

INTEGRATED DEVELOPMENT PROPOSAL FOR PUBLIC COMMENT

The following development proposal has been submitted to Council and although not designated, is notified as Integrated Development in accordance with Section 4.46 of the Environmental Planning & Assessment Act, 1979 for public comment:

Portal Application Number	DA No.	Location	Proposal
PAN-443595	67/2024	Lot : 41 DP : 789996, 4 Glenburn Road PATERSON Applicant: Perception Planning PTY LTD Owners: Mr D S & Mrs A J Pilgrim Consent Authority: Dungog Shire Council	Torrens Tile Subdivision (one into three lots)

This application is Integrated Development as an approval is required under Section 100B of the Rural Fires Act, 1997 from the NSW Rural Fire Service.

Details of the above proposal are available for inspection on the NSW Planning Portal website from **Monday 8 July 2024**.

<https://www.planningportal.nsw.gov.au/publications/exhibitions-and-publications/development-applications-exhibition>

Submissions can be made via the NSW Planning Portal until **Monday 22 July 2024**. If you require assistance making a submission via the Planning Portal, please contact Council.

In accordance with *Section 10.4 of the Environmental Planning & Assessment Act 1979*, a person who makes a public submission to Council in relation to this application is required to disclose all reportable political donations within two years prior to the submission being made and ending when the application is determined.

If the submission includes an objection to the proposal, the grounds of objection must be given. Council may also be obliged to release your submission as required by the *Government Information (Public Access) Act 2009* and the *Environmental Planning and Assessment Act 1979*.

Further, as stipulated in Council's Public Submissions Policy C1.19, Council will not place any weight on anonymous submissions when determining the respective development application.

**DUNGOG SHIRE COUNCIL
EXHIBITED COPY**

Commencement Date 8 July 2024

Closing Date 22 July 2024

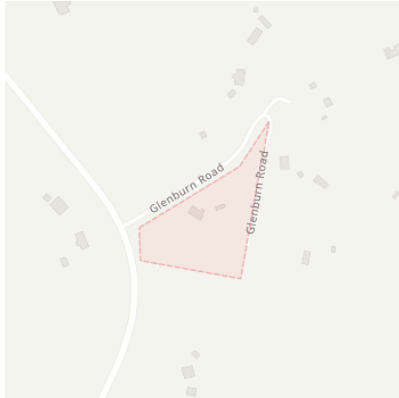
Contact Details

Contact Renee Neely	Contact number 0437 195 264	Company -	Enquirer ID 3478374
Email renee@perceptionplanning.com.au	Address 260 Maitland Road Mayfield NSW 2304		

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date 08/05/2024	Start date 09/05/2024	End date 09/05/2024	On behalf of Private	Job purpose Design	Locations Both Road, Nature Strip, Footpath	Onsite activities Planning & Design
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Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference J004283	Address 4 Glenburn Rd Paterson NSW 2421	Notes/description -
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Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you **MUST** advise the asset owner immediately.
- By using the BYDA service, you agree to the [Privacy Policy](#) and [Term of Use](#).
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
238911838	Essential Energy	13 23 91	NOTIFIED
238911839	Hunter Water Corporation	1300 657 657	NOTIFIED
238911840	Telstra NSW Central	1800 653 935	NOTIFIED

END OF UTILITIES LIST



Plan

Plan your job. Use the BYDA service at least one day before your job is due to begin, and ensure you have the correct plans and information required to carry out a safe project.



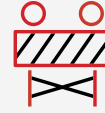
Prepare

Prepare by communicating with asset owners if you need assistance. Look for clues onsite. Engage a skilled Locator.



Pothole

Potholing is physically sighting the asset by hand digging or hydro vacuum extraction.



Protect

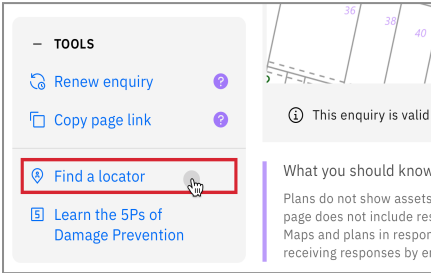
Protecting and supporting the exposed infrastructure is the responsibility of the excavator. Always erect safety barriers in areas of risk and enforce exclusion zones.



Proceed

Only proceed with your excavation work after planning, preparing, potholing (unless prohibited), and having protective measures in place.

Engage a skilled Locator



When you lodge an enquiry you will see skilled Locators to contact

Visit the Certified Locator website directly and search for a locator near you

bydlocator.com/certified-locating-organisation

Book a FREE BYDA Session



BYDA offers two different sessions to suit you and your organisation's needs. The free sessions are offered in two different formats - online and face-to-face:

- 1. Awareness Session:** Understand the role of BYDA, safe excavation practices, complying with asset-owner instructions, and the consequences of damages. Learn how to mitigate and avoid potential damage and harm and ensure a safe work environment.
- 2. Plan Reading Session:** Develop the skills to interpret asset owners' plans, legends, and symbols effectively. Understand the complexities of plan interpretation to ensure smooth project execution.

To book a session, visit:

byda.com.au/contact/education-awareness-enquiry-form/

BOOK NOW



CABLE/PIPE LOCATION

Assets were found in the search area

COMPANY NAME:	Not supplied
ATTENTION:	Renee Neely
SEARCH LOCATION:	4 Glenburn Rd Paterson NSW 2421
SEQUENCE NO:	238911838
DATE:	Wednesday, 8 May 2024

Provision of Plans:

Please find enclosed plans depicting approximate locations of **Essential Energy** assets in the search location. **The excavator must not assume that there may not be assets owned by other network operators in the search location.**

Underground assets searched for	Underground assets found
Essential Energy Electrical	<input checked="" type="checkbox"/>
Essential Energy Water & Sewerage	<input type="checkbox"/>

Plans are updated from time to time to record changes to underground assets and may be updated by Essential Energy without notice. In the event that excavation does not commence within 28 days of receipt of a plan, a new plan should be obtained.

The excavator must retain the plans on site for the duration of the works.

The excavator shall report all damage made to Essential Energy assets immediately. Note that damage includes gouges, dents, holes and gas escapes.

**IN CASE OF EMERGENCY OR TO REPORT DAMAGE:
PHONE 13 20 80**

DISCLAIMER

Please be aware that plans may **not** reflect alterations to surface levels or the position of roads, buildings, fences etc. **Cable and pipe locations are approximate** and the plans are **not** suitable for scaling purposes. *Essential Energy does not retain plans for privately-owned underground electrical or water & sewerage assets located on private property. Privately-owned underground electrical assets located on private property are the responsibility of the owner.*

The plans have been prepared for Essential Energy's sole use and benefit. **Essential Energy cannot and does not warrant the accuracy or completeness of the plans.** Essential Energy supplies them at no cost with the object of reducing the serious risk of unintentional damage being caused to its cables and pipes. **Essential Energy does not accept any responsibility for any omissions, inaccuracies or errors in the plans, or any reliance placed on the material. Any reliance placed on any plan provided in response to your request is at your own risk.**



Essential Energy retains all intellectual and industrial property rights which exists or may exist in or with respect to the plan(s). The material provided is not to be copied or distributed beyond you.

You release Essential Energy from and against all claims, demands, actions and proceedings arising out of or in any way related to the use of the provided material.

Location of Assets on Site:

The plans indicate only that cables and pipes may exist in the general vicinity – they do not pinpoint the exact location of the cables and pipes.

If it is found that the location of cables or pipes on the plans can be improved, please notify Essential Energy on 13 23 91 (or fax 1800 354 636).

All individuals have a duty of care they must observe when working in the vicinity of underground cables and pipes. It is the **excavator's responsibility to visually expose the underground cables and pipes manually, ie. by using hand-held tools and non-destructive pot-holing techniques prior to any mechanical excavation.** The excavator will be held responsible for all damage caused to the Essential Energy network or cables and pipes, and for the costs associated with the repair of any such damage. The excavator will also be held responsible for all damage caused to any persons.

When digging in the vicinity of underground assets, persons should observe the requirements of the applicable Codes of Practice published by the NSW Work Cover Authority or Safe Work Australia, and any amendments from time to time by the Authorities, including although not limited to:

- Excavation Work
- Managing Electrical Risks in the workplace
- How to manage and control asbestos in the workplace

(Please refer to <https://www.workcover.nsw.gov.au/law-and-policy/legislation-and-codes/codes-of-practice>).

When digging in the vicinity of **electrical assets** persons should observe the requirements of the **Electricity Supply Act 1995.**

Persons excavating near live underground electrical reticulation and/or earthing cables **must exercise extreme caution at all times and adhere to the requirements of Essential Energy's Electrical Safety Rules.** (These are available on our website: <http://www.essentialenergy.com.au/content/safety-community> and include

- **Work near Essential Energy's Underground Assets:**
<http://www.essentialenergy.com.au/asset/cms/pdf/contestableWorks/CEOP8041.pdf> , and
- **Asbestos Fact Sheet:**
<http://www.essentialenergy.com.au/asset/cms/pdf/safety/AsbestosFactSheet.pdf>

In some situations these procedures call for work to be performed by authorised staff.

Should there be any doubt as to the exact location of any underground electrical assets, and the potential for conflict with live underground cables caused by excavation at your work site, you should contact

13 23 91 to arrange for an on-site visit by an Essential Energy representative. No construction or mechanical excavation work is to commence prior to this on-site visit and approval being obtained.

When digging in the vicinity of **water or sewer assets** persons should observe the requirements of the **Water Management Act 2000.**

Should there be any doubt as to the exact location of any underground water and sewer assets, and the potential for conflict with underground water and sewer pipes caused by excavation at your work site, you should contact **13 23 91** to arrange for an on-site visit. No construction or excavation work is to commence prior to this on-site visit and approval being obtained.

Prior Notification:

Please note that for excavation depths greater than 250mm near power poles and stays you should allow for **advance notice** in your construction program to permit Essential Energy time to allocate the necessary field resources to carry out the inspection at the site a **minimum of fourteen (14) working days prior to work commencing.** This service may incur a fee and this can be negotiated with the local Area Coordinator at the time of making the appointment. Failure to give reasonable notice to the local Area Coordinator may result in disruption to Essential Energy's planned works program in the district and could incur an extra charge over and above the normal rate for this service.

For further information please call 13 23 91.

When working near underground electrical infrastructure

NSW legislation requires people who are planning to do excavation work to obtain copies of underground electricity cable plans through Dial Before you Dig (Phone 1100) and to make sure that the plans are no more than 30 days old when excavation commences.

The aim of the legislation is to ensure that when workers dig or drive items near underground electricity cables, ducting, and pipes, they will establish the exact location of the cables and thus avoid coming into contact with them or damaging them. These items carry vital services such as electricity, water, gas and communications, and establishing their location before digging will help ensure worker safety and prevent damage to the network which may cause disruption of essential services to local communities.

Excavate safely and protect underground assets

Dial Before You Dig (DBYD) is the first step to excavating safely. You should use DBYD when you will be undertaking (but not restricted to) the following:

- > Any excavation using machinery digging deeper than 150mm. This includes but is not restricted to back hoes, excavators, borers & kanger hammers (ploughing or ripping activities)
- > Any excavation using hand tools deeper than 300mm which includes shovels, spades and crow bars
- > Any vertical or horizontal boring.

Note: The above examples are general and may not cover all situations in the regulations where a DBYD would be required e.g. driving metal posts in the ground.

Regardless of the size of your project you should lodge an enquiry with DBYD before commencing work. This applies to small tasks like backyard landscaping, driving items into the ground as well as heavy work such as directional boring or directional drilling. DBYD strive to respond to enquiries within two business days.

Dial Before You Dig

- > Phone 1100
- > Web www.1100.com.au
- > Download the DBYD iPhone app



The Essential First Step

When a DBYD has been obtained, contact Essential Energy on **13 23 91** to identify any underground pipes and/or cables in the vicinity of excavation works to be carried out. Allow at least **two weeks or 10 working days advance notice** in your construction program to permit Essential Energy time to allocate the necessary field resources to carry out an onsite inspection if required. This service may incur a fee & should be stated at the time of making the appointment.

In the event the excavation does not commence within 28 days of receipt of a plan, a new plan should be obtained. The excavator **must** retain the plans on site for the duration of the excavation works.

Your responsibility

All individuals have a duty of care they must observe when working in the vicinity of underground cables, ducts and pipes. Be aware of the requirement set out in the latest WorkCover Codes of Practice 'Work near Underground Assets Guideline' and 'Work near Overhead Powerlines' which can be viewed at www.workcover.nsw.gov.au or you can purchase a copy of the Code of Practice by contacting WorkCover on 1300 799 003.

You should also be familiar with Essential Energy's operational procedures 'Work near Essential Energy's underground assets' CEOP8041 and 'Construction work near electricity network' CEOP1116, which can be found at essentialenergy.com.au/construction

- > **Employers:** If you're an employer or employing someone to excavate, complete construction or drive items into the ground even at home you have a legal obligation to ensure their safety
- > **Excavators:** It is the excavator's responsibility to visually expose the underground pipes and cables manually before any construction begins.

Note – when excavating involving high pressure water or compressed air to break up the ground, which is then removed by a powerful vacuum unit to expose critical utilities after they have been electronically located to confirm identity, size, number of services and depth, checks should be carried out to ensure the pressure is acceptable for all cables and other assets which may be found prior to commencing pot holing by this method. Warning: CONSAC cables shouldn't be potholed by this method and must be de-energised before any work carried out near them. It's recommended to only use air/vacuum equipment to pot hole that operates at or less than 13,790Kpa (2000psi).

Be safe, because they need you



No Go Zone for powered excavation

Extract from WorkCover “Work near Underground Assets”

TABLE 1: Types of assets and limits of underground approach

Assets	Clearances	No Go Zone for Powered Excavation	Controls	Typical Depths
Low voltage electricity cables – voltages less than or equal to 1000V (1kV)	Close proximity with the use of hand tools	300 mm	Must contact asset owner for specific conditions	450 – 750 mm
Electricity conductors from 11,000V (11kV) up to 33,000V (33 kV)	Close proximity with the use of hand tools	600 mm	Must contact asset owner for specific conditions	900 mm
Underground sub-transmission cables 33,000V up to 132,000V (132 kV)	Must contact asset owner	Must contact asset owner	Must be carried out under the supervision of the asset owner	900 mm
High Voltage Electricity cables – voltages from 1000V (1kV) up to (33 kV)	Close proximity with the use of hand tools	Must contact asset owner	Must contact asset owner for specific conditions	600 – 1000 mm
Extra High Voltage Electricity Transmission cables – voltages above (132 kV) and 330,000V (330 kV)	Must contact asset owner	Must contact asset owner	Work must be carried out under the supervision of the asset owner	800 – 1200 mm

How to expose cables or pipes

Location plans provide an indication of the presence of underground assets only; they do not pinpoint the exact location. This is why manual exposure is required, which can be done by potholing. Underground assets must first be exposed by pot-holing with non-conductive tools to identify their location. Excavation with hand tools shall be carried out carefully up to, but not closer than, the minimum distances specified in Table 1. Several potholes may need to be dug manually to determine and satisfy yourself of the exact locations of cables or pipes to avoid any mishaps. Manual pot-holing needs to be undertaken with extreme care, common sense and while employing techniques least likely to damage cables. For example, orientate shovel blades and trowels parallel to the cable rather than digging across the cable. Look out for sand, plastic strips or specially marked bricks when excavating, which signal the presence of underground cables.

Only once all underground assets have been located, marked and protected against damage can the excavation proceed with caution.

No Go Zone for powered excavation

Directional boring is powered excavation and contact with the asset owner must be made before excavation takes place. For directional boring across the line of an asset a minimum clearance of **300 mm** from the asset shall be maintained. When boring across the line of an underground asset, the location of the asset/s shall be positively proven by hand digging (pot-holing) or by another approved method and a safety observer appointed.

Note: Where the risk assessment identifies a potential risk of making contact with either underground assets, safety observer/s would be required. The safety observer’s

responsibility is to ensure that approach distances from underground and overhead assets are maintained.

For boring under electricity cables, the only true way of knowing where the directional drill is, is to “see” it. It is necessary to excavate a slit trench at right angles to the approaching drill and 500mm deeper than the asset being protected and beside the cables to confirm the depth of the cables and ensure the drill is not within the minimum approach distance of the cable (specified in Table 1).

For directional boring parallel to the asset and at the level of the asset, a clearance of **500 mm** shall be maintained from the edge of the nearest asset and pot holed at 10m intervals to ensure clearances are maintained with a safety observer appointed.

The four Ps of safe excavation

- Plan** – Plan your job. Use the Dial Before You Dig service before your job is due to begin to help keep your project safe. Contact Essential Energy on 13 23 91 to identify any underground pipes and/or cables in the vicinity
- Pothole** – Potholing (digging by hand) is a method to assist in establishing the exact location of all underground infrastructure. Only use air/vacuum equipment to pot hole that operates at or less than 13,790Kpa (2000psi)
- Protect - Protecting and supporting exposed infrastructure is the excavator’s responsibility.** Always erect safety barriers in areas at risk to protect underground networks
- Proceed** – But ONLY when you have planned, potholed and put the protective measures in place.

Be safe, because they need you



Digging safely

You cannot be too careful when it comes to safe excavation. Avoiding underground ducting pipe and cable damage is as simple as having the right tools, the right skills and the right information.

- > Study the plans you receive from asset owners thoroughly
- > Check to see if they relate to the area you requested and make sure you understand them. If you are unclear about what the symbols mean or how to proceed, contact the relevant network owner
- > Check the work area for other forms of electrical equipment, including street lights, ground substations, phone boxes or traffic lights – all good indicators that underground cables will be present
- > Remember underground cables can also be present even if overhead powerlines have been identified
- > Never assume the depth or alignment of pipes and cables. Installed networks assets may not have been installed in a straight line
- > Always observe any instructions stated on the plans provided by the asset owner
- > Remember, plans and maps identifying the location of underground cables and depths can alter after road upgrades or developments and underground assets may be as little as a few millimetres below the surface
- > Other service lines (for example gas mains (pipes) and communication cables) can also be present. Shared trenches are frequently used on underground runs to premises
- > New electrical cables are sometimes laid using existing old conduits
- > Various methods of protecting underground cables may be utilised (for example electrical bricks, conduits, concrete or flat PVC barriers) or may be direct buried or installed by under-boring methods which may have no visual disturbance of the ground
- > Ensure overhead & electrical structures aren't undermined during excavation.

Earth cables

Earth cables are an important part of all electrical installations and have two main purposes:

- > To safeguard against the possibility of danger to life
- > To maintain the good working order of the electrical network.

They can have potentially dangerous electrical current flowing through them. Usually they have a green and yellow covering but could be a bare cable buried directly in the ground.

Even if the map provided does not show underground cables, earth cables may be present. These earth cables are usually associated with electrical equipment located

on the pole such as transformers, switching equipment, permanent earthing points or Padmount / kiosk subs.

It's recommended that if any excavation is to take place within **10m** of a power pole with a cable running down it into the ground, contact is made with Essential Energy on **13 23 91** to have the earthing system located. While an effort is made to install the earthing under the powerline and guy if installed, sometimes circumstances may require a variation to this, so do not assume where they are installed. The distance and configuration that the earthing cable is installed varies due to the soil conditions and system type (e.g. Single wire earth return (SWER)).

Additional earthing electrodes stakes may be installed to ensure the required earthing reading is obtained.

WARNING:SWER installations

- > Contacting SWER earthing can be deadly
- > Voltage is present on SWER transformer earthing systems either at 12.7 kV or 19.1kV
- > NO excavation is allowed within 10 metres of a SWER transformer pole.

Excavating around electrical poles

Anyone intending to excavate around any electrical item risks serious injury or death as a result of contact with underground cables or the earthing system.

Assets around poles

For excavation depths greater than 250mm near power poles and stays you must arrange for an Essential Energy representative to attend the worksite 2 weeks prior to work commencing. Call Essential Energy on **13 23 91**. More information is available in Essential Energy's operational procedure, 'Work near Essential Energy's underground assets: CEOP8041' which can be found at essentialenergy.com.au/construction

Unless otherwise agreed, underground assets and other obstructions around poles are to be kept a minimum distance of 300mm from the periphery of the pole, to allow inspections by the asset owner employees.

No excavation within 10 metres of a SWER transformer pole is to occur without the approval of the local electricity asset owner. It should be noted that the NSW Service and Installation Rules require a sketch of the underground service/consumers mains to be marked inside the switchboard.

The risks are higher for those earthing systems of the SWER constructions as the earthing is utilised as the return path.

Be safe, because they need you



Typically any electrical item installed on a pole will have an earth wire running down the pole into the ground, which includes:

- > Transformers in urban and rural situations
- > Isolation, protection and regulation items.

Transformers located on the ground (padmount and kiosk), besides having underground electrical cables, will have an earthing system installed around them.

Damaged earthing

If an earth cable has been damaged, maintain a clearance of eight (8) meters and contact Essential Energy on **13 23 91**. **DONT ATTEMPT** to re-join the cable - this will place you at serious risk.

Operating near underground cables and earths

- > Underground cables should never be moved or relocated unless under the express authority of the organisation or person responsible for the powerlines
- > The excavator shall report all damage made to Essential Energy assets immediately. Damage includes: gouges, dents, holes and gas escapes
- > Never undermine poles, cables, earthing cable, pad-mount and kiosk substations.



Above: Poles with become unstable if undermined

Make sure it can't go wrong

You should ensure that people at work, their equipment (tools and plant) or materials do not come within close proximity to underground powerlines unless:

- > A written risk assessment has been completed and a safe system of work implemented
- > The relevant safety precautions and worker training requirements, including WorkCover Codes of Practice and Essential Energy's requirements, have been implemented and complied with.

If working in close proximity to underground cables is unavoidable and the risk assessment has been completed, the following should be considered to control the risks and ensure work safety:

- > Have the power switched off by Essential Energy
- > Consider all conductors as live unless it is positively known they have been de-energised
- > Where appropriate, provide ground markings to identify location and warn workers of the presence of underground power and other assets.

Emergency situations

In the event that contact with an underground powerline occurs or cables are exposed or damaged, remembering the following points could help save a life:

- > If the situation is at all life threatening, immediately contact the Emergency Services on 000 (triple zero)
- > Call Essential Energy's 24-hour supply interruptions line - **13 20 80** to switch off the power if required or report damage or exposure cables / conduits
- > If any other underground assets are damaged you should contact the affected asset owners immediately
- > Treat underground cables as alive, even if they appear to be dead
- > Keep everyone at least eight metres away from the incident site, the person or any machinery making contact with underground cable
- > Don't panic or touch the person receiving the electric shock - this could place you at risk
- > Untrained, unequipped persons should not attempt to rescue a person receiving an electric shock. All too often secondary deaths occur when others go to the aid of earlier victims
- > Remain on/inside the machinery until the supply is disconnected
- > If possible, break contact between the machinery and underground cable.



For more information

Essential Energy's Public Safety team is available to facilitate Electrical Awareness sessions and discuss any questions relating to electrical safety. For more information on electrical safety please call

- > Essential Energy General Enquiries 13 23 91
- > Essential Energy Supply Interruptions 13 20 80
- > WorkCover NSW 13 10 50
- > Dial Before You Dig www.1100.com.au 1100



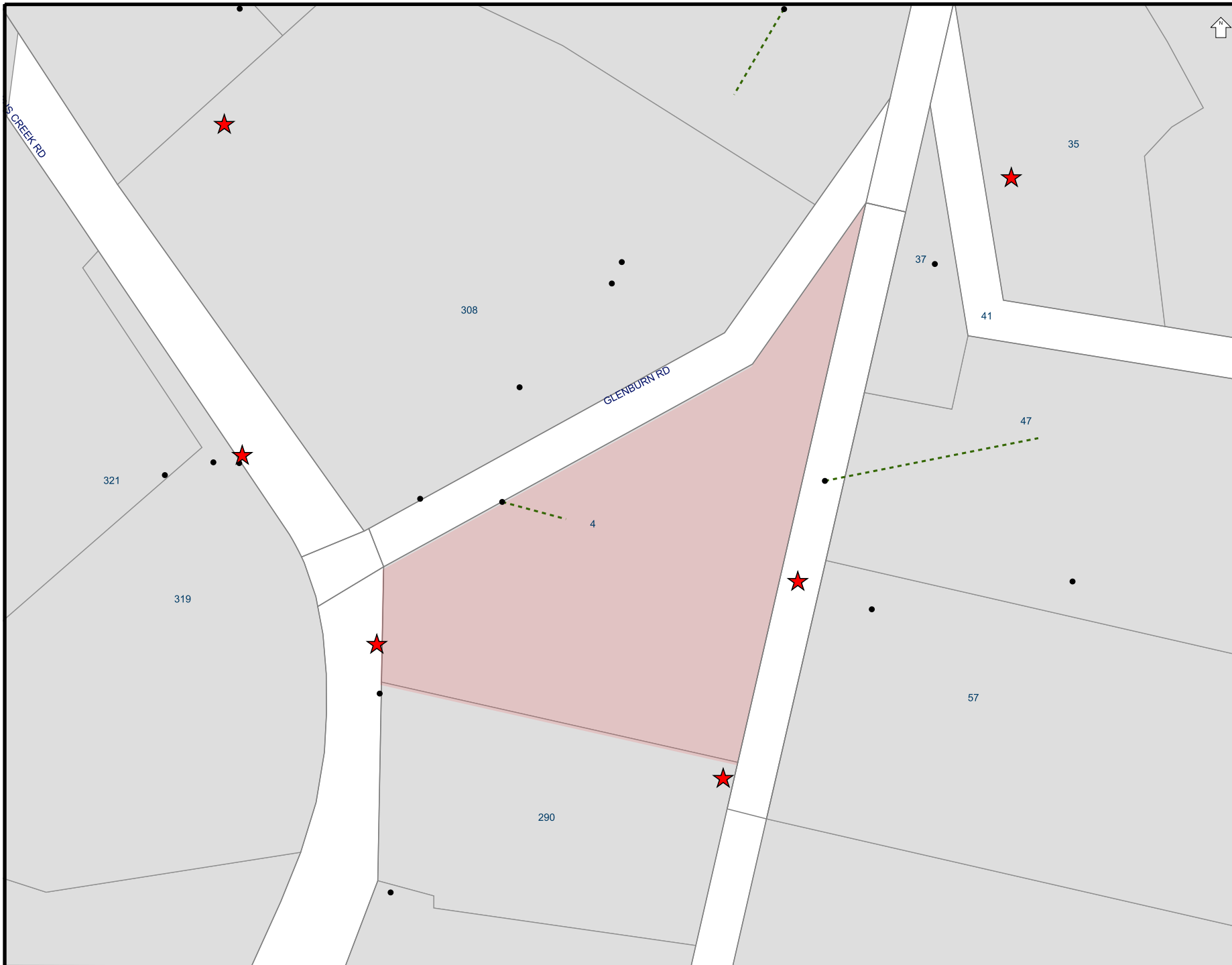
- > Follow us
- > or visit essentialenergy.com.au/safety

Safety first: Before you dig or drive items into the ground

1. Contact DBYD
2. DO NOT attempt to excavate within 10m of any power pole or electrical item
3. Contact Essential Energy on 13 23 91 for assistance to locate cables and earthing
4. Locate asset: Pot-hole
5. Proceed only if you have satisfied yourself it is safe.

Be safe, because they need you





Overhead wires not shown
LOOK UP & LIVE!

LEGEND

- - - LV Underground Cable
- - - HV Underground Cable
- - - Underground Pipe
- ★ Underground Earth or Wires
- ▲ Ground Substation
- Pole
- Cubicle
- Pit
- Area of Interest

Critical Assets

- Contact Essential Energy on 13 23 91
- Zone Substation
- - - Underground Cable
- - - Underground Fibre

Proposed Works

- Area of proposed works
- Proposed assets are shown as orange symbols

THE INFORMATION ON THIS MAP MAY NOT BE ACCURATE. If details are incorrect, please notify Essential Energy on 13 23 91 (or fax 1800 354 636)

ISSUE DATE: 08/05/2024

You must resubmit your request if you have not started work within 4 weeks of the 'Issue Date' above

A4 SCALE: 1:2514





Before You Dig Australia (BYDA) Location Information

Hunter Water Corporation

36 Honeysuckle Drive
NEWCASTLE NSW 2300

To:

Renee Neely
260 Maitland Road
Mayfield NSW 2304

Enquiry Details	
Utility ID	80220
Job Number	36628193
Sequence Number	238911839
Enquiry Date	08/05/2024 08:30
Response	NOT AFFECTED
Address	4 Glenburn Rd Paterson
Location in Road	Road,Nature Strip,Footpath
Activity	Planning and Design

Enquirer Details	
Customer ID	3478374
Contact	Renee Neely
Company	
Email	renee@perceptionplanning.com.au
Phone	+61437195264

Enquirer Responsibilities

Hunter Water Corporation's (HWC) provision, and your access to and use, of the data, maps and other information contained in this response (Information) are subject to the following terms and conditions, and all additional disclaimers contained elsewhere within this response.

Nature of HWC's assets

You acknowledge that:

- water in the main is under pressure and may cause injury if the main is damaged;
- sewer mains can be under pressure and may cause injury if the main is damaged;
- recycled water mains can be under pressure and may cause injury if the main is damaged;
- services are laid at varying depths;
- the Information does not include data related to property services; and
- HWC will seek recovery of repair costs if assets are damaged.
- All electrical services are to be considered live.

Accordingly, all persons must exercise extreme care and only use hand excavation until the exact location of all assets within a relevant work area is established.

Your use of Information

You acknowledge and accept that all Information provided in this response by HWC:

- (a) is generated based on an automated analysis of the data you submit to the Before You Dig Australia website (BYDA). Accordingly, the relevance and reliability of such Information is dependant on the accuracy and suitability of the data you provide to BYDA;
- (b) the Information is intended to have a general application only and may not be suitable for your specific requirements; and
- (c) all Information is intended to provide guidance only and any reliance you place on such Information is entirely at your own risk.

The Information is provided for the sole purpose of assisting the location of HWC assets before excavation (**Permitted Purpose**), and you must not copy, translate, modify, distribute or make derivative works of the Information except as you directly require to achieve the Permitted Purpose. All Information contained in this response must be used and kept together. Your access to, and use of, the Information does not grant you any ownerships rights in respect of the Information or any intellectually property in the Information.

Disclaimer

While HWC takes all reasonable care in providing details of its underground assets, due to changes in road and footway alignments and levels, the age and incompleteness of some records and the intended general nature of the Information, it is not possible to conclusively specify the location of all of HWC's underground assets.

ALL INFORMATION IS PROVIDED AS GENERAL GUIDANCE ONLY AND SHOULD NOT BE USED OR RELIED UPON IN SUBSTITUTION FOR SPECIALISED PROFESSIONAL INDEPENDENT ADVICE.

If you have a question or concern about the appropriateness, reliability or application of any Information you must seek advice from a relevantly qualified professional.

HWC makes no representation and gives no warranty or undertaking (express or implied) as to the currency, accuracy, completeness, effectiveness or reliability of the Information or that the Information can be used for any purpose in substitution for specialised, professional and independent advice.

You must not solely rely upon the Information when undertaking underground works.

To the full extent permitted by law, HWC disclaims responsibility or liability for all loss, damage, injury or other claim whatsoever for any outcome arising from:

- (a) your access to, or use of, the Information, including any failure to avail yourself of the Information;
- (b) your reliance on the Information or its inability to meet your needs;
- (c) your failure to correctly or accurately:
- (1) submit relevant or valid data to BYDA; or
 - (2) use or interpret the Information provided by HWC; or
- (d) any delay, failure, interruption, or corruption of any Information.

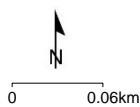
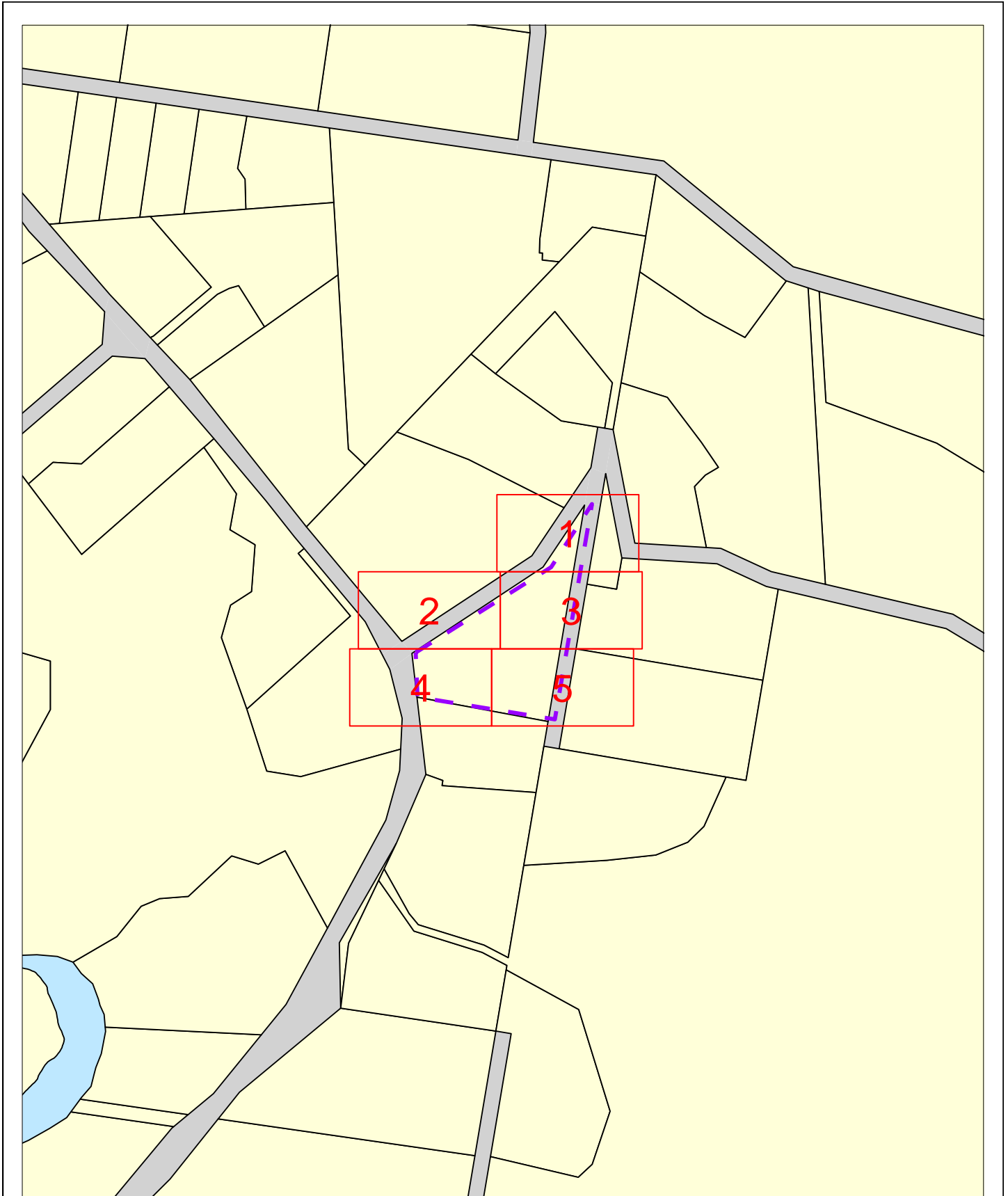
www.hunterwater.com.au

1300 657 000



Overview Map

Sequence No: 238911839
4 Glenburn Rd Paterson



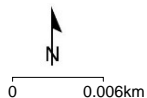
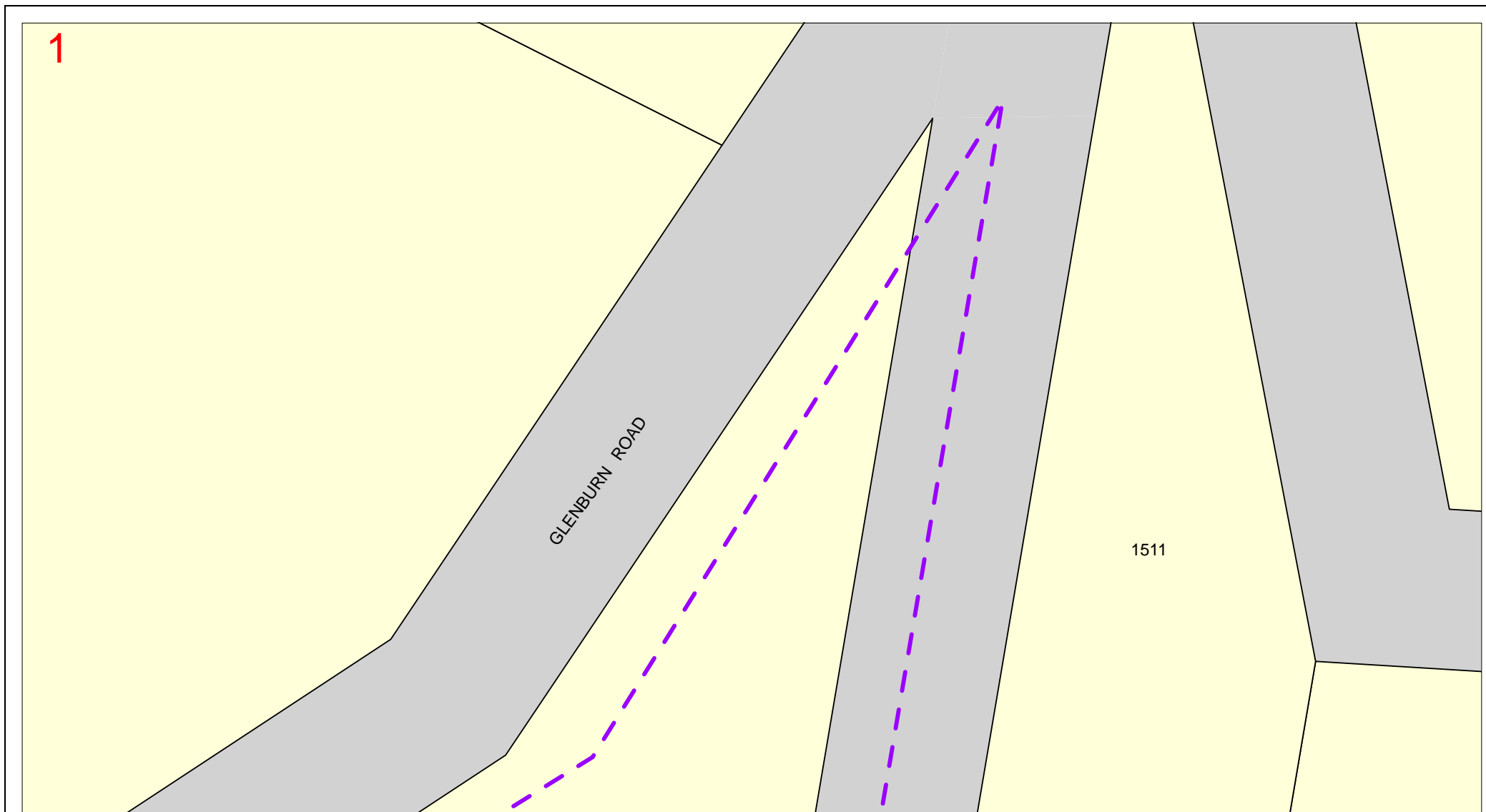
LEGEND:

- 1** Detail Map
- BYDA Work Area



Map 1

Sequence No: 238911839



IMPORTANT

THIS PLAN IS NOT TO BE USED FOR CONVEYANCING

THIS INFORMATION IS VALID FOR 30 DAYS FROM THE DATE OF ISSUE

SEWER/WATER/RECYCLED WATER/
ELECTRICAL - UTILITY DATA
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SERVICE LOCATIONS ARE APPROXIMATE.
HAND DIG UNTIL ACTUAL LOCATIONS ARE IDENTIFIED.
PROPERTY SERVICES ARE NOT SHOWN.

