ON-SITE WASTEWATER MANAGEMENT FEASIBILITY ASSESSMENT

Proposed Restaurant, Artisan food and drink and artisan sales area

Lots 7 and 8 DP 8385
103 Yagers Lane, Skinners Shoot

For:	M. Schrieber
Report no:	21421_WW_REVB
Date:	January 2024

Greg Alderson Associates

Greg Alderson Associates

Contact Information

43 Main St
Clunes NSW 2480

Telephone: 02 6629 1552

office@aldersonassociates.com.au
www.aldersonassociates.com.au

Document Information

Project name	Restaurant, Artisan food and drink industry and artisan sales area
Reference	21421_WW_REVB
Revision summary	B – changes to plans by architect

TABLE OF CONTENTS

ATTACHMENTS

Exhibit No 1 - Site Location

Exhibit No 2 - Feasible OSMS layout

1. INTRODUCTION

Greg Alderson and Associates have been commissioned by M Schrieber to provide an On-Site Wastewater Management feasibility assessment to accompany a Development Application for the proposed restaurant, artisan food and drink industry and artisan sales area at Lots 7 and 8 DP 8385, 103 Yagers Lane, Skinners Shoot.

The following report provides information in regards to the site characteristics and the proposed feasibility of an On-site Sewage Management System (OSMS) to manage wastewater generated from the proposed development.

Development consent is sought for a proposal to adaptively reuse part of a former piggery building for the purpose of a Restaurant and construct new buildings to be utilised as both an Artisan Food and Drink Industry and Roadside Stall. The application is inclusive of internal and external building works, carparking, earthworks, landscaping, waste water disposal and vegetation management works.

It is proposed that on approval of the development application that the s68 application will be lodged prior to the release of the construction certificate which will provide more detail of the subsurface irrigation design and pumping requirements, which has not been done at this feasibility stage.

1.1. Proposed On-Site Wastewater Management System

There will be two wastewater streams from the site that is proposed to be treated and disposed of in the described OSMS, being:

- Artisan food and drink industry which includes a café and commercial kitchen;
- Proposed restaurant

These two wastewater streams will be managed within the separate treatment systems and a combined disposal system consisting of subsurface irrigation. Exhibit No. 2 presents a site plan showing the location of the proposed development components.

1.1.1. Proposed Restaurant

The proposed restaurant is within a former piggery building, which will be modified to allow for a fine dining experience, operated on a reservation only basis. The premises will be strictly 'reservation only'. Bookings will only be accepted at 15 minute intervals to ensure a personal style of greeting guests and catering to the kitchen capacity. There will be no access to the restaurant for the general public on a 'drop-in' basis.

It is understood that the restaurant will have seating for 60. On the days opened for lunch and dinner, it is expected that there will be a number of sittings over the time period.

The proposed restaurant would be open:

Wednesday: 12 noon to 11.00 pm

Thursday: 12 noon to 11.00 pm

Friday: 12 noon to 11.00 pm

Saturday: 12 noon to 11.00 pm

Sunday: 12 noon to 10.00 pm

Wastewater sourced from the cafe is suspected to be high in effluent constituents such as Biochemical Oxygen Demand (BOD), Fats, Oils & Grease (FOG), and nutrients.

1.1.2. Proposed Artisan Food and Drink Industry

A separate building will be constructed on site which will comprise an Artisan Food and Drink Industry, which will manufacture gourmet food products primarily utilising local heirloom and organic produce.

The premises contains a commercial kitchen (comprising production & packing areas) and an associated sales and tasting space in the form of a small 15 seat café. It is intended that customers will be able to sit and 'meet the makers', taste the produce and purchase a collection of food items produced on site.

The proposed café/sales and tastings would be open seven days:

Monday to Sunday: 10 am to 3 pm

The industry will operate 7 days:

Cooking and packing: Monday to Friday 10 am to 4 pm

Packing: Saturday and Sunday 10 am to 12 pm

1.1.3. Artisan sales area

The stall will not generate any wastewater and will just sell flowers and vegetables grown at the site.

1.1.4. Proposed Farm Building

A farm building is proposed at the north eastern end of the carpark. The building is intended to be used for the storage of materials and equipment associated with the vegetable and flower beds on site. This building will have a GFA of 113m^2 including a staff WC.

2. SITE DESCRIPTION

Staff of this office investigated the subject property. The site consists of two allotments, being lot 7, which is vacant with the exception of a large dam. This lot is relatively flat with a slight gradient to the drainage line

below the dam to the east. Lot 8, which is to the south of Lot 7 contains numerous structures, including a former piggery and approved nursery.

Figure 1: Existing site (Metromaps, 2022)

It is proposed that part of the piggery structures will be modified to allow for the proposed restaurant. New driveway access and parking is proposed to service the restaurant. It is proposed that the artisan food and drink industry and artisan sales area will be constructed within the new parking area.

