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WASTEWATER MANAGEMENT PLAN PROPOSED EARLY LEARNING CENTRE

**Lot 2 in DP746654
167 Serpentine Road Terrigal**

for

**Malachite Holdings Pty Ltd
Superannuation Fund**



Distribution

Malachite Holdings Pty Ltd Superannuation Fund

Rep. 24142-E

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1. INTRODUCTION AND BACKGROUND

As requested by *Malachite Holdings Pty Ltd Superannuation Fund* (the owner), *Larry Cook Consulting Pty Ltd* has conducted a wastewater treatment and disposal investigation at Lot 2 in DP746654, No. 167 Serpentine Road Terrigal Central Coast New South Wales (the Site). The Site is shown on Near Map lot plan in **Figure 1** and on a Six Maps topographic plan presented in **Figure 2**. A plan of the Site is presented in **Figure 3**. A ground contour plan is presented in **Figure 4**.

The owner proposes to construct an Early Learning Centre on the eastern part of the Site. The Site is not connected to the municipal sewerage scheme. In this regard, Central Coast Council (Council) requires the preparation of a Wastewater Management Plan for an On-Site Sewerage Management system (OSSM) to manage all wastewater generated from the proposed commercial development.

A Wastewater Management Plan was prepared for the proposed development in December 2024 (Ref. 24142-B dated 2nd December 2024). The Wastewater Management Plan (WMP) proposed treatment of wastewater generated from the proposed childcare centre in a commercial-scale secondary (aerated) sewage treatment system with two options for disposal: sub-surface drip irrigation and a set of raised pressure dosed absorption beds. The preferred option was a set of raised pressure dosed absorption beds.

Council assessed the WMP and requested further information which is summarised as follows:

- Revision of the wastewater allowances for children and staff.
- Commentary on potential waste products associated with craft/activities and cleaning agents which may impact on the quality of the influent.
- Commentary on the management of sodic soils in the soil landscape.
- Revised water balance using more localised rainfall and evaporation data.
- Review buffer setback distances associated with an existing swale drain in the central western part of the Site.
- Review the design size for sub-surface drip irrigation including the adopted DIR and land slope.
- Provide flow balancing based on an 18-month operating cycle and how flow balancing will be achieved.
- Provide a new site plan showing the proposed locations of the treatment tanks
- Provide details of the decommissioning strategy for the existing OSSM.

A revised WMP was prepared in July 2025 (Ref. 24142-C dated 25th July 2025).

Council further assessed the WMP and requested the following information in a letter dated 1st September 2025:

- Formalise the management of waste products used in the centre in a Plan of Management.
- Consideration of subsoil treatment in the proposed Land Application Area given the potential for sodicity problems documented in state government soil mapping.

- Formal flow balancing based on an 18-month operating cycle and how flow balancing will be achieved.

This revised WMP addresses the above-listed requests, in particular incorporation of flow balancing and tank capacity requirements with revised calculations of the size of the Land Application Area.

The OSSM system is designed to:

1. Dispose of treated effluent on-site using an approved and effective methodology in accordance with the Environmental Health Protection Guidelines (DLG 1998 & OLG 2025), Council's DCP and AS/NZS 1547:2012 (SAI & NZS 2012).
2. Meet the environmental and health *Performance Objectives* documented in the Environmental Health Protection Guidelines (DLG 1998 & OLG 2025) which ensure that on-site sewage management for single households is appropriate and will not affect public health or the environment.

These objectives are detailed in Section 7.1.

2. INVESTIGATOR

Larry Cook, wastewater consultant and geoscientist undertook the effluent disposal management investigation. Larry Cook is qualified to carry out such investigations.

3. EXISTING DEVELOPMENT

The Site is a mostly cleared and partly developed parcel of land. A *Near Map* image over the Site showing existing conditions is presented in **Figure 5**. Two dwellings are located in the north-eastern part of the Site with access from Serpentine Road. The central and western parts of the Site are mostly cleared with a cluster of trees in the far western and south-western parts.

Wastewater generated from the buildings is treated to primary standard in a single concrete septic tank located immediately west of the buildings (**Figure 5**). Disposal of primary treated wastewater is via a single absorption trench located along the contour immediately downslope of the treatment tank (**Figure 5**).

4. PROPOSED DEVELOPMENT

The owner proposes to construct an Early Learning Centre on the eastern Serpentine Road part of the Site. A plan showing the proposed locations of the elements of the development are shown in **Figure 6**. The proposal includes the demolition of the existing ancillary building structures, the redesign of the existing dwelling to change the use to an Early Learning Centre. The proposed development will accommodate a total of 113 children and up to 21 staff. A 38-car car park, access road off Serpentine Road, landscaping and an extensive outdoor children's playground area are also

proposed. It is understood that the centre will incorporate several rooms including five principal activity rooms. The centre also includes:

- Staff – Unisex facilities – 4 cubicles and basins
- Children facilities – 2 cubicles and basins
- DDA facilities
- Programming room. Interview room. Filling room, Yoga room and Staff room
- Sleep room and Cot room
- Staff area and Reception area
- Storerooms x 3
- Kitchen and Pantry
- Laundry Clrs

5. SITE INFORMATION

The Site is a 1.8-hectare multi-sided but broadly 'L' shaped parcel of rural-residential land oriented east-west. The Site is in the Parish of Kincumber, County of Northumberland and in the Central Coast Council local government area. The Site is located on the eastern side of Serpentine Road and approximately 60 m north-west of its intersection with Mitarra Road.

The Site is surrounded by rural-residential properties to the east, Our Lady Star of the Sea Primary School to the north and west, and Terrigal Pet Resort to the south. There is mains power and town water available to the Site but no municipal sewerage system.

6. SITE ASSESSMENT

The Site is located on a north-south oriented coastal ridge system with the western part sloping to the west into the Erina Valley system. The ridge forms a watershed in this area with drainages to the west flowing into the Erina Creek system. There are no defined streams on the Site. However, a north-westerly flowing stream is located immediately south-west of the Site.

As can be seen on the topographic plan shown in **Figure 2** and in the site plan (**Figure 3**), the Site slopes down from a topographic high point on the eastern Serpentine Road boundary to the western end. The highest elevation is in the eastern part of the Site close to Serpentine Road, approximately 57.0 m Australian Height Datum (AHD) The lowest elevation is in the north-western corner of the Site; approximately 35.0 m AHD. The ground slope in the southern part of the Site where disposal of treated wastewater is preferred is less than approximately 1 in 10 (10 %) to 1 in 8 (12 %).

The Site is underlain by Triassic-age Terrigal Formation, which consists of interbedded lithic to quartz-lithic sandstone, siltstone, and minor claystone and conglomerate. The Terrigal Formation is partly exposed on the elevated parts of Erina Heights along The Central Coast Highway and in cut embankments along the Serpentine Road ridge system.

The Terrigal Formation in the coastal valleys (where the Site is located) is variably deeply weathered and generally covered with a silty sandy colluvial and residual clay loam to sandy-silty clay loam soil profile which can exceed one metre in depth on the lower flanks of the valleys. The soils are deeper in the lower parts of the valley and sometimes on the flanks where deep colluvium can be developed.

The Site is largely cleared with a stand of eucalypt tall open forest and under storey preserved in the western and south-western parts.

7. ON-SITE WASTEWATER DISPOSAL MANAGEMENT PLAN

7.1 INTRODUCTION

The **objectives** of a Wastewater Disposal Management Plan are to:

1. Dispose of treated effluent on-site using an approved and effective methodology in accordance with the Environmental Health Protection Guidelines (DLG 1998 & OLG 2025), Council's DCP (sewage management policy) and AS/NZS 1547:2012 (SAI & NZS 2012).
2. Meet the environmental and health *Performance Objectives* documented in the Environmental Health Protection Guidelines (DLG 1998 & OLG 2025) which ensure that on-site sewage management for single households is appropriate and will not affect public health or the environment and

These objectives are summarised as follows:

- **Prevention of public health risk.** Contact with effluent should be minimised or eliminated, particularly for children. Residuals, such as composted material, should be handled carefully. Treated sewage should not be used on edible crops that are consumed raw
- **Protection of lands** - on-site sewage management systems should not cause deterioration of land and vegetation quality through soil structure degradation, salinisation, waterlogging, chemical contamination or soil erosion
- **Protection of surface waters** - on-site sewage management systems should be selected, sited, designed, constructed, operated and maintained so that surface waters are not contaminated by any flow from treatment systems and land application areas (including effluent, rainfall run-off and contaminated groundwater flow)
-

The following works were undertaken:

- Undertake a site inspection and site walkover of the site,
- Review recent state government colour aerial photographs and remotely sensed data acquired over the district,
- Describe the physical setting (geomorphology),
- Establish, assess and describe local and district hydrogeological conditions,

- Establish subsurface conditions including soil assessments (soil type, soil permeability) and estimate depth to bedrock (if possible) and depth to groundwater,
- Establish soil parameters including pH, Electrical Conductivity (EC), Phosphorus Sorption (PSorp), Cation Exchange Capacity (CEC), Exchangeable Sodium Capacity (ESP) and Modified Emerson Class,
- Estimate the total hydraulic load for the proposed new commercial development,
- Acquire and utilise relevant Bureau of Meteorology (BOM) climate data and calculate a water balance,
- Assess and rank any potential impacts from the on-site disposal of treated wastewater on the groundwater system and environment, and
- Provide recommendations for the method, location and size of any disposal area/s.

7.2 CLIMATE

Sun and wind exposure over the Site are excellent. No temperature, evaporation and rainfall data are available for the Site. In this regard, rainfall data was acquired from the BoM Avoca Beach Bowling Club site (Site No. 061294). Based on temperature data from the Avoca Beach Bowling Club, mean daily maximum temperatures for the Site are expected to be always greater than 15°C (**Table 1**). Rainfall statistics for the site are also provided in **Table 1**.

Evaporation data was acquired from the closest official BoM pan evaporation site on this part of the coast, Maryville (Site No. 061223).

The water balance calculations utilised in the hydraulic balance (**Appendix A**) are based on the rainfall data acquired from Avoca Beach Bowling Club and mean monthly evaporation data from Maryville.

Table 1
Summary Climate Statistics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Rainfall - Avoca Beach Bowling Club (Station 061294)														
Mean rainfall (mm)	169.5	155.0	171.6	142.5	113.2	136.1	59.7	65.9	76.2	96.2	93.4	86.2	1368.1	All Years
Decile 5 (median) rainfall (mm)	146.8	117.5	161.8	104.1	112.1	98.6	38.8	50.4	63.2	58.7	91.6	58.0	1340.4	All Years
Evaporation - Maryville (Station 061223)														
Evaporation (mm)	186.0	154.0	142.6	105.0	74.4	60.0	71.3	93.0	117.0	148.8	165.0	195.3	1512.4	1964 1994

7.3 SOIL ASSESSMENT

The reader is referred to the *Soil Landscapes of the Gosford-Lake Macquarie 1:100,000 Sheet* Report (Murphy, 1993). The soils beneath the Site are grouped with the Erina soil landscape which is developed on undulating rises overlying the Terrigal Formation and Narrabeen Group sedimentary rocks in this area.

The whole Site is underlain by variably thick colluvial soils derived from the Triassic age Terrigal Formation. Three hand auger holes were sunk in the central part of the Site, south-east of the footprint of the proposed childcare centre where application of wastewater may be suitable. The locations of the investigation soil test holes are shown in **Figure 3**. The soil investigations revealed a colluvial soil profile of greater than approximately 1.20 m thickness. Soil logs are provided in **Appendix B**. A photo showing the soil test hole BH1 in relation to the existing buildings is presented in **Plate 1**.



Plate 1 Location Soil Test Hole BH1

In summary, the soil profile consists of approximately 0.50 m of brown, organic-rich, gritty silty sandy loam with rare fragments of strongly weathered siltstone/sandstone overlying a 0.20 m-thick layer of orange-brown to yellow-brown sandy clay loam with rare fragments strongly weathered sandstone fragments. Orange to red brown colluvial sandy clay was intersected from 0.0.70 m depth to at least the base of the test hole at 1.00 m depth. Groundwater was not encountered in the investigations.

A photo of the soil profile encountered in BH 1 is presented in **Plate 2**.



Plate 2 Soil Profile – BH1

The soils were classified according to the textural classification in AS/NZS 1547:2012. A summary soil classification is presented in **Table 2**.

Table 2 Summary Soil Profile – BH 1	
COLLUVIAL	<u>0.00 - 0.50 m Silty Sandy Loam</u> . Brown topsoil and colluvium. Minor amounts of strongly weathered rock fragments to 20 mm. Common to abundant amounts of organic material. Dry and loose. Average thickness: 0.50 m Average interval: 0.00 - 0.50 m
COLLUVIAL	<u>0.50 - 0.70 m Sandy Clay Loam</u> . Orange brown to yellow-brown. Rare sub-angular strongly weathered sandstone fragments to 10 mm. Dry and semi dense. Average thickness: 0.20 m Average interval: 0.50 - 0.70 m

COLLUVIAL	<u>0.70 – 1.00 m Sandy Clay</u>. Orange to red brown. Dry to moist in parts and semi dense. Average thickness: > 0.30 m Average interval: 0.70 - > 1.00 m
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The textural classification of the Silty Sandy Loam encountered down to between approximately 0.50 and 0.60 m in the central part of the Site allows a determination of its expected permeability in accordance with Table 5.1 of AS/NZS 1547:2012 (SAI & NZS, 2012). The indicative permeability value (K_{sat}) is predicted to be between approximately 0.5 and 1.5 m/d with an expected Design Loading Rate (DLR) of approximately 30 mm/day (Tables L1 in Appendix L, AS/NZS 1547:2012) and a Design Irrigation Rate (DIR) of approximately 4mm/day (28 mm/week) (Table M1 in Appendix M).

The moderately limiting clay loam to light clay layer intersected from 0.70 m depth has an indicative saturated hydraulic conductivity value of between approximately 0.06 and 0.12 m/d with an expected DIR of approximately 21 mm/week and a DLR of approximately 8 mm/day. A revised DIR of 3 mm/day (21 mm/week) is therefore adopted in the calculations for this WMP.

However, the ground slopes measured on the contour plan and referenced in Section 6, are between approximately 1 in 10 (10%) and 1 in 8 (12 %). Table M2 in AS/NZS 1547:2012 provides recommended reductions in the DIR to compensate for the ground slope. A 20% reduction in the DIR has been suggested to accommodate the measured 10 to 12% slope. However, the results of a site inspection carried out between the wastewater consultant and Council on 10th July suggests that the ground slope is not significantly constraining. In addition, the actual ground slope in the southern part of the Site is gentler. Therefore, a DIR of 3 mm/day (21 mm/week) is maintained in this WMP.

Laboratory results for a sandy clay loam sample collected at approximately 0.50 to 0.60 m in the same soil landscape in adjoining Lot 11 is presented in **Table 3**. A copy of the Laboratory certificate is provided in **Appendix C**.

Table 3 Soil Test Results		
Sample	0.60 m	Limitation
Analytes	Silty Sandy Loam	
pH (pH units)	5.1	Moderate
E.C. (dS/m)	0.07	Minor
Mod. Emerson Class	5	Moderate
Exchangeable Sodium Capacity (ESP) (%)	1.8	Minor
Cation Exchange Capacity (CEC) (cmol ⁺ /kg)	7.68	Moderate
Phosphorus Sorption (P Sorp) (mg/kg)	1,900	Moderate

The moderate CEC limitation can be ameliorated by adding organic matter and/or lime resulting in raising the soil pH. Council noted in their September 2025 request for further information, that the state government soil landscape notes for the Gosford-Lake Macquarie 1:100,000 Sheet Report (Murphy, 1993) document potential subsoil sodicity problems in the Erina soil landscape. However, the site-specific soil test results provided in **Table 3** returned a minor limitation for subsoil Exchangeable Sodium Capacity. Any such limitation can be ameliorated by adding gypsum to the soil in the proposed Land Application Area.

Descriptions of the various soil tests are provided in **Table 4**.

Table 4 Descriptions of the Various Soil Tests	
Parameter	Description
pH	The pH value of a soil influences soil conditions and vegetation growth. Soil pH affects the solubility and fixation of some nutrients in soils. Soils with a pH of between 4.5 and 8.5 should pose no constraints for land application areas.
Electrical Conductivity (EC)	High electrical conductivity (EC) in soils usually corresponds to elevated concentrations of soluble salt. This is considered undesirable for vegetation growth. Salt concentration in soil is indicated by the EC of an extract from a 1:5 soil:water mix. To convert EC 1:5 deci Siemens per metre (dS/m) to EC _e a multiplier factor related to the soil texture is required (see Hazelton & Murphy 1992). The tolerance of vegetation species to soil salinity varies among vegetation types. An EC _e of greater than 4 ds/m is suggested as a limit above which vegetation growth problems can occur.
Sodicity (Exchangeable Sodium Percentage - ESP)	The concentration of exchangeable sodium cations in a soil is known as sodicity which relates to likely dispersion on wetting and shrink/swell properties. Sodic soils tend to have low infiltration capability, low hydraulic conductivity, and a high susceptibility to erosion. Exchangeable sodium percentage (ESP) is used as a measure of sodicity.
Cation Exchange Capacity (CEC)	Solid particles in soil commonly have a negative surface charge. The overall neutrality of the system is maintained by the presence of cations close to the surface of the solid particles. These cations may be exchanged with others. This process is referred to as adsorption, a reversible surface phenomenon that does not involve a chemical reaction. Adsorbed

	cations may be retained by the soil or utilised by vegetation. The cation exchange capacity is the total number of cations a soil can retain on its adsorbent complex at a given pH and is therefore a good measure of a soil's ability to retain specific pollutants. The most abundant cations in soil are calcium, magnesium, potassium and sodium, and hydrogen and aluminium in acid soils. A cation exchange capacity of greater than 15 cmol+/kg is recommended for disposal systems.
Phosphorus Sorption Capacity (PSorp)	The capacity of a soil to adsorb phosphorus is expressed as its phosphorus sorption capacity. A medium to high sorption capacity is greater than the equivalent of 6,000 kg/ha (considered to be active to a depth of approximately 100 cm below the level of wastewater application) and is preferred for land application areas. Phosphorus sorption by the soil is expected to occur up to approximately 25 to 50% of the phosphorus sorption capacity above which leaching of phosphorus can occur if the phosphorus is not used by vegetation uptake. A soil with a phosphorus sorption capacity of at least 50 years (in terms of mg P/g soil), based on the expected phosphorus load, is recommended for land application areas.
Modified Emerson Aggregate Class	The Emerson Aggregate Test is a measure of soil dispersibility and susceptibility to erosion and structural degradation. It assesses the physical changes that occur in a single ped of soil when immersed in water, specifically whether the soil slakes and falls apart or disperses and clouds the water. For example, an Emerson Class of 7 or 8 indicates low dispersion potential. This does not present a significant constraint for effluent application; however, it can be overcome by the addition of gypsum to the soil.

7.4 MAXIMUM DESIGN HYDRAULIC LOAD

The Site is connected to the reticulated town water supply. The various components of the proposed childcare centre generating wastewater and estimates of hydraulic load are listed in the following sections. It is understood that the childcare centre will only operate on a five day per week basis. In this regard, the design load can be effectively proportioned over seven days by using a balancing tank in the wastewater treatment system.

Children

It is understood that the childcare centre will cater for a maximum of 113 children, 12 of which will not be toilet trained.

The calculated design hydraulic load is based on a wastewater allowance of 20 L/child/day which is suggested in Table H4 AS/NZS 1574:2012 for school premises with a reticulated water supply.

Age groups and wastewater allowances are listed as follows:

Age (yrs)	Number	Wastewater Allowance (L/day)
0 - 3 ¹	12	15
3 - 6	101	30
Total	113	3,210

1. In nappies

In summary:

$$113 \text{ children/day} \times 100\% \text{ usage} \times 5 \text{ days} = 16,050 \text{ L}$$

This equates to 2,293 L/day

Management and Staff

It is understood that the childcare centre will employ 21 staff comprising 18 teachers, one centre director, an assistant centre director, and one part-time cook. The calculated design hydraulic load is based on a wastewater allowance of 30 L/staff/day with a reticulated water supply.

$$21 \text{ staff} \times 30 \text{ L/person} \times 100\% \text{ amenities usage} \times 5 \text{ days} = 3,150 \text{ L}$$

This equates to 450 L/day

Kitchen Wastewater

The childcare centre incorporates a kitchen including a cook top, dishwasher, sink and food preparation benches. Although a typical commercial dishwasher consumes approximately 15.1 L/wash (Alliance for Water Efficiency, 2019), the latest generation dishwashers use approximately 10 L per wash cycle (or less) with some units recycling water. The calculations adopt 10 L water usage per cycle.

$$\text{Dishwasher: } 15 \text{ cycles/day} \times 10 \text{ L/cycle} \times 5 \text{ days} = 750 \text{ L}$$

This equates to 107 L/day

PLUS

Sink and washdown: 10 washes/day x 5 L x 5 days = 250 L

This equates to 36 L/day

Laundry

It is understood that the childcare centre will wash bedding used in the centre but not clothing as such.

The calculated design hydraulic load is based on a wastewater allowance of 80 L/wash with a reticulated water supply.

10 washes/day x 80 L/wash x 5 days = 4,000 L

This equates to 571 L/day

A summary of the maximum design hydraulic loads is presented in **Table 5**.

Table 5
Summary Maximum Design Hydraulic Load

Components		Daily Children	Staff	Adopted Daily Use (Number)	Frequency	Unit Volume (L)	Usage (%)	Total Volume (week) ³	Daily Wastewater Volume over 5 days (L)
Childcare Centre	Children	101 ¹			5 days/week	30	100%	15,150	3,030
	Children	12 ²			5 days/week	15	100%	900	180
	Staff		21		5 days/week	30	100%	3,150	630
Kitchen	Sink/benches			10	5 days/week	5		250	50
	Dishwasher			15	5 days/week	10		750	150
Laundry	Washing Machine			10	5 days/week	80 ⁴		4,000	800
Total									4,840

1. Children toilet trained
2. Children not toilet trained
3. Five-day week
4. Front loader 10 kg machine

7.5 EVIDENCE BASED WATER USAGE

The Australian Standard AS/NZS 1547:2012 states that design hydraulic loadings should be based on the maximum value of wastewater allowances unless justification for lower values can be provided by way of actual water use data.

Detailed water usage data obtained from Council rates is available for the nearby *Sprout Early Learning Center* (Centre) in 125 Serpentine Road Terrigal which is managed by the same group. A Wastewater Management Plan prepared for the Centre in September 2016 (Ref. 16120-A dated 20th September 2016) documented a capacity to accommodate a total of 141 persons including 121 children and 20 staff. The Centre is connected to the reticulated town water supply and operates on a five-day week. The total daily hydraulic load was calculated at 4,230 L/day which, with balancing equates to approximately 3,100 L/day for a seven day dosing week.

A recalculation of the design maximum hydraulic load was undertaken for the Centre as part of proposed revision of the Wastewater Management Plan in April 2025 (Ref. 25026-A dated 26th April 2025). The owner supplied water usage summaries for the Centre's operation from their Council Water Account notices for a six-month period. The accounts indicate an average site usage of between 1,620 L/day for the period 23rd September through 13th December 2024 and 1,720 L/day for the period 13th December 2024 to 4th March 2025.

Adopting 1,720 L/day with a 50% contingency, the adopted design load for the revised WMP was 2,500 L/day.

It is noted that the proposed current Early Learning Centre development application in 167 Serpentine Road is managed by the same group is very similar in design, size and operation with a documented a capacity to accommodate a total of 141 persons including 121 children and 20 staff. These data slightly exceed the capacity of the new proposed Early Learning Centre in 167 Serpentine Road.

Therefore, a conservative water usage figure of 2,500 L/day (1,720 L/day + 50% contingency) was considered plausible for the new proposed development.

7.6 ADOPTED MAXIMUM DESIGN HYDRAULIC LOAD

In light of the variability in Council-recorded water usage, a conservative estimate of the hydraulic load is based on the water usage figures documented in Section 7.4 and summarised in **Table 5**.

The **five-day design hydraulic load** taken from **Table 5** is 4,840 L/day.

Design Hydraulic Load (5 days): 4,840 L/day
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Flow balancing is documented in Section 7.10.

7.7 SYSTEM SELECTION

In terms of the application of treated wastewater in the central part of the Site, the potential limitations for the Site have been reviewed, assessed and the results summarised in **Table 6**. Positive site attributes include excellent sun and wind exposure over the whole of the Site, gentle ground slope and grass cover.