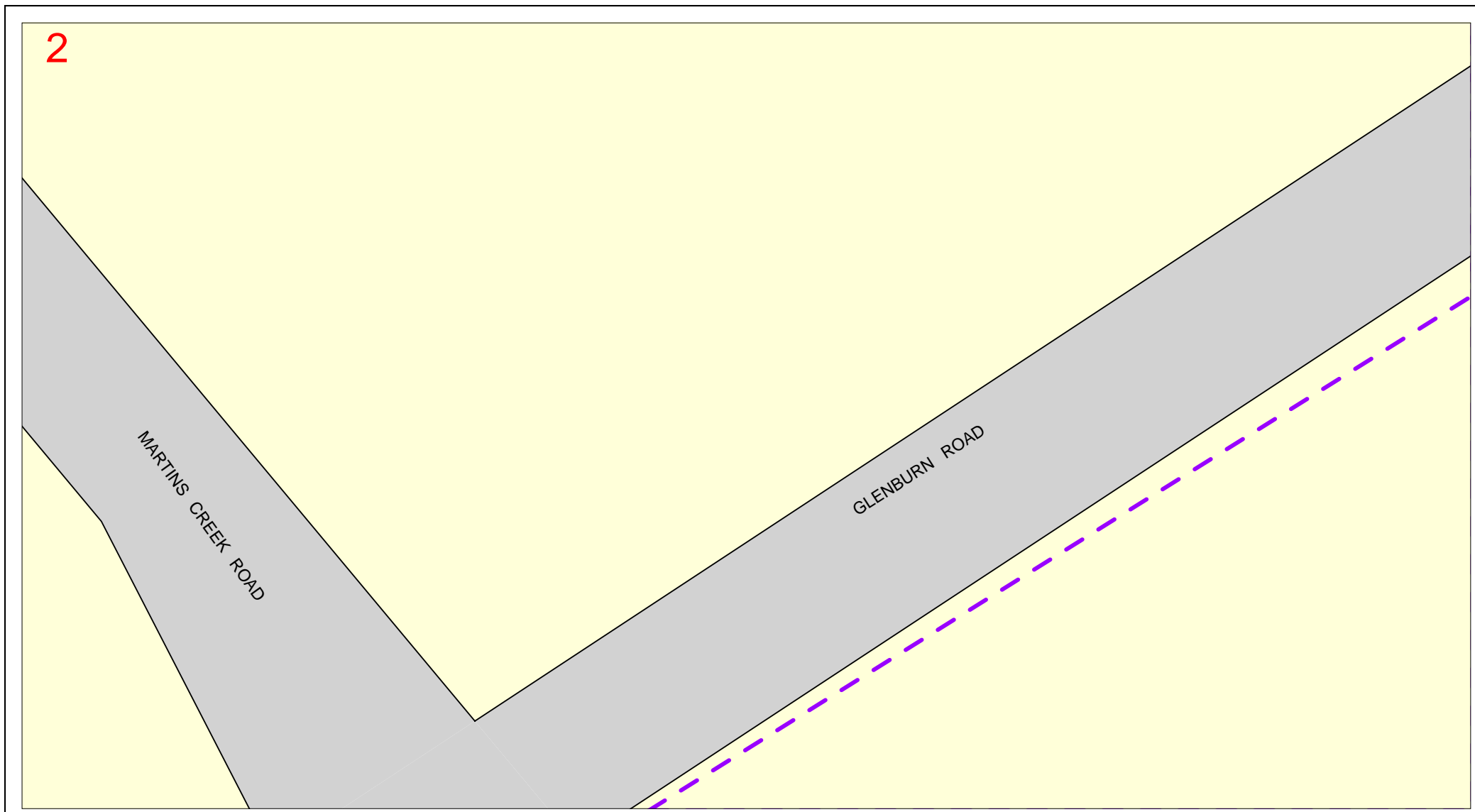
ANY INFORMATION ON THIS PLAN MAY NOT BE UP TO DATE
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[Nov 2017]



Map 2

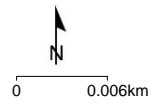
Sequence No: 238911839



2

MARTINS CREEK ROAD

GLENBURN ROAD



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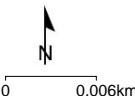
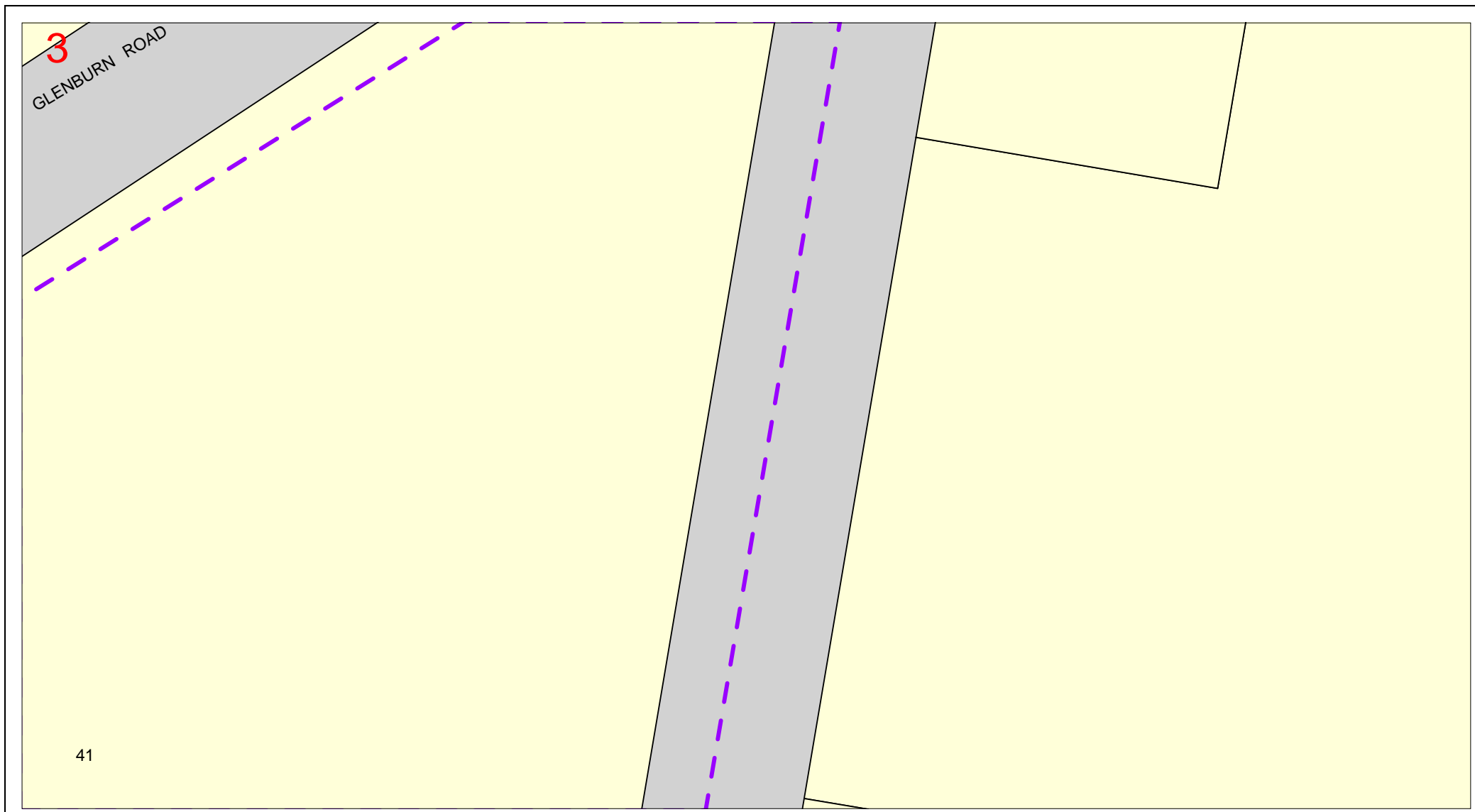
ANY INFORMATION ON THIS PLAN MAY NOT BE UP TO DATE
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Map 3

Sequence No: 238911839



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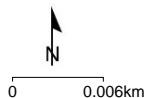
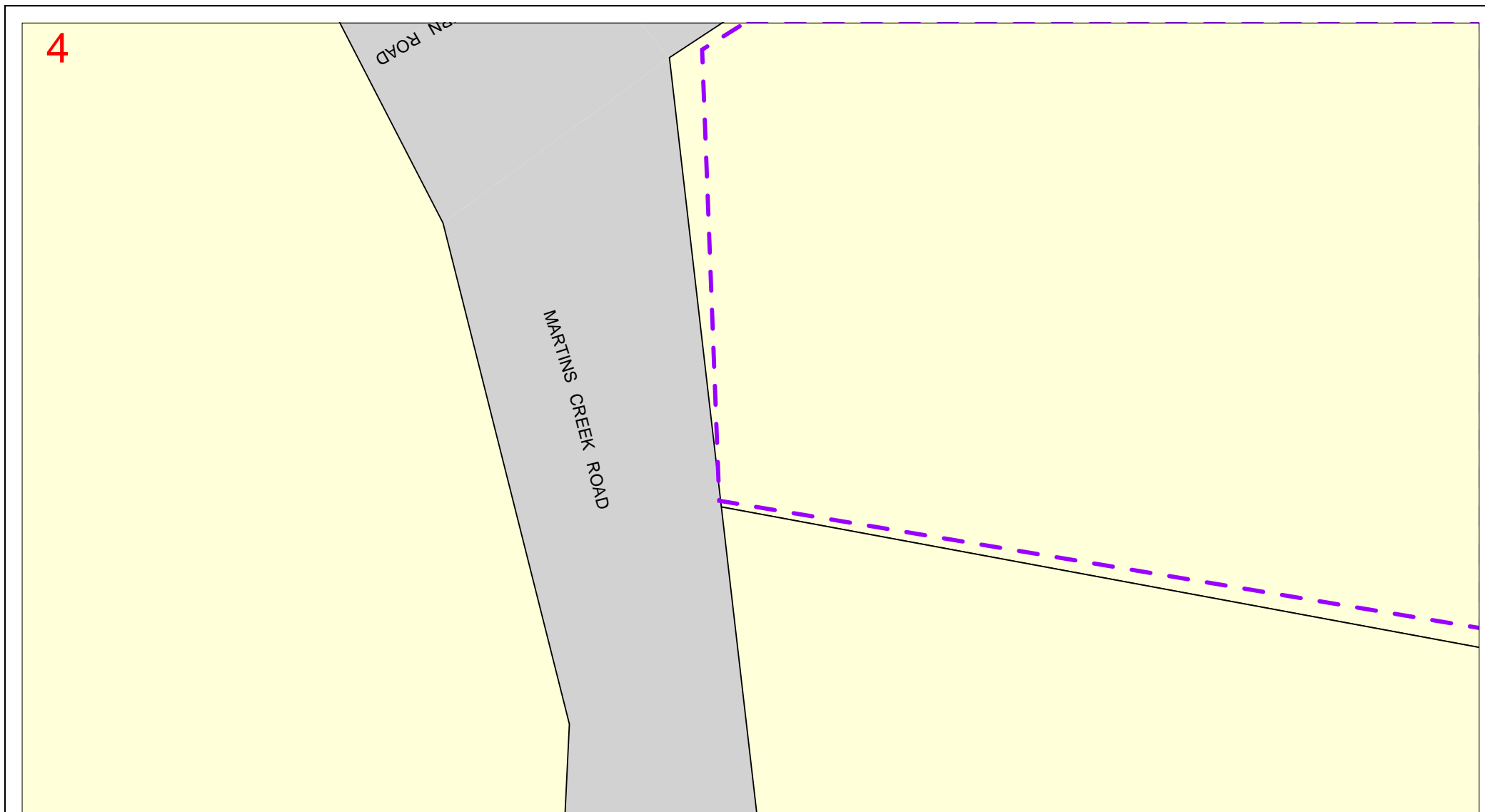
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SERVICE LOCATIONS ARE APPROXIMATE.
HAND DIG UNTIL ACTUAL LOCATIONS ARE IDENTIFIED.
PROPERTY SERVICES ARE NOT SHOWN.

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Map 4

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SERVICE LOCATIONS ARE APPROXIMATE.
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PROPERTY SERVICES ARE NOT SHOWN.

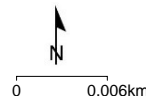
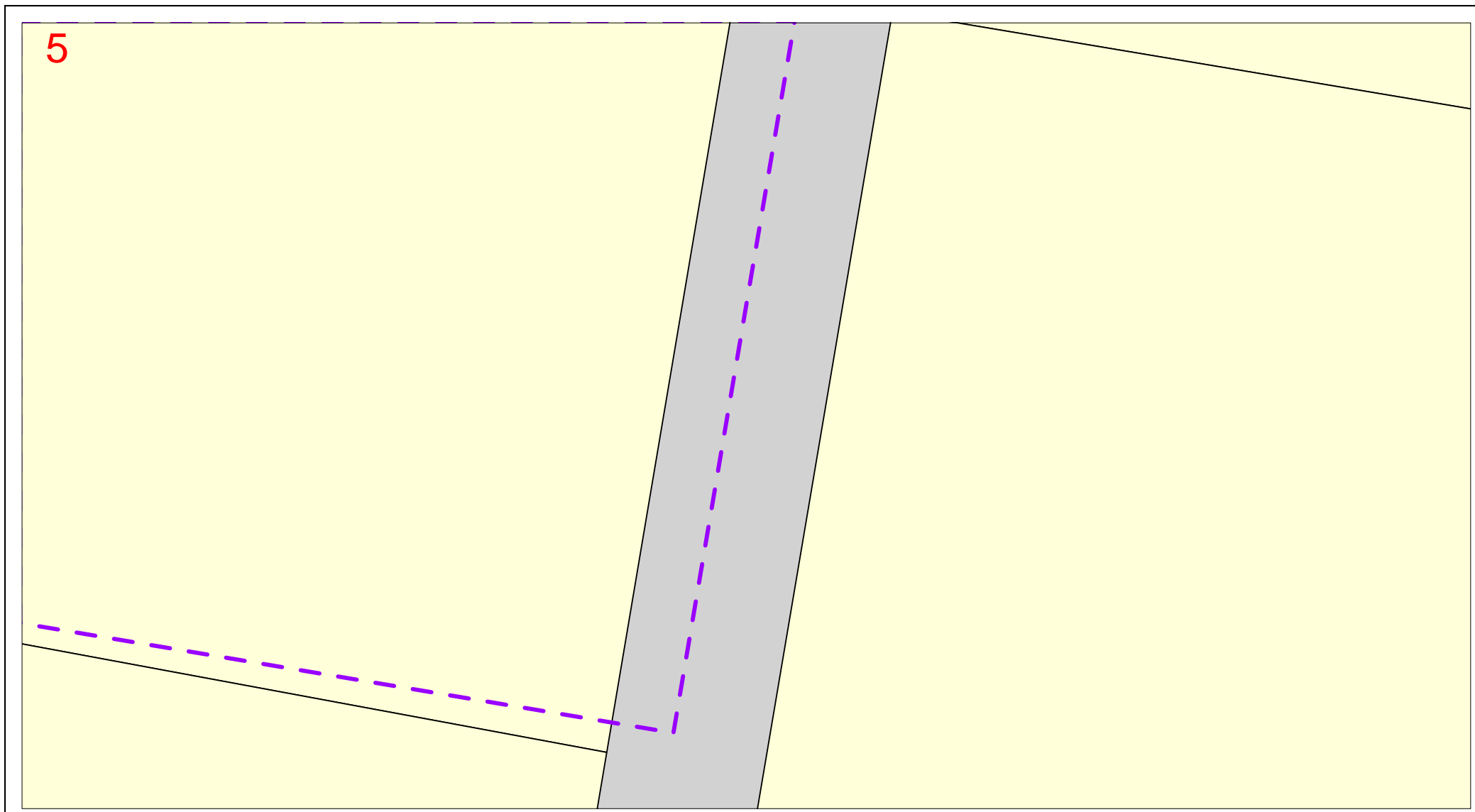
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Map 5

Sequence No: 238911839










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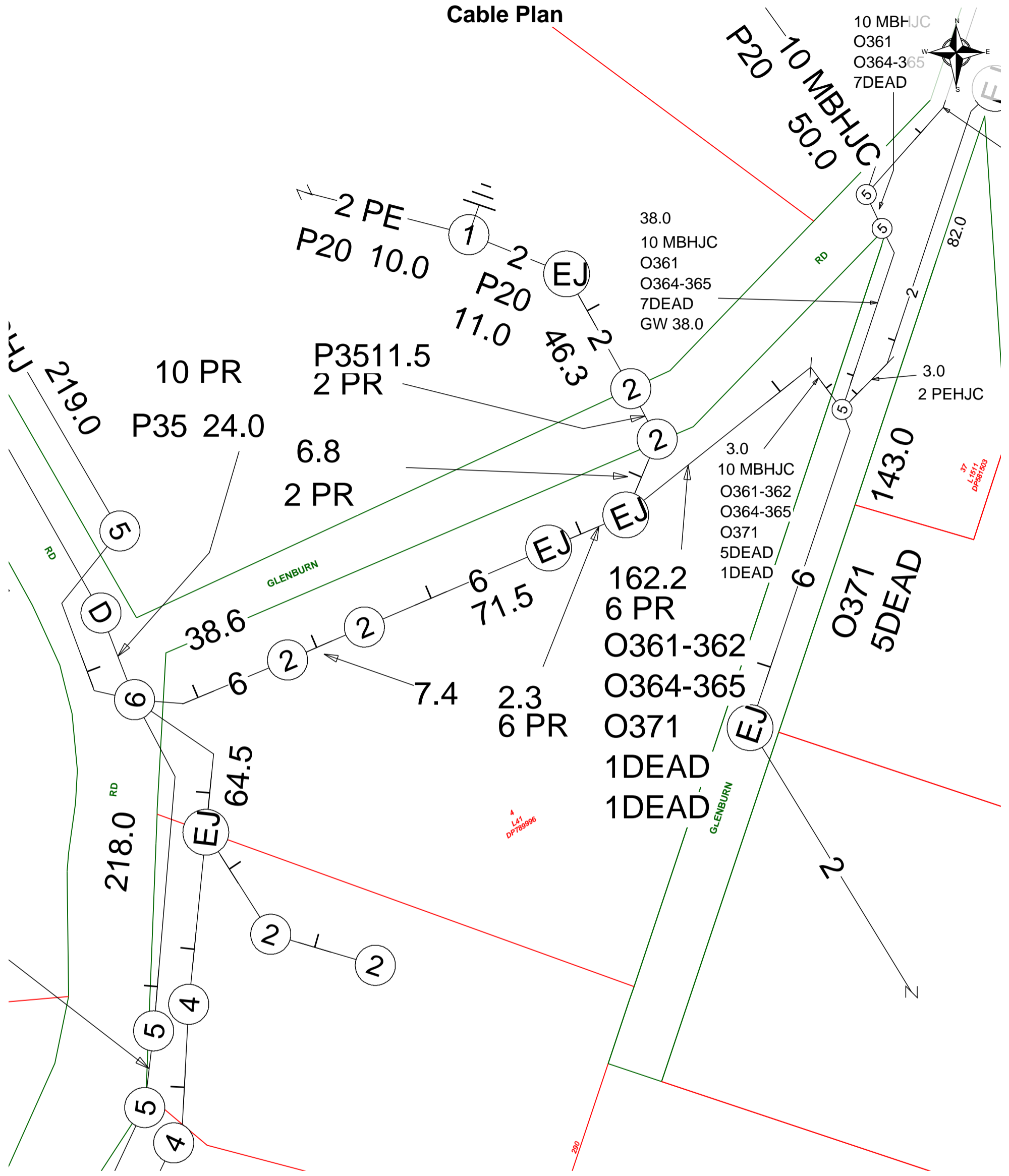
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SERVICE LOCATIONS ARE APPROXIMATE.
HAND DIG UNTIL ACTUAL LOCATIONS ARE IDENTIFIED.
PROPERTY SERVICES ARE NOT SHOWN.

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Hunter Water Corporation DBYD Asset Legend

<p>Electrical Assets</p> <ul style="list-style-type: none">  High Voltage  Low Voltage  Electrical Pole  Distribution Transformer  Air Break Switch  Circuit Breaker  High Voltage  Low Voltage 	<p>Water Assets</p> <ul style="list-style-type: none">  Contol Valve  Hydrant Control Valve  Reflux Valve  Stop/Scour Valve  Tee & Stop Valve  Hydrant  Cluster Box  End Cap  Flushing Tap  Manhole  Scour  Water Meter  Water Network Structure  Other Main  Trunk Main  Reticulation Main  Water Encased Mains  Water Prelaid Service 	<ul style="list-style-type: none">  HWC Rain Gauge  HWC Stream Flow Gauge  Radio Base  Weather Station  Piezometer  Bore Site 	<p>RecycledWater Assets</p> <ul style="list-style-type: none">  Air Valve  Reflux Valve Open  Stop Valve Open  RecycledWater Hydrant  Cluster Box  End Cap  Flushing Tap  Manhole  Scour  RecycledWater Meter  RecycledWater Network Structure  Other Main  Reticulation Main Encased/Conduit  Trunk Main  Trunk Main Encased/Conduit  RecycledWater Encased Mains  RecycledWater Prelaid Service 	<p>Sewer Assets</p> <ul style="list-style-type: none">  Air Valve  Stop/Butterfly/Ball Valve  Gate Valve  Manhole  Cap  Dead End  Flushing Tank  H&V Bend  Junction Connection  Outfall  Overflow  Sewer/Valve Pit  Tangent Point  Sewer Meter  Sewer Vent  Sewer Network Structure  Other Main  Gravity Main  Pressure/Vacuum Main  Effluent Main  Outfall  Overflow Main  Rising Main  Sewer Encased Mains 	<ul style="list-style-type: none">  StormWater Assets  StormWater Network Structure  StormWater Mains  Mains Abandon 	<p>Land Details</p> <ul style="list-style-type: none">  Area of Interest  Easement Non HWC  Fence Line  Non-HWC Easement  HWC Easement  Parcel  Road  Water Parcels  Hazardous Material  Map Sheet Index
--	---	---	---	--	--	---

Cable Plan



Report Damage: <https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment>
 Ph - 13 22 03
 Email - Telstra.Plans@team.telstra.com
 Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries

Sequence Number: 238911840

Please read Duty of Care prior to any excavating

TELSTRA LIMITED A.C.N. 086 174 781

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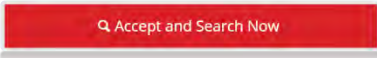
WARNING
 Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy. Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work. A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.
 See the Steps- Telstra Duty of Care that was provided in the email response.



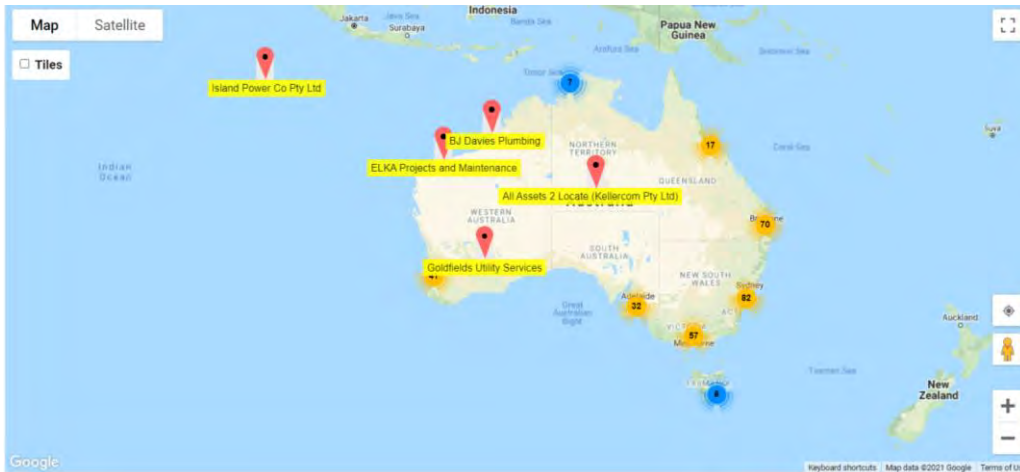
Certified Locating Organisations (CLO)

Find the closest CLO to your worksite on: <https://dbydlocator.com/certified-locating-organisation/>

Read the disclaimer and click:



A national map and an A-Z list of Certified Locating Organisations is displayed.



Search ZIP code: Radius:

Use the map to zoom to your work area and choose the closest Locator indicated.

OR search by entering the **postcode** of your work area.

1. Enter the post/zip code
2. Choose your search radius
3. Click filter (If there is no result, you may have to increase the search radius)
4. Click on the closest for CLO details or view the results displayed below the map



Locator skills have been tested, and the Organisation has calibrated location and safety equipment.

Telstra is aware of each Certified Locating Organisation and their employee locators.

Only a DBYD Certified Locator registered with a Certified Locating Organisation is authorised to access Telstra network for locating purposes.

Each Certified Locator working for a CLO is issued with a photo ID Card, authorising them to access Telstra pits and manholes for the purpose of cable and plant locations.

Please ask to see your Locators' CLO ID Card.



Before You Dig Australia

Think before you dig

This document has been sent to you because you requested plans of the Telstra network through Before You Dig Australia (BYDA).

If you are working or excavating near telecommunications cables, or there is a chance that cables are located near your site, you are responsible to avoid causing damage to the Telstra network.

Please read this document carefully. Taking your time now and following the steps below can help you avoid damaging our network, interrupting services, and potentially incurring civil and criminal penalties.

Our network is complex and working near it requires expert knowledge. Do not attempt these activities if you are not qualified to do so.



Further Information



Cable Plan enquiries
1800 653 935 (AEST business hours only)



Telstra.Plans@team.telstra.com



Information on how to find cables and request asset relocations:
<https://www.telstra.com.au/consumer-advice/digging-construction>



Opening Digital Plan Attachments. Asset Plan Readers:

PDF [Adobe Acrobat Reader DC Install for all versions](#)
DWF Map Files (all sizes over A3)
[Autodesk Viewer \(Browser\)](#) or
[Autodesk Design Review \(Microsoft Windows\)](#)

Report any damage immediately



<https://www.telstra.com.au/forms/report-damage-to-telstra-equipment>



13 22 03
If you receive a message asking for an account or phone number say
"I Don't have one"
Then say, "Report Damage" and listen to the prompts.

Relocating Telstra Assets

If your project requires the relocation of a Telstra asset, please contact the Telstra Network Integrity Group:



1800 810 443 (AEST business hours only)



NetworkIntegrity@team.telstra.com

Never try to move or alter our network infrastructure without authorisation. By law, only authorised people can work on our assets or enter a facility owned or operated by us. Any interference, including unauthorised entry or tampering, may result in legal action.

Certified Locating Organisation (CLO)



Engage a CLO



Find your Closest CLO to identify, validate and protect Telstra Assets before you commence you work.
<https://dbydlocator.com/certified-locating-organisation/>



1. Plan

Plan your work with the latest plans of our network.

Plans provided through the BYDA process are indicative only*.

This means the actual location of our asset may differ substantially from that shown on the plans.

Refer to steps 2 and 3 to determine actual location prior to proceeding with construction.



2. Prepare

Engage a DBYD Certified Locating Organisation (CLO) via dbydlocator.com to identify, validate and protect Telstra assets before you commence work.



3. Pothole

Validate underground assets by potholing by hand or using non-destructive vacuum extraction methods.

Electronic detection alone (step 2) is not deemed to validate underground assets and must not be used for construction purposes.

If you cannot validate the Telstra network, you must not proceed with construction.



4. Protect

Protect our network by maintaining the following distances from our assets:

- › 1.0m Mechanical Excavators, Farm Ploughing, Tree Removal
- › 500mm Vibrating Plate or Wacker Packer Compactor
- › 600mm Heavy Vehicle Traffic (over 3 tonnes) not to be driven across Telstra ducts or plant
- › 1.0m Jackhammers/Pneumatic Breakers
- › 2.0m Boring Equipment (in-line, horizontal and vertical)



5. Proceed

You can proceed with your work only once you have completed all the appropriate preparation, potholing and protection.

Disclaimer and legal details



*Telstra advises that the accuracy of the information provided by Telstra conforms to Quality Level D as defined in AS5488-2013.

It is a criminal offence under the Criminal Code Act 1995 (Cth) to tamper or interfere with telecommunications infrastructure.

Telstra will also take action to recover costs and damages from persons who damage assets or interfere with the operation of **Telstra's** networks.

By receiving this information including the indicative plans that are provided as part of this information package you confirm that you understand and accept the risks of working near **Telstra's** network and the importance of taking all of the necessary steps to confirm the presence, alignments and various depths of **Telstra's** network. This in addition to, and not in replacement of, any duties and obligations you have under applicable law.

When working in the vicinity of a telecommunications plant you have a "Duty of Care" that must be observed. Please read and understand all the information and disclaimers provided below.

The Telstra network is complex and requires expert knowledge to interpret information, to identify and locate components, to pothole underground assets for validation and to safely work around assets without causing damage. If you are not an expert and/or qualified in these areas, then you must not attempt these activities. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers. Construction activities and/or any activities that potentially may impact on Telstra's assets must not commence without first undertaking these steps. Construction activities can include anything that involves breaking ground, potentially affecting Telstra assets.

If you are designing a project, it is recommended that you also undertake these steps to validate underground assets prior to committing to your design.

This Notice has been provided as a guide only and may not provide you with all the information that is required for you to determine what assets are on or near your site of interest. You will also need to collate and understand all of the information received from other Utilities and understand that some Utilities are not a part of the BYDA program and make your own enquiries as appropriate. It is the responsibility of the entities undertaking the works to protect **Telstra's** network during excavation / construction works.

Telstra owns and retains the copyright in all plans and details provided in conjunction with the applicant's request. The applicant is authorised to use the plans and details only for the purpose indicated in the applicant's request. The applicant must not use the plans or details for any other purpose.

Telstra plans or other details are provided only for the use of the applicant, its servants, agents, or Certified Locating Organisation. The applicant must not give the plans or details to any parties other than these and must not generate profit from commercialising the plans or details.

Telstra, its servants or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and or details so supplied to the applicant, its servants and agents, and the applicant agrees to indemnify Telstra against any claim or demand for any such loss or damage.

Please ensure Telstra plans and information provided always remains on-site throughout the inspection, location, and construction phase of any works.

Telstra plans are valid for 60 days after issue and must be replaced if required after the 60 days.

Data Extraction Fees

In some instances, a data extraction fee may be applicable for the supply of Telstra information. Typically, a data extraction fee may apply to large projects, planning and design requests or requests to be supplied in non-standard formats. For further details contact Telstra Planned Services.

Telstra does not accept any liability or responsibility for the performance of or advice given by a Certified Locating Organisation. Certification is an initiative taken by Telstra towards the establishment and maintenance of competency standards. However, performance and the advice given will always depend on the nature of the individual engagement.

Neither the Certified Locating Organisation nor any of its employees are an employee or agent for Telstra. Telstra is not liable for any damage or loss caused by the Certified Locating Organisation or its employees.

Once all work is completed, the excavation should be reinstated with the same type of excavated material unless specified by Telstra

The information contained within this pamphlet must be used in conjunction with other material supplied as part of this request for information to adequately control the risk of potential asset damage.

When using excavators and other machinery, also check the location of overhead power lines.

Workers and equipment must maintain safety exclusion zones around power lines

WARNING: Telstra plans and location information conform to Quality Level 'D' of the Australian Standard AS 5488 - Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans. **FURTHER ON SITE INVESTIGATION IS REQUIRED TO VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK.** A plant location service is an essential part of the process to validate the exact location of Telstra assets and to ensure the assets are protected during construction works. The exact position of Telstra assets can only be validated by physically exposing them. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

Privacy Note

Your information has been provided to Telstra by BYDA to enable Telstra to respond to your BYDA request. Telstra keeps your information in accordance with its privacy statement. You can obtain a copy at www.telstra.com.au/privacy or by calling us at 1800 039 059 (business hours only).



OPENING ELECTRONIC MAP ATTACHMENTS -

Telstra Cable Plans are generated automatically in either PDF or DWF file types, dependent on the site address and the size of area selected. You may need to download and install free viewing software from the internet e.g.



