

DOYLE **SOIL** **CONSULTING**



SITE AND SOIL EVALUATION REPORT ONSITE WASTEWATER ASSESSMENT

**70 Gumpits Road
Birch's Bay**

February 2024

Doyle Soil Consulting: 6/76 Auburn Rd Kingston Beach 7050 – 0488 080 455 – robyn@doylesoilconsulting.com.au

SITE INFORMATION

Client: Ivan and Judith Ross

Address: 70 Gumpits Road (CT 87437/1)

Site Area: Approximately 10 ha

Date of inspection: 14/02/2023

Building type: Existing house and visitor accommodation with proposed extension to visitor accommodation

Services: Tank water and onsite wastewater

Planning Overlays: Scenic Landscape, Bushfire prone areas, Biodiversity protection area.

Mapped Geology - Mineral Resources Tasmania 1:50 000 Kingborough sheet:

Pa = Permian siltstone, silty sandstone, minor sandstone beds with frequent dropstones

Soil Depth: > 1.5 - 1.75 m

Subsoil Drainage: imperfectly drained

Drainage lines/water courses: Dam in SE corner.

Vegetation: pasture, gardens, lawns.

Rainfall in previous 7 days: Approximately 7 mm

Slope at LAA(s): up to 6° to the southeast

SITE ASSESSMENT AND SAMPLE TESTING

Site and soil assessment in accordance with AS1547-2012 *Onsite domestic wastewater assessment and design*.

Emerson Dispersion test on subsoils.

Test holes were dug using a Christie Post Driver Soil Sampling Kit, comprising CHPD78 Christie Post Driver with Soil Sampling Tube (50 mm OD x 1600/2100 mm).

SITE AND SOIL COMMENTS

The existing 3-bedroom house and 2-bedroom ancillary are serviced by an aerated wastewater treatment system (AWTS), with land application via two movable surface sprinklers (no longer compliant). Proposed is a one-bedroom with ensuite (no kitchen or laundry) addition to the ancillary dwelling/s.

The natural soil profiles are formed from clayey colluvium derived from Permian mud/siltstone. The profiles are deep with no refusal occurring at 1.5 m at TH1 & TH3, and no refusal at 2.0 m at TH2. The field textures of the soil profile are dominated by is weakly structured clay with mild dispersion characteristics.

Site constraints to be addressed by suitably designed OWMS:

- High design hydraulic load of 1200 L/day (up to 10 people)
- Dispersive medium clay (cat. 6) subsoils
- Waterlogged subsoils at approx. 1.2 m depth
- Slope angles up to 6 degrees at available land application areas
- Run on water from upslope areas

Site strengths to be exploited by suitably designed OWMS:

- Large area available for land application
- Moderately deep to deep soil profiles (≥ 1.5 m)
- Existing AWTS

The site constraints may be addressed by the use of an approved secondary treatment with disinfection – i.e., the existing AWTS. Land application via an (appropriately sized) sub-surface irrigation area/s is recommended for the slightly dispersive Cat. 6 soil with waterlogging at shallow depth.

Diversion drains are required upslope of all land application areas (LAA) to protect LAAs from run-on water.

SOIL PROFILES – Test Hole 1



Depth (m)	Horizon	Description and field texture grade	Soil Cat.
0 – 0.2	FILL	Dark greyish brown (10YR 4/2) Sandy Clay Loam , dry loose consistency, strong fine angular blocky structure, common angular gravels.	4
0.2 – 0.8	FILL	Mottled grey (10YR 6/1) and brownish yellow (10YR 6/6) Silty Medium Clay , dry stiff consistency, massive breaking to weak coarse structure, few roots.	6
0.8 – 1.0	A1	Dark grey (7.5YR 4/1) Silty Light Clay , massive breaking to moderate medium angular blocky structure, few roots, common gravels.	5
1.0 – 1.5	B2	Mottled grey (10YR 6/1) and brownish yellow (10YR 6/6) Silty Medium Clay , massive. <u>No refusal.</u>	6