Table 6 Assessment of Limitations for On-site Disposal of Treated Wastewater Lot 2 DP746654 167 Serpentine Road Terrigal				
Feature	Site	Capable level (Low Limitation)	Marginal Level (Mod. Limitation)	Unsuitable Level (High Limitation)
Proximity to any drainages or surface water bodies	>40 m	X		
Depth to bedrock (m)	> 0.70 m	X		
Depth to Water Table (m)	> 0.70 m	X		
Soil Permeability	Loam 1.4 – 3.0 m/day Clay Loam 0.06- 0.12 m/day	X	X	
Soil Drainage	Good	X		
Coarse Fragments (%)	< 20 %	X		
Bulk Density (g/cm ³)	~1.5		X	
pH (pH units)	5.1		X	
Electrical Conductivity (dS/m)	0.07	X		
Sun/wind Exposure	Excellent	X		
Flood Potential	Nil	X		
Slope (%)	< approx. 10-12 %	X		
Landform	Constant slope over appn. area	X		
Run-on seepage	Low	X		
Erosion Potential	Low	X		
Site Drainage	Good	X		
Site Fill	nil	X		
Practical Available Land Area (m ²)	> 1,000 m ²	X		

7.8 ASSESSMENT EXISTING ON-SITE SEWAGE MANAGEMENT SYSTEM

As documented in Section 3, wastewater generated from the existing dwelling is treated to primary standard in a single 'old' concrete septic tank located immediately west of the buildings (**Figure 5**). Disposal of primary treated wastewater is via a single absorption trench located along the contour immediately downslope of the treatment tank (**Figure 5**). A new proposed OSSM is planned for the proposed childcare development. The existing OSSM is not suitable for the proposed development. In this regard, the septic tank will be decommissioned subject to Council approval. The conventional strategy is to engage a suitable licensed haulage contractor to arrange a 'pump out' then remove the septic tank. In the event that the tank cannot be 'pulled', collapse and bury the tank. The trench can then be allowed to 'dry out' without any requirement to excavate.

7.9 NEW PROPOSED WASTEWATER TREATMENT SYSTEM

Wastewater treatment to minimum secondary standard using a suitably designed commercial-scale aerated wastewater treatment system is considered suitable for the management of all wastewater generated from the Early Learning Centre. The treatment system must be a commercial-scale design that will effectively and efficiently treat the design hydraulic load with capacity to manage 'shock' loads (influent flow balancing). In summary, the treatment process will consist of the following stages:

- Balance chamber
- Primary Chamber for anaerobic digestion and sludge management/storage.
- Aeration Chamber for biological treatment.
- Clarification Chamber for the settling out of solids.
- Disinfection/Irrigation Chamber for disinfection and storage prior to disposal.

The treatment plant should, if maintained correctly, produce treated effluent with the following characteristics as a minimum standard, in accordance with the prescribed minimum effluent quality standard as documented in Table 14 of the NSW DLG (1998).

- $BOD^5 < 20 \text{ mg/L}$
- Suspended Solids $< 30 \text{ mg/L}$
- Faecal Coliforms $< 30 \text{ cfu/100ml}$
- Total Nitrogen (TN) $\leq 30 \text{ mg/L}$
- Total Phosphorus (TP) $\leq 10 \text{ mg/L}$

Two examples of a commercial-scale Aerated Wastewater Treatment System (AWTS) suitable for the management of the total design hydraulic load are an **EcoSeptic Maxi 5000 AWTS** and an **Econocycle Maxi 20 AWTS**.

EcoSeptic Maxi 5000 AWTS

The *EcoSeptic Maxi 5000* AWTS has been tested by *Global Certification Pty Ltd*. The certificate of testing (No. 574) dated 4th July 2020 is provided in **Appendix D**. The

certificate is valid to 3rd July 2025. As noted on the certificate, the treatment system attained advanced secondary levels in two weeks.

Econocycle Maxi 20 AWTS.

The manufacturer states that this treatment system is a commercial system that has the capacity to treat up to 4,500 L/day. Engineering drawings (sections and plans) supplied by the manufacturer are provided in **Appendix E**.

The *Econocycle Maxi 20 AWTS* comprises two in-line 7,000 L concrete tanks which are constructed using wet cast 40 mpa steel fibre reinforced concrete with integrated baffle, stainless steel outlet filter and lockable covers.

Tank	Purpose
1	Primary and Secondary Septic
2	Primary and secondary treatment, aeration, disinfection, clarification and irrigation

The pump chamber (irrigation well) incorporates a single pump system *Orange SP334*.

The treatment system (including separate in-line influent balance tank) incorporates the following elements and capacities.

Elements	Volume
Primary Septic Capacity	4457 L
Secondary Septic Capacity	2243 L
Primary Treatment Chamber Capacity	2832 L
Secondary Treatment Chamber Capacity	2763 L
Clarification Chamber Capacity	382 L
Aeration Chamber Capacity	6,000 L
Pump Chamber (irrigation) Capacity	382 L
Chlorination via 2 chlorine canisters	Tablets
Equalisation Tank Capacity (separate in-line concrete tank)	10,000L

The Econocycle Maxi 20 AWTS with a separate 10,000 L in-line influent balance tank is designed to manage moderately high hydraulic loads over short periods of time

(shock loads). Peak loads are stored in the 10,000 L influent equalisation tank and then metered into the treatment process.

The manufacturer reports the following treated wastewater discharge quality:

- BOD₅: < 20 mg/L
- Suspended solids: <30 mg/L
- Faecal coliforms: <30 cfu/100 ml

The 3,500 L design hydraulic load for the Early Learning Centre is generated over a five-day operational week. In this regard, it is considered that flow balancing can effectively spread the load over seven days. Flow balancing is documented in Section 7.10.

The actual position of the multi-tank AWTs can be selected by the installer/plumber to suit the position of the Early Learning Centre infrastructure and available hydraulic fall. A possible location is shown in **Figure 7**.

7.10 FLOW BALANCING

7.10.1 Introduction

Flow balancing is an industry accepted and effective strategy to manage any daily and seasonal fluctuations in the hydraulic load. Evidence of variations in the hydraulic load is documented in Council's water usage data for a similar size existing early learning development managed by the same group in Serpentine Road (see Section 7.5).

Flow balancing is recommended in both the influent and effluent wastewater streams.

7.10.2 Influent Flow Balancing

Influent flow balancing results in a relatively constant loading to the commercial wastewater treatment system thus eliminating surge flows and optimising treatment. Flow balancing is achieved by installing a suitably sized temporary storage tank the location of which can be selected by the installer.

An 18-month flow balancing spreadsheet-based iterative analysis was undertaken to determine the optimal balance between storage volume and the capacity of wastewater treatment (**Appendix F**). The iterative analysis indicates that based on a design hydraulic load of 4,840 L/day and installation of an in-line 10,000 L storage (balance) tank, the required treatment volume can be safely and sustainably reduced to 3,350 L/day.

Influent Balance Tank Capacity: 10,000 L

Desludging must be undertaken every 3 years.

7.10.3 Effluent Flow Balancing

Effluent flow balancing is an effective strategy to optimise the size of the Land Application Area which is a desirable outcome but especially useful in constrained sites. Flow balancing is achieved by installing an effluent storage tank to temporarily store/hold excess treated wastewater during relatively peak periods of wastewater generation with scheduled incremental discharge to the Land Application Area. The location of the effluent balance tank can be selected by the installer.

An 18-month flow balancing spreadsheet-based iterative analysis was undertaken to determine the optimal balance between storage volume and the volume of treated wastewater discharge to the Land Application Area (**Appendix F**). The iterative analysis indicates that based on a daily treated wastewater discharge volume of 3,350 L/day and installation of an in-line 10,000 L storage (balance) tank, the optimal acceptance capacity of the Land Application Area is 2,300 L/day.

Effluent Balance Tank Capacity: 10,000 L

7.11 GREASE ARRESTOR

A grease trap (grease arrestor) is an important and integral component in any wastewater treatment stream that captures and retains any oils and fats generated from a hot kitchen. Examples and engineering drawings of state government accredited, and Council approved grease traps manufactured by *Halgan* Wetherill Park are provided in **Appendix G**. One example is a 1,500 L capacity which is considered suitable for the purpose. The location of the grease trap can be selected by the plumber to suit the location of the planned plumbing system.

7.12 WASTEWATER DISPOSAL

7.12.1 Introduction

The preferred method of wastewater application of treated wastewater generated from the proposed development is Sub-Surface Drip Irrigation:

- Sub-Surface Drip Irrigation in the grassed area immediately southwest and sideslope of the Early Learning Centre as shown in **Figure 7**.

7.12.2 Sub-Surface Drip Irrigation

The important design elements of the sub-surface irrigation system are summarised as follows:

- The recommended type of irrigation is pressurised sub-surface drip irrigation which, if designed and installed correctly, ensures even, widespread and efficient application of treated wastewater under controlled application rates within the root-zone of plants and grasses.

- The treated wastewater should be applied evenly across the designated disposal area.
- There are several suitable and available proprietary, pressure-compensating drip irrigation systems which are designed for irrigation of wastewater which contain elevated levels of nutrient and biological loads, BOD and suspended solids. Industry examples include:
 - *UniBioline* - Netafim Australia
 - *Safe-T-Flow* - BUI Ebb & Flow Technologies, Australia
 - *Wasteflow* - Triangle Filtration & Irrigation, Australia
 - *KISS Ground Irrigation system*
 - *Triangle Irrigation system*

These proprietary irrigation systems incorporate root intrusion protection and are designed to significantly reduce the risk of any blockages.

- The irrigation lines should be installed at a depth of between approximately 100 and 150 mm below ground surface, parallel to the ground slope and parallel to each other. The recommended separation distance between lateral pipes in the irrigation panels is less than approximately 1.0 m which will minimise 'striping'.
- Manufacturers recommend the installation of:
 - In-line 120-micron disc filter in order to minimise the amount of solids entering the pipelines and emitters
 - Air release valves (vacuum breaker valves) will be installed at the high points in individual irrigation areas to prevent soil particles being sucked into the lines at the end of pump cycles as pipelines depressurise.
 - Flushing valves are installed at points most distant to the inlet manifold, to enable periodic flushing of lines and provide for effective long-term performance
- Install an automated sequencing valve (rota valve) to distribute treated wastewater into approximately four to six irrigation panels.

It is recommended that these elements are inspected for integrity and operational status and cleaned as necessary during quarterly contractual inspections and maintenance. Repairs or replacement should be carried out as required.

A design for sub-surface drip irrigation is provided in **Figure 8** and an industry example of a sub-surface irrigation layout with principal components is presented in **Figure 9**.

7.12.3 Calculations

Design parameters and calculations are provided in **Appendix A**. The calculations of the disposal area proposed for the Site are summarised in **Table 7**.

Table 7 Summary Disposal Area Calculations		
Design Maximum Hydraulic Load (L/day)		2,300
Area (m²)		
Minimum Area Method		711
Nominated Area Method with full wet weather storage		1,720
100 % Nitrogen Uptake		846
50-year Phosphorus Life		330
Proposed Application Area (Most Limiting)		1,720 m²
Adopted Application Area		1,720 m²
Parameters and Assumptions:		
1.	Total N	25 mg/L
2.	Total P	12 mg/L
3.	Indicative Permeability:	0.06 - 0.12 m/d
4.	Design Irrigation Rate (DIR):	21 mm/wk
5.	Effective Absorption Depth:	0.70 m
6.	Soil Phosphorus Sorption Capacity:	19,950 kg/ha
7.	Soil Treatment:	nil

Therefore, the proposed total primary application area required to accept the design hydraulic load of 2,300 L/day with full wet weather storage, a satisfactory 50-year phosphorus adsorption life and the uptake of the total nitrogen is approximately 1,720 m².

The position of the irrigation system takes into account the required buffer distances from the property boundaries, buildings, surface water bodies and driveway. The proposed application area will have excellent sun and wind exposure with satisfactory soil development.

7.12.4 Nutrient Calculations

The nutrient calculations and results are provided in the third spread sheet in **Appendix A**. The calculations are comprehensive and take into all relevant parameters and values based on the current literature. The basic formula used to calculate the area requirements based on nitrogen and phosphorus loadings are taken from the Environmental Health Protection Guidelines (DLG 1998) and are provided below in support of the model calculations in **Appendix A**.

Determination of Minimum Area Based on Nitrogen Loading

$$A = \frac{C \times Q}{L_n}$$

$$A = 25 \times 2,300 / 68$$
$$= 845.6 \text{ m}^2$$

where A = land Area (m²)

C = concentration of Total Nitrogen (TN) (17 mg/L) less 20% for lost to soil processes

Q = treated wastewater flow rate (L/day)

L_n = critical TN loading rate (mg/m²/day) (Whitehead & Associates)

Determination of Area Based on Phosphorus Loading

The determination of the minimum area is based on a phosphorus loading of 10 mg/L. Based on the parameters gleaned from research by Patterson (2001) and used by a leading consultancy in the industry, a phosphorus soil sorption without leaching factor of 0.7, a critical phosphorus uptake rate of 7 mg/m²/day and a recommended phosphorus sorption ability of 50 years is as follows;

$$A = P_{\text{generated}} / (P_{\text{adsorbed}} + P_{\text{uptake}})$$

$$A = 503.7 / (1.40 + 0.128)$$
$$= 329.6 \text{ m}^2$$

$$P_{\text{generated over 50 years}} = TP \times Q \times \text{days} \times \text{years}$$
$$= 12 \times 2,300 \times 365 \times 50$$
$$= 503.7 \text{ kg (10.07 kg/year)}$$

where P_{generated} = amount of phosphorus generated (kg)

TP = Total Phosphorus concentration in treated wastewater (mg/L)

Q = treated wastewater flow rate (L/day)

$$\begin{aligned} P_{\text{adsorbed}} &= P_{\text{Sorp}} \times 0.5 \\ &= 19,950 \times 0.7 \\ &= 1.40 \text{ kg/m}^2 \end{aligned}$$

where P_{adsorbed} = amount of phosphorus that can be adsorbed without leaching
 P_{Sorp} = phosphorus sorption capacity (kg/ha)

$$\begin{aligned} P_{\text{uptake over 50 years}} &= \text{CPLR} \times \text{days} \times \text{years} \\ &= 7 \times 365 \text{ days} \times 50 \text{ years} \\ &= 0.128 \text{ kg/m}^2 \end{aligned}$$

where P_{uptake} = amount of phosphorus vegetation uptake
 CPLR = critical P loading rate (mg/m²/day)

The results are summarised in **Table 8**.

Table 8 Summary Results of Nutrient Calculations	
Parameter	Calculation
Estimated Total Nitrogen Concentration (AWTS)	25 mg/L
Estimated Total Phosphorus Concentration (AWTS)	12 mg/L
Estimated bulk soil density	1500 kg/m ³
Phosphorus sorption depth (from field soil testing)	0.70 m
Phosphorus sorption capacity (laboratory testing)	1,900 mg P/kg (19,950 kg/ha)
Design wastewater load	2,300 L/day
Adopted total design application area	1,720 m ²
Total nitrogen <u>not</u> assimilated	0 kg/year
Total phosphorus <u>not</u> assimilated	7.59 kg/year
Site phosphorus longevity	Greater than 50 years

7.13 RESERVE APPLICATION AREA

In the unlikely event that the primary disposal area fails, additional available area for disposal is available in the western part of the Site. A possible location for a reserve disposal area is shown in **Figure 7**.

7.14 BUFFER DISTANCES

The position of the proposed Land Application Area (LAA) satisfies the following buffer distances listed in **Table 9** and documented in Table 5 of the Environmental Health Protection Guidelines (DLG 1998). There are no farm dams, drainages or water wells (bores) on the Site.

Table 9 Buffer Distances	
From Intermittent Drainages	40 m
From Permanent Drainages	100 m
From Dams	40 m
From Domestic water well (Bore)	250 m
Upgradient of Property Boundary	6 m
Downgradient of Property Boundary	3 m
Upgradient of swimming pools, driveways and buildings	6 m
Downgradient of swimming pools, driveways and buildings	3 m

The 40m buffer setback from the north-westerly stream immediately south-west of the Site is shown in a Council-supplied plan over the Site presented in **Figure 10**.

7.15 MANAGEMENT OF WASTE PRODUCTS USED IN THE CENTRE

7.15.1 Introduction

It is recommended that, as part of the induction process, all staff be made aware of how the sewage treatment system operates, its general operation and the alarms fitted to the system.

The AWTS is a biological cell which treats sewage and wastewater. It is not able to be used for the disposal of foreign bodies such as paper, sanitary napkins or strong caustic or alkaline substances, oils, acids, bleaches, disinfectants or chemical detergents and paints,

These substances can harm or kill the beneficial bacteria within the treatment system, resulting in unpleasant odours and adversely affecting the operation

of the system. Excess use of detergent can also be detrimental. Always follow the manufacturers' directions regarding use and quantities.

7.15.2 Proposed Cleaning Practices

Excessive use of disinfectants and/or cleaning chemicals will kill the beneficial bacteria in the system. It will be necessary for management to develop a cleaning practices guideline which takes this into account.

7.15.3 Hand Sanitisers and Hand Wash Products.

Antibacterial soaps (those designed to be used with water) should not be used as the antibacterial properties may impact upon the helpful bacteria within the system. Alcohol based antibacterial solutions designed to be used without water, are permissible provided they are used as directed.

7.15.4 Waste paints and Craft Materials

Waste paints and craft materials are considered foreign objects and are not suitable for disposal within the system.

It will be necessary for management to develop a disposal guideline which takes this into account. Any excess chemicals and paints should be temporarily stored in a clearly and suitably labelled waste receptacle dedicated for the purpose and disposed off-site to a licensed waste facility. A suitable container is one similar to that is used in hair salons (**see Plates 3 and 4**).

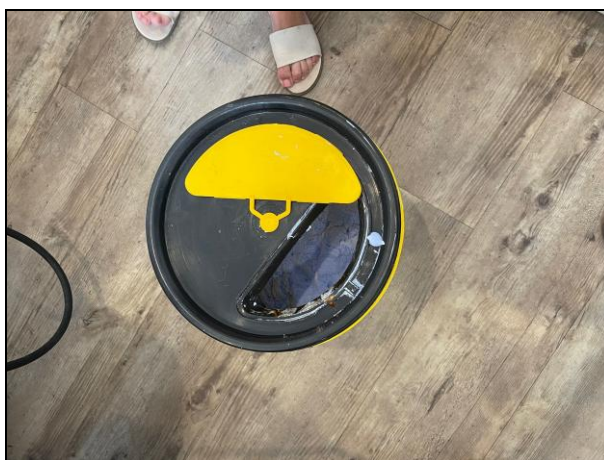


Plate 3 Liquid Waste Container



Plate 4 Liquid Waste Container

7.15.5 Sanitary Items

Sanitary items are considered to be foreign objects and are not to be disposed of in the system. Management will need to develop alternative disposal methods for these items.

7.15.6 Signage

It is recommended that a sign conveying the following information be displayed at all sinks and toilet facilities.

“All sewerage and wastewater from this facility is treated via an On-Site Sewerage Management System which uses accelerated natural biological processes”.

“Please do not use strong caustic or alkaline substances, oils, acids, bleaches, disinfectants or chemical detergents. These substances can harm or kill the beneficial bacteria within the system.”

“Use detergents in only quantities as recommended by the manufacturers.”

“Do not dispose of foreign objects in sinks or toilets.”

7.15.7 Plan of Management

The management of waste products will be incorporated in a ‘standalone’ Plan of Management for the centre.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 GENERAL

- The wastewater management plan for the proposed new dwelling is developed to meet the environmental and health *Performance Objectives* documented in the Environmental Health Protection Guidelines (DLG 1998), in particular the avoidance of any impacts on public health or the environment. The design disposal of advanced secondary treated wastewater on-site proposes an approved and effective methodology in accordance with the Environmental Health Protection Guidelines (DLG 1998 & OLG 2025), Council's DCP and AS/NZS 1547:2012 (SAI & NZS 2012).
- The geology, soil characteristics and attributes, landform, available land for on-site application and local climate allow treated wastewater to be disposed on-site via sub-surface drip irrigation.
- Installation of a commercial scale AWTS and disposal via sub-surface drip irrigation in an appropriately constructed Land Application Area is considered suitable for the Site.
- Install an automated sequencing valve (rota valve) to distribute treated wastewater into approximately four to six irrigation panels.
- An area suitable for a reserve application system is also available on the Site.
- The AWTS will require quarterly (3-monthly) contractual inspections which include the examination of the operation of the aerator, pump, disinfection system and alarm system. This is an ongoing cost.
- The construction of the disposal system and associated plumbing and hydraulic connections should be undertaken by a licensed plumber/drainier or suitably licensed practitioner with experience in installing wastewater treatment and on-site disposal systems in accordance with AS/NZS 1547:2012 and any relevant codes of practices.
- The optimal route for the plumbing between the proposed AWTS and the disposal system can be selected by the licensed plumber or installer to suit the new and existing development, and proposed plumbing.
- Supporting documentation provided by the state government describing the various types of systems and the dos and don'ts are provided in **Appendix H**.
- As required, complete an *Application to Install Sewage Management System including Greywater Treatment System and Greywater Diversion System* Sec 68, Chapter 7 LGA 1993. A Council fee applies.

8.2 FOR SUB-SURFACE DRIP IRRIGATION

- The adopted size of the area calculated for the sub-surface drip irrigation system is approximately 1,720 m². This calculated disposal area is predicated on a hydraulic load of 2,330 L/day (flow balancing analysis & disposal over seven days) and a DIR of 21 mm/week.

- Pressure compensated drips and root invasion protection should be used in the sub-surface drip irrigation system. Lilac coloured *UniBioline*, *Wasteflow*, *Triangle*, *Safe-T-Flow* or *KISS* dripper line should be used.
- The proposed location of the primary sub-surface drip irrigation system is shown in **Figure 7**. The design specifications of the sub-surface irrigation system are shown in **Figure 8**. An industry example of a typical sub-surface drip irrigation layout is provided in **Figure 9**. Construction of the irrigation system should be in general accordance with the principles documented in Section 7.12.2.

