	28/08/2024
2	FOR APPROVAL	30/08/2024

DRAWING TITLE: LCA SITE PLAN		
SCALE: 1 : 750	JOB NO.: TCE2743-2024	A3
DRW BY: TC	SHEET: S300	
CHKD BY: GPT	FOR APPROVAL	



Attachment 2: Tier 2 Risk Assessment

TIER 2 - QUANTITATIVE RISK ASSESSMENT - DEVELOPMENT OF SETBACK DISTANCES

SITE ADDRESS: 13 Loyola Drive, Mansfield, VIC 3723
CLIENT: Joshua Hutchins
PROJECT: Proposed third dwelling

SITE FEATURE: SURFACE WATER (A, B, D, E, F, G, J) (WATERWAY)

RATING

Table 1: As modified from AS1547:2012 Tables R1 & R2

Item	SITE CONSTRAINT OF SPECIFIC CONCERN	LOW (1)	LOW-MODERATE (2)	MODERATE (3)	MODERATE-HIGH (4)	HIGH (5)	Sensitive features
A ¹	Microbial quality of effluent	Advanced/tertiary treated effluent with disinfection ≤ 10 cfu m/L E.coli	Advanced treated effluent no disinfection (e.g. Absorbs beds)	Secondary treatment EPA certified	Improved Primary (e.g. sand filter, not certified)	Primary treated effluent ≥ 10 ⁶ cfu/100 mL E.coli	Groundwater and surface pollution hazard, public health hazard
	Score:			3			
B	Surface water	Category 1 to 3 soils, no surface water down gradient within 100 m, rainfall < 500 mm	Category 1 to 3 soils, no surface water down gradient within 100 m; rainfall > 500 mm, < 750 mm	Category 3 to 5 soils, permanent surface water < 50 m sloping down gradient, rainfall < evaporation	Category 4 to 6 soils, permanent surface water < 50 m gently sloping down gradient, rainfall > 750 mm < 1000 mm	Category 4 to 6 soils, permanent surface water < 50 m down gradient, rainfall > 1000 mm, sensitive receiver as determined by Council	Surface water pollution hazard for low permeable soils, low lying or poorly draining areas
	Score:					5	
D	Slope	0-6% (surface effluent application), 0 - 10% (subsurface effluent application)	6 % - 8 % surface application; 10 % - 15 % subsurface application	8 % - 9 % surface application, 15 % - 20 % subsurface application	9 % - 10 % surface application, 20 % - 30 % subsurface effluent application	> 10 % surface application, > 30 % subsurface application	Off-site export of effluent, erosion
	Score:		2				
E	Position of land application area in landscape (see note 6)	Downgradient of surface water, property boundary, recreational area	N/A	Flat ground	N/A	Upgradient of surface water , property boundary, recreational area	Surface water pollution hazard, off-site export of effluent
	Score:					5	
F	Drainage	Category 1 and 2 soils, gently sloping area	Category 1 to 3 soils; > 10 % slopes; no hydrophytic plants	Category 3 to 4 soils; < 15% slopes; no hydrophytic plants	Category 4 to 5 soils; > 10 %, < 15 % slopes; hydrophytic plants	Category 6 soils, sites with visible seepage, moisture tolerant vegetation, low lying area	Groundwater pollution hazard
	Score:				4		
G	Flood potential	Above 1 in 20 year flood contour	N/A	N/A	N/A	Below 1 in 20 year flood contour	Off-site export of effluent, system failure, mechanical faults
	Score:	1					
J	Application method	Drip irrigation or subsurface application of effluent	N/A	N/A	N/A	Surface / above ground application of effluent	Off-site export of effluent, surface water pollution
	Score:	1					

Notes:

- Table 4-5: Wastewater treatment quality standards. GOWM
- Scale shows the level of constraint to siting an on-site system due to the constraints identified by SSE evaluator or regulatory authority. See Figures R1 and R2 for examples of on-site system design boundaries and possible site constraints.
- Examples of typical siting constraint factors that may be identified either by SSE evaluator or regulatory authority. Site constraints are not limited to this table. Other site constraints may be identified and taken into consideration when determining setback distances.
- The regulatory authority may reduce or increase setback distances at their discretion based on the distances of the land application up or downgradient of sensitive receptors.

RISK VALUE

21

Low	< 8
Low-Moderate	8-15
Moderate	16-22
Moderate-High	23-30
High	> 31

ALTERNATIVE SETBACK RANGE:

Reservoir	EPA GOWM 4-10:	50	300
Surface Water	AS/NZ 1547 - 2012:	15	100
Waterway	EPA GOWM 4-10:	30	100
Farm Dam	EPA GOWM 4-10:	30	60
Drainage Line	EPA GOWM 4-10:	20	40
Open Stormwater Drain	EPA GOWM 4-10:	10	50

CALCULATED DEVELOPED SETBACK (m):

175
58
65
45
30
30

TRENCH 3.0 - VIRAL DIE-OFF ANALYSIS (BEAVERS, CROMER, GARDNER, 2001)

MODEL: TWO LAYERED SOIL WITH "IMPERMEABLE" SUBSOIL; NO WATER TABLE

SURFACE SLOPE (DEGREES)	7	* Measured via hand held clinometer - Statewide Geotechnical
SURFACE LAYER PERMEABILITY (m/day)	0.06	
EFFECTIVE POROSITY OF SURFACE LAYER (%)	10	*Typical values 10-40% - R.J Gerke (1987), 35-45% (Verruijt 2006)
MINIMUM WASTEWATER TEMPERATURE (DEGREES)	9	9.13° to 18.5°
VIRAL LOG REDUCTION REQUIRED	3	*6-Primary, 3-Secondary, 1-Advanced Secondary with disinfection
APPROXIMATE VIRAL DIE-OFF PERIOD (DAYS)	255	* Data output from Trench 3.0 software
WASTEWATER TRAVEL DISTANCE IN DIE-OFF PERIOD (m)	19	* Data output from Trench 3.0 software

CALCULATED SUMMARY:

		ALTERNATIVE SETBACK (m):	MEASURED AVAILABLE SETBACK FROM LAA (m):
Reservoir	EPA GOWM 4-10:	175	> 175
Surface Water	AS/NZ 1547 - 2012:	58	> 100
Waterway	EPA GOWM 4-10:	65	> 100
Farm Dam	EPA GOWM 4-10:	45	> 60
Drainage Line	EPA GOWM 4-10:	30	> 40
Open Stormwater Drain	EPA GOWM 4-10:	30	> 50
	Viral die-off distance:	19	185

OK

Attachment 3: Land Application Area Based on Hydraulic Load

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet

Irrigation area sizing using Nominated Area Water Balance for Zero Storage

Site Address: 13 Loyola Drive, Mansfield

Date: Tuesday, 30 June 2026

Assessor: T. Creighton

INPUT DATA

Design Wastewater Flow	Q	1,500	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Irrigation Rate	DIR	3.0	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	600	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	0.8	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff
Mean Monthly Rainfall Data	Mansfield Post Office (83019)			BoM Station and number
Mean Monthly Pan Evaporation Data	Lake Eildon (088023)			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	47	39.2	50.8	50.9	61.9	65.8	70.2	74.3	66.8	69.4	58.1	52.3	706.7
Evaporation	E		mm/month	164.3	137.2	108.5	57	31	18	18.6	31	51	83.7	117	145.7	963
Evaporation	E		mm/day	5.3	4.9	3.5	1.9	1	0.6	0.6	1	1.7	2.7	3.9	4.7	
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	131	110	76	40	19	11	11	19	36	67	94	117	729.03
Percolation	B	DIRxD	mm/month	93.0	84	93.0	90.0	93.0	90.0	93.0	93.0	90.0	93.0	90.0	93.0	1095.0
Outputs		ET+B	mm/month	224.4	193.76	169.0	129.9	111.6	100.8	104.2	111.6	125.7	160.0	183.6	209.6	1824.0
INPUTS																
Retained Rainfall	RR	RxRF	mm/month	37.6	31.36	40.64	40.72	49.52	52.64	56.16	59.44	53.44	55.52	46.48	41.84	565.36
Applied Effluent	W	(QxD)/L	mm/month	77.5	70.0	77.5	75.0	77.5	75.0	77.5	77.5	75.0	77.5	75.0	77.5	912.5
Inputs		RR+W	mm/month	115.1	101.4	118.1	115.7	127.0	127.6	133.7	136.9	128.4	133.0	121.5	119.3	1477.9
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	15.4	42.3	71.8	97.1	99.8	72.9	10.8	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-109.3	-92.4	-50.8	-14.2	15.4	26.8	29.5	25.3	2.7	-26.9	-62.1	-90.2	
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	15.4	42.3	71.8	97.1	99.8	72.9	10.8	0.0	
Maximum Storage for Nominated Area	N		mm	99.84												
	V	NxL	L	59904												
LAND AREA REQUIRED FOR ZERO STORAGE			m ²	249	259	362	505	749	934	969	891	623	445	328	277	

MINIMUM AREA REQUIRED FOR ZERO STORAGE: 969.0 m²

CELLS

	Please enter data in blue cells
	Data in white cells are calculated by the spreadsheet, DO NOT ALTER THESE CELLS
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

Please read the notes before using this spreadsheet

Nitrogen Balance

Site Address: 13 Loyola Drive, Mansfield

SUMMARY - LAND APPLICATION AREA REQUIRED BASED NITROGEN BALANCE

597

m²

INPUT DATA¹

Wastewater Loading			Nutrient Crop Uptake					
Hydraulic Load	1500	L/day	Crop N Uptake	220	kg/ha/yr	which equals	60.27	mg/m ² /day
Effluent N Concentration	30	mg/L						
% N Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal						
Total N Loss to Soil	9000	mg/day						
Remaining N Load after soil loss	36000	mg/day						

NITROGEN BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer

Nitrogen

597

m²

Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)

Nominated LAA Size

600

m²

Predicted N Export from LAA

-0.06

kg/year

Minimum Buffer Required for excess nutrient

0

m²

CELLS

XX

Please enter data in blue cells

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

Victorian Land Capability Assessment Framework

Please read the attached notes before using this spreadsheet

Irrigation area sizing using Nominated Area Water Balance for Zero Storage

Site Address: 13 Loyola Drive, Mansfield

Date: Tuesday, 30 June 2026

Assessor: T. Creighton

INPUT DATA

Design Wastewater Flow	Q	1,500	L/day	Based on maximum potential occupancy and derived from Table 4 in the EPA Code of Practice (2013)
Design Irrigation Rate	DIR	4.0	mm/day	
Nominated Land Application Area	L	600	m ²	Based on soil texture class/permeability and derived from Table 9 in the EPA Code of Practice (2013) ¹
Crop Factor	C	0.6-0.8	unitless	
Rainfall Runoff Factor	RF	0.8	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type ² Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff
Mean Monthly Rainfall Data	Mansfield Post Office (83019)			
Mean Monthly Pan Evaporation Data	Lake Eildon (088023)			BoM Station and number
				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	47	39.2	50.8	50.9	61.9	65.8	70.2	74.3	66.8	69.4	58.1	52.3	706.7
Evaporation	E		mm/month	164.3	137.2	108.5	57	31	18	18.6	31	51	83.7	117	145.7	963
Evaporation	E		mm/day	5.3	4.9	3.5	1.9	1	0.6	0.6	1	1.7	2.7	3.9	4.7	
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	131	110	76	40	19	11	11	19	36	67	94	117	729.03
Percolation	B	DIRxD	mm/month	124.0	112	124.0	120.0	124.0	120.0	124.0	124.0	120.0	124.0	120.0	124.0	1460.0
Outputs		ET+B	mm/month	255.4	221.76	200.0	159.9	142.6	130.8	135.2	142.6	155.7	191.0	213.6	240.6	2189.0
INPUTS																
Retained Rainfall	RR	RxRF	mm/month	37.6	31.36	40.64	40.72	49.52	52.64	56.16	59.44	53.44	55.52	46.48	41.84	565.36
Applied Effluent	W	(QxD)/L	mm/month	77.5	70.0	77.5	75.0	77.5	75.0	77.5	77.5	75.0	77.5	75.0	77.5	912.5
Inputs		RR+W	mm/month	115.1	101.4	118.1	115.7	127.0	127.6	133.7	136.9	128.4	133.0	121.5	119.3	1477.9
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	-140.3	-120.4	-81.8	-44.2	-15.6	-3.2	-1.5	-5.7	-27.3	-57.9	-92.1	-121.2	
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	213	221	292	378	500	576	589	559	440	343	269	234	