SOIL PROFILES – Test Hole 2



Depth (m)	Horizon	Description and field texture grade	Soil Cat.
0 – 0.05	FILL	Dark greyish brown (10YR 4/2) Sandy Clay Loam , dry loose consistency, strong fine angular blocky structure, common angular gravels.	4
0.05 – 1.0	B2 ₁	Mottled brownish yellow (10YR 6/8) and white (7.5YR 1/8) Silty Light Clay , massive breaking to weak coarse blocky structure, slightly moist stiff to 0.80m, then moist firm consistency.	5
1.0 – 1.75	B2 ₂	Grey gley (1 6/N) with a few brownish (10YR 4/2) mottles, Silty Light Clay , massive, moist soft consistency.	5
1.75 – 1.9	?	This part of sample lost down test hole and not retrieved. <u>No Refusal @ 2.0 m</u>	

SOIL PROFILES – Test Hole 3



Depth (m)	Horizon	Description and field texture grade	Soil Cat.
0 – 0.2	A1	Dark greyish brown (10YR 4/2) Silty Clay Loam , dry loose consistency, strong fine angular blocky structure.	4
0.2 – 0.7	B2 ₁	Mottled brownish yellow (10YR 6/8) and white (7.5YR 1/8) Silty Light Clay , very strong medium angular blocky structure, abundant roots down cracks.	5
0.7 – 1.1	B2 ₂	Mottled brownish yellow (10YR 6/8) and white (7.5YR 1/8) Silty Light Clay , massive breaking to weak coarse blocky structure, slightly moist stiff to 0.80m, then moist firm consistency.	5
1.1 – 1.5	BC	Grey gley (1 6/N) with a few brownish (10YR 4/2) mottles, Silty Light Clay , massive, moist soft consistency. <u>No Refusal</u>	5

EMERSON AGGREGATE DISPERSION TEST

Soils with an excess of exchangeable sodium ions on the cation exchange complex (clays), can cause clay dispersion. Under some circumstances the presence of dispersive soils can also lead to significant erosion, and in particular tunnels leading to eventual gully erosion. Dispersive clay subsoil materials can also cause sealing of the soil surface – if left out in wet weather, they then dry and set very hard in dry weather. Based upon field survey of the property and the surrounding area, no erosion was identified at the site.

The subsoil was tested for dispersion using the Emerson Aggregate Test (EAT). Photos of test results are available on request. Testing resulted in worst-case Emerson class 2(2) indicating clays with mild dispersion characteristics. Exposure to rainfall/low-electrolyte water may, therefore, lead to spontaneous clay dispersion.

To minimise the likelihood of this, we recommend treating exposed subsoils with gypsum at 1.0 Kg/m² During and after construction, cover any exposed subsoil with topsoil and grass seed (or regular treatment gypsum at 1.0 - 0.5 Kg/m²). Minimise subsoil disturbance where possible.

TH #	Depth (m)	Visual sign	Class
1	0.2 - 0.8	Some dispersion (obvious milkiness < 50% of aggregate affected)	2(2)
2	0.1 - 0.4	Some dispersion (obvious milkiness < 50% of aggregate affected)	2(2)
3	0.2 - 0.7	Some dispersion (Slight milkiness immediately adjacent to aggregate)	2(1)

WASTEWATER LAND APPLICATION AREA SETBACKS

Required setback from foundations: 3 m

Required setback from downslope surface water: 11.0 m

Required setback from downslope boundary: 7.5 m

Required setback from upslope and side boundaries: 1.5 m

Required vertical setback to bedrock: 0.5 m below the LAA (Table R1 of AS1547-2012)

WASTEWATER CLASSIFICATION AND DESIGN

According to AS1547-2012, the soil is **category 6** (Medium Clay - dispersive).

Secondary treatment recommended.

Wastewater loading: 10 persons @ 120 L/day (tank) - 1200 L/day.

Design Irrigation Rates (DIR): **2 mm/day for LAA 1** and **1.6 mm/day for LAA's 2 & 3**.

Total minimum Land Application Area (LAA) required: **700 m²** subsurface irrigation area.

The existing two dwellings and the proposed additional bedroom have a calculated maximum hydraulic load of 1200 L (up to 10 persons @ 120 L/person/day). To address the site and soil constraints (previously discussed), secondary treatment with the existing aerated wastewater treatment system (AWTS) with subsurface irrigation is recommended.

The proposed addition is downslope of the AWTS unit. Therefore, a pumpwell (min. 1000 L with wired-in highwater alarm) is required to raise the raw sewerage to the treatment unit. Use a grinder/macerator-type pump for raising the raw sewerage.

A disk filter (130 micron / 120 mesh) is required on the distribution main and should be covered by a lilac-coloured valve box.