DWF Map Files (all sizes over A3)

Autodesk Viewer (Browser) (<https://viewer.autodesk.com/>) or

Autodesk Design Review (<http://usa.autodesk.com/design-review/>) for DWF files. (Windows PC)



PDF Map Files (max size A3)

Adobe Acrobat Reader (<http://get.adobe.com/reader/>)

Telstra BYDA map related enquiries email

Telstra.Plans@team.telstra.com

1800 653 935 (AEST Business Hours only)



REPORT ANY DAMAGE TO THE TELSTRA NETWORK IMMEDIATELY

Report online - <https://www.telstra.com.au/forms/report-damage-to-telstra-equipment>

Ph: **13 22 03**

If you receive a message asking for a phone or account number say:

“I don’t have one” then say “Report Damage” then press 1 to speak to an operator.



Telstra New Connections / Disconnections

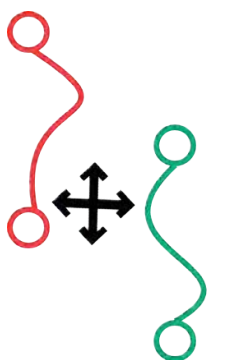
13 22 00



Telstra asset relocation enquiries: 1800 810 443 (AEST business hours only).

NetworkIntegrity@team.telstra.com

<https://www.telstra.com.au/consumer-advice/digging-construction>



Certified Locating Organisation (CLO)

<https://dbydlocator.com/certified-locating-organisation/>

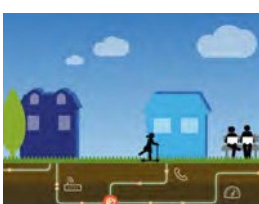
Please refer to attached Accredited Plant Locator.pdf



Telstra Smart Communities

Information for new developments (developers, builders, homeowners)

<https://www.telstra.com.au/smart-community>



LEGEND

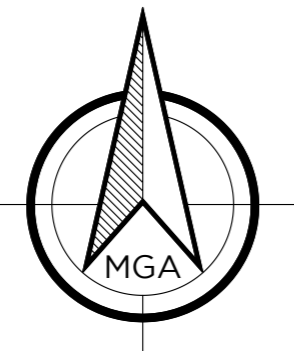


For more info contact a [Certified Locating Organisation](#) or Telstra Plan Services 1800 653 935

	<p>Exchange (Major Cable Present)</p>		<p>Cable Jointing Pit (number / Letter indicating Pit Type)</p>
	<p>Footway Access Chamber (can vary from 1-lid to 12-lid)</p>		<p>Elevated Joint (above ground joint on buried cable)</p>
	<p>Pillar / Cabinet (above ground / free standing)</p>		<p>Telstra Plant in shared Utility trench</p>
	<p>Above ground complex equipment housing (eg RIM) Please Note: This equipment is powered by 240V Electricity</p>		<p>Aerial Cable / Overhead (includes on wall)</p>
<p>OC</p>	<p>Other Carrier Telecommunications Cable/Asset</p>		<p>Aerial Cable (attached to joint Use Pole e.g. Power)</p>
<p>Dist</p>	<p>Distribution cables in Main Cable ducts</p>		<p>Direct Buried Cable</p>
<p>MC</p>	<p>Main Cable ducts on a Distribution plan</p>		<p>Marker Post Installed</p>
	<p>Blocked or damaged duct.</p>		<p>Buried Transponder</p>
	<p>Roadside / Front Boundary 2 pair lead-in to property from pit in street 1</p> <p>O59 pair working (pair ID 059) 1 DEAD 1 pair dead (i.e. spare, not connected)</p> <p>Side / Rear Property Boundary Property Number 107</p>		<p>Marker Post, Transponder</p>
	<p>Single to multiple round conduit Configurations 1,2,4,9 respectively (attached text denotes conduit type and size)</p>		<p>Optical Fiber cable direct buried</p>
	<p>Multiple square conduit Configurations 2, 4, 6 respectively (attached text denotes conduit type and size)</p>	<p>Some examples of conduit type and size:</p> <p>A - Asbestos cement, P - PVC / Plastic, C - Concrete, GI - Galanised iron, E - Earthenware Conduit sizes <i>nominally</i> range from 20mm to 100mm P50 50mm PVC conduit P100 100mm PVC conduit A100 100mm asbestos cement conduit</p>	
<p>Some Examples of how to read Telstra Plans</p>			
	<p>-50- 10 30 20.0</p>	<p>One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits. approximately 20.0m apart, with a direct buried 30-pair cable along the same route</p>	
	<p>AA - (cable information) AB - (cable information) BA - (cable information)</p> <p>C100 P100 245.0</p>	<p>Two separate conduit runs between two footway access chambers (manholes) approximately 245m apart A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100)</p>	

NOTES:

1. FEATURES SHOWN TO SCALE ACCURACY.
2. THIS PLAN IS SUITABLE FOR DETAILED PLANNING AND DESIGN AT THE SCALE/S STATED. THE PLAN MAY NOT BE SUITABLE FOR ANY OTHER PURPOSE OR FOR USE AT ANY OTHER SCALE/S.
3. SERVICES LOCATED ONLY WHERE VISIBLE.
4. THE LOCATION OF ALL UNDERGROUND SERVICES WHETHER SHOWN ON THE PLAN OR NOT, SHOULD BE PRECISELY DETERMINED BEFORE ANY CONSTRUCTION WORK COMMENCES AND MEASURES TAKEN TO PROTECT THESE SERVICES FROM DAMAGE.
5. CONTOUR INTERVAL - 0.5m
6. THE BOUNDARIES SHOWN ARE APPROXIMATE ONLY. THE BOUNDARIES SHOWN HAVE BEEN COMPILED FROM THE RELEVANT DEPOSITED PLANS. FURTHER SURVEY WILL BE REQUIRED IF CONSTRUCTION IS TO TAKE PLACE ON OR ADJACENT TO THE BOUNDARIES.

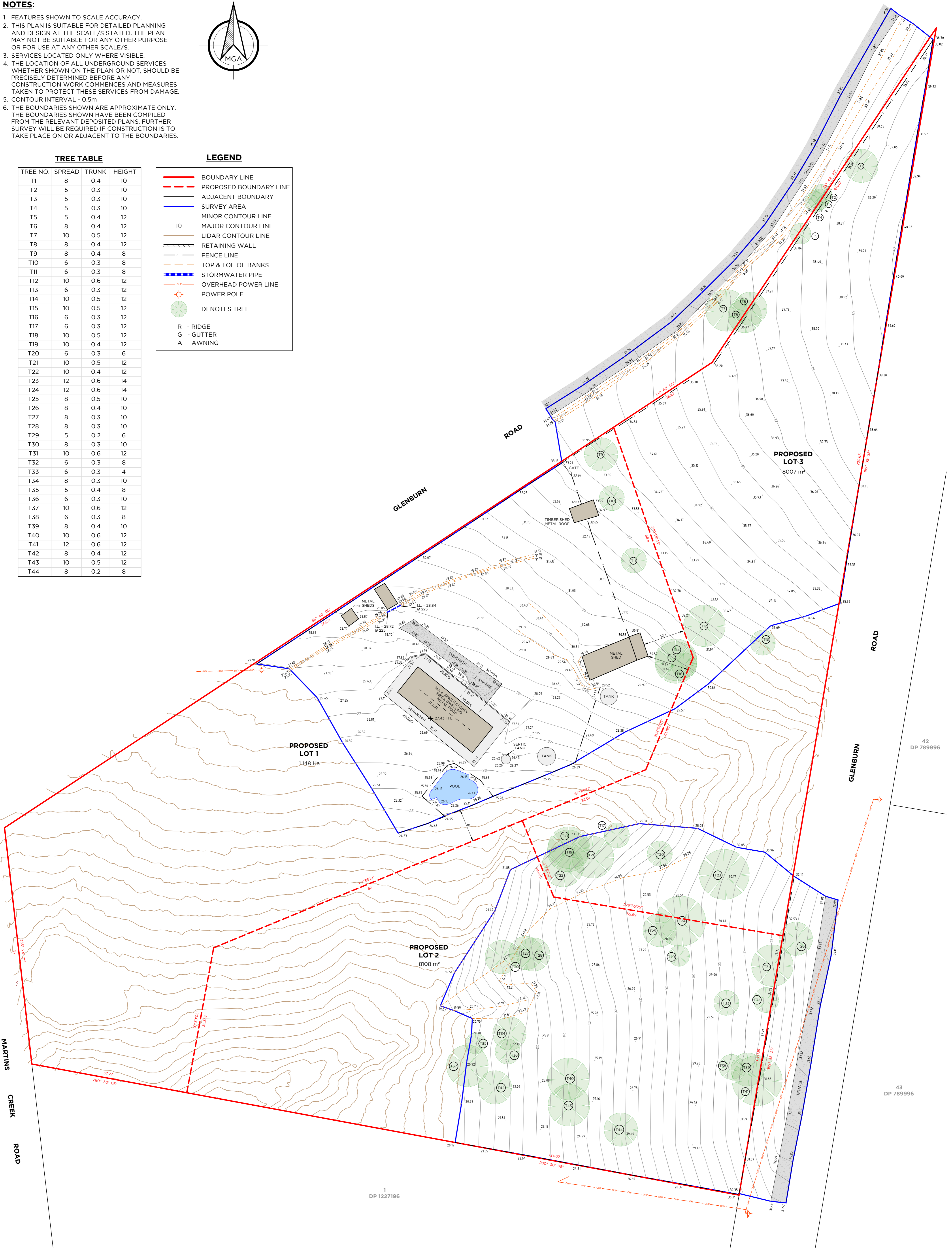


TREE TABLE

TREE NO.	SPREAD	TRUNK	HEIGHT
T1	8	0.4	10
T2	5	0.3	10
T3	5	0.3	10
T4	5	0.3	10
T5	5	0.4	12
T6	8	0.4	12
T7	10	0.5	12
T8	8	0.4	12
T9	8	0.4	8
T10	6	0.3	8
T11	6	0.3	8
T12	10	0.6	12
T13	6	0.3	12
T14	10	0.5	12
T15	10	0.5	12
T16	6	0.3	12
T17	6	0.3	12
T18	10	0.5	12
T19	10	0.4	12
T20	6	0.3	6
T21	10	0.5	12
T22	10	0.4	12
T23	12	0.6	14
T24	12	0.6	14
T25	8	0.5	10
T26	8	0.4	10
T27	8	0.3	10
T28	8	0.3	10
T29	5	0.2	6
T30	8	0.3	10
T31	10	0.6	12
T32	6	0.3	8
T33	6	0.3	4
T34	8	0.3	10
T35	5	0.4	8
T36	6	0.3	10
T37	10	0.6	12
T38	6	0.3	8
T39	8	0.4	10
T40	10	0.6	12
T41	12	0.6	12
T42	8	0.4	12
T43	10	0.5	12
T44	8	0.2	8

LEGEND

- BOUNDARY LINE
 - - - PROPOSED BOUNDARY LINE
 - ADJACENT BOUNDARY
 - SURVEY AREA
 - MINOR CONTOUR LINE
 - MAJOR CONTOUR LINE
 - LIDAR CONTOUR LINE
 - RETAINING WALL
 - FENCE LINE
 - TOP & TOE OF BANKS
 - - - STORMWATER PIPE
 - - - OVERHEAD POWER LINE
 - POWER POLE
 - DENOTES TREE
- R - RIDGE
G - GUTTER
A - AWNING



REV.	DATE	AMENDMENT(S)	SUR	DFT	CHK
A	19.03.24	ORIGINAL ISSUE	SF	JD	TC
B	25.03.24	PROPOSED BOUNDARIES AMENDED	--	TC	TC
C	27.03.24	PROPOSED BOUNDARIES AMENDED	--	TC	TC

DELFS LASCELLES
CONSULTING SURVEYORS

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delacs.com.au

CAD REF: 24120 - DET_Rev C

PARTIAL DETAIL SURVEY & PROPOSED SUBDIVISION OF LOT 41 DP 789996

SITE ADDRESS: 4 GLENBURN ROAD PATERSON

CLIENT: A. PILGRIM

POSITION DATUM: SSM 55510
ORIENTATION: MGA 2020 (GND)
EASTING: 371 449.207
NORTHING: 6 392 880.088
CLASS: A
HEIGHT DATUM: SSM 55510
CLASS: B
RL: 24.954 (AHD)
DATE: 04.03.24

JAS-ANZ
BEFORE YOU DIG

SURVEYED	DRAFTED	CHECKED
SF	JD	TC

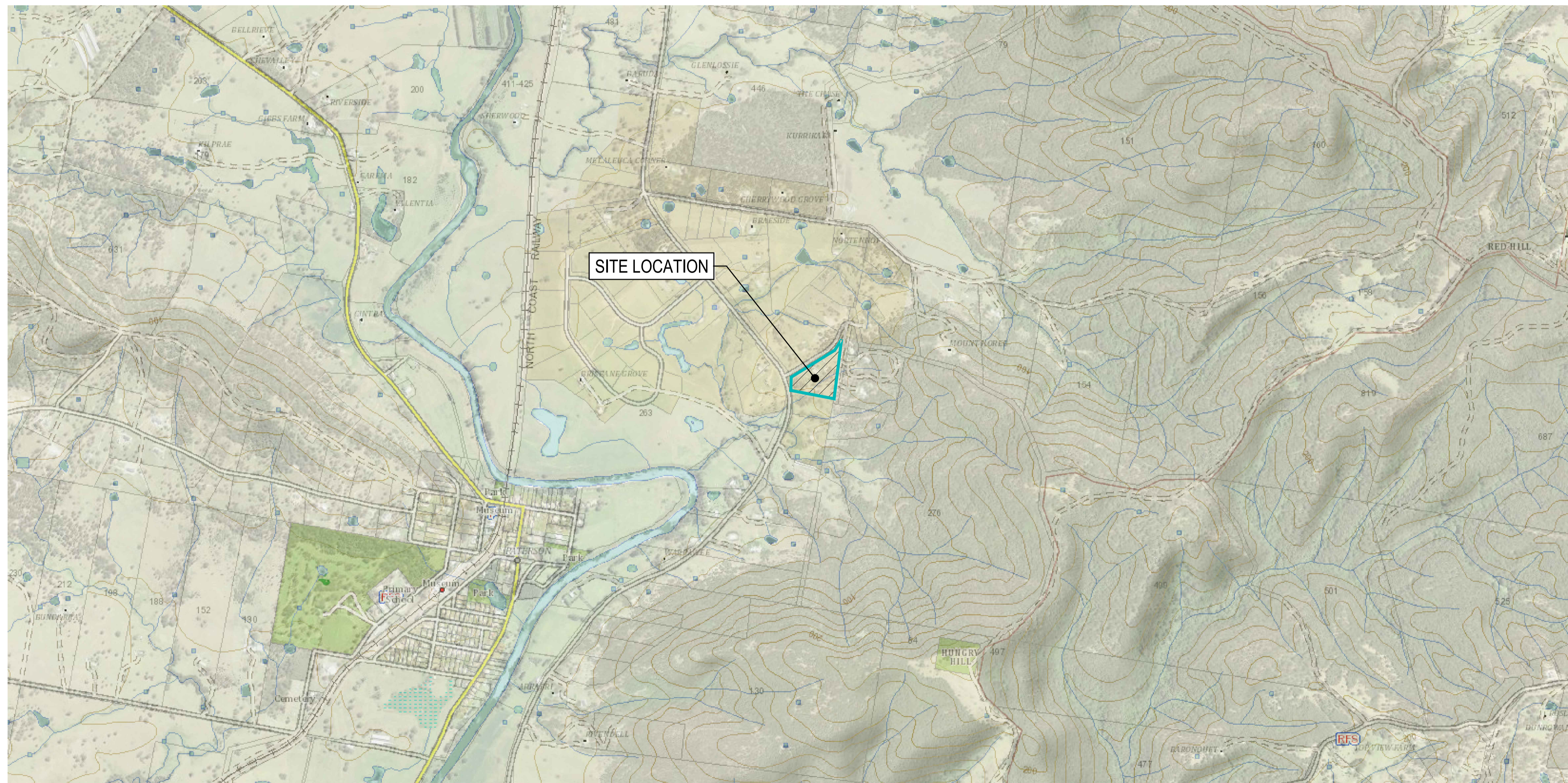
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SHEET	REV.	PROJECT No.
1	C	24120

PROPOSED SUBDIVISION

CIVIL DOCUMENTATION FOR DEVELOPMENT APPLICATION

4 GLENBURN ROAD, PATERSON, NSW 2421



LOCALITY PLAN
NTS

DRAWING LIST

DWG No.	DRAWING TITLE
CIV-001	COVER PAGE, DRAWING LIST AND LOCALITY PLAN
CIV-005	OVERALL SITE PLAN
CIV-011	CIVIL WORKS PLAN - SHEET 1
CIV-012	CIVIL WORKS PLAN - SHEET 2

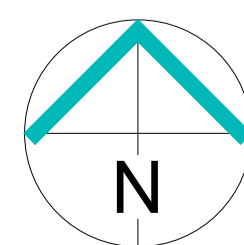
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CLIENT	PILGRIM
TITLE	COVER PAGE, DRAWING LIST AND LOCALITY PLAN

PROJECT	PROPOSED SUBDIVISION
	4 GLENBURN ROAD, PATERSON, NSW 2421

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SCALE	NOT TO SCALE	DRAWN	M.J.
PROJECT REF No.	243339	DRAWING No.	CIV-001
		REVISION	A

STORM WATER & WATER STORAGE PHILOSOPHY CALCULATIONS

- THE PROPOSED DEVELOPMENT OF 4 GLENBURN ROAD, PATERSON INVOLVES A 1 INTO 3 LOT SUBDIVISION. THE EXISTING RESIDENCE IS PROPOSED TO REMAIN WITH 2 OTHER LOTS CREATED.
- DURING STORM EVENTS ALL NEW ROOF WATER FROM THE PROPOSED FUTURE RESIDENCES ARE TO BE DIRECTED TO THE PROPOSED FUTURE ONSITE RAINWATER TANKS. RAINWATER TANKS WILL LIMIT PEAK FLOWS FOR THE ENTIRE LOT TO PRE-DEVELOPED PEAK FLOWS. TANKS HAVE BEEN SIZED FOR STORMWATER DETENTION AND AN ALLOWANCE FOR BASIX & OWNER REQUIREMENTS. TANKS WILL CONTRIBUTE TO THE TREATMENT OF ROOF WATER TO MEET WATER QUALITY STRIPPING TARGETS.
- OVERFLOW FROM THE RAINWATER TANK IN PROPOSED LOT 3 WILL BE DIRECTED TO A GRASS LINED SWALE. DRIVEWAY RUNOFF WILL ALSO BE CAPTURED IN THE GRASS LINED SWALE. THE SWALE WILL CONTRIBUTE TO THE STORMWATER TREATMENT AND CONVEY FLOWS TOWARDS THE EXISTING ROADSIDE CHANNEL IN GLENBURN ROAD.
- OVERFLOW FROM THE RAINWATER TANK IN PROPOSED LOT 2 WILL BE DIRECTED TO A GRASS LINED SWALE. DRIVEWAY RUNOFF WILL ALSO BE CAPTURED IN THE GRASS LINED SWALE. THE SWALE WILL CONTRIBUTE TO THE TREATMENT TRAIN AND CONVEY FLOWS TOWARDS THE EXISTING WATER COURSE WITHIN THE SITE WHICH WILL ACT AS THE LEGAL POINT OF DISCHARGE.
- THE COMBINATION OF SWALES AND RAINWATER TANKS WILL PROVIDE WATER QUALITY TREATMENT DEVICES THAT ACHIEVE WATER QUALITY STRIPPING TARGETS. REFER TABLE BELOW.

STORMWATER CALCULATIONS

LOT 2 AREA = 8100.00 m²
 LOT 2 ROOF AREA = 400.00 m²
 LOT 2 DRIVEWAY AREA = 200.00 m²

LOT 3 AREA = 8000.00 m²
 LOT 3 ROOF AREA = 400.00 m²
 LOT 3 DRIVEWAY AREA = 200.00 m²

ON SITE DETENTION CALCULATIONS (OSD) (IMPERVIOUS AREA ONLY)

QPRE(10 Yr) = C I A (tc = 5min)
 = 0.38 x 157 x 600
 = 10.02 L/s

QPRE(100Yr) = C I A (tc = 5min)
 = 0.46 x 259 x 600
 = 19.83 L/s

ROOF AREA WILL BE CAPTURED AND DETAINED WITHIN THE SITE. DRIVEWAY AREA WILL BE ALLOWED TO BYPASS THE DETENTION WITHIN THE SITE.

QROOF (10YR) = C I A (tc = 5min)
 = 0.90 x 157 x 400
 = 15.70 L/s

QDRIVEWAY (10YR) = C I A (tc = 5min)
 = 0.90 x 157 x 200
 = 7.85 L/s

QROOF (100YR) = C I A (tc = 5min)
 = 1.00 x 259 x 400
 = 28.78 L/s

QDRIVEWAY (100YR) = C I A (tc = 5min)
 = 1.00 x 259 x 200
 = 14.39 L/s

ALLOWABLE DISCHARGE (OSD) = QPRE(10 Yr) - QDRIVEWAY (10YR)
 = 10.02 - 7.85
 = 2.17 L/s

THIS WILL BE RESTRICTED BY A 19mm CONDUIT ON THE DETENTION TANK OUTLET.

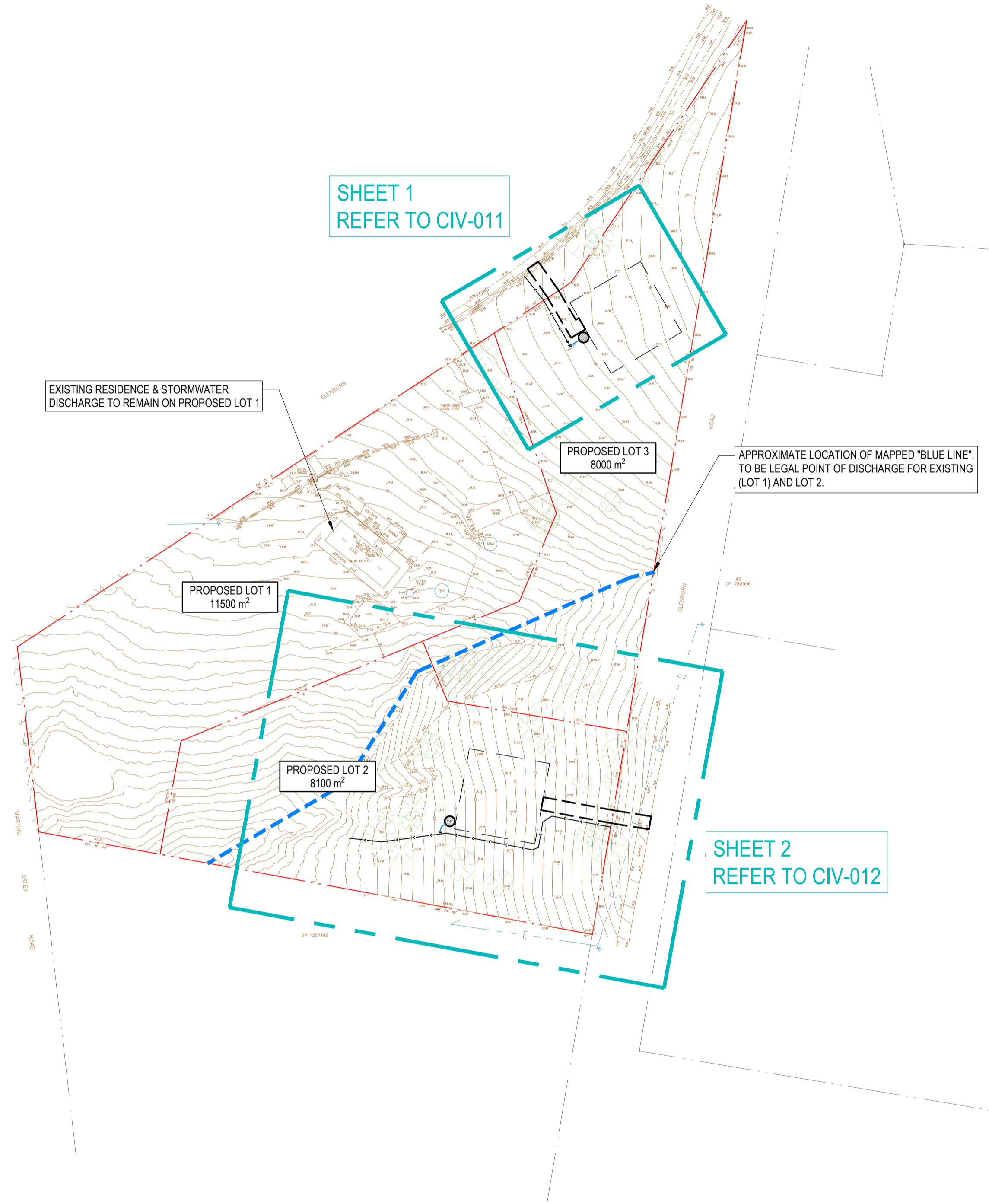
THE OSD STORAGE FOR THE DEVELOPMENT IS DETERMINED BY THE 100 Yr STORM EVENT.

OSD = (QROOF (100YR) + QDRIVEWAY (100YR)) - QPRE(100Yr)
 = 7.0 kL

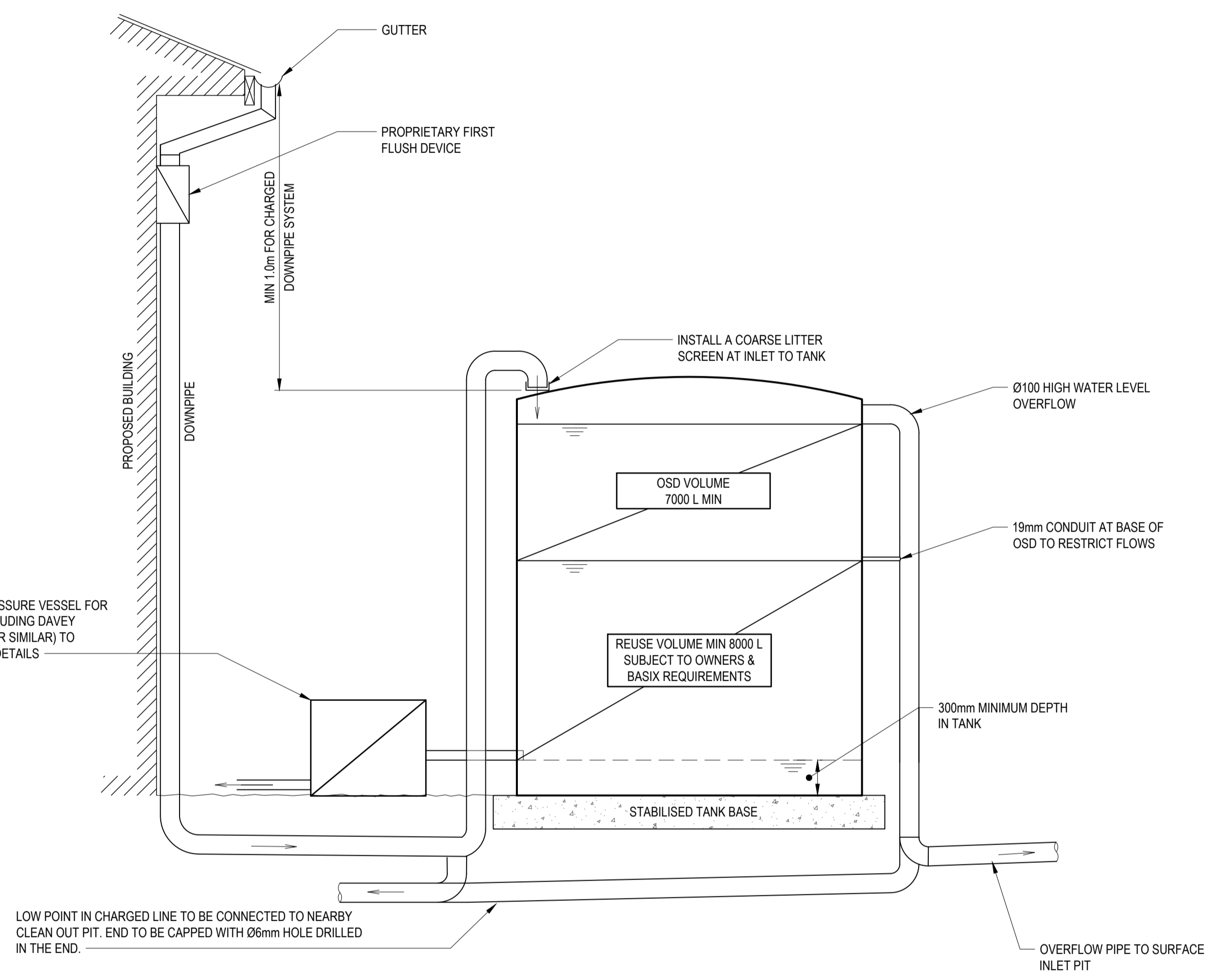
SITE STORM EVENTS WATER QUALITY RUNOFF DATA - MUSIC

POLLUTANTS (kg/yr)	SOURCES	RESIDUAL LOAD	% TARGET	% REDUCTION	OK?
TOTAL SUSPENDED SOLIDS	71.150	5.647	90	92.06	Y
TOTAL PHOSPHOROUS	0.157	0.0475	60	69.73	Y
TOTAL NITROGEN	1.190	0.628	45	47.22	Y
GROSS POLLUTANTS	14.290	0	100	100	Y

* MUSIC FILE CAN BE PROVIDED ON REQUEST.



OVERALL SITE PLAN
SCALE 1:1000



ABOVE GROUND RAINWATER TANK SCHEMATIC
NOT TO SCALE

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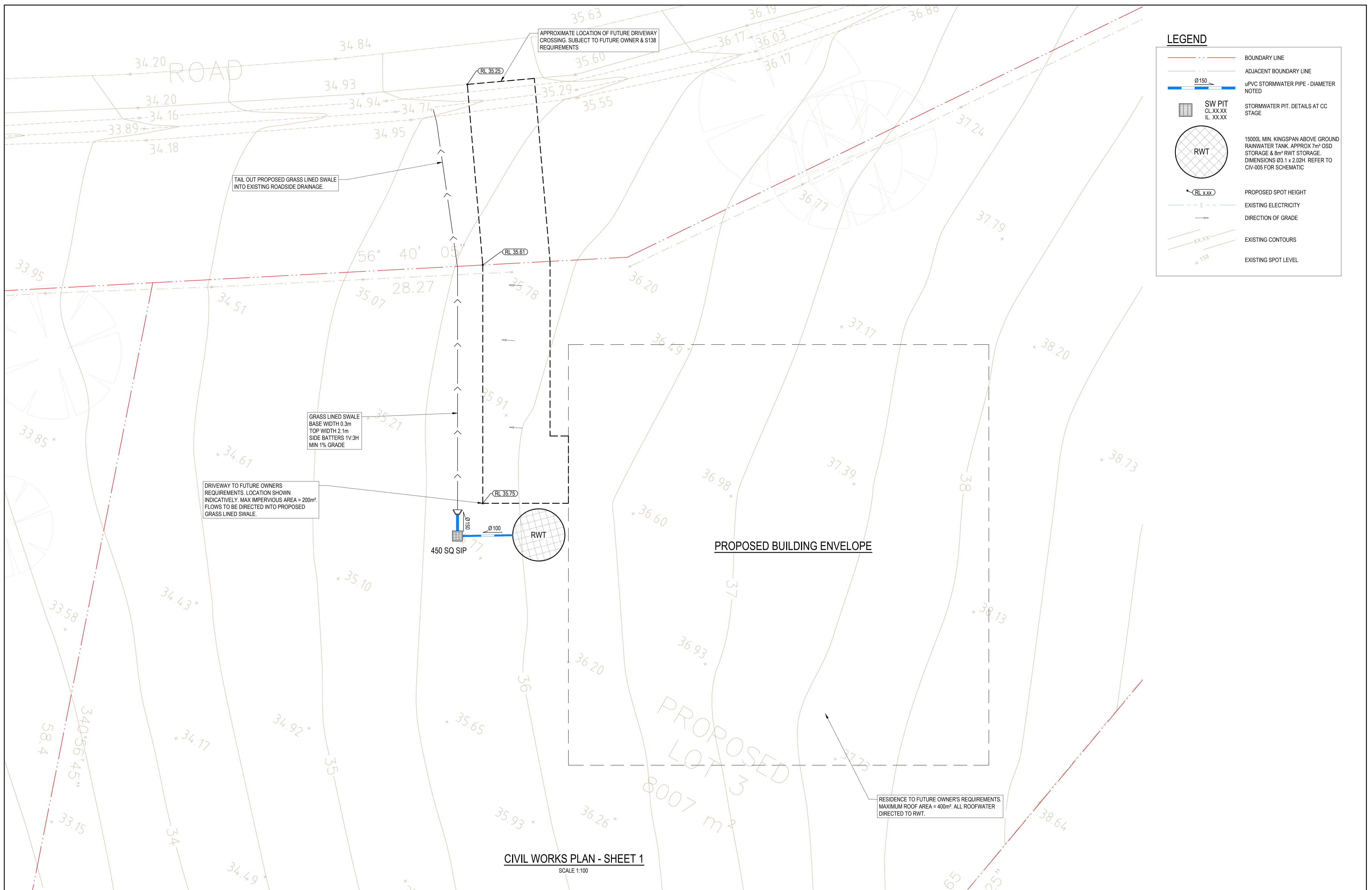
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TITLE: **OVERALL SITE PLAN**

PROJECT: **PROPOSED SUBDIVISION**

4 GLENBURN ROAD, PATERSON, NSW 2421

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SCALE: 1:1000 (A1)	DRAWN: M.J.
PROJECT REF No: 243339	REVISION: A
DRAWING No: CIV-005	



LEGEND

- BOUNDARY LINE
- ADJACENT BOUNDARY LINE
- Ø150
PVC STORMWATER PIPE - DIAMETER NOTED
- SW PIT
CL.XX.XX
IL.XX.XX
STORMWATER PIT. DETAILS AT CC STAGE
- RWT
15000L MIN. KINGSPAN ABOVE GROUND RAINWATER TANK. APPROX 7m³ OSD STORAGE & 8m³ RWT STORAGE. DIMENSIONS Ø3.1 x 2.02H. REFER TO CIV-005 FOR SCHEMATIC
- PROPOSED SPOT HEIGHT
- EXISTING ELECTRICITY
- DIRECTION OF GRADE
- EXISTING CONTOURS
- EXISTING SPOT LEVEL

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CLIENT
PILGRIM

TITLE
CIVIL WORKS PLAN - SHEET 1

PROJECT
PROPOSED SUBDIVISION

4 GLENBURN ROAD,
PATERSON, NSW 2421

DRAWING STATUS
NOT FOR CONSTRUCTION

SCALE
1:100 (A1)

PROJECT REF No.
243339

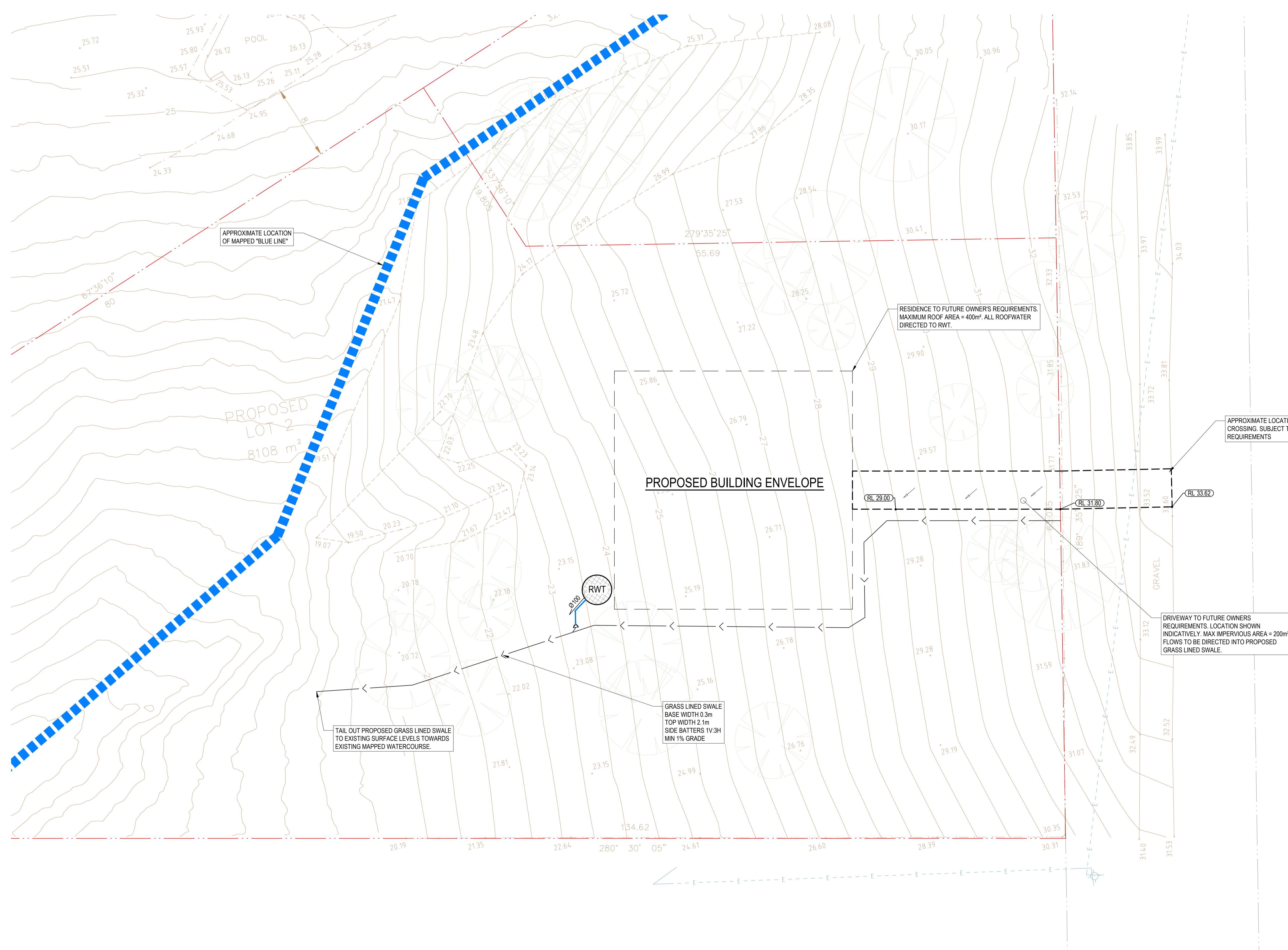
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DRAWN
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REVISION
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LEGEND

- BOUNDARY LINE
- ADJACENT BOUNDARY LINE
- Ø 150 uPVC STORMWATER PIPE - DIAMETER NOTED
- RWT (1500L MIN. KINGSPAN ABOVE GROUND RAINWATER TANK. APPROX 9.3m³ OSD STORAGE & 5.7m³ RWT STORAGE. DIMENSIONS Ø3.1 x 2.02H. REFER TO CIV-005 FOR SCHEMATIC)
- PROPOSED SPOT HEIGHT (RL x.xx)
- EXISTING ELECTRICITY
- DIRECTION OF GRADE
- EXISTING CONTOURS
- EXISTING SPOT LEVEL

APPROXIMATE LOCATION OF MAPPED "BLUE LINE"

PROPOSED LOT 2
8108 m²

PROPOSED BUILDING ENVELOPE

RESIDENCE TO FUTURE OWNER'S REQUIREMENTS. MAXIMUM ROOF AREA = 400m². ALL ROOFWATER DIRECTED TO RWT.