9. REFERENCES

- DLG. 1998. *Environmental Health Protection Guidelines – On Site Sewage Management for Single Households*.
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For and on behalf of
Larry Cook Consulting



Larry Cook
Wastewater Consultant and Hydrogeologist

LIST OF APPENDICES

Appendix A	Design Parameters And Calculations – Irrigation
Appendix B	Soil Bore Logs
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Appendix H	Supporting Documentation

APPENDIX A

**DESIGN PARAMETERS
AND CALCULATIONS**

**SURFACE/SUB-SURFACE
APPLICATION**

Environment and Health Protection Guidelines

[illegible]

Environment and Health Protection Guidelines

Design Wastewater Flow	Q	L/day	2,300
Design Percolation Rate	R	mm/wk	21
Land Area	L	m ²	1,720

[illegible]

Monthly Nutrient Balance Calculation

Nutrient & Soil Parameters		
Estimated Total - N concentration (mg/L)	25	
Effluent Total P Concentration (mg/L)	12	
Effluent Ammonia - N concentration (mg/L) (55% total N)		13.75
Effluent Organic - N concentration (mg/L) (15% total N)		3.75
Effluent Oxidised - N concentration (mg/L) (30% total N)		7.5
Organic N conversion to ammonia (%)		90
Ammonia loss through volatilisation(%)		25
Oxidised N loss through denitrification (%)		10
Critical Total Nitrogen Loading Rate (mg/m ² /day)		68
Critical Phosphorus Loading Rate (mg/m ² /day)		7
Estimated Soil Bulk Density (kg/m ³)		1500
Assumed Phosphorus Sorption Depth (m)		0.70
Lab-determined P-Sorp capacity (mg P/kg soil)		1900

Hydraulic Load and Disposal Area Parameters

Design wastewater load (L/day)	2,300
Design Application Area (m ²)	1,720

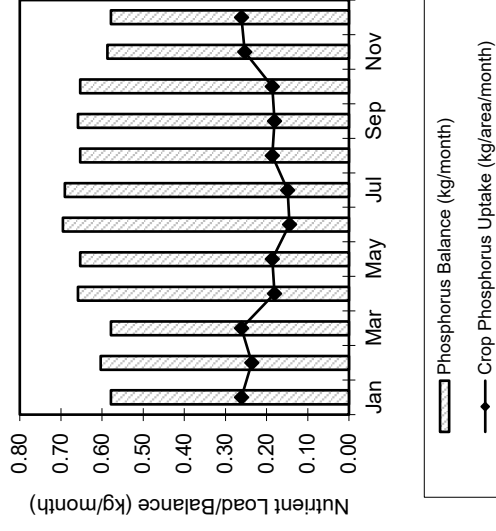
Computed Parameters

Ammonia N Load (kg/year)	14.38
Organic N load (kg/year)	0.31
Oxidised N load (kg/year)	5.67
Effective total N load (kg/year)	20.36
Phosphorus load (kg/year)	10.07
Soil phosphorus sorption capacity (kg/ha)	19950

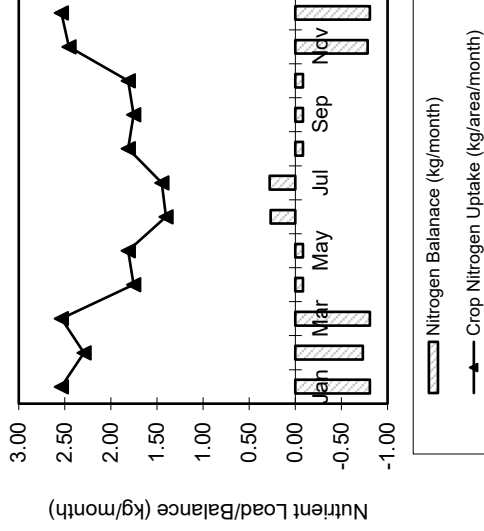
Results Summary

Total nitrogen not assimilated (kg/year)	0.00
Percent of nitrogen not assimilated (%)	0
Total phosphorus not assimilated (kg/year)	7.59
Site phosphorus longevity (years)	452

Phosphorus Balance



Nitrogen Balance



Month	Days in Month	Growth Rate Factor (0-1)	Nitrogen Load (kg/month)	Crop Nitrogen Uptake (kg/area/month)	Nitrogen Balance (kg/month)	Positive Nitrogen Balance (kg/month)	Phosphorus Load (kg/month)	Crop Phosphorus Uptake (kg/area/month)	Phosphorus Balance (kg/month)	Positive Phosphorus Balance (kg/month)
Jan	31	0.7	1.73	2.54	-0.81	0.81	0.84	0.26	0.58	0.58
Feb	28	0.7	1.56	2.29	-0.73	0.73	0.84	0.24	0.60	0.60
Mar	31	0.7	1.73	2.54	-0.81	0.81	0.84	0.26	0.58	0.58
Apr	30	0.5	1.67	1.75	-0.08	0.08	0.84	0.18	0.66	0.66
May	31	0.5	1.73	1.81	-0.08	0.08	0.84	0.19	0.65	0.65
Jun	30	0.4	1.67	1.40	0.27	0.27	0.84	0.14	0.70	0.70
Jul	31	0.4	1.73	1.45	0.28	0.28	0.84	0.15	0.69	0.69
Aug	31	0.5	1.73	1.81	-0.08	0.08	0.84	0.19	0.65	0.65
Sep	30	0.5	1.67	1.75	-0.08	0.08	0.84	0.18	0.66	0.66
Oct	31	0.5	1.73	1.81	-0.08	0.08	0.84	0.19	0.65	0.65
Nov	30	0.7	1.67	2.46	-0.78	0.78	0.84	0.25	0.59	0.59
Dec	31	0.7	1.73	2.54	-0.81	0.81	0.84	0.26	0.58	0.58
Total	365	6.8	20.36	24.16	-3.81	4.90	10.07	2.49	7.59	7.59

APPENDIX B

SOIL BORE LOGS

Job No:	24142
Hole No:	BH 1
Sheet 1	of 1

Client:	Malachite Holdings Pty Ltd Superannuation Fund	Test Bore Location: Ref. Figure 3		
Project:	Wastewater Management Investigation	Test Method: Hand Auger		
Project Location:	Lot 2 DP746654 167 Serpentine Road Terrigal	Coordinates	Easting:	
		(MGA Grid)	Northing:	
		Logged by: LLC		

Explanatory Notes:				
<u>Consistency</u>		<u>Density Index</u>	<u>Samples</u>	<u>Moisture</u>
VS	Very Soft	VL Very Loose	B Bulk Sample	D Dry
S	Soft	L Loose	D Disturbed Sample	M Moist
F	Firm	MD Medium Dense	U50 Undisturbed Sample	W Wet
St	Stiff	D Dense	(50mm diam.)	Wp Plastic Limit
VSst	Very Stiff	VD Very Dense	N S.P.T. Value	WI Liquid Limit
H	Hard			

Larry Cook Consulting Pty Ltd

Job No: 24142
Hole No: BH 2
Sheet 1 of 1

LOG OF TEST HOLE

Client:		Malachite Holdings Pty Ltd Superannuation Fund		Test Bore Location: Ref. Figure 3	
Project:		Wastewater Management Investigation		Test Method: Hand Auger	
Project Location:		Lot 2 DP746654 167 Serpentine Road Terrigal		Coordinates (MGA Grid)	Easting:
				Northing:	
		Logged by: LLC		Date: Nov 2024	

Groundwater	Samples/Field Tests	Depth (m)	Graphic Log	Unified Classification	Description	Moisture Condition	Consistency/Rel. Density	Additional Comments	Depth (m)	
N I L	B T				0.00 - 0.40 m Silty Sandy Loam. Brown topsoil and colluvium. Minor amounts of strongly weathered rock fragments to 10 mm. Common to abundant amounts of organic material. Dry and	D	L	TOPSOIL/COLLUVIAL		
		0.5			0.40 - 0.60 m Sandy Clay Loam. Orange brown to yellow-brown. Rare sub-angular strongly weathered sandstone fragments . Dry and semi	D	SD	COLLUVIAL	0.5	
		1.0			0.60 – 1.00 m Sandy Clay. Orange to orange brown to red brown. Moist and semi dense.	M	SD	COLLUVIAL	1.0	
					BH 2 terminated at 1.00 m depth.					
		1.5								1.5
		2.0								2.0
		2.5								2.5
		3.0								3.0
		3.5								3.5

Explanatory Notes:

<u>Consistency</u>	<u>Density Index</u>	<u>Samples</u>	<u>Moisture</u>
VS Very Soft	VL Very Loose	B Bulk Sample	D Dry
S Soft	L Loose	D Disturbed Sample	M Moist
F Firm	MD Medium Dense	U50 Undisturbed Sample (50mm diam.)	W Wet
St Stiff	D Dense	N S.P.T. Value	Wp Plastic Limit
VSt Very Stiff	VD Very Dense		WL Liquid Limit
H Hard			

Job No:	24142
Hole No:	BH 3
Sheet 1	of 1

Client:	Malachite Holdings Pty Ltd Superannuation Fund	Test Bore Location: Ref. Figure 3		
Project:	Wastewater Management Investigation	Test Method: Hand Auger		
Project Location:	Lot 2 DP746654 167 Serpentine Road Terrigal	Coordinates	Easting:	
		(MGA Grid)	Northing:	
		Logged by: LLC		

Explanatory Notes:				
<u>Consistency</u>		<u>Density Index</u>	<u>Samples</u>	<u>Moisture</u>
VS	Very Soft	VL Very Loose	B Bulk Sample	D Dry
S	Soft	L Loose	D Disturbed Sample	M Moist
F	Firm	MD Medium Dense	U50 Undisturbed Sample	W Wet
St	Stiff	D Dense	(50mm diam.)	Wp Plastic Limit
VSst	Very Stiff	VD Very Dense	N S.P.T. Value	WI Liquid Limit
H	Hard			

APPENDIX C

LABORATORY CERTIFICATE

Sample Drop Off: 16 Chilvers Road
 Thornleigh NSW 2120
Mailing Address: PO Box 357
 Pennant Hills NSW 1715

Tel: 1300 30 40 80
Fax: 1300 64 46 89
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 55114	Sample N°: 1	Date Received: 22/11/19	Report Status: Final
------------------------	---------------------	--------------------------------	-----------------------------

Client Name: On Time Septic Services	Project Name: 24818 - Terrigal
Client Contact: Robert Archer	SESL Quote N°:
Client Order N°:	Sample Name: 24818 Terrigal
Address: 27 Portsmouth Rd	Description: Soil
Erina NSW 2250	Test Type: pHEC_S, PRI, ECEC_NH4Cl, EAT

TEST	RESULT	COMMENTS
pH in water 1:5	5.1	
pH in CaCl ₂ 1:5	4.3	
EC dS/m 1:5	0.07	
Phosphate Sorption		

CATION ANALYSIS					
TEST	SOLUBLE		EXCHANGEABLE		
	meq%	Comment	meq%	% of ECEC	Comment
Sodium	0.16		0.138	1.8	
Potassium	0.28		0	0	
Calcium	0.02		0.437	5.7	
Magnesium	0.24		0.499	6.5	
Aluminium			0.032	0.4	
ECEC			7.68		
Ca/Mg			.6		

Phosphate Retention Index (%): 40.90 Medium	PRI (mgP/kg): 1900.0	PRI (kg/ha): -
--	-----------------------------	-----------------------

PHYSICAL CHARACTERISTICS		Comment
Texture:	-	Field Density (g/mL):
Colour:	-	Emerson Stability Class: H20 CLASS 5
Size:	-	High SAR/Low Ionic Strength:
Aggregate strength:	-	Med SAR/High Ionic Strength:
Structural unit:	Did not test	
Approx. Clay Content (%):	Did not test	
Potential infiltration rate:	Did not test	
Gravel Content:	Soil is	
Additional comments:		

Recommendations

Analysed by SESL Australia Pty Ltd, NATA # 15633
Recommendations by SESL Australia not requested.

Method References:
 pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). Exchangeable Cations, ECEC: Method 15A1 Rayment & Higginson (1992)
 Chloride: Vogel (1961). Aluminium: Method 3500 APHA (1992). Phosphate: 9H1 of Rayment & Lyons. Wax Block Density: Method 30-4 Black (1983),
 Emerson's Aggregate Test: Charman & Murphy (1991), Particle Size Analysis: Modified Black (1983) Method 43-1 to 43-6. Texture/Structure/Colour -
 PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Tests are performed under a quality system certified
 as complying with ISO 9001: 2000. Results and
 conclusions assume that sampling is representative.
 This document shall not be reproduced except in full.

Consultant: Helen Liang

Authorised Signatory: Michelle Murphy

Date Report Generated
 5/12/2019




APPENDIX D

TEST CERTIFICATE
ECOSEPTIC MAXI 5000 AWTS

PRODUCT CERTIFICATE OF REGISTRATION



Global Certification Pty Ltd

Number 574

Product Performance Testing

AS 1546.3:2017

**Advanced Secondary 5000 Litre/day or 33.3EP Level
without Nutrient Reduction**

Issued to

ECO – Septic Pty Ltd T/as Econocycle

65 – 67 Warradale Road, Warragamba, NSW 2752

Certification Date: - 4/7/2020 Expiry Date: - 3/7/2025

Product Certified:

Model	Disinfection	Average Results over the Test Period	Servicing Frequency	Discharge	Manufactured and assembled
EcoSeptic Maxi 5000	Yes	TSS 6.7mg/l BOD ₅ <2mg/l Turbidity 10.3NTU FAC 2.3 mg/l E coli <1CFU/100ml	3 Monthly Service sedimentation pump out 4.8 years or as required	Pumped via disinfection/pump chamber with chlorine dispenser	Manufactured and Assembled: 65 Warradale Road, Warragamba NSW 2752
The system took 2 weeks to meet the advanced secondary standard.					

NACE CODES: 3700

This Certificate of Conformance to the Product Certificate Scheme remains the property of Global Certification Pty. Ltd. and is granted subject to the terms and conditions of the Contract Application, in respect of the Product certified on this page and the attached schedule to the Certification of Conformance, bearing the same number as this certificate.

Date of Issue: 4th July 2020 **Bruce Smith Director**



Signed for and on behalf of Global Certification Pty Ltd
PO Box 953 Belconnen ACT 2616

APPENDIX E

SPECIFICATIONS

ECONOCYCLE MAXI 20 AWTS



Maxi 20

Environmental Sewage Systems

1800 808 135

MAXI 20 DESIGN CALCULATIONS

PROPOSED INFLUENT QUANTITIES/QUALITIES AVERAGE
FLOW RATE: 3000 litres per day MAXIMUM FLOW RATE:
4500 litres per day

150 litres per person per days average

$$20 \times 150 = 3000$$

Maximum: 225 litres per person

$$20 \times 225 = 4500 \text{ litres/day}$$

BOD₅	150 – 300 mg/L
------------------------	----------------

SS	150 – 300 mg/L
-----------	----------------

Total Nitrogen Total	20 – 100 mg/L
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Phosphorous	10– 25 mg/L
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PROPOSED EFFLUENT QUALITY

BOD₅	<20 mg/L
------------------------	----------

SS	<30 mg /L
-----------	-----------

Free Chlorine	>0.2 & <2.0 mg/L
----------------------	------------------

Thermotolerant Coliforms	<30 cfu/100ml
-------------------------------------	---------------

SEPTIC SECTION: 7000 LITRES

1550 sludge allowance + (150 x N) N =
Number of persons
1550 + (150 x 20)
1550 + 3000
4550 litres capacity

SUPPLIED CAPACITY 7000 LITRES

AERATION:

VOLUME: 6000 litres
250 litres per person
250 x 20
5000 litres

SUPPLIED CAPACITY 6000 LITRES

AIR SUPPLY: 200 litres per minute
8 litres per person per minute
8 x 20
160 litres per minute

SUPPLIED CAPACITY 200 LITRES PER MINUTE

DIFFUSERS: 1600 mm
1 x 300 mm per 5 persons
4 x 300 mm diffusers

1200 mm

SUPPLED 8 X 200MM TOTALLING 1600MM

GROWTH MEDIA:

5 square metres per person
5 x 20 = 100 square metres

SUPPLIED 160 SQUARE METRES

CLARIFIER:

0.42M2 / 500 litres capacity

CHLORINATION:

Twin Cholrine Bath
200 gram trichlor tablets

CHLORINE DETENTION:

Half hour detention time
4500 litres /10 hours
450 / hour
225 litres

SUPPLIED 500 LITRES

IRRIGATION:

As per site evaluation report

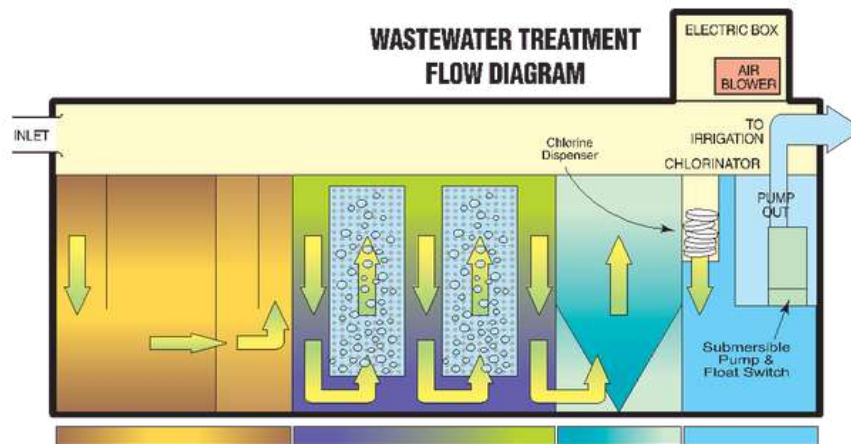
MAXI 20 SPECIFICATIONS

Description	Specification
Number of persons	20 EP
Tanks	2 x 7000 litre Econocycle Tanks
Blower	200 litres per minute
Irrigation Pump	1 Orange SP334
Septic Section	7000 litres tanks
Aeration Section	7000 litres of aeration divided into three sections
Media	Tasman Cooling Towers CF1900 160m2 (8 packs x 500 x 800 x 800mm)
Diffusers	8x200mm 25 OD Inglewood Technologies
Chlorinator	2 Chlorine canister

TECHNICAL PROCESS DESCRIPTION

This is a general breakdown of our wastewater treatment unit.

The wastewater unit works on the combined principles of primary settling plus aerobic and tertiary treatment.



As you can see in the above diagram all your household wastewater and effluent enters the tank through the inlet shown here on the left side of tank.

This settles into the septic zone (identified by the orange & yellow shaded area).

Towards the top of the baffle wall which separates the septic and aeration compartments, there is an outlet which enables the effluent to trickle into the aeration / treatment zone. The aeration / treatment zone is the blue shaded area of the diagram.

From this, the effluent is filtered over a mass of growth media plates. The growth media acts as a bacteria-breeding ground, which sounds quite nasty but is actually a very important and proficient function of the wastewater unit.

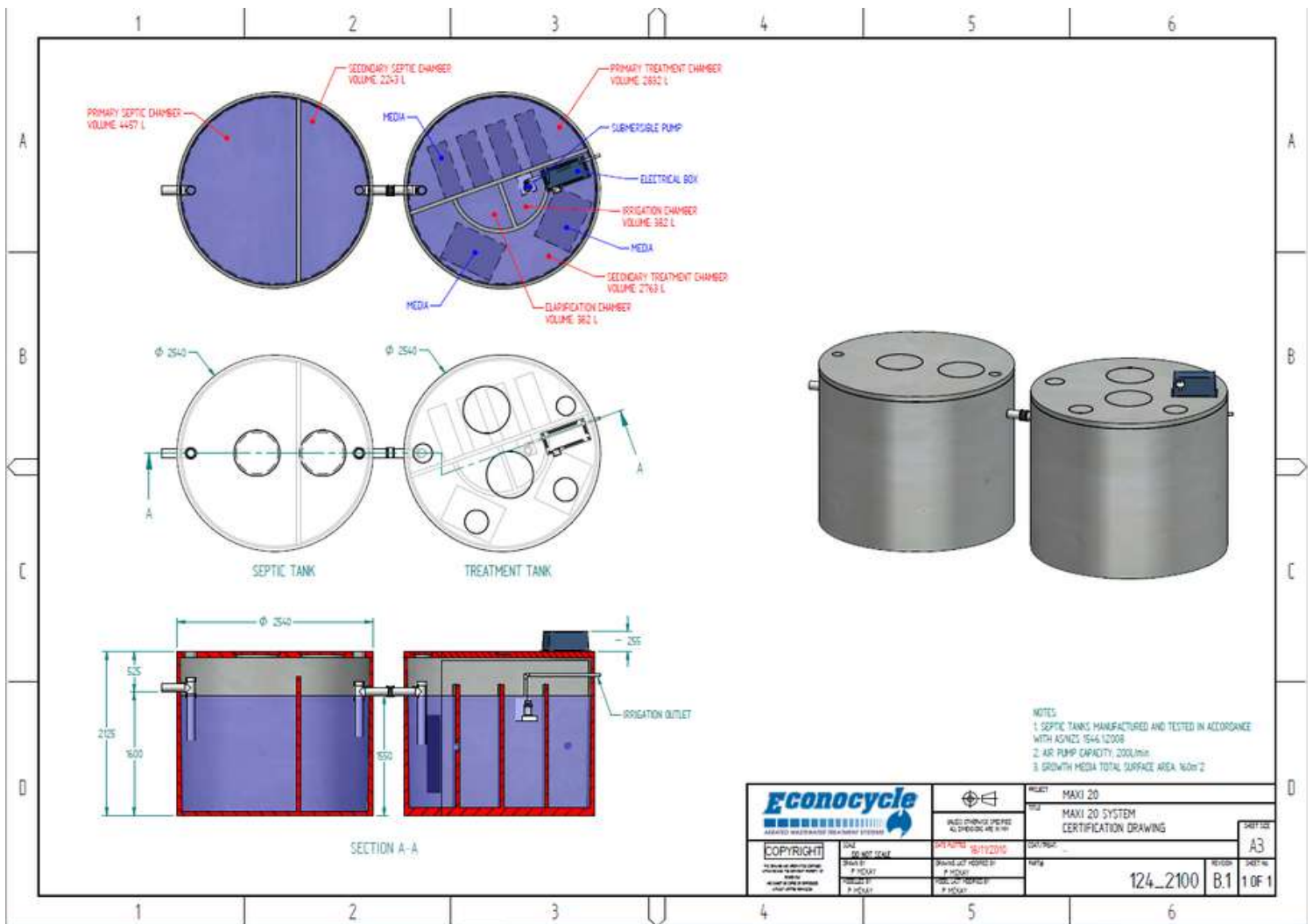
The growth media (illustrated as the grey checked areas) enables the bacteria to break down.

Once the organic impurities have been absorbed within the aerobic culture of microorganisms, the water passes to the clarification zone. At this stage the water has been recycled into clean, clear, odorless water.

The clarification zone is the secondary sedimentation process.

Before the water is released from the tank it is circulated through the chlorinator. The chlorinator is as the name suggests – a chlorine based chamber that acts as a final back up and safeguard to catch and kill any nasties that may have escaped through the aeration and clarification processes.