Three subsurface irrigation zones, totalling 700m², are required (SEE SITE PLAN):

- The existing (cut and fill) levelled area downslope of the main house is a suitable location for **LAA 1**. Using a design irrigation rate (DIR) of 2 mm/day, 200 m² is required here – use approx. dims: 10 m wide x 20 m long.
- The lower paddock, SW of the large dam is a suitable location for **LAA 2 and LAA 3**. These areas require a reduced DIR of 1.6 mm/day, due to slope angle (~6°). Each of these areas shall be 250 m² – use approx. dims: 10 m wide x 25 m long.

An indexing valve is required after the disk filter. A Three-Zone 1" Fimco/Netafim indexing valve is recommended unit because of its relatively low minimum operation pressure (7 m head) and relatively low head loss. A non-return valve is required on the outlet to LAA 1 because the LAA is upslope of the sequencing valve. All filters and valves are to be housed in lilac-coloured valve box(s), installed flush with the ground surface.

All land application areas are to be installed as subsurface irrigation under lawn. Use purple **Netafim Unibioline (internal diameter = 16 mm, dripper flow rate = 2.3 L/hr, dripper spacing = 0.3 m, pressure compensating drippers).**

NOTE: The local topsoils are light clay and clay loam. If conditions are wet, the site is **not suitable** for installation using a tractor mounted rig. In addition, to avoid compaction, LAA's are not to have vehicles or heavy machinery traffic during wet conditions - soil smearing/compaction will reduce permeability and may cause failure of the land application area.

To prepare the site at the LAA, the natural surface should be scarified prior to laying down the irrigation system.

Dripper line **laterals to be installed 1.0 m apart and along the contour** to achieve even distribution across the irrigation area – see Spec Sheet. This means:

- **LAA 1** will have 11 runs of dripper line (laterals), each 20 m long (total 220 m irrigation line) and;
- **LAA 2 and 3** will each have 11 runs of dripper line (laterals), 25 m long (total 275 m irrigation line per zone)
- Supply mains are to be installed at the downslope end of each supply header.

Cover the finished irrigation areas with a minimum of 150 mm sandy loam topsoil, seeded with grass.

Minimum irrigation pumping capacities for the proposed design are: **28 L/min @ 13.5 m to 35 L/min @ 10.5 m head**. When subjected to the maximum design hydraulic load of 1200 L/day, the pump will run for a maximum of **37 minutes per day**. If the minimum pump capacities are not achievable with the standard pump of the existing AWTS (check pump curve data), a **Zenox-040 (or pump of equivalent capacity) is recommended**. See Appendix 2 for hydraulic design calculations and minimum pump duty requirements.

If livestock are to be kept in the paddock surrounding LAAs 2 and 3, adequate fencing should be constructed around their perimeters. The area should be mowed to encourage grass growth, evapotranspiration and nutrient removal, clippings removed.

A new surface diversion drain is to be installed upslope of the LAA 2. Once constructed, the diversion drain should have adequate topsoil and grass seed to ensure successful pasture establishment. This will protect against soil erosion. There is an existing subsurface (Ag-style) drain behind LAA 1.

Gypsum should be applied to any exposed subsoil clays, at a rate of 1.0 Kg/m².

A 100% reserve area should be set aside for future wastewater requirements. See site plan.

NOTE: The LAA may require supplementary irrigation to maintain healthy grass cover if the system is consistently underloaded (i.e., by low occupation). Healthy plants are required for effective evapotranspiration – see Loading Certificate.

Compliance with *Directors Guidelines 2016* is shown in the attached table for acceptable criteria. It is recommended that Doyle Soil Consulting be notified of any major variation to the soil conditions or loading rate during construction as predicted in this report.



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APPENDIX 1 – TRENCH™

Doyle Soil Consulting

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Assessment Report

Upgrade OWMS for additional bedroom

Assessment for	Judith and Ivan Ross	Assess. Date	20-Feb-24
	70 Gumpits Rd, Birch's Bay	Ref. No.	
Assessed site(s)	70 Gumpits Rd, Birches Bay	Site(s) inspected	14-Feb-24
Local authority	Kingborough Council	Assessed by	R Doyle

This report summarises wastewater volumes, climatic inputs for the site, soil characteristics and system sizing and design issues. Site Capability and Environmental sensitivity issues are reported separately, where 'Alert' columns flag factors with high (A) or very high (AA) limitations which probably require special consideration for system design(s). Blank spaces on this page indicate data have not been entered into TRENCH.