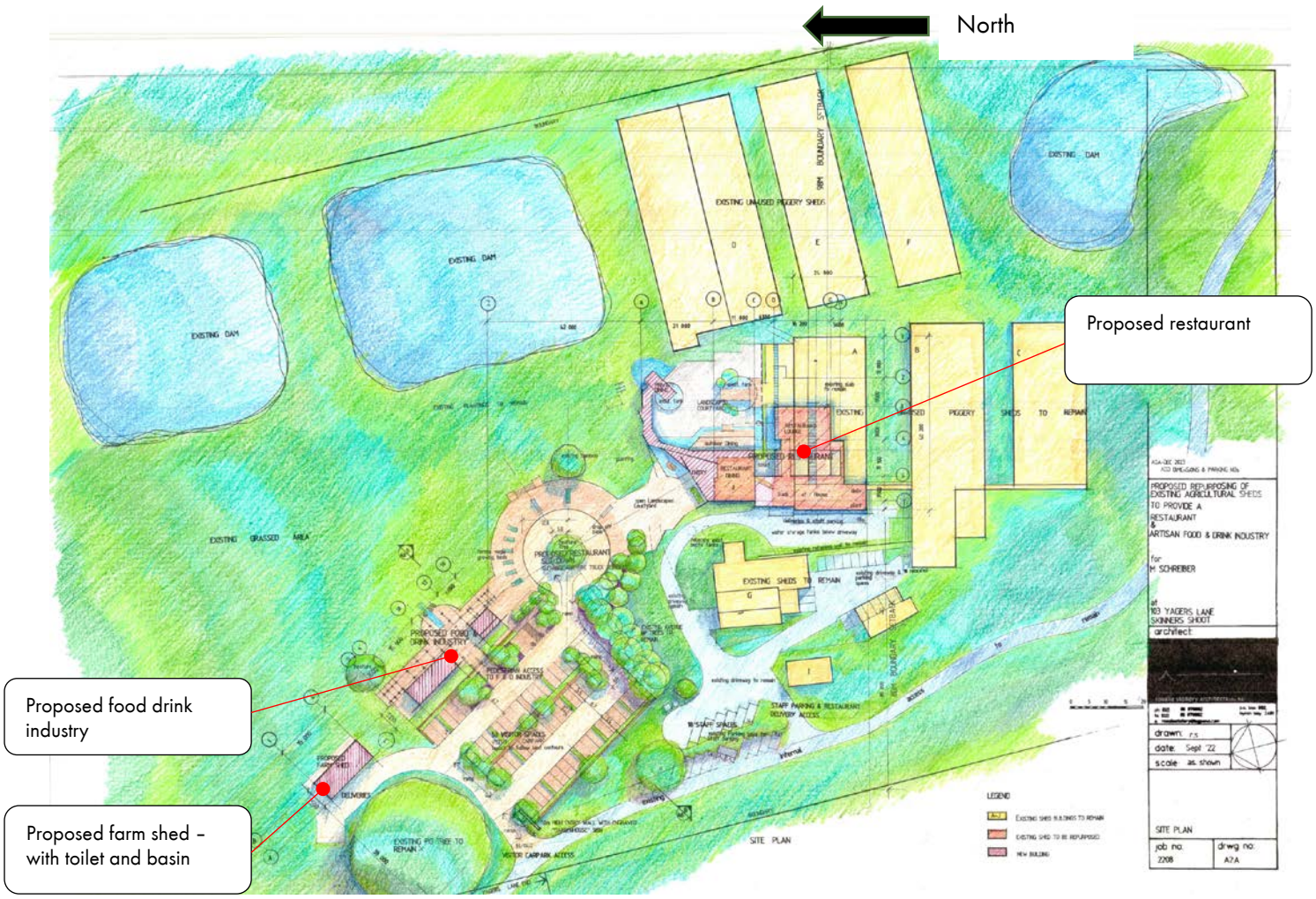


Figure 2: Proposed development (part site plan, Rosie Stollery September 2022)

2.1. Land Area

The land area of the two allotments is about 13.1 ha. The proposed development area is located in the northern area of Lot 8 and the proposed wastewater disposal field is located in the northern section of Lot 7. Currently Lot 7 is grazed by horses and contains a dam and drainage line in the eastern section of the site and is generally unconstrained.

The disposal areas are shown on **Exhibit No. 2**.

2.2. Vegetation

Vegetation across the property consists of grazed paddocks in the proposed disposal field. Vegetation will not be restrictive to the installation of a large OSMS on the site.

2.3. Slope

The topography of the property consists of generally gentle slopes. The proposed disposal area is positioned on a gently sloping area of approximately 10 % with a easterly facing aspect. This slope is not restrictive to the proposed pressurised, subsurface drip irrigation system.

2.4. Soil

Soil at the site consisted of dark grey sandy loams and sand. This was consistent to the extent of the entire borehole. Table 1 below presents a borelog of the soil at the site.

Table 1. Borelog of soil.

	SOIL DESCRIPTION						
Horizon	Depth (mm)	Texture	Structure	Colour	Coarse Fragments	Soil pH	Dispersive Class
	0 100 800	Sandy loam Sand	 Friable throughout	Dark grey Grey	 None throughout	6 – 6.5 (Morand, 1994	Not tested although Morand (1994) states low dispersive class in this soil landscape.

Morand (1994) shows that the soil type of the site is of the 'Bagotville Erosional Landscape' on the Soil Conservation Service 1:100,000 Soil Landscape Map. The soil encountered in the investigation would support this description of soils in the Bagotville Residual Landscape, however the boundary with the Tyagarah Aeolian/Estuarine Landscape is close to the site and there may be some characteristics of this soil landscape at areas of the subject site.

The following is a summary of the description of the Bagotville landscape from Morand (1994, p78).

Soil Landscape: Bagotville Soil Landscape.

Soils: Stony, shallow (<100cm), moderately well-drained Lithosols and Siliceous Sands on conglomerate. Moderately deep (50-100cm) moderately well-drained yellow podzolic soils on slopes. Deep (>100cm) moderately well drained weakly podsolised red/yellow podzolic soils and red earths may occur in association with claystone.

Geology: Bundamba Group: sandstone, siltstone, claystone, conglomerate.

Limitations: Acid, hard setting soils of low fertility with localized stoniness. Steep slopes and localized rock outcrop and mass movement.

Permeability: High for ba1 soil horizon, in which the existing disposal trench sits.

The limitations as outlined in Morand (1994) were not evident in the site assessment. Amelioration of the pH through the addition of lime can improve the conditions for plant growth.

The following is an assessment for the proposed disposal system in accordance with the *Environment and Health Protection Guideline On-site Sewage Management for Single Households* (EPA et al 1998).

Table 1:Soil Assessment for Wastewater Disposal in accordance to EHPG

SOIL FEATURE	COMMENT	LIMITATION RATING		
		Minor	Moderate	Major
DEPTH OF SOIL	Soil depth is estimated to be greater than 2000mm in depth	✓		
DEPTH TO HIGH EPISODIC/ SEASONAL WATERTABLE	The water table was not intersected during borehole tests and no springs or other water discharges were observed. An allowance of 3 m to the watertable was used in order to size the disposal area based on phosphorous movements	✓		
SOIL PERMEABILITY	The soils were sands which have a high permeability	✓		
COARSE FRAGMENTS	No rock fragments or floaters detected in the borehole, only small hailstone	✓		
pH	Soil pH is generally acidic (5.0-5.5), and will require lime to be incorporated into the disposal area.	✓	with addition of lime	
ELECTRICAL CONDUCTIVITY (dS/m)	Morand (1994) states that the Bagotville soil landscape has a 'very low' electrical conductivity, there was no evidence of vegetation being affected by salt	✓		

PHOSPHOROUS SORPTION (kg/ha)	Morand (1994) states that the Bagotville soil landscape has a 'Low' phosphorous sorption rate. The Byron Shire Council Design model categorises the Bagotville soil landscape as having a soil sorption capacity of 8000kg/ha/m.	✓
MODIFIED EMERSON AGGREGATE TEST	Morand (1994) states that the Bagotville soil landscape has a very low dispersive percentage, there were no signs of dispersiveness when soil at site was examined	✓

Overall EPA *et. al.* (1998) would class the soil as being a minor limitation for disposal of wastewater.

2.4.1. Improvements to Soil

Increased acidity affects cation exchange capacity and can lead to deficiencies in calcium and magnesium while mobilising aluminium, which is toxic to plant growth. Lime can be added to the soil profile when preparing the area for disposal to increase the pH to a range between 6.5 – 8.5, which will enable plants to take up nutrients, which will be within the wastewater.

Gypsum will be added to the soil on an annual basis at the rate of 0.5 tonne/hectare to prevent the soil from degrading from sodium application, which is contained in the wastewater.

2.5. Environment and Health Risk Assessment

The following (Table 2) is an environment and health risk assessment in accordance with the policy for *Design Guidelines for On-Site Sewage Management Systems* Byron Shire Council (December, 2004).