Drawings – Maxi 20



APPENDIX F

FLOW BALANCING ANALYSIS

INFLUENT FLOW BALANCE CALCULATIONS

Project: Early Learning Centre
Title: Lot 2 in DP746654
Address: 167 Serpentine Road Terrigal

Design Hydraulic Load: 4,840 L/day
No. days influent received: 5
No. days dosing to Land Application Area: 7
Pump Flow Rate: 200 L/min
Dosing Period: 24 hrs

Design Hydraulic Load (L/day)	4,840
Treatment Volume (L/day)	3,350

Month	Date	Day	Design Hydraulic Load (L)	Treatment Volume (L)	Stored Wastewater (L)	Stored Wastewater from Previous Day (L)	Cumulative Wastewater Influent Storage (L)	Sorted Temporary Storage (max-min) (L)	Maximum Storage Requirement (L)
January	1	Thursday	0	0	0	0	0	7,150	10,000
	2	Friday	4,840	3,350	1,490	0	1,490	6,400	
	3	Saturday	0	3,350	-3,350	1,490	-1,860	5,660	
	4	Sunday	0	3,350	-3,350	-1,860	-5,210	5,650	
	5	Monday	4,840	3,350	1,490	-5,210	-3,720	4,910	
	6	Tuesday	4,840	3,350	1,490	-3,720	-2,230	4,900	
	7	Wednesday	4,840	3,350	1,490	-2,230	-740	4,170	
	8	Thursday	4,840	3,350	1,490	-740	750	4,160	
	9	Friday	4,840	3,350	1,490	750	2,240	4,150	
	10	Saturday	0	3,350	-3,350	2,240	-1,110	3,800	
	11	Sunday	0	3,350	-3,350	-1,110	-4,460	3,740	
	12	Monday	4,840	3,350	1,490	-4,460	-2,970	3,420	
	13	Tuesday	4,840	3,350	1,490	-2,970	-1,480	3,410	
	14	Wednesday	4,840	3,350	1,490	-1,480	10	3,400	
	15	Thursday	4,840	3,350	1,490	10	1,500	3,050	
	16	Friday	4,840	3,350	1,490	1,500	2,990	2,990	
	17	Saturday	0	3,350	-3,350	2,990	-360	2,680	
	18	Sunday	0	3,350	-3,350	-360	-3,710	2,670	
	19	Monday	4,840	3,350	1,490	-3,710	-2,220	2,660	
	20	Tuesday	4,840	3,350	1,490	-2,220	-730	2,650	
	21	Wednesday	4,840	3,350	1,490	-730	760	2,300	
	22	Thursday	4,840	3,350	1,490	760	2,250	2,250	
	23	Friday	4,840	3,350	1,490	2,250	3,740	2,240	
	24	Saturday	0	3,350	-3,350	3,740	390	1,940	

25	Sunday	0	3,350	-3,350	390	-2,960	1,930
26	Monday	0	3,350	-3,350	-2,960	-6,310	1,920
27	Tuesday	4,840	3,350	1,490	-6,310	-4,820	1,910
28	Wednesday	4,840	3,350	1,490	-4,820	-3,330	1,900
29	Thursday	4,840	3,350	1,490	-3,330	-1,840	1,550
30	Friday	4,840	3,350	1,490	-1,840	-350	1,500
31	Saturday	0	3,350	-3,350	-350	-3,700	1,490
February		0	3,350	-3,350	-3,700	-7,050	1,190
1	Sunday	0	3,350	-3,350	-7,050	-5,560	1,180
2	Monday	4,840	3,350	1,490	-5,560	-4,070	1,170
3	Tuesday	4,840	3,350	1,490	-4,070	-2,580	1,160
4	Wednesday	4,840	3,350	1,490	-2,580	-1,090	1,150
5	Thursday	4,840	3,350	1,490	-1,090	400	800
6	Friday	4,840	3,350	1,490	400	-2,950	760
7	Saturday	0	3,350	-3,350	-2,950	-6,300	750
8	Sunday	0	3,350	-3,350	-6,300	-4,810	450
9	Monday	4,840	3,350	1,490	-4,810	-3,320	440
10	Tuesday	4,840	3,350	1,490	-3,320	-1,830	430
11	Wednesday	4,840	3,350	1,490	-1,830	-340	420
12	Thursday	4,840	3,350	1,490	-340	1,150	410
13	Friday	4,840	3,350	-3,350	1,150	-2,200	400
14	Saturday	0	3,350	-3,350	-2,200	-5,550	390
15	Sunday	0	3,350	-3,350	-5,550	-4,060	270
16	Monday	4,840	3,350	1,490	-4,060	-2,570	50
17	Tuesday	4,840	3,350	1,490	-2,570	-1,080	10
18	Wednesday	4,840	3,350	1,490	-1,080	410	0
19	Thursday	4,840	3,350	1,490	410	1,900	-300
20	Friday	4,840	3,350	-3,350	1,900	-1,450	-310
21	Saturday	0	3,350	-3,350	-1,450	-4,800	-320
22	Sunday	0	3,350	-3,350	-4,800	-3,310	-330
23	Monday	4,840	3,350	1,490	-3,310	-1,820	-340
24	Tuesday	4,840	3,350	1,490	-1,820	-330	-350
25	Wednesday	4,840	3,350	1,490	-330	1,160	-360
26	Thursday	4,840	3,350	1,490	1,160	2,650	-480
27	Friday	4,840	3,350	1,490	2,650	-700	-700
28	Saturday	0	3,350	-3,350	-700	-4,050	-730
March		0	3,350	-3,350	-4,050	-2,560	-740
1	Sunday	0	3,350	-3,350	-2,560	-1,070	-1,050
2	Monday	4,840	3,350	1,490	-1,070	420	-1,060
3	Tuesday	4,840	3,350	1,490	420	1,910	-1,070
4	Wednesday	4,840	3,350	1,490	1,910	3,400	-1,080
5	Thursday	4,840	3,350	1,490	3,400	50	-1,090
6	Friday	4,840	3,350	-3,350	50	-3,300	-1,110
7	Saturday	0	3,350	-3,350	-3,300	-1,810	-1,220
8	Sunday	0	3,350	-3,350	-1,810	-320	-1,230
9	Monday	4,840	3,350	1,490	-320	1,170	-1,410
10	Tuesday	4,840	3,350	1,490	1,170	2,660	-1,450
11	Wednesday	4,840	3,350	1,490	2,660	4,150	-1,480
12	Thursday	4,840	3,350	1,490	4,150		
13	Friday	4,840	3,350	1,490			

14	Saturday	0	3,350	-3,350	4,150	800	-1,800
15	Sunday	0	3,350	-3,350	800	-2,550	-1,810
16	Monday	4,840	3,350	1,490	-2,550	-1,060	-1,820
17	Tuesday	4,840	3,350	1,490	-1,060	430	-1,830
18	Wednesday	4,840	3,350	1,490	430	1,920	-1,840
19	Thursday	4,840	3,350	1,490	1,920	3,410	-1,860
20	Friday	4,840	3,350	1,490	3,410	4,900	-1,960
21	Saturday	0	3,350	-3,350	4,900	1,550	-1,970
22	Sunday	0	3,350	-3,350	1,550	-1,800	-1,980
23	Monday	4,840	3,350	1,490	-1,800	-310	-2,200
24	Tuesday	4,840	3,350	1,490	-310	1,180	-2,220
25	Wednesday	4,840	3,350	1,490	1,180	2,670	-2,230
26	Thursday	4,840	3,350	1,490	2,670	4,160	-2,550
27	Friday	4,840	3,350	1,490	4,160	5,650	-2,560
28	Saturday	0	3,350	-3,350	5,650	2,300	-2,570
29	Sunday	0	3,350	-3,350	2,300	-1,050	-2,580
30	Monday	4,840	3,350	1,490	-1,050	440	-2,710
31	Tuesday	4,840	3,350	1,490	440	1,930	-2,720
April	1	4,840	3,350	1,490	1,930	3,420	-2,730
	2	4,840	3,350	1,490	3,420	4,910	-2,950
	3	4,840	3,350	1,490	4,910	6,400	-2,960
	4	4,840	3,350	-3,350	6,400	3,050	-2,970
5	Sunday	0	3,350	-3,350	3,050	-300	-3,080
6	Monday	4,840	3,350	1,490	-300	1,190	-3,300
7	Tuesday	4,840	3,350	1,490	1,190	2,680	-3,310
8	Wednesday	4,840	3,350	1,490	2,680	4,170	-3,320
9	Thursday	4,840	3,350	1,490	4,170	5,660	-3,330
10	Friday	4,840	3,350	1,490	5,660	7,150	-3,450
11	Saturday	0	3,350	-3,350	7,150	3,800	-3,460
12	Sunday	0	3,350	-3,350	3,800	450	-3,470
13	Monday	4,840	3,350	1,490	450	1,940	-3,480
14	Tuesday	0	3,350	-3,350	1,940	-1,410	-3,700
15	Wednesday	0	3,350	-3,350	-1,410	-4,760	-3,710
16	Thursday	0	3,350	-3,350	-4,760	-8,110	-3,720
17	Friday	0	3,350	-3,350	-8,110	-11,460	-3,830
18	Saturday	0	3,350	-3,350	-11,460	-14,810	-3,890
19	Sunday	0	3,350	-3,350	-14,810	-18,160	-4,050
20	Monday	4,840	3,350	1,490	-18,160	-16,670	-4,060
21	Tuesday	4,840	3,350	1,490	-16,670	-15,180	-4,070
22	Wednesday	4,840	3,350	1,490	-15,180	-13,690	-4,200
23	Thursday	4,840	3,350	1,490	-13,690	-12,200	-4,210
24	Friday	0	3,350	-3,350	-12,200	-15,550	-4,220
25	Saturday	0	3,350	-3,350	-15,550	-18,900	-4,230
26	Sunday	0	3,350	-3,350	-18,900	-22,250	-4,460
27	Monday	4,840	3,350	1,490	-22,250	-20,760	-4,580
28	Tuesday	4,840	3,350	1,490	-20,760	-19,270	-4,630
29	Wednesday	4,840	3,350	1,490	-19,270	-17,780	-4,640
30	Thursday	4,840	3,350	1,490	-17,780	-16,290	-4,760

May	1	Friday	4,840	3,350	1,490	-16,290	-14,800	-4,800
	2	Saturday	0	3,350	-3,350	-14,800	-18,150	-4,810
	3	Sunday	0	3,350	-3,350	-18,150	-21,500	-4,820
	4	Monday	4,840	3,350	1,490	-21,500	-20,010	-4,940
	5	Tuesday	4,840	3,350	1,490	-20,010	-18,520	-4,950
	6	Wednesday	4,840	3,350	1,490	-18,520	-17,030	-4,960
	7	Thursday	4,840	3,350	1,490	-17,030	-15,540	-4,970
	8	Friday	4,840	3,350	1,490	-15,540	-14,050	-4,980
	9	Saturday	0	3,350	-3,350	-14,050	-17,400	-5,210
	10	Sunday	0	3,350	-3,350	-17,400	-20,750	-5,310
	11	Monday	4,840	3,350	1,490	-20,750	-19,260	-5,330
	12	Tuesday	4,840	3,350	1,490	-19,260	-17,770	-5,380
	13	Wednesday	4,840	3,350	1,490	-17,770	-16,280	-5,390
	14	Thursday	4,840	3,350	1,490	-16,280	-14,790	-5,550
	15	Friday	4,840	3,350	1,490	-14,790	-13,300	-5,560
	16	Saturday	0	3,350	-3,350	-13,300	-16,650	-5,690
	17	Sunday	0	3,350	-3,350	-16,650	-20,000	-5,700
	18	Monday	4,840	3,350	1,490	-20,000	-18,510	-5,710
	19	Tuesday	4,840	3,350	1,490	-18,510	-17,020	-5,720
	20	Wednesday	4,840	3,350	1,490	-17,020	-15,530	-5,730
	21	Thursday	4,840	3,350	1,490	-15,530	-14,040	-6,080
	22	Friday	4,840	3,350	1,490	-14,040	-12,550	-6,120
	23	Saturday	0	3,350	-3,350	-12,550	-15,900	-6,130
	24	Sunday	0	3,350	-3,350	-15,900	-19,250	-6,140
	25	Monday	4,840	3,350	1,490	-19,250	-17,760	-6,300
	26	Tuesday	4,840	3,350	1,490	-17,760	-16,270	-6,310
	27	Wednesday	4,840	3,350	1,490	-16,270	-14,780	-6,430
	28	Thursday	4,840	3,350	1,490	-14,780	-13,290	-6,440
	29	Friday	4,840	3,350	1,490	-13,290	-11,800	-6,450
	30	Saturday	0	3,350	-3,350	-11,800	-15,150	-6,460
	31	Sunday	0	3,350	-3,350	-15,150	-18,500	-6,470
June	1	Monday	4,840	3,350	1,490	-18,500	-17,010	-6,480
	2	Tuesday	4,840	3,350	1,490	-17,010	-15,520	-6,830
	3	Wednesday	4,840	3,350	1,490	-15,520	-14,030	-6,870
	4	Thursday	4,840	3,350	1,490	-14,030	-12,540	-6,880
	5	Friday	4,840	3,350	1,490	-12,540	-11,050	-6,890
	6	Saturday	0	3,350	-3,350	-11,050	-14,400	-7,050
	7	Sunday	0	3,350	-3,350	-14,400	-17,750	-7,180
	8	Monday	4,840	3,350	1,490	-17,750	-16,260	-7,190
	9	Tuesday	4,840	3,350	1,490	-16,260	-14,770	-7,200
	10	Wednesday	4,840	3,350	1,490	-14,770	-13,280	-7,210
	11	Thursday	4,840	3,350	1,490	-13,280	-11,790	-7,220
	12	Friday	0	3,350	-3,350	-11,790	-15,140	-7,230
	13	Saturday	0	3,350	-3,350	-15,140	-18,490	-7,240
	14	Sunday	0	3,350	-3,350	-18,490	-21,840	-7,580
	15	Monday	4,840	3,350	1,490	-21,840	-20,350	-7,610
	16	Tuesday	4,840	3,350	1,490	-20,350	-18,860	-7,620
	17	Wednesday	4,840	3,350	1,490	-18,860	-17,370	-7,630

	18	Thursday	4,840	3,350	1,490	-17,370	-15,880	-7,640
	19	Friday	4,840	3,350	1,490	-15,880	-14,390	-7,930
	20	Saturday	0	3,350	-3,350	-14,390	-17,740	-7,940
	21	Sunday	0	3,350	-3,350	-17,740	-21,090	-7,950
	22	Monday	4,840	3,350	1,490	-21,090	-19,600	-7,960
	23	Tuesday	4,840	3,350	1,490	-19,600	-18,110	-7,970
	24	Wednesday	4,840	3,350	1,490	-18,110	-16,620	-7,980
	25	Thursday	4,840	3,350	1,490	-16,620	-15,130	-7,990
	26	Friday	4,840	3,350	1,490	-15,130	-13,640	-8,110
	27	Saturday	0	3,350	-3,350	-13,640	-16,990	-8,330
	28	Sunday	0	3,350	-3,350	-16,990	-20,340	-8,360
	29	Monday	4,840	3,350	1,490	-20,340	-18,850	-8,370
	30	Tuesday	4,840	3,350	1,490	-18,850	-17,360	-8,380
July	1	Wednesday	4,840	3,350	1,490	-17,360	-15,870	-8,390
	2	Thursday	4,840	3,350	1,490	-15,870	-14,380	-8,520
	3	Friday	4,840	3,350	1,490	-14,380	-12,890	-8,660
	4	Saturday	0	3,350	-3,350	-12,890	-16,240	-8,680
	5	Sunday	0	3,350	-3,350	-16,240	-19,590	-8,690
	6	Monday	4,840	3,350	1,490	-19,590	-18,100	-8,700
	7	Tuesday	4,840	3,350	1,490	-18,100	-16,610	-8,710
	8	Wednesday	4,840	3,350	1,490	-16,610	-15,120	-8,720
	9	Thursday	4,840	3,350	1,490	-15,120	-13,630	-8,740
	10	Friday	4,840	3,350	1,490	-13,630	-12,140	-9,080
	11	Saturday	0	3,350	-3,350	-12,140	-15,490	-9,100
	12	Sunday	0	3,350	-3,350	-15,490	-18,840	-9,110
	13	Monday	4,840	3,350	1,490	-18,840	-17,350	-9,120
	14	Tuesday	4,840	3,350	1,490	-17,350	-15,860	-9,130
	15	Wednesday	4,840	3,350	1,490	-15,860	-14,370	-9,140
	16	Thursday	4,840	3,350	1,490	-14,370	-12,880	-9,270
	17	Friday	4,840	3,350	1,490	-12,880	-11,390	-9,430
	18	Saturday	0	3,350	-3,350	-11,390	-14,740	-9,440
	19	Sunday	0	3,350	-3,350	-14,740	-18,090	-9,450
	20	Monday	4,840	3,350	1,490	-18,090	-16,600	-9,460
	21	Tuesday	4,840	3,350	1,490	-16,600	-15,110	-9,490
	22	Wednesday	4,840	3,350	1,490	-15,110	-13,620	-9,830
	23	Thursday	4,840	3,350	1,490	-13,620	-12,130	-9,850
	24	Friday	4,840	3,350	1,490	-12,130	-10,640	-9,860
	25	Saturday	0	3,350	-3,350	-10,640	-13,990	-9,870
	26	Sunday	0	3,350	-3,350	-13,990	-17,340	-9,880
	27	Monday	4,840	3,350	1,490	-17,340	-15,850	-9,890
	28	Tuesday	4,840	3,350	1,490	-15,850	-14,360	-10,010
	29	Wednesday	4,840	3,350	1,490	-14,360	-12,870	-10,020
	30	Thursday	4,840	3,350	1,490	-12,870	-11,380	-10,180
	31	Friday	4,840	3,350	1,490	-11,380	-9,890	-10,190
August	1	Saturday	0	3,350	-3,350	-9,890	-13,240	-10,200
	2	Sunday	0	3,350	-3,350	-13,240	-16,590	-10,210
	3	Monday	4,840	3,350	1,490	-16,590	-15,100	-10,240
	4	Tuesday	4,840	3,350	1,490	-15,100	-13,610	-10,580

	5	Wednesday	4,840	3,350	1,490	-13,610	-12,120	-10,590
	6	Thursday	4,840	3,350	1,490	-12,120	-10,630	-10,600
	7	Friday	4,840	3,350	1,490	-10,630	-9,140	-10,610
	8	Saturday	0	3,350	-3,350	-9,140	-12,490	-10,620
	9	Sunday	0	3,350	-3,350	-12,490	-15,840	-10,630
	10	Monday	4,840	3,350	1,490	-15,840	-14,350	-10,640
	11	Tuesday	4,840	3,350	1,490	-14,350	-12,860	-10,760
	12	Wednesday	4,840	3,350	1,490	-12,860	-11,370	-10,770
	13	Thursday	4,840	3,350	1,490	-11,370	-9,880	-10,930
	14	Friday	4,840	3,350	1,490	-9,880	-8,390	-10,940
	15	Saturday	0	3,350	-3,350	-8,390	-11,740	-10,950
	16	Sunday	0	3,350	-3,350	-11,740	-15,090	-10,990
	17	Monday	4,840	3,350	1,490	-15,090	-13,600	-11,050
	18	Tuesday	4,840	3,350	1,490	-13,600	-12,110	-11,330
	19	Wednesday	4,840	3,350	1,490	-12,110	-10,620	-11,340
	20	Thursday	4,840	3,350	1,490	-10,620	-9,130	-11,350
	21	Friday	4,840	3,350	1,490	-9,130	-7,640	-11,360
	22	Saturday	0	3,350	-3,350	-7,640	-10,990	-11,370
	23	Sunday	0	3,350	-3,350	-10,990	-14,340	-11,380
	24	Monday	4,840	3,350	1,490	-14,340	-12,850	-11,390
	25	Tuesday	4,840	3,350	1,490	-12,850	-11,360	-11,460
	26	Wednesday	4,840	3,350	1,490	-11,360	-9,870	-11,500
	27	Thursday	4,840	3,350	1,490	-9,870	-8,380	-11,510
	28	Friday	4,840	3,350	1,490	-8,380	-6,890	-11,520
	29	Saturday	0	3,350	-3,350	-6,890	-10,240	-11,680
	30	Sunday	0	3,350	-3,350	-10,240	-13,590	-11,690
	31	Monday	4,840	3,350	1,490	-13,590	-12,100	-11,700
September	1	Tuesday	4,840	3,350	1,490	-12,100	-10,610	-11,740
	2	Wednesday	4,840	3,350	1,490	-10,610	-9,120	-11,790
	3	Thursday	4,840	3,350	1,490	-9,120	-7,630	-11,800
	4	Friday	4,840	3,350	1,490	-7,630	-6,140	-11,870
	5	Saturday	0	3,350	-3,350	-6,140	-9,490	-12,010
	6	Sunday	0	3,350	-3,350	-9,490	-12,840	-12,090
	7	Monday	4,840	3,350	1,490	-12,840	-11,350	-12,100
	8	Tuesday	4,840	3,350	1,490	-11,350	-9,860	-12,110
	9	Wednesday	4,840	3,350	1,490	-9,860	-8,370	-12,120
	10	Thursday	4,840	3,350	1,490	-8,370	-6,880	-12,130
	11	Friday	4,840	3,350	1,490	-6,880	-5,390	-12,140
	12	Saturday	0	3,350	-3,350	-5,390	-8,740	-12,200
	13	Sunday	0	3,350	-3,350	-8,740	-12,090	-12,240
	14	Monday	4,840	3,350	1,490	-12,090	-10,600	-12,250
	15	Tuesday	4,840	3,350	1,490	-10,600	-9,110	-12,260
	16	Wednesday	4,840	3,350	1,490	-9,110	-7,620	-12,270
	17	Thursday	4,840	3,350	1,490	-7,620	-6,130	-12,430
	18	Friday	4,840	3,350	1,490	-6,130	-4,640	-12,440
	19	Saturday	0	3,350	-3,350	-4,640	-7,990	-12,490
	20	Sunday	0	3,350	-3,350	-7,990	-11,340	-12,540
	21	Monday	4,840	3,350	1,490	-11,340	-9,850	-12,550

	22	Tuesday	4,840	3,350	1,490	-9,850	-8,360	-12,620
	23	Wednesday	4,840	3,350	1,490	-8,360	-6,870	-12,840
	24	Thursday	4,840	3,350	1,490	-6,870	-5,380	-12,850
	25	Friday	4,840	3,350	1,490	-5,380	-3,890	-12,860
	26	Saturday	0	3,350	-3,350	-3,890	-7,240	-12,870
	27	Sunday	0	3,350	-3,350	-7,240	-10,590	-12,880
	28	Monday	4,840	3,350	1,490	-10,590	-9,100	-12,890
	29	Tuesday	4,840	3,350	1,490	-9,100	-7,610	-12,990
	30	Wednesday	4,840	3,350	1,490	-7,610	-6,120	-13,000
October	1	Thursday	4,840	3,350	1,490	-6,120	-4,630	-13,010
	2	Friday	0	3,350	-3,350	-4,630	-7,980	-13,020
	3	Saturday	0	3,350	-3,350	-7,980	-11,330	-13,180
	4	Sunday	0	3,350	-3,350	-11,330	-14,680	-13,190
	5	Monday	4,840	3,350	1,490	-14,680	-13,190	-13,240
	6	Tuesday	4,840	3,350	1,490	-13,190	-11,700	-13,280
	7	Wednesday	4,840	3,350	1,490	-11,700	-10,210	-13,290
	8	Thursday	4,840	3,350	1,490	-10,210	-8,720	-13,300
	9	Friday	4,840	3,350	1,490	-8,720	-7,230	-13,370
	10	Saturday	0	3,350	-3,350	-7,230	-10,580	-13,590
	11	Sunday	0	3,350	-3,350	-10,580	-13,930	-13,600
	12	Monday	4,840	3,350	1,490	-13,930	-12,440	-13,610
	13	Tuesday	4,840	3,350	1,490	-12,440	-10,950	-13,620
	14	Wednesday	4,840	3,350	1,490	-10,950	-9,460	-13,630
	15	Thursday	4,840	3,350	1,490	-9,460	-7,970	-13,640
	16	Friday	4,840	3,350	1,490	-7,970	-6,480	-13,690
	17	Saturday	0	3,350	-3,350	-6,480	-9,830	-13,730
	18	Sunday	0	3,350	-3,350	-9,830	-13,180	-13,740
	19	Monday	4,840	3,350	1,490	-13,180	-11,690	-13,750
	20	Tuesday	4,840	3,350	1,490	-11,690	-10,200	-13,760
	21	Wednesday	4,840	3,350	1,490	-10,200	-8,710	-13,770
	22	Thursday	4,840	3,350	1,490	-8,710	-7,220	-13,930
	23	Friday	4,840	3,350	1,490	-7,220	-5,730	-13,990
	24	Saturday	0	3,350	-3,350	-5,730	-9,080	-14,030
	25	Sunday	0	3,350	-3,350	-9,080	-12,430	-14,040
	26	Monday	4,840	3,350	1,490	-12,430	-10,940	-14,050
	27	Tuesday	4,840	3,350	1,490	-10,940	-9,450	-14,120
	28	Wednesday	4,840	3,350	1,490	-9,450	-7,960	-14,340
	29	Thursday	4,840	3,350	1,490	-7,960	-6,470	-14,350
	30	Friday	4,840	3,350	1,490	-6,470	-4,980	-14,360
November	1	Saturday	0	3,350	-3,350	-4,980	-8,330	-14,370
	2	Sunday	0	3,350	-3,350	-8,330	-11,680	-14,380
	3	Monday	4,840	3,350	1,490	-11,680	-10,190	-14,390
	4	Tuesday	4,840	3,350	1,490	-10,190	-8,700	-14,400
	5	Wednesday	4,840	3,350	1,490	-8,700	-7,210	-14,480
	6	Thursday	4,840	3,350	1,490	-7,210	-5,720	-14,490
	7	Friday	4,840	3,350	1,490	-5,720	-4,230	-14,500
	8	Saturday	0	3,350	-3,350	-4,230	-7,580	-14,510
	9	Sunday	0	3,350	-3,350	-7,580	-10,930	-14,520

10	Monday	4,840	3,350	1,490	-10,930	-9,440	-14,680
11	Tuesday	4,840	3,350	1,490	-9,440	-7,950	-14,740
12	Wednesday	4,840	3,350	1,490	-7,950	-6,460	-14,770
13	Thursday	4,840	3,350	1,490	-6,460	-4,970	-14,780
14	Friday	4,840	3,350	1,490	-4,970	-3,480	-14,790
15	Saturday	0	3,350	-3,350	-3,480	-6,830	-14,800
16	Sunday	0	3,350	-3,350	-6,830	-10,180	-14,810
17	Monday	4,840	3,350	1,490	-10,180	-8,690	-14,870
18	Tuesday	4,840	3,350	1,490	-8,690	-7,200	-15,090
19	Wednesday	4,840	3,350	1,490	-7,200	-5,710	-15,100
20	Thursday	4,840	3,350	1,490	-5,710	-4,220	-15,110
21	Friday	4,840	3,350	1,490	-4,220	-2,730	-15,120
22	Saturday	0	3,350	-3,350	-2,730	-6,080	-15,130
23	Sunday	0	3,350	-3,350	-6,080	-9,430	-15,140
24	Monday	4,840	3,350	1,490	-9,430	-7,940	-15,150
25	Tuesday	4,840	3,350	1,490	-7,940	-6,450	-15,180
26	Wednesday	4,840	3,350	1,490	-6,450	-4,960	-15,220
27	Thursday	4,840	3,350	1,490	-4,960	-3,470	-15,230
28	Friday	4,840	3,350	1,490	-3,470	-1,980	-15,240
29	Saturday	0	3,350	-3,350	-1,980	-5,330	-15,250
30	Sunday	0	3,350	-3,350	-5,330	-8,680	-15,260
December	1 Monday	4,840	3,350	1,490	-8,680	-7,190	-15,270
	2 Tuesday	4,840	3,350	1,490	-7,190	-5,700	-15,360
	3 Wednesday	4,840	3,350	1,490	-5,700	-4,210	-15,490
	4 Thursday	4,840	3,350	1,490	-4,210	-2,720	-15,520
	5 Friday	4,840	3,350	1,490	-2,720	-1,230	-15,530
	6 Saturday	0	3,350	-3,350	-1,230	-4,580	-15,540
	7 Sunday	0	3,350	-3,350	-4,580	-7,930	-15,550
	8 Monday	4,840	3,350	1,490	-7,930	-6,440	-15,620
	9 Tuesday	4,840	3,350	1,490	-6,440	-4,950	-15,840
	10 Wednesday	4,840	3,350	1,490	-4,950	-3,460	-15,850
	11 Thursday	4,840	3,350	1,490	-3,460	-1,970	-15,860
	12 Friday	4,840	3,350	1,490	-1,970	-480	-15,870
	13 Saturday	0	3,350	-3,350	-480	-3,830	-15,880
	14 Sunday	0	3,350	-3,350	-3,830	-7,180	-15,900
	15 Monday	4,840	3,350	1,490	-7,180	-5,690	-15,970
	16 Tuesday	4,840	3,350	1,490	-5,690	-4,200	-15,980
	17 Wednesday	4,840	3,350	1,490	-4,200	-2,710	-15,990
	18 Thursday	4,840	3,350	1,490	-2,710	-1,220	-16,000
	19 Friday	4,840	3,350	1,490	-1,220	270	-16,010
	20 Saturday	0	3,350	-3,350	270	-3,080	-16,020
	21 Sunday	0	3,350	-3,350	-3,080	-6,430	-16,240
	22 Monday	4,840	3,350	1,490	-6,430	-4,940	-16,260
	23 Tuesday	4,840	3,350	1,490	-4,940	-3,450	-16,270
	24 Wednesday	4,840	3,350	1,490	-3,450	-1,960	-16,280
	25 Thursday	0	3,350	-3,350	-1,960	-5,310	-16,290
	26 Friday	0	3,350	-3,350	-5,310	-8,660	-16,370
	27 Saturday	0	3,350	-3,350	-8,660	-12,010	-16,590

	28	Sunday	0	3,350	-3,350	-12,010	-15,360	-16,600
	29	Monday	0	3,350	-3,350	-15,360	-18,710	-16,610
	30	Tuesday	0	3,350	-3,350	-18,710	-22,060	-16,620
January	31	Wednesday	0	3,350	-3,350	-22,060	-25,410	-16,650
	1	Thursday	0	3,350	-3,350	-25,410	-28,760	-16,670
	2	Friday	4,840	3,350	1,490	-28,760	-27,270	-16,720
	3	Saturday	0	3,350	-3,350	-27,270	-30,620	-16,730
	4	Sunday	0	3,350	-3,350	-30,620	-33,970	-16,740
	5	Monday	4,840	3,350	1,490	-33,970	-32,480	-16,750
	6	Tuesday	4,840	3,350	1,490	-32,480	-30,990	-16,760
	7	Wednesday	4,840	3,350	1,490	-30,990	-29,500	-16,770
	8	Thursday	4,840	3,350	1,490	-29,500	-28,010	-16,990
	9	Friday	4,840	3,350	1,490	-28,010	-26,520	-17,010
	10	Saturday	0	3,350	-3,350	-26,520	-29,870	-17,020
	11	Sunday	0	3,350	-3,350	-29,870	-33,220	-17,030
	12	Monday	4,840	3,350	1,490	-33,220	-31,730	-17,120
	13	Tuesday	4,840	3,350	1,490	-31,730	-30,240	-17,340
	14	Wednesday	4,840	3,350	1,490	-30,240	-28,750	-17,350
	15	Thursday	4,840	3,350	1,490	-28,750	-27,260	-17,360
	16	Friday	4,840	3,350	1,490	-27,260	-25,770	-17,370
	17	Saturday	0	3,350	-3,350	-25,770	-29,120	-17,400
	18	Sunday	0	3,350	-3,350	-29,120	-32,470	-17,470
	19	Monday	4,840	3,350	1,490	-32,470	-30,980	-17,480
	20	Tuesday	4,840	3,350	1,490	-30,980	-29,490	-17,490
	21	Wednesday	4,840	3,350	1,490	-29,490	-28,000	-17,500
	22	Thursday	4,840	3,350	1,490	-28,000	-26,510	-17,510
	23	Friday	4,840	3,350	1,490	-26,510	-25,020	-17,520
	24	Saturday	0	3,350	-3,350	-25,020	-28,370	-17,740
	25	Sunday	0	3,350	-3,350	-28,370	-31,720	-17,750
	26	Monday	4,840	3,350	1,490	-31,720	-30,230	-17,760
	27	Tuesday	4,840	3,350	1,490	-30,230	-28,740	-17,770
	28	Wednesday	4,840	3,350	1,490	-28,740	-27,250	-17,780
	29	Thursday	4,840	3,350	1,490	-27,250	-25,760	-17,870
	30	Friday	4,840	3,350	1,490	-25,760	-24,270	-18,090
	31	Saturday	0	3,350	-3,350	-24,270	-27,620	-18,100
February	1	Sunday	0	3,350	-3,350	-27,620	-30,970	-18,110
	2	Monday	4,840	3,350	1,490	-30,970	-29,480	-18,150
	3	Tuesday	4,840	3,350	1,490	-29,480	-27,990	-18,160
	4	Wednesday	4,840	3,350	1,490	-27,990	-26,500	-18,220
	5	Thursday	4,840	3,350	1,490	-26,500	-25,010	-18,230
	6	Friday	4,840	3,350	1,490	-25,010	-23,520	-18,240
	7	Saturday	0	3,350	-3,350	-23,520	-26,870	-18,250
	8	Sunday	0	3,350	-3,350	-26,870	-30,220	-18,260
	9	Monday	4,840	3,350	1,490	-30,220	-28,730	-18,270
	10	Tuesday	4,840	3,350	1,490	-28,730	-27,240	-18,490
	11	Wednesday	4,840	3,350	1,490	-27,240	-25,750	-18,500
	12	Thursday	4,840	3,350	1,490	-25,750	-24,260	-18,510
	13	Friday	4,840	3,350	1,490	-24,260	-22,770	-18,520

	14	Saturday	0	3,350	-3,350	-22,770	-26,120	-18,620	
	15	Sunday	0	3,350	-3,350	-26,120	-29,470	-18,710	
	16	Monday	4,840	3,350	1,490	-29,470	-27,980	-18,840	
	17	Tuesday	4,840	3,350	1,490	-27,980	-26,490	-18,850	
	18	Wednesday	4,840	3,350	1,490	-26,490	-25,000	-18,860	
	19	Thursday	4,840	3,350	1,490	-25,000	-23,510	-18,900	
	20	Friday	4,840	3,350	1,490	-23,510	-22,020	-18,970	
	21	Saturday	0	3,350	-3,350	-22,020	-25,370	-18,980	
	22	Sunday	0	3,350	-3,350	-25,370	-28,720	-18,990	
	23	Monday	4,840	3,350	1,490	-28,720	-27,230	-19,000	
	24	Tuesday	4,840	3,350	1,490	-27,230	-25,740	-19,010	
	25	Wednesday	4,840	3,350	1,490	-25,740	-24,250	-19,020	
	26	Thursday	4,840	3,350	1,490	-24,250	-22,760	-19,250	
	27	Friday	4,840	3,350	1,490	-22,760	-21,270	-19,260	
	28	Saturday	0	3,350	-3,350	-21,270	-24,620	-19,270	
March	1	Sunday	0	3,350	-3,350	-24,620	-27,970	-19,370	
	2	Monday	4,840	3,350	1,490	-27,970	-26,480	-19,590	
	3	Tuesday	4,840	3,350	1,490	-26,480	-24,990	-19,600	
	4	Wednesday	4,840	3,350	1,490	-24,990	-23,500	-19,720	
	5	Thursday	4,840	3,350	1,490	-23,500	-22,010	-19,730	
	6	Friday	4,840	3,350	1,490	-22,010	-20,520	-19,740	
	7	Saturday	0	3,350	-3,350	-20,520	-23,870	-19,750	
	8	Sunday	0	3,350	-3,350	-23,870	-27,220	-19,760	
	9	Monday	4,840	3,350	1,490	-27,220	-25,730	-19,770	
	10	Tuesday	4,840	3,350	1,490	-25,730	-24,240	-20,000	
	11	Wednesday	4,840	3,350	1,490	-24,240	-22,750	-20,010	
	12	Thursday	4,840	3,350	1,490	-22,750	-21,260	-20,120	
	13	Friday	4,840	3,350	1,490	-21,260	-19,770	-20,340	
	14	Saturday	0	3,350	-3,350	-19,770	-23,120	-20,350	
	15	Sunday	0	3,350	-3,350	-23,120	-26,470	-20,470	
	16	Monday	4,840	3,350	1,490	-26,470	-24,980	-20,480	
	17	Tuesday	4,840	3,350	1,490	-24,980	-23,490	-20,490	
	18	Wednesday	4,840	3,350	1,490	-23,490	-22,000	-20,500	
	19	Thursday	4,840	3,350	1,490	-22,000	-20,510	-20,510	
	20	Friday	4,840	3,350	1,490	-20,510	-19,020	-20,520	
	21	Saturday	0	3,350	-3,350	-19,020	-22,370	-20,750	
	22	Sunday	0	3,350	-3,350	-22,370	-25,720	-20,760	
	23	Monday	4,840	3,350	1,490	-25,720	-24,230	-20,870	
	24	Tuesday	4,840	3,350	1,490	-24,230	-22,740	-21,090	
	25	Wednesday	4,840	3,350	1,490	-22,740	-21,250	-21,220	
	26	Thursday	4,840	3,350	1,490	-21,250	-19,760	-21,230	
	27	Friday	4,840	3,350	1,490	-19,760	-18,270	-21,240	
	28	Saturday	0	3,350	-3,350	-18,270	-21,620	-21,250	
	29	Sunday	0	3,350	-3,350	-21,620	-24,970	-21,260	
	30	Monday	4,840	3,350	1,490	-24,970	-23,480	-21,270	
	31	Tuesday	4,840	3,350	1,490	-23,480	-21,990	-21,500	
April	1	Wednesday	4,840	3,350	1,490	-21,990	-20,500	-21,620	
	2	Thursday	4,840	3,350	1,490	-20,500	-19,010	-21,840	

	3	Friday	4,840	3,350	1,490	-19,010	-17,520	-21,970
	4	Saturday	0	3,350	-3,350	-17,520	-20,870	-21,980
	5	Sunday	0	3,350	-3,350	-20,870	-24,220	-21,990
	6	Monday	4,840	3,350	1,490	-24,220	-22,730	-22,000
	7	Tuesday	4,840	3,350	1,490	-22,730	-21,240	-22,010
	8	Wednesday	4,840	3,350	1,490	-21,240	-19,750	-22,020
	9	Thursday	4,840	3,350	1,490	-19,750	-18,260	-22,060
	10	Friday	4,840	3,350	1,490	-18,260	-16,770	-22,250
	11	Saturday	0	3,350	-3,350	-16,770	-20,120	-22,370
	12	Sunday	0	3,350	-3,350	-20,120	-23,470	-22,720
	13	Monday	4,840	3,350	1,490	-23,470	-21,980	-22,730
	14	Tuesday	4,840	3,350	1,490	-21,980	-20,490	-22,740
	15	Wednesday	4,840	3,350	1,490	-20,490	-19,000	-22,750
	16	Thursday	4,840	3,350	1,490	-19,000	-17,510	-22,760
	17	Friday	4,840	3,350	1,490	-17,510	-16,020	-22,770
	18	Saturday	0	3,350	-3,350	-16,020	-19,370	-23,120
	19	Sunday	0	3,350	-3,350	-19,370	-22,720	-23,470
	20	Monday	4,840	3,350	1,490	-22,720	-21,230	-23,480
	21	Tuesday	4,840	3,350	1,490	-21,230	-19,740	-23,490
	22	Wednesday	4,840	3,350	1,490	-19,740	-18,250	-23,500
	23	Thursday	4,840	3,350	1,490	-18,250	-16,760	-23,510
	24	Friday	4,840	3,350	1,490	-16,760	-15,270	-23,520
	25	Saturday	0	3,350	-3,350	-15,270	-18,620	-23,870
	26	Sunday	0	3,350	-3,350	-18,620	-21,970	-24,220
	27	Monday	4,840	3,350	1,490	-21,970	-20,480	-24,230
	28	Tuesday	4,840	3,350	1,490	-20,480	-18,990	-24,240
	29	Wednesday	4,840	3,350	1,490	-18,990	-17,500	-24,250
	30	Thursday	4,840	3,350	1,490	-17,500	-16,010	-24,260
May	1	Friday	4,840	3,350	1,490	-16,010	-14,520	-24,270
	2	Saturday	0	3,350	-3,350	-14,520	-17,870	-24,620
	3	Sunday	0	3,350	-3,350	-17,870	-21,220	-24,970
	4	Monday	4,840	3,350	1,490	-21,220	-19,730	-24,980
	5	Tuesday	4,840	3,350	1,490	-19,730	-18,240	-24,990
	6	Wednesday	4,840	3,350	1,490	-18,240	-16,750	-25,000
	7	Thursday	4,840	3,350	1,490	-16,750	-15,260	-25,010
	8	Friday	4,840	3,350	1,490	-15,260	-13,770	-25,020
	9	Saturday	0	3,350	-3,350	-13,770	-17,120	-25,370
	10	Sunday	0	3,350	-3,350	-17,120	-20,470	-25,410
	11	Monday	4,840	3,350	1,490	-20,470	-18,980	-25,720
	12	Tuesday	4,840	3,350	1,490	-18,980	-17,490	-25,730
	13	Wednesday	4,840	3,350	1,490	-17,490	-16,000	-25,740
	14	Thursday	4,840	3,350	1,490	-16,000	-14,510	-25,750
	15	Friday	4,840	3,350	1,490	-14,510	-13,020	-25,760
	16	Saturday	0	3,350	-3,350	-13,020	-16,370	-25,770
	17	Sunday	0	3,350	-3,350	-16,370	-19,720	-26,120
	18	Monday	4,840	3,350	1,490	-19,720	-18,230	-26,470
	19	Tuesday	4,840	3,350	1,490	-18,230	-16,740	-26,480
	20	Wednesday	4,840	3,350	1,490	-16,740	-15,250	-26,490

	21	Thursday		4,840	3,350	1,490	-15,250	-13,760	-26,500
	22	Friday		4,840	3,350	1,490	-13,760	-12,270	-26,510
	23	Saturday		0	3,350	-3,350	-12,270	-15,620	-26,520
	24	Sunday		0	3,350	-3,350	-15,620	-18,970	-26,870
	25	Monday		4,840	3,350	1,490	-18,970	-17,480	-27,220
	26	Tuesday		4,840	3,350	1,490	-17,480	-15,990	-27,230
	27	Wednesday		4,840	3,350	1,490	-15,990	-14,500	-27,240
	28	Thursday		4,840	3,350	1,490	-14,500	-13,010	-27,250
	29	Friday		4,840	3,350	1,490	-13,010	-11,520	-27,260
	30	Saturday		0	3,350	-3,350	-11,520	-14,870	-27,270
	31	Sunday		0	3,350	-3,350	-14,870	-18,220	-27,620
June	1	Monday		4,840	3,350	1,490	-18,220	-16,730	-27,970
	2	Tuesday		4,840	3,350	1,490	-16,730	-15,240	-27,980
	3	Wednesday		4,840	3,350	1,490	-15,240	-13,750	-27,990
	4	Thursday		4,840	3,350	1,490	-13,750	-12,260	-28,000
	5	Friday		4,840	3,350	1,490	-12,260	-10,770	-28,010
	6	Saturday		0	3,350	-3,350	-10,770	-14,120	-28,370
	7	Sunday		0	3,350	-3,350	-14,120	-17,470	-28,720
	8	Monday		4,840	3,350	1,490	-17,470	-15,980	-28,730
	9	Tuesday		4,840	3,350	1,490	-15,980	-14,490	-28,740
	10	Wednesday		4,840	3,350	1,490	-14,490	-13,000	-28,750
	11	Thursday		4,840	3,350	1,490	-13,000	-11,510	-28,760
	12	Friday		4,840	3,350	1,490	-11,510	-10,020	-29,120
	13	Saturday		0	3,350	-3,350	-10,020	-13,370	-29,470
	14	Sunday		0	3,350	-3,350	-13,370	-16,720	-29,480
	15	Monday		4,840	3,350	1,490	-16,720	-15,230	-29,490
	16	Tuesday		4,840	3,350	1,490	-15,230	-13,740	-29,500
	17	Wednesday		4,840	3,350	1,490	-13,740	-12,250	-29,870
	18	Thursday		4,840	3,350	1,490	-12,250	-10,760	-30,220
	19	Friday		4,840	3,350	1,490	-10,760	-9,270	-30,230
	20	Saturday		0	3,350	-3,350	-9,270	-12,620	-30,240
	21	Sunday		0	3,350	-3,350	-12,620	-15,970	-30,620
	22	Monday		4,840	3,350	1,490	-15,970	-14,480	-30,970
	23	Tuesday		4,840	3,350	1,490	-14,480	-12,990	-30,980
	24	Wednesday		4,840	3,350	1,490	-12,990	-11,500	-30,990
	25	Thursday		4,840	3,350	1,490	-11,500	-10,010	-31,720
	26	Friday		4,840	3,350	1,490	-10,010	-8,520	-31,730
	27	Saturday		0	3,350	-3,350	-8,520	-11,870	-32,470
	28	Sunday		0	3,350	-3,350	-11,870	-15,220	-32,480
	29	Monday		4,840	3,350	1,490	-15,220	-13,730	-33,220
	30	Tuesday		4,840	3,350	1,490	-13,730	-12,240	-33,970

EFFLUENT FLOW BALANCE CALCULATIONS

Project: Early Learning Centre
Title: Lot 2 in DP746654
Address: 167 Serpentine Road Terrigal

Design Hydraulic Load: 4,840 L/day

No. days influent received: 5

No. days dosing to Land Application Area: 7

Pump Flow Rate: 200 L/min

Dosing Period: 24 hrs

Load Leaving AWTs (L/day)	3,350
LAA Acceptance Capacity (L/day)	2,300

Month	Date	Day	Leaving STP (L)	LAA Acceptance Capacity (L)	Stored Wastewater (L)	Stored Wastewater from Previous Day (L)	Cumulative Effluent Storage (L)	Sorted Temporary Storage (max-min) (L)	Maximum Storage Requirement (L)
January	1	Thursday	0	2,300	0	0	0	7,500	10,000
	2	Friday	3,350	2,300	1,050	0	1,050	6,850	
	3	Saturday	0	2,300	-2,300	1,050	-1,250	6,800	
	4	Sunday	0	2,300	-2,300	-1,250	-3,550	6,450	
	5	Monday	3,350	2,300	1,050	-3,550	-2,500	6,200	
	6	Tuesday	3,350	2,300	1,050	-2,500	-1,450	6,150	
	7	Wednesday	3,350	2,300	1,050	-1,450	-400	6,050	
	8	Thursday	3,350	2,300	1,050	-400	650	5,800	
	9	Friday	3,350	2,300	1,050	650	1,700	5,750	
	10	Saturday	0	2,300	-2,300	1,700	-600	5,550	
	11	Sunday	0	2,300	-2,300	-600	-2,900	5,500	
	12	Monday	3,350	2,300	1,050	-2,900	-1,850	5,400	
	13	Tuesday	3,350	2,300	1,050	-1,850	-800	5,200	
	14	Wednesday	3,350	2,300	1,050	-800	250	5,150	
	15	Thursday	3,350	2,300	1,050	250	1,300	5,100	
	16	Friday	3,350	2,300	1,050	1,300	2,350	5,000	
	17	Saturday	0	2,300	-2,300	2,350	50	4,950	
	18	Sunday	0	2,300	-2,300	50	-2,250	4,900	
	19	Monday	3,350	2,300	1,050	-2,250	-1,200	4,850	
	20	Tuesday	3,350	2,300	1,050	-1,200	-150	4,750	
	21	Wednesday	3,350	2,300	1,050	-150	900	4,700	
	22	Thursday	3,350	2,300	1,050	900	1,950	4,550	
	23	Friday	3,350	2,300	1,050	1,950	3,000	4,500	
	24	Saturday	0	2,300	-2,300	3,000	700	4,500	

	25	Sunday	0	2,300	-2,300	700	-1,600	4,450
	26	Monday	0	2,300	-2,300	-1,600	-3,900	4,350
	27	Tuesday	3,350	2,300	1,050	-3,900	-2,850	4,300
	28	Wednesday	3,350	2,300	1,050	-2,850	-1,800	4,250
	29	Thursday	3,350	2,300	1,050	-1,800	-750	4,200
	30	Friday	3,350	2,300	1,050	-750	300	4,100
	31	Saturday	0	2,300	-2,300	300	-2,000	4,050
February	1	Sunday	0	2,300	-2,300	-2,000	-4,300	3,950
	2	Monday	3,350	2,300	1,050	-4,300	-3,250	3,900
	3	Tuesday	3,350	2,300	1,050	-3,250	-2,200	3,900
	4	Wednesday	3,350	2,300	1,050	-2,200	-1,150	3,850
	5	Thursday	3,350	2,300	1,050	-1,150	-100	3,850
	6	Friday	3,350	2,300	1,050	-100	950	3,800
	7	Saturday	0	2,300	-2,300	950	-1,350	3,750
	8	Sunday	0	2,300	-2,300	-1,350	-3,650	3,700
	9	Monday	3,350	2,300	1,050	-3,650	-2,600	3,650
	10	Tuesday	3,350	2,300	1,050	-2,600	-1,550	3,650
	11	Wednesday	3,350	2,300	1,050	-1,550	-500	3,600
	12	Thursday	3,350	2,300	1,050	-500	550	3,550
	13	Friday	3,350	2,300	1,050	550	1,600	3,450
	14	Saturday	0	2,300	-2,300	1,600	-700	3,400
	15	Sunday	0	2,300	-2,300	-700	-3,000	3,300
	16	Monday	3,350	2,300	1,050	-3,000	-1,950	3,250
	17	Tuesday	3,350	2,300	1,050	-1,950	-900	3,250
	18	Wednesday	3,350	2,300	1,050	-900	150	3,250
	19	Thursday	3,350	2,300	1,050	150	1,200	3,200
	20	Friday	3,350	2,300	1,050	1,200	2,250	3,200
	21	Saturday	0	2,300	-2,300	2,250	-50	3,150
	22	Sunday	0	2,300	-2,300	-50	-2,350	3,050
	23	Monday	3,350	2,300	1,050	-2,350	-1,300	3,050
	24	Tuesday	3,350	2,300	1,050	-1,300	-250	3,000
	25	Wednesday	3,350	2,300	1,050	-250	800	3,000
	26	Thursday	3,350	2,300	1,050	800	1,850	3,000
	27	Friday	3,350	2,300	1,050	1,850	2,900	2,950
	28	Saturday	0	2,300	-2,300	2,900	600	2,900
March	1	Sunday	0	2,300	-2,300	600	-1,700	2,900
	2	Monday	3,350	2,300	1,050	-1,700	-650	2,850
	3	Tuesday	3,350	2,300	1,050	-650	400	2,800
	4	Wednesday	3,350	2,300	1,050	400	1,450	2,750
	5	Thursday	3,350	2,300	1,050	1,450	2,500	2,650
	6	Friday	3,350	2,300	1,050	2,500	3,550	2,650
	7	Saturday	0	2,300	-2,300	3,550	1,250	2,650
	8	Sunday	0	2,300	-2,300	1,250	-1,050	2,600
	9	Monday	3,350	2,300	1,050	-1,050	0	2,600
	10	Tuesday	3,350	2,300	1,050	0	1,050	2,600
	11	Wednesday	3,350	2,300	1,050	1,050	2,100	2,550
	12	Thursday	3,350	2,300	1,050	2,100	3,150	2,550
	13	Friday	3,350	2,300	1,050	3,150	4,200	2,500

