ON-SITE SEWAGE MANAGEMENT SYSTEM

14 Peelwood Road
LAGGAN NSW 2583
Lot 1 DP 583484

SOILANDWATER

30 May 2023 V01

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SOILANDWATER

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Limitations

This report has relied on the information provided by the client prior to this report, and from site investigation as undertaken on a specific date. The results provided are indicative of the sub-surface conditions only at the specific sampling or testing locations, and only to the depths investigated and at the time the inspection was carried out. It cannot be considered that these findings represent the actual state of the site at all points. The accuracy of the report may be limited by undetected variations in ground conditions between sampling locations. Should any site conditions be encountered during construction that vary significantly from those outlined in this report, Franklin Consulting Australia should be advised and further advice sought accordingly.

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CONTENTS

SUMMARY RECOMMENDATIONS

Development:

Conversion of the Laggan Church to a 3 double bedrooms plus mezzanine to be used as short-term accommodation

Lot 1 DP 583484,
14 Peelwood Road,
Laggan, NSW 2583.

Expected wastewater load/day:

Daily effluent load is based on a 4 potential bedroom dwelling [8 potential occupants] @ 96L/pp/day[1] in accordance with AS 1547:2012.

Daily Effluent Load – 768L/day.

Occasional occupancy of up to 12 people will generate potential daily loading up to 1,152L/day.

Given the intermittent and short-term nature of these higher occupant numbers, combined with the inherent storage capacity within the subsoil absorption bed, the proposed system will have adequate capacity to manage the estimated effluent loads.

Recommended treatment system:

Secondary Treatment System (NSW Health Accredited) including disinfection.

[Refer to Table 1 of NSW Health accredited secondary treatment systems in this report.]

Recommended effluent dispersal system:

Treated effluent will be disposed of by subsoil absorption in an absorption bed with a minimum base (absorption) area of **60m²**.

[1] 96L/day is based on non-reticulated water supply and excludes an allowance for laundry as the facility is being used as short term accommodation facility.

REPORT SCOPE AND TECHNICAL REFERENCES

The report assesses land in the vicinity of the proposed development to identify specific areas suited to the on-site disposal of effluent associated with the proposed conversion of the church to short term accommodation.

This involves excluding land with major physical constraints such as steep slopes, rocky outcrops, poor drainage, areas within buffer distances of property boundaries watercourses, storages, flow lines and existing and proposed buildings.

All information required by the approving authority, usually regional Councils, is contained in this report, including suitable types of sewage management systems, management prescriptions, site plan and photographs, with supporting information in this report including nutrient balance and limitation tables.

The report also refers to, or relies on, standards and technical references listed below.

On-site Sewage Management for Single Households (The Silver Book) NSW Govt, 1998.

AS/ANZ Standard 1547:2012 On-site Domestic Wastewater Management.

Designing and Installing On-Site Wastewater Systems: A Sydney Catchment Authority Current Recommended Practice. Sydney Catchment Authority, 2014.

Upper Lachlan Local Environment Plan 2010

Soil Landscapes of the Canberra 1:100,000 Sheet. Jenkins, B.R. (2000) Department of Land and Water Conservation, NSW.

Soil Landscape of the Goulburn 1:250,000 Sheet. Hird, C (1991) Soil Conservation Service of NSW, Sydney

