

Isabel Estate

70 Hawkesbury Road, Renwick

On Site Domestic Wastewater Management
Report V.2

8 December 2017

Our ref: 5266

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Issue No.	A	B	C	D	E	F
Date	06/03/17	8/12/17				
Prepared By	NM	PhD				
Approved By	RE	RE				

1 Executive Summary

With respect to the residential development at 70 Hawkesbury Road, Renwick, Smart Alliances Ltd have carried out an engineering appraisal of the ground conditions related to the proposed on-site wastewater management for the site.

1. The on-site wastewater system for the proposed new barrel hall consists of a secondary treatment unit coupled with dose loaded shallow bed land application with a minimum area of 150m².
2. The proposed system must be maintained periodically by the supplier of the system, or with a recognised maintenance contractor.
3. A resource consent for the discharge of wastewater might be necessary.

Installation is to be in accordance with the requirements and recommendations of AS/NZS 1547:2012.

This report comes as an updated version of the initial report (Smart Alliances Ltd, March 2017) further the request made by the client for the relocation of the initially designed Land Application Area (LAA).

The following recommendations cannot be taken in isolation and must be read with respect to the balance of this report and the context of the proposed developments at the site.

2 Introduction

Smart Alliances have carried out an engineering appraisal for providing on-site domestic wastewater management at 70 Hawkesbury Road, Renwick.

The site is an operating winery, and Isabel Estate (the client) proposes to add a new barrel hall to the site to provide additional storage space. This new barrel hall will be located on top of where one of the two existing septic tanks is located and this septic tank therefore needs to be relocated and replaced.

We consider that the site is suitable for continued on-site wastewater treatment and disposal using secondary treatment and dose loaded shallow bed land application with a minimum area of 150m².

The purpose of this report is to present the results of site investigations carried out in relation to providing a new relocated on-site wastewater treatment and land application for the domestic wastewater from the building.

Smart Alliances Ltd undertook the initial site investigation in March 2017. Complementary investigation related to the relocation of the proposed new LAA was carried out on the 6th December 2017.

3 Location & Site Description

The property is located at 70 Hawkesbury Road, Renwick. The legal description of the property is LOT 1 DP 10690 LOT 1 DP 413653 and the land area is 2.25 Ha. The buildings are to the West of the property.

The property is a rural lifestyle property with grassed areas and with some trees planted for landscaping. There is a terraced area bounded by an access driveway leading to the

neighbouring property (Lot 1 DP 6027) along the Omaka River at the south of the property which is used by Isabel Estate for the disposal of their trade waste (winery wastewater). The estimated level of the terrace is approximately 2.5 m lower than the access driveway and the rest of the vineyard.

Another on-site wastewater treatment system serving another part of the Isabel Estate is located 80m to the East of where the relocated system is proposed to be installed.

Locations of all the features of the property are shown on the site plans attached in **Appendix A**.

4 Wastewater Assessment

4.1 Soils and Site Assessment

4.1.1 Soils

The Marlborough Soils Map indicate that the soils are referenced as Broadbridge Soils. The Landcare research soil report indicates that Broadbridge soils are Silty Loam soils that are generally poorly drained with high structural vulnerability and bearing high risks of water logging vulnerability. Kaiapoi soils generally show low vulnerability to Nitrogen leaching. The Landcare Research soil report is available in **Appendix C**.

Three auger tests were carried out in the frame of the March 2017 initial investigation. A fourth one was carried out on the 6th December 2017 on the new proposed LAA location which confirmed the characteristics of the soil as being a **category 4** as per AS/NZS 1547:2012. Details of the three initial auger tests (AT1 to AT3) are available in **Appendix A**. The results of the fourth auger test are shown in the table below.

AT4

Genesis	Lower Depth	Colour	Field Texture	% + 2mm Fragments	Moisture Condition	Drainage Category
Top Soil	0 to 0.2 m	Dark Brown	Loam	None	Dry	3
Layer 1	0.2 m to 0.5 m	Light Brown	Silty Loam	None		3-4
Layer 2	0.5 m to 1.5 m	Orange Brown	Silty Clay Loam ⁽¹⁾⁽²⁾⁽³⁾	<2	Dry	4

(1) Evident iron mottling signs at 1.0 m bgl

(2) Hard pan encountered at 0.5 m bgl; Percentage of clay increasing at 0.7 m bgl; Gravel encountered at 1.5 m bgl.

(3) Groundwater **not** present at 1.5 m bgl

Photos of the soil exposed during the auger tests are presented in **Appendix A**.

4.1.2 Summary

The fourth auger tests confirmed the assessment carried out in March 2017 by Smart Associates Ltd in the frame of the initial assessment of the soils and concluded the soil being of **Category 4**, as per AS/NZS1547:2012 classification.

The site investigation has identified that the property is suitable for continuing wastewater disposal by secondary treatment into a shallow bed land application area.

Based on the soil assessment carried out, an average drainage category of 4 has been adopted. With this considered, a conservative design loading with secondary treatment of **20 mm/day** is considered appropriate.

4.1.3 Site Considerations

As indicated by the auger tests results, groundwater on the site was detected at 1.5 m bgl.

According to the data collected from the Marlborough District Council Smart Maps database, there are several wells located in the vicinity of the construction site, the closest being referenced as P28w/2110 located approximately 120 m South of the proposed new location for the LAA. Drinking water comes from the well P28w/0724 located approximately 240m to the West of the proposed new LAA.

The MDC Smart Maps database also indicates that the site is zoned as Rural Environmental zone, lies within Threatened Environment (Indigenous Vegetation Site), within a Soil Sensitive Area (impeded soils) and at the boundary of a Flood Hazard Area (FHA 2). As a result of the above, under the new Marlborough Environment Plan (MEP), the property will require resource consent for the discharge of wastewater.

4.2 System Design

The proposed wastewater management, including the required land application area has been designed in accordance with the NZS1547:2012. The design takes into account the site and soil conditions outlined above.

4.2.1 Wastewater Treatment Design

It is understood that the secondary wastewater treatment system recommended within the March engineering report has already been installed. Details about the wastewater treatment design can be found in the March 2017 engineering report. A summary of the design is outlined below.

- 20 permanent staff at peak times
- 100 cellar door visitors/day
- Standard water reduction fixtures.
- Total design flow of 3,000 litres/day.
- Soil category 4 and a design loading rate 20mm.

The secondary treatment system is expected to achieve the following treatment levels:

- BOD after 5 days (average) < 20 g/m³
- Suspended solids (average) < 30 g/m³

4.2.2 Land Application Area

Based on the criteria above, the minimum total area required for the land application field is 150m².

The treated wastewater discharge is expected to be at approximately 0.4m below ground level, providing vertical setback of 1.6m. This is acceptable under AS/NZS1547:2012 and MDC guidelines.

For practical reasons, the 150 m² (5m x 30m) infiltration bed initially designed in March 2017 has to be relocated and split into two 75 m² (2m x 37.5m) beds positioned as shown in detailed design plans in **Appendix A**.

The new proposed LAA location consists of the 4m wide shoulder area at the border of the terraced land south of the property as shown in **Figure 1** below.



Figure 1: Proposed LAA Location

Detail design of the disposal bed is available in **Appendix A**.

Prior to the proposed system becoming operational, the system installer must certify that the system has been constructed according to the design. This certification must then be forwarded to Council.

5 Environmental Assessment

An onsite wastewater system is required on this property as there is no reticulation in the area. An onsite wastewater system is installed on this property and has been operating successfully for more than 15 years. This report assesses the effects of replacing and moving the location of the system to allow construction of a new barrel hall.

Because of the following reasons we do not envisage the relocated wastewater discharge becoming an environmental risk:

- Conservative soil classification
- Split field, dose loaded (with pump) to insure even distribution
- Large property size
- Conservative loading rates are used.
- The environmental buffering capacity of land.
- No ground water or surface water in the vicinity of the wastewater field

The risk from the wastewater system contaminating drinking water is negligible. Set back distances are achieved; soil classification and loading rates used are conservative.