Table 2: Environment and Health Risk Assessment for Proposed Disposal Area

	LIMITATION		
SITE FEATURE	NONE	MAJOR	REASONING
FLOOD POTENTIAL	✓		The land of the proposed disposal areas is not subject to flooding.
SOIL TYPE	✓		Light clays which have adequate permeability
EXPOSURE	✓		Exposure to sun and wind is good.
SLOPE %	✓		Slope is 10% which is not restrictive to subsurface irrigation
LANDFORM	✓		The proposed disposal field is concave gentle gradient more than 40 from the drainage line
EROSION POTENTIAL	✓		No signs of erosion present in disposal areas.
SUBSOIL DRAINAGE	✓		No visible signs of subsoil dampness in the proposed disposal area.
SURFACE DRAINAGE	✓		Catch drains can be installed and stormwater runoff can be diverted from the disposal area.
LAND FILLING	✓		No fill observed in the proposed disposal area.
LAND AVAILABLE FOR APPLICATION AREA AND BUFFERS	✓		There is in excess of 2000m^2 available, which is suitable for on-site wastewater treatment and disposal.
ROCKS AND ROCK OUTCROPS	✓		None observed in disposal area.
TREATMENT SYSTEM	✓		Septic tanks for kitchen waste (to act as a large grease trap to reduce BOD and AWTS for Secondary Treatment
BUFFERS	✓		All buffers are achieved

2.6. Site Constraints and Proposed Best Practice

Tables 1 & 2 presented site constraints that may occur following the BSC Design Guidelines for On-Site Sewage Management Policy (2004) and the Environment and Health Protection Guideline On-site Sewage Management for Single Households (EPA *et.* al, 1998). It can be seen that the site is generally not restrictive to wastewater treatment and disposal according to these tables.

3. WASTEWATER CHARACTERISATION

The 'strength' of the wastewater will vary from the wastewater generating proposed development on the subject site. Wastewater from the restaurant and cafe will most likely have high BOD, nutrients and fats, oils and grease (FOG), and therefore particular consideration will need to be taken for these constituents. BOD is of most concern from such a development when considering on-site treatment and disposal, as poor management of high BOD loads will lead to odour issues and biofilm build up in irrigation lines and can cause issues with the function of the Aerated Wastewater Treatment Systems.

A description of the expected wastewater characteristics and constituents are given in the following sections.

3.1. Predicted Hydraulic Loading

Predicted hydraulic loadings are based on occupancy information provided and in accordance with AS 1547-2012. Table 3 presents the calculated water volumes from the various development components present on the subject site.

Table 3: Hydraulic volumes estimated from the development on the site.

Source	No. of People	Loading per person (L/day)	Meals per day and Turn over	Loading per source (L/day)
Restaurant - patrons	45	30[2]	2 meals, 2 sittings	5400
Restaurant - staff	10	30[2]		300
Artisan food and drink Café - patrons	15	30[2]	2 meals, 3 sittings	2700
Artisan food and drink Commercial kitchen			-	1000
Restaurant - staff	10	30		300
Farm shed*	-	-		-
		Total		**9550**

[1] based on typical wastewater design flows for restaurant AS1547-2012,

[2] based on Byron Shire Council's On-site wastewater management strategy (2004) for reticulated water with standard water

*Assumed same staff would use facilities in artisan food and drink area if farm shed was not provided

3.2. BOD Loading

It is expected that wastewater BOD concentrations between the restaurant and cafe and other components of the proposed development will be significantly different.

It is estimated that the BOD generated from the proposed restaurant and café will be in the order of 1800 mg/L based on previous assessments. With best practice, this figure would be conservative for the design.

3.3. Predicted Nutrient Loading

Nitrogen & Phosphorus are the nutrients of main concern when treating and disposing of wastewater on-site (Crites & Tchobanoglous, 1998). The predicted loadings of these two nutrients from the existing and proposed development on the subject site is discussed in the sections below.

3.3.1. Total Nitrogen

Total Nitrogen (TN) calculations for the subject site are based on both published loading figures for domestic sources and this offices experience for concentrations from commercial sources.

A figure of 120 mg/L is used based on this offices experience with other restaurants in the Byron Shire. As the figure is an annual loading, rather than a daily loading, an actual load over the year has been used, rather than a peak daily load like the hydraulic load.

Table 4: TN loadings per source.

Source	L/day	Days open	Occupancy rate	Kg/year
Restaurant	5700	5	80%	143
Artisan food and drink - cafe	2850	7	80%	99.9
Artisan food and drink Café - kitchen	1000	5	100%	31.3
	Total			**274**

3.3.2. Total Phosphorus

Total Phosphorus (TP) calculations for the subject site are based on both published loading figures for domestic sources and this offices experience for concentrations from commercial sources.

A figure of 20 mg/L is used based on this offices experience with other restaurants in the Byron Shire. As the figure is an annual loading, rather than a daily loading, an actual load over the year has been used, rather than a peak daily load like the hydraulic load.

Table 5: Estimated TP loading from the development on the site.

Source	L/day	Days open	Occupancy rate	Kg/year
Restaurant	5700	5	80%	23.8
Artisan food and drink - cafe	2850	7	80%	16.6
Artisan food and drink Café - kitchen	1000	5	100%	5.2
	Total			**45.6**

3.4. Additional wastewater characteristics of concern

In this offices experience wastewater generated from restaurants or cafes can have high concentrations of Fats, Oils and Grease (FOG). From this offices experience in FOG concentrations from other restaurant/commercial kitchens in Byron Shire it is expected that a FOG concentration of 250mg/L should be designed for in the OSMS. Grease traps and septic tanks are sized to provide adequate FOG removal.

4. DESIGN OF ON-SITE WASTEWATER MANAGEMENT SYSTEM

This Section describes an OSMS design that would be feasible for treating and disposing of wastewater generated at the site. It is proposed that septic tanks & Aerated Wastewater Treatment Systems (AWTS's) could be utilised for providing treatment of wastewater generated on the site. It is also proposed that a SubSurface Irrigation (SSI) field could be installed to dispose of all wastewater generated from the site.

4.1. Septic Tank/Grease Trap Capacities for Restaurant and Artisan Food and Drink

4.1.1. Septic Tanks

The kitchens of the restaurant and the artisan food and drink industry will generate high volumes of BOD, greater than what the Aerated Wastewater Treatment Systems can cope with. Therefore, it is proposed that a series of septic tanks be used in order to reduce the BOD loading, to allow for a suitable BOD load to enter the AWTS'. It is proposed that commercial AWTS by Taylex be utilised, which are able to treat 2300 g of BOD per day.

The proposed wastewater loading for the restaurant is in the order of 5700 L/day, however it is estimated the loading from the kitchen will be in the order of 60 %, therefore 7695 g/day. In order to reduce the BOD from the kitchen, it is proposed to use a series of septic tanks, instead of grease traps, which allows for a higher retention rate of oils and greases. From this offices experience, a septic tank providing a one day retention reduces BOD in wastewater by 25%. This reduction is considered conservative compared to the reductions stated in other literature such as that in Crites & Tchobanoglous (1998).