LOCATION

Site Location

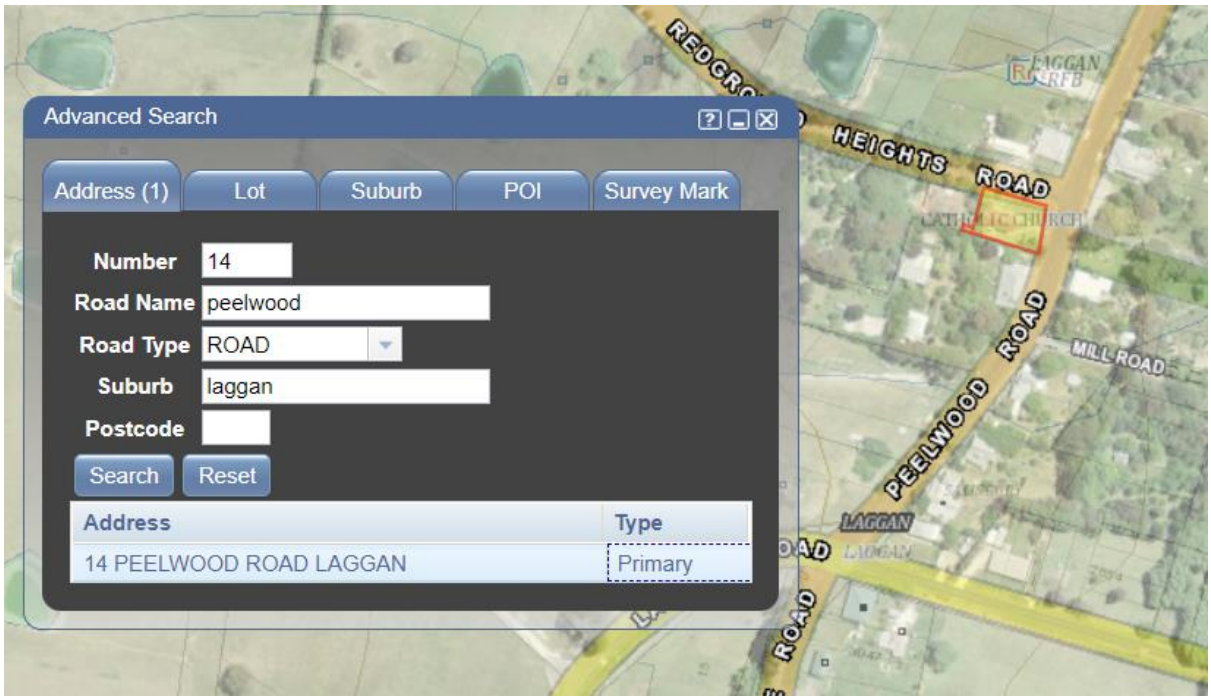

Figure 1: Lot 1 DP 583484

Landscape

The landscape is identified as the Blakeney Creek Soil Landscape Unit in the *Soil Landscapes of the Goulburn 1:250,000 Sheet,* (Hird, C. 1993). This is described as footslopes and valley floors of undifferentiated Ordovician and early Silurian metasediments. Local relief between 20-50m with low slopes generally less than 10%. Elevations range between 600 and 900m. Drainage patterns are permanent erosional stream channels with non-directional or convergent tributary patterns.

The local landscape is developed as Laggan village.

Soils

Detailed soil profile descriptions are provided in **Appendix 1** of this report.

The soils in the proposed effluent dispersal areas range from shallow gravelly well drained Rudosols constrained for effluent dispersal due to limited depth to deeper moderately drained Red and Brown Chromosols and Kandosols. These were formed in situ and on alluvial and colluvial material derived from the metamorphosed Ordovician and Silurian sedimentary parent material.

Soils comprise a massive, fine sandy loam to silty loam textured upper layer overlying a weak to moderately structured yellow-brown coloured light sandy clay loam subsoil. Soil depth varies considerably but is typically less than 50cm on crests and rises and 80-100 cm on side slopes. The steep to undulating to hilly areas coincide with Ordovician and some Devonian and Lower

Silurian metasediments which are heavily folded and in parts isoclinal resulting in the occurrence of deep and very shallow soils in the same landform element.

The area is identified as the Blakeney Creek Soil Landscape Unit in the Soil Landscapes of the Goulburn :250,000 Sheet, Hird, C. (1993). This soil landscape is analogous to the Bywong Soil Landscape Unit in Soil Landscapes of the Canberra 1:100,000 Sheet, Jenkins, B.J. (2000). The representative analytical shows a moderate phosphorous sorption level, non-saline subsoils and low exchangeable sodium. As such the soils are free of any significant chemical limitations to effluent dispersal. The main soil constraint to effluent dispersal is the low to moderate permeability subsoil at depth.

SITE INFORMATION

Address	14 Peelwood Road, Laggan Lot 1 DP 583484
Owners/ Builder	Scott Marvell
LGA	Upper Lachlan Shire Council
Block configuration:	
Intended water supply	Non-reticulated - potable water to be supplied by roof catchment with tank storage.
Expected wastewater load (volume in litres/day)	Daily effluent load is based on a 4 potential double bedroom dwelling [8 potential occupants] @ 96L/pp/day[2] in accordance with AS 1547:2012. **Daily Effluent Load – 768L/day.** Occasional occupancy of up to 12 people will generate potential daily loading up to 1,152L/day. Given the intermittent and short-term nature of these higher occupant numbers, combined with the inherent storage capacity within the subsoil absorption bed, the proposed system will have adequate capacity to manage the estimated effluent loads.
Local experience	Most secondary treatment and subsoil absorption systems work adequately in the area provided they are adequately sized, located in appropriate soil conditions, and are properly managed. Systems need to be maintained regularly, in accordance with council regulations and prescriptions in this report.

[2] 96L/day is based on non-reticulated water supply and excludes an allowance for laundry as the facility is being used as short-term accommodation facility.

Figure 2: Looking southeast at the existing church building.

Figure 3: Looking north across the front of the building.

Figure 4: Looking west along the southern side of the building.

SITE ASSESSMENT

Climate

The climate is typically a cool and moderately dry climate. Average rainfall (mean) for the Crookwell area is 858.6 mm with the 3 highest rainfall months occurring across the winter months of June-August.

Annual evaporation (Orange) is 1335 mm. Warm summers exhibit a large evaporative deficit (evaporation exceeds rainfall), while cool winters have a small evaporative deficit in all months except June and July which have small rainfall surpluses.

Climate is well suited for land application of secondary treated and disinfected effluent by subsoil absorption.

Rainfall water balance attached	Yes
Land application area calculated	Yes
Wet weather storage calculation attached	NA

Flood potential

land application area above 1:20 year flood:	Yes
land application area above 1:100 year flood:	Yes
electrical components above 1:100 year flood:	Yes

Exposure

There are no trees within the vicinity of the proposed dwelling.

Exposure is suitable for the disposal of secondary treated and disinfected effluent through subsoil absorption.

Slope

The effluent dispersal site is proposed for a site with flat to gentle slope.

Slopes are not a constraint to the disposal of secondary treated effluent through subsoil absorption.

Landform

Slope form of the site is flat in the proposed effluent disposal areas and suited to the subsoil absorption.

Landform is suited to the disposal of secondary treated effluent through subsoil absorption.

Run-on

Run-on water will not impact the effluent disposal site due to the elevated effluent disposal area.

Run-on water will not be a constraint to the effluent disposal site due to the elevated subsoil absorption area.

Seepage

No seepage was evident on the property.