The proposed land application field is sited on flat exposed ground and not within any ground depressions that are prone to flooding.

The effect of a failed system will primarily affect the applicant's property. In the event of a failed system wastewater is likely to accumulate within the flat grassed area within

which the field is located. Infiltration into the topsoil layers and the environmental buffering capacity of the land will ensure all water sources and neighbours are protected.

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. A reserve area is available to relocate the field should the existing field fail.

Regular maintenance and inspection by the owner will ensure the onsite wastewater system is operating to a suitable standard.

6 Conclusion

There is sufficient area to treat and dispose of the wastewater created from the existing building.

The new replacement wastewater management system should comprise a secondary treatment unit and a pumping chamber. The treated effluent should discharge into shallow beds LAA. A sequencing valve will be used to distribute the treated effluent into the shallow bed land application area. The application area should be two beds totalling a minimum of 150m² in area, configured in two beds each 37.5m long x 2m wide.

Installation is to be in accordance with the requirements and recommendations of AS/NZS 1547:2012.

7 Limitations


This report is valid for two years from the date of issue and covers the onsite domestic wastewater treatment at 70 Hawkesbury Road. Any other areas are outside the scope of this report.

The reliance by other parties on the information or opinions in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

8 References

1. NZS 1547:2012 On-site Domestic Wastewater Management.
2. Marlborough District Council Guidelines for New On-site Wastewater Management Systems, July 2005.
3. Crites, R.W. and Tchobanoglous. Small and Decentralised Wastewater Management Systems. WCB/McGraw-Hill, 02/04/1998
4. Liping Pang (ESR Christchurch). Microbial removal rates in subsurface medi estimated from published studies of field experiments and large intact soil cores. J. of Environmental Quality. Vol 38. July-Aug 2009. pp 1531-1559.

SMART ALLIANCES LTD


Dg Dumont PR

Philippe Dumont
Environmental Engineer
8 December 2017

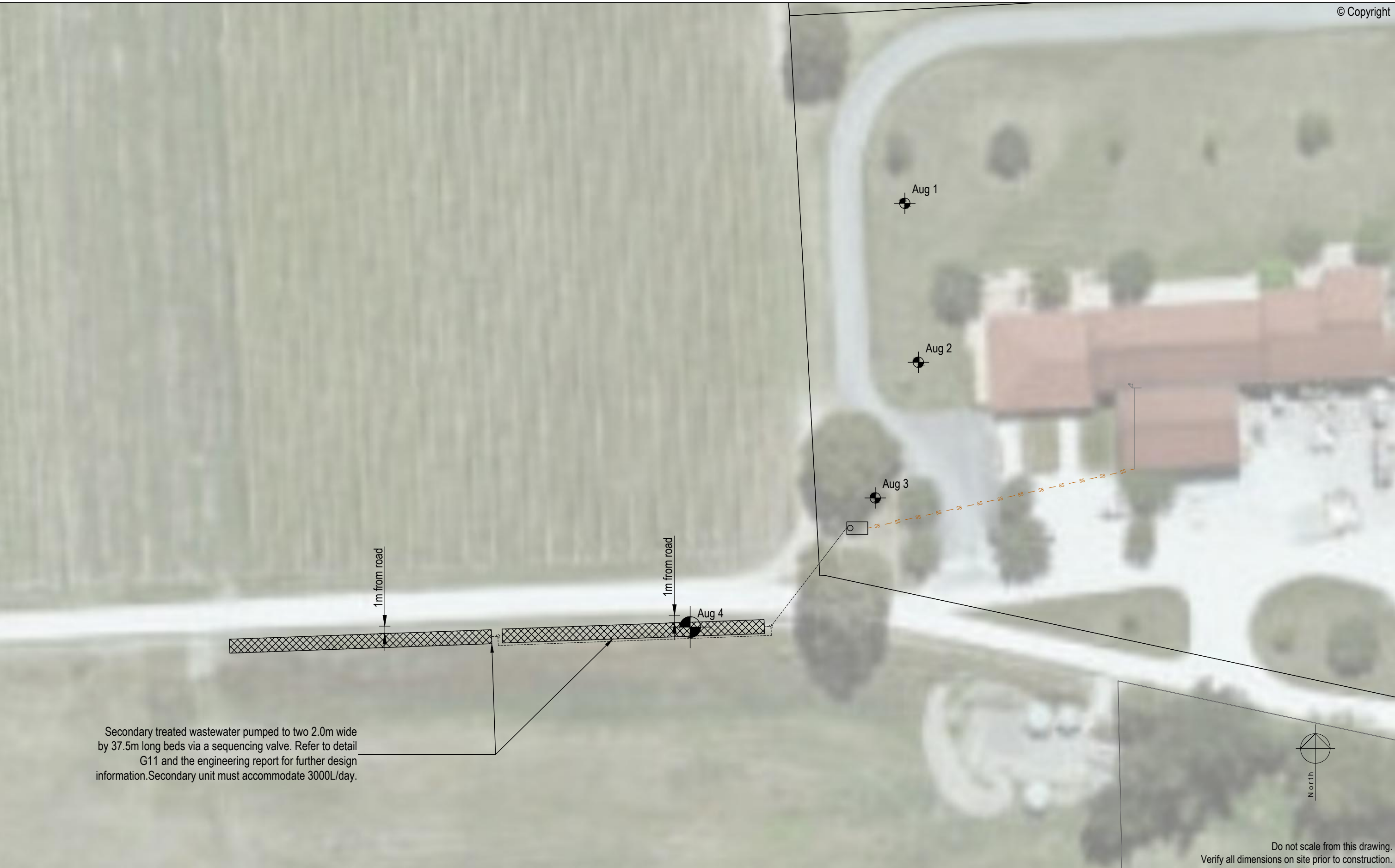
SMART ALLIANCES LTD



Richard Evans
Chartered Professional Engineer
8 December 2017

Appendix A - Drawings

- **Site Plans**
- **Wastewater Details Drawing**



REV	DATE	DETAILS	ISSUE	DATE	ISSUED FOR
A	18-01-17	INFORMATION TO CLIENT			
B	19-01-17	STORM WATER ADDED			
C	30-06-17	ISSUED FOR BC			
D	11-12-17	REVISION OF WASTEWATER			

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PROJECT
ISABEL WINERY
70-72 HAWKESBURY ROAD

CLIENT
PINNACLE DRINKS NZ LTD

DRAWING
SITE & DRAINAGE PLAN
2017 WORKS

ORIGIN DATE
25-11-16

STATUS	
CONSENT	
DESIGNED RE	SCALE (A3) 1:500
DRAWN BS	REVISION DATE 11-12-17
APPROVED RE	DWG NO. REV. 5266-C10-D

SYSTEM USE & MAINTENANCE

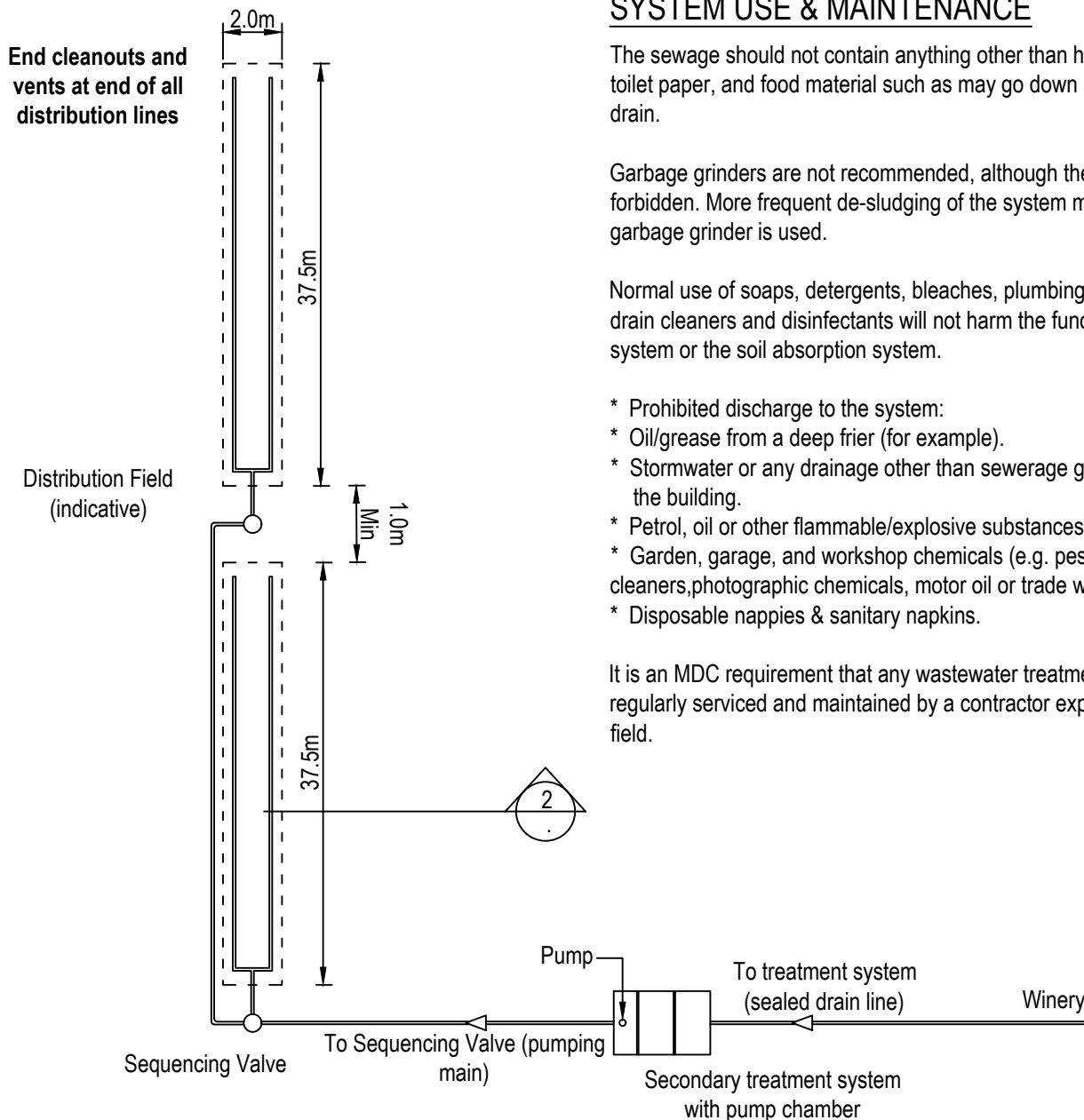
The sewage should not contain anything other than human waste and toilet paper, and food material such as may go down a kitchen sink drain.

Garbage grinders are not recommended, although they need not be forbidden. More frequent de-sludging of the system may be needed if a garbage grinder is used.

Normal use of soaps, detergents, bleaches, plumbing fixture cleaners, drain cleaners and disinfectants will not harm the functioning of the system or the soil absorption system.

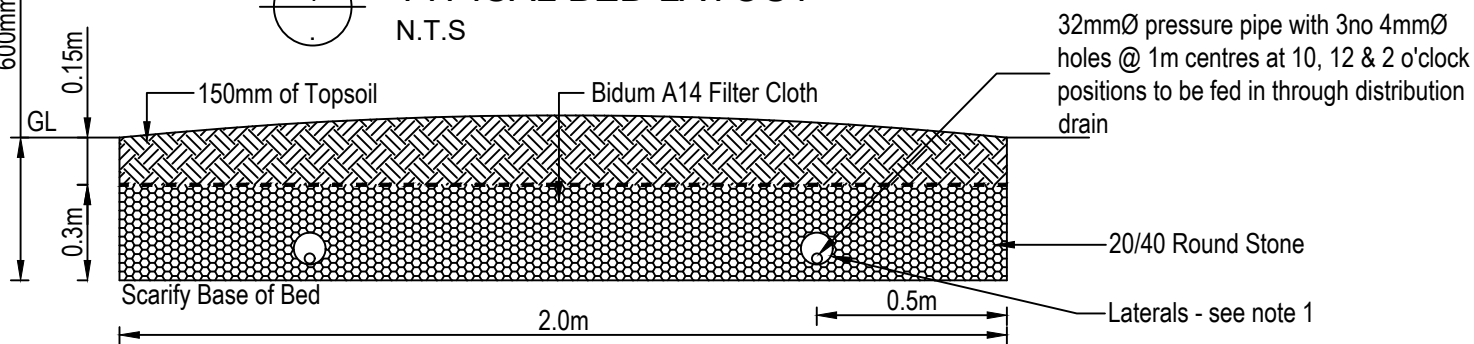
- * Prohibited discharge to the system:
- * Oil/grease from a deep frier (for example).
- * Stormwater or any drainage other than sewerage generated in the building.
- * Petrol, oil or other flammable/explosive substances
- * Garden, garage, and workshop chemicals (e.g. pesticides, paint cleaners, photographic chemicals, motor oil or trade waste).
- * Disposable nappies & sanitary napkins.

It is an MDC requirement that any wastewater treatment system be regularly serviced and maintained by a contractor experienced in this field.



Variable with contour
600mm max

1 TYPICAL BED LAYOUT
N.T.S



2 TYPICAL BED CONSTRUCTION
N.T.S

Note:

1. Distribution drains to be U-PVC 90mmØ perforated pipe laid flat with perforations comprising at least 2% of surface area. (10mmØ slots at 100mm centres from 4 to 8 o'clock positions).

Do not scale from this drawing



CLIENT
ISABEL ESTATE

PROJECT
ISABEL ESTATE
70-72 HAWKESBURY RD

DRAWING
WASTEWATER DETAIL

ISSUE
CONSENT

DATE 11-12-17	SCALE (A4) N.T.S
DRAWN BS	REVISION 02
APPROVED JH	DWG NO. 5266-G11

A 11-12-17 Revision of LAA

REV	DATE	DETAILS
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Appendix B - Calculations Sheet, Setback Distance Matrix, Loading Certificate

WASTEWATER SYSTEM DESIGN SHEET
To AS/NZS 1547:2012

Number of Occupants: 20 staff + 100 visitors

Intended water Supply: Bore or Well Supply

Soil Category Determined on Site Category 4

Recommendation for this site: *Secondary treated effluent in shallow pump fed bed disposal*

DRAINAGE CONTROLS:

Need for surface water collector / cut-off drains? No

AVAILABILITY OR RESERVE / SETBACK AREAS

Reserve area available for extensions, % of design area: 100%

Setback distance? (between development and disposal system):

DESIGN

Daily Loading Rate: 20.0 mm/day Cat 4 soil - 20mm is allowed

Occupancy: (staff) 20 Persons

Occupancy: (visitors) 100 Persons

L/person/day: (staff) 50 L/p/d = 1000 L/day from Table H4 AS/NZS 1547:2012

L/person/day: (visitors) 20 L/p/d = 2000 L/day from Table H4 AS/NZS 1547:2012

DESIGN DAILY FLOW: 3000 L/day

AREA REQUIRED: 150 m²

LENGTH REQUIRED: 75.0 m with 2.0 metre wide drip field

RESERVE AREA REQUIRED: 100% of specified

Field LENGTH: 37.5 m

NUMBER OF BEDS: 2

RECOMMENDED LAA = Two 2 x 30m beds with sequencing valve

Setback Distance Matrix AS/NZ 1547 Appendix R

Note - Refer to Table R1 and R2 and relevant NOTES

Site Feature	Constraint Scale			Notes:
	Low	Medium	High	
Horizontal Setback Distance				
Property Boundary				
Distance Range	1.5m -----50m			
A - Microbial Quality	•			Secondary treated wastewater
D - Slope	•			Flat Site
J - Application Method	•			Application Beds
<i>Weighted Setback Selected</i>	5			
Actual Setback Provided	9m			
Buildings/ houses				
Distance Range	2m ----- > 6m			
A - Microbial Quality	•			Secondary treated wastewater
D - Slope	•			Flat Site
J - Application Method	•			Application Beds
<i>Weighted Setback Selected</i>	2m			
Actual Setback Provided	>20m			
Surface Water				
Distance Range	15m -----100m			
A - Microbial Quality	•			Secondary treated wastewater
B - Surface Water (Soil effect)		•		Cat 4 - Conservative approach
B - Surface Water (Water)	•			Closest water body >100m
B - Surface Water (Rainfall)		•		Moderate Rainfall
D - Slope	•			Flat Site
E - Position of LAA		•		>5m away from stormwater disposal
F - Drainage	•			Subsurface application
G - Flood Potential	•			Level 1 Shallow flood risk, Design adapted
J - Application Method	•			Subsurface application
<i>Weighted Setback Selected</i>	20m			
Actual Setback Provided	>100m			Setback from nearest well
Vertical Setback Distance				
	Low	Medium	High	
Groundwater				
Distance Range	0.6m -----1.5m			
A - Microbial Quality	•			Secondary treated wastewater
C - Groundwater		•		Silty clay loam with an average drainage rate
F - Drainage		•		Silty clay loam with an average drainage rate
H - Geology and Soils	•			Silty clay loam with an average drainage rate
I - Landform		•		Large flat farm land
J - Application Method	•			Subsurface application
<i>Weighted Setback Selected</i>	0.9m			
Actual Setback Provided	>1m			
<p>Secondary treated effluent. Favourable setback distances from boundaries, buildings, groundwater and no waterbodies nearby. Based on the findings from the Matrix exercise, it is considered suitable to use maximum design loading rates (DLR) for bed application however due to the large property size we have decided to design the bed application area using the conservative design loading rate.</p>				

Appendix C - Landcare Research Soil Report



Report generated: 6-Dec-2017 from <http://smap.landcareresearch.co.nz>

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks.

S-map correlates soils across New Zealand. Both the old soil name and the new correlated (soil family) name are listed below.

Family: Mairakif

Smap ref: Mair_21a.1

Broadbridge (Mairaki_21a.1)

Key physical properties

Depth class (diggability)	Moderately deep (80 - 99 cm)
Texture profile	Silty loam
Potential rooting depth	45 - 65 (cm)
Rooting barrier	Pan
Topsoil stoniness	Stoneless
Topsoil clay range	20 - 35 %
Drainage class	Poorly drained
Aeration in root zone	Very limited
Permeability profile	Moderate over slow
Depth to slowly permeable horizon	45 - 65 (cm)
Permeability of slowest horizon	Slow (< 4 mm/h)
Profile available water	Moderate to low (82 mm)
	(0 - 100cm or root barrier)
	(0 - 60cm or root barrier) Moderate (82 mm)
	(0 - 30cm or root barrier) Moderate (48 mm)
Dry bulk density, topsoil	1.22 g/cm ³
Dry bulk density, subsoil	1.42 g/cm ³
Depth to hard rock	No hard rock within 1 m
Depth to soft rock	No soft rock within 1 m
Depth to stony layer class	Moderately deep

Key chemical properties

Topsoil P retention Low (22%)

About this publication

- This information sheet describes the *typical average properties* of the specified soil.
- For further information on individual soils, contact Landcare Research New Zealand Ltd: www.landcareresearch.co.nz
- Advice should be sought from soil and land use experts before making decisions on individual farms and paddocks.
- The information has been derived from numerous sources. It may not be complete, correct or up to date.
- This information sheet is licensed by Landcare Research on an "as is" and "as available" basis and without any warranty of any kind, either express or implied.
- Landcare Research shall not be liable on any legal basis (including without limitation negligence) and expressly excludes all liability for loss or damage howsoever and whenever caused to a user of this factsheet.



Broadbridge (Mairaki_21a.1)

Additional factors to consider in choice of management practices

Vulnerability classes relate to soil properties only and do not take into account climate or management

Soil structure integrity

- Structural vulnerability High (0.69)
- Pugging vulnerability not available yet

Water management

- Water logging vulnerability High
- Drought vulnerability - if not irrigated Moderate
- Bypass flow Medium or high
- Hydrological soil group D

Contaminant management

- N leaching vulnerability Medium
- P leaching vulnerability not available yet
- Bypass flow Medium or high
- Dairy effluent (FDE) risk category C if slope > 7 deg otherwise B

Relative Runoff Potential

Slope	0-3°	4-7°	8-15°	16-25°	>25°
Risk	H	VH	VH	VH	VH

Additional information

- Soil classification Argillic-fragic Perch-gley Pallic Soils (PPJX)
- Family Mairakif
- Sibling number 21
- Profile texture group Silty
- Soil profile material Soil with stones (non contrasting)
- Rock class of stones/rocks From hard sandstone rock
- Rock origin of fine earth From hard sandstone rock
- Parent material origin Loess on alluvium

Characteristics of functional horizons in order from top to base of profile:

Functional Horizon	Thickness	Stones	Clay*	Sand*
Loamy Weak	20 - 30 cm	0 %	20 - 35 %	5 - 30 %
Loamy Weak	25 - 35 cm	0 %	20 - 35 %	10 - 30 %
Loamy Coarse Firm	25 - 45 cm	0 %	25 - 35 %	10 - 30 %
Stony Loamy Weak	0 - 25 cm	20 - 35 %	25 - 35 %	10 - 30 %

* clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)

Soil information for OVERSEER

The following information can be entered in the OVERSEER® Nutrient Budget model. This information is derived from the S-map soil properties which are matched to the most appropriate OVERSEER categories. Please read the notes below for further information.

Soil description page

1. Select **Link to S-map**
2. Under S-map sibling data enter the S-map name/ref: **Mair_21a.1**

Considerations when using Smap soil properties in OVERSEER

- The soil water values are estimated using a regression model based on soil order, parent rock, soil functional horizon information (stone content, soil density class), as well as texture (field estimates of sand, silt and clay percentages). The model is based on laboratory - measured water content data held in the National Soils Database and other Landcare Research datasets. Most of this data comes from soils under long-term pasture and may vary from land under arable use, irrigation, etc.
- Each value is an estimate of the water content of the whole soil within the target depth range or to the depth of the root barrier (if this occurs above the base of the target depth). Where soil layers contain stones, the soil water content has been decreased according to the stone content.
- S-map only contains information on soils to a depth of 100 cm. The soil water estimates in the > 60 cm depth category assume that the bottom functional horizon that extends to 100 cm, continues down to a depth of 150cm. Where it is known by the user that there is an impermeable layer or non-fractured bedrock between 100 and 150 cm, this depth should be entered into OVERSEER. Where there is a change in the soil profile characteristics below 100 cm, the user should be aware that the values provided on this factsheet for the > 60 cm depth category will not reflect this change. For example, the presence of gravels at 120 cm would usually result in lower soil water estimates in the > 60 cm depth category. Note though that this assumption only impacts on a cropping block, as OVERSEER uses soil data from just the top 60 cm in pastoral blocks.
- OVERSEER requires the soil water values to be non-zero integers (even though zero is a valid value below a root barrier), and the wilting point value must be less than the field capacity value which must be less than the saturation value. The S-map water content estimates supplied by the web service have been rounded to integers and may be assigned minimal values to meet these OVERSEER requirements. These modifications will result in a slightly less accurate estimate of Available Water to 60 cm (labelled PAW in OVERSEER) than that provided on the first page of this factsheet, but this is not expected to lead to any significant difference in outputs from OVERSEER.