	14	Saturday	0	2,300	-2,300	4,200	1,900	2,450
	15	Sunday	0	2,300	-2,300	1,900	-400	2,400
	16	Monday	3,350	2,300	1,050	-400	650	2,400
	17	Tuesday	3,350	2,300	1,050	650	1,700	2,350
	18	Wednesday	3,350	2,300	1,050	1,700	2,750	2,350
	19	Thursday	3,350	2,300	1,050	2,750	3,800	2,350
	20	Friday	3,350	2,300	1,050	3,800	4,850	2,300
	21	Saturday	0	2,300	-2,300	4,850	2,550	2,250
	22	Sunday	0	2,300	-2,300	2,550	250	2,250
	23	Monday	3,350	2,300	1,050	250	1,300	2,200
	24	Tuesday	3,350	2,300	1,050	1,300	2,350	2,200
	25	Wednesday	3,350	2,300	1,050	2,350	3,400	2,150
	26	Thursday	3,350	2,300	1,050	3,400	4,450	2,100
	27	Friday	3,350	2,300	1,050	4,450	5,500	2,000
	28	Saturday	0	2,300	-2,300	5,500	3,200	2,000
	29	Sunday	0	2,300	-2,300	3,200	900	2,000
	30	Monday	3,350	2,300	1,050	900	1,950	1,950
	31	Tuesday	3,350	2,300	1,050	1,950	3,000	1,950
April	1	Wednesday	3,350	2,300	1,050	3,000	4,050	1,950
	2	Thursday	3,350	2,300	1,050	4,050	5,100	1,950
	3	Friday	3,350	2,300	1,050	5,100	6,150	1,900
	4	Saturday	0	2,300	-2,300	6,150	3,850	1,900
	5	Sunday	0	2,300	-2,300	3,850	1,550	1,850
	6	Monday	3,350	2,300	1,050	1,550	2,600	1,800
	7	Tuesday	3,350	2,300	1,050	2,600	3,650	1,750
	8	Wednesday	3,350	2,300	1,050	3,650	4,700	1,750
	9	Thursday	3,350	2,300	1,050	4,700	5,750	1,700
	10	Friday	3,350	2,300	1,050	5,750	6,800	1,700
	11	Saturday	0	2,300	-2,300	6,800	4,500	1,700
	12	Sunday	0	2,300	-2,300	4,500	2,200	1,650
	13	Monday	3,350	2,300	1,050	2,200	3,250	1,600
	14	Tuesday	0	2,300	-2,300	3,250	950	1,600
	15	Wednesday	0	2,300	-2,300	950	-1,350	1,600
	16	Thursday	0	2,300	-2,300	-1,350	-3,650	1,550
	17	Friday	0	2,300	-2,300	-3,650	-5,950	1,550
	18	Saturday	0	2,300	-2,300	-5,950	-8,250	1,500
	19	Sunday	0	2,300	-2,300	-8,250	-10,550	1,450
	20	Monday	3,350	2,300	1,050	-10,550	-9,500	1,450
	21	Tuesday	3,350	2,300	1,050	-9,500	-8,450	1,400
	22	Wednesday	3,350	2,300	1,050	-8,450	-7,400	1,350
	23	Thursday	3,350	2,300	1,050	-7,400	-6,350	1,350
	24	Friday	0	2,300	-2,300	-6,350	-8,650	1,350
	25	Saturday	0	2,300	-2,300	-8,650	-10,950	1,300
	26	Sunday	0	2,300	-2,300	-10,950	-13,250	1,300
	27	Monday	3,500	2,300	1,200	-13,250	-12,050	1,300
	28	Tuesday	3,500	2,300	1,200	-12,050	-10,850	1,300
	29	Wednesday	3,500	2,300	1,200	-10,850	-9,650	1,250
	30	Thursday	3,500	2,300	1,200	-9,650	-8,450	1,250

May	1	Friday	3,500	2,300	1,200	-8,450	-7,250	1,200
	2	Saturday	0	2,300	-2,300	-7,250	-9,550	1,150
	3	Sunday	0	2,300	-2,300	-9,550	-11,850	1,100
	4	Monday	3,350	2,300	1,050	-11,850	-10,800	1,100
	5	Tuesday	3,350	2,300	1,050	-10,800	-9,750	1,050
	6	Wednesday	3,350	2,300	1,050	-9,750	-8,700	1,050
	7	Thursday	3,350	2,300	1,050	-8,700	-7,650	1,050
	8	Friday	3,350	2,300	1,050	-7,650	-6,600	1,000
	9	Saturday	0	2,300	-2,300	-6,600	-8,900	950
	10	Sunday	0	2,300	-2,300	-8,900	-11,200	950
	11	Monday	3,350	2,300	1,050	-11,200	-10,150	950
	12	Tuesday	3,350	2,300	1,050	-10,150	-9,100	950
	13	Wednesday	3,350	2,300	1,050	-9,100	-8,050	900
	14	Thursday	3,350	2,300	1,050	-8,050	-7,000	900
	15	Friday	3,350	2,300	1,050	-7,000	-5,950	900
	16	Saturday	0	2,300	-2,300	-5,950	-8,250	850
	17	Sunday	0	2,300	-2,300	-8,250	-10,550	800
	18	Monday	3,350	2,300	1,050	-10,550	-9,500	750
	19	Tuesday	3,350	2,300	1,050	-9,500	-8,450	750
	20	Wednesday	3,350	2,300	1,050	-8,450	-7,400	700
	21	Thursday	3,350	2,300	1,050	-7,400	-6,350	700
	22	Friday	3,350	2,300	1,050	-6,350	-5,300	700
	23	Saturday	0	2,300	-2,300	-5,300	-7,600	700
	24	Sunday	0	2,300	-2,300	-7,600	-9,900	650
	25	Monday	3,350	2,300	1,050	-9,900	-8,850	650
	26	Tuesday	3,350	2,300	1,050	-8,850	-7,800	650
	27	Wednesday	3,350	2,300	1,050	-7,800	-6,750	650
	28	Thursday	3,350	2,300	1,050	-6,750	-5,700	600
	29	Friday	3,350	2,300	1,050	-5,700	-4,650	600
	30	Saturday	0	2,300	-2,300	-4,650	-6,950	550
	31	Sunday	0	2,300	-2,300	-6,950	-9,250	550
June	1	Monday	3,350	2,300	1,050	-9,250	-8,200	500
	2	Tuesday	3,350	2,300	1,050	-8,200	-7,150	450
	3	Wednesday	3,350	2,300	1,050	-7,150	-6,100	450
	4	Thursday	3,350	2,300	1,050	-6,100	-5,050	400
	5	Friday	3,350	2,300	1,050	-5,050	-4,000	400
	6	Saturday	0	2,300	-2,300	-4,000	-6,300	350
	7	Sunday	0	2,300	-2,300	-6,300	-8,600	350
	8	Monday	3,350	2,300	1,050	-8,600	-7,550	300
	9	Tuesday	3,350	2,300	1,050	-7,550	-6,500	300
	10	Wednesday	3,350	2,300	1,050	-6,500	-5,450	300
	11	Thursday	3,350	2,300	1,050	-5,450	-4,400	250
	12	Friday	0	2,300	-2,300	-4,400	-6,700	250
	13	Saturday	0	2,300	-2,300	-6,700	-9,000	250
	14	Sunday	0	2,300	-2,300	-9,000	-11,300	200
	15	Monday	3,350	2,300	1,050	-11,300	-10,250	150
	16	Tuesday	3,350	2,300	1,050	-10,250	-9,200	100
	17	Wednesday	3,350	2,300	1,050	-9,200	-8,150	100

	18	Thursday	3,350	2,300	1,050	-8,150	-7,100	50
	19	Friday	3,350	2,300	1,050	-7,100	-6,050	50
	20	Saturday	0	2,300	-2,300	-6,050	-8,350	50
	21	Sunday	0	2,300	-2,300	-8,350	-10,650	50
	22	Monday	3,350	2,300	1,050	-10,650	-9,600	0
	23	Tuesday	3,350	2,300	1,050	-9,600	-8,550	0
	24	Wednesday	3,350	2,300	1,050	-8,550	-7,500	0
	25	Thursday	3,350	2,300	1,050	-7,500	-6,450	0
	26	Friday	3,350	2,300	1,050	-6,450	-5,400	-50
	27	Saturday	0	2,300	-2,300	-5,400	-7,700	-50
	28	Sunday	0	2,300	-2,300	-7,700	-10,000	-100
	29	Monday	3,350	2,300	1,050	-10,000	-8,950	-100
	30	Tuesday	3,350	2,300	1,050	-8,950	-7,900	-150
July	1	Wednesday	3,350	2,300	1,050	-7,900	-6,850	-150
	2	Thursday	3,350	2,300	1,050	-6,850	-5,800	-200
	3	Friday	3,350	2,300	1,050	-5,800	-4,750	-200
	4	Saturday	0	2,300	-2,300	-4,750	-7,050	-250
	5	Sunday	0	2,300	-2,300	-7,050	-9,350	-250
	6	Monday	3,350	2,300	1,050	-9,350	-8,300	-300
	7	Tuesday	3,350	2,300	1,050	-8,300	-7,250	-350
	8	Wednesday	3,350	2,300	1,050	-7,250	-6,200	-350
	9	Thursday	3,350	2,300	1,050	-6,200	-5,150	-400
	10	Friday	3,350	2,300	1,050	-5,150	-4,100	-400
	11	Saturday	0	2,300	-2,300	-4,100	-6,400	-400
	12	Sunday	0	2,300	-2,300	-6,400	-8,700	-450
	13	Monday	3,350	2,300	1,050	-8,700	-7,650	-500
	14	Tuesday	3,350	2,300	1,050	-7,650	-6,600	-500
	15	Wednesday	3,350	2,300	1,050	-6,600	-5,550	-550
	16	Thursday	3,350	2,300	1,050	-5,550	-4,500	-550
	17	Friday	3,350	2,300	1,050	-4,500	-3,450	-600
	18	Saturday	0	2,300	-2,300	-3,450	-5,750	-600
	19	Sunday	0	2,300	-2,300	-5,750	-8,050	-600
	20	Monday	3,350	2,300	1,050	-8,050	-7,000	-600
	21	Tuesday	3,350	2,300	1,050	-7,000	-5,950	-650
	22	Wednesday	3,350	2,300	1,050	-5,950	-4,900	-650
	23	Thursday	3,350	2,300	1,050	-4,900	-3,850	-650
	24	Friday	3,350	2,300	1,050	-3,850	-2,800	-700
	25	Saturday	0	2,300	-2,300	-2,800	-5,100	-750
	26	Sunday	0	2,300	-2,300	-5,100	-7,400	-750
	27	Monday	3,350	2,300	1,050	-7,400	-6,350	-800
	28	Tuesday	3,350	2,300	1,050	-6,350	-5,300	-800
	29	Wednesday	3,350	2,300	1,050	-5,300	-4,250	-850
	30	Thursday	3,350	2,300	1,050	-4,250	-3,200	-850
	31	Friday	3,350	2,300	1,050	-3,200	-2,150	-850
August	1	Saturday	0	2,300	-2,300	-2,150	-4,450	-900
	2	Sunday	0	2,300	-2,300	-4,450	-6,750	-900
	3	Monday	3,350	2,300	1,050	-6,750	-5,700	-950
	4	Tuesday	3,350	2,300	1,050	-5,700	-4,650	-1,000

	5	Wednesday	3,350	2,300	1,050	-4,650	-3,600	-1,000
	6	Thursday	3,350	2,300	1,050	-3,600	-2,550	-1,050
	7	Friday	3,350	2,300	1,050	-2,550	-1,500	-1,050
	8	Saturday	0	2,300	-2,300	-1,500	-3,800	-1,100
	9	Sunday	0	2,300	-2,300	-3,800	-6,100	-1,150
	10	Monday	3,350	2,300	1,050	-6,100	-5,050	-1,150
	11	Tuesday	3,350	2,300	1,050	-5,050	-4,000	-1,200
	12	Wednesday	3,350	2,300	1,050	-4,000	-2,950	-1,200
	13	Thursday	3,350	2,300	1,050	-2,950	-1,900	-1,200
	14	Friday	3,350	2,300	1,050	-1,900	-850	-1,250
	15	Saturday	0	2,300	-2,300	-850	-3,150	-1,250
	16	Sunday	0	2,300	-2,300	-3,150	-5,450	-1,250
	17	Monday	3,350	2,300	1,050	-5,450	-4,400	-1,250
	18	Tuesday	3,350	2,300	1,050	-4,400	-3,350	-1,300
	19	Wednesday	3,350	2,300	1,050	-3,350	-2,300	-1,300
	20	Thursday	3,350	2,300	1,050	-2,300	-1,250	-1,300
	21	Friday	3,350	2,300	1,050	-1,250	-200	-1,350
	22	Saturday	0	2,300	-2,300	-200	-2,500	-1,350
	23	Sunday	0	2,300	-2,300	-2,500	-4,800	-1,400
	24	Monday	3,350	2,300	1,050	-4,800	-3,750	-1,450
	25	Tuesday	3,350	2,300	1,050	-3,750	-2,700	-1,450
	26	Wednesday	3,350	2,300	1,050	-2,700	-1,650	-1,500
	27	Thursday	3,350	2,300	1,050	-1,650	-600	-1,500
	28	Friday	3,350	2,300	1,050	-600	450	-1,550
	29	Saturday	0	2,300	-2,300	450	-1,850	-1,550
	30	Sunday	0	2,300	-2,300	-1,850	-4,150	-1,550
	31	Monday	3,350	2,300	1,050	-4,150	-3,100	-1,600
September	1	Tuesday	3,350	2,300	1,050	-3,100	-2,050	-1,600
	2	Wednesday	3,350	2,300	1,050	-2,050	-1,000	-1,650
	3	Thursday	3,350	2,300	1,050	-1,000	50	-1,650
	4	Friday	3,350	2,300	1,050	50	1,100	-1,700
	5	Saturday	0	2,300	-2,300	1,100	-1,200	-1,700
	6	Sunday	0	2,300	-2,300	-1,200	-3,500	-1,800
	7	Monday	3,350	2,300	1,050	-3,500	-2,450	-1,800
	8	Tuesday	3,350	2,300	1,050	-2,450	-1,400	-1,850
	9	Wednesday	3,350	2,300	1,050	-1,400	-350	-1,850
	10	Thursday	3,350	2,300	1,050	-350	700	-1,850
	11	Friday	3,350	2,300	1,050	700	1,750	-1,900
	12	Saturday	0	2,300	-2,300	1,750	-550	-1,900
	13	Sunday	0	2,300	-2,300	-550	-2,850	-1,900
	14	Monday	3,350	2,300	1,050	-2,850	-1,800	-1,950
	15	Tuesday	3,350	2,300	1,050	-1,800	-750	-1,950
	16	Wednesday	3,350	2,300	1,050	-750	300	-1,950
	17	Thursday	3,350	2,300	1,050	300	1,350	-2,000
	18	Friday	3,350	2,300	1,050	1,350	2,400	-2,050
	19	Saturday	0	2,300	-2,300	2,400	100	-2,100
	20	Sunday	0	2,300	-2,300	100	-2,200	-2,150
	21	Monday	3,350	2,300	1,050	-2,200	-1,150	-2,150

	22	Tuesday	3,350	2,300	1,050	-1,150	-100	-2,200
	23	Wednesday	3,350	2,300	1,050	-100	950	-2,200
	24	Thursday	3,350	2,300	1,050	950	2,000	-2,200
	25	Friday	3,350	2,300	1,050	2,000	3,050	-2,250
	26	Saturday	0	2,300	-2,300	3,050	750	-2,250
	27	Sunday	0	2,300	-2,300	750	-1,550	-2,300
	28	Monday	3,350	2,300	1,050	-1,550	-500	-2,300
	29	Tuesday	3,350	2,300	1,050	-500	550	-2,350
	30	Wednesday	3,350	2,300	1,050	550	1,600	-2,350
October	1	Thursday	3,350	2,300	1,050	1,600	2,650	-2,450
	2	Friday	0	2,300	-2,300	2,650	350	-2,500
	3	Saturday	0	2,300	-2,300	350	-1,950	-2,500
	4	Sunday	0	2,300	-2,300	-1,950	-4,250	-2,500
	5	Monday	3,350	2,300	1,050	-4,250	-3,200	-2,550
	6	Tuesday	3,350	2,300	1,050	-3,200	-2,150	-2,550
	7	Wednesday	3,350	2,300	1,050	-2,150	-1,100	-2,550
	8	Thursday	3,350	2,300	1,050	-1,100	-50	-2,600
	9	Friday	3,350	2,300	1,050	-50	1,000	-2,600
	10	Saturday	0	2,300	-2,300	1,000	-1,300	-2,700
	11	Sunday	0	2,300	-2,300	1,300	-3,600	-2,750
	12	Monday	3,350	2,300	1,050	-3,600	-2,550	-2,800
	13	Tuesday	3,350	2,300	1,050	-2,550	-1,500	-2,850
	14	Wednesday	3,350	2,300	1,050	-1,500	-450	-2,850
	15	Thursday	3,350	2,300	1,050	-450	600	-2,850
	16	Friday	3,350	2,300	1,050	600	1,650	-2,900
	17	Saturday	0	2,300	-2,300	1,650	-850	-2,900
	18	Sunday	0	2,300	-2,300	-650	-2,950	-2,950
	19	Monday	3,350	2,300	1,050	-2,950	-1,900	-2,950
	20	Tuesday	3,350	2,300	1,050	-1,900	-850	-3,000
	21	Wednesday	3,350	2,300	1,050	-850	200	-3,000
	22	Thursday	3,350	2,300	1,050	200	1,250	-3,100
	23	Friday	3,350	2,300	1,050	1,250	2,300	-3,150
	24	Saturday	0	2,300	-2,300	2,300	0	-3,150
	25	Sunday	0	2,300	-2,300	0	-2,300	-3,150
	26	Monday	3,350	2,300	1,050	-2,300	-1,250	-3,200
	27	Tuesday	3,350	2,300	1,050	-1,250	-200	-3,200
	28	Wednesday	3,350	2,300	1,050	-200	850	-3,200
	29	Thursday	3,350	2,300	1,050	850	1,900	-3,250
	30	Friday	3,350	2,300	1,050	1,900	2,950	-3,250
November	1	Saturday	0	2,300	-2,300	2,950	650	-3,350
	2	Sunday	0	2,300	-2,300	650	-1,650	-3,400
	3	Monday	3,350	2,300	1,050	-1,650	-600	-3,450
	4	Tuesday	3,350	2,300	1,050	-600	450	-3,500
	5	Wednesday	3,350	2,300	1,050	450	1,500	-3,500
	6	Thursday	3,350	2,300	1,050	1,500	2,550	-3,550
	7	Friday	3,350	2,300	1,050	2,550	3,600	-3,550
	8	Saturday	0	2,300	-2,300	3,600	1,300	-3,600
	9	Sunday	0	2,300	-2,300	1,300	-1,000	-3,600

10	Monday	3,350	2,300	1,050	-1,000	50	-3,650
11	Tuesday	3,350	2,300	1,050	50	1,100	-3,650
12	Wednesday	3,350	2,300	1,050	1,100	2,150	-3,650
13	Thursday	3,350	2,300	1,050	2,150	3,200	-3,750
14	Friday	3,350	2,300	1,050	3,200	4,250	-3,800
15	Saturday	0	2,300	-2,300	4,250	1,950	-3,800
16	Sunday	0	2,300	-2,300	1,950	-350	-3,850
17	Monday	3,350	2,300	1,050	-350	700	-3,850
18	Tuesday	3,350	2,300	1,050	700	1,750	-3,900
19	Wednesday	3,350	2,300	1,050	1,750	2,800	-3,900
20	Thursday	3,350	2,300	1,050	2,800	3,850	-4,000
21	Friday	3,350	2,300	1,050	3,850	4,900	-4,000
22	Saturday	0	2,300	-2,300	4,900	2,600	-4,050
23	Sunday	0	2,300	-2,300	2,600	300	-4,100
24	Monday	3,350	2,300	1,050	300	1,350	-4,150
25	Tuesday	3,350	2,300	1,050	1,350	2,400	-4,150
26	Wednesday	3,350	2,300	1,050	2,400	3,450	-4,200
27	Thursday	3,350	2,300	1,050	3,450	4,500	-4,250
28	Friday	3,350	2,300	1,050	4,500	5,550	-4,250
29	Saturday	0	2,300	-2,300	5,550	3,250	-4,300
30	Sunday	0	2,300	-2,300	3,250	950	-4,300
December	1	Monday	3,350	1,050	950	2,000	-4,400
	2	Tuesday	3,350	2,300	2,000	3,050	-4,400
3	Wednesday	3,350	2,300	1,050	3,050	4,100	-4,450
4	Thursday	3,350	2,300	1,050	4,100	5,150	-4,450
5	Friday	3,350	2,300	1,050	5,150	6,200	-4,500
6	Saturday	0	2,300	-2,300	6,200	3,900	-4,500
7	Sunday	0	2,300	-2,300	3,900	1,600	-4,550
8	Monday	3,350	2,300	1,050	1,600	2,650	-4,650
9	Tuesday	3,350	2,300	1,050	2,650	3,700	-4,650
10	Wednesday	3,350	2,300	1,050	3,700	4,750	-4,700
11	Thursday	3,350	2,300	1,050	4,750	5,800	-4,750
12	Friday	3,350	2,300	1,050	5,800	6,850	-4,800
13	Saturday	0	2,300	-2,300	6,850	4,550	-4,800
14	Sunday	0	2,300	-2,300	4,550	2,250	-4,850
15	Monday	3,350	2,300	1,050	2,250	3,300	-4,900
16	Tuesday	3,350	2,300	1,050	3,300	4,350	-4,950
17	Wednesday	3,350	2,300	1,050	4,350	5,400	-5,050
18	Thursday	3,350	2,300	1,050	5,400	6,450	-5,050
19	Friday	3,350	2,300	1,050	6,450	7,500	-5,100
20	Saturday	0	2,300	-2,300	7,500	5,200	-5,100
21	Sunday	0	2,300	-2,300	5,200	2,900	-5,150
22	Monday	3,350	2,300	1,050	2,900	3,950	-5,150
23	Tuesday	3,350	2,300	1,050	3,950	5,000	-5,200
24	Wednesday	3,350	2,300	1,050	5,000	6,050	-5,300
25	Thursday	0	2,300	-2,300	6,050	3,750	-5,300
26	Friday	0	2,300	-2,300	3,750	1,450	-5,350
27	Saturday	0	2,300	-2,300	1,450	-850	-5,400

	28	Sunday	0	2,300	-2,300	-850	-3,150	-5,450
	29	Monday	0	2,300	-2,300	-3,150	-5,450	-5,450
	30	Tuesday	0	2,300	-2,300	-5,450	-7,750	-5,450
January	31	Wednesday	0	2,300	-2,300	-7,750	-10,050	-5,450
	1	Thursday	0	2,300	-2,300	-10,050	-12,350	-5,500
	2	Friday	3,350	2,300	1,050	-12,350	-11,300	-5,550
	3	Saturday	0	2,300	-2,300	-11,300	-13,600	-5,600
	4	Sunday	0	2,300	-2,300	-13,600	-15,900	-5,700
	5	Monday	3,350	2,300	1,050	-15,900	-14,850	-5,700
	6	Tuesday	3,350	2,300	1,050	-14,850	-13,800	-5,750
	7	Wednesday	3,350	2,300	1,050	-13,800	-12,750	-5,750
	8	Thursday	3,350	2,300	1,050	-12,750	-11,700	-5,800
	9	Friday	3,350	2,300	1,050	-11,700	-10,650	-5,800
	10	Saturday	0	2,300	-2,300	-10,650	-12,950	-5,850
	11	Sunday	0	2,300	-2,300	-12,950	-15,250	-5,950
	12	Monday	3,350	2,300	1,050	-15,250	-14,200	-5,950
	13	Tuesday	3,350	2,300	1,050	-14,200	-13,150	-5,950
	14	Wednesday	3,350	2,300	1,050	-13,150	-12,100	-6,000
	15	Thursday	3,350	2,300	1,050	-12,100	-11,050	-6,050
	16	Friday	3,350	2,300	1,050	-11,050	-10,000	-6,100
	17	Saturday	0	2,300	-2,300	-10,000	-12,300	-6,100
	18	Sunday	0	2,300	-2,300	-12,300	-14,600	-6,100
	19	Monday	3,350	2,300	1,050	-14,600	-13,550	-6,150
	20	Tuesday	3,350	2,300	1,050	-13,550	-12,500	-6,200
	21	Wednesday	3,350	2,300	1,050	-12,500	-11,450	-6,250
	22	Thursday	3,350	2,300	1,050	-11,450	-10,400	-6,300
	23	Friday	3,350	2,300	1,050	-10,400	-9,350	-6,350
	24	Saturday	0	2,300	-2,300	-9,350	-11,650	-6,350
	25	Sunday	0	2,300	-2,300	-11,650	-13,950	-6,350
	26	Monday	3,350	2,300	1,050	-13,950	-12,900	-6,400
	27	Tuesday	3,350	2,300	1,050	-12,900	-11,850	-6,400
	28	Wednesday	3,350	2,300	1,050	-11,850	-10,800	-6,450
	29	Thursday	3,350	2,300	1,050	-10,800	-9,750	-6,450
	30	Friday	3,350	2,300	1,050	-9,750	-8,700	-6,500
	31	Saturday	0	2,300	-2,300	-8,700	-11,000	-6,500
February	1	Sunday	0	2,300	-2,300	-11,000	-13,300	-6,600
	2	Monday	3,350	2,300	1,050	-13,300	-12,250	-6,600
	3	Tuesday	3,350	2,300	1,050	-12,250	-11,200	-6,650
	4	Wednesday	3,350	2,300	1,050	-11,200	-10,150	-6,700
	5	Thursday	3,350	2,300	1,050	-10,150	-9,100	-6,750
	6	Friday	3,350	2,300	1,050	-9,100	-8,050	-6,750
	7	Saturday	0	2,300	-2,300	-8,050	-10,350	-6,750
	8	Sunday	0	2,300	-2,300	-10,350	-12,650	-6,800
	9	Monday	3,350	2,300	1,050	-12,650	-11,600	-6,850
	10	Tuesday	3,350	2,300	1,050	-11,600	-10,550	-6,900
	11	Wednesday	3,350	2,300	1,050	-10,550	-9,500	-6,950
	12	Thursday	3,350	2,300	1,050	-9,500	-8,450	-7,000
	13	Friday	3,350	2,300	1,050	-8,450	-7,400	-7,000

	14	Saturday	0	2,300	-2,300	-7,400	-9,700	-7,050	
	15	Sunday	0	2,300	-2,300	-9,700	-12,000	-7,050	
	16	Monday	3,350	2,300	1,050	-12,000	-10,950	-7,100	
	17	Tuesday	3,350	2,300	1,050	-10,950	-9,900	-7,100	
	18	Wednesday	3,350	2,300	1,050	-9,900	-8,850	-7,150	
	19	Thursday	3,350	2,300	1,050	-8,850	-7,800	-7,150	
	20	Friday	3,350	2,300	1,050	-7,800	-6,750	-7,250	
	21	Saturday	0	2,300	-2,300	-6,750	-9,050	-7,250	
	22	Sunday	0	2,300	-2,300	-9,050	-11,350	-7,300	
	23	Monday	3,350	2,300	1,050	-11,350	-10,300	-7,400	
	24	Tuesday	3,350	2,300	1,050	-10,300	-9,250	-7,400	
	25	Wednesday	3,350	2,300	1,050	-9,250	-8,200	-7,400	
	26	Thursday	3,350	2,300	1,050	-8,200	-7,150	-7,400	
	27	Friday	3,350	2,300	1,050	-7,150	-6,100	-7,450	
	28	Saturday	0	2,300	-2,300	-6,100	-8,400	-7,500	
March	1	Sunday	0	2,300	-2,300	-8,400	-10,700	-7,550	
	2	Monday	3,350	2,300	1,050	-10,700	-9,650	-7,550	
	3	Tuesday	3,350	2,300	1,050	-9,650	-8,600	-7,600	
	4	Wednesday	3,350	2,300	1,050	-8,600	-7,550	-7,650	
	5	Thursday	3,350	2,300	1,050	-7,550	-6,500	-7,650	
	6	Friday	3,350	2,300	1,050	-6,500	-5,450	-7,700	
	7	Saturday	0	2,300	-2,300	-5,450	-7,750	-7,700	
	8	Sunday	0	2,300	-2,300	-7,750	-10,050	-7,750	
	9	Monday	3,350	2,300	1,050	-10,050	-9,000	-7,750	
	10	Tuesday	3,350	2,300	1,050	-9,000	-7,950	-7,800	
	11	Wednesday	3,350	2,300	1,050	-7,950	-6,900	-7,800	
	12	Thursday	3,350	2,300	1,050	-6,900	-5,850	-7,900	
	13	Friday	3,350	2,300	1,050	-5,850	-4,800	-7,950	
	14	Saturday	0	2,300	-2,300	-4,800	-7,100	-8,050	
	15	Sunday	0	2,300	-2,300	-7,100	-9,400	-8,050	
	16	Monday	3,350	2,300	1,050	-9,400	-8,350	-8,050	
	17	Tuesday	3,350	2,300	1,050	-8,350	-7,300	-8,100	
	18	Wednesday	3,350	2,300	1,050	-7,300	-6,250	-8,150	
	19	Thursday	3,350	2,300	1,050	-6,250	-5,200	-8,200	
	20	Friday	3,350	2,300	1,050	-5,200	-4,150	-8,200	
	21	Saturday	0	2,300	-2,300	-4,150	-6,450	-8,250	
	22	Sunday	0	2,300	-2,300	-6,450	-8,750	-8,250	
	23	Monday	3,350	2,300	1,050	-8,750	-7,700	-8,300	
	24	Tuesday	3,350	2,300	1,050	-7,700	-6,650	-8,350	
	25	Wednesday	3,350	2,300	1,050	-6,650	-5,600	-8,350	
	26	Thursday	3,350	2,300	1,050	-5,600	-4,550	-8,400	
	27	Friday	3,350	2,300	1,050	-4,550	-3,500	-8,450	
	28	Saturday	0	2,300	-2,300	-3,500	-5,800	-8,450	
	29	Sunday	0	2,300	-2,300	-5,800	-8,100	-8,450	
	30	Monday	3,350	2,300	1,050	-8,100	-7,050	-8,450	
	31	Tuesday	3,350	2,300	1,050	-7,050	-6,000	-8,550	
April	1	Wednesday	3,350	2,300	1,050	-6,000	-4,950	-8,600	
	2	Thursday	3,350	2,300	1,050	-4,950	-3,900	-8,600	

	3	Friday	3,350	2,300	1,050	-3,900	-2,850	-8,650
	4	Saturday	0	2,300	-2,300	-2,850	-5,150	-8,700
	5	Sunday	0	2,300	-2,300	-5,150	-7,450	-8,700
	6	Monday	3,350	2,300	1,050	-7,450	-6,400	-8,700
	7	Tuesday	3,350	2,300	1,050	-6,400	-5,350	-8,750
	8	Wednesday	3,350	2,300	1,050	-5,350	-4,300	-8,850
	9	Thursday	3,350	2,300	1,050	-4,300	-3,250	-8,850
	10	Friday	3,350	2,300	1,050	-3,250	-2,200	-8,900
	11	Saturday	0	2,300	-2,300	-2,200	-4,500	-8,950
	12	Sunday	0	2,300	-2,300	-4,500	-6,800	-9,000
	13	Monday	3,350	2,300	1,050	-6,800	-5,750	-9,000
	14	Tuesday	3,350	2,300	1,050	-5,750	-4,700	-9,050
	15	Wednesday	3,350	2,300	1,050	-4,700	-3,650	-9,100
	16	Thursday	3,350	2,300	1,050	-3,650	-2,600	-9,100
	17	Friday	3,350	2,300	1,050	-2,600	-1,550	-9,200
	18	Saturday	0	2,300	-2,300	-1,550	-3,850	-9,250
	19	Sunday	0	2,300	-2,300	-3,850	-6,150	-9,250
	20	Monday	3,350	2,300	1,050	-6,150	-5,100	-9,350
	21	Tuesday	3,350	2,300	1,050	-5,100	-4,050	-9,350
	22	Wednesday	3,350	2,300	1,050	-4,050	-3,000	-9,400
	23	Thursday	3,350	2,300	1,050	-3,000	-1,950	-9,500
	24	Friday	3,350	2,300	1,050	-1,950	-900	-9,500
	25	Saturday	0	2,300	-2,300	-900	-3,200	-9,500
	26	Sunday	0	2,300	-2,300	-3,200	-5,500	-9,550
	27	Monday	3,350	2,300	1,050	-5,500	-4,450	-9,600
	28	Tuesday	3,350	2,300	1,050	-4,450	-3,400	-9,650
	29	Wednesday	3,350	2,300	1,050	-3,400	-2,350	-9,650
	30	Thursday	3,350	2,300	1,050	-2,350	-1,300	-9,700
May	1	Friday	3,350	2,300	1,050	-1,300	-250	-9,750
	2	Saturday	0	2,300	-2,300	-250	-2,550	-9,750
	3	Sunday	0	2,300	-2,300	-2,550	-4,850	-9,900
	4	Monday	3,350	2,300	1,050	-4,850	-3,800	-9,900
	5	Tuesday	3,350	2,300	1,050	-3,800	-2,750	-10,000
	6	Wednesday	3,350	2,300	1,050	-2,750	-1,700	-10,000
	7	Thursday	3,350	2,300	1,050	-1,700	-650	-10,050
	8	Friday	3,350	2,300	1,050	-650	400	-10,050
	9	Saturday	0	2,300	-2,300	400	-1,900	-10,150
	10	Sunday	0	2,300	-2,300	-1,900	-4,200	-10,150
	11	Monday	3,350	2,300	1,050	-4,200	-3,150	-10,250
	12	Tuesday	3,350	2,300	1,050	-3,150	-2,100	-10,300
	13	Wednesday	3,350	2,300	1,050	-2,100	-1,050	-10,350
	14	Thursday	3,350	2,300	1,050	-1,050	0	-10,400
	15	Friday	3,350	2,300	1,050	0	1,050	-10,550
	16	Saturday	0	2,300	-2,300	1,050	-1,250	-10,550
	17	Sunday	0	2,300	-2,300	-1,250	-3,550	-10,550
	18	Monday	3,350	2,300	1,050	-3,550	-2,500	-10,650
	19	Tuesday	3,350	2,300	1,050	-2,500	-1,450	-10,650
	20	Wednesday	3,350	2,300	1,050	-1,450	-400	-10,700

	21	Thursday	3,350	2,300	1,050	-400	650	-10,800
	22	Friday	3,350	2,300	1,050	650	1,700	-10,800
	23	Saturday	0	2,300	-2,300	1,700	-600	-10,850
	24	Sunday	0	2,300	-2,300	-600	-2,900	-10,950
	25	Monday	3,350	2,300	1,050	-2,900	-1,850	-10,950
	26	Tuesday	3,350	2,300	1,050	-1,850	-800	-11,000
	27	Wednesday	3,350	2,300	1,050	-800	250	-11,050
	28	Thursday	3,350	2,300	1,050	250	1,300	-11,200
	29	Friday	3,350	2,300	1,050	1,300	2,350	-11,200
	30	Saturday	0	2,300	-2,300	2,350	50	-11,300
	31	Sunday	0	2,300	-2,300	50	-2,250	-11,300
June	1	Monday	3,350	2,300	1,050	-2,250	-1,200	-11,350
	2	Tuesday	3,350	2,300	1,050	-1,200	-150	-11,450
	3	Wednesday	3,350	2,300	1,050	-150	900	-11,600
	4	Thursday	3,350	2,300	1,050	900	1,950	-11,650
	5	Friday	3,350	2,300	1,050	1,950	3,000	-11,700
	6	Saturday	0	2,300	-2,300	3,000	700	-11,850
	7	Sunday	0	2,300	-2,300	700	-1,600	-11,850
	8	Monday	3,350	2,300	1,050	-1,600	-550	-12,000
	9	Tuesday	3,350	2,300	1,050	-550	500	-12,050
	10	Wednesday	3,350	2,300	1,050	500	1,550	-12,100
	11	Thursday	3,350	2,300	1,050	1,550	2,600	-12,250
	12	Friday	3,350	2,300	1,050	2,600	3,650	-12,300
	13	Saturday	0	2,300	-2,300	3,650	1,350	-12,350
	14	Sunday	0	2,300	-2,300	1,350	-950	-12,500
	15	Monday	3,350	2,300	1,050	-950	100	-12,650
	16	Tuesday	3,350	2,300	1,050	100	1,150	-12,750
	17	Wednesday	3,350	2,300	1,050	1,150	2,200	-12,900
	18	Thursday	3,350	2,300	1,050	2,200	3,250	-12,950
	19	Friday	3,350	2,300	1,050	3,250	4,300	-13,150
	20	Saturday	0	2,300	-2,300	4,300	2,000	-13,250
	21	Sunday	0	2,300	-2,300	2,000	-300	-13,300
	22	Monday	3,350	2,300	1,050	-300	750	-13,550
	23	Tuesday	3,350	2,300	1,050	750	1,800	-13,600
	24	Wednesday	3,350	2,300	1,050	1,800	2,850	-13,800
	25	Thursday	3,350	2,300	1,050	2,850	3,900	-13,950
	26	Friday	3,350	2,300	1,050	3,900	4,950	-14,200
	27	Saturday	0	2,300	-2,300	4,950	2,650	-14,600
	28	Sunday	0	2,300	-2,300	2,650	350	-14,850
	29	Monday	3,350	2,300	1,050	350	1,400	-15,250
	30	Tuesday	3,350	2,300	1,050	1,400	2,450	-15,900

APPENDIX G

**HALGAN MGT 1500 MODEL
GREASE TRAP
DESIGN AND SPECIFICATIONS**

HALGAN MGT 1500 GREASE TRAP DETAIL

Notes

1. General

1.1.

Tank constructed from Polyethylene.

1.2.

The MGT is to be installed in a location that will not cause a nuisance, obstruct fire access; cannot be vandalised or be damaged by vehicles.

1.3.

The MGT must have ease of access to pumpout point for maintenance.

1.4.

A hose tap fitted with RPZD backflow protection (as per AS/NZS 3500) must be installed within 5 metres of the grease trap for maintenance and cleaning.

1.5.

Non standard installations require Halgan approval.

2. Installation above ground

2.1.

The MGT is to be supported on a 100mm thick concrete pad.

2.2.

The MGT does not require a stand.

2.3.

Any maintenance platform must be installed in accordance with Australian Standard 1657-1992 allowing safe access while inspecting and maintaining the MGT

2.4.

All pipes connecting to the MGT shall be fully supported; there shall be no stress on the tank connections.

2.5.

All stormwater must be diverted away from the MGT to prevent undermining of foundation.

3. Installation below ground

3.1.

All connections to the MGT shall be in accordance with the appropriate authorities.

3.2.

Any excavation exceeding 1.5 metres in depth shall comply with the construction safety acts and regulations before backfilling.

3.3.

The MGT must be filled with water prior to backfilling.

3.4.

Riser heights greater than 900mm require Halgan approval

4. Excavation dimensions

4.1.

The excavated hole width shall be kept as narrow as practicable. The depth shall not be greater than 150mm more than the required depth.

4.2.

75mm clearance is required at the sides of tank.

5. Over excavation

5.1.

Where an excavation has been made deeper than required, the excess depth shall be filled either with bedding material compacted to achieve 98% compaction or concrete.

6. Water Charged Ground

6.1.

Where installation is in high water table or water charged ground, mine subsidence, filled or unstable areas, the services of a qualified structural engineer is required for certification.

7. Bedding material

7.1.

The bedding material shall be 1 part Portland cement to 4 parts clean sand.

7.2.

The bedding shall be thoroughly compacted by tamping at 300 mm layers.

7.3.

The bedding material shall encase the whole tank.

8. Final Backfill

8.1.

The final backfill material shall comply with the following:

8.1.a.

Spoil from the excavation of the trench may be used.

8.1.b.

Foreign material such as builder's waste, bricks, and concrete shall not be used.

8.1.c.

The backfill shall be compacted to restore the excavated hole as near as practicable to the normal ground.

The diagram illustrates the Halgan MGT 1500 Grease Trap in two views: a side elevation and a top plan view.

Side Elevation View:

 - Dimensions:** Overall width is 720mm. The main body height is 1550mm. The riser height is 300mm. The access chamber height is 600mm. The total height is 2450mm.
 - Labels:** "INSTALLATIONS WITH B CLASS LIDS ADD 50mm TO FSL", "INSTALLATIONS WITH D CLASS LIDS ADD 100mm TO FSL", "300mm & 600mm RISER SIZES AVAILABLE (RISER HEIGHTS GREATER THAN 900mm REQUIRE HALGAN APPROVAL)", "150mm SERVICING PORT", "WATER LEVEL DURING NORMAL OPERATION", "SUBMERGED INLET", "SURGE CONTROL DEVICE (SCD) SERVICING RISER (BOLTED TO ACCESS CHAMBER WALL)", "SURGE CONTROL DEVICE (SCD) LENGTH DIMENSIONS VARY DEPENDING ON VOLUME OF GREASE TRAP", "GREASE TRAP VENT TO DISCHARGE TO ATMOSPHERE IN ACCORDANCE WITH AS/NZS 3500", "600 x 600 ACCESS CHAMBER", "IOS", "0.75", "0.57", "0.67".

Top Plan View:

 - Dimensions:** Overall width is 720mm. The main body width is 1550mm. The access chamber width is 600mm. The total width is 2150mm.
 - Labels:** "INLET", "OUTLET", "SCD".

HALGAN MGT 1500 GREASE TRAP DIMENSIONS					
MODEL	HEIGHT	WIDTH	LENGTH	VOLUME	WEIGHT
MGT 1500	1550mm	720mm	3000mm	1500 L	140 KG

22.05.2013

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REV

NOTES & TITLE BLOCK AMENDED

DETAIL DESIGN

DESCRIPTION

15.10.2012

A

DATE

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DO NOT SCALE IF IN DOUBT ASK



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NAME

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DATE

15.10.2012

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REV. NO.

MGT1500

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APPENDIX H

SUPPORTING DOCUMENTATION

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.

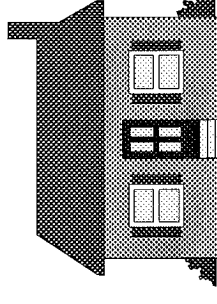
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

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

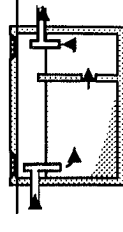
By looking after your management system you can do your part in helping to protect the environment and the health of you and your community.

For more information please contact:

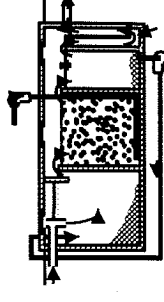
Managing Wastewater In Your Backyard



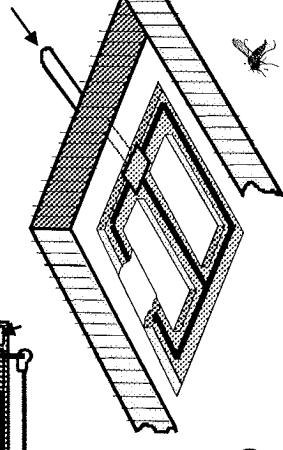
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ON-SITE SEWAGE MANAGEMENT SYSTEMS

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.

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.

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.

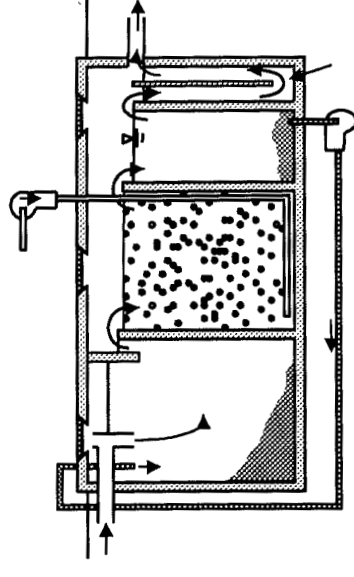
HELP PROTECT YOUR HEALTH AND THE ENVIRONMENT

Poorly maintained AWTSs 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



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

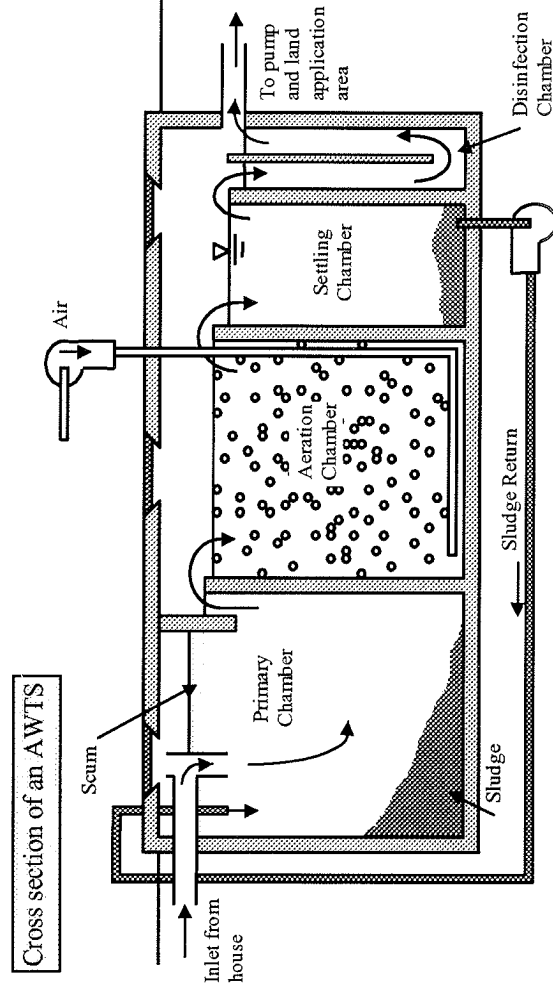
The effectiveness of the system will, in part, depend on how it is used and maintained. The following is a guide on good maintenance procedures that you should follow:

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



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:

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

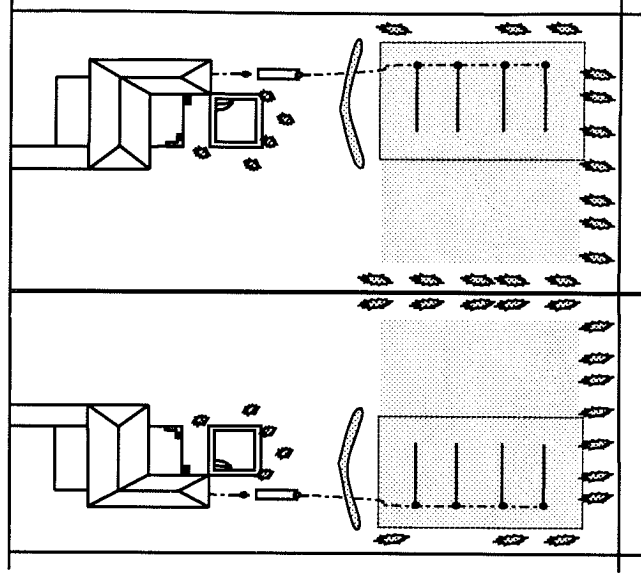
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By looking after your sewage management system you can do your part in helping to protect the environment and the health of you and your family.

For more information please contact:

Your Land Application Area



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).

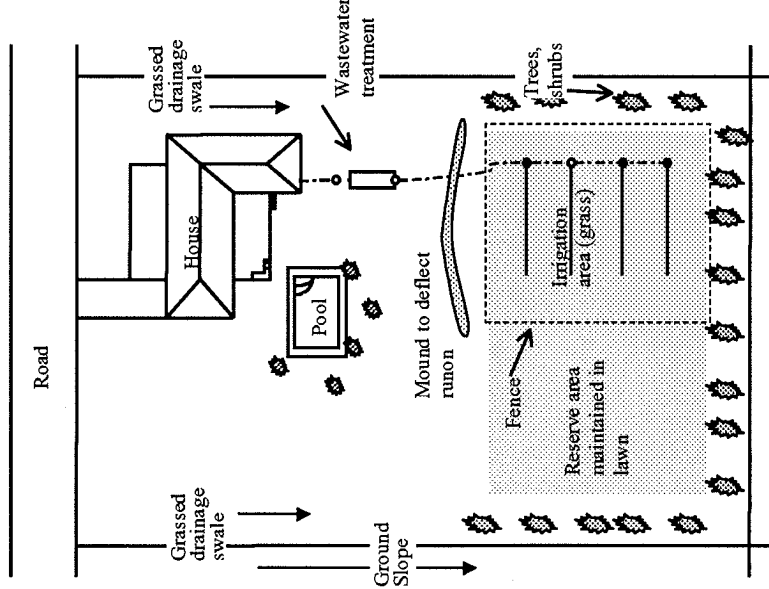
Soil absorption systems do not require highly treated effluent, and wastewater treated by a septic tank is reasonable as the solids content in the effluent has been reduced. Absorption systems release the effluent into the soil at a depth that cannot be reached by the roots of most small shrubs and grasses. 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.