Erosion potential

The site has very low erosion potential due to the low slope and good groundcover of grasses and pasture species.

The erosion risk will be managed through the maintenance of good groundcover on the effluent disposal area.

Site drainage

Site drains through the overland flow. There are no drainage features in the vicinity of the property which will require a 40 metre buffer from effluent disposal areas.

There are no drainage features requiring buffers from the effluent disposal area.

Fill

There is no imported fill on the site.

No fill in the area proposed for effluent disposal.

Groundwater

Horizontal distance to groundwater well used for domestic supply:

There are no known wells used for potable water in the vicinity.

Groundwater vulnerability map category:

The area is mapped as Moderate Groundwater Vulnerability in the Lachlan Catchment Groundwater Vulnerability Map (DLWC)

Bores in area and purpose:

There are 6 bores within 500 metres of the site.

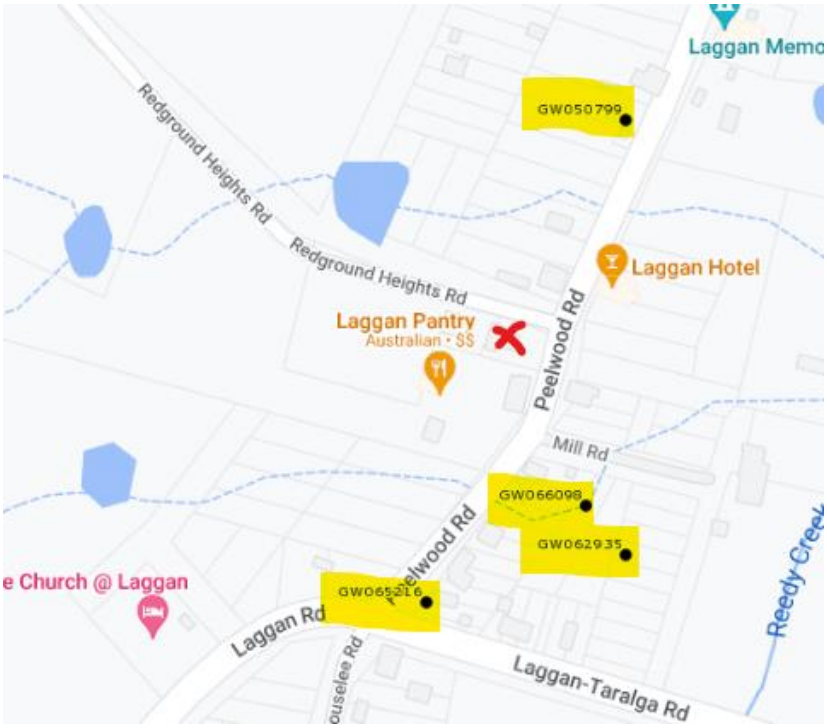

Figure 5: Nearby bores

https://realtimedata.waternsw.com.au/

Bore GW066098 is approx. 110 m south east of the dispersal site. The bore is 32 m deep, with water bearing zones at 827.6-28.6m. GW062935

is approx. 150m south east, it has depth of 32m with water bearing zones at 14.3m, 20.7m, 29.6m. Bore GW050799 is approx. 160m to the north east with depth of 30.5m, and water bearing zones at 26.2-27.4m.

The effluent management practices proposed in this report will not impact this bore or the groundwater aquifer due to the horizontal separation of >100m and vertical separation of approximately >14m, low transmissivity of fractured rock aquifer systems and low application rate of secondary treated and disinfected effluent to the surface or near surface.

Buffer distance from treatment system to	
Perennial rivers and creeks:	NA
Drainage depressions:	NA
Other sensitive environments:	100 m (bore)[3]
Boundary of premises:	3 m[4]
Dwelling:	15 m
Swimming pools:	NA
Buildings:	3/6 m (from upslope/downslope buildings)
[Buffers distances as per Table 5, Silver Book]	

Is there sufficient land area for	
Application system including buffers:	Yes
Reserve application system:	Yes Refer **Figures 6 & 7**

Surface rock outcrop	***No areas of outcropping rock in the vicinity of the proposed effluent disposal site.***

[3] A reduced bore buffer of 100 metres is considered adequate given the use of secondary treated and disinfected effluent combined with subsoil absorption. This is also the buffer distance required by Sydney Catchment Authority Guidelines.

[4] A reduced boundary buffer of 3 metres is considered adequate given the use of secondary treated and disinfected effluent combined with subsoil absorption.

SOIL ASSESSMENT

Depth to bedrock or hardpan:	**>1.0 m**
Depth to high soil water table:	>1.5 m
Hydraulic loading rate Soil texture: Soil structure: Permeability *(from table \L1 of AS1547:2012)*: Recommended design for subsoil absorption *(from table L1 of AS1547:2012)*:	 **Silty loam** topsoil underlain by **silty clay loam.** **Weak** in topsoil and **weak to massive** in subsoil 0.06 – 0.5 m/day 10-20 mm/day [15mm/day adopted]
Coarse fragments:	5-10%
Bulk density (a):	1.4 t/m^3
pH field (a)	4.8 in topsoil, 6.5 in subsoil
Electrical conductivity dS/m (a)	0.2 in topsoil, 0.3 in subsoil
Exchangeable sodium %(a)	3 in topsoil, 2 in subsoil
Cation exchange capacity (mequiv/100g) (a)	15 in topsoil, 9 in subsoil
Phosphorous sorption capacity mg/kg (a)	5000 (moderate)
Geological feature Discontinuities: Fractured rock:	 None None
Soil landscape reference (a):	Williamsdale Unit (comparable soil landscape unit with the Blakeney Creek Unit)[5]
Dispersiveness EAT class (a):	8 in topsoil, 3(1) in subsoil