Septic tank volumes are sized using a conservative 25% BOD reduction value with a one day retention time. Therefore, allowing for a reduction of 25% of BOD will require three x 7000 L septic tanks to reduce the BOD to below 1800 g/day, which achieves 6 day retention for the kitchen wastewater (which assumes kitchen wastewater is 60 % of the total load of 5700 L/day).

Similarly the loading from the artisan food and drink industry requires two x 7000 L septic tanks prior to the commercial AWTS due to the commercial kitchen.

It is also proposed that an outlet filter should be installed in the first septic tank to further improve septic tank performance.

It is considered that the use of the septic tanks will replace the requirement of grease traps and the continual pump out requirements of grease traps. These will also reduce BOD prior to the septic tanks.

Therefore, it is considered that the installation of three septic tanks is a simple and robust method for reducing BOD to under 300mg/L for the subject development.

A comparison was also made to the septic tank capacity by Crites & Tchobanoglous (2008), based on a three year pump out interval for the proposed restaurant. The equation is as follows:

For a three year pump out interval = 2.8*average flow*peak factor

= 2.8*3420L*1.5 (assume)

= 14364 L

4.2. Aerated Wastewater Treatment System

It is considered that commercial Taylex ABS AWTS's are suitable for providing secondary treatment for wastewater generated from the subject site. This is possible as the septic tanks have been sized to reduce BOD, FOG and Total Suspended Solids (TSS) to a level reflecting that of wastewater that these systems can handle. Each Taylex ABS is capable of treating 5000L/day.

It is proposed that two commercial Taylex AWTS will be used for the proposed restaurant, and this will be managed with the use of a balanced tank. A separate commercial Taylex AWTS would be utilised at the artisan food and drink.

The septic tanks servicing the wastewater from the kitchen of the restaurant will flow to the balance tank and then the commercial AWTS. The balance tank will also receive wastewater from the remainder of the restaurant development. The balance tank will evenly spread the wastewater load over a 24 hour period, rather than a large dose when the restaurant is operating, and therefore will allow the AWTS to work more efficiently. The Two commercial AWTS can treat 5000 L/day, which is above the estimated loading of 5700 L/day. Following treatment in the AWTS, the treated wastewater will be pumped to a pump well of 10000 L and transferred to the irrigation tank below the treatment system of the artisan food and drink. A combined irrigation tank will be used for the wastewater from the two areas.

The artisan food and drink will be serviced by two septic tanks connected to the kitchens, which are then connected to a Taylex commercial AWTS which also treats wastewater from the other fixtures from the artisan food and drink industry. Following treatment, the wastewater will be pumped to the combined irrigation tank for transfer to the subsurface irrigation area for disposal.

4.3. Collection Well Capacities

Collection wells will be required to transfer effluent on the site, one being after the treatment system of the commercial AWTS servicing the restaurant and the irrigation tank which collects all treated wastewater and pumps to the subsurface irrigation area.

The sizing of these collection wells is in accordance with the requirements in *Septic Tank & Collection Well Accreditation Guideline* (NSW Health, 2016). The formula given in this guideline for tank sizing using a single pump configuration is:

Daily flow x No. of people x 2 = tank capacity (minimum 2050L)

The collection well at the restaurant will be required to be 5700 L x 2 = 11,400 L

The irrigation tank for the development will be required to be 9550 L x 2 = 19,000 L

4.4. Design of Subsurface Disposal Area

A detailed irrigation design is required to be submitted with the s68 which presents:

- Dripper line spacing,
- Emitter spacing,
- Pipe sizes (delivery main and submains),
- Pump duties for all pumps,
- Dosages, irrigation time and number of blocks.

4.5. Disposal Area Required

This section investigates the disposal area required based on the predicted hydraulic and nutrient loadings from the entire site, and environmental factors which influence the design. In order to ascertain the size of the disposal area, the model within the Byron Shire Council Design Guidelines for On-site Sewage Management for Single Households was used (referred to as 'the model') with the hydraulic and nutrient parameters calculated in this report used in the modelling. The following parameters were inserted into the model for calculating the disposal area:

- 1 person (hydraulic and nutrient values adjusted to match proposed loadings);
- Land area of 131000 m^2
- 9550 L peak daily loading;
- 274 kg/TN/year;
- 45.6 kg/TP/year;
- 54% Nitrogen reduction with the use of the commercial Taylex ABS AWTS';
- 3 m depth to water table;
- Sandy loams – weak structured;
- Duplex soils;
- Level bed with grass – conservative rate

- SSI land application.

The disposal area required for the hydraulic and nutrient loadings is as follows:

Area Required for	Hydraulics:	1865 m^2
	Nitrogen:	**4651 m^2**
	Phosphorus:	939 m^2

Therefore, the disposal area will be required to be 4651 m^2, which is proposed to be subsurface irrigation.

A copy of the Design model is attached to this report. Exhibit No. 2 shows the proposed location of the SSI field.

5. EXISTING WASTEWATER SYSTEM

There is an existing wastewater management system servicing the existing building to the west of the proposed restaurant. This system, comprises two treatment tanks and a subsurface irrigation area, approved under 70.2007.1063 for amenities and staff facilities. There is a proposed service road to the west of the proposed restaurant which will require these tanks to be relocated.

It is proposed that the existing treatment tanks be repositioned to allow for gravity fall from the existing building and then re-connect the treatment tanks to the existing, approved subsurface irrigation area to the west. If the tanks are proposed to be replaced with new treatment tanks in-lieu of being repositioned, then this will be detailed in the s68 application.

The existing subsurface irrigation area is 600 m^2 and the existing area will be decommissioned and removed (as the proposed car parking will be in this area). It is proposed that this surface area, as approved under 70.2007.1063.1 will then be applied to the proposed disposal field servicing the restaurant and artisan food and drink café.

The total disposal field therefore will be 4651 m^2 plus 600 m^2, being 5251 m^2.

6. MAINTENANCE PLANS

The following is a maintenance check list to be undertaken by the client for all of the wastewater management systems for the site. It is recognised that the site will be used for visitors, therefore it is encouraged that signage is place in the toilet and/or made available to inform guests not to flush foreign objects down toilets.

6.1. General

- Bleach, bleach-based products, whiteners, nappy soakers and spot removers shall not be disposed of into the on-site system. They shall be disposed of on a disused area of a garden, well away from the disposal area.
- Wipes are not to be flushed down the toilet, as these will cause blockages, and must be disposed of into garbage bins in sealed plastic bags.

- Hygiene products, condoms, tampons, sanitary napkins, disposable nappies and cotton buds are not to be disposed of via the on-site disposal system. They should be disposed of into garbage bins in sealed plastic bags.
- Only the recommended amounts of disinfectants should be used. Biodegradable products for septic systems are recommended.

6.2. AWTS

The following maintenance requirements are listed in Council's On-site Sewage & Wastewater Management Strategy (2013).

'Regular servicing and maintenance is required, commonly on a quarterly basis. The owner therefore must enter a service contract with a service agent.

A copy of the service report is forwarded to Council within 7 days from the date of service.