Wastewater Characteristics

Wastewater volume (L/day) used for this assessment = 1,200 (using the 'No. of bedrooms in a dwelling' method)

Septic tank wastewater volume (L/day) = 400

Sullage volume (L/day) = 800

Total nitrogen (kg/year) generated by wastewater = 8.8

Total phosphorus (kg/year) generated by wastewater = 2.2

Climatic assumptions for site

(Evapotranspiration calculated using the crop factor method)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean rainfall (mm)	54	56	63	76	72	81	82	95	87	85	75	73
Adopted rainfall (R, mm)	54	56	63	76	72	81	82	95	87	85	75	73
Retained rain (Rr, mm)	46	47	53	65	61	69	70	81	74	73	64	62
Max. daily temp. (deg. C)	24	23	21	18	15	13	12	13	15	17	19	21
Evapotrans (ET, mm)	156	123	104	70	47	31	35	50	74	102	118	149
Evapotr. less rain (mm)	110	76	51	5	-14	-38	-35	-31	1	29	54	87

Annual evapotranspiration less retained rain (mm) = 295

Soil characteristics

Texture = Medium Clay

Category = 6 Thick. (m) = 1.5

Adopted permeability (m/day) = 0.06

Adopted LTAR (L/sq m/day) = 2

Min depth (m) to water = 3

Proposed disposal and treatment methods

Proportion of wastewater to be retained on site:	All wastewater will be disposed of on the site
The preferred method of on-site primary treatment:	In a package treatment plant
The preferred method of on-site secondary treatment:	In-ground
The preferred type of in-ground secondary treatment:	None
The preferred type of above-ground secondary treatment:	Trickle irrigation
Site modifications or specific designs:	Not needed

Suggested dimensions for on-site secondary treatment system

Total length (m) =	61
Width (m) =	10
Depth (m) =	1.5
Total disposal area (sq m) required =	1500
comprising a Primary Area (sq m) of:	725
and a Secondary (backup) Area (sq m) of:	750

Sufficient area is available on site

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

The calculated DIR for the category 6 soil at LAA1 is 2mm/day and an irrigation area of 200 sq m is required here (see site plan) the DIR at LAA's 2 & 3 (with an average slope of 6 degrees slope is 1.6 mm/day. Each of these irrigation areas (LAA 2 & 3) should be 250 sq m. total LAA therefore = 700 sq m. The system should have the capacity to cope with predicted climatic and loading events.

Doyle Soil Consulting
Land suitability and system sizing for on-site wastewater management
Trench 3.0 (Australian Institute of Environmental Health)

Site Capability Report
Upgrade OWMS for additional bedroom

Assessment for Judith and Ivan Ross	Assess. Date	20-Feb-24
70 Gumpits Rd, Birch's Bay	Ref. No.	
Assessed site(s) 70 Gumpits Rd, Birches Bay	Site(s) inspected	14-Feb-24
Local authority Kingborough Council	Assessed by	R Doyle

This report summarises data relating to the physical capability of the assessed site(s) to accept wastewater. Environmental sensitivity and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) site limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation		Remarks
					Trench	Amended	
	Expected design area	sq m	3,000		Very low		
	Density of disposal systems	/sq km	12		Low		
	Slope angle	degrees	6		Low		
	Slope form	Straight simple			Low		
	Surface drainage	Imperfect			Moderate		
	Flood potential	Site floods <1:100 yrs			Very low		
	Heavy rain events	Rare			Low		
A	Aspect (Southern hemi.)	Faces SE or SW			High		
	Frequency of strong winds	Common			Low		
AA	Wastewater volume	L/day	1,200		Very high		
	SAR of septic tank effluent		1.0		Low		
	SAR of sullage		2.5		Moderate		
	Soil thickness	m	1.5		Very low		
	Depth to bedrock	m	2.0		Low		
	Surface rock outcrop	%	0		Very low		
	Cobbles in soil	%	0		Very low		
	Soil pH		6.0		Low		
	Soil bulk density	gm/cub. cm	1.6		Moderate		
	Soil dispersion	Emerson No.	5		Moderate		
	Adopted permeability	m/day	0.06		Low		
AA	Long Term Accept. Rate	L/day/sq m	2		Very high		

To enter comments, click on the line below 'Comments'. (This yellowshaded box and the buttons on this page will not be printed.)