MINIMUM AREA REQUIRED FOR ZERO STORAGE: 589.0 m²

CELLS

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NOTES

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² Values selected are suitable for pasture grass in Victoria

Attachment 4: Site Plan & Proposed Works



NORTH

LOT 8

LOT 7

LOYOLA DRIVE

SITE PLAN
1 : 750

TAYLOR
CONSULTING ENGINEERS

PH. (03) 5753 6607 | WWW.TAYLORENG.COM.AU | 2/269 DEAD HORSE LANE, MANSFIELD, VIC 3722

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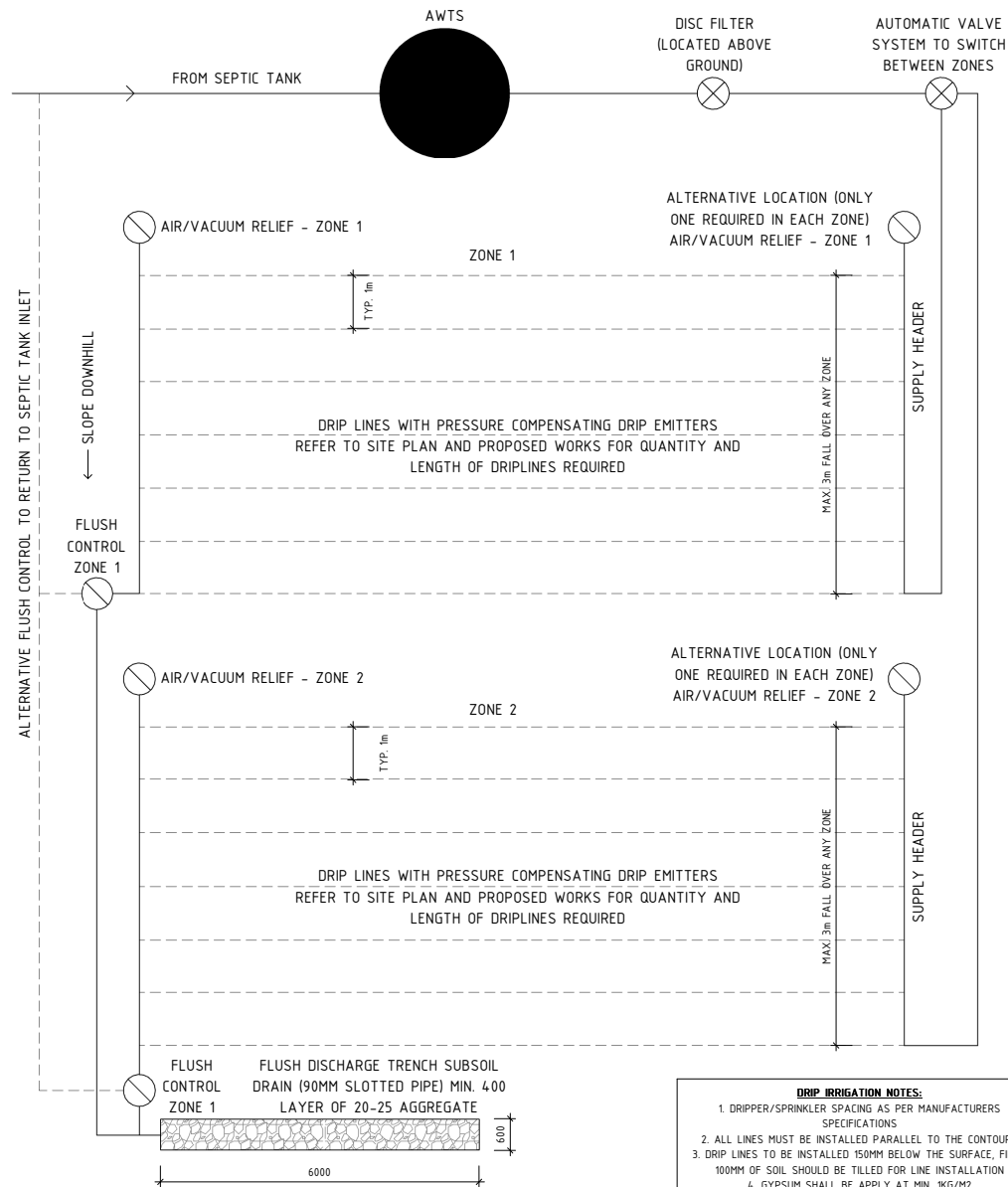
CLIENT:
JOSH HUTCHINS