At each service, the treatment system and effluent disposal system should be checked, including:

- all pumps;
- the air blower, fan or air venturi:
- the alarm system:
- the operation of the sludge return system, where installed:
- pH from a sample taken from the irrigation chamber;
- check on sludge accumulation in the septic tank (primary treatment chamber) and the clarifier
- where appropriate;
- a thorough inspection & testing (if appropriate) of the effluent disposal field and all fixtures to
- ensure operation is in accordance with the approved design; and
- a sludge bulking test is required annually if activated sludge or contact aeration is used.

6.3. Septic Tanks

The septic tanks at the restaurant and artisan food and drink industry are to be regularly checked and are to be pumped out by a licensed septic pumping company. It is recommended that pump out occurs every 2 months for the first septic tank servicing both developments, and annual pump out for all of the septic tanks.

6.4. Balance Tank and Pump Wells

The balance tank and pump wells are to be checked to ensure that the pumps are working and no sludge has carried over into the system.

6.5. Irrigation Area

The subsurface irrigation system is designed in a manner that will allow the system to be maintained and repaired quickly if part of the system happens to fail.

- Run-off diversion banks to be inspected annually and maintenance as required undertaken to ensure that surface runoff is diverted around each of the disposal areas;
- No vehicular, stock or regular pedestrian access should be made across the disposal field.
- Regular soil tests are to be taken in the irrigation area and corrective measures taken as necessary;
- Vegetation will be harvested frequently;
- Any vegetation which shades the disposal area to be trimmed as required;
- Plant clippings shall be removed from the site to decrease amount of nutrients returning to the wastewater system;
- Effluent from disposal system should not be discharged to the stormwater system or over the ground;
- The effluent distribution pipes are to be inspected for blockage etc.

Some signs of the disposal system failure are listed below, if any of these occur contact the plumber who installed the system and arrange for immediate pump out of the holding tank to relieve the need for effluent disposal to the subsurface irrigation area.

- Surface ponding and run-off of treated wastewater;
- degradation of soil structure – e.g. sheet and rill erosion, surface crusts, or hard surfaces are evident;
- poor vegetation growth;
- unusual odours.

6.6. Maintenance for dripper lines

Dripper lines should be maintained in accordance with the irrigation designers specifications, this includes cleaning the filter and also flushing the dripper lines.

7. CONCLUSION

An onsite wastewater management feasibility assessment has been undertaken for the proposed restaurant and artisan food and drink industry at Lots 7 and 8 DP 8385, 103 Yagers Lane, Skinners Shoot.

It is proposed that two wastewater treatment systems be installed to service the two developments comprising:

- Restaurant:
  - 3 x 7kL septic tanks to act as a grease trap for the kitchen, to reduce BOD prior to treatment within the AWTS
  - A balance tank and two commercial Taylex AWTS of treatment capacity of 5kL each
  - Collection tank of minimum of 11400 L to be installed to collect treated wastewater and transfer to the irrigation tank
- Artisan Food and Drink:
  - 2 x 7kL septic tanks to act as a grease trap for the kitchen, to reduce BOD prior to treatment within the AWTS
  - One commercial Taylex AWTS of treatment capacity of 5kL
- Rural shed with amenities
  - No additional loading, transfer to artisan food and drink system
- Irrigation tank of minimum of 19,000 L to be installed to collect treated wastewater from artisan food and drink and the restaurant and transfer to the SSI field

- Design based on predicted loading from artisan food and drink industry and the restaurant
- 9550 L/day peak loading
- TN loading of 231 kg/year
- TP Loading of 38.5 kg/year
- Treatment in commercial Taylex AWTS achieving 53 % TN reduction
- Subsurface Irrigation field of 4651 m^2 required,
- S68 application required to be lodged prior to release of the construction certificate that details irrigation layout, pump duties

The existing wastewater management system servicing the staff facilities and amenities (under 70.2007.1063) will be impacted by the proposed development, therefore it is proposed that the following be undertaken:

- Relocate the exiting treatment systems servicing the building to allow for gravity flow from building
- Decommission the existing disposal field
- Pump wastewater to proposed pump well to service restaurant (then connection to combined irrigation tank)
- Additional 600 m2 to be added to proposed disposal field

Combined irrigation area to comprise:

- Subsurface Irrigation field of 4651 m2 + 600 m2 (5250 m2) required
- S68 application required to be lodged prior to release of the construction certificate that details irrigation layout, pump duties

8. REFERENCES

Australian Standard AS 1547 - 2012 *On-Site Domestic-Wastewater Management.*

Byron Shire Council (2004). *Design Guidelines for On-site Sewage Management for Single Households.* Protecting the Environment and Health of Byron Shire. Technical Guidelines for System Designers.

Crites, R. & Tchobanoglous, G. (1998). *Small and Decentralized Wastewater Management Systems*. McGraw-Hill.

Department of Water & Energy (2009). *Liquid Trade Waste Regulation Guidelines*. NSW Government, Sydney.

Environment Protection Authority, Dept. of Local Government, Department of Land & Water Conservation and NSW Department of Health (1998). *Environment and Health Protection Guidelines - On-Site Sewage Management Systems for Single Households*.

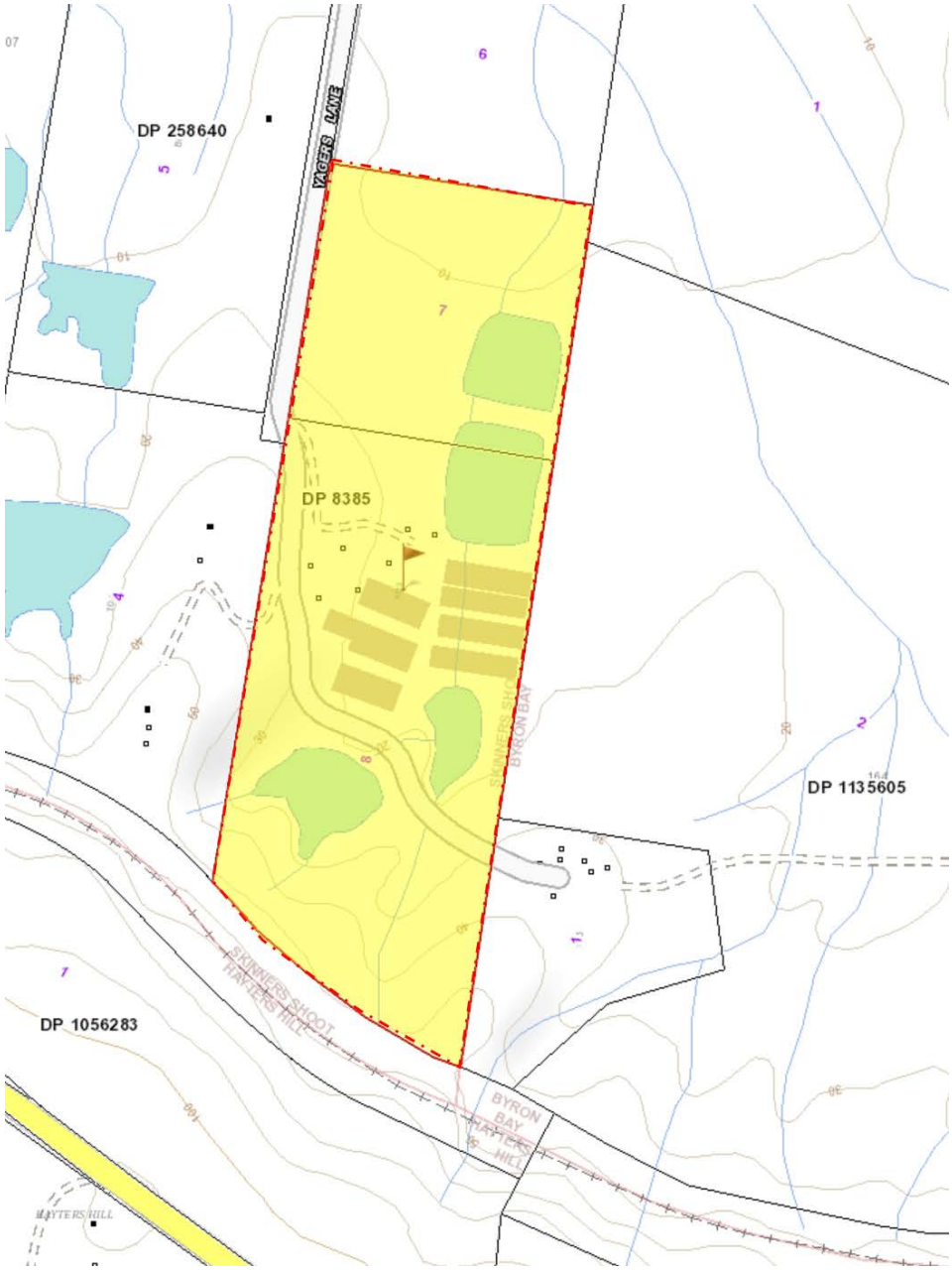
Morand, D.T. (1994). *Soil Landscapes of the Lismore-Ballina 1:100,000 Sheet* Report, Soil Conservation Service of NSW, Sydney.

NSW Health Department (2016). *Septic Tank & Collection Well Accreditation Guideline*. NSW Government, Sydney.