(a) extrapolated from Jenkins (2000) *Soil Landscapes of the Canberra 1:100,000 Sheet*. DLWC

[5] Similar to Williamsdale Unit

SYSTEM SELECTION

Consideration of connection to centralised sewerage system Distance: Potential for future connection: Potential for reticulated water:	 **>5 kilometres** **None** **None**
Type of land application system best suited Justification:	Subsoil absorption in subsoil absorption bed. Suited to site and soil conditions. Low maintenance reliable system suited to site and occupancy patterns.
Type of treatment system best suited Justification:	NSW Health accredited secondary treatment system. Reliable system with high quality disinfected effluent.

EFFLUENT MANAGEMENT PRESCRIPTIONS

Effluent treatment	The following site-specific recommendations are made in respect of the AWTS: 1. Effluent will be treated by a NSW Health accredited system capable of achieving secondary standard treatment, refer below link to accredited systems: **http://www.health.nsw.gov.au/environment/domesticwastewater/Pages/default.aspx** 2. The treatment system tank should also be installed so that the lid remains at least 100 mm above final ground level to avoid stormwater entering the tank. 3. The final location for the AWTS unit should be chosen by the installer, in consultation with the client, and provide a minimum 3 m buffer from the dwelling or other buildings – an indicative location is provided in **Figure 6 & 7**. 4. AWTS tanks should be installed in compliance with the manufacturer's recommendations, 'AS/NZS 3500.2:2003 Plumbing and Drainage Part 2 Sanitary Plumbing and Drainage' and Council requirements.
Effluent dispersal	Effluent will be dispersed via an absorption bed. The following specific management practices should be implemented to ensure effluent is appropriately treated: 1. The absorption bed should be located within land shown as suitable in **Figure 6.** 2. An absorption area with a basal (floor) area of **60 m²** is required. This can be achieved by the installation of a single absorption bed of 20 m length and 3 m width. A design is provided in **Figure 7.** 3. The effluent can be delivered in a perforated pipe bedded in clean durable aggregate. The aggregate should be installed with a 200mm layer of 20-40mm aggregate on the base, overlain by a 175mm layer of 20-40mm aggregate. The distribution pipes are to be bedded approximately 75mm deep in the 20-40mm aggregate layer). 4. The 20 m absorption bed should be fed by two delivery lines (perforated pipe) which are spaced at 750mm from the edge of the bed with 1500mm between the delivery lines. 5. The pipe delivery lines will be two runs of 32-40mm PVC sewer pipe drilled out with 5mm holes every 500mm, and 45 degrees off the bottom of the pipe. Seep holes of 5mm diameter should be drilled at 1m intervals along the bottom of the pipe. 6. The two delivery lines should be joined such that effluent is distributed evenly between each. This can be achieved using a proprietary distribution box (e.g. Everhard) or a splitter comprising a level T piece with outlets as required. 7. The bed should be excavated parallel to the contour so the floor of the trench is level along the entire length. 8. The excavation should have a total depth of 0.5 m (500 mm), comprising a wetted depth of 375 mm and a 125 mm cover of topsoil. 9. Geotextile should be placed between the aggregate in the bed and the covering of topsoil. 10. The topsoiled bed should be planted with perennial grasses and slashed/mown regularly. 11. Landscaping around the bed, particularly on the downslope, can provide for the additional utilization of effluent discharged to the bed. Suitable species include

	Callistemon pallidus, C. palludosis, Kunzea ericoides, K. parvifolia, K. phyllicoides (burgen), Leptospermum continentale (prickly ti tree), L. multicaule, L. flavescens, L. squarrosum, Melaleuca armillaris (honey myrtle), M. decussata, M. squamea, M. thymifolia, M. ericifolia, M. hypericifolia, M. linariifolia. 12. The following buffers will be applied to the absorption bed: 3 m from buildings and boundaries[6], 100 m from bores[7].
Special Conditions	1. The area proposed for the subsoil absorption bed should be investigated for buried services and potential unmarked grave sites prior to final excavation.
General	1. Stock and vehicular access must be excluded from the irrigation area as they compact the soil, thereby reducing the infiltration rate and water holding capacity. 2. Water conservation measures should be adopted to the greatest extent possible in the house, particularly in relation to the high water use activities of showering, clothes washing and toilet flushing. AAA+ plumbing appliances and fittings should be used. Measures including use of front-loading washing machines, low volume shower roses and dual flush toilets reduce water usage by 30 to 40%. 3. Detergents low in phosphorous and sodium should be used as much as possible (see details in appendix) in order to protect the soil's capacity to absorb water.

[6] A reduced boundary buffer of 3 metres is considered adequate given the use of secondary treated and disinfected effluent combined with subsoil absorption.

[7] A reduced bore buffer of 100 metres is considered adequate given the use of secondary treated and disinfected effluent combined with subsoil absorption. This is also the buffer distance required by Sydney Catchment Authority Guidelines.

