

# Onsite Wastewater Report

**Client:**  
S. Coleman

**Located at:**  
140 Bells Road, Fairhall, Marlborough

**Date:** 17 May 2017

**Ref:** 0514

## Contents

---

1. Executive Summary.....	2
2. Introduction .....	3
3. Site & Soil Evaluation .....	4
4. System Design .....	4
5. Alternative Systems .....	5
6. Assessment of Environmental Effects.....	5
7. Recommendations / Conclusions.....	7
8. Limitations.....	7
9. References .....	7

Appendix A – Site Plan & Field Details

Appendix B – Wastewater Design Calculations

Appendix C – Soil Properties

Appendix D – Loading Certificate

Appendix E – Setback Distance Assessment

## 1. Executive Summary

---

- 1.1. Stephen Coleman owns a property at 140 Bells Road in Fairhall, Marlborough.
- 1.2. The existing wastewater system has failed and Mr. Coleman has requested an appraisal of the on-site wastewater management criteria for the existing one bedroom dwelling and future 3 bedroom home. This report has been prepared to present the results of investigations and recommendations for the Onsite Wastewater System.
- 1.3. My assessment has determined the best practical onsite wastewater management system solution for the proposed development should comprise of:
  - Secondary Treatment Unit.
  - Dripper line field, totaling a minimum of 200m<sup>2</sup> area – Stage 1
  - Dripper line field, totaling a minimum of 660m<sup>2</sup> area – Stage 2
- 1.4. Installation is to be in accordance with the requirements and recommendations of AS/NZS 1547:2012.
- 1.5. The recommendations above cannot be taken in isolation and must be read with respect to the balance of this report and the context of the proposed development at the site.

## **2. Introduction**

---

- 2.1. Stephen Coleman owns a property at 140 Bells Road in Fairhall, Marlborough. The existing septic tank and bed wastewater system has failed and requires replacing.
- 2.2. Mr. Coleman has requested an appraisal of the new on-site wastewater management system.
- 2.3. The property is located on the western side of Bells Road in a rural environment.
- 2.4. The property is legally described as Lot 7, D.P.354997 and has an area of approximately 12.1ha.
- 2.5. The site is developed as vineyard with a driveway, stock fencing, small house and shed.
- 2.6. A site walkover and investigations were carried out on 17 May 2017.

### 3. Site & Soil Evaluation

---

- 3.1. Three test holes were dug to various depths in the general area of the proposed field location. The locations of the observations are shown on the site plan provided in Appendix A. The tests were conducted to determine the soil type and soil category.
- 3.2. Based on the soil assessment carried out, an average drainage category of 4 has been adopted. Logs of the representative soil properties are provided in Appendix C. Although a design loading rate for this category soil is 3.5mm/day, due to the soil properties it is recommended this is reduced to 2.0mm/day.
- 3.3. Groundwater was not encountered within the subsurface investigation and it is anticipated groundwater is generally more than 1.0m below ground level but soil mottling indicates that ground water can rise to 600mm below ground level.
- 3.4. The site is exposed to both wind and sun.

### 4. System Design

---

- 4.1. An assessment of the best practical option has determined that secondary treatment unit coupled a dripper line land application is appropriate for the site conditions and constraints.
- 4.2. The secondary treatment system must achieve the following treatment levels:

BOD after 5 days (average)	< 20 g/m <sup>3</sup>
Suspended solids (average)	< 30 g/m <sup>3</sup>
- 4.3. Any system that has been tested and meets the above standard is satisfactory.
- 4.4. Grid power supply is available to the property that will provide power to any blower / pump associated with the treatment unit.
- 4.5. A wastewater design sheet is provided in Appendix B with the design calculation based on the following criteria for the proposed wastewater system.

- 2 person permanent occupancy – STAGE 1
- 8 person permanent occupancy – STAGE 2
- Loading of 400 litres/day (200 litres / person / day) – STAGE 1.
- Loading of 1320 litres/day (165 litres / person / day) – STAGE 2.

- Soil category 4
- Design loading rate of 2.0mm/day
- Standard plumbing fixtures installed– STAGE 1.
- Standard water reduction plumbing fixtures installed – STAGE 2.

4.6. Based on the criteria above, the minimum total area of the application field is 200m<sup>2</sup> for Stage 1 and 660m<sup>2</sup> for Stage 2.