Typical Site Layout (not to scale)



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

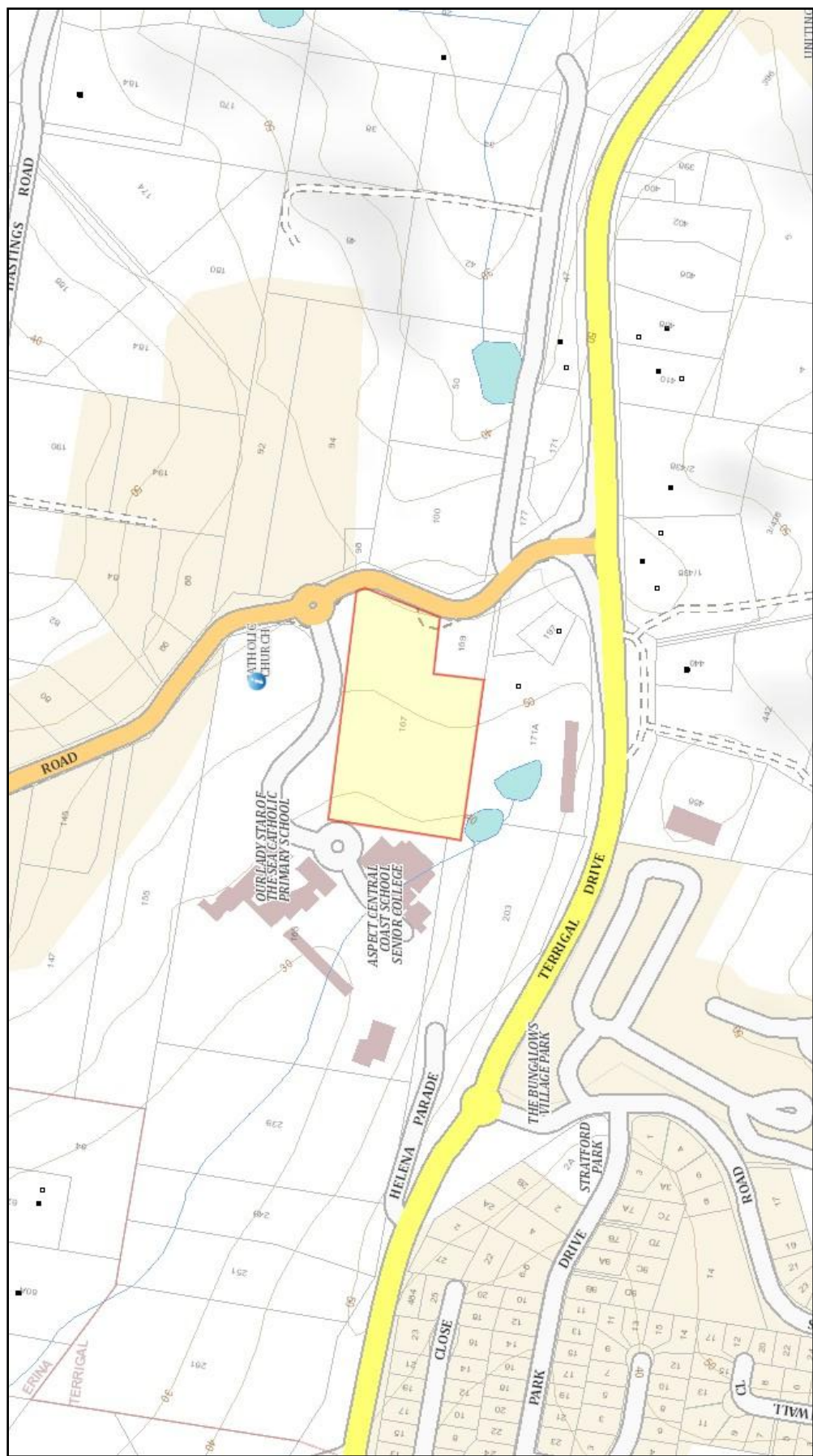
Treated wastewater has the potential to have negative impacts on public health and the environment. For this reason the application area must be located in accordance with the results of a site evaluation, and approved landscaping must be completed prior to occupation of the building. Sandy soil and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

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

FIGURES



Wastewater Management Plan		Scale: As shown
Lot 2 in DP746654 167 Serpentine Road Terrigal Lot Plan		FIGURE 1
Larry Cook Consulting PO Box 8146 Tumbi Umbi NSW 2261 Ph 02 4340 1114		



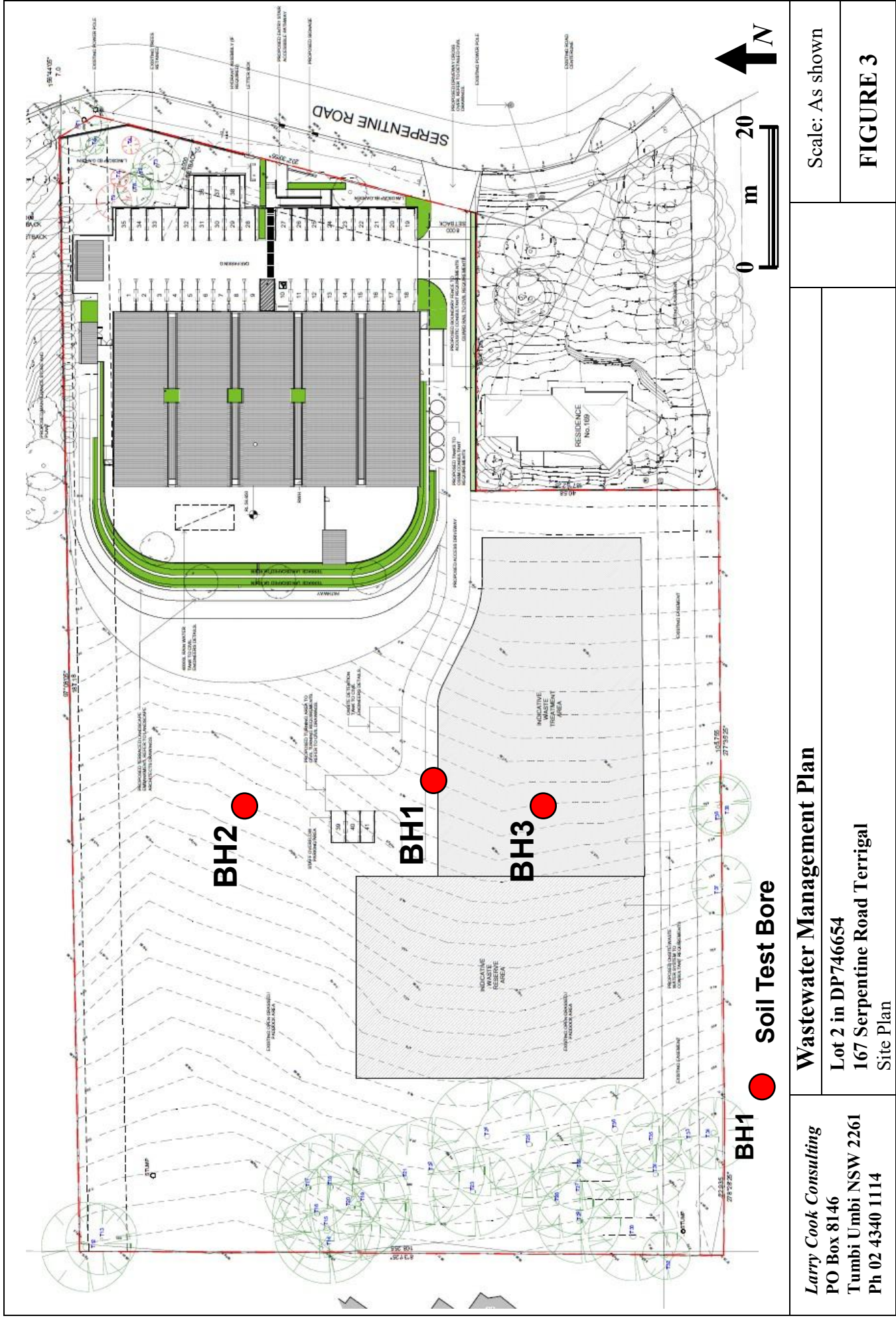
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Tumbi Umbi NSW 2261
Ph 02 4340 1114

Wastewater Management Plan

Lot 2 in DP746654
167 Serpentine Road Terrigal
Topographic Plan

Scale: As shown

FIGURE 2



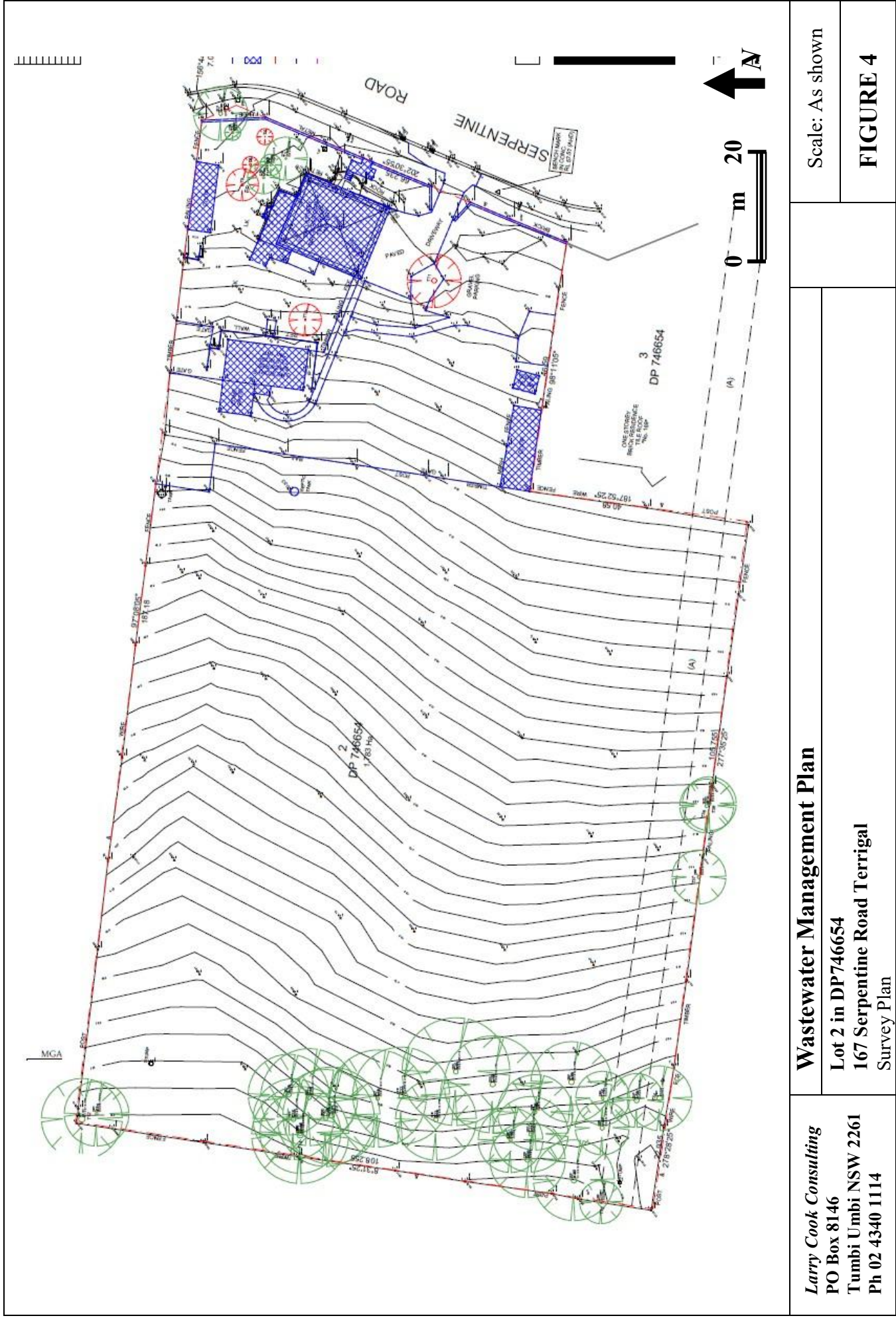
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Wastewater Management Plan

Lot 2 in DP746654
167 Serpentine Road Terrigal
Site Plan

Scale: As shown

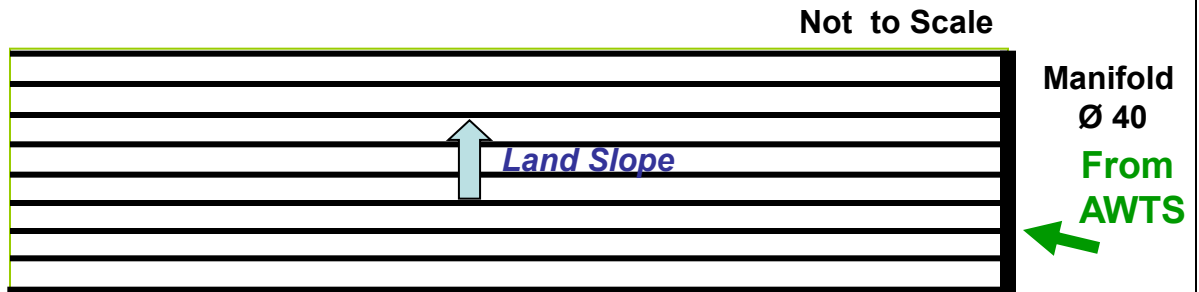
FIGURE 3





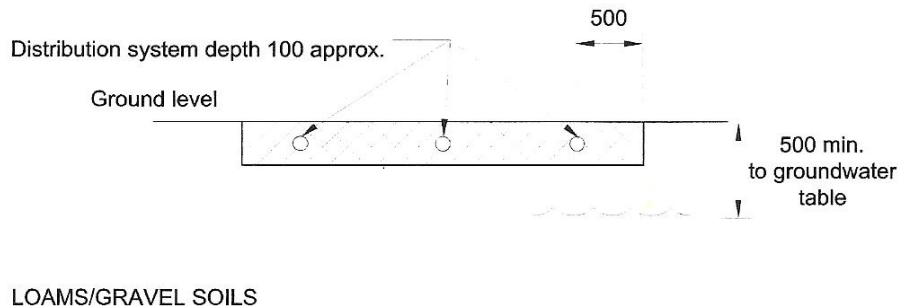
<i>Larry Cook Consulting</i> PO Box 8146 Tumbi Umbi NSW 2261 Ph 02 4340 1114	Wastewater Management Plan		Scale: As shown
	Lot 2 in DP746654 167 Serpentine Road Terrigal Aerial Photo Showing Existing Conditions		
			FIGURE 5





Recommended Dripper Line Separation = approx. 0.6 – 1.0m
 Recommended Emitter separation = 0.4 m
 Proposed Application Area = 1,720 m²

Sub-Surface Drip Irrigation Concept Plan



Sub-Surface Drip Irrigation Bed Cross Section

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 Phone 02 4340 1114

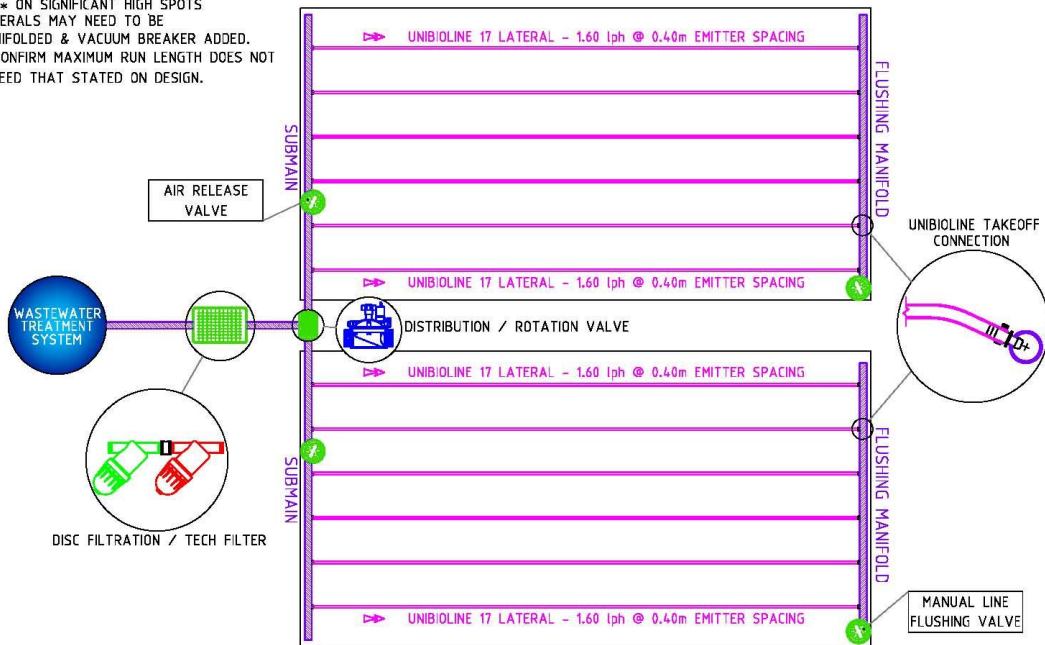
Wastewater Management Plan
 Lot 2 in DP746654
 167 Serpentine Road Terrigal
 Design Sub-Surface Irrigation

Scale: As shown

FIGURE 8

NOTE

1. ** ON SIGNIFICANT HIGH SPOTS
LATERALS MAY NEED TO BE
MANIFOLDED & VACUUM BREAKER ADDED.
2. CONFIRM MAXIMUM RUN LENGTH DOES NOT
EXCEED THAT STATED ON DESIGN.



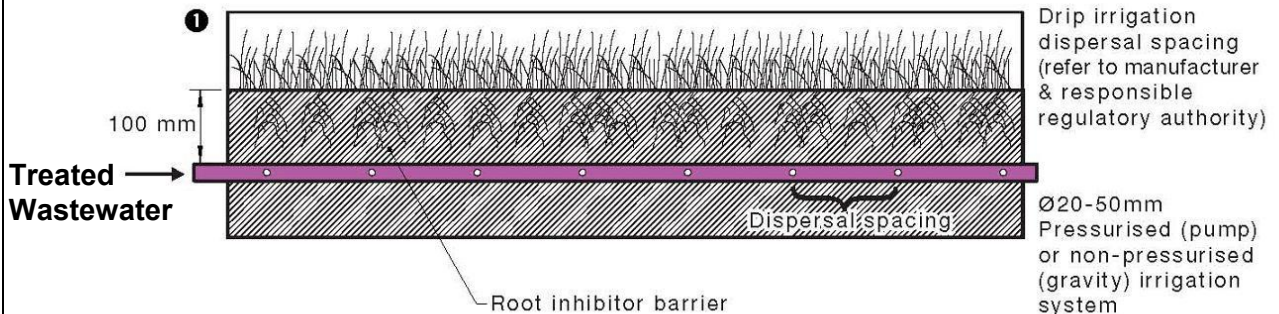
re:SOURCE
SUSTAINABLE WATER SOLUTIONS



PROJECT:	re:SOURCE DISPERSAL SYSTEM	DATE:	27/03/07	DRAWN BY:	MJB	APPRVD BY:	GH	SCALE:	N.T.S.
TITLE:	MULTIPLE END FEED LAYOUT SUB-SURFACE UNIBILINE	DRAWING No:	LWL-002	REV No:					

Industry Example Sub-Surface Drip Irrigation System

Subsurface absorption - suitable for treated and untreated greywater systems



Typical Cross Section

Modified after *Urban Greywater Design and Installation Handbook*
(National Water Commission, 2008)

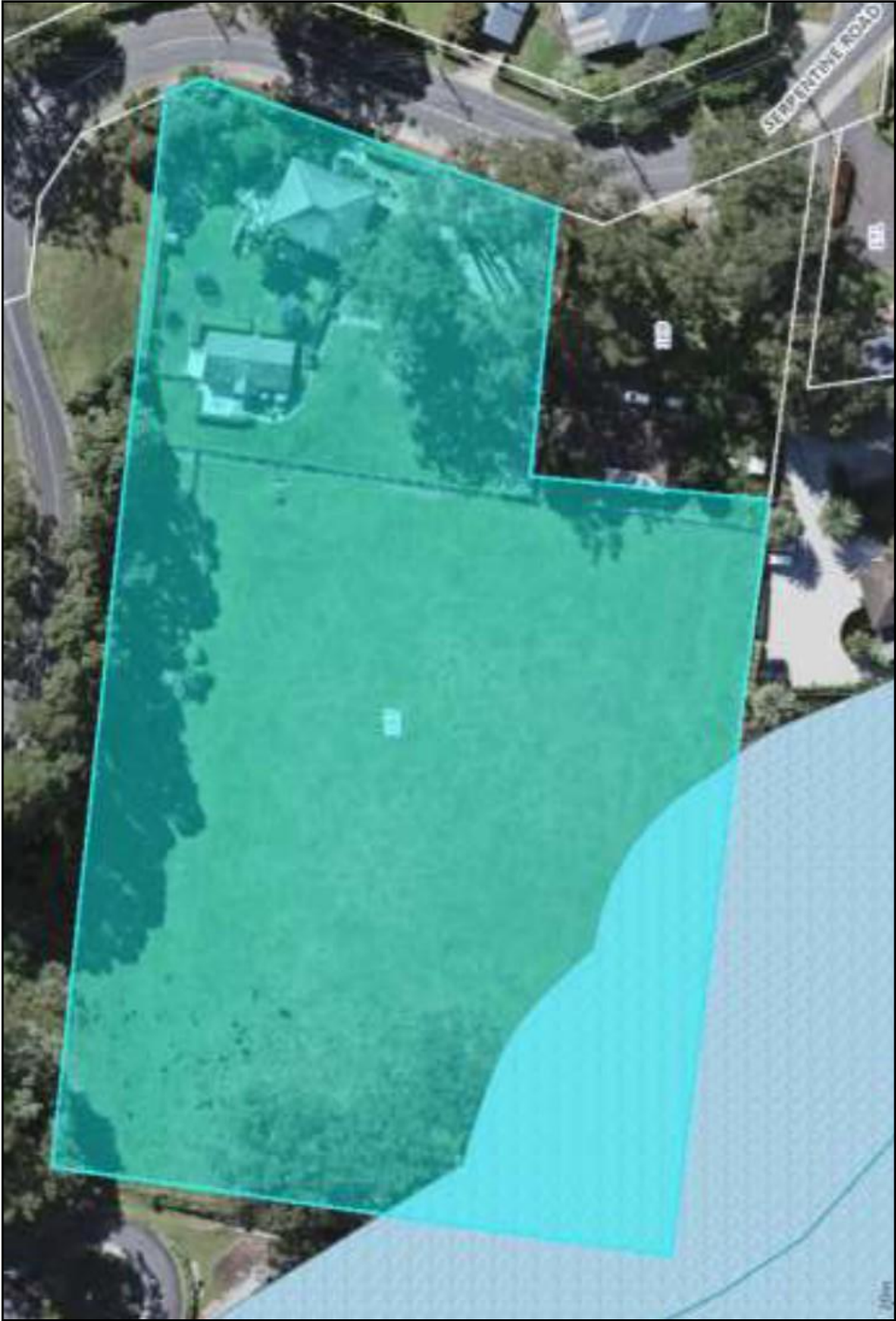
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Wastewater Management Plan

Lot 2 in DP746654
167 Serpentine Road Terrigal
Industry Example Sub-Surface Drip Irrigation System

Scale: As shown

FIGURE 9



Wastewater Management Plan		Scale: As shown
<i>Larry Cook Consulting</i> PO Box 8146 Tumbi Umbi NSW 2261 Ph 02 4340 1114	Lot 2 in DP746654 167 Serpentine Road Terrigal 40m Buffer Setback from South-Western Drainage	
FIGURE 10		