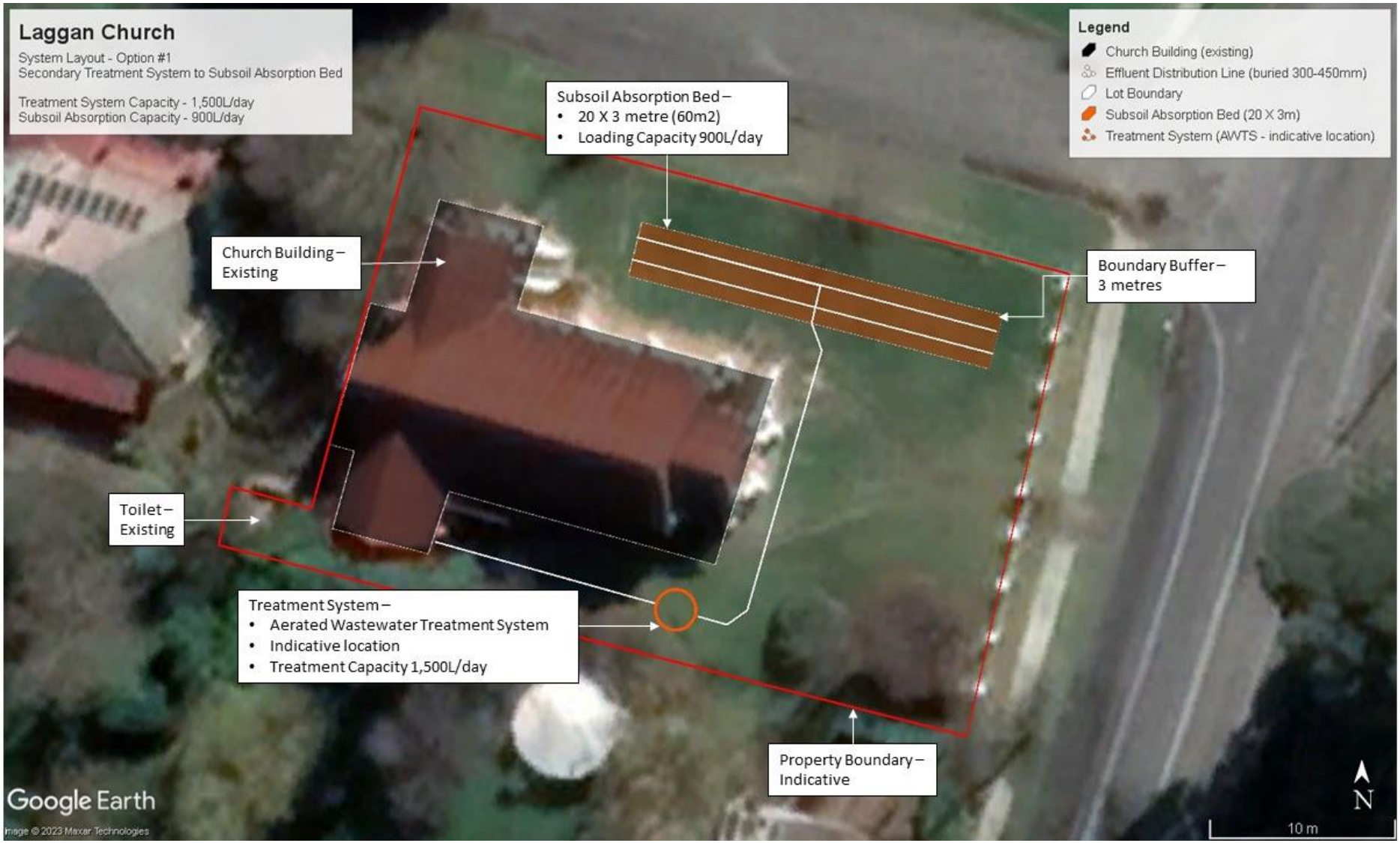

Figure 6: Property Constraints

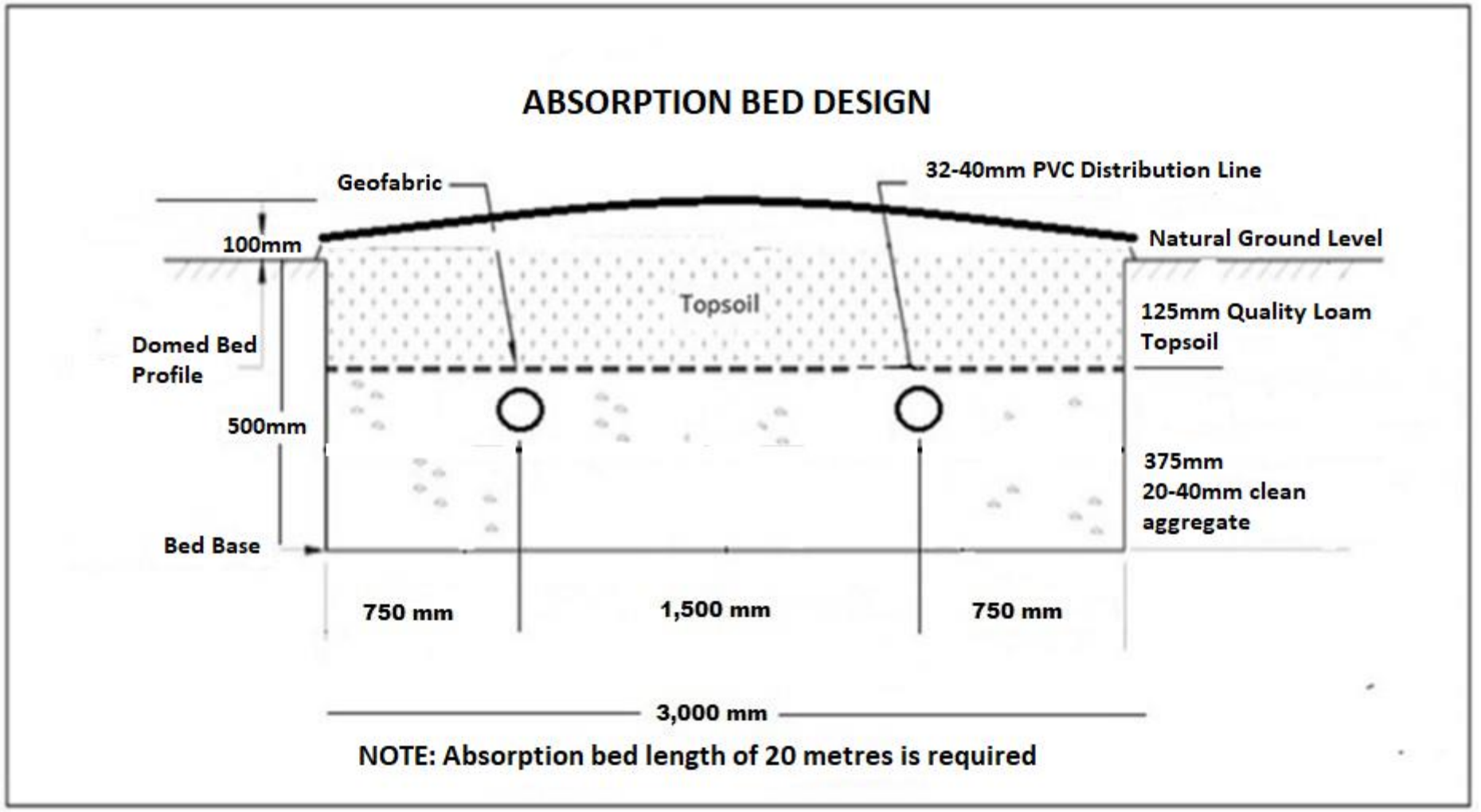

Figure 7: Absorption Bed Design

SIZING EFFLUENT DISPOSAL AREA

Using the DLR for subsoil absorption on massive to weak clay loam soils of 10 – 20mm (15mm/day adopted) and design loading of 1080 L/day, the following land application areas are required to manage additional hydraulic loading, nitrogen and phosphorous generated.

Water balance	• **Sizing based on hydraulic loading:** A = Q (l/day)/DLR (mm/day) where A = area; Q = 768 l/day; DLR = 15 mm/day A = 768/15 = 512 m^2 **Area required = 60 m^2**
Design effluent disposal area	Therefore, a subsoil absorption area of **60 m^2** will account for phosphorous, nitrogen and water applied based on estimated connections and usage patterns associated with the conversion of the church to a 4 potential double bedroom short stay accommodation.

SITE AND SOIL LIMITATION ASSESSMENT

The following two limitation tables are a standardised guide to the site and soil characteristics which may limit the suitability of the site for effluent disposal and which would require attention through specific management practices. The tables have been reproduced from *On-site Sewage Management for Single Households* (tables 4 and 6, Anon, 1998). The highlighted categories represent site and soil conditions of the land covered in this report. The tables show that the land designated for effluent application has slight to moderate limitations, but no severe limitations.

Site limitation assessment

Site feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Flood potential	All land application systems	> 1 in 20 yrs.		Frequent, below 1 in 20 yrs	Transport in wastewater off site