4.7. It is recommended that the field be positioned to the west of the house with in 25m long rows (Stage 1). Details of the application field are shown in Appendix A.

4.8. Vehicular access is available from Bells Road for maintenance and servicing.

## **5. Alternative Systems**

---

5.1. Alternative systems have been considered, the reasons why dismissed are listed below:

5.2. Primary treatment (septic tank) –Not suitable for dripper line (clogging) and considered not a suitable level of treatment given the massive and poor permeability of the soil (the existing field has failed).

5.3. Trenches, Beds, ETS - Considered not a suitable given the massive and poor permeability of the soil.

5.4. Mound Field - Used where there is a limiting layer or high ground water such as this site, but is expensive and requires a large area that would be inaccessible for machinery – reduction of the vineyard require. Considered excessive given alternative, more practical system can be installed.

## **6. Assessment of Environmental Effects**

---

6.1. An onsite wastewater system is required as there is no reticulation in the area.

6.2. Due to the following reasons I do not envisage the wastewater becoming an environmental risk:

- Relatively remote location
- Secondary treatment
- Low application rate

- The environmental buffering capacity of land
- Large property size

- 6.3. The proposed wastewater treatment system generally complies with AS/NZS 1547:2012 and the Council Guidelines.
- 6.4. Public health risks from an underperforming on-site system in this location would come from unlikely contamination of the surface water.
- 6.5. The disposal area has been designed specifically to accommodate wastewater where the soil is of lower permeability.
- 6.6. The dripper lines are to be buried 150mm below the surface. Periodic vehicle traffic over the dripperlines is acceptable.
- 6.7. There are suitable offsets from water courses and water bores. The environmental buffering capacity of land is sufficient to treat the wastewater to a suitable standard to avoid risk to public health. Coliform numbers, the indicators used to measure the various pathogens present in sewage effluent are not considered to be a concern. Bacterial, (and viral etc), numbers are reduced exponentially with passage of effluent through mid-range textured soils. The proposed field assists in the effectiveness of this by reducing the quantity of effluent required to be treated by the soil in a single location. This will also provide a greater safety margin for accommodation of any fluctuations in discharge that may not be able to be accommodated or adequately treated by the soil within the existing field. It is generally accepted that a path length of 0.3 – 0.4 metres is sufficient to reduce bacterial numbers to insignificant levels in normal soils i.e. soils that are of a mid-range texture, not too sandy or too clayey, and not saturated all the time. The topsoil soil on the property falls into this mid-range soil category. It is therefore my opinion that no significant adverse effect on the environment.
- 6.8. In the unlikely event of the system failure the effects will be less than minor, it is likely the wastewater will saturate the soils. There will be an unpleasant odour and saturated unusable areas. The effects will be easily identifiable, inhibit the applicant's use of the land and be generally unpleasant. The owner will want to address the failure and repair / install a new wastewater system (such as they have in this instance). The property is relatively large and there are reserve areas available to relocate the field should the field fail. The land in the location of the field predominately falls towards boundary. Probable infiltration into the topsoil before reaching these features as well as the environmental buffering capacity of the land between the field and the surface features will produce very minor effects.

6.9. Regular maintenance and inspection by the owner / owner's contractor will ensure the onsite wastewater system is operating to a suitable standard.

## 7. Recommendations / Conclusions

---

- 7.1. The new onsite wastewater management system should comprise of a secondary treatment unit. The treated effluent is to be discharged to a dripper line field of at least 200m<sup>2</sup> in size for Stage 1 and 660m<sup>2</sup> total area (additional 460m<sup>2</sup>) for Stage 2.
- 7.2. It is confirmed that there is sufficient area available for the adequate treatment and application of domestic effluent provided that the conditions and recommendations specified in this report are implemented.
- 7.3. Regular maintenance is required on any onsite wastewater treatment system to ensure the system operates properly. Maintenance is the responsibility of the owner.

## 8. Limitations

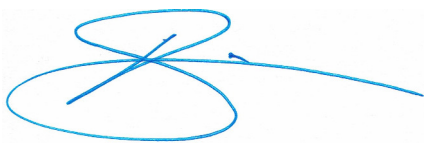
---

- 8.1. This report is valid for five years from the date of issue and covers the wastewater treatment for the staged development at 140 Bells Road for Stephen Coleman. Any other areas are outside the scope of this report.
- 8.2. This report relies on the regular maintenance by a recognised maintenance contractor and regular inspection maintenance of the wastewater system and disposal field by the owner.