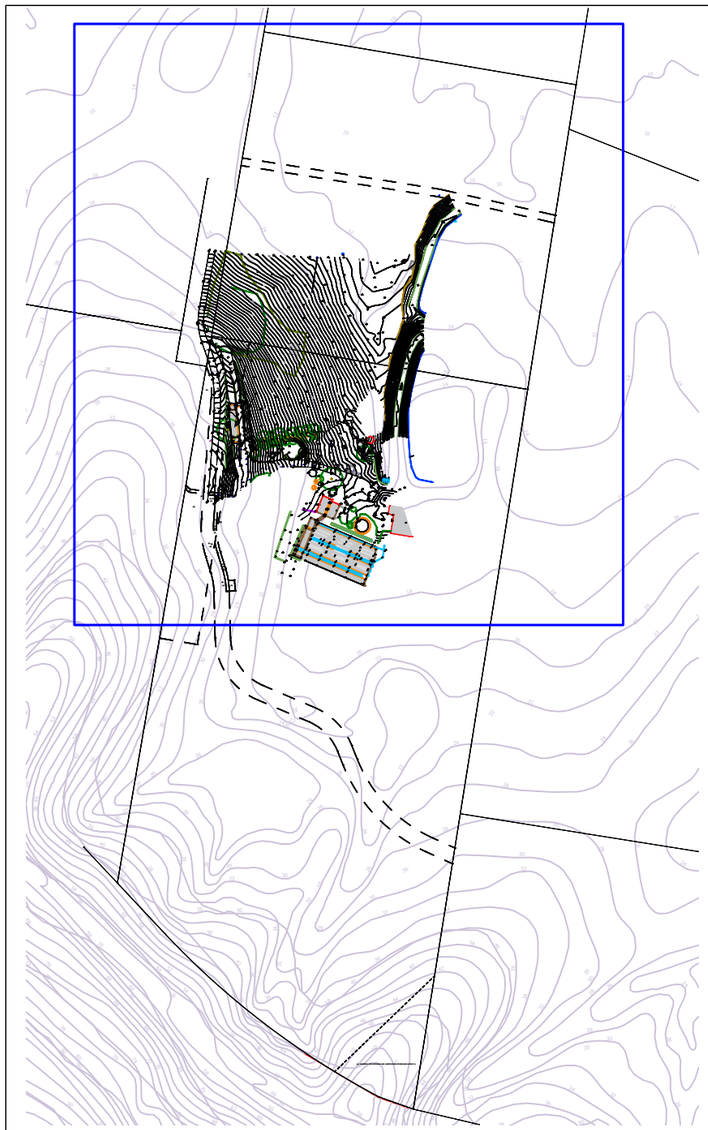
End of Report

Greg Alderson & Associates

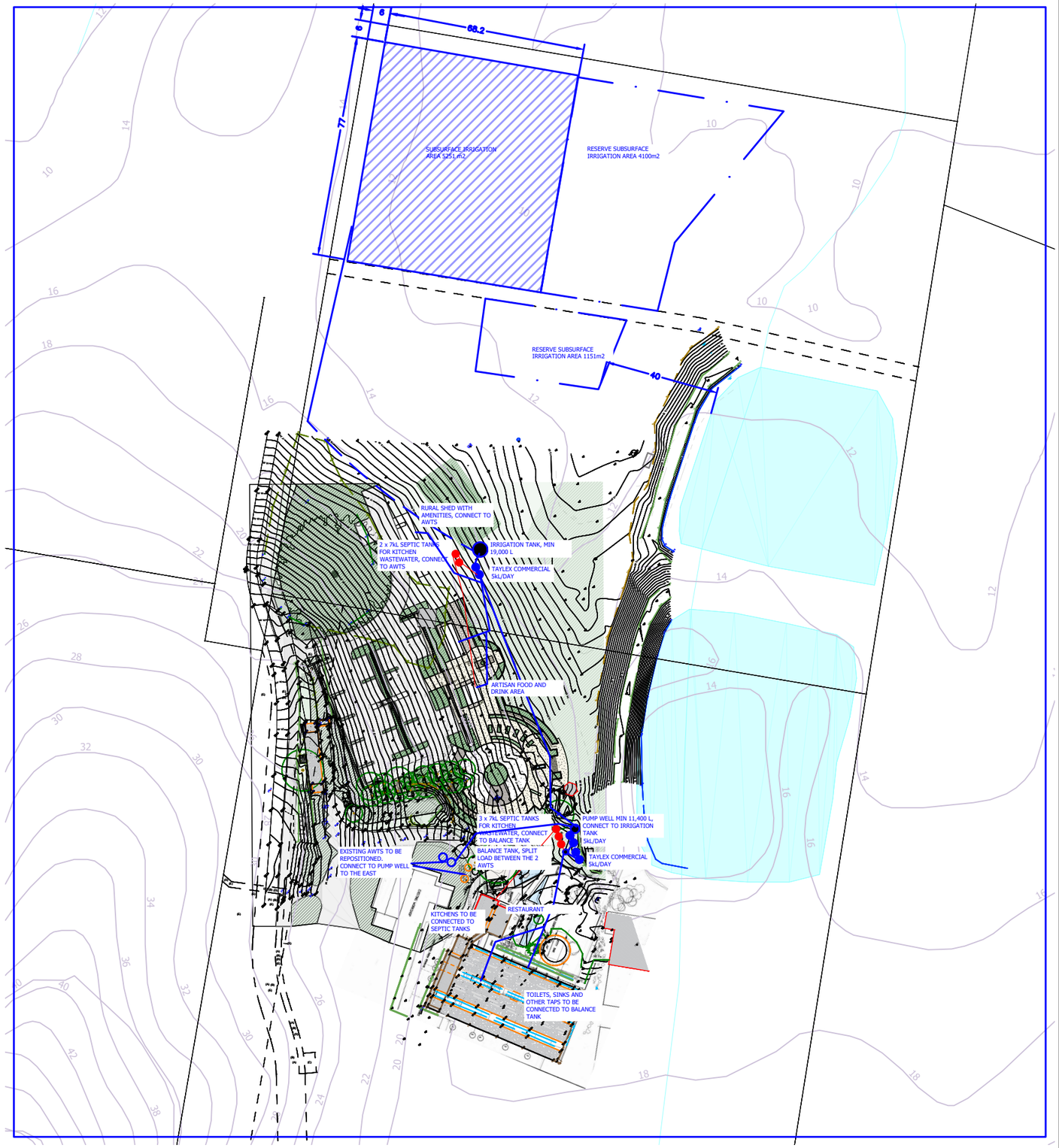
Chartered Professional Engineers



Source: NSW LPI Spatial Information Exchange (2018) Date Project No. 21421_WW_REVA.docx Scale: NTS	**GREG ALDERSON AND ASSOCIATES** **ABN 58 594 160 789** 43 Main Street, Clunes NSW 2480 Phone: (02) 6629 1552 Email: office@aldersonassociates.com.au	**Exhibit No. 1.** **SITE LOCATION** Lot 7 and 8 DP 8385 Yagers Lane, Skinners Shoot



SUBJECT SITE 1:4000



Wastewater Notes:

- Feasibility of wastewater management for the proposed restaurant and artisan food and drinks;
- S68 to be lodged with CC on approval of the DA, to provide irrigation details, pump duty and pipe sizes
- Design based on 60 seats in the restaurant, open for 3.5 days and artisan food and drink with a cafe open 7 days and commercial kitchen 5 days;
- estimated peak hydraulic loading 9550 L/day

restaurant:

- install 3 x 7kL septic tanks as a grease arrestor for the proposed kitchen
- install balance tank and 2 x commercial Taylex AWTS for the treatment of wastewater from the remainder of the development and after the septic tanks
- Collect treated wastewater in minimum 11,400 L pump well and transfer treated wastewater to irrigation tank

Artisan food and drink

- install 2 x 7kL septic tanks as a grease arrestor for the proposed kitchen
- install a commercial Taylex AWTS for the treatment of wastewater from the remainder of the development and after the septic tanks
- Collect treated wastewater in minimum 19,000 L irrigation tank
- Pump from irrigation tank to subsurface irrigation area of 5251 m2 being 4651 m2 for proposed restaurant and artisan food and drink and cafe plus the approved 600 m2 under s68 70.2007.1063

Rural farm shed

- wastewater to flow to AWTS servicing artisan food and drink

Existing Wastewater System for Staff and Amenities

Under s68 70.2007.1063. New S68 to be lodged to relocate existing tanks, to allow for gravity fall and discoonect to the existing disposal field. Connect to proposed pump well servicing restaurant.

No works to be undertaken until s68 approval is obtained for all works

Z:\JOBS\21\21421 - Maggie Schreiber - 103 Yagers Lane, Skinners Shoot\ENVIRONMENTAL\WASTEWATER\restaurant\21421_wwresplan_VER_B.dwg

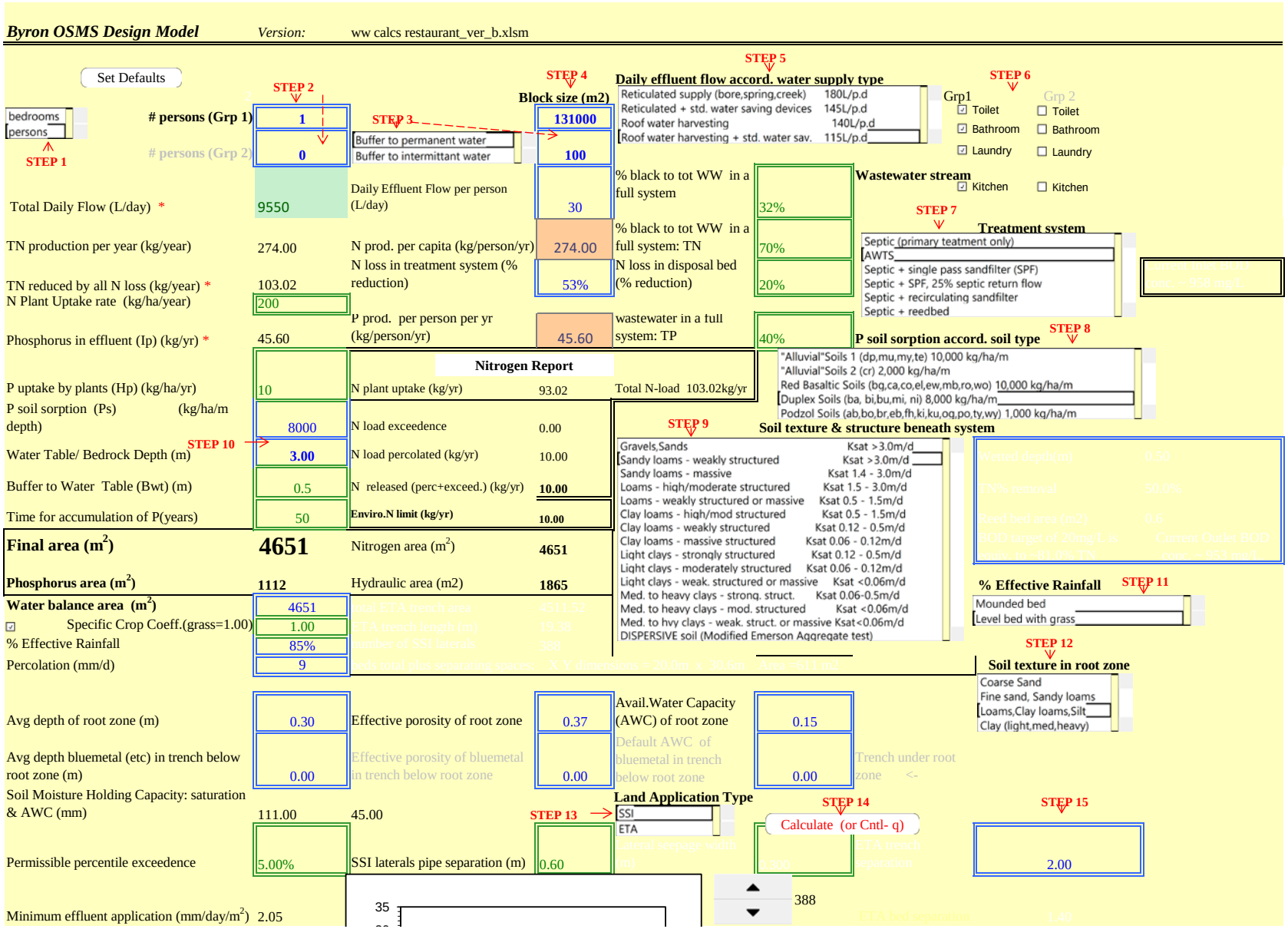
Greg Alderson Associates
43 Main Street, CLUNES NSW 2480
PO Box 12344, CLUNES NSW 2480
P:(02) 6629 1552 E:office@aldersonassociates.com.au
W:aldersonassociates.com.au ABN 58 594 160 789