APPROXIMATE LOCATION OF FUTURE DRIVEWAY CROSSING. SUBJECT TO FUTURE OWNER & S138 REQUIREMENTS

DRIVEWAY TO FUTURE OWNERS REQUIREMENTS. LOCATION SHOWN INDICATIVELY. MAX IMPERVIOUS AREA = 200m². FLOWS TO BE DIRECTED INTO PROPOSED GRASS LINED SWALE.

TAIL OUT PROPOSED GRASS LINED SWALE TO EXISTING SURFACE LEVELS TOWARDS EXISTING MAPPED WATERCOURSE.

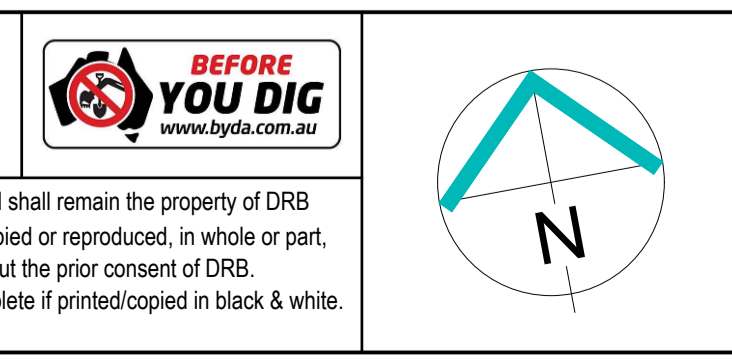
GRASS LINED SWALE
BASE WIDTH 0.3m
TOP WIDTH 2.1m
SIDE BATTERS 1V:3H
MIN 1% GRADE

CIVIL WORKS PLAN - SHEET 2
SCALE 1:200

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TITLE: **CIVIL WORKS PLAN - SHEET 2**

PROJECT: **PROPOSED SUBDIVISION**

4 GLENBURN ROAD, PATERSON, NSW 2421

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PROJECT REF No: 243339	REVISION: A
DRAWING No: CIV-012	

BUSHFIRE ASSESSMENT

PROPOSED 1 INTO 3 LOT RESIDENTIAL SUBDIVISION



**LOT 41 DP 789996
4 Glenburn Road, Paterson**

Date: **03/04/2024**

Prepared for: **Perception Planning**

NEWCASTLE BUSHFIRE CONSULTING

5 Chartley Street, Warners Bay NSW 2282
(ph) 02 40230149 (mob) 0423 923284
email: mail@newcastlebushfire.com.au

I hereby declare that I am a BPAD accredited bushfire practitioner.		
Accreditation No.	BPAD16132	
Signature		
Date	3/04/2024	

Couch Family Trust T/A
Newcastle Bushfire Consulting Pty Ltd A.B.N. 96 831 374 298
Bushfire and Building Sustainability Consultants

Document Status

Revision No.	Issue	Description	Reviewed	Approved by Director
1	03/04/2024	Final	E. Davis	P. Couch

Prepared By:



Phillip Couch GIFireE
Bach Info Science
Grad Dip Design for Bushfire Prone Areas
FPAA BPAD – Level 3 Accreditation Number BPD-PA-16132
Director Newcastle Bushfire Consulting



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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

This report has assessed the proposed 1 into 3 lot residential subdivision against the requirements of Section 100B of the Rural Fires Act 1997, AS3959 (2018) Construction of buildings in bushfire-prone areas and Planning for Bush Fire Protection (2019).

This report establishes that the development is capable of complying with the acceptable solutions of Planning for Bush Fire Protection (2019).

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Perception Planning		
Site Address	4 Glenburn Road, Paterson	Lot/Sec/DP	Lot 41 DP 789996
Local Government Area	Dungog	FDI	100
Bushfire Prone Land	Yes, mapped bushfire prone land		
Type of development	1 into 3 lot residential subdivision	Type of Area	Rural Residential
Special Fire Protection Purpose	No	Flame Temperature	1090K
Application Complies with Acceptable Solutions	Yes. Relevant specifications and requirements are satisfied	Referral to NSW Rural Fire Service (NSW RFS) required	Yes. Bushfire Safety Authority Required

TABLE 2.1 – BUSHFIRE THREAT ASSESSMENT PROPOSED LOT 1

	North	East	South	West
Vegetation Structure	Grassland	Grassland	Grassland	Grassland
Distance to Vegetation	22 metres	12 metres	13 metres	12 metres
Accurate Slope Measure	5 degrees downslope	5 degrees downslope	8 degrees downslope	5 degrees downslope
Slope Range	>0 to 5 degrees downslope	>0 to 5 degrees downslope	>5 to 10 degrees downslope	>0 to 5 degrees downslope
Planning for Bush Fire Protection (2019) Table A1.12.2 Minimum Setbacks	10 metres	12 metres	13 metres	12 metres
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-12.5	BAL-29	BAL-29	BAL-29

TABLE 2.2 – BUSHFIRE THREAT ASSESSMENT PROPOSED LOT 2

	North	East	South	West
--	-------	------	-------	------

Vegetation Structure	Grassland	Forest	Grassland	Grassland
Distance to Vegetation	12 metres	37 metres	12 metres	13 metres
Accurate Slope Measure	5 degrees downslope	Upslope	5 degrees downslope	7 degrees downslope
Slope Range	>0 to 5 degrees downslope	Level/Upslope	>0 to 5 degrees downslope	>5 to 10 degrees downslope
Planning for Bush Fire Protection (2019) Table A1.12.2 Minimum Setbacks	12 metres	24 metres	12 metres	10 metres
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-29	BAL-19	BAL-29	BAL-29

TABLE 2.3 – BUSHFIRE THREAT ASSESSMENT PROPOSED LOT 3

	North	East	South	West
Vegetation Structure	Remnant Vegetation < 1 hectare in size	Remnant Vegetation < 1 hectare in size	Grassland	Grassland
Distance to Vegetation	38 metres	23 metres	13 metres	12 metres
Accurate Slope Measure	2 degrees downslope	Upslope	8 degrees downslope	5 degrees downslope
Slope Range	>0 to 5 degrees downslope	Level/Upslope	>5 to 10 degrees downslope	>0 to 5 degrees downslope
Planning for Bush Fire Protection (2019) Table A1.12.2 Minimum Setbacks	14 metres	11 metres	13 metres	12 metres
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-12.5	BAL-12.5	BAL-29	BAL-29

TABLE 3 – PLANNING FOR BUSH FIRE PROTECTION (2019) SECTION 5 COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	<p>Asset Protection Zones have been determined in accordance with Planning for Bush Fire Protection (2019).</p> <p>The Asset Protection Zone will be maintained for the life of development and defensible space is provided onsite.</p>	Acceptable Solution
Landscaping	Landscaping to comply with Planning for Bush Fire Protection (2019) Appendix 4.	Acceptable Solution
Public Road Access	No new public roads are proposed for this development.	Acceptable Solution
Property Access	Property access offers compliance with Planning for Bush Fire Protection (2019) Section 5.3b.	Acceptable Solution
Fire Trail Access	No new fire trails are proposed for this development.	Acceptable Solution
Water and Utility Services	Water, electricity and gas services offer compliance with Planning for Bush Fire Protection (2019) Section 5.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed 1 into 3 lot residential subdivision of land located at Lot 41 DP 789996, 4 Glenburn Road, Paterson. The assessment acknowledges the requirements of Section 100B of the Rural Fires Act 1997 and Planning for Bush Fire Protection (2019) to protect persons, property and the environment from dangers that may arise from a bushfire.

Under the provisions of Section 100B of the Rural Fires Act 1997 as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation 2008 Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aims and objectives of Planning for Bush Fire Protection (2019) to reduce the risk of ignition of the development in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The subject site is a single allotment R5: Large Lot Residential 28,755 square metres in size. An existing dwelling and outbuildings are located onsite which are intended to be retained. The proposed development includes a 1 into 3 lot subdivision.

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

The only known significant environmental feature is a mapped waterway which runs through the property.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site.

2.5 ABORIGINAL HERITAGE

Searches of NSW National Parks and Wildlife Service's database identify no known aboriginal relics or aboriginal places as defined by National Parks and Wildlife Act 1974 to exist on the site.



PHOTO 1 – PROPOSED LOT 1 LOOKING SOUTH

View of the northwestern portion of proposed lot 1. Mown grass can be seen in the foreground with a cluster of low-threat eucalypts to the south. The eucalypts are less than 1 hectare in size and greater than 100 metres from another vegetative threat.



PHOTO 2 – PROPOSED LOT 3 LOOKING SOUTH

View of the eastern portion of the site showing grass within the potential building envelope. The thin band of eucalypts on the eastern boundary of the site is classified as a low-threat windrow.



FIGURE 1 – SITE CONSTRAINTS MAP

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Dungog Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bush Fire Protection (2019).

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Table 2 – Bushfire Attack Assessment.

3.2 EFFECTIVE SLOPE

Effective slope was measured using 2-metre contour data obtained from The Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation, calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective slopes have been identified in Figure 1 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES

Minimum setbacks have been determined in accordance with Planning for Bush Fire Protection (2019) Table A1.12.2. The minimum Asset Protection Zone for subdivision has been demonstrated in Section 1.0 Executive Summary and Compliance Tables.

The required Asset Protection Zone is available within the subject site and neighbouring managed lands. All dwellings will be exposed to less than 29 kw/m² of radiant heat.

3.4 BUSHFIRE ATTACK LEVELS

BALs and relevant construction levels in accordance with Planning for Bush Fire Protection (2019) have been demonstrated in Section 1.0 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.

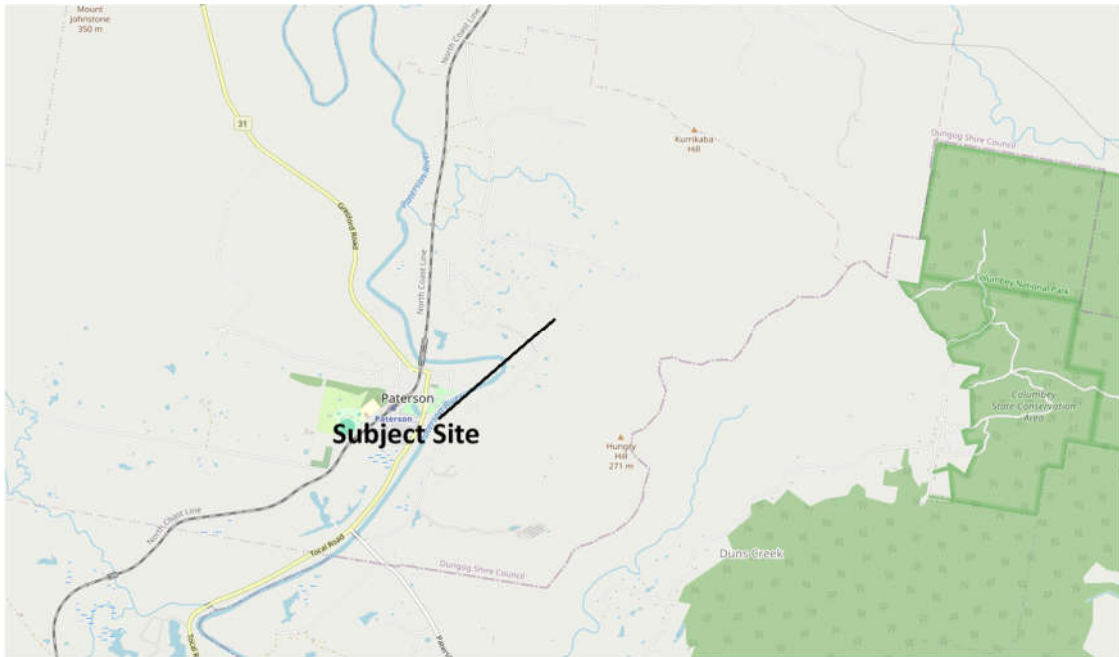


FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

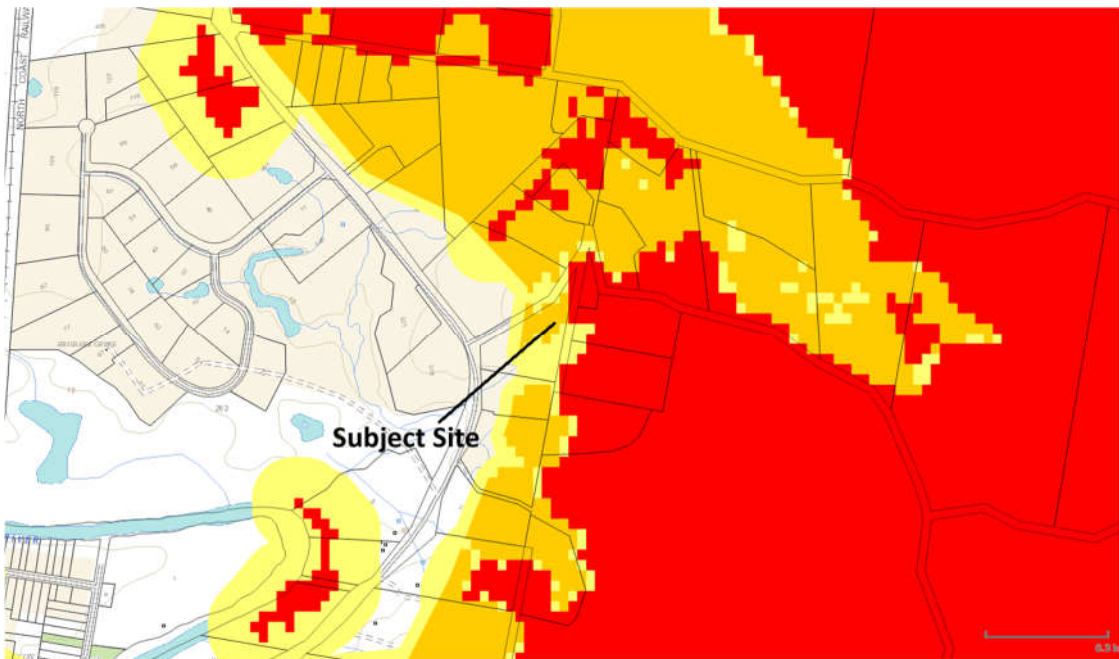


FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

Proposed lot 1 is greater than 10,000 square metres in size, with proposed lots 2 and 3 being between 1,000 and 10,000 square metres in size. Hydrant spans do not comply with AS2419.1. A static water supply, with provision for a minimum 10,000 litres shall be provided to lots 2 and 3 with the future dwelling approval. The 10,000 litre water supply may be either a tank or pool, providing that the 10,000 litres is available for firefighting purposes. The following requirements should be adhered to for the water supply:

- a) a connection for firefighting purposes is located within the Inner Protection Area (IPA) or non-hazard side and away from the structure; 65 millimetres Storz outlet with a ball valve is fitted to the outlet;
- b) ball valve and pipes are adequate for water flow and are metal;
- c) supply pipes from tank to ball valve have the same bore size to ensure flow volume;
- d) underground tanks have an access hole of 200 millimetres to allow tankers to refill directly from the tank;
- e) a hardened ground surface for truck access is supplied within 4 metres;
- f) above-ground tanks are manufactured from concrete or metal;
- g) raised tanks have their stands constructed from non combustible material or bushfire resisting timber (AS3959 (2018) Appendix F);
- h) unobstructed access can be provided at all times;
- i) underground tanks are clearly marked;
- j) tanks on the hazard side of the building are provided with adequate shielding for the protection of firefighters;
- k) all exposed water pipes external to the building are metal, including any fittings.

Proposed lot 1 presently has a pool that exceeds the required 20,000 litres capacity requirement and is identified as a suitable static water supply.

4.2 ELECTRICITY SERVICES

The existing power supply to the local area is via overhead electrical transmission lines.

Where overhead, electrical transmission lines are proposed:

- lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and
- no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.

4.3 GAS SERVICES

- Reticulated or bottled gas to be installed and maintained in accordance with AS1596 (2002) and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10 metres and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and be at least 2 metres from flammable material with connections to and from the gas cylinder being of metal.

Polymer-sheathed, flexible gas supply lines to gas meters adjacent to the buildings are not to be used.



PHOTO 3 - SOUTHEASTERN FOREST

View of cleared residential land and grassy forest located southeast of the site on a neighbouring property. Eucalypts dominate the tree canopy with a grassy understorey.

Bushfire Assessment: Lot 41 DP 789996, 4 Glenburn Road, Paterson

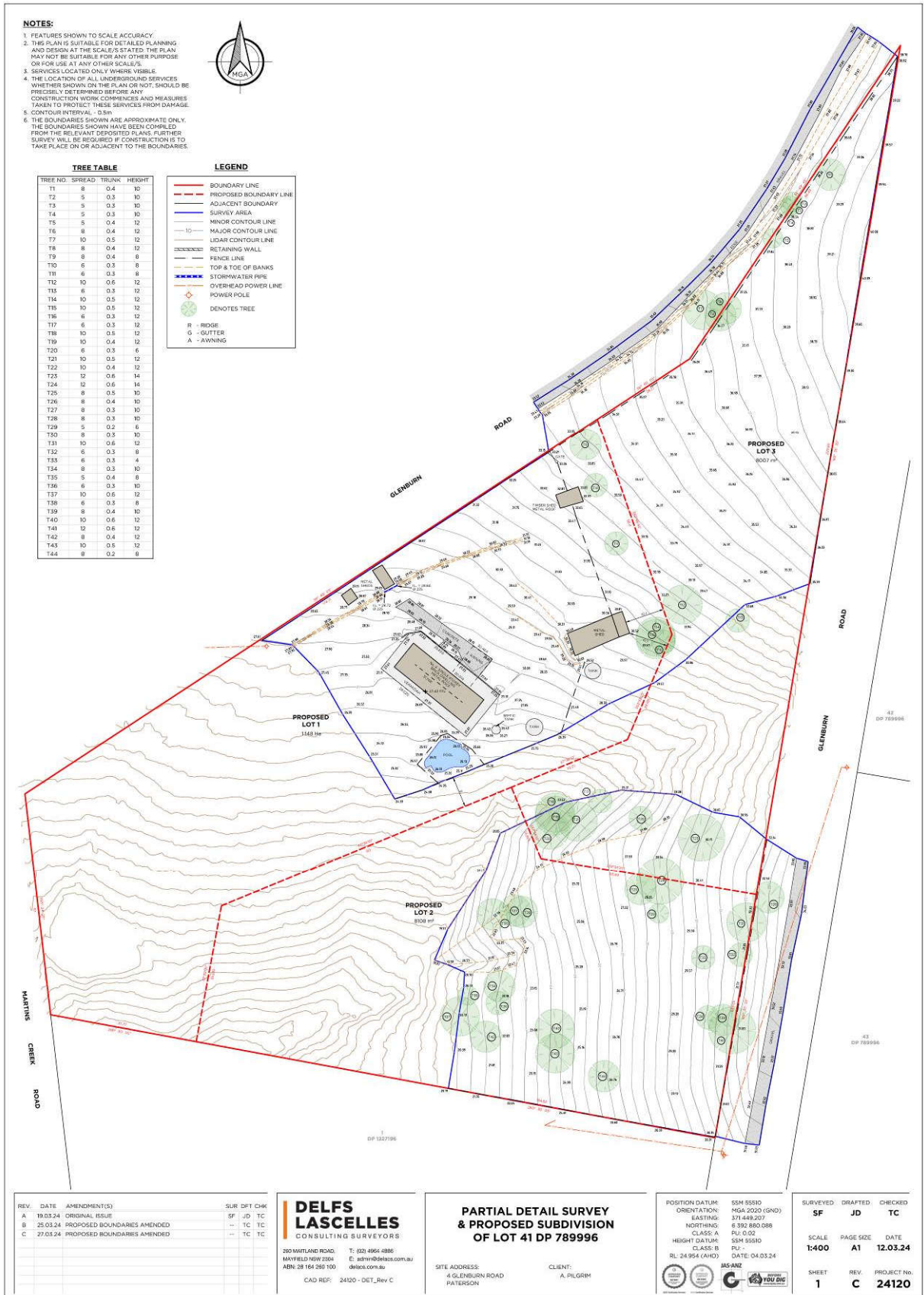


FIGURE 4 – SUBDIVISION PLAN

5.0 PROPERTY ACCESS

The existing public road network is expected to be adequate to handle increased volumes of traffic in the event of a bushfire emergency, that is generated by the additional dwelling. The public road network will remain unchanged.

Fire Trails

Fire trails do not intersect the vegetation in the local area. No new fire trails are proposed.

Property Access

Property access is provided by way of Glenburn Road providing access from the public road system directly to the private land, giving firefighters access to the building.

Property access roads shall comply with Planning for Bush Fire Protection (2019) Section 5.3b. The Property Access Road should comply with the following conditions:

PROPERTY ACCESS	
<p>Firefighting vehicles can access the dwelling and exit the property safely.</p>	<ul style="list-style-type: none"> a) minimum 4m carriageway width; b) in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; c) a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; d) provide a suitable turning area in accordance with Appendix 3; e) curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; f) the minimum distance between inner and outer curves is 6m; g) the crossfall is not more than 10 degrees; h) maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; i) a development comprising more than three dwellings has access by dedication of a road and not by right of way.
<p>Compliance: The development can offer full compliance.</p>	

6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris.

Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6 millimetres in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and, where possible, green.

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

There is no known Bushfire Maintenance Plan for the site. A condition of development is to maintain the entire site as an Inner Protection Area which should be monitored by the building owner.

7.2 FIRE EMERGENCY PROCEDURES

It is recommended the future property owners or building occupants prepare a bushfire survival plan for each residence when they occupy the building.

8.0 RECOMMENDATIONS

There is presently a single dwelling located onsite and no dwelling is proposed as part of this development application. Any future dwelling will be assessed separately under legislation current at time of approval. The below recommendations provide an indication of recommended measures for a future dwelling, however specific consideration should be made with the development submission:

1. Indicative asset protection zones for BAL-29 are shown in table 2.1, 2.2 and 2.3. A specific assessment of future dwellings will be made with the development submission.
2. Water, electricity and gas are to comply with Section 5 of Planning for Bush Fire Protection (2019).

Water Services

- a. A 10,000 litre static water supply with firefighting fittings will be required on proposed lots 2 and 3 when a future development application is lodged.
3. The property access shall comply with Section 5.3b of Planning for Bush Fire Protection (2019).
4. Landscaping is to be undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and managed and maintained in perpetuity.
5. It is recommended that the property owner or building users familiarise themselves with the relevant bushfire preparation and survival information provided by the NSW RFS.
6. The existing dwelling shall be upgraded to improve ember protection. This is to be achieved by enclosing all openings (excluding roof tile spaces) or covering openings with a non-corrosive metal screen mesh with a maximum aperture of 2 millimetres. Where applicable, this includes any subfloor areas, openable windows, vents, weepholes and eaves. External doors are to be fitted with draft excluders.

9.0 CONCLUSION

The final recommendation is that the proposed development offers compliance with Planning for Bush Fire Protection (2019). There is potential for bushfire attack at this site and a list of recommendations has been included in the above assessment to reduce that risk.

10.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in appendix 4 of Planning for Bush Fire Protection (2019) and the NSW Rural Fire Services “Standards for Asset Protection Zones”. The property owner(s) should obtain these two documents and familiarise themselves with their content.

Generally

Asset Protection Zones (APZ) refer to the area between the bushfire threat and the asset (i.e. building). The APZ may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an Inner Protection Area (IPA). Refer to the plans for locations of APZ and distances from Assets.

Inner Protection Area (IPA)

The inner protection area is located adjacent to the asset and is identified as a fuel-free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
2. Shrubs should not be located under trees;
3. Shrubs should not form more than 10% ground cover; and
4. Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Tree canopy cover should be less than 15% at maturity;
2. Trees at maturity should not touch or overhang the building;
3. Lower limbs should be removed up to a height of 2m above the ground;
4. Tree canopies should be separated by 2 to 5m; and
5. Preference should be given to smooth barked and evergreen trees.

Outer Protection Area (OPA)

The Outer Protection Area (OPA) is located adjoining the vegetation. The OPA should be maintained as a fuel-reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

A. Shrubs:

1. Shrubs should not form a continuous canopy;
2. Shrubs should form no more than 20% of ground cover.

B. Trees:

1. Existing trees can be retained.
2. Tree canopy cover should be less than 30%; and
3. Canopies should be separated by 2 to 5m.

Grass (throughout the entire asset protection zone)

Grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and leaves and vegetation debris should be removed.

11.0 REFERENCES AND DISCLAIMER

References

Standards Australia AS3959 (2018) Construction of buildings in bushfire-prone areas.

Keith D. "Ocean Shores to Desert Dunes", Department of Environment and Conservation, Sydney, (2004).

Environmental Planning and Assessment Act 1979.

New South Wales Rural Fire Service Planning for Bush Fire Protection (2019).

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed to ensure a level of protection is provided to the building, occupants and firefighters.

Planning for Bush Fire Protection (2019) states that notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains.

AS3959 (2018) Construction of buildings in bushfire-prone areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion. External combustible cladding is not recommended.

ONSITE WASTEWATER REPORT

PROPOSED SUBDIVISION DEVELOPMENT AT 4 GLENBURN ROAD, PATERSON

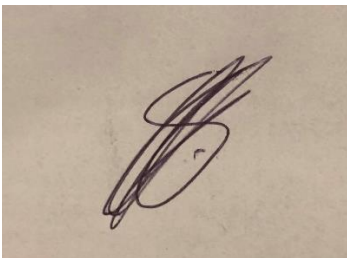
GSL Environmental
Authored by: Simon Doberer B.Sc. (ENV)
Job Reference #: 124924 – A1
Date: 5th April 2024

Limitations

This report has been developed based on agreed requirements between the client and GSL Environmental as understood by GSL Environmental at the time of investigation. This report only applies to the subject scope of works undertaken at the subject site. Other interpretations should not be made, including changes of scope or application to other projects. The contents of this report are based on a professional appraisal of the conditions that existed onsite at the time of this investigation. Where a subsurface soil investigation has been undertaken the results are only applicable to the specific sampling locations and the depths undertaken. Because of natural geological variability and possible anthropogenic influences, the subsurface conditions reported can change abruptly. Such changes can also occur after the site investigation has been undertaken. The accuracy of the results provided in this assessment is limited by these possible variations along with limitations by budget constraints imposed by others and by inadequate site accessibility.

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A handwritten signature in dark ink on a light-colored, textured paper background. The signature is stylized and appears to be 'S. Doberer'.

Simon Doberer
Principle Environmental Scientist
B.Sc. (ENV)

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1. Introduction

GSL Environmental has been commissioned by Allen Pilgrim to assess the suitability of an on-site sewage management system for the proposed three allotment rural residential subdivision at 4 Glenburn Road, PATERSON NSW. This report will be submitted to Dungog Council in accordance with the relevant details in the 'Dungog Council Onsite Sewage DAF 2015'. Other guiding documents include,

- Australian Standard AS1547: 2012 "On-site Domestic Wastewater Management"
- Dept. Local Government 1998, On-site Sewage Management for Single Households
- Water NSW, "Designing and Installing Onsite Wastewater Systems", 2019

This assessment is required to show that treated wastewater generated by the proposed allotments from the subdivision can be sustainably managed on the site.

2. Site Description

The subject allotment is irregular in shape and approximately 2.875 hectares in size. The majority of the site is very gently to gently inclined and can be considered a mid-slope waning landforms. The proposed EDAs have been located within very gently to gently inclined mid slope landscapes. The closest significant water body, the Paterson River flows approximately 550m to the south west of the site. There is a farm dam within the eastern portion of the site and an overland flowpath traversing the site.

According to the Port Stephens 1:100 000 Soil Map the proposed dispersal areas onsite are underlain by "Vacy" residual soils. The Vacy Soil Landscape areas generally consist of gentle footslopes and undulating low hills on Carboniferous sediments in the Paterson Mountains region. Slope gradients are generally between 2 - 10%. Underlying soils mostly consist of bleached sandy clay loams traversing to greying yellow brown clays.

The proposal is for a three lot rural residential subdivision, proposed plans in Appendix B. As at subdivision stage the new allotment has been designed for 5 bedroom residences. The existing residence is a four bedroom residence and is currently serviced by an AWTS followed by surface irrigation. Bedroom density on the future dwellings at DA stage may be altered subject to a site specific onsite wastewater assessment.



Figure 1: Subject Site, care of six maps showing property boundaries and associated landmarks.

3. Site Information

Site Address: 4 Glenburn Road, PATERSON

Water Supply: Tank

Proposed Development: Three lot rural residential subdivision

Equivalent Population: Up to 8 persons/day – 5 habitable room residence – Proposed Allotment
Up to 7 persons/day – 4 habitable room residence – Existing dwelling

Wastewater Flow Allowance: 120L per person per day

Design Flowrate: 960L per day – Proposed Allotment
840L per day – Existing dwelling

Proposed Effluent Dispersal Type: Sub-Surface Drip

System Design: Aerated wastewater treatment systems

Most restrictive Soil Texture: greying yellow brown clays

Minimum Dispersal Area: 600m²

Buffer Distances: All required buffer distances can be achieved without any variation required.

4. Physical Site Assessment

A site inspection was undertaken on the 6th March 2024. The fieldwork included an assessment of the site's physical parameters as well as hand excavation of boreholes to determine the underlying soil structures. This was undertaken to delineate the most suitable location for the proposed dispersal area. Potential onsite limitations have been investigated and are discussed below.

4.1 Landform

Varying landforms pose differing potential limitations to an effluent dispersal area. Risk of run-on and runoff may be enhanced dependent on the site's landform.

The proposed EDAs have been located within very gently to gently inclined mid slope landscapes.

Limitation: **LOW**

4.2 Slope Gradient

Excessive slope within an EDA can potentially lead to effluent leaching away from the EDA.

The proposed EDAs have been located within very gently to gently inclined mid slope landscapes. The EDAs have slope gradients between 3 – 12%.

Limitation: **LOW**

4.3 Exposure

Providing the EDA with maximum wind and sun exposure is preferable. This will enhance the evapotranspiration properties of the EDA and should add to the life of the EDA.

The proposed EDAs are within areas of very high exposure.

Limitation: **LOW**

4.4 Flood Potential

The proposed AWTS and dispersal area will be located above the council given flood planning levels. Some areas onsite are considered flood prone lands. As such the proposed EDAs are not to be in these locations. Subsurface irrigation is recommended to minimise any spray drift from leaching from the EDA into levels below the flood planning levels.

The proposed EDAs are outside of any flood planning levels and above the 1:20 Flood level.

Limitation: **LOW**

4.5 Vegetation

All effluent dispersal areas should be covered with vegetation or mulch-based covers. A vegetated EDA provides the possibility of that area in enhancing nutrient uptake and evapotranspiration. Low vegetation cover can cause effluent runoff and low nutrient and evapotranspiration uptake rates.

The proposed EDAS are located within areas of dense grassland vegetation coverage. Future EDAs will need to be regularly mowed and maintained.

Limitation: **LOW**

4.6 Stormwater Run-on

Stormwater runoff through the EDA has the potential to transport effluent away from the EDA to more sensitive receivers.

There were no visible signs of stormwater entering the proposed EDAs. The proposed EDAs have been located within very gently to gently inclined mid slope landscapes. The EDAs have slope gradients between 3 – 12%.

Limitation: **LOW**

4.7 Site Drainage

Damp and wet areas should be avoided for EDAs. These areas indicate seepage of waters and could become a transport option for effluent if placed in these areas.

Site appears to be well drained with semi-permeable soils. No visible signs of wet/damp areas in the proposed EDA. The soil profile did not show evidence of water logging

Limitation: **LOW**

4.8 Erosion Potential

Areas of visible soil movement and erosion should be avoided.

No visible signs of erosion within the EDA. Proposed EDA areas are densely vegetated and very gently inclined.

Limitation: **LOW**

4.9 Evidence of Fill

No evidence of fill was seen onsite or in the excavated boreholes. Soil logs are consistent of the description for underlying soils within the Vacy Soil Areas.

Limitation: **LOW**

4.10 Groundwater Depth

Groundwater not observed in bore holes.

Limitation: **LOW**

4.11 Surface Rock

No surface boulders or rock outcrops were observed within the proposed EDAs. Whilst depth was found in boreholes excavated within the proposed EDA, if during installation a “floater” is found it is to be removed from the proposed EDA. There are some areas onsite that do have visible rock outcropping, the proposed EDAs are to be located outside of these areas.