## 9. References

---





- NZS 1547:2012 On-site Domestic Wastewater Management.
- Wairau / Awatere Resource Management Plan.
- Marlborough District Council Guidelines for New On-site Wastewater Management Systems July 2005
- Marlborough District Council DEKHO (GIS mapping).



**Khalid Suleiman**  
CPEng, MIPENZ, BEngTech(civil) NZCE(civil)  
Civil Engineer

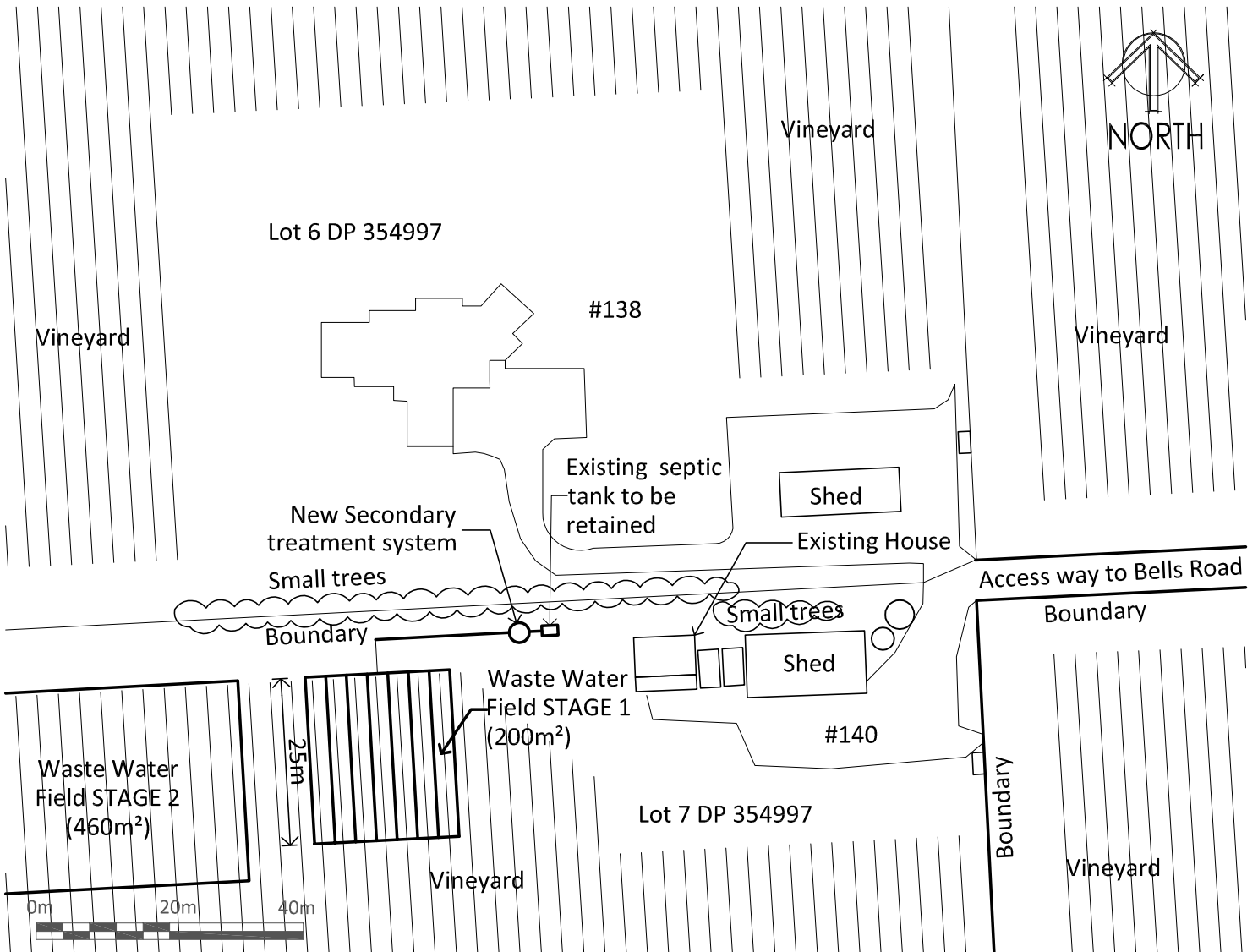
## **Appendix A – Site Plan & Field Details**

Soil Testing Key

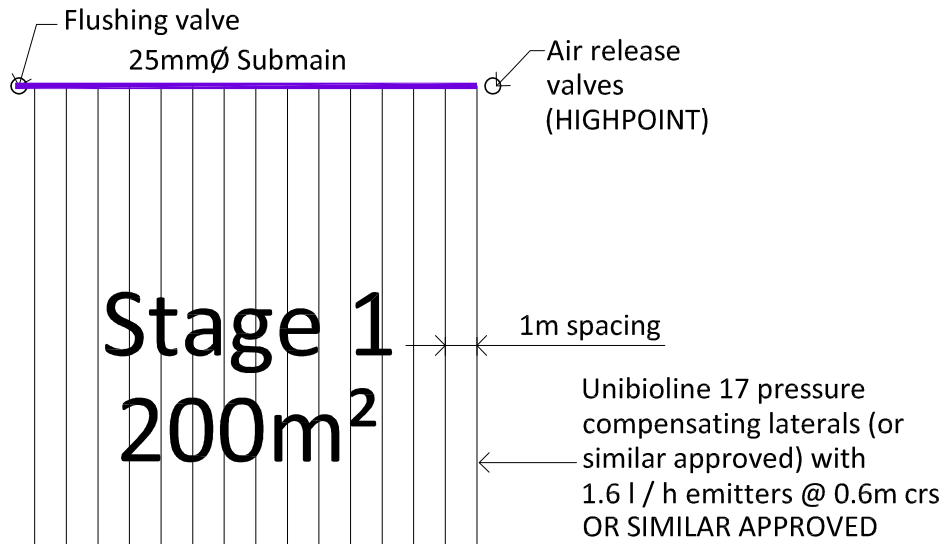
-  Hand Auger
-  Borehole
-  Testpit
-  Scala Penetrometer