SITE ADDRESS:
13 LOYOLA DRIVE, MANSFIELD

REVISION SCHEDULE		
REV.	DESCRIPTION	DATE
1	FOR REVIEW	28/08/2024
2	FOR APPROVAL	30/08/2024
3	FOR APPROVAL	10/10/2024
4	LAA AMENDMENT	9/7/2026

DRAWING TITLE: LCA SITE PLAN			
DRW BY:	TC	JOB NO.:	2025-3070
CHKD BY:	GPT	SHEET:	S300
APPROVED BY:	GPT	SCALE:	1 : 750

A3



- DRIP IRRIGATION NOTES:**
1. DRIPPER/SPRINKLER SPACING AS PER MANUFACTURERS SPECIFICATIONS
 2. ALL LINES MUST BE INSTALLED PARALLEL TO THE CONTOURS
 3. DRIP LINES TO BE INSTALLED 150MM BELOW THE SURFACE, FIRST 100MM OF SOIL SHOULD BE TILLED FOR LINE INSTALLATION
 4. GYPSUM SHALL BE APPLY AT MIN. 1KG/M2
 5. SELECTED VEGETATION SHALL BE PLANTED WITH MIN. 220KG/HA/YR OF NITROGEN UPTAKE, E.G RYEGRASS, CLOVER OR LUCERNE.
 6. DELIVERY/FLUSH LINE TO BE 25MM-30MM, IRRIGATION LINE DIAMETER TO BE 12-16MM. PLUMBER TO PROVIDE SPECIFICATIONS

 **TYP. DETAIL - AWTS DRIP IRRIGATION (DUAL ZONE)**
1 : 100

REVISION SCHEDULE		
REV.	DESCRIPTION	DATE
1	FOR REVIEW	28/08/2024
2	FOR APPROVAL	30/08/2024
3	FOR APPROVAL	10/10/2024
4	LAA AMENDMENT	9/7/2026

DRAWING TITLE: AWTS & IRRIGATION DETAILS (DUAL ZONE)			
DRW BY:	TC	JOB NO.:	2025-3070
CHKD BY:	GPT	SHEET:	S301
APPROVED BY:	GPT	SCALE:	1 : 100