Limitation: **MODERATE**

4.12 Groundwater Bores

A search of Water’s all groundwater mapping was undertaken to determine the proximity of any bores to the EDAs. There are no domestic bores within 250m of the proposed EDAs.

Limitation: **LOW**

4.13 Watercourse Proximity

The closest significant water body, the Paterson River flows approximately 550m to the south west of the site. There is a farm dam within the eastern portion of the site and an overland flowpath traversing the site. Recommended setbacks to water bodies from the EDAs will be met.

This report proposes that subsurface irrigation be installed as the EDA on the subject site. Treatment is to be provided via a NSW Health accredited AWTS. The secondary effluent is further treated during

the subsurface absorption/transpiration processes. These measures will help the effluent to not leach from the proposed EDA.

Limitation: **LOW**

4.14 Stock Present

Stock can cause damage to irrigation systems and must be kept out of the EDA by fencing or other physical barrier.

4.15 Buffer Distances

All buffer distances in accordance with the required buffer distances within AS 1547 will be achieved.

Limitation: **LOW**

Buffer distances from the EDA are required to minimise risk to public health, maintain public amenity and protect sensitive environments. Table below from 'Dungog Council Onsite Sewage DAF'.

Table 6-8 Minimum Buffer Distances for On-site System Land Application Systems

System / Land Application Type	Limiting Factor	Minimum Buffer Distance (m)
All Land Application Systems	Permanent surface waters such as: Lakes, rivers, creeks and streams	➤ 100m
	Domestic groundwater wells and bores	➤ 250m
	Other waters such as: Farm dams, intermittent waterways and drainage channels	➤ 40m
	Retaining wall, embankments, escarpments and cuttings.	➤ 15
Surface Spray Irrigation (Standard Spray Heads)	Driveways and property boundaries	➤ 6m if area up gradient ➤ 3m if area down gradient
	Dwellings and buildings	➤ 15m
	<i>Paths and walkways</i>	➤ 3m
	Swimming pools	➤ 6m
	Retaining wall, embankments, escarpments and cuttings.	➤ 12m if area up gradient ➤ 3m if down gradient
Surface Drip and Trickle Irrigation	Dwellings and buildings, swimming pools, property boundaries and driveways. Retaining wall, embankments, escarpments and cuttings.	➤ 6m if area up gradient ➤ 3m if area down gradient
Subsurface Irrigation	Dwellings and buildings, swimming pools, property boundaries and driveways Retaining wall, embankments, escarpments and cuttings.	➤ 6m if area up gradient ¹ ➤ 3m if area down gradient ¹
	<i>Depth to Hardpan or Bedrock</i>	➤ 0.6m below level of pipework ²
Absorption System	<i>Property boundary</i> <i>Retaining wall, embankments,</i> <i>escarpments and cuttings.</i>	➤ 12m if area up gradient ➤ 6m if area down gradient
	<i>Dwellings and buildings, swimming</i> <i>pools and driveways</i>	➤ 6m if area up gradient ➤ 3m if area down gradient
	<i>Depth to Hardpan or Bedrock</i>	➤ 0.6m below base of trench/bed

Permanent Watercourse: Any river, creek, stream or chain of ponds, whether artificially modified or not, in which water usually flows, either continuously or intermittently, in a defined bed or channel

Intermittent Watercourse: A low point with no or little defined bed or channel that carries water during rainfall events, but dries out quickly when rainfall stops. A gully or incised drainage depression is considered to be an intermittent watercourse.



Figure 2: Proposed EDA onsite for existing residence on proposed Lot.



Figure 3: Proposed EDA area onsite for proposed Lot.

5. Onsite Soil Assessment

During the site inspection 6 boreholes were hand excavated with a 100mm auger within the proposed EDAs. 2 boreholes within each proposed EDA. The following are the results from the excavation. The auger holes were used to determine the underlying soil properties. No groundwater was observed in the excavated boreholes.

According to the Port Stephens 1:100 000 Soil Map the proposed dispersal areas onsite are underlain by “Vacy” residual soils. The Vacy Soil Landscape areas generally consist of gentle footslopes and undulating low hills on Carboniferous sediments in the Paterson Mountains region. Slope gradients are generally between 2 - 10%. Underlying soils mostly consist of bleached sandy clay loams traversing to greying yellow brown clays.

Borehole 1

0 – 300mm - brown sandy clay loams
300 – 1000mm – greying yellow brown clays

Borehole 2

0 – 350mm - brown sandy clay loams
350 – 1000mm – greying yellow brown clays

Borehole 3

0 – 400mm - brown sandy clay loams
400 – 1000mm – greying yellow brown clays

Borehole 4

0 – 300mm - brown sandy clay loams
300 – 1000mm – greying yellow brown clays

Borehole 5

0 – 250mm - brown sandy clay loams
250 – 1000mm – greying yellow brown clays

Borehole 6

0 – 300mm - brown sandy clay loams

300 – 1000mm – greying yellow brown clays

Ph and EC

An insitu probe, tested the soil layers for pH and EC, results as below.

Borehole 1

Depth	pH	EC _e (µS/cm)
0 – 300mm	6.8	297
300 – 1000mm	6.2	668

Borehole 2

Depth	pH	EC _e (µS/cm)
0 – 350mm	6.5	498
350 – 1000mm	6.2	1087

Borehole 3

Depth	pH	EC _e (µS/cm)
0 – 400mm	6.1	391
400 – 1000mm	5.9	998

Borehole 4

Depth	pH	EC _e (µS/cm)
0 – 300mm	6.0	448
300 – 1000mm	5.6	784

Borehole 5

Depth	pH	EC _e (µS/cm)
0 – 250mm	5.0	1258
250 – 1000mm	5.2	1687

Borehole 6

Depth	pH	EC _e (µS/cm)
0 – 300mm	5.5	818
300 – 1000mm	5.3	1487

The pH of a soil influences its ability to supply nutrients to vegetation. If the soil is too acidic vegetative growth is inhibited. The electrical conductivity of the soil relates to the amount of salts present. A high salt concentration inhibits vegetative growth.

The electrical conductivity of the soils is less than 4 dS/m. This will not inhibit vegetative growth. The pH of the soil is between 5.0 and 6.8. A regular application of lime and gypsum is recommended to maintain healthy vegetation growth.

Two samples were sent to ALS Australia, a NATA accredited laboratory to determine the insitu reliability as well as the testing of further parameters. Results below and in appendix.

The samples tested at the laboratory were from

- borehole 1, 0-300mm – TP1
- borehole 3, 0-400mm – TP3
- borehole 5, 0-250mm – TP3

Coarse fragments

Coarse fragments are those over 2 mm in diameter. They can pose limitations to vegetative growth by lowering the soil's ability to supply water and nutrients.

<2% of coarse fragments within the boreholes. There were some peds which could be crushed easily using fingers.

Limitation: **LOW**

Exchangeable Sodium Percentage

The exchangeable sodium percentage (ESP) measures the proportion of cation exchange sites occupied by sodium. Soils are considered sodic when the ESP is greater than 6, and highly sodic when the ESP is greater than 15.

TP1 - ESP 0.2 %, suggesting non sodic soils within this area

TP3 - ESP 3.3 %, suggesting non sodic soils within this area

TP5 - ESP 17.9 %, suggesting sodic soils within this area

Once EDA is installed an annual maintenance application rate of the following is to be implemented.

Lime 0.5kg/m² – Subject site calculation = A minimum 300kg across the proposed 600m² EDAs.

Gypsum 0.5kg/m² – Subject site calculation = A Minimum 300kg across the proposed 600m² EDAs.

Cation Exchange Capacity

Cation exchange capacity (CEC) is a measure of the soil's ability to hold positively charged ions. It is a very important soil property influencing soil structure stability, nutrient availability, soil pH and the soil's reaction to fertilisers and other ameliorants. A figure above 10 meq/100g is preferred for plant production. You can improve CEC in weathered soils by adding lime and raising the pH.

TP1 - CEC = 4.2 meq/100g

TP3 - CEC = 7.0 meq/100g

TP5 - CEC = 2.0 meq/100g

Once EDA is installed an annual maintenance application rate of the following is to be implemented.

Lime 0.5kg/m² – Subject site calculation = A minimum 300kg across the proposed 600m² EDAs.

Gypsum 0.5kg/m² – Subject site calculation = A Minimum 300kg across the proposed 600m² EDAs.

Phosphorus Sorption Index

The capacity of a soil to adsorb phosphorus is expressed as its phosphorus sorption capacity.

TP1 P sorb = 250mg P sorbed/kg – laboratory

TP3 P sorb = 312mg P sorbed/kg - laboratory

TP5 P sorb = 310mg P sorbed/kg - laboratory

P sorb = 400mg P sorbed/kg – given figure within literature for clay loam soils

For nutrient balance calculations the lesser of value above is to be utilized

Emerson Aggregate Test

The combination of slaking and dispersion caused a reduction in macroporosity and, therefore, lower infiltration rates and hydraulic conductivities as well as an increase in soil strength and other undesirable soil physical properties. This test classifies the behavior of soil aggregates, when immersed, on their coherence in water. This test was completed inhouse. Soils are divided into seven classes on the basis of their coherence in water, with one further class being distinguished by the presence of calcium-rich minerals.

EAT Class = 2(2). Some slight dispersion potential within underlying soils onsite.

6. System Design/Selection

For the subject site there are a number of methods to treat the wastewater generated onsite. A general septic followed by an absorption pit/trench should not be recommended for the subject site. However, with the site being of high-risk, effluent should be treated to a secondary level followed by subsurface dispersal. A number of dispersal options could be considered, subsurface irrigation, pressure dosed absorption bed and mounds. Subsurface irrigation was the dispersal method recommended and designed. Subsurface irrigation reduces the chance of human contact with the effluent and significantly reduces any potential public health risk.

Proposed Treatment Node

The proposal is to install a NSW Health Accredited AWTS system onsite for the new proposed allotments. The proposal is to continue use of existing AWTS to service existing dwelling. An Aerated Wastewater Treatment System (AWTS) uses aerobic treatment to promote oxidation and microbiological consumption of organic matter by bacteria through facilitated biological processes.

Proposed Effluent Dispersal

The proposal is to install subsurface irrigation onsite. Subsurface irrigation reduces the chance of human contact with the effluent and significantly reduces any potential public health risk. By placing the effluent in the root zone of plants or grasses, beneficial reuse of both the hydraulic and nutrient components of the effluent is maximised, offering enhanced environmental benefits. There are also potential amenity benefits offered by subsurface irrigation, such as less chance of surface saturation and effluent runoff.

Hydraulic Sizing

As per section 6.4.3 of “Dungog Council Onsite Sewage DAF 2015’ the hydraulic sizing was calculated using the following formula.

$$LAA = q / (DLR - CAF)$$

$$LAA = EDA$$

Q = Design Daily Loading Rate (L/day)

DLR = Design Loading Rate (mm/day)

CAF = Climate Adjustment Factor (mm/day)

Proposed Allotment

$$LAA = 960 / (3 - 0)$$

$$LAA = 320\text{m}^2$$

Annual Nutrient Balance

Minimum Area Required for Nitrogen Uptake: 467m²

Minimum Area Required for Phosphorus Uptake: 518m²

As such a minimum 518m² of subsurface irrigation is to be installed onsite for proposed allotment.

Existing Dwelling

$$LAA = 840 / (3 - 0)$$

$$LAA = 280\text{m}^2$$

Annual Nutrient Balance

Minimum Area Required for Nitrogen Uptake: 467m²

Minimum Area Required for Phosphorus Uptake: 595m²

7. Cumulative Impact

One of the proposed allotments have a minimum 4000m² of usable land for effluent dispersal and the other 1905m². The usable land areas meet the setbacks identified within Table 6 – 8 of the ‘Dungog Council Onsite Sewage DAF 2015’. As such a cumulative impact assessment is required for the subject proposal. Image below and in Appendix A show the minimum available areas.



Figure 8: minimum usable land for effluent dispersal for the proposed allotments.

“In order to maintain simplicity in CIA procedures, the following indicative performance objective has been adopted” from the DAF.

- No more than 10% increase in average annual nitrogen and phosphorus loads (kg/year) from existing undeveloped loads
- Average virus concentrations in effluent (following attenuation) of <1 MPN/100ml.

- All land application areas sized to ensure hydraulic failure (surcharging) accounts for only 5% of total wastewater generated (i.e. 95% containment via evapo-transpiration and deep drainage).

Daily Performance Modelling

The detailed cumulative impact assessment includes an assessment of the potential impact of the proposed system on existing “background” water quality and human health. Equations outlined in Fletcher et al (2004) were used to calculate rainfall-runoff processes to derive the ‘background’ hydraulic and nutrient loads associated with sources other than wastewater. Water and nutrient modelling of the proposed wastewater system was undertaken using Model for Effluent Disposal by Land Irrigation (MEDLI). MEDLI was used to derive average annual hydraulic and nutrient loads from the wastewater treatment system to surface and subsurface export routes. Viral die-off modelling was undertaken using Cromer, W. C., Gardner, E. A. and Beavers, P. D. 2001, “An improved viral die-off method for estimating setback distances”.

Onsite System Performance

Water, nutrient and salt modelling was undertaken using Model for Effluent Disposal using Land Irrigation (MEDLI). MEDLI V2 is a water and nutrient mass balance model developed by the Queensland Government Department of Science, Information Technology and Innovation (DSITI) with Version 2 being used for this project. It is capable of simulating storage pond dynamics, irrigation scheduling, plant growth, transpiration and nutrient uptake, soil water and nutrient dynamics and salinity on a daily time step over long periods (up to 100 years). MEDLI is widely accepted throughout Australia as a technically robust tool for simulating the operation of effluent or recycled water irrigation.

Modelling parameters were developed based on the design parameters calculated from bio-physical data sourced from field and desktop investigations. Detailed inputs and outputs of MEDLI modelling can be found in Appendix E.

Table. 1 Summary of MEDLI Inputs

Input	Value/Assumptions	Source
Climate Data	Rainfall, pan evaporation, temperature.	SILO data drill
Wastewater inputs and irrigation	960L/day effluent generation, 600m ² subsurface irrigation	Calculated using desktop and site data
Soil Parameters	Based on in situ soils present. Specific parameters inferred from published sources based on texture and structure.	AS1547: 2012
Horizontal Drainage Rate	Estimated using the Darcy Flux equation based on observed soil profiles and gradients.	Onsite borehole logs and site data
Crop Inputs	Adopted MEDLI default parameters for Kikuyu and assumed limited harvesting (mowing).	MEDLI

A summary of MEDLI mass balance modelling results for the proposed wastewater management system is provided in the table below. The results represent attenuated average annual loads discharging from the site.

It can be seen that a high level of water quality protection can be achieved with target concentrations (ANZECC low risk triggers) met at a short distance from the LAA. All other performance targets, particularly relating to the prevention of surface surcharge of the land application area, have also been met. Modelling results showed zero surface surcharge from the effluent management area which meets the surcharge target of less than or equal to 5% of total wastewater generated.

Table. 2 Summary of MEDLI Results

Average Annual Concentration			Average Annual Load		
TN (mg/L)	TP (mg/L)	Virus (MPN/100ml)	TN (mg/L)	TP (mg/L)	Virus (MPN)
1.02	0.14	>1	0	0	222,346

Site Hydrology and Water Quality

Equations outlined in Fletcher et al (2004) were used to calculate rainfall-runoff processes to derive the 'background' hydraulic and nutrient loads associated with sources other than wastewater.

Table. 3 Background Flow and Pollutant Load Data

Data Input	Value	Source
Property Area	2.875 Ha	Site Plan
Average Annual Rainfall	941 mm	SILO data drill
Volumetric Rainfall Runoff Coefficient	0.13	Derived from equations Fletcher et al (2004)
Average Annual Runoff	123 mm	Calculated
Property Annual Average Runoff	8.1 ML	Calculated
TN Load	5 Kg/ha/yr	Figure 2.2 in Fletcher et al (2004) for 0% imperviousness
TP Load	0.5 Kg/ha/yr	Figure 2.19 in Fletcher et al (2004) for 0% imperviousness

A rainfall runoff coefficient of 0.30 was derived using Figure 2-3 from Fletcher et al (2004). Thus, based on the mean annual rainfall and the property area of 13 ha, total runoff from the property was calculated to be approximately 7.79 ML/yr. Results are summarised below and indicate that in general nitrogen and phosphorus export from the study site is largely dominated by these non-wastewater sources. Thus, the proposed on-site systems are not likely to be a substantial contributor to nitrogen or phosphorus loads based on these results.

Table. 4 Background Load Calculations

Flow (ML/yr)	Average Annual Concentration		Average Annual Load	
	TN (mg/L)	TP (mg/L)	TN (kg)	TP (kg)
8.1	0.64	0.01	13	1.3

Pollution Attenuation

Pollutant attenuation factors were applied to on-site system (MEDLI) loads prior to inclusion in a mass balance.

The results are summarised in the following table. It can be seen that negligible off-site impacts are expected and water quality targets can be achieved under a range of scenarios. The long term nutrient loads are expected to reach the DAF target of <10% increase on background loads within a <1m distance from the LAA. Additionally, these nutrient loads are expected to reach the ANZECC low risk trigger of 0.015 mg/L for nitrogen and phosphorus within approximately <1m of land application respectively.

Long-term virus plume modelling indicates adequate viral die-off subject to effective performance of the proposed secondary treatment system. For virus export modelling, the minimum distance

required to achieve total viral dieoff (<0.5 MPN/L in the modelling) was evaluated and determined to be approximately 2.8m from the LAA. As such, a high quality of treatment is expected for both nutrients and pathogens onsite.

Table. 5 Summary of Effluent Flume Modelling

Parameter	Scenario	Result	Summary
Phosphate	Annual Average	<1m Setback	No setback required to achieve <10% increase on background TP loads (50 yrs)
		<1m Setback	Distance required to achieve ANZECC low risk trigger concentration (0.015 mg/L)
		>50 Years	No breakout expected during operational life of system.
Nitrate	Annual Average	No Setback	No setback required to achieve <10% increase on background TN loads.
		<1m Setback	Distance required to achieve ANZECC low risk trigger concentration (0.015 mg/L)
Virus	Annual Average	0.4m setback	Based on secondary treatment and disinfection with median decay rate. Total die-off achieved approximately 2.8m from the LAA

Hydraulic Performance

MEDLI modelling confirmed that 100% of total wastewater generated by the proposal will be contained on-site. This means long-term hydraulic failure from the land application area is negligible.

Offsite Impacts

A mass balance calculation was performed utilising both the calculated 'background' loads (derived from Fletcher et al (2004)) and the nutrient loads resulting from the wastewater treatment system (derived using MEDLI) to assess the environment / health performance of the proposed wastewater treatment systems. Off-site impacts were assessed by combined loads through a mass balance following application of the appropriate attenuation factors. The results are shown in the table below.

Table. 6 Final Offsite Impact assessment Results (Created wastewater and Background) for 600m².

Average Annual Concentration			Average Annual Load		
TN (mg/L)	TP (mg/L)	Virus (MPN/L)	TN (mg/L)	TP (mg/L)	Virus (MPN)
1.02	0.14	>1	13	1.3	222,346

Sensitivity testing of viral die off and attenuation was undertaken as part of groundwater plume

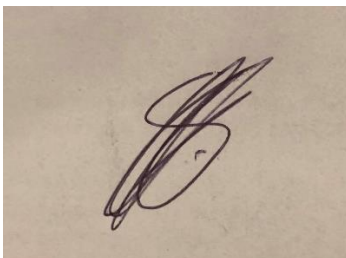
modelling. It can be seen that a high level of protection is provided by the proposed system under all scenarios. Even under the extreme case scenario (very low probability), total viral die-off is expected 2.8m from the proposed LAA and prior to groundwater plumes reaching onsite waterbodies, such, the outcomes of the viral plume modelling are considered effective and acceptable.

For 595m² sized effluent dispersal field the initial required performance objective of $\leq 10\%$ increase in background loads was not achievable. As such the dispersal field area has been increased to 600m² which brings the dispersal system into allowable background objectives.

The results show that average annual loads for nitrogen, phosphorous and viruses for the proposed on-site system meet the required performance objectives of $\leq 10\%$ increase in background loads. Average annual virus concentrations in the effluent portion of study area discharge are < 1 MPN/100mL for the proposed system. This suggests off-site viral health risks can be considered minor to low risk.

8. Recommendations

- Installation of NSW Health Accredited AWTS system onsite to treat the calculated flowrate of 960L/day for the proposed allotments.
- Installation of subsurface effluent dispersal field of a minimum 600m² for all allotments.
- The existing dwelling to continue to be serviced by current AWTS onsite.
- Stock must be kept out of the EDAs by fencing or other physical barrier.
- Upslope diversion drains to be installed around the proposed EDA.
- This design assumes at least three-star rated plumbing fixtures are used in any new development.

A handwritten signature in dark ink on a light-colored, textured paper background. The signature is stylized and appears to be 'S. Doberer'.

Simon Doberer
Principle Environmental Scientist
B.Sc. (ENV)

Appendix A – Site Plans



Farm Dam

Overland Flowpath

Existing Dwelling

Shed

Pool

Existing AWTS

Potential Building Envelope

Potential Building Envelope

600m2 Irrigation Area (Subsurface Drip)

600m2 Irrigation Area (Subsurface Drip)

600m2 Irrigation Area (Subsurface Drip)

3000

21000

20000

10000

17500

40000

40000

41000

40000

10000

10000

10000

10000

10000

10000

10000

10000

10000

10000

10000

10000

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10000

10000

10000

10000

10000

10000

10000

10000

10000

10000

10000

X6

X5

X3

X4

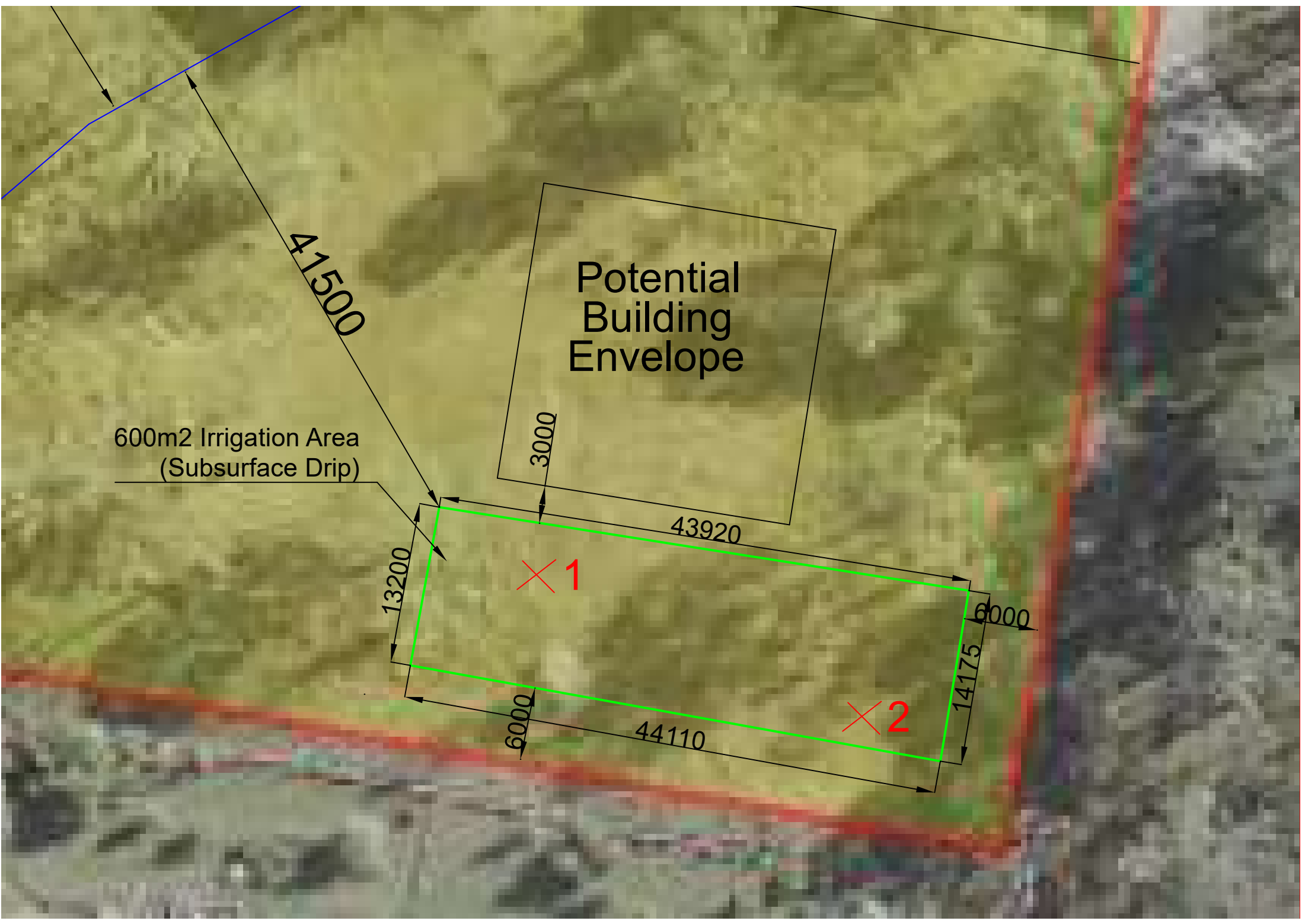
X1

X2

Potential Building Envelope



600m2 Irrigation Area
(Subsurface Drip)



41500

Potential Building Envelope

3000

600m2 Irrigation Area
(Subsurface Drip)

43920

X 1

13200

6000

X 2

6000

44110

14175

600m² Irrigation Area
(Subsurface Drip)

Existing
Dwelling

Existing
AWTS

Pool

40000

40000





Farm Dam

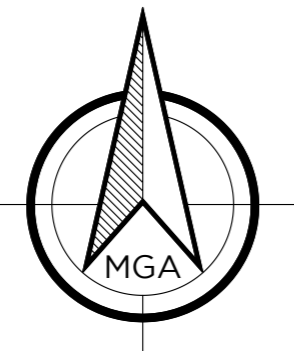
4000m2 Available Area

1905m2 Available Area

Appendix B – Proposed Plans

NOTES:

1. FEATURES SHOWN TO SCALE ACCURACY.
2. THIS PLAN IS SUITABLE FOR DETAILED PLANNING AND DESIGN AT THE SCALE/S STATED. THE PLAN MAY NOT BE SUITABLE FOR ANY OTHER PURPOSE OR FOR USE AT ANY OTHER SCALE/S.
3. SERVICES LOCATED ONLY WHERE VISIBLE.
4. THE LOCATION OF ALL UNDERGROUND SERVICES WHETHER SHOWN ON THE PLAN OR NOT, SHOULD BE PRECISELY DETERMINED BEFORE ANY CONSTRUCTION WORK COMMENCES AND MEASURES TAKEN TO PROTECT THESE SERVICES FROM DAMAGE.
5. CONTOUR INTERVAL - 0.5m
6. THE BOUNDARIES SHOWN ARE APPROXIMATE ONLY. THE BOUNDARIES SHOWN HAVE BEEN COMPILED FROM THE RELEVANT DEPOSITED PLANS. FURTHER SURVEY WILL BE REQUIRED IF CONSTRUCTION IS TO TAKE PLACE ON OR ADJACENT TO THE BOUNDARIES.

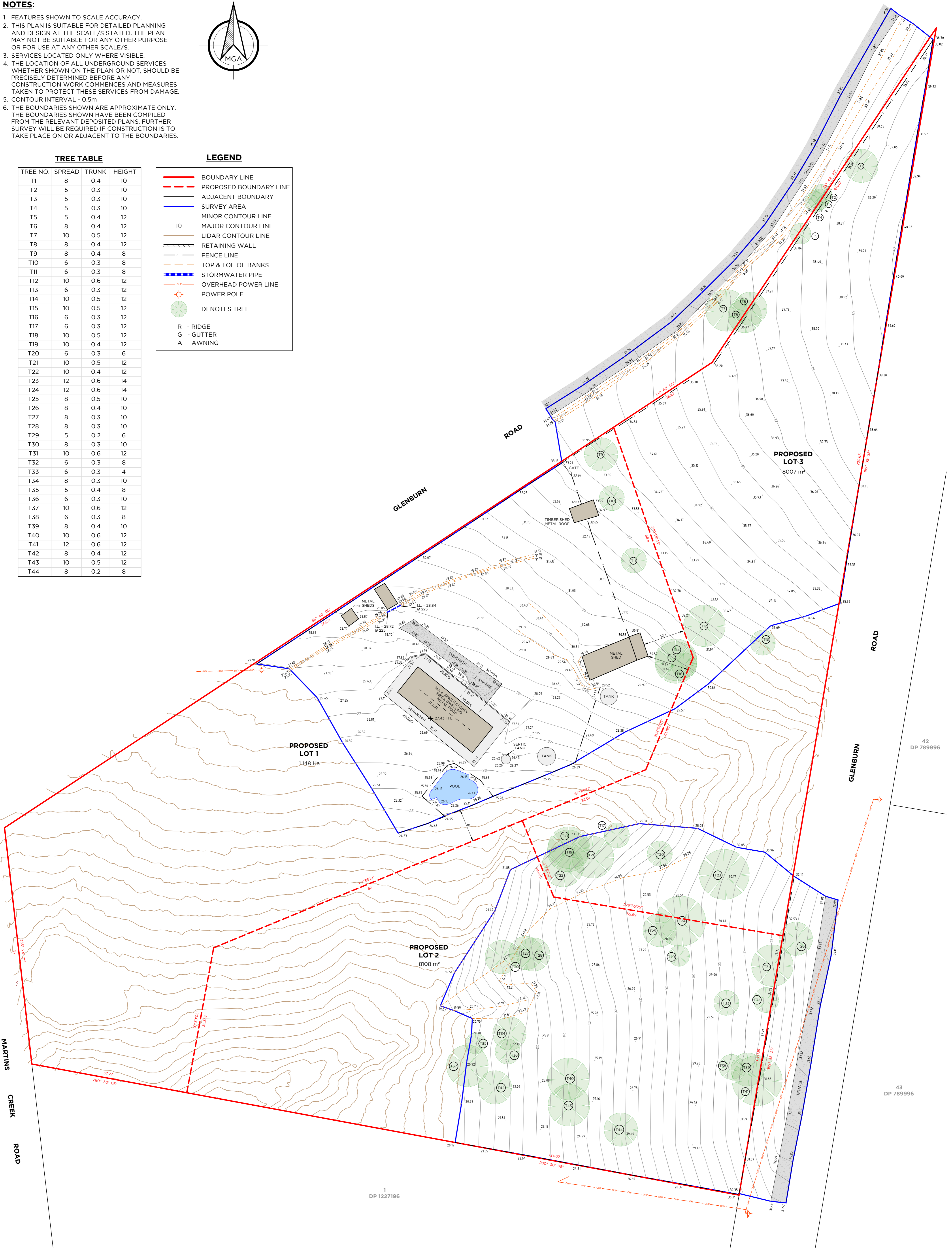


TREE TABLE

TREE NO.	SPREAD	TRUNK	HEIGHT
T1	8	0.4	10
T2	5	0.3	10
T3	5	0.3	10
T4	5	0.3	10
T5	5	0.4	12
T6	8	0.4	12
T7	10	0.5	12
T8	8	0.4	12
T9	8	0.4	8
T10	6	0.3	8
T11	6	0.3	8
T12	10	0.6	12
T13	6	0.3	12
T14	10	0.5	12
T15	10	0.5	12
T16	6	0.3	12
T17	6	0.3	12
T18	10	0.5	12
T19	10	0.4	12
T20	6	0.3	6
T21	10	0.5	12
T22	10	0.4	12
T23	12	0.6	14
T24	12	0.6	14
T25	8	0.5	10
T26	8	0.4	10
T27	8	0.3	10
T28	8	0.3	10
T29	5	0.2	6
T30	8	0.3	10
T31	10	0.6	12
T32	6	0.3	8
T33	6	0.3	4
T34	8	0.3	10
T35	5	0.4	8
T36	6	0.3	10
T37	10	0.6	12
T38	6	0.3	8
T39	8	0.4	10
T40	10	0.6	12
T41	12	0.6	12
T42	8	0.4	12
T43	10	0.5	12
T44	8	0.2	8

LEGEND

- BOUNDARY LINE
 - - - PROPOSED BOUNDARY LINE
 - ADJACENT BOUNDARY
 - SURVEY AREA
 - MINOR CONTOUR LINE
 - MAJOR CONTOUR LINE
 - LIDAR CONTOUR LINE
 - RETAINING WALL
 - FENCE LINE
 - TOP & TOE OF BANKS
 - - - STORMWATER PIPE
 - - - OVERHEAD POWER LINE
 - POWER POLE
 - DENOTES TREE
- R - RIDGE
G - GUTTER
A - AWNING



REV.	DATE	AMENDMENT(S)	SUR	DFT	CHK
A	19.03.24	ORIGINAL ISSUE	SF	JD	TC
B	25.03.24	PROPOSED BOUNDARIES AMENDED	--	TC	TC
C	27.03.24	PROPOSED BOUNDARIES AMENDED	--	TC	TC

DELFS LASCELLES
CONSULTING SURVEYORS

260 MAITLAND ROAD, MAYFIELD NSW 2304
ABN: 28 164 260 100

T: (02) 4964 4886
E: admin@delacs.com.au
delacs.com.au

CAD REF: 24120 - DET_Rev C

PARTIAL DETAIL SURVEY & PROPOSED SUBDIVISION OF LOT 41 DP 789996

SITE ADDRESS: 4 GLENBURN ROAD PATERSON

CLIENT: A. PILGRIM

POSITION DATUM: SSM 55510
ORIENTATION: MGA 2020 (GND)
EASTING: 371 449.207
NORTHING: 6 392 880.088
CLASS: A
HEIGHT DATUM: SSM 55510
CLASS: B
RL: 24.954 (AHD)
DATE: 04.03.24

JAS-ANZ
BEFORE YOU DIG

SURVEYED	DRAFTED	CHECKED
SF	JD	TC

SCALE	PAGE SIZE	DATE
1:400	A1	12.03.24

SHEET	REV.	PROJECT No.
1	C	24120

Appendix C – Operation and Maintenance Guideline

ON-SITE SEWAGE MANAGEMENT SYSTEMS

If you live in or rent a house that is not connected to the main sewer then chances are that your yard contains an on-site sewage management system. If this is the case then you have a special responsibility to ensure that it is working as well as it can.

The aim of this pamphlet is to introduce you to some of the most popular types of on-site sewage management systems and provide some general information to help you maintain your system effectively. You should find out what type of system you have and how it works.

More information can be obtained from the pamphlets:

Your Septic System
Your Aerated Wastewater Treatment System
Your Composting Toilet
Your Land Application Area

You can get a copy of these pamphlets from your local council or the address marked on the back of this pamphlet.

It is important to keep in mind that maintenance needs to be performed properly and regularly. Poorly maintained on-site sewage management systems can significantly affect you and your family's health as well as the local environment.

What is an on-site sewage management system?

A domestic on-site sewage management system is made up of various components which - if properly designed, installed and maintained - allow the treatment and utilisation of wastewater from a house, completely within the boundary of the property.

Wastewater may be blackwater (toilet waste), or greywater (water from showers, sinks, and washing machines), or a combination of both.

Partial on-site systems - eg. pump out and common effluent systems (CES) - also exist. These usually involve the preliminary on-site treatment of wastewater in a septic tank, followed by collection and transport of the treated wastewater to an off-site management facility. Pump out systems use road tankers to transport the effluent, and CES use a network of small diameter pipes.

How does an on-site sewage management system work?

For complete on-site systems there are two main processes:

1. treatment of wastewater to a certain standard
2. its application to a dedicated area of land.

The type of application permitted depends on the quality of treatment, although you should try to avoid contact with all treated and untreated wastewater, and thoroughly wash affected areas if contact does occur.