01 LOCATION  
SCALE 1:50000



02 SITE PLAN  
SCALE 1:1000



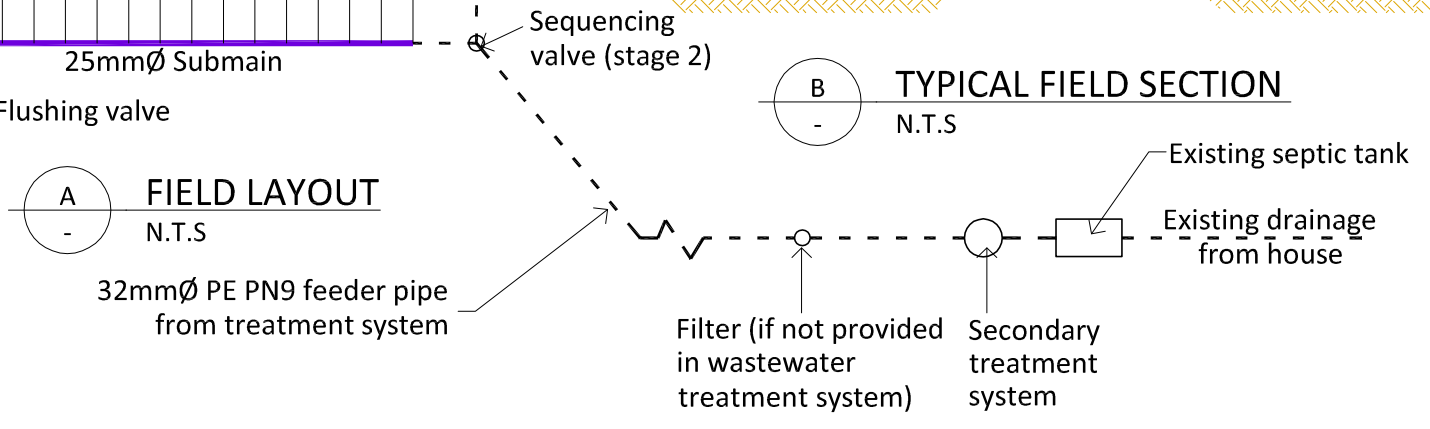
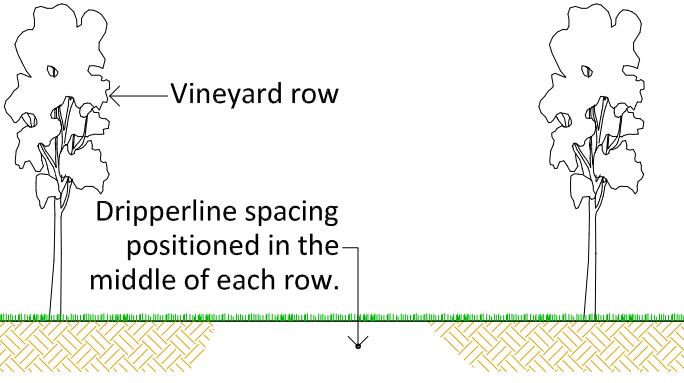
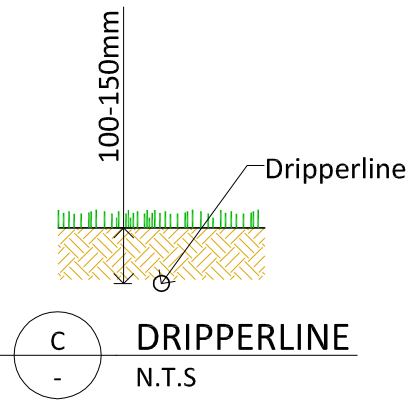
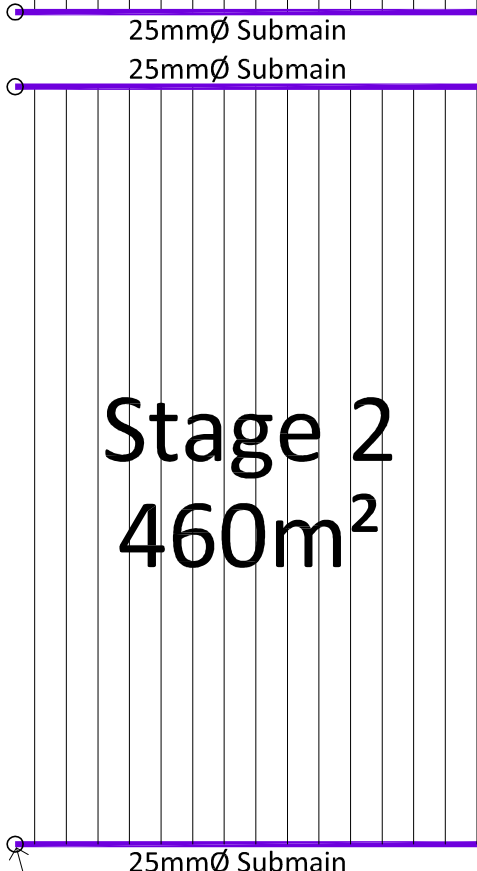
The wastewater from the house should not contain anything other than human waste, toilet paper and food material (such as may go down a kitchen sink drain).

It is recommended that natural soaps, detergents, , plumbing fixture cleaners, drain cleaners and disinfectants are used.

Bleaches and harsh chemicals are not recommended.

Prohibited discharge to the system:

- Oil/grease from a deep frier (for example).
- Stormwater
- Petrol, oil or other flammable/explosive substances
- Garden / garage chemicals (e.g. pesticides, paint cleaners, photographic chemicals, motor oil or trade waste).
- Disposable nappies & sanitary napkins.



**NOTE: INDICATIVE LAYOUT - PLUMBER / DRAINLAYER TO CONFIRM**

## **Appendix B – Wastewater Design Calculations**

<b>Project:</b>	Onsite Wastewater System				<b>seng</b>	<b>ENGINEERING CONSULTANCY</b>
<b>Client:</b>	Coleman					
<b>Location:</b>	140 Bells Road					
<b>Ref:</b>	0514	<b>Date:</b>	16.05.17	<b>Page:</b>	1 of 1	<b>P</b> 021 281 8889 <b>E</b> khalid@seng.co.nz <b>W</b> www.seng.co.nz <b>P.O</b> Box 707, Blenheim 7240

## Wastewater Design Calculations

In accordance with AS/NZS 1547:2012 & The Marlborough District Council Guidelines 2005