Client: M. Schrieber

Site address: Lot 8 DP 8385, 103 Yagers Lane, Skinners Shoot

PROPOSED ON-SITE WASTEWATER MANAGEMENT SYSTEM

Drawn:	Source:	EXHIBIT NO: 2	Date:
WA	LIDAR, METROMAPS, R. STOLERY (JUNE 22), TERRASCHEMA 4/9/22		16-1-24
Scale: 1:1600	Original Size: A3	Project: PROPOSED RESTAURANT	Revision: B
Job Number: 21421			


Byron OSMS Design Model
Version: ww calcs restaurant_ver_b.xlsm
Set Defaults
STEP 1
STEP 2
STEP 3
STEP 4
STEP 5
STEP 6
STEP 7
STEP 8
STEP 9
STEP 10
STEP 11
STEP 12
STEP 13
STEP 14
STEP 15
bedrooms
persons
persons (Grp 1)
persons (Grp 2)
Block size (m2)
Buffer to permanent water
Buffer to intermittant water
Daily effluent flow accord. water supply type
Reticulated supply (bore,spring,creek) 180L/p.d
Reticulated + std. water saving devices 145L/p.d
Roof water harvesting 140L/p.d
Roof water harvesting + std. water sav. 115L/p.d
Grp1
Grp 2
Toilet
Bathroom
Laundry
Kitchen
Wastewater stream
Total Daily Flow (L/day) *
Daily Effluent Flow per person (L/day)
% black to tot WW in a full system
TN production per year (kg/year)
N prod. per capita (kg/person/yr)
% black to tot WW in a full system: TN
TN reduced by all N loss (kg/year) *
N loss in treatment system (% reduction)
N loss in disposal bed (% reduction)
N Plant Uptake rate (kg/ha/year)
Treatment system
Septic (primary teatment only)
AWTS
Septic + single pass sandfilter (SPF)
Septic + SPF, 25% septic return flow
Septic + recirculating sandfilter
Septic + reedbed
Phosphorus in effluent (Ip) (kg/yr) *
P prod. per person per yr (kg/person/yr)
wastewater in a full system: TP
P soil sorption accord. soil type
"Alluvial"Soils 1 (dp,mu,my,te) 10,000 kg/ha/m
"Alluvial"Soils 2 (cr) 2,000 kg/ha/m
Red Basaltic Soils (bq,ca,co,el,ew,mb,ro,wo) 10,000 kg/ha/m
Duplex Soils (ba, bi,bu,mi, ni) 8,000 kg/ha/m
Podzol Soils (ab,bo,br,eb,fh,ki,ku,oq,po,ty,wy) 1,000 kg/ha/m
Nitrogen Report
P uptake by plants (Hp) (kg/ha/yr)
N plant uptake (kg/yr)
Total N-load 103.02kg/yr
P soil sorption (Ps) (kg/ha/m depth)
N load exceedence
Soil texture & structure beneath system
Water Table/ Bedrock Depth (m)
N load percolated (kg/yr)
Buffer to Water Table (Bwt) (m)
N released (perc+exceed.) (kg/yr)
Time for accumulation of P(years)
Enviro.N limit (kg/yr)
Gravels,Sands Ksat >3.0m/d
Sandy loams - weakly structured Ksat >3.0m/d
Sandy loams - massive Ksat 1.4 - 3.0m/d
Loams - high/moderate structured Ksat 1.5 - 3.0m/d
Loams - weakly structured or massive Ksat 0.5 - 1.5m/d
Clay loams - high/mod structured Ksat 0.5 - 1.5m/d
Clay loams - weakly structured Ksat 0.12 - 0.5m/d
Clay loams - massive structured Ksat 0.06 - 0.12m/d
Light clays - strongly structured Ksat 0.12 - 0.5m/d
Light clays - moderately structured Ksat 0.06 - 0.12m/d
Light clays - weak. structured or massive Ksat <0.06m/d
Med. to heavy clays - strong. struct. Ksat 0.06-0.5m/d
Med. to heavy clays - mod. structured Ksat <0.06m/d
Med. to hvy clays - weak. struct. or massive Ksat<0.06m/d
DISPERSIVE soil (Modified Emerson Aggregate test)
Final area (m2)
Nitrogen area (m2)
Phosphorus area (m2)
Hydraulic area (m2)
Water balance area (m2)
Specific Crop Coeff.(grass=1.00)
% Effective Rainfall
Percolation (mm/d)
% Effective Rainfall
Mounded bed
Level bed with grass
Soil texture in root zone
Coarse Sand
Fine sand, Sandy loams
Loams,Clay loams,Silt
Clay (light,med,heavy)
Avg depth of root zone (m)
Effective porosity of root zone
Avail.Water Capacity (AWC) of root zone
Avg depth bluemetal (etc) in trench below root zone (m)
Effective porosity of bluemetal in trench below root zone
Default AWC of bluemetal in trench below root zone
Trench under root zone <-
Soil Moisture Holding Capacity: saturation & AWC (mm)
Land Application Type
SSI
ETA
Calculate (or Cntl- q)
Permissible percentile exceedence
SSI laterals pipe separation (m)
Minimum effluent application (mm/day/m2)
35

Greg Alderson Associates

Greg Alderson and Associates

ABN 58 594 160 789

43 Main Street

Clunes NSW 2480

T: 02 6629 1552

office@aldersonassociates.com.au

Civil Engineering

Roads
Driveways
Stormwater
Flooding
Traffic
Earthworks

Structural Engineering

New Structures
Additions and Alterations
including:
Foundations
Wind Bracing & Tie Down
Framing
Retaining Walls
House Plan Drafting
BASIX Certificates

Environmental Assessments

Contaminated Land Assessments
(SEPP 55)
Acoustics & Noise Assessments
Wastewater Management
Acid Sulfate Soil Assessments
Water Quality Assessment