	All treatment systems	components above 1 in 100 yrs.		Components below 1 in 100 yrs.	Transport in wastewater off site, system failure
Exposure	All land application systems	High sun and wind exposure		Low sun and wind exposure	Poor evapo-transpiration
Slope %	Surface irrigation	0-6	6-12	>12	Runoff, erosion potential
	Sub-surface irrigation	0-10	10-20	>20	Runoff, erosion potential
	Absorption	0-10	10-20	>20	Runoff, erosion potential
Landform	All systems	Hillcrests, convex side slopes and plains	Concave side slopes and foot slopes	Drainage plains and incised channels	Groundwater pollution hazard, resurfacing hazard

Site feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Run-on and seepage	All land application systems	None-low	Moderate [8]	High, diversion not practical	Transport of wastewater off site
Erosion potential	All land application systems	No sign of erosion potential		Indications of erosion e.g. rills, mass failure	Soil degradation and off-site impact
Site drainage	All land application systems	No visible signs of surface dampness		Visible signs of surface dampness	Groundwater pollution hazard, resurfacing hazard
Fill	All systems	No fill	Fill present		Subsidence
Land area	All systems	Area available		Area not available	Health and pollution risk
Rock and rock outcrop	All land application systems	<10%	10-20%	>20%	Limits system performance
Geology	All land application systems	None		Major geological discontinuities, fractured or highly porous regolith	Groundwater pollution hazard

[8] An upslope earth diversion bank will be installed upslope of the effluent irrigation area