Treatment and application can be carried out using various methods:

Septic Tank

Septic tanks treat both greywater and blackwater, but they provide only limited treatment through the settling of solids and the flotation of fats and greases. Bacteria in the tank break down the solids over a period of time. Wastewater that has been treated in a septic tank can only be applied to land through a covered soil absorption system, as the effluent is still too contaminated for above ground or near surface irrigation.

AWTS

Aerated wastewater treatment systems (AWTS) treat all household wastewater and have several treatment compartments. The first is like a septic tank, but in the second compartment air is mixed with the wastewater to assist bacteria to break down solids. A third compartment allows settling of more solids and a final chlorination contact chamber allows disinfection. Some AWTS are constructed with all the compartments inside a single tank. The effluent produced may be surface or sub-surface irrigated in a dedicated area.

Composting Toilets

Composting toilets collect and treat toilet waste only. Water from the shower, sinks and the washing machine needs to be treated separately (for example in a septic tank or AWTS as above). The compost produced by a composting toilet has special requirements but is usually buried on-site.

These are just some of the treatment and application methods available, and there are many other types such as sand filter beds, wetlands, and amended earth mounds. Your local council or the NSW Department of Health have more information on these systems if you need it.

Regulations and recommendations

The NSW Department of Health determines the design and structural requirements for treatment systems for single households. Local councils are primarily responsible for approving the installation of smaller domestic septic tank systems, composting toilets and AWTSs in their area, and are also responsible for approving land application areas. The NSW Environment Protection Authority approves larger systems.

The design and installation of on-site sewage management systems, including plumbing and drainage, should only be carried out by suitably qualified or experienced people. Care is needed to ensure correct sizing of the treatment system and application area.

Heavy fines may be imposed under the Clean Waters Act if wastewater is not managed properly.

Keeping your on-site sewage management system operating well

What you put down your drains and toilets has a lot to do with how well your system performs. Maintenance of your sewage management system also needs to be done well and on-time. The following is a guide to the types of things you should and should not do with your system.

DO

- ✓ Learn how your sewage management system works and its operational and maintenance requirements.
- ✓ Learn the location and layout of your sewage management system.
- ✓ Have your AWTS (if installed) inspected and serviced four times per year by an approved contractor. Other systems should be inspected at least once every year. Assessment should be applicable to the system design.
- ✓ Keep a record of desludgings, inspections, and other maintenance.
- ✓ Have your septic tank or AWTS desludged every three years to prevent sludge build up, which may 'clog' the pipes.
- ✓ Conserve water. Conservative water use around the house will reduce the amount of wastewater which is produced and needs to be treated.
- ✓ Discuss with your local council the adequacy of your existing sewage management system if you are considering house extensions for increased occupancy.

DON'T

- ✗ Don't let children or pets play on land application areas.
- ✗ Don't water fruit and vegetables with effluent.
- ✗ Don't extract untreated groundwater for cooking and drinking.
- ✗ Don't put large quantities of bleaches, disinfectants, whiteners, nappy soakers and spot removers into your system via the sink, washing machine or toilet.
- ✗ Don't allow any foreign materials such as nappies, sanitary napkins, condoms and other hygiene products to enter the system.
- ✗ Don't put fats and oils down the drain and keep food waste out of your system.
- ✗ Don't install or use a garbage grinder or spa bath if your system is not designed for it.

Reducing water usage

Reducing water usage will lessen the likelihood of problems such as overloading with your septic system. Overloading may result in wastewater backing up into your house, contamination of your yard with improperly treated effluent, and effluent from your system contaminating groundwater or a nearby waterway.

Your sewage management system is also unable to cope with large volumes of water such as several showers or loads of washing over a short period of time. You should try to avoid these 'shock loads' by ensuring water use is spread more evenly throughout the day and week.

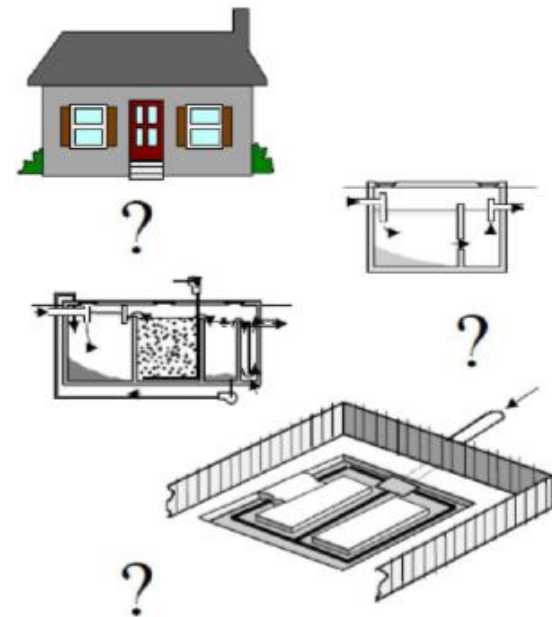
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained sewage management systems are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

By looking after your management system you can do your part in helping to protect the environment and the health of you and your community.

For more information please contact:

Managing Wastewater In Your Backyard



Aerated Wastewater Treatment Systems (AWTS)

In unsewered areas, the proper treatment and utilisation of household wastewater on-site is critical in preserving the health of the public and the environment. AWTS have been developed as a way of achieving this.

What is an AWTS?

An AWTS is a purpose built system used for the treatment of sewage and liquid wastes from a single household or multiple dwellings.

It consists of a series of treatment chambers combined with an irrigation system. An AWTS enables people living in unsewered areas to treat and utilise their wastewater.

How does an AWTS work?

Wastewater from a household is treated in stages in several separate chambers. The first chamber is similar to a conventional septic tank. The wastewater enters the chamber where the solids settle to the bottom and are retained in the tank forming a sludge layer. Scum collects at the top, and the partially clarified wastewater flows into a second chamber. Here the wastewater is mixed with air

to assist bacteria to further treat it. A third chamber allows additional clarification through the settling of solids, which are returned for further treatment to either the septic chamber (as shown) or to the aeration chamber. The clarified effluent is disinfected in another chamber (usually by chlorination) before irrigation can take place.

Bacteria in the first chamber break down the solid matter in the sludge and scum layers. Material that cannot be fully broken down gradually builds up in the chamber and must be pumped out periodically.

Regulations and recommendations

Local councils are primarily responsible for approving the smaller, domestic AWTSs in their area. The Environment Protection Authority (EPA) approves larger units, whilst the NSW Department of Health determines the design and structural requirements for all AWTSs.

At present AWTSs need to be serviced quarterly by an approved contractor at a cost to the owner. Local councils should also maintain a register of the servicing of each system within their area.

AWTSs should be fitted with an alarm having visual and audible components to indicate mechanical and electrical equipment malfunctions. The alarm should provide a signal adjacent to the alarm and at a relevant position inside the house. The alarm should incorporate a warning lamp which may only be reset by the service agent.

Maintaining your AWTS

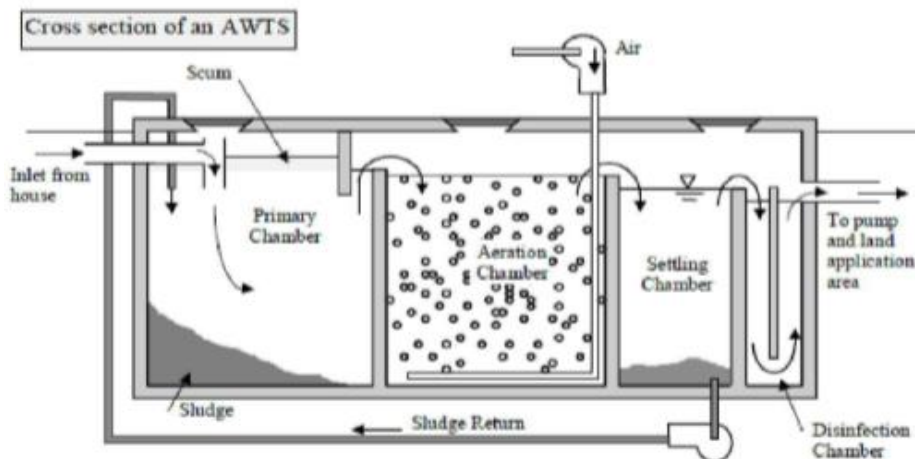
The effectiveness of the system will, in part, depend on how it is used and maintained. The following is a guide on good maintenance procedures that you should follow:

DO

- ✓ Have your AWTS inspected and serviced four times per year by an approved contractor. Assessment should be applicable to the system design.
- ✓ Have your system service include assessment of sludge and scum levels in all tanks, and performance of irrigation areas.
- ✓ Have all your tanks desludged at least every three years.
- ✓ Have your disinfection chamber inspected and tested quarterly to ensure correct disinfectant levels.
- ✓ Have your grease trap (if installed) cleaned out at least every two months.
- ✓ Keep a record of pumping, inspections, and other maintenance.
- ✓ Learn the location and layout of your AWTS and land application area.
- ✓ Use biodegradable liquid detergents such as concentrates with low sodium and phosphorous levels.
- ✓ Conserve water.

DON'T

- ✗ Don't put bleaches, disinfectants, whiteners, nappy soakers and spot removers in large quantities into your AWTS via the sink, washing machine or toilet.
- ✗ Don't allow any foreign materials such as nappies, sanitary napkins, condoms and other hygiene products to enter the system.
- ✗ Don't use more than the recommended amounts of detergents.
- ✗ Don't put fats and oils down the drain and keep food waste out of your system.
- ✗ Don't switch off power to the AWTS, even if you are going on holidays



Reducing water usage

Reducing water usage will lessen the likelihood of problems such as overloading with your AWTs. Overloading may result in wastewater backing up into your house, contamination of your yard with improperly treated effluent, and effluent from your system entering a nearby river, creek or dam.

Conservative water use around the house will reduce the amount of wastewater which is produced and needs to be treated.

Your AWTs is also unable to cope with large volumes of water such as several showers or loads of washing over a short period of time. You should try to avoid these 'shock loads' by ensuring water use is spread more evenly throughout the day and week.

Warning signs

You can look out for a few warning signs that signal to you that there are troubles with your AWTs. Ensure that these problems are attended to immediately to protect your health and the environment.

Look out for the following warning signs:

- ⚠ Water that drains too slowly.
- ⚠ Drain pipes that gurgle or make noises when air bubbles are forced back through the system.
- ⚠ Sewage smells, this indicates a serious problem.
- ⚠ Water backing up into your sink which may indicate that your system is already failing.
- ⚠ Wastewater pooling over the land application area.
- ⚠ Black coloured effluent in the aerated tank.
- ⚠ Excess noise from the blower or pumping equipment.
- ⚠ Poor vegetation growth in irrigated area.

- ⚠ Black coloured effluent in the aerated tank.
- ⚠ Excess noise from the blower or pumping equipment.
- ⚠ Poor vegetation growth in irrigated area.

Odour problems from a vent on the AWTs can be a result of slow or inadequate breakdown of solids. Call a technician to service the system.

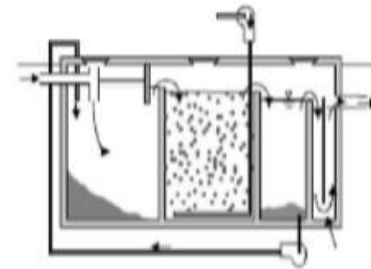
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained AWTs are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

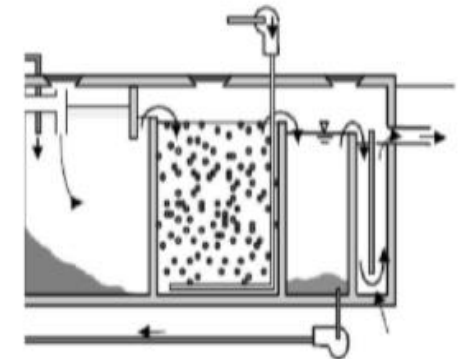
By looking after your treatment system you can do your part in helping to protect the environment and the health of you and your family.

If you would like more information please contact:

Your Aerated Wastewater Treatment System



Your Aerated Wastewater Treatment System



LAND APPLICATION AREAS

The reuse of domestic wastewater on-site can be an economical and environmentally sound use of resources.

What are land application areas?

These are areas that allow treated domestic wastewater to be managed entirely on-site.

The area must be able to utilise the wastewater and treat any organic matter and wastes it may contain. The wastewater is rich in nutrients, and can provide excellent nourishment for flower gardens, lawns, certain shrubs and trees. The vegetation should be suitably tolerant of high water and nutrient loads.

How does a land application area work?

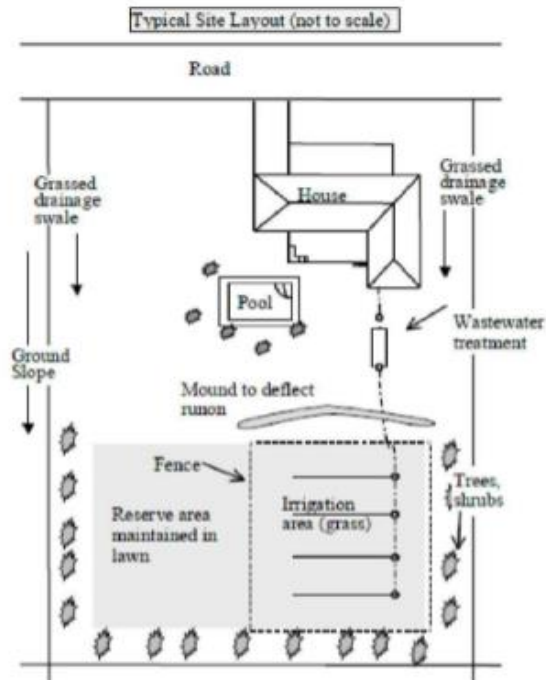
Treated wastewater applied to a land application area may be utilised or simply disposed, depending on the type of application system that is used. The application of the wastewater can be through a soil absorption system (based on disposal) or through an irrigation system (based on utilisation).

Soil absorption systems do not require highly treated effluent, and wastewater treated by a septic tank is reasonable as the solids content in the effluent has been reduced. Absorption systems release the effluent into the soil at a depth that cannot be reached by the roots of most small shrubs and grasses. They rely mainly on the processes of soil treatment and then transmission to the water table, with minimal evaporation and up-take by plants. **These systems are not recommended in sensitive areas as they may lead to contamination of surface water and groundwater.**

Irrigation systems may be classed as either subsurface or surface irrigation. If an irrigation system is to be used, wastewater needs to be pre-treated to at least the quality produced by an aerated wastewater treatment system (AWTS).

Subsurface irrigation requires highly treated effluent that is introduced into the soil close to the surface. The effluent is utilised mainly by plants and evaporation.

Surface irrigation requires highly treated effluent that has undergone aeration and disinfection treatments, so as to reduce the possibility of bacteria and virus contamination.



The effluent is then applied to the land area through a series of drip, trickle, or spray points which are designed to eliminate airborne drift and run-off into neighbouring properties.

There are some public health and environmental concerns about surface irrigation. There is the risk of contact with treated effluent and the potential for surface run-off. Given these problems, subsurface irrigation is arguably the safest, most efficient and effective method of effluent utilisation.

Regulations and recommendations

The design and installation of land application areas should only be carried out by suitably qualified or experienced people, and only after a site and soil evaluation is done by a soil scientist. Care should be

taken to ensure correct buffer distances are left between the application area and bores, waterways, buildings, and neighbouring properties.

Heavy fines may be imposed under the Clean Waters Act if effluent is managed improperly.

At least two warning signs should be installed along the boundary of a land application area. The signs should comprise of 20mm high Series C lettering in black or white on a green background with the words:

**RECLAIMED EFFLUENT
NOT FOR DRINKING
AVOID CONTACT**

Depending on the requirements of your local council, wet weather storage and soil moisture sensors may need to be installed to ensure that effluent is only irrigated when the soil is not saturated.

Regular checks should be undertaken of any mechanical equipment to ensure that it is operating correctly. Local councils may require periodic analysis of soil or groundwater characteristics

Humans and animals should be excluded from land application areas during and immediately after the application of treated wastewater. The longer the period of exclusion from an area, the lower the risk to public health.

The householder is required to enter into a service contract with the installation company, its agent or the manufacturer of their sewage management system, this will ensure that the system operates efficiently.

Location of the application area

Treated wastewater has the potential to have negative impacts on public health and the environment. For this reason the application area must be located in accordance with the results of a site evaluation, and approved landscaping must be completed prior to occupation of the building. Sandy soil and clayey soils may present special problems.

The system must allow even distribution of treated wastewater over the land application area.

Maintaining your land application area

The effectiveness of the application area is governed by the activities of the owner.

DO

- ✓ Construct and maintain diversion drains around the top side of the application area to divert surface water.
- ✓ Ensure that your application area is kept level by filling any depressions with good quality top soil (not clay).
- ✓ Keep the grass regularly mowed and plant small trees around the perimeter to aid absorption and transpiration of the effluent.
- ✓ Ensure that any run off from the roof, driveway and other impermeable surfaces is directed away from the application area.
- ✓ Fence irrigation areas.
- ✓ Ensure appropriate warning signs are visible at all times in the vicinity of a spray irrigation area.
- ✓ Have your irrigation system checked by the service agent when they are carrying out service on the treatment system.

DON'T

- ✗ Don't erect any structures, construct paths, graze animals or drive over the land application area.
- ✗ Don't plant large trees that shade the land application area, as the area needs sunlight to aid in the evaporation and transpiration of the effluent.
- ✗ Don't plant trees or shrubs near or on house drains.
- ✗ Don't alter stormwater lines to discharge into or near the land application area.
- ✗ Don't flood the land application area through the use of hoses or sprinklers.
- ✗ Don't let children or pets play on land application areas.
- ✗ Don't water fruit and vegetables with the effluent.
- ✗ Don't extract untreated groundwater for potable use.

Warning signs

Regular visual checking of the system will ensure that problems are located and fixed early.

The visual signs of system failure include:

- ⚠ surface ponding and run-off of treated wastewater
- ⚠ soil quality deterioration
- ⚠ poor vegetation growth
- ⚠ unusual odours

Volume of water

Land application areas and systems for on-site application are designed and constructed in anticipation of the volume of waste to be discharged. Uncontrolled use of water may lead to poorly treated effluent being released from the system.

If the land application area is waterlogged and soggy the following are possible reasons:

- A Overloading the treatment system with wastewater.
- A The clogging of the trench with solids not trapped by the septic tank. The tank may require desludging.
- A The application area has been poorly designed.
- A Stormwater is running onto the area.

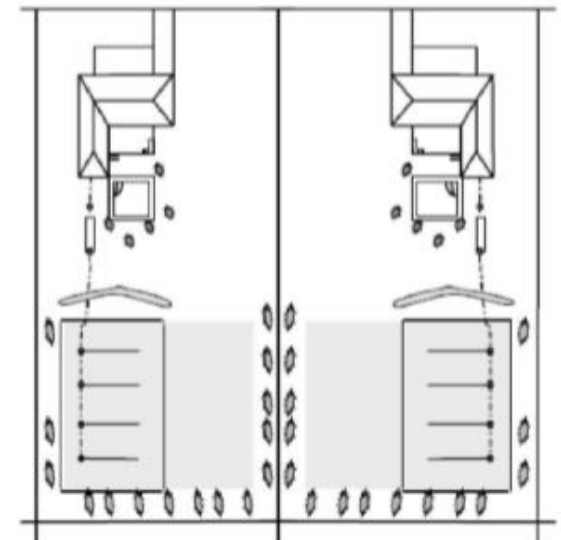
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained land application areas are a serious source of water pollution and may present health risks, cause odours and attract vermin and insects.

By looking after your sewage management system you can do your part in helping to protect the environment and the health of you and your family.

For more information please contact:

Your Land Application Area



Appendix D – Laboratory Results



CERTIFICATE OF ANALYSIS

Work Order	: ES2407912	Page	: 1 of 3
Client	: GSL Environmental	Laboratory	: Environmental Division Sydney
Contact	: Simon Doberer	Contact	: Mechelle Sahyoun
Address	: 71 Moona Creek Road Vincentia	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Glenburn Road, PATERSON	Date Samples Received	: 07-Mar-2024 19:00
Order number	: 124924	Date Analysis Commenced	: 12-Mar-2024
C-O-C number	: ----	Issue Date	: 25-Mar-2024 14:18
Sampler	: Simon Doberer		
Site	: ----		
Quote number	: EW23GSLENV0001		
No. of samples received	: 3		
No. of samples analysed	: 3		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H⁺ + Al³⁺).



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	TP1	TP3	TP5	----	----
Sampling date / time				06-Mar-2024 00:00	06-Mar-2024 00:00	06-Mar-2024 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES2407912-001	ES2407912-002	ES2407912-003	-----	-----	
				Result	Result	Result	----	----	
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit	7.3	5.9	4.8	----	----	
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm	11	23	74	----	----	
ED006: Exchangeable Cations on Alkaline Soils									
∅ Exchangeable Calcium	----	0.2	meq/100g	2.4	----	----	----	----	
∅ Exchangeable Magnesium	----	0.2	meq/100g	1.3	----	----	----	----	
∅ Exchangeable Potassium	----	0.2	meq/100g	0.4	----	----	----	----	
∅ Exchangeable Sodium	----	0.2	meq/100g	<0.2	----	----	----	----	
∅ Cation Exchange Capacity	----	0.2	meq/100g	4.2	----	----	----	----	
∅ Exchangeable Sodium Percent	----	0.2	%	<0.2	----	----	----	----	
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g	----	4.2	0.3	----	----	
Exchangeable Magnesium	----	0.1	meq/100g	----	2.0	1.2	----	----	
Exchangeable Potassium	----	0.1	meq/100g	----	0.5	0.1	----	----	
Exchangeable Sodium	----	0.1	meq/100g	----	0.2	0.4	----	----	
Cation Exchange Capacity	----	0.1	meq/100g	----	7.0	2.0	----	----	
Exchangeable Sodium Percent	----	0.1	%	----	3.3	17.9	----	----	
EK072: Phosphate Sorption Capacity									
Phosphate Sorption Capacity	----	250	mg P sorbed/kg	<250	312	310	----	----	



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095
Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 8500 Gladstone Rd Gladstone QLD 4750
Ph: 07 4742 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2522
Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GSL Environmental		TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)		<input type="checkbox"/> Standard TAT (List due date): <input type="checkbox"/> Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY (Circle)		
OFFICE: 71 Moona Creek Road, VINCENTIA		ALS QUOTE NO.: EW23GSENV0001		COC SEQUENCE NUMBER (Circle)		Custody Seal Intact? Yes No N/A		
PROJECT: Glenburn Road, PATERSON		CONTACT PH: 0416935868		COC: 1 2 3 4 5 6 7		Free ice / frozen ice bricks present upon receipt? Yes No N/A		
ORDER NUMBER: 124924		SAMPLER MOBILE: 0416935868		OF: 1 2 3 4 5 6 7		Random Sample Temperature on Receipt: °C		
PROJECT MANAGER: Simon Doberer		RELINQUISHED BY: Simon Doberer		RECEIVED BY: <i>[Signature]</i>		RELINQUISHED BY:		
SAMPLER: Simon Doberer		DATE/TIME: 07/03/2024		DATE/TIME: 7/3/24 1900		RECEIVED BY:		
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):				DATE/TIME:		
Email Reports to (will default to PM if no other addresses are listed): gslenvironmental@outlook.com						DATE/TIME:		
Email Invoice to (will default to PM if no other addresses are listed): gslenvironmental@outlook.com						DATE/TIME:		
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:								

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).					Additional Information		
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <i>(refer to codes below)</i>	TOTAL CONTAINERS	IN-4S	ED007	EK072 (P) Sorption Capacity				
	1	TP1	6/03/2024	s		1	1	1	1				
	2	TP3	6/03/2024	s		1	1	1	1				
	3	TP5	6/03/2024	s		1	1	1	1				
TOTAL						3	3	3	3				

Environmental Division
Sydney
Work Order Reference
ES2407912

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Appendix E – Balances

Nutrient Balances

Parameters

Parameters	Symbol	Value
Daily Wastewater (L/Day)	Q	960
Total Nitrogen in Effluent (mg/L)	TN	40
Total Phosphorus in Effluent (mg/L)	TP	12
Design Life of System (Years)	L	50
P Sorption Soil Capacity (mg/kg)	Psorp	250
P Sorption Soil Capacity Field Coefficient (%)	PsorpC	0.5
Soil Depth for P Sorption	D	0.8
Bulk Density of Soil (g/cm ³)	B	1.8
Nitrogen Plant Uptake (kg/Ha/year)	NPU	240
Phosphorus Plant Uptake (kg/Ha/year)	PPU	30

Model Inputs

Applied Total Nitrogen (kg/year)	TN _A	14.02	$TN_A = (Q * TN * 365) / 1,000,000$
Applied Total Phosphorus (kg/year)	TP _A	4.20	$TP_A = (Q * TP * 365) / 1,000,000$

Model Outputs

Subsoil Nitrogen Soil Losses (kg/year)	NL	2.80	$NL = TN_A * 20\%$
Phosphorus Sorption by Soil (kg/m ²)	PS	0.18	$PS = ((Psorp / 1,000,000) * (B * 1,000)) * D * PsorpC$
Phosphorus Plant Uptake Over Design Life (kg/m ²)	PPU _L	0.15	$PPU_L = (PPU / 10,000) * L$

Model Results

Minimum Area Required for Nitrogen Uptake (m ²)	NUA _N	467	$NUA_N = ((TN_A - NL) / NPU) * 1,000$
Minimum Area Required for Phosphorus Uptake (m ²)	NUA _P	595	$NUA_P = (TP_A * L) / (PS + PPU_L)$
Maximum Area for Nutrient Uptake (m ²)	NUA	595	Max Value of NUA _N and NUA _P

Appendix F – Viral Dieoff Calculation

Beavers, Cromer, Gardner Viral Dieoff Model

Input Data		Source
Groundwater Temperature (C)	12.2	Mean minimum air temp (BoM)
Orders of Magnitude Reduction	2	Cromer et al for wastewater treatment level
Days Required for Viral Reduction	26	Figure 1 of Cromer et al
Bulk Density of Soil (g/m ³)	1.6	Table 2.18 of Hazelton and Murphy (2007)
Saturated Hydraulic Conductivity (m/day)	0.5	Table 5.2 AS1547:2012
Groundwater Gradient (fraction)	0.1	From Site Investigation
Vertical Drainage before Entering Groundwater	1	From Site Investigation

Calculate the predicted travel distance using equation 4 from Cromer et al (2001).

$$D_g = (t - d_v * P / K) / (P / K * i)$$

Time in days = t	26
Effective porosity of soil = P	0.45
Saturated hydraulic conductivity = K	0.5
Groundwater gradient = i	0.1
Vertical drainage before entering groundwater = d_v	1
Distance Travelled in Groundwater = D_g (m)	2.8

Appendix E – MEDLI Data

Climate Data: Paterson, -32.63°, 151.59°

Run Period: 01/01/1916 to 31/12/2011 96 years, 0 days

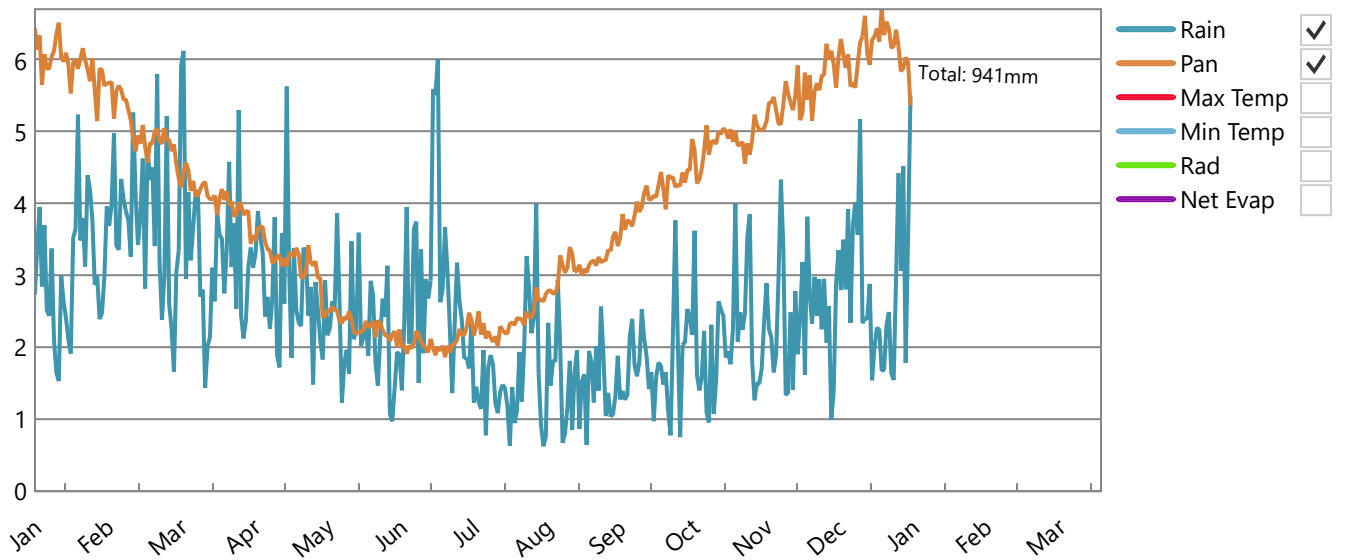
Climate Statistics:

	5th <input type="checkbox"/> Percentile	50th Percentile	95th <input type="checkbox"/> Percentile
Rainfall (mm/year)	563	897	1292
Pan Evaporation (mm/year)	1303	1464	1765

Climate Data:

- Chart Table
- Monthly Daily

Daily Average Across Run Period



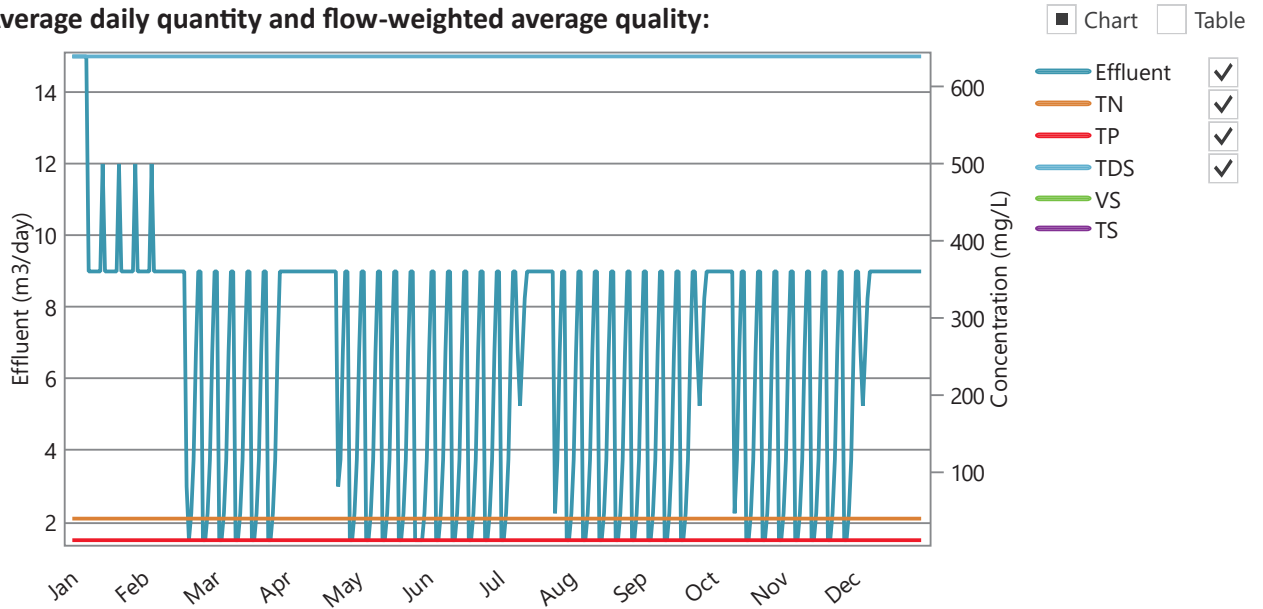
DESCRIPTION



Effluent type: New Generic System

Wastestream before any recycling or pretreatment

Average daily quantity and flow-weighted average quality:



DESCRIPTION

Wastestream after any recycling and pretreatment if applicable

Effluent quantity: **1176.04 m³/year** or 3.22 m³/day (Min-Max: 1.50 - 15.00)

Flow-weighted average (minimum - maximum) daily effluent quality entering pond system:

	Concentration (mg/L)	Load (kg/year)
Total Nitrogen	40.00 (40.00 - 40.00)	94.08 (93.99 - 94.35)
Total Phosphorus	12.00 (12.00 - 12.00)	28.22 (28.20 - 28.31)
Total Dissolved Salts	640.00 (640.00 - 640.00)	1505.31 (1503.84 - 1509.60)
Volatile Solids	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)
Total Solids	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)

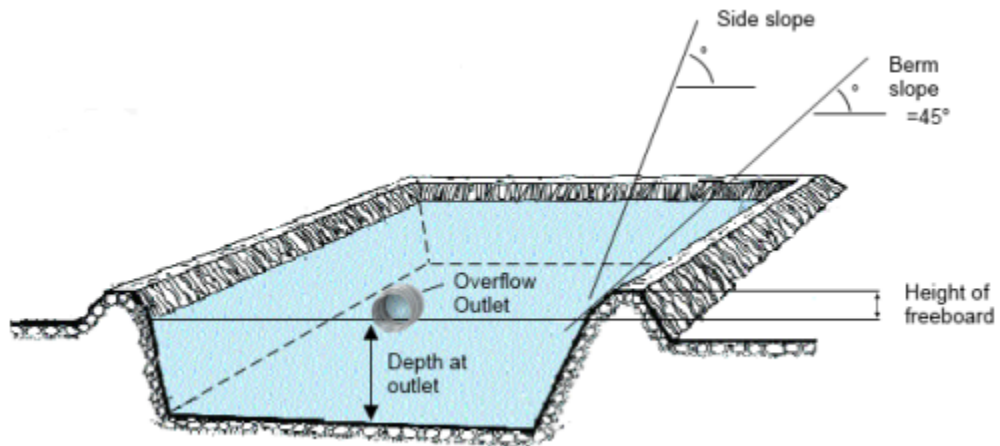
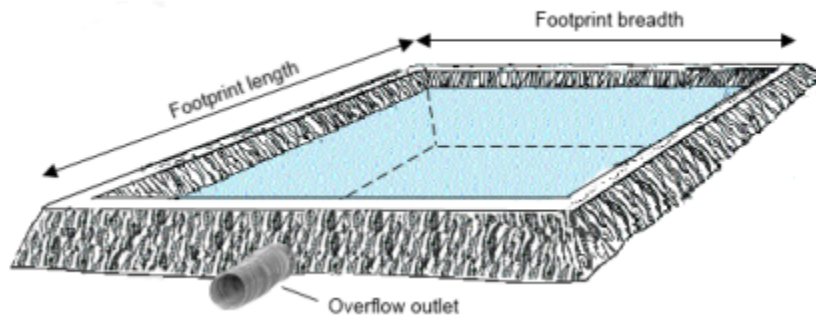


DESCRIPTION

Pond system: 1 closed storage tank

Pond system details:

	Pond 1
Maximum pond volume (m3)	50
Minimum allowable pond volume (m3)	8.34
Pond depth at overflow outlet (m)	0.65
Maximum water surface area (m2)	41.2
Pond footprint length (m)	6.40
Pond footprint width (m)	6.40
Pond catchment area (m2)	41.2
Average active volume (m3)	8.34



Irrigation pump limits:

Minimum pump rate limit (ML/day)	0.00
Maximum pump rate limit (ML/day)	0.00

Shandyng water:

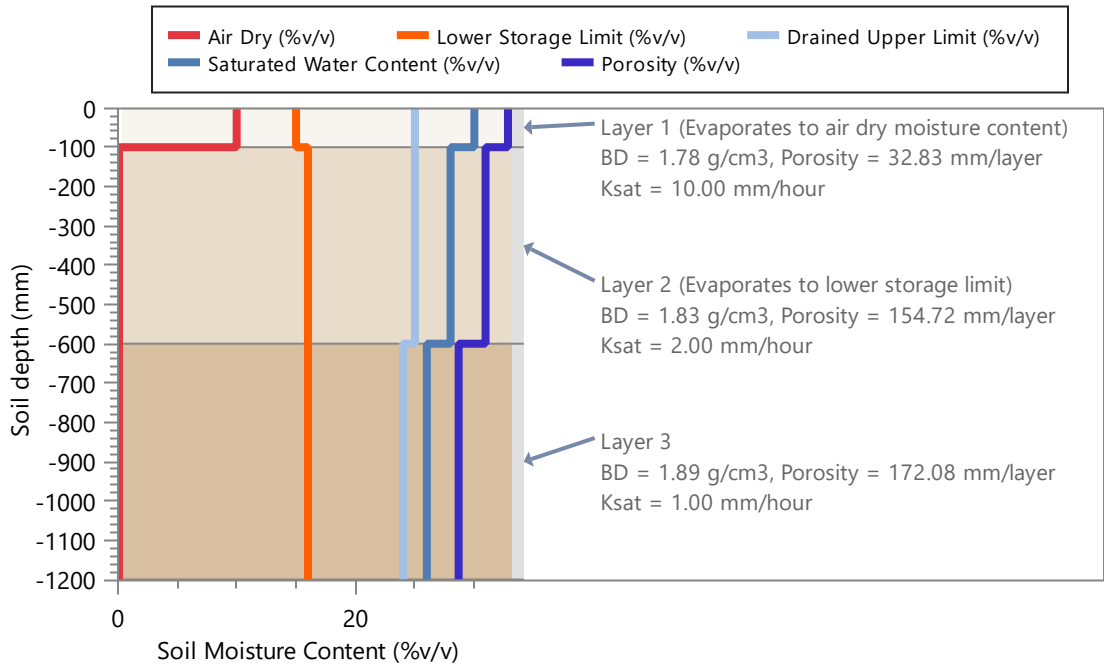
Annual allocation of fresh water available for shandyng (m3/year)	0.00
Maximum rate of application of fresh water (ML/day)	0.00
Nitrogen concentration (mg/L)	0.00
Salinity (dS/m)	0.00
Minimum shandy water is used	False

Land: New Paddock

Area (ha): 0.06

Soil Type: Medium Permeability Red Brown Ea, 1200.00 mm defined profile

Profile Porosity (mm)	359.62
Profile saturation water content (mm)	326.00
Profile drained upper limit (or field capacity) (mm)	294.00
Profile lower storage limit (or permanent wilting point) (mm)	191.00
Profile available water capacity (mm)	103.00
Profile limiting saturated hydraulic conductivity (mm/hour)	1.00
Surface saturated hydraulic conductivity (mm/hour)	10.00
Runoff curve number II (coefficient)	80.00
Soil evaporation U (mm)	10.00
Soil evaporation Cona (mm/sqrt day)	4.00



DESCRIPTION

Plant Data: Continuous Kikuyu 1 Pasture

Average monthly cover (fraction) (minimum - maximum)	0.87 (0.78 - 0.92)
Maximum crop factor at 100% cover (mm/mm) (Maximum crop coefficient 0.8 x Pan coefficient 1)	0.80
Total plant cover (both green and dead) left after harvest (fraction)	1.00
Maximum potential root depth in defined soil profile (mm)	1200.00
Salt tolerance	Moderately tolerant
Salinity threshold EC sat. ext. (dS/m)	3.00
Proportion of yield decrease per dS/m increase (fraction/dS/m)	0.03



DESCRIPTION

Pathogen Data: Direct ingestion of effluent with calculation of risk from multiple (identical) events

Risk: Multiple Event Risk

Pathogens Present:

Pathogen	Type	Irrigation Water Concentration (org/m3)	Organism Unit
Escherichia coli O111	Bacteria	100	cfu

Receptor attributes: (Default Activity)

Maximum Volume Ingested per Event Resulting From Activity (mL)	1000.00
--	---------

Exposures: Multiple identical exposures

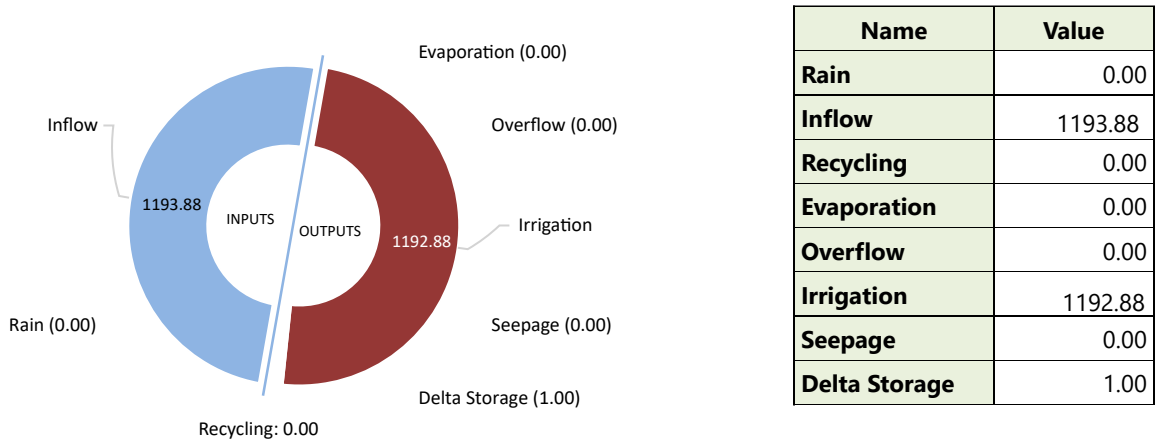
No. exposures modelled	0
------------------------	---



Pond System Water Performance - Overflow: 1 closed storage tank

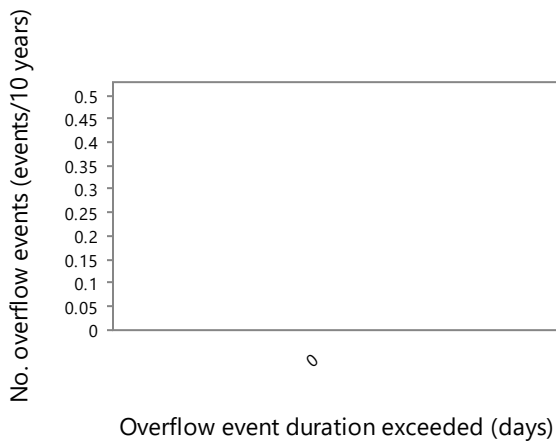
Capacity of wet weather storage pond: 41 m3

Pond System Water Balance (m3/year)

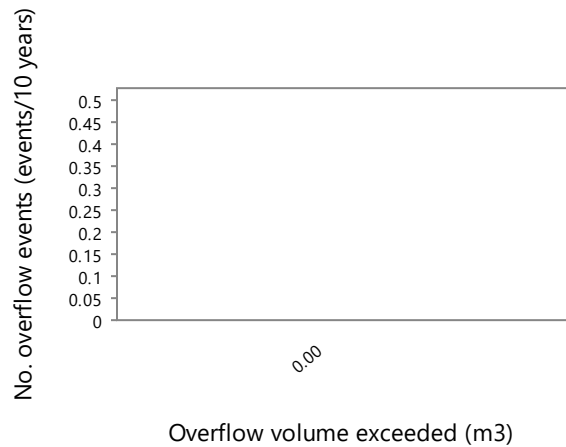


Overflow Diagnostics

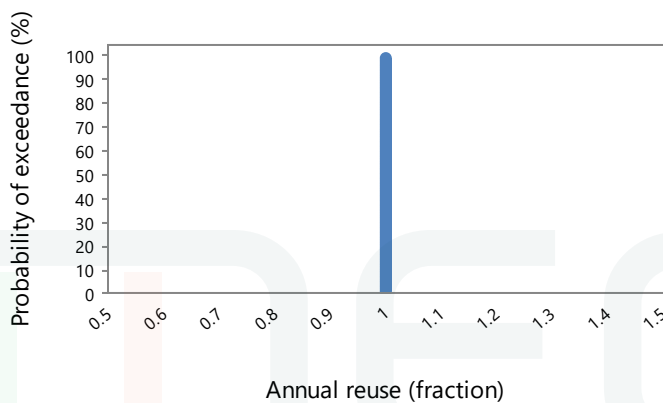
Volume of overflow (m3/year)	0.00
No. days pond overflows (days/year)	0.00
Average duration of overflow (days)	0.00
Effluent Reuse (Proportion of Inflow + Net Rain Gain that is Irrigated) (fraction)	1.00
Probability of at least 90% reuse (fraction)	1.00



[Export plot](#)



[Export plot](#)



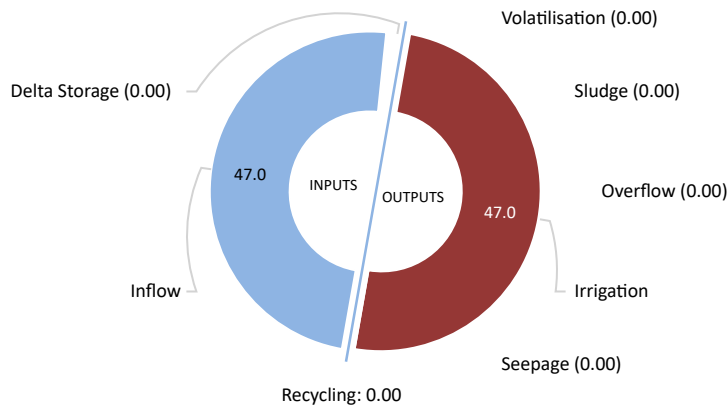
[Export plot](#)

PERFORMANCE

Pond System Performance - Nutrient: 1 closed storage tank

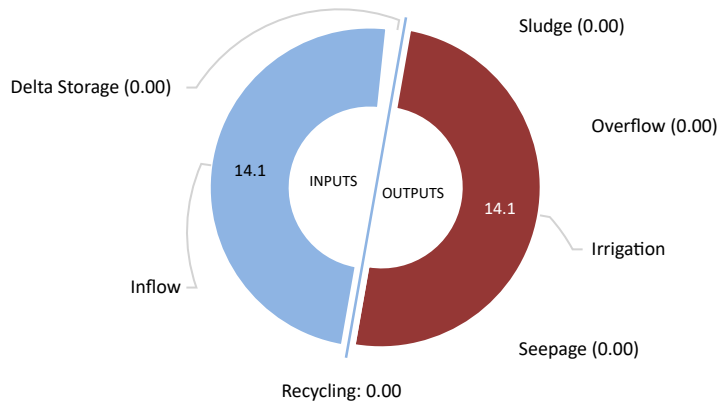
Pond System Nutrients and Salt Balance:

Nitrogen Balance (kg/year)



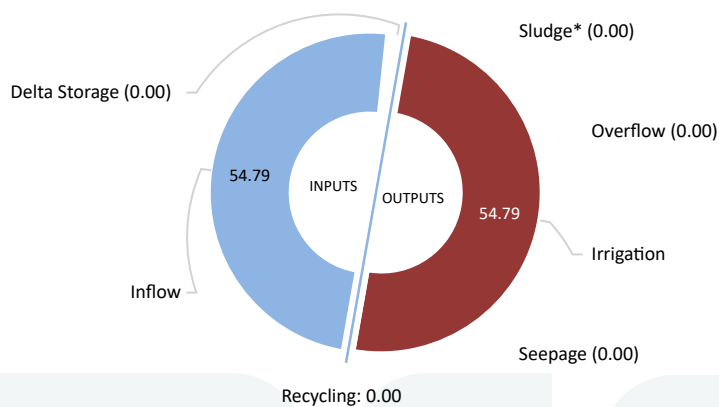
Name	Value
Inflow	47.0
Recycling	0.00
Volatilisation	0.00
Sludge	0.00
Overflow	0.00
Irrigation	47.0
Seepage	0.00
Delta Storage	0.00

Phosphorus Balance (kg/year)



Name	Value
Inflow	14.1
Recycling	0.00
Sludge	0.00
Overflow	0.00
Irrigation	14.1
Seepage	0.00
Delta Storage	0.00

Salt Balance (kg/year)



Name	Value
Inflow	752
Recycling	0.00
Sludge*	0.00
Overflow	0.00
Irrigation	752
Seepage	0.00
Delta Storage	0.00

* Salt removal in sludge is not calculated from the pond salt balance. However if salt could be assumed to be present in the sludge at the same concentration as in the pond supernatant (up to a maximum of salt added in inflow) - then salt accumulation in the sludge could be 0.00 kg/year

Pond System Sludge Accumulation: 0.00 kg dwt/year

Pond System Performance - Nutrient: 1 closed storage tank**Pond Nutrient Concentrations and Salinity:**

Average across simulation period	Pond 1
Average nitrogen concentration of pond liquid (mg/L)	40.00
Average phosphorus concentration of pond liquid (mg/L)	12.00
Average salinity of pond liquid (dS/m)	1.00

Value on final day of simulation period	Pond 1
Final nitrogen concentration of pond liquid (mg/L)	40.00
Final phosphorus concentration of pond liquid (mg/L)	12.00
Final salinity of pond liquid (dS/m)	1.00

* Not determined. Pond is empty.

Irrigation Performance:

Water Use: (assumes 100% Irrigation Efficiency)

Pond water irrigated (m3/year)	1194
Average Shandy water irrigation (m3/year) (minimum - maximum)	0.00 (0.00 - 0.00)
Total water irrigated (m3/year)	1194
Proportion of irrigation events requiring shandying (fraction of events)	0.00
Proportion of years shandying water allocation of 0 m3/year is exceeded (fraction of years)	0.00
Average exceedance as a proportion of annual shandy water allocation (fraction of allocation) (minimum - maximum)	0.00 (0.00 - 0.00)

Irrigation Quality:

Average nitrogen concentration of irrigation water - before ammonia loss during irrigation (mg/L)	40.00
Average nitrogen concentration of irrigation water - after ammonia loss during irrigation (mg/L)	39.20
Average phosphorus concentration of irrigation water (mg/L)	12.00
Average salinity of irrigation water (dS/m)	1.00

Irrigation Diagnostics:

Proportion of Days irrigation occurs (fraction)	1.00
---	------



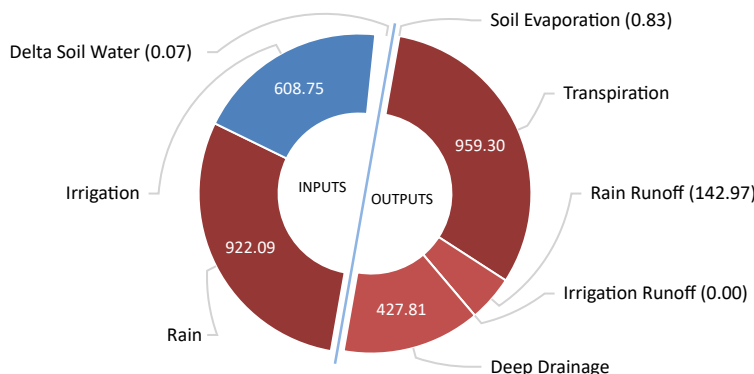
Land Performance - Soil Water

Paddock: **New Paddock, 0.06 ha**

Soil Type: **Medium Permeability Red Brown Ea, 103.00 mm PAWC at maximum root depth**

Land Water Balance (mm/year):

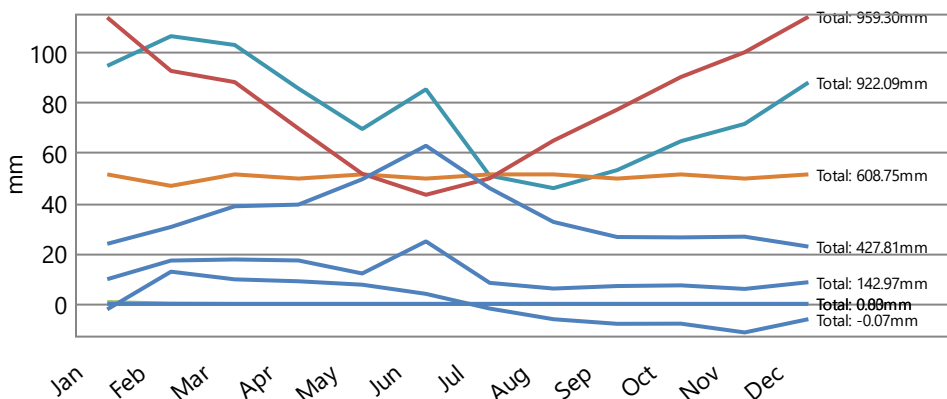
mm/year % Total inputs



Name	Value
Rain	922.09
Irrigation	608.75
Soil Evaporation	0.83
Transpiration	959.30
Rain Runoff	142.97
Irrigation Runoff	0.00
Deep Drainage	427.81
Delta Soil Water	-0.07

Average Monthly Totals (mm):

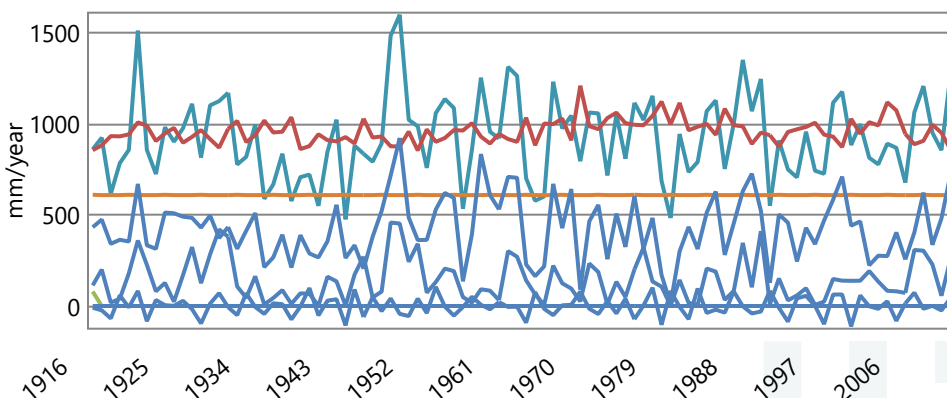
Chart Table



- Rain
- Irrigation
- Soil Evap
- Transpn.
- Rain Runoff
- Irrigation Runoff
- Deep Drainage
- Delta Soil Water

Average Annual Totals (mm/year):

Chart Table



- Rain
- Irrigation
- Soil Evap
- Transpn.
- Rain Runoff
- Irrigation Runoff
- Deep Drainage
- Delta Soil Water

PERFORMANCE



Land Performance - Soil Nutrient

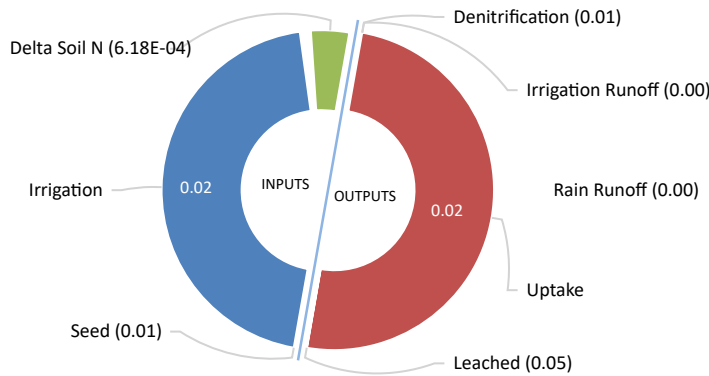
Soil Type: **Medium Permeability Red Brown Ea**

Paddock: **New Paddock, 0.06 ha**

Irrigation ammonium volatilisation losses (kg/ha/year): 0.00

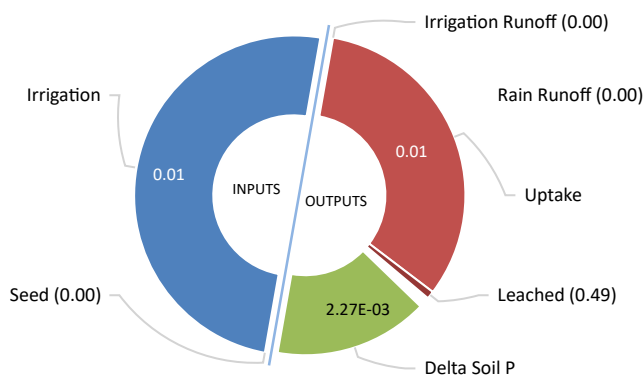
Proportion of total nitrogen in irrigated effluent as ammonium (fraction): 0.20

Land Nitrogen Balance (kg/ha/year)



Name	Value
Seed	2.06E-06
Irrigation	0.02
Denitrification	8.18E-06
Irrigation Runoff	0.00
Rain Runoff	0.00
Uptake	0.02
Leached	2.26E-004
Delta Soil N	-6.18E-04

Land Phosphorus Balance (kg/ha/year)



Name	Value
Seed	9.38E-04
Irrigation	0.01
Irrigation Runoff	0.00
Rain Runoff	0.00
Uptake	0.01
Leached	4.51E-07
Delta Soil P	2.27E-03

PERFORMANCE

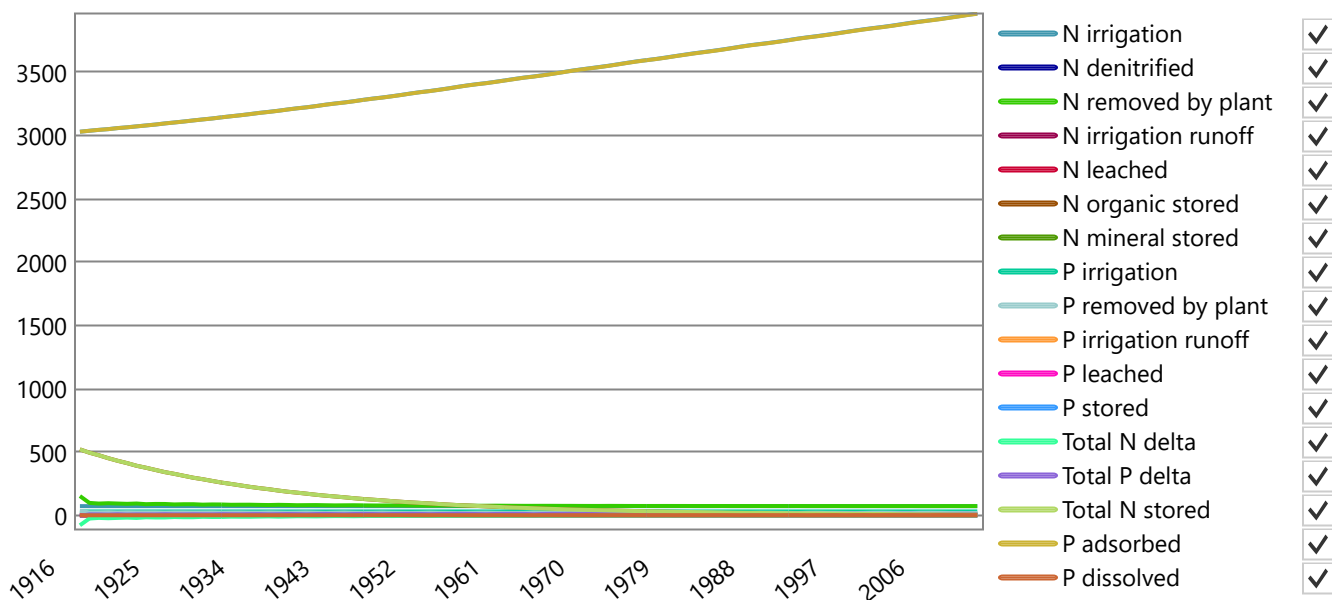


Land Performance - Soil Nutrient

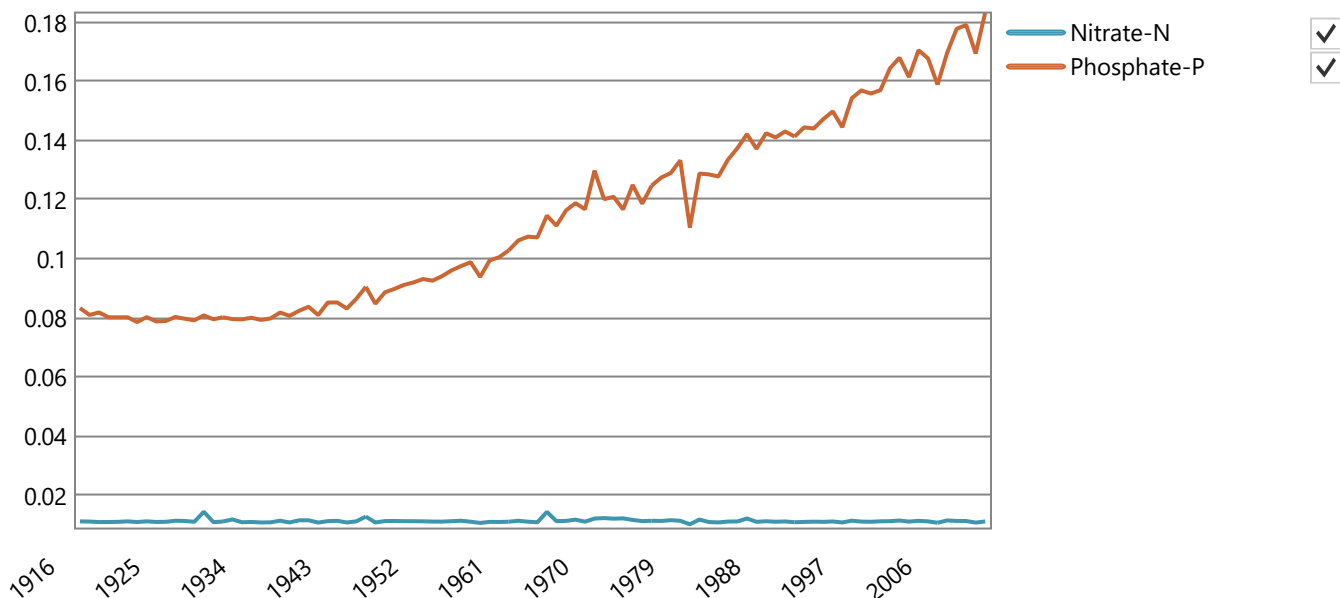
Soil Type: **Medium Permeability Red Brown Ea**

Paddock: **New Paddock, 0.06 ha**

PERFORMANCE



Annual Nutrient Leaching Concentration (mg/L):



Plant Performance and Nutrients

Soil Type: **Medium Permeability Red Brown Ea**

Paddock: **New Paddock, 0.06 ha**

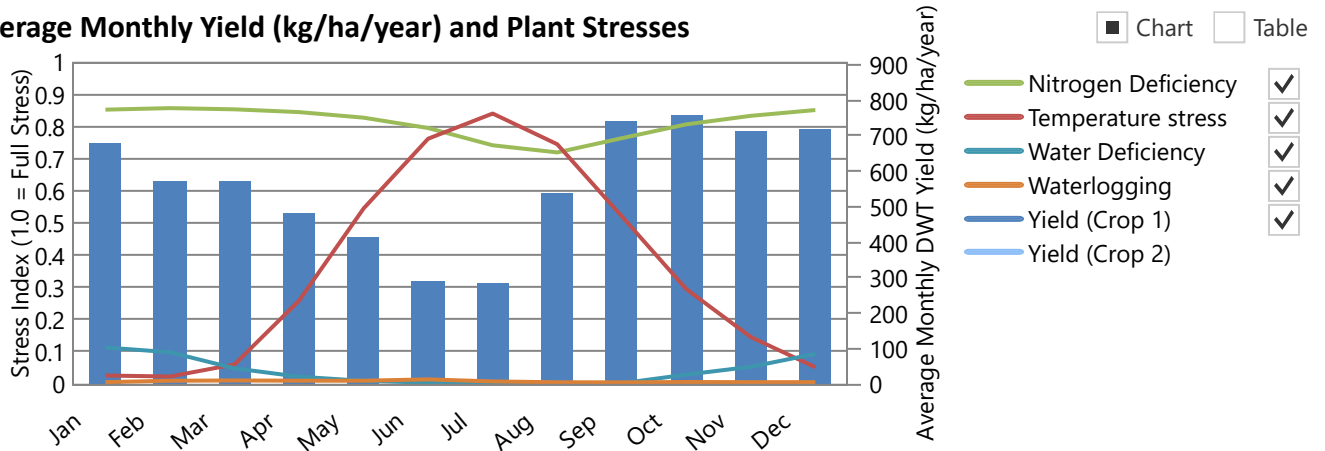
Plant:

Average annual shoot dry matter yield (kg/ha/year)	6759.91 (5912.54 - 11730.07)
Average monthly plant (green) cover (fraction) (minimum - maximum)	0.87 (0.78 - 0.92)
Average monthly root depth (mm) (minimum - maximum)	1199.26 (1191.95 - 1200.00)

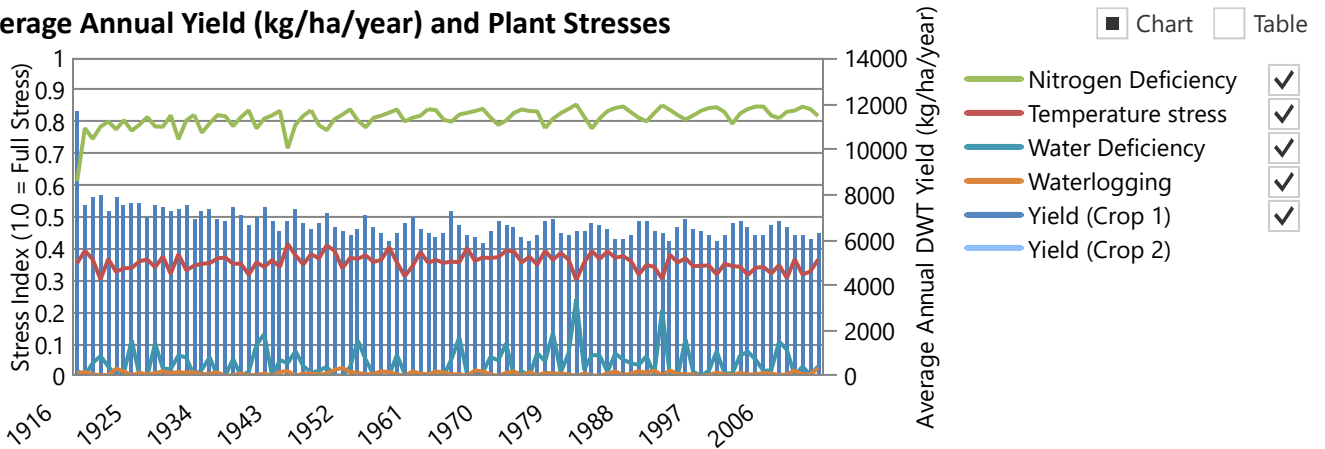
Nutrient Uptake (minimum - maximum):

Average annual net nitrogen removed by plant uptake (kg/ha/year)	78.43 (72.42 - 152.24)
Average annual net phosphorus removed by plant uptake (kg/ha/year)	20.27 (17.73 - 35.15)
Average annual shoot nitrogen concentration (fraction dwt)	0.01 (0.01 - 0.02)
Average annual shoot phosphorus concentration (fraction dwt)	0.003 (0.003 - 0.003)

Average Monthly Yield (kg/ha/year) and Plant Stresses

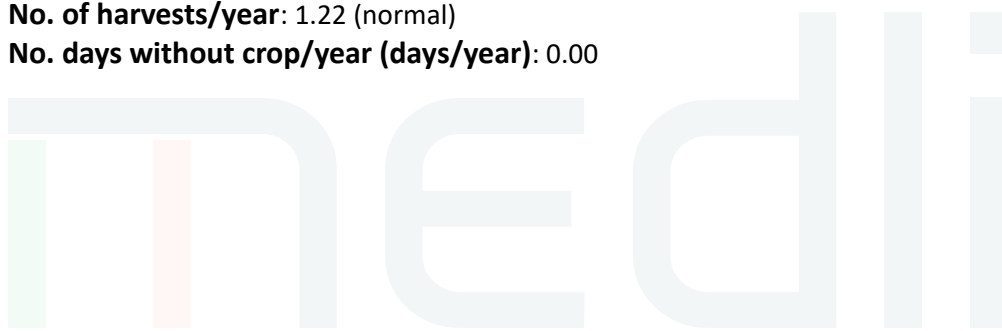


Average Annual Yield (kg/ha/year) and Plant Stresses



No. of harvests/year: 1.22 (normal)

No. days without crop/year (days/year): 0.00



Land Performance

Paddock: New Paddock, 0.06 ha

Soil Type: Medium Permeability Red Brown Ea

Plant: Continuous Kikuyu 1 Pasture

Salt tolerance	Moderately tolerant
Salinity threshold EC sat. ext. (dS/m)	3.00
Proportion of yield decrease per dS/m increase (fraction/dS/m)	0.03
No. years assumed for leaching to reach steady-state (years)	10.00

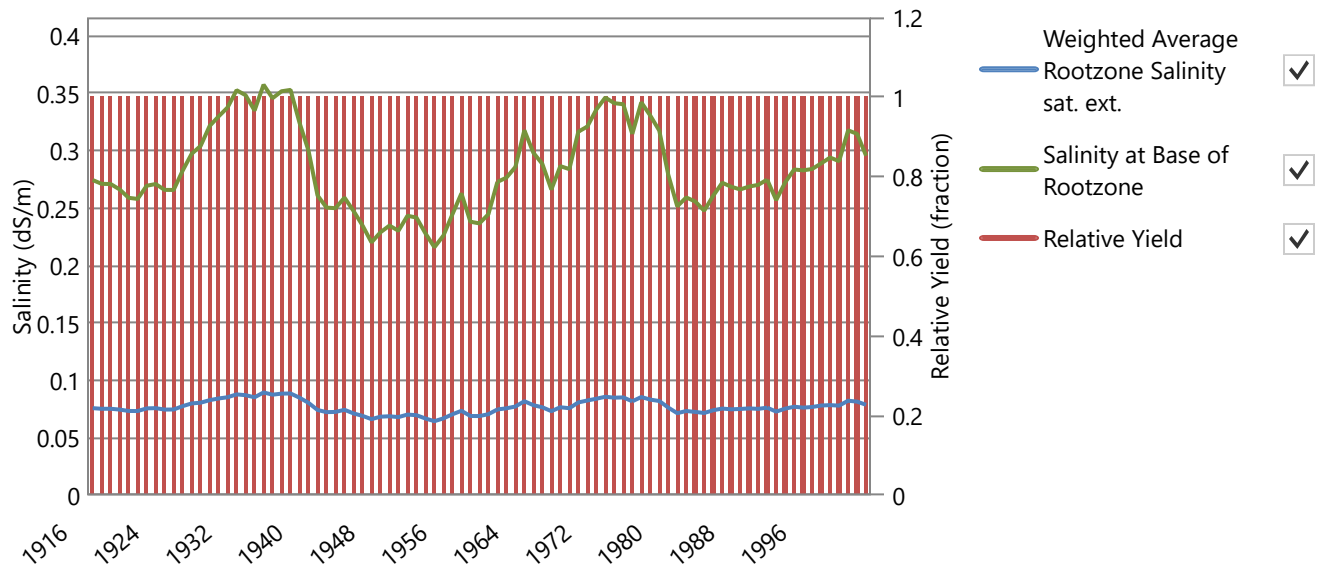
Soil Salinity:

Salinity of infiltrated water (Average salinity of rainwater = 0.03 dS/m) (dS/m)	0.09
Salt added by rainfall (kg/ha/year)	149.59
Average annual effluent salt added & leached at steady state (kg/ha/year)	758.34
Average leaching fraction based on 10 year running averages (fraction)	0.51
Average water-uptake-weighted rootzone salinity sat. ext. (dS/m)	0.08
Salinity of the soil solution (at drained upper limit) at base of rootzone (dS/m)	0.28
Relative crop yield expected due to salinity (fraction)	1.00
Proportion of years that crop yields would be expected to fall below 90% of potential due to salinity (fraction)	0.00

Average Annual Rootzone Salinity and Relative Yield:

Chart Table

All values based on 10 year running averages



PERFORMANCE



Pathogen Data: Direct ingestion of effluent with calculation of risk from multiple (identical) events

Risk: Multiple Event Risk

Activity: Default Activity

Liquid Ingested (mL): 1000

Health risk threshold: 0.0 extra infections/10000 persons/0.0 events

Pathogen Risk:

	Escherichia coli O111	
Pathogen Type		Bacteria
No. Ingested per Event (Organisms)		0
Infection Risk per Event (No. extra infections/10000 persons)		0.00
Infection risk per 0 events (extra infections/10000 persons/all events)		0.00
Organism Unit		cfu

No monthly infection risk chart is available as Annual Risk using Monthly Data was not specified

PERFORMANCE



Groundwater

Recharge:

Average groundwater recharge (m³/day): 1.05

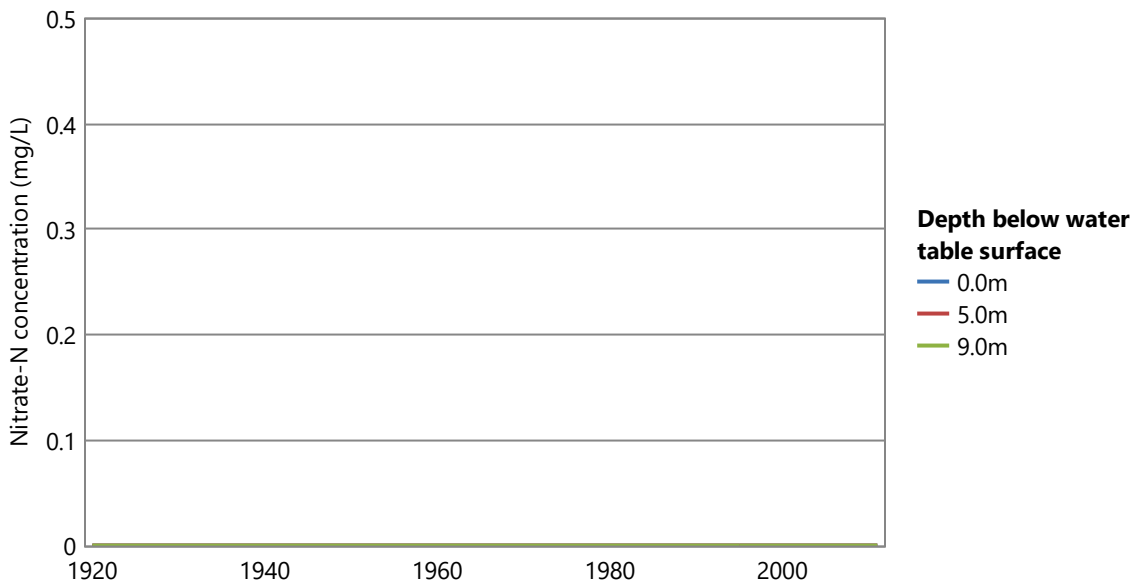
Average nitrate-N concentration of recharge (mg/L): 0.01

Aquifer characteristics:

Thickness (m)	20.0
Porosity (fraction)	0.6
Specific flux (mm/hour)	10.0
Vertical dispersion coefficient (m ² /day)	0.1
Longitudinal dispersion coefficient (m ² /day)	100.0
Retardation factor due to adsorption (multiplier)	1.0

Groundwater Nitrate-N concentration (mg/L) at property boundary, 6 m from effluent irrigation area:

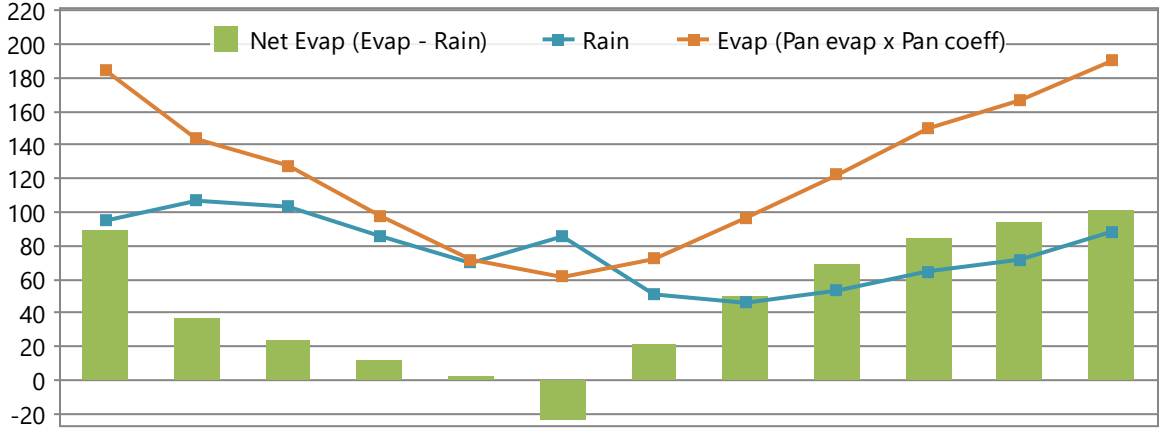
Chart Table



Sustainability Diagnostics:Glenburn Road, PATERSON

Averaged Historical Climate Data Used in Simulation (mm)

Location: Paterson, -32.63°, 151.59°
 Run Period: 01/01/1916 to 31/12/2011 96 years, 0 days



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rain	95.0	106.8	103.3	85.9	69.8	85.6	51.1	46.2	53.4	64.9	71.8	88.3	922.1
Evap	184.4	143.5	127.8	98.0	71.8	61.5	72.1	96.5	122.0	149.9	166.5	189.8	1483.7
Net Evap	89.5	36.6	24.5	12.1	2.0	-24.1	21.0	50.3	68.6	85.0	94.7	101.5	561.7
Net Evap/day	2.9	1.3	0.8	0.4	0.1	-0.8	0.7	1.6	2.3	2.7	3.2	3.3	1.5

DIAGNOSTICS



Sustainability Diagnostics: Glenburn Road, PATERSON

Pond System: 1 closed storage tank

New Generic System - 1176.88 m3/year or 3.22m3/day generated on average

Effluent entering pond system after any pretreatment and recycling

Average (Minimum-Maximum influent quality calculated for 365.25 non-zero flow days, after any pretreatment and recycling.

Constituent	Concentration (mg/L)	Load (kg/year)
Total Nitrogen	40.00 (40.00 - 40.00)	94.08 (93.99 - 94.35)
Total Phosphorus	12.00 (12.00 - 12.00)	28.22 (28.20 - 28.31)
Total Dissolved Salts	320.00 (320.00 - 320.00)	1505.31 (1503.84 - 1509.60)
Volatile Solids	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)
Total Solids	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)

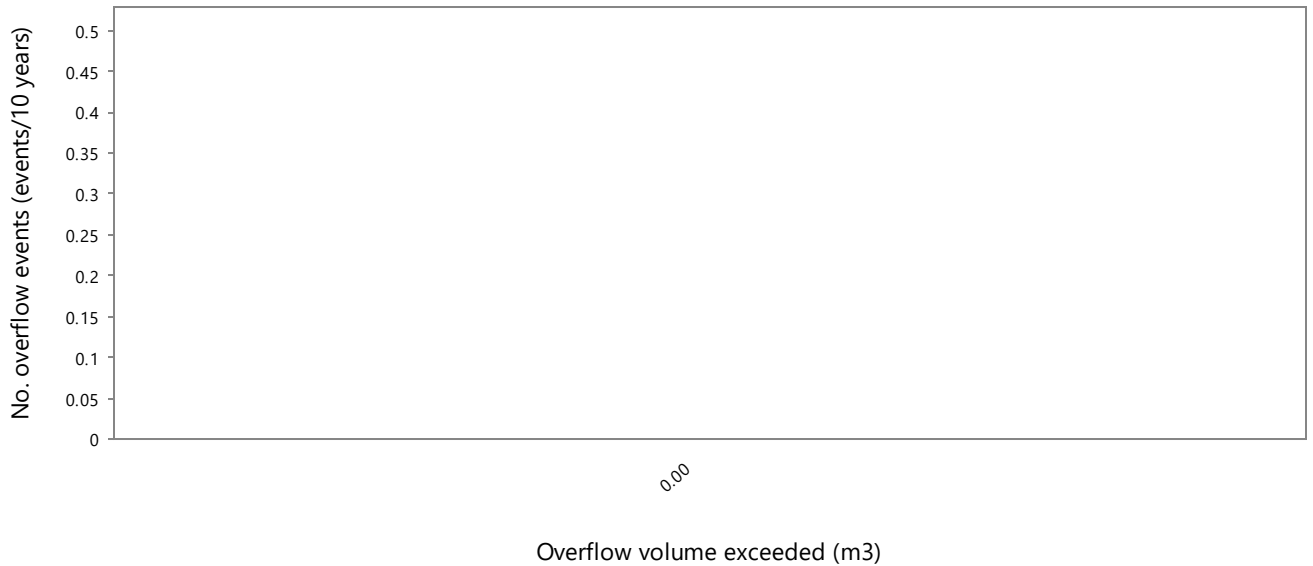
Last pond (Wet weather store): 41.2 m3

Theoretical hydraulic retention time (days)	6.33
Average volume of overflow (m3/year)	0.00
No. overflow events per year exceeding threshold* of 0.01 m3 (no./year)	0.00
Average duration of overflow (days)	0.00
Effluent Reuse (Proportion of Inflow + Net Rain Gain that is Irrigated) (fraction)	1.00
Probability of at least 90% effluent reuse (fraction)	1.00
Average salinity of last pond (dS/m)	0.16
Salinity of last pond on final day of simulation (dS/m)	0.16
Ammonia loss from pond system water area (kg/m2/year)	0.00

* The threshold is the volume equivalent to the top 1 mm depth of water of a full pond

Overflow exceedance:

Chart Table



[Export plot](#)



Sustainability Diagnostics: Glenburn Road, PATERSON

Irrigation Information

	Quantity/year	Quantity/ha/year
Total irrigation applied (m3)	1176	0.21
Total nitrogen applied (kg)	94.08	0.02
Total phosphorus applied (kg)	28.22	0.01
Total salts applied (kg)	1505	0.27

Shandying

Annual allocation of fresh water for shandying (m3/year)	0.00
Average Shandy water irrigation (m3/year) (minimum - maximum)	0.00 (0.00 - 0.00)
Average exceedance as a proportion of annual shandy water allocation (% of allocation) (minimum - maximum)	0.00 (0.00 - 0.00)
Proportion of irrigation events requiring shandying (fraction of events)	0.00
Minimum shandy water is used	False

Irrigation Issues

Proportion of Days irrigation occurs (fraction)	1.00
---	------

Sustainability Diagnostics: Glenburn Road, PATERSON

Paddock Land: New Paddock: 0.06 ha

Irrigation triggered every 1 days
Irrigate a fixed amount of 20.00 mm each day
Irrigation window from 1/1 to 31/12 including the days specified
A minimum of 0 days must be skipped between irrigation events

Soil Water Balance (mm): Medium Permeability Red Brown Ea, 103.00 mm PAWC at maximum root depth

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rain	95.0	106.8	103.3	85.9	69.8	85.6	51.1	46.2	53.4	64.9	71.8	88.3	922.1
Irrigation	51.7	47.1	51.7	50.0	51.7	50.0	51.7	51.7	50.0	51.7	50.0	51.7	608.8
Soil Evap	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Transpn.	114.3	92.9	88.5	70.0	51.9	43.5	50.1	65.1	77.5	90.5	100.4	114.5	959.3
Rain Runoff	9.9	17.3	17.7	17.3	12.1	25.0	8.4	6.1	7.1	7.4	6.0	8.7	143.0
Irr. Runoff	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drainage	24.0	30.7	38.9	39.6	49.7	63.1	46.2	32.7	26.7	26.5	26.8	22.9	427.8
Delta	-2.2	12.9	9.8	9.0	7.7	4.0	-1.9	-6.1	-7.9	-7.9	-11.4	-6.1	-0.1

Soil Nitrogen Balance

Average annual effluent nitrogen added (kg/ha/year)	0.02
Average annual soil nitrogen removed by plant uptake (kg/ha/year)	0.02
Average annual soil nitrogen removed by denitrification (kg/ha/year)	0.01
Average annual soil nitrogen leached (kg/ha/year)	0.05
Average annual nitrate-N loading to groundwater (kg/ha/year)	0.05
Soil organic-N kg/ha (Initial - Final)	5.44E-04 - 6.32E - 05
	0.01 - 0.03
Average nitrate-N concentration of deep drainage (mg/L)	0.01
Max. annual nitrate-N concentration of deep drainage (mg/L)	0.01

Soil Phosphorus Balance

Average annual effluent phosphorus added (kg/ha/year)	0.01
Average annual soil phosphorus removed by plant uptake (kg/ha/year)	0.01
Average annual soil phosphorus leached (kg/ha/year)	4.49E-04
Dissolved phosphorus (kg/ha) (Initial - Final)	0.29 - 1.83
Adsorbed phosphorus (kg/ha) (Initial - Final)	0.07 - 0.01
Average phosphate-P concentration in rootzone (mg/L)	0.35
Average phosphate-P concentration of deep drainage (mg/L)	0.11
Max. annual phosphate-P concentration of deep drainage (mg/L)	0.18
Design soil profile storage life based on average infiltrated water phosphorus concn. of 2.19 mg/L (years)	71.24

DIAGNOSTICS



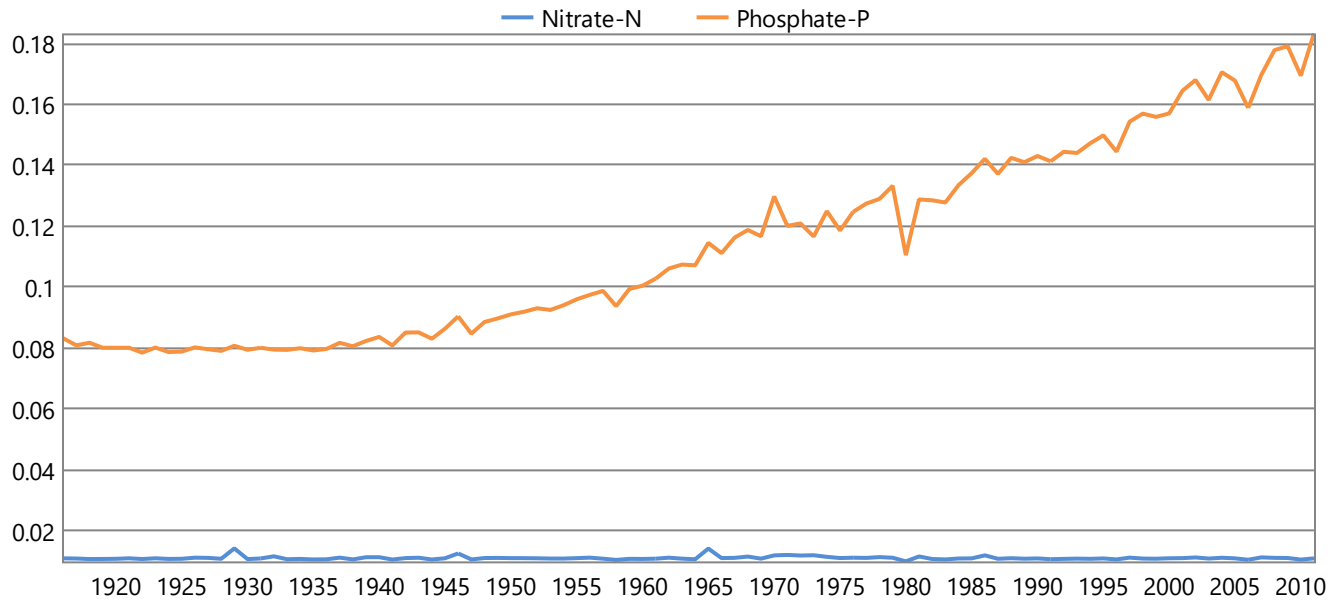
DIAGNOSTICS

Sustainability Diagnostics: Glenburn Road, PATERSON

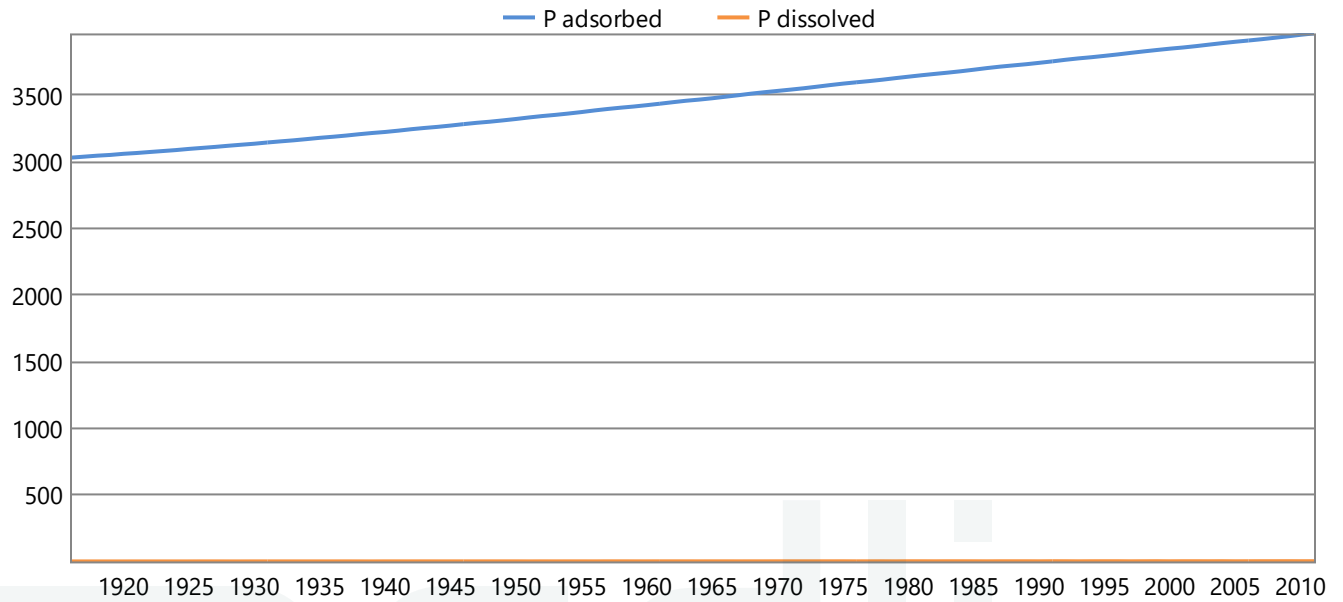
Paddock Land: New Paddock: 0.06 ha

Irrigation: Flood with 0.1% ammonium loss during irrigation

Annual nutrient leachate concentration (mg/L)



Annual Phosphate-P in soil (kg/ha)



Sustainability Diagnostics: Glenburn Road, PATERSON

Paddock Plant Performance: New Paddock: 0.06 ha

Average Plant Performance (Minimum - Maximum: Continuous Kikuyu 1 Pasture)

Average annual shoot dry matter yield (kg/ha/year)	1.13(1.06 .28)
Average monthly plant (green) cover (fraction)	0.87 (0.78 - 0.92)
Average monthly crop factor (fraction)	0.70 (0.63 - 0.74)
Total plant cover (both green and dead) left after harvest (fraction)	1.00
Average monthly root depth (mm)	1199.26 (1191.95 - 1200.00)
Average number of normal harvests per year (no./year)	1.22 (1.00 - 2.00)
Average number of normal harvests for last five years only (no./year)	1.20
Average number of crop deaths per year (no./year)	0.00 (0.00 - 0.00)
Average number of crop deaths for last five years only (no./year)	0.00
Average annual nitrogen deficiency index (0 = no stress, 1 = full stress) (coefficient)	0.81 (0.61 - 0.85)
Average January temperature stress index (0 = no stress, 1 = full stress) (coefficient)	0.03 (0.00 - 0.13)
Average July temperature stress index (0 = no stress, 1 = full stress) (coefficient)	0.84 (0.72 - 0.95)
Average monthly water stress index (0 = no stress, 1 = full stress) (coefficient)	0.04 (0.00 - 0.11)
Average monthly waterlogging index (0 = no stress, 1 = full stress) (coefficient)	0.01 (0.00 - 0.01)
No. days without crop/year (days)	0.00

Soil Salinity - Plant salinity tolerance: Moderately tolerant

Assumes 1.0 dS/m Electrical Conductivity = 640 mg/L Total Dissolved Salts

All values based on 10 year running averages

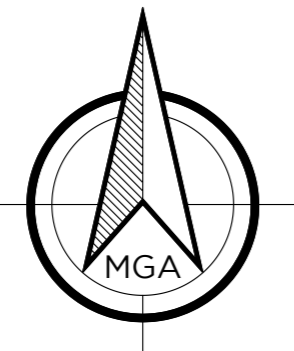
Salinity of infiltrated water (Average salinity of rainwater = 0.03 dS/m) (dS/m)	0.09
Salt added by rainfall (kg/ha/year)	0.02
Average annual effluent salt added & leached at steady state (kg/ha/year)	0.09
Average leaching fraction based on 10 year running averages (fraction)	0.51
Average water-uptake-weighted rootzone salinity sat. ext. (dS/m)	0.08
Salinity of the soil solution (at drained upper limit) at base of rootzone (dS/m)	0.28
Relative crop yield expected due to salinity (fraction)	1.00
Proportion of years that crop yields would be expected to fall below 90% of potential due to salinity (fraction)	0.00

DIAGNOSTICS



NOTES:

1. FEATURES SHOWN TO SCALE ACCURACY.
2. THIS PLAN IS SUITABLE FOR DETAILED PLANNING AND DESIGN AT THE SCALE/S STATED. THE PLAN MAY NOT BE SUITABLE FOR ANY OTHER PURPOSE OR FOR USE AT ANY OTHER SCALE/S.
3. SERVICES LOCATED ONLY WHERE VISIBLE.
4. THE LOCATION OF ALL UNDERGROUND SERVICES WHETHER SHOWN ON THE PLAN OR NOT, SHOULD BE PRECISELY DETERMINED BEFORE ANY CONSTRUCTION WORK COMMENCES AND MEASURES TAKEN TO PROTECT THESE SERVICES FROM DAMAGE.
5. CONTOUR INTERVAL - 0.5m
6. THE BOUNDARIES SHOWN ARE APPROXIMATE ONLY. THE BOUNDARIES SHOWN HAVE BEEN COMPILED FROM THE RELEVANT DEPOSITED PLANS. FURTHER SURVEY WILL BE REQUIRED IF CONSTRUCTION IS TO TAKE PLACE ON OR ADJACENT TO THE BOUNDARIES.



HUNTER WATER
BUILDING PLAN ASSESSMENT

Clear of Hunter Water Assets

Reference No: 123497

Water not available for connection
 Sewer not available for connection

Development Assessment (Section 50) application has been submitted and is being reviewed by Hunter Water. A Hydraulic Design Assessment application is required if development is larger than 2 units or commercial/industrial.

Date Processed: 20 June 2024
Applicant: Perception Planning - Jordan Long

Property Location: 4 GLENBURN RD
PATERSON NSW 2421

PLEASE TAKE INTO CONSIDERATION

This is not a compliance certificate. This stamp indicates that Hunter Water has undertaken an initial assessment of the proposed development to identify possible impacts to our infrastructure. Conditions of Hunter Water easements apply. For information on Hunter Water's processes please refer to our 'Land Development Manual' on our website or contact us on 1300 657 657. Version 3.3 (22 December 2021)

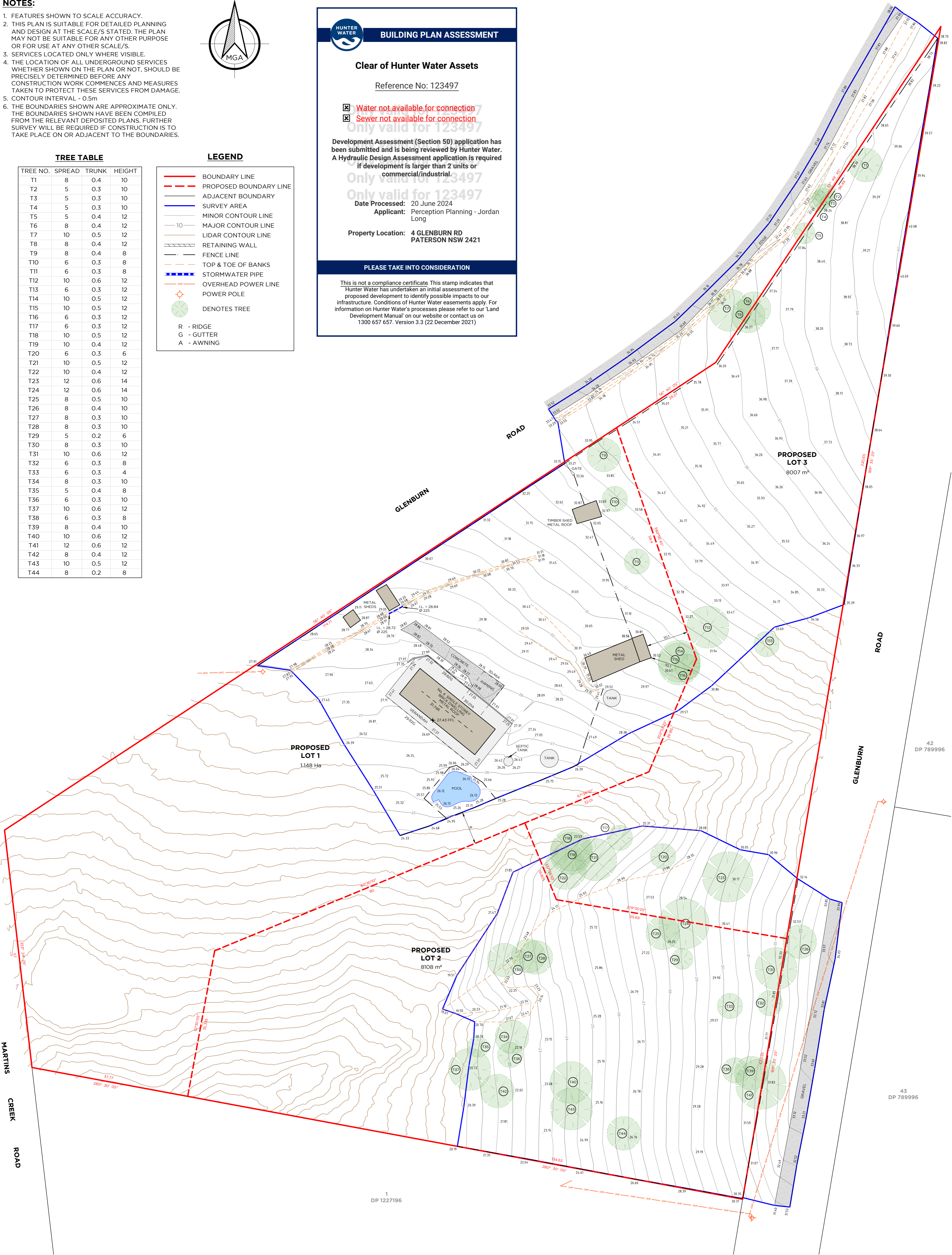
TREE TABLE

TREE NO.	SPREAD	TRUNK	HEIGHT
T1	8	0.4	10
T2	5	0.3	10
T3	5	0.3	10
T4	5	0.3	10
T5	5	0.4	12
T6	8	0.4	12
T7	10	0.5	12
T8	8	0.4	12
T9	8	0.4	8
T10	6	0.3	8
T11	6	0.3	8
T12	10	0.6	12
T13	6	0.3	12
T14	10	0.5	12
T15	10	0.5	12
T16	6	0.3	12
T17	6	0.3	12
T18	10	0.5	12
T19	10	0.4	12
T20	6	0.3	6
T21	10	0.5	12
T22	10	0.4	12
T23	12	0.6	14
T24	12	0.6	14
T25	8	0.5	10
T26	8	0.4	10
T27	8	0.3	10
T28	8	0.3	10
T29	5	0.2	6
T30	8	0.3	10
T31	10	0.6	12
T32	6	0.3	8
T33	6	0.3	4
T34	8	0.3	10
T35	5	0.4	8
T36	6	0.3	10
T37	10	0.6	12
T38	6	0.3	8
T39	8	0.4	10
T40	10	0.6	12
T41	12	0.6	12
T42	8	0.4	12
T43	10	0.5	12
T44	8	0.2	8

LEGEND

- BOUNDARY LINE
- - - PROPOSED BOUNDARY LINE
- ADJACENT BOUNDARY
- SURVEY AREA
- MINOR CONTOUR LINE
- MAJOR CONTOUR LINE
- LIDAR CONTOUR LINE
- RETAINING WALL
- FENCE LINE
- TOP & TOE OF BANKS
- STORMWATER PIPE
- OVERHEAD POWER LINE
- POWER POLE
- DENOTES TREE

R - RIDGE
G - GUTTER
A - AWNING



REV.	DATE	AMENDMENT(S)	SUR	DFT	CHK
A	19.03.24	ORIGINAL ISSUE	SF	JD	TC
B	25.03.24	PROPOSED BOUNDARIES AMENDED	--	TC	TC
C	27.03.24	PROPOSED BOUNDARIES AMENDED	--	TC	TC

DELFS LASCELLES
CONSULTING SURVEYORS

260 MAITLAND ROAD, MAYFIELD NSW 2304
ABN: 28 164 260 100

T: (02) 4964 4886
E: admin@delacs.com.au
delacs.com.au

CAD REF: 24120 - DET_Rev C

PARTIAL DETAIL SURVEY & PROPOSED SUBDIVISION OF LOT 41 DP 789996

SITE ADDRESS: 4 GLENBURN ROAD PATERSON
CLIENT: A. PILGRIM

POSITION DATUM: SSM 55510
ORIENTATION: MGA 2020 (GND)
EASTING: 371 449.207
NORTHING: 6 392 880.088
CLASS: A
HEIGHT DATUM: SSM 55510
CLASS: B
RL: 24.954 (AHD)
DATE: 04.03.24

JAS-ANZ
BEFORE YOU DIG

SURVEYED	DRAFTED	CHECKED
SF	JD	TC

SCALE: 1:400
PAGE SIZE: A1
DATE: 12.03.24

SHEET: 1
REV: C
PROJECT No: 24120



SITE WASTE MANAGEMENT PLAN

TORRENS TITLE SUBDIVISION (ONE INTO THREE LOTS) AT 4 GLENBURN ROAD, PATERSON, NSW, 2421 (LOT 41, DP 789996)

Prepared by Perception Planning Pty Ltd on behalf of Allan and Dean Pilgrim

08 May 2024

Mr. Jordan Long
Town Planner, Perception Planning Pty Ltd.

PO Box 107
Clarence Town, NSW, 2321
Phone: 0475 713 934
Email: jordan@perceptionplanning.com.au

Document Versions and Control

Site Waste Management Plan, 4 Glenburn Rd, Paterson, NSW, 2421

No:	Date:	PP Ref:	Author:	Reviewed by:
Version 1	08/05/2024	SWMP 4 Glenburn Rd, Paterson, NSW, 2421	JL	JL

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EXECUTIVE SUMMARY

Perception Planning Pty Ltd has been engaged by Allan and Dean Pilgrim to prepare a Site Waste Management Plan for Torrens title subdivision (one into three lots) at 4 Glenburn Rd, Paterson, NSW, 2421 (the site).

In planning a construction project, it is important to understand what excess materials are likely to be generated and then focus on how the generation of those excess materials can either be avoided or the material can be diverted from landfill. One approach is to develop a waste management plan. The key objectives of any waste management plan should be to:

1. Minimise the amount of waste generated as part of the project
2. Maximise the amount of material which is sent for reuse, recycling or reprocessing
3. Minimise the amount of material sent to landfill.

When developing and implementing this waste management plan, the following key elements have been considered:

- 1. Waste streams:** identify which waste streams are likely to be generated and estimate the approximate amounts of material
- 2. Focus on waste avoidance:** instead of managing the waste once it has been generated, look at ways to avoid the generation of that waste in the first place
- 3. Services:** select an appropriately qualified waste management contractor who will provide services for the waste streams generated and data on waste/recycling generation
- 4. On-site:** understand how the waste management system will work on-site, including bin placement and access
- 5. Clearly assign and communicate responsibilities:** ensure that those involved in the construction are aware of their responsibilities in relation to the construction waste management plan
- 6. Engage and educate personnel:** be clear about how the various elements of the waste management plan will be implemented and ensure personnel have an opportunity to provide feedback on what is/isn't working
- 7. Monitor:** to ensure the plan is being implemented, monitor on-site
- 8. Evaluate:** once the project is complete, evaluate your estimates in the plan against the actual data for waste generated and consider feedback from personnel.

OUTLINE OF PROJECT

Site address: 4 Glenburn Rd, Paterson, NSW, 2421
Applicants name: Jordan Long (Perception Planning)
Mailing address: PO Box 107 Clarence Town, NSW, 2321
Phone: 0475 713 934
Email: jordan@perceptionplanning.com.au
Buildings and other structures currently on-site (if any): The subject site currently includes the following structures: <ul style="list-style-type: none"> Existing dwelling
Brief description of proposal: The objective of the proposed development is to obtain development consent for Torrens title subdivision (one into three lots) at 4 Glenburn Rd, Paterson, NSW, 2421.

The details provided in this report accurately describe the proposed waste management actions to be undertaken as part of this project. The proposed works will be for the erection/construction of a new development. It should be noted that all waste management practices will be contained within the subject site (where necessary) – This is not relevant to material that will be transported in and out of the site.

Construction (all types of developments)

Type of waste generated	Description	Reuse	Recycling	Disposal	Specific method of onsite reuse, contractor and recycling outlet and or waste depot to be used
Construction					
Excavation material	The extent of excavation will involve minor soil removal for the establishment of concrete abutments at either end of the bridge.	Potentially. Minor fill may be required for any over excavation.	Excess unused fill will be reused as per normal practices.	Excess fill will not be disposed (unless found to be contaminated). As such, soil will be treated accordingly.	Soil erosion measures will be put into place as per normal around construction site to prevent soil erosion/ mudslides onto other parts of the site/ neighbouring lots.

Concrete	Will be used for the creation of abutments	Set concrete will not be reused on site	<p>Excess Concrete will be recycled accordingly and where necessary.</p> <p>Material will be transported to specialised concrete recycling centres.</p>	Disposal of concrete will be located within designed skip bins/ material waste areas in close proximity to the proposed developments.	Concrete will be managed before, during and after construction phase to ensure minimal resources wastage is achieved during this development. Excess material will be taken from site to be further used/ managed for potential disposal at relevant waste management centre.
Metal	Will be used for the bridge deck	Where necessary, metal onsite will be cut to relevant size to ensure maximum usage of material	<p>Excess metal will be recycled accordingly and where necessary.</p> <p>Material will be transported to specialised metal recycling centres</p>	Disposal of metal will be located within designed skip bins/ material waste areas in close proximity to the proposed developments.	Metal will be managed before, during and after construction phase to ensure minimal resources wastage is achieved during this development. Excess material will be taken from site to be further used/ managed for potential disposal at relevant waste management centre.
Packaging (used pallets, pallet wrap)	Packaging will be generated from incoming material for construction	Pallets will be returned to supplier to ensure continued reuse of material packaging.	<p>Pallets will be returned for reuse to the supplier.</p> <p>Depending on pallet wrap, material will be disposed of accordingly.</p>	Disposal of pallet wrap will be located within designed skip bins/ material waste areas in close proximity to the	Packaging will be organised prior to construction. Pallet boards will be taken from site to be further used by the supplier.

		Pallet wrap will be disposed of.		proposed developments	
Containers (cans, plastic, glass)	Will be used to assist in the construction of the development (paint, silicon, nail boxes etc.)	Containers will not be reused for this development	Containers that are recycle friendly will be managed accordingly	Disposal of containers will be located within designed skip bins/ material waste areas in close proximity to the proposed developments.	Containers will be managed before, during and after construction phase to ensure minimal resources wastage is achieved during this development.