### Loading

Bedrooms: 1 4

Occupancy: 2 Persons 8 Persons

Water Supply: 3 Bore or Well Supply ▼

Household Plumbing: 1 Standard Fixtures ▼

Flow Allowance STAGE 1: 200 litres/day/ person

Flow Allowance STAGE 2: 165 litres/day/ person

### DRAINAGE CONTROLS:

No need for surface water collector / cut-off drains

### RESERVE AREA

Reserve area available for extensions is 100% of the design area:

### RESTRICTIONS

Boundaries, vineyard & boundaries

### Design

Disposal Field Type 4 Irrigation ▼

Soil Type: Clay Loam - Massive ▼

Soil Category: 4

Daily Loading Rate: 2.0 mm/day

### Calculations

	STAGE 1	STAGE2
DAILY FLOW:	400 L/day	1320 L/day
LOADING RATE:	2.0 mm/day	2.0 mm/day
AREA REQUIRED:	200 m <sup>2</sup>	660 m <sup>2</sup>

## **Appendix C – Soil Properties**

# Site & Soil Evaluation Form

Client: Coleman Job Number: 0514 Logged By: Khalid Suleiman  
 Address: 140 Bells Road  
 Date of Inspection: 17May 2017 Surface Conditions: Moist  
 Slope: 0-5 degrees Ground Cover: Grass / vineyard  
 Surface Notes: Modified - Vineyard Water Table Depth: >1.0m

## Aug 1

Layer	Lower Depth (mm)	Horizon	Moisture Conditions	Colour	Field Texture	Course Fragments (%)	Structure	Dispersive	Sample Taken	Consistency	Soil Category
1	300	A	Moist	Dark brown	Loam	5%	Massive	No	N	Weak	3
2	450	B1	Moist	Brownish yellow	Silty clay loam	<5%	Massive	No	N	Strong, Mod. sticky	4
3	800	B2	Moist	Brownish yellow	Silty clay loam	<5%	Massive	No	N	V.Strong, very. sticky	4

## Aug 2

Layer	Lower Depth (mm)	Horizon	Moisture Conditions	Colour	Field Texture	Course Fragments (%)	Structure	Dispersive	Sample Taken	Consistency	Soil Category
1	400	A	Moist	Dark brown	Loam	5%	Massive	No	N	Weak	3
2	700	B1	Moist	Brownish yellow	Clayey silt	10-15%	Massive	No	N	Weak, Mod. sticky	4
3	850	B2	Moist	Brownish yellow	Silty clay	10-20%	Massive	No	N	Weak, Mod. sticky	5

## Aug 3

Layer	Lower Depth (mm)	Horizon	Moisture Conditions	Colour	Field Texture	Course Fragments (%)	Structure	Dispersive	Sample Taken	Consistency	Soil Category
1	350	A	Moist	Dark brown	Loam	5%	Massive	No	N	Weak	3
2	500	B1	Moist	Brownish yellow	Clayey silt	10-15%	Massive	No	N	Weak, Mod. sticky	4
3	650	B2	Moist	Brownish yellow	Silty clay	10-20%	Massive	No	N	Weak, Mod. sticky	5

**Moisture** – Dry, moist, very moist, saturated. **Structure** – Apedal (no peds) single grain or massive. **Strength** - Loose, very weak, weak, firm, strong, very strong, rigid. **Stickiness** - Non, slightly, moderately, very

## **Appendix D – Loading Certificate**

<b>Project:</b>	Wastewater System					<b>seng</b>	<b>ENGINEERING CONSULTANCY</b>
<b>Client:</b>	Coleman						
<b>Location:</b>	140 Bells Road						
<b>Ref:</b>	0514	<b>Date:</b>	17.05.17	<b>Page:</b>	1 of 1	P 021 281 8889 E khalid@seng.co.nz	W www.seng.co.nz P.O Box 707, Blenheim 7240

## Wastewater - Loading Certificate

### System Capacity

The system is designed for 2 person permanent occupancy with a combined load of 400 litres per day STAGE 1  
The system is designed for 10 person permanent occupancy with a combined load of 1320 litres per day STAGE 2

### Summary of Design Criteria

The field has been sized based on an application rate of 2.0mm/day.

### Reserve Area

The reserve area is required to provide a factor of safety should the proposed wastewater field fail. It is important to maintain a suitable area as reserve area should it be required.

### Plumbing Fixtures

The design of the wastewater system is based on standard plumbing fixtures for Stage 1 and standard plumbing reduction fixtures for Stage 2 .

### Consequences of Overloading The System

The system will manage brief, short term overloading, however prolonged overloading will lead to the failure of the wastewater field and likely replacement.

### Consequences of Damaging Use, Lack of Monitoring, Maintenance and Servicing

The system will require regular maintenance, (largely flushing of the disc filter).

The wastewater from the house should not contain anything other than human waste, toilet paper and food material such as may go down a kitchen sink drain.


It is recommended that natural soaps, detergents, , plumbing fixture cleaners, drain cleaners and disinfectants are used.

Bleaches and harsh chemicals are not recommended.

Prohibited discharge to the system:

- Oil/grease from a deep frier (for example).
- Stormwater
- Petrol, oil or other flammable/explosive substances
- Garden / garage chemicals (e.g. pesticides, paint cleaners, photographic chemicals, motor oil or trade waste).

## **Appendix E – Setback Distance Assessment**

<b>Project:</b>	Wastewater System					
<b>Client:</b>	Coleman					
<b>Location:</b>	140 Bells Road					
<b>Ref:</b>	0514	<b>Date:</b>	17.05.17	<b>Page:</b>	1 of 1	
<p>P 021 281 8889      W www.seng.co.nz E info@seng.co.nz      P.O Box 707, Blenheim 7240</p>						

## Wastewater Setback Distance Assessment

Item	Site/system feature	Constraint Scale		Sensitive Features	Score
		Lower (1) ←	→ Higher (10)		
A	Microbial quality of effluent	Effluent quality consistently producing ≤ 10 cfu/100 mL E. coli (secondary treated effluent + disinfection)	Effluent quality consistently producing ≥ 106 cfu/100 mL E. coli (primary treated effluent)	Groundwater and surface pollution hazard, public health hazard	3
B	Surface water	Category 1 to 3 soils (see Note 5) no surface water down gradient within >100 m, low rainfall area	Category 4 to 6 soils, permanent surface water <50m down gradient, high rainfall area, high resource / enviro value	Surface water pollution hazard for low permeable soils, low lying or poorly draining areas	7
C	Groundwater	Category 5 and 6 soils, low resource / environmental value	Category 1 and 2 soils, gravel aquifers, high resource / environmental value	Groundwater pollution hazard	5
D	Slope	0-6% (surface effluent application), 0 - 10% (subsurface effluent application)	> 10% (surface effluent application), > 30% subsurface effluent application	Off-site export of effluent, erosion	2
E	Position of land application area in landscape	Downgradient of surface water, property boundary, recreational area	Upgradient of surface water, property boundary, recreational area	Surface water pollution hazard, off-site export of effluent	5
F	Drainage	Category 1 and 2 soils, gently sloping area	Category 6 soils, sites, visible seepage, moisture tolerant vegetation, low lying area	Groundwater pollution hazard	7
G	Flood potential	Above 1 in 20 year flood contour	Below 1 in 20 year flood contour	Off-site export of effluent, system failure, mechanical faults	3
H	Geology and soils	Category 3 and 4 soils, low porous regolith, deep, uniform soils	Category 1 and 6 soils, fractured rock, gravel aquifers, highly porous regolith	Groundwater pollution hazard for porous regolith and permeable soils	2
I	Landform	Hill crests, convex side slopes, and plains	Drainage plains and incise channels	Groundwater pollution hazard, resurfacing hazard	3
J	Application method	Drip irrigation or subsurface application of effluent	Surface/above ground application of effluent	Off-site export of effluent, surface water pollution	2

Site feature	Setback Distance	Average Score From Table Above	Guideline Setback Requirement	Achieved Setback
Property boundary	1.5m - 50m	2.3	13m	4m
Buildings / houses	2m - >6m	2.3	3m	>10m
Surface water	15m – 100m	4.1	50m	>15m
Bore, well	15m – 50m	3.0	26m	>50m
Recreational areas	3m – 15m	3.3	7m	>100m
In ground water tank	4m – 15m	3.3	N/A	N/A
Retaining wall / cut slope	3m	2.3	3.0m	N/A
Groundwater	0.6m - ≥ 1.5m	3.7	0.9m	>1m
Hardpan or bedrock	0.6m - ≥ 1.5m	7.0	1.2m	N/A