Soil limitation assessment

Soil feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Depth to bedrock	Surface and sub surface irrigation	> 1.0	0.5-1.0	< 0.5	Restricts plant growth
or hardpan (m)	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Depth to seasonal water table (m)	Surface and sub surface irrigation	> 1.0	0.5-1.0	< 0.5	Groundwater pollution hazard
	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Permeability	Surface and sub surface irrigation	2b, 3 and 4	2a, 5	1 and 6	Excessive runoff and waterlogging
Class	Absorption	3, 4		1, 2, 5, 6	Percolation
Coarse fragments %	All systems	0-20	20-45	>40	Restricts plant growth, affects trench installation
Bulk density (g/cc) **SL** **L, CL** **C**	All land application systems	 < 1.8 < 1.6 < 1.4		 > 1.8 > 1.6 >1.4	restricts plant growth, indicator of permeability
pH	All land application systems	> 6.0	4.5-6.0	-	Reduces plant growth
Electrical conductivity (dS/m)	All land application systems	<4	4-8	>8	Restricts plant growth

Soil feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Sodicity (ESP)	Irrigation 0-40cm; absorption 0-1.2mtr	0-5	5-10	> 10	Potential for structural degradation
CEC mequiv/100g	Irrigation systems	> 15	5-15	< 5	Nutrient leaching
P sorption kg/ha	All land application systems	> 6000	2000-6000	< 2000	Capacity to immobilise P
Aggregate stability	All land application systems	Classes 3-8	class 2	class1	Erosion hazard

Appendix 1: Soil Profile Description

Soil Profile 1: Front yard of church

Soil classification	Depth (cm)	Properties
CHROMOSOL	0-40 40->100	A Medium solid brown silty loam, dry & friable, massive to weak, <5% coarse as stones 5-15mm grades to. B Red/brown silty clay loam, dry & friable, weak, <5% coarse, continues.

Figure 8: Soil profile – front yard of church (above) and texture ribbon (below).

Appendix 2: Supporting information

Powder Laundry Detergents

What did we test?

Lanfax Laboratories purchased laundry detergents powders from supermarkets in Armidale, NSW (during late 2008) and a few samples were supplied, without charge, by various individuals to total 71 powders.

Samples of each of these products were mixed at two rates: one specifically for front loading washing machines (25 L); and one for top loading washing machines (60 L) to simulate the wash cycle of a normal wash program.

The rates of detergent were calculated from weighed samples of a known volume from a freshly opened packet and mixed at the manufacturer's recommended dose for a normal wash.

The samples were mixed with rainwater at the chosen dose and agitated for 30 minutes to replicate washing action. Samples were tested within one hour for pH and salinity. Other tests followed normal good laboratory practice.

Why carry out the tests?

The quality of greywater from domestic dwellings is a cocktail from the numerous chemicals used in the home for personal and general cleaning. Perhaps the greatest use of chemicals is in the laundry where modern detergents are used at rates from a teaspoonful per wash to 1½ cups per wash. Manufacturers have their formulations and marketing strategies that mostly fail to address the problem of potentially hazardous chemicals. The impacts of pH, salinity, sodium, phosphorus and sulphur are not addressed in advertising. Most product labels don't state the ingredients, so astute purchasers can never be sure what is actually in the product. More importantly, very few even let you know how many washes in a packet. This research set out to address some of those shortcomings.

These data are not an endorsement of any product. ***Lanfax Labs*** has a policy of not endorsing or degrading any product.

No "safe in septic" standards or acceptable guidelines exit, and no laundry product can be "environmentally friendly".

The term "biodegradability" can only apply to the organic components of a powder detergent. When the detergent has a positive reading for Electrical Conductivity, you know immediately that inorganic components are included so the product cannot be "100% biodegradable".

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Commercial and Research Laboratories with special expertise in analysis for:
Domestic On-site Sewage Treatment
Laundry product testing
Greywater reuse
Effluent irrigation
Wastewater treatment
Environmental Monitoring
Soil and Landscape Assessments
Environmental Engineering

Principal Scientist:
Dr Robert Patterson FIEAust, CPSS, CPAg

NOTE: Product formulations may have changed since this research was undertaken. Lanfax Labs has no way of knowing which products may have changed and manufacturers have no requirement to advertise formulation changes to the public.

Lanfax Laboratories
ABN 72 212 385 096

Laundry Detergents

Research Results - 2009

Front Loading & Top Loading Powders

How to interpret the results

The graphs shown on these pages are examples of the numerous graphs available on the website.

Greywater pH

pH is a measure of the acid or alkaline status of the liquid. Acids have a pH <7, while alkaline solutions have a pH>7. Natural systems prefer pH between 6 and 8.

High pH causes soil to disperse and where greywater is used for landscaping, a high pH may be detrimental to both the plants, soil microbes and the soil structural stability.

Phosphorus (symbol P)

Phosphorus is an essential biological element and a non-renewable resource. It is an excellent component of modern detergents, but detrimental when discharged into waterways as it encourages growth of algae and bacteria ("blue-green algae"). When greywater is used for landscaping, plants can uptake the P and so reduce the need for P from other fertilisers. On sandy soils P may leach into groundwater. With care on heavy clay soils much of the P may be locked up in the soil and not be an environmental problem.

If your greywater system may impinge on a sensitive environment, you need to choose a product with a very low P. The "P" symbol on the packet is not a good indicator as some products marked "P" have relatively high levels of P. The "NP" symbol is a good indicator of extremely low (almost absent) P. See Figure F1 and T1 for P ratings.

Sulphur (symbol S)

Sodium sulphate is often used as a "manufacturing" agent, in other words a "filler". Detergents high in sulphur are more likely to have ingredients that may not be essential to a clean wash. Usually there is no indication on the packet to suggest high proportions of "filler" other than a big bulky box. Choose a concentrate and one with a small dose.

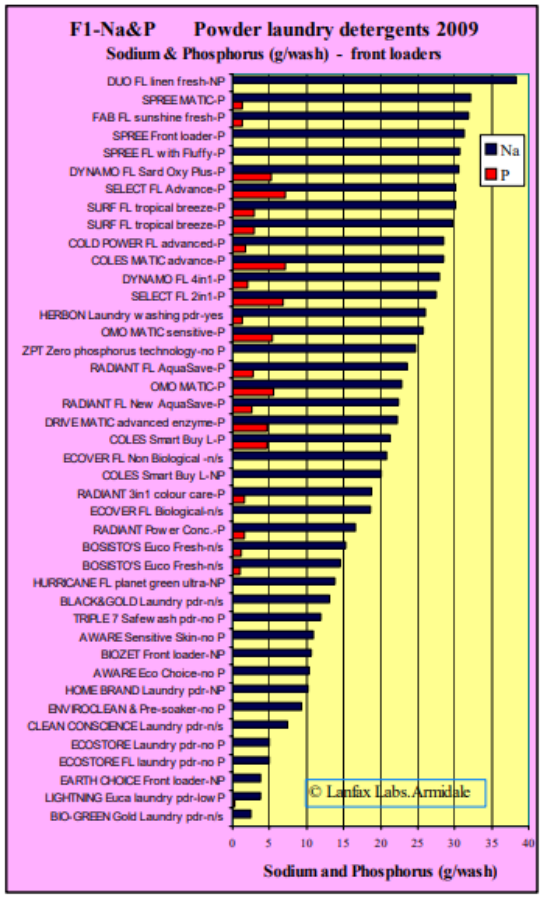
How much detergent to use.

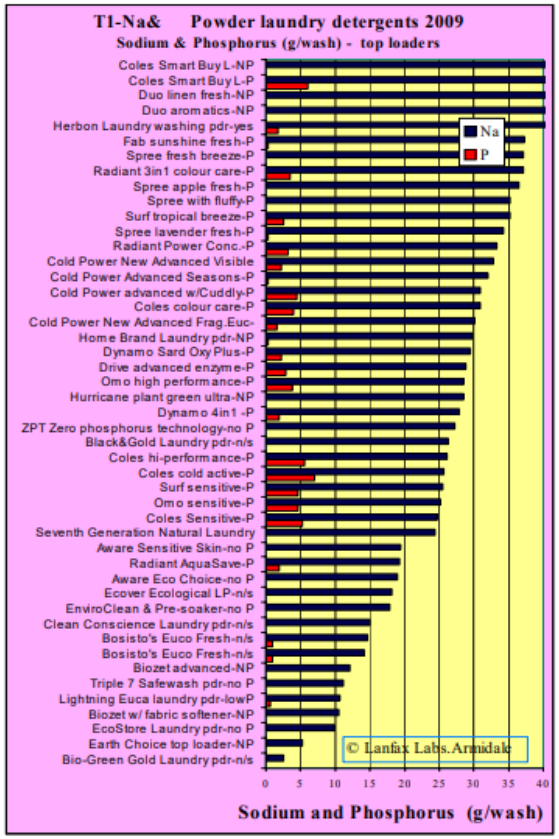
The "builder" in detergents (often sodium tripolyphosphate, or zeolite as a replacement) has to immobilise the "hardness" in water. Hardness is caused by calcium and magnesium in the water. Rainwater has almost none of these two elements and is "soft" water. Use less detergent than recommended in "soft" water. You may need to use more detergent in "very hard" water. How do you know if water is soft or hard?Hard water leaves a scum with soap.

Sodium (symbol Na)

Sodium is an element essential for all life, however, in elevated concentrations leads to serious plant water stress and potential soil structural instability. Laundry detergents that contain more than 20 g sodium per wash may be detrimental to plants and soil structure. In the figures F1 and T1, the lower the sodium the better. Take care with products over 20 g Na/wash by spreading greywater over a larger area, or dilute with the rinse water.

When in doubt, choose low sodium and no phosphorus.





WASH and RINSE efficiency

Whether you have a front loader or a top loader, the efficiency of the wash and rinse cycles are more important than the quantity of water used. Some powders are slow to fully dissolve so the particles will be difficult to wash from the clothes. Always try your own experiment and see how much detergent you need to a wash to your satisfaction. Be aware of great cleaning claims. Remember, the performance of your wash will depend upon the washing machine action, the hardness of your water, the temperature of the wash, and the quality of the detergent. They all go together for a clean wash.

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.

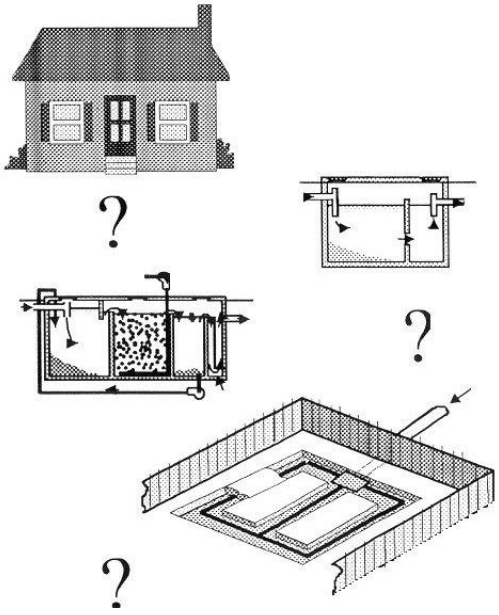
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

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



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