ONSITE WASTEWATER MANAGEMENT ASSESSMENT

Proposed Development

Subdivision of Lot 117 &118 DP 126140
No. 292 Rosemont Road, Boxers Creek

Assessment of proposed 4 Lot Subdivision

Date: 01 November 2023

Our Reference: 214480

Prepared on Behalf of: M. Taylor

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Document Control

Revision No.	Date	Description	Prepared By:	Reviewed by:
1	16/11/2021	Initial issue	T Murphy	D Ingenhoff
2	10/02/2023	Updated Bores	T Murphy	D Ingenhoff
3	01/11/2023	Updated Layout	T Murphy	M Carpenter

This Onsite Wastewater Management Assessment Report provides a fair and true assessment of the proposed development on the site and the opportunities for onsite management.

The Report meets the requirements of *'Designing and Installing On-Site Wastewater Systems – Sydney Catchment Authority Current Recommended Practice'* and is consistent with the currently available guidelines as produced by Water NSW.

This assessment relates only to the development and the site as described in the report. The recommendations are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation. Interpretations of the modelling and assessment information should not be made including changes in the scope of the development or application to other projects.

Within the confines of the above statements and to the best of my knowledge, this report does not contain any incomplete or misleading information.

Tim Murphy
BE Civil
01 November 2023

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1 Assessment Summary and Recommendations

The treatment of wastewater for the proposed 4 Lot subdivision by means of on-site treatment is assessed to be feasible for all proposed lots. The consideration is accounting for buffer distances as required by Water NSW and sizing of the appropriate land application area according to AS/NZS 1547:2012.

Each lot will be subject to an individual assessment once an application has been made to develop on the proposed lots, however this report has been carried out using an appropriate amount of test pits and soil samples and ensuring that all lots can satisfactorily treat effluent using an on-site system.

2 Introduction

As requested, LandTeam Australia have carried out an assessment of the property located on Lots 117 and 118 DP125140. Field work for the testing was carried out in accordance with the requirements and their adopted guidelines for On-Site Sewerage Management, carried out by Tim Murphy.

The site is located in an area covered by the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011, which requires that a basic Water Cycle Management Study be carried out to assess the effect of the development on the receiving of waters which form part of the catchment controlled by Water NSW. This site must be capable of having a sustainable effluent disposal system, with the assessment based on the guidelines in “On-Site Sewerage Management for Single Household” produced by the Department of Local Government and others.

The feasibility for on-site wastewater disposal for all 4 proposed lots was considered and assessed and a recommendation has been concluded. It will furthermore become the responsibility of future land owners to provide a more accurate assessment for each lot once the dwelling size and orientation are known. This report however assesses the feasibility for each proposed lot to sustain a four bedroom dwelling.

2.1 Scope of Works

The geotechnical assessments have involved the following activities:

- A review of existing regional maps and reports held within our office;
- Observations of surface features on the property and the surrounding area by an experienced Engineer;
- Excavation of 2 test pits to sample and assess the nature and consistency of the surface soils; refer to LandTeam plan 214480-TP02-E
- Carrying out soil index and classification tests to assist with the assessment of the absorption capacity of the soils; and

- Engineering assessment and reporting.

2.2 Site Observation

The following site observations were made during the site visit.

Surface Site Description

The site is located within gently sloping terrain on the South side of Goulburn. The land has been used for grazing and Agricultural purposes. There are outcrops of mature trees throughout the property.

The proposed 4 lots grade from 1% to 5% in the proposed house sites to sleeper grades throughout.

Subsurface Conditions

The site was investigated by digging 2 test pits to 1m in depth to establish the soil profile and suitability for on-site wastewater treatment.

The below table lists the soil types and depths in each test pit. Test pits were selected to give the most accurate results for the complete site.

Test Pit 1	
0.0m – 0.4m	Topsoil
0.4m – 0.8m	Clay Loam
0.8m – 1.0m	Light Clay

Test Pit 2	
0.0m – 0.5m	Topsoil
0.5m – 0.7m	Clay Loam
0.7m – 1.0m	Light Clay

Soil Permeability Assessment

Soil permeability assessment was achieved by conducting a textural classification of the soils in accordance with AS/NZS1547 with the following results:

Topsoil: 1.5m/day
Clay loam: 0.5 – 1.5 m/day
Sandy clay loam: 0.5 – 3.0 m/day
Light clay: 0.12 – 0.5 m/day

The design loading rates for the absorption trenches systems were obtained from Table L1 AS/NZS1547:2012.

Alkalinity and electrical conductivity tests were undertaken on 1:5 samples of soil:distilled water in the field (measured in deci-siemens/m) to ascertain any major chemical constraints to onsite disposal.

The Modified Emerson Aggregate Test (Amended) was also carried out in accordance with AS/NZS1547 (Appendix 4.1D7) on selected samples of the soils obtained from the site to assess the dispersivity of the site materials.

The results of the dispersion, alkalinity and electrical conductivity testing are as follows:

The test results reveal that the soils are not dispersive by nature, slightly alkaline, non-saline and have no major chemical constraint to the onsite disposal of effluent.
All required buffer distances are satisfied with the proposed new boundaries.

3 Discussion and recommendations

3.1 Available Disposal Methods

The following are the potential onsite disposal methods available that are to be individually assessed for their suitability on this site, with the constraints as listed for each option:

- Absorption Trenches – Absorption trenches and beds are typically used to manage primary treated effluent. They can be used to manage secondary treated effluent, in which a higher loading rate can be achieved, allowing a reduced footprint. Absorption beds & trenches are not typically suited to low permeability soils

- Evapotranspiration/absorption (ETA) trenches or beds – ETA trenches or beds are generally unlined beds with some deep seepage. Capillary action draws effluent up through the sand in the upper part of the ETA bed from the storage in the void spaces. This provides the root zone of vegetation (typically grass) on top of the bed to optimise evapotranspiration. Effluent is distributed through the bed via a series of slotted pipes. The vegetation cover must be well maintained to ensure strong growth for maximum uptake by transpiration.

- Surface irrigation – the disposal of secondary treated and disinfected effluent may be permitted, however significant limitations exist with the increased chance of contact of the effluent by humans. These limitations include high slope of the ground → increased runoff, risk of frosts, proximity to neighbours, proximity to dwellings (considering prevailing wind conditions), and requires a lower annual rainfall.

- Subsurface irrigation – Subsurface irrigation reduces the chance of human contact with the effluent and thus significantly reduces Public Health risks. By placing the irrigation system in the root zone of potential plants, beneficial reuse is maximised through the uptake of water and associated nutrients. NSW Health requires that non-disinfected effluent is to be disposed of at least 300mm underground (subsoil) rather than subsurface as described herein. Therefore subsurface effluent disposal is required to be disinfected.

- Subsoil disposal – puts the effluent largely below the root zone of most grasses, resulting in a lower uptake of nutrient by vegetation (grasses). It however minimises

risk of human contact with untreated effluent and minimises surface runoff during extended wet weather.

- Sand filters or mounds – these devices and arrangements are more typically used on environmentally sensitive or constrained sites and are designed to treat and dispose of primary of secondary treated effluent. These mounds are useful in further removing phosphorus, nitrogen and micro-organisms from the effluent.

3.2 Effluent Loading

For the purpose of this report effluent loading was calculated for each proposed lot as a 4 bedroom dwelling which allows for 8 people using 100 litres of tank water per day. Therefore the effluent loading is calculated at 800 L/day.

Table 2.1 of the SCA current recommended practice for the Design and Installation of Onsite Wastewater Systems (SCA CRP OWMS) presents the design wastewater loadings for a range of potential sources based upon dwelling size/number of bedrooms, which concurs with the above adopted loading rate.

3.3 Siting of Disposal Areas

Disposal areas should be sited to meet the set back requirements as listed in Table 2.6 of Water NSW Designing and Installing On-site Wastewater Systems as listed below:

Feature	Level of effluent treatment	Effluent application method	Buffer distance (minimum)
Buildings, retaining walls	Primary	Subsoil	2.0m downslope and where flat, or 6.0m upslope of the feature
	Secondary (disinfected)	Subsurface and surface (including drip or trickle) irrigation	2-6m (<3m only for drip irrigation on low rate)
Premises, boundaries, paths and walkways, recreation areas	Primary	Subsoil	3.0m downslope and where flat, or 6.0m upslope of the feature; 15m to recreation areas, if by LPED irrigation
	Secondary (disinfected)	Subsurface irrigation	3.0m downslope and where flat, or 4.0m upslope of the feature
		Surface irrigation	15m up- or downslope of the feature
In ground potable water tanks, in ground swimming pools	Primary	Subsoil	15.0m and downslope from water tank or pool
	Secondary (disinfected)	Subsurface and surface irrigation	4.0m – should not be located upslope of feature
Watercourse, lakes and the full	Primary	Subsoil	100m from the high water level

Feature	Level of effluent treatment	Effluent application method	Buffer distance (minimum)
supply level for all water supply reservoirs	Secondary (disinfected)	Subsurface and surface irrigation	100m from the high water level
Bore or well licenced for domestic^ consumption	Primary	Subsoil	100m
	Secondary (disinfected)	Subsurface and surface irrigation	100m
Drainage depressions, farm dams and roadside drainage and lot scale stormwater quality improvement devices	Primary	Subsoil	40m from the high water level
	Secondary (disinfected)	Subsurface and surface irrigation	40m from the high water level
^ If within 100 metres of a bore or well licenced for domestic consumption, a draw-down analysis is required using an appropriate methodology, such as Cromer, Gardner and Beavers, 2001 'An improved viral die-off method to estimate setback distances'. Domestic consumption is taken to mean for drinking, watering of edible plants etc.			

Each proposed lot was assessed against the required buffer distances and careful consideration was made to ensure that these buffer distances are satisfied.

Groundwater bores were located outside at allowable buffer distances. Bore GW105702 is a licenced domestic bore and it is greater than 200m from proposed lot 4. Bore GW043480 is licenced for stock and domestic use and is located greater than 150m from proposed lot 3. Bore GW049567 is licenced for general use and is located greater than 150 metres from proposed lot 2.

4 Summary

The use of on-site wastewater management is assessed as feasible for the proposed 4 Lot subdivision. It has been assessed with each lot containing a 4 bedroom dwelling with 8 residents using 100 L/day of tank water each. The lots were modelled and assessed considering the use of an Aerated Wastewater Treatment System (AWTS) draining secondary treated effluent into an absorption bed.

The nature and the depth of the soil contribute to the suitability of the site for on-site disposal along with the gentle sloping nature of each proposed lot.

5 References

Sydney Catchment Authority, 2012, *Designing and Installing Onsite Wastewater Systems – A Sydney Catchment Authority Current Recommended Practice*

AS/NZS1547:2012

6 Supporting Plans and Information

Sizing of absorption beds

The soil absorption trench/ bed can be constructed within the range of widths and depths shown in (AS/NZ1547, 2012).
The trench can be no deeper than 600mm and no wider than 4m.
For this site, the proposed base of the trench is 600mm below ground surface consisting of min 350mm arch and 150mm topsoil.
The size of the absorption trench is calculated using the formulae in AS/NZ 1547, 2012. It is based on design flow rate, design width and design loading rate (DLR), which is the amount of effluent that will be applied each day per area of infiltrative surface.

The DLR adopted for the well structured clay loam subsoil receiving secondary treated effluent is derived from AS/NZ 1547, 2012, Table L1 is 30 mm/d.

The AS/NZ 1547, 2012 calculation method is-

$$L = \frac{Q}{DLR \times W}$$

Where

L= Length in m
Q= Design daily flow in L/day (800)
W= Width in m (4m assumed)
DLR = Design loading rate in mm/day (30mm/d)

Based on the above formulae and assumptions the soil absorption trench bed must be at least 7m long.

Absorption trenches should be constructed according to requirements set out in SCA CRP

- Where more than one absorption trench is needed, the lengths should be equal and effluent should be distributed evenly via a splitter box or sequencing valve.
- The maximum number of beds for any one design is 10.

- Trench length should be designed to ensure that effluent is evenly distributed and reaches the far end of each trench. Individual trenches must be less than 20m for passive systems or 25m for pressure dosed systems.
- Trenches must not be added in series. (i.e. end to end)

7 General

Topsoil stripped from the access road and the building sites may be spread over the effluent disposal area to maximise the depth of loamy soil available to distribute effluent to the roots of plants.

A list of the plants suitable for growing within and downslope of disposal areas is attached.

The use of low sodium detergents and washing powder, and water efficient plumbing fixtures will assist in maintaining the effectiveness of the on-site disposal areas.

Manufacturers of waste treatment systems generally provide written guidelines for operation and maintenance of their equipment, and also often provide guidance on preferred household cleaners and landscaping details.

Maintainable filters such as that manufactured by Halgan Pty Ltd for the outlets of septic tanks, are commercially available to reduce the amount of suspended solids transferred to disposal beds, which will extend the life of absorption areas. Septic tanks should be serviced at least on a 3 yearly basis to maintain the effective storage and treatment capacities.

Aerated waste treatment systems and membrane treatment systems are normally serviced on a 3 monthly basis.

Maintenance of the Ecomax system requires a 6 monthly operation of a diversion valve, and regular mowing of the grassed surface of the mound.

Plants for effluent management areas

Planting lawn, trees and shrubs around an e uent disposal area will greatly increase the system's e ciency.

Using scoria, pebbles, pine bark mulch and plastic underlay is definitely not recommended as they inhibit evaporation and air movement in the soil.

Take care to locate trees so that they do not shade the system. Place trees as far away from the system as necessary (at least two metres beyond the potential canopy) so that roots do not interfere with pipes and trenches.

Here are some of the recommended plants that are suitable to grow in e uent management areas.

Grasses and flowers

Botanical Name	Common Name	Native (N) or Exotic (E)	Height x Width (m)
Trifolium fragiferum	Strawberry Clover	E	Ground cover
Trifolium repens	White Clover	E	Ground cover
	Geraniums	E	Ground cover
	Hydrangeas	E	1 x 1
Puccinellia stricta	Saltmarsh Grass	N	
Eleocharis acuta	Common Spike Rush	N	

Shrubs

Botanical Name	Common Name	Native or Exotic	Height x Width (m)	Comment
Banksia robur	Swamp Banksia	N	2 x 2	
Callistemon citrinus	Lemon scented b.brush	N	2 x 2	Many cultivars
Callistemon sieberi	River bottlebrush	N	2 x 2	
Lonicera nitida	Box honeysuckle	E	1.5 x 1	Dense bush
Melaleuca styphelioides	Paperbark	N	4 x 2	Most species are suitable
Melaleuca parvistaminea	Paperbark	N	4 x 3	
Melaleuca thymifolia	Paperbark	N	1 x 1	
Veronica species	Hebe	E	2 x 2	Most suitable

Trees

Botanical Name	Common Name	Native or Exotic	Height x Width (m)
Betula alba	Silver birch	E	12 x 4
Casuarina cunninghamiana	River She-oak	N	20 x 6
Casuarina glauca	Swamp She-oak	N	6 x 4
Cornus capitata	Evergreen dogwood	E	4 x 2
Eucalyptus amplifolia	Cabbage gum	N	15 x 8
Eucalyptus blakelyi	Blakely's red gum	N	15 x 8
Eucalyptus ovata	Swamp gum	N	15 x 8
Eucalyptus stellulata	Black Sally	N	12 x 6

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LEGEND

PROPOSED WATER QUALITY SWALE DRAIN

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

NOTES:

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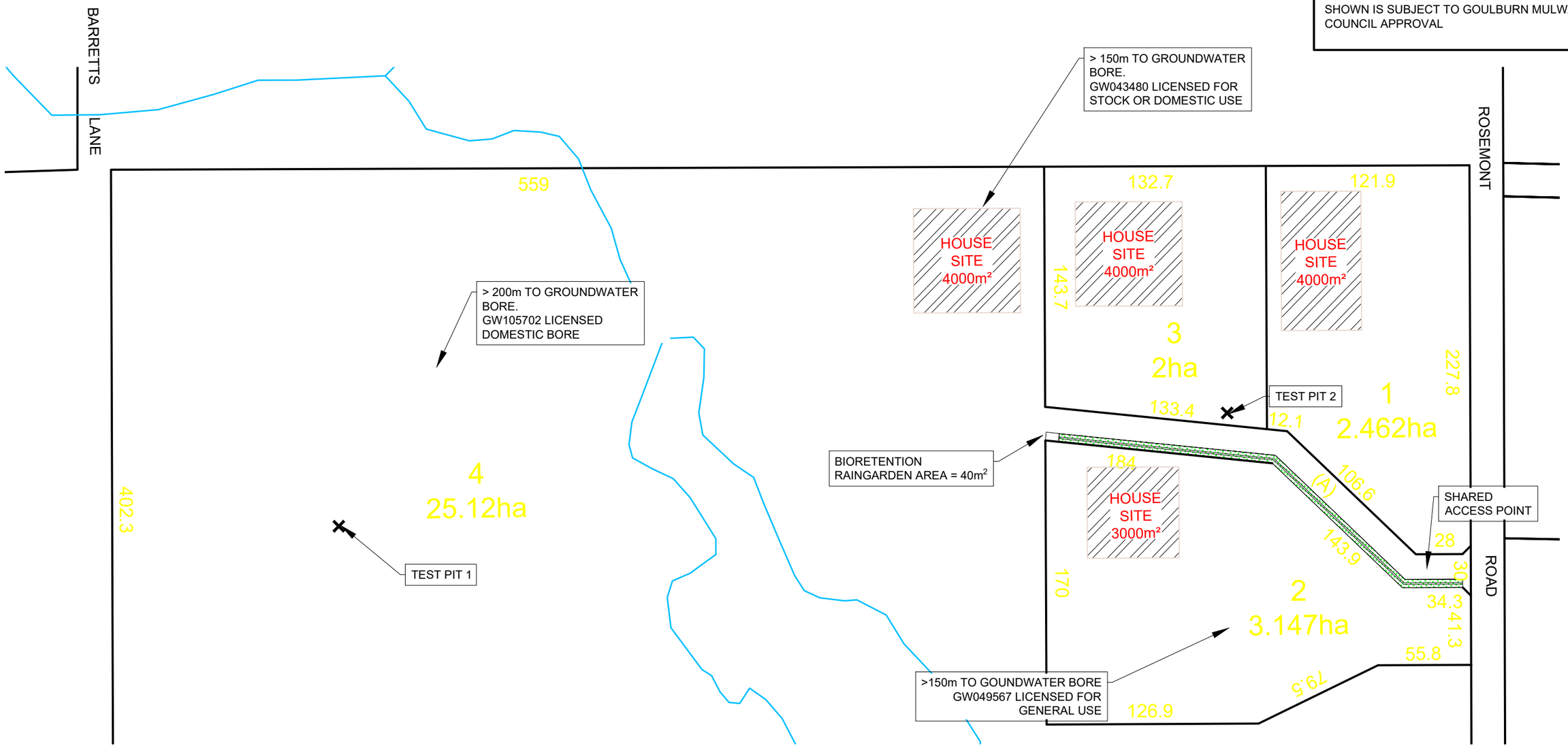

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ISSUE	AMENDMENT	DRAWN	DATE
A	INITIAL ISSUE	BH	09.12.21
B	BOUNDARY ADJUSTMENT	BH	14.02.22
C	COMMENTS	BH	10.02.23
D	BORE HOLE LOCATION	BH	27.02.23
E	LOT LAYOUTS UPDATED	TJ	16.11.23

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A3 SHEET

M.TAYLOR

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ROSEMONT ROAD, BOXERS CREEK

GOULBURN MULWAREE COUNCIL

TEST PITS AND WATER QUALITY LAYOUT PLAN

SCALE	1:2500@A3	DATUM	A.H.D.	DATE	16.11.2023

DESIGNED: TM
DRAWN: BH
CHECKED: TM
ISSUE E
DRAWING No. 214480-TP02

LEGEND

EXISTING BORE HOLE LOCATION

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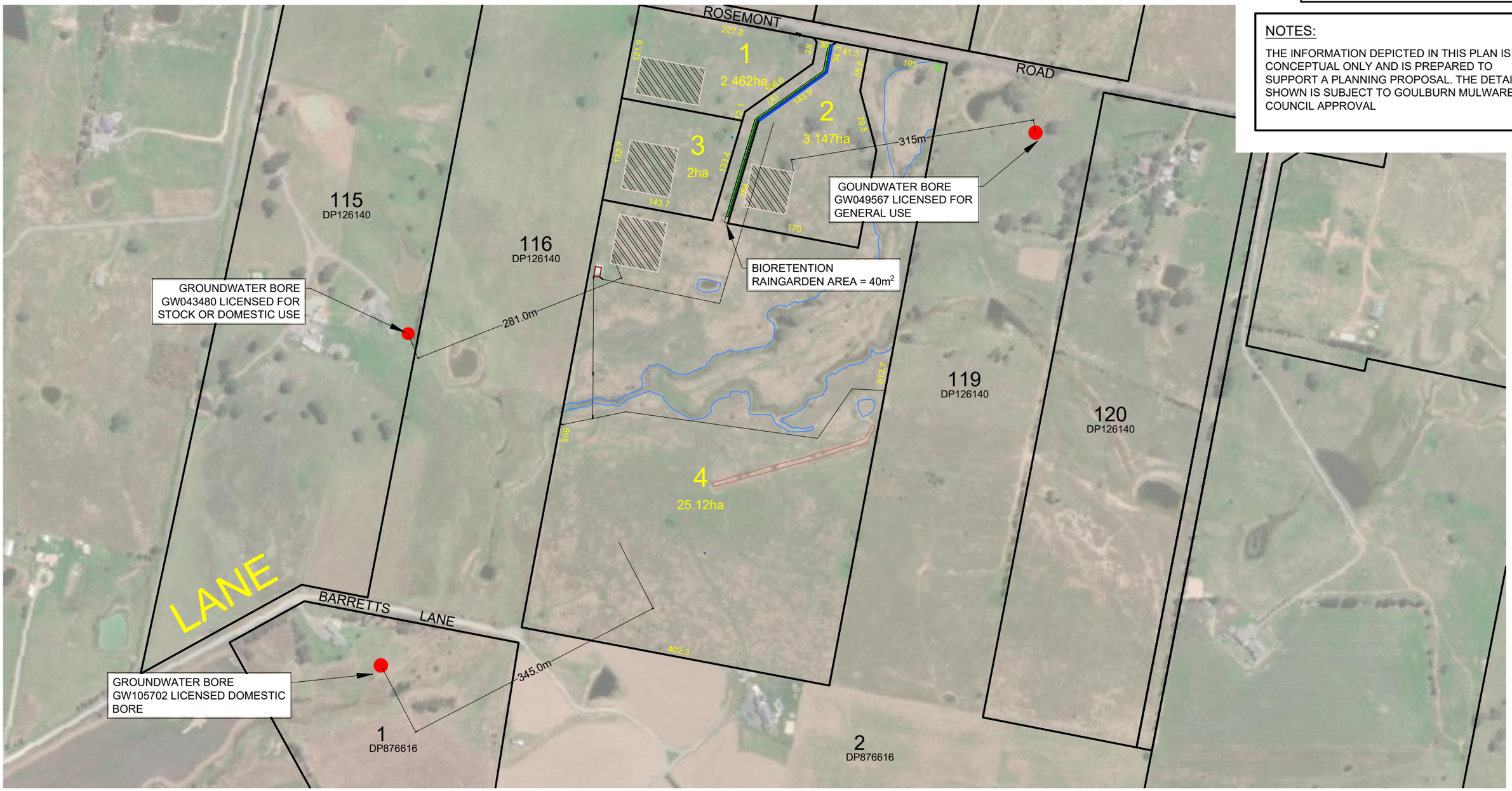

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A3 SHEET

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GOULBURN MULWAREE COUNCIL

BORE HOLE LOCATION PLAN

DESIGNED:	TM	ISSUE
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CHECKED:	TM	

DRAWING No. 214480-TP03

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