Comments

The site is suitable for onsite wastewater disposal with a very large area available. The site is limited by depth of soil and mildly dispersive medium clay subsoils, therefore secondary treatment and irrigation is required.

Doyle Soil Consulting
Land suitability and system sizing for on-site wastewater management
Trench 3.0 (Australian Institute of Environmental Health)

Environmental Sensitivity Report
Upgrade OWMS for additional bedroom

Assessment for Judith and Ivan Ross	Assess. Date	20-Feb-24
70 Gumpits Rd, Birch's Bay	Ref. No.	
Assessed site(s) 70 Gumpits Rd, Birches Bay	Site(s) inspected	14-Feb-24
Local authority Kingborough Council	Assessed by	R Doyle

This report summarises data relating to the environmental sensitivity of the assessed site(s) in relation to applied wastewater. Physical capability and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation		Remarks
					Trench	Amended	
	Cation exchange capacity	mmol/100g	100		Low		Factor not assessed
	Phos. adsorp. capacity	kg/cub m	0.7		Moderate		
	Annual rainfall excess	mm	-295		Very low		
	Min. depth to water table	m	3		Very low		
	Annual nutrient load	kg	11.0		Moderate		
	G'water environ. value	Agric non-sensit			Low		
	Min. separation dist. required	m	8		Very low		
	Risk to adjacent bores						
	Surf. water env. value	Agric non-sensit			Low		
	Dist. to nearest surface water	m	250		Moderate		
AA	Dist. to nearest other feature	m	7.5		Very high		
	Risk of slope instability		Low		Low		
	Distance to landslide	m	1000		Very low		

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

There will be a low environmental risk due to use of subsurface irrigation. Distances to both the downslope boundary and surface water is means a low risk of off-site movement.

APPENDIX 2 - Hydraulic Design, System Componentry & Pump Duty Requirements

LAA 1

System Sizing and Componentry for Subsurface Irrigation System for LAA 1			
Design Hydraulic Load (L/day)	Max. DIR (L/m ² /day)	Min. LAA (m ²)	
1200	2.0		
Sequencing valve required?	Valve make/model	Number of zones	Area/zone (m ²)
yes	1" Fimco/Netafim indexing	3	200
Zone width (m)	Lateral spacing (m)	Number of laterals	
10	1.00	11	
Dripper spacing (m)	Total length irrigation pipe (m)	Number of drippers/zone	
0.3	660	733	
Dripper flow rate (L/hr)	Zone flow rate (L/hr)	Zone flow rate (L/min)	
2.3	1686	28	
Supply line material	Supply line internal diameter (mm)	Supply line length (m)	
Lilac LDPE	31.7	13.00	
Filter Type	Make/Model (or equivalent)	Filter grade	
Disk	Arkal 1" short	120 mesh / 130 micron (RED)	

Dynamic Head Calculation		Pump Requirements	
Component	Approx. Head loss (m)	Min. pump capacity (LAA 1)	Max. Pump time @ Design Hydraulic Load (mins/day)
Supply line (friction @ flow rate)	0.2	28L/min @ 13.5 m Head	37
Filter (friction @ flow rate)	0.5		
Sequencing valve (friction @ flow rate)	0.6		
Other Fittings (friction)	0.2	35 L/min @10.5 m head	
Elevation differential from bottom of AWTS to highest point of LAA (m)	2.0		
Dripper line operating head (min)	10.0		
Total	13.5		

LAA 2 & 3:

System Sizing and Componentry: 3-Zone Subsurface Irrigation System			
Design Hydraulic Load (L/day)	Max. DIR (L/m ² /day)	Min. LAA (m ²)	
1200	1.6		
Sequencing valve required?	Valve make/model	Number of zones	Area/zone (m ²)
yes	1" Fimco/Netafim indexing	3	250
Zone width (m)	Lateral spacing (m)	Number of laterals	
10	1.00	11	
Dripper spacing (m)	Total length irrigation pipe (m)	Number of drippers/zone	
0.3	825	917	
Dripper flow rate (L/hr)	Zone flow rate (L/hr)	Zone flow rate (L/min)	
2.3	2109	35	
Supply line material	Supply line internal diameter (mm)	Supply line length (m)	
Lilac LDPE	31.7	75.00	
Filter Type	Make/Model (or equivalent)	Filter grade	
Disk	Arkal 1" short	120 mesh / 130 micron (RED)	

Dynamic Head Calculation		Pump Requirements	
Component	Approx. Head loss (m)	Min. pump capacity (LAA 1)	Max. Pump time @ Design Hydraulic Load (mins/day)
Supply line (friction @ flow rate)	1.6	28L/min @ 13.5 m Head	37
Filter (friction @ flow rate)	0.5		
Sequencing valve (friction @ flow rate)	0.9	Min. pump capacity (LAA 2 & 3) 35 L/min @ 10.5 m head	
Other Fittings (friction)	0.5		
Elevation differential from bottom of AWTS to highest point of LAA (m)	-3.0		
Dripper line operating head (min)	10.0		
Total	10.5		

Demonstration of wastewater system compliance to *2016 Directors Guidelines for On-site Wastewater Disposal*

Acceptable Solutions	Performance Criteria	Compliance
<p>A1 Horizontal separation distance from a building to a land application area must comply with one of the following:</p> <ul style="list-style-type: none"> a) be no less than 6m; or b) be no less than: <ul style="list-style-type: none"> i) 3m from an upslope building or level building; ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building; iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building 	<p>P1 The land application area is located so that</p> <ul style="list-style-type: none"> a) the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low.; and b) is setback a sufficient distance from a downslope excavation around or under a building to prevent inadequately treated wastewater seeping out of that excavation 	<p>Complies with A1 (a) Land application area will be located with minimum separation distance to proposed building of 6m.</p>
<p>A2 Horizontal separation distance from downslope surface water to a land application area must comply with (a) or (b)</p> <ul style="list-style-type: none"> a) be no less than 100m; or b) be no less than the following: <ul style="list-style-type: none"> i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water. 	<p>P2 Horizontal separation distance from downslope surface water to a land application area must comply with all of the following:</p> <ul style="list-style-type: none"> a) Setback must be consistent with AS/NZS 1547 Appendix R; b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable. 	<p>Complies with A2 (a) Land application area located > 100m from downslope surface water</p>

<p>A3 Horizontal separation distance from a property boundary to a land application area must comply with either of the following:</p> <ul style="list-style-type: none"> a) be no less than 40m from a property boundary; or b) be no less than: <ul style="list-style-type: none"> i) 1.5m from an upslope or level property boundary; and ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary. 	<p>P3 Horizontal separation distance from a property boundary to a land application area must comply with all of the following:</p> <ul style="list-style-type: none"> a) Setback must be consistent with AS/NZS 1547 Appendix R; and b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable. 	<p>Complies with A3 (b) (i) Land application area will be located with a minimum separation distance of 1.5m from an upslope or level property boundary</p> <p>Complies with A3 (b) (iii) Land application area will be located with a minimum separation distance of 7.5 m of downslope property boundary (7.5 m required)</p>
<p>A4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.</p>	<p>P4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must comply with all of the following:</p> <ul style="list-style-type: none"> a) Setback must be consistent with AS/NZS 1547 Appendix R; and b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable 	<p>No bore or well identified within 50m</p>

<p>A5</p> <p>Vertical separation distance between groundwater and a land application area must be no less than:</p> <p>a) 1.5m if primary treated effluent; or</p> <p>b) 0.6m if secondary treated effluent</p>	<p>P5</p> <p>Vertical separation distance between groundwater and a land application area must comply with the following:</p> <p>a) Setback must be consistent with AS/NZS 1547 Appendix R; and</p> <p>b) A risk assessment completed in accordance with appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable</p>	<p>Complies with A5 (b)</p>
<p>A6</p> <p>Vertical separation distance between a limiting layer and a land application area must be no less than:</p> <p>a) 1.5m if primary treated effluent; or</p> <p>b) 0.5m if secondary treated effluent</p>	<p>P6</p> <p>Vertical setback must be consistent with AS/NZS1547 Appendix R.</p>	<p>No limiting layer identified.</p>
<p>A7</p> <p>nil</p>	<p>P7</p> <p>A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols) from the unit do not create an environmental nuisance to the residents of those properties</p>	<p>Complies</p>

AS1547:2012 – Loading Certificate – AWTs Design

This loading certificate is provided in accordance with Clause 7.4.2(d) of AS/NZS 1547:2012 and sets out the design criteria and the limitations associated with use of the system.

Site Address: 70 Gumpits Road, Birchs Bay

System Capacity: 10 persons @ 120 L/person/day

Summary of Design Criteria

DIR: 1.6 - 2 mm/day.

Irrigation area: 700 m²

Reserve area location /use: Assigned – 100 % available

Water saving features fitted: Standard fixtures

Allowable variation from design flows: 1 event @ 200 % daily loading per quarter

Typical loading change consequences: Expected to be minimal due to use of AWTs and large land area

Overloading consequences: Continued overloading may cause hydraulic failure of the irrigation area, necessitating extension or replacement of the area. Risk considered acceptable due to monitoring through quarterly maintenance reports.

Underloading consequences: Lower than expected flows will have minimal consequences on system operation unless the house has long periods of non-occupation. Under such circumstances additional maintenance of the system may be required. Long term under loading of the system may also result in vegetation die off in the irrigation areas and additional watering may be required. Risk considered acceptable due to monitoring through quarterly maintenance reports.

Lack of maintenance / monitoring consequences: Issues of underloading/overloading and condition of the irrigation area require monitoring and maintenance. If not completed, system failure may result in unacceptable health and environmental risks. Monitoring and regulation by the permit authority required to ensure compliance.

Other considerations: Owners/occupiers must be made aware of the operational requirements and limitations of the system by the installer/maintenance contractor.

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

To: Owner name
 Address
 Suburb/postcode

Form **35**

Designer details:

Name: Category:
Business name: Phone No:
Business address:
 Fax No:
Licence No: Email address:

Details of the proposed work:

Owner/Applicant Designer's project reference No.
Address: Lot No:

Type of work: Building work ☐ Plumbing work ☒ (X all applicable)

Description of work:

(new building / alteration / addition / repair / removal / re-erection
water / sewerage / stormwater / on-site wastewater management system / backflow prevention / other)

Description of the Design Work (Scope, limitations or exclusions): (X all applicable certificates)

Certificate Type:	Certificate	Responsible Practitioner
	<input type="checkbox"/> Building design	Architect or Building Services Designer
	<input type="checkbox"/> Structural design	Structural Engineer
	<input type="checkbox"/> Fire Safety design	Fire Engineer
	<input type="checkbox"/> Civil design	Civil Engineer
	<input checked="" type="checkbox"/> Hydraulic design	Building Services Designer
	<input type="checkbox"/> Fire service design	Building Services Designer
	<input type="checkbox"/> Electrical design	Building Services Designer
	<input type="checkbox"/> Mechanical design	Building Service Designer
	<input type="checkbox"/> Plumbing design	Plumber
<input type="checkbox"/> Other (specify)		
Deemed-to-Satisfy: <input checked="" type="checkbox"/>		Performance Solution: <input type="checkbox"/> (X the appropriate box)
Other details:		

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers:	Prepared by: Doyle Soil Consulting	Date: Feb 2024
Schedules:	Prepared by:	Date:
Specifications:	Prepared by: Doyle Soil Consulting	Date: Feb 2024
Computations:	Prepared by:	Date:
Performance solution proposals:	Prepared by:	Date:
Test reports:	Prepared by: Doyle Soil Consulting	Date: Feb 2024

Standards, codes or guidelines relied on in design process:

AS1547-2012 On site domestic wastewater management.

AS3500 (Parts 0-5)-2013 Plumbing and drainage set.

Any other relevant documentation:

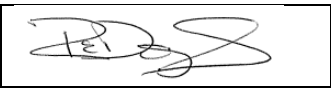
Site and Soil Evaluation Report

Attribution as designer:

I, Robyn Doyle, am responsible for the design of that part of the work as described in this certificate.

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act.

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

	<i>Name: (print)</i>	<i>Signed</i>	<i>Date</i>
Designer:	R Doyle		18/02/2024
Licence No:	CC7418		

Assessment of Certifiable Works: (TasWater)

Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.

If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.

TasWater must then be contacted to determine if the proposed works are Certifiable Works.

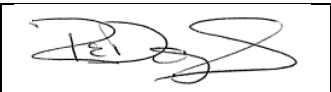
I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:

- ☒ The works will not increase the demand for water supplied by TasWater
- ☒ The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- ☒ The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- ☒ The works will not damage or interfere with TasWater's works
- ☒ The works will not adversely affect TasWater's operations
- ☒ The work are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- ☒ I have checked the LISTMap to confirm the location of TasWater infrastructure
- ☒ If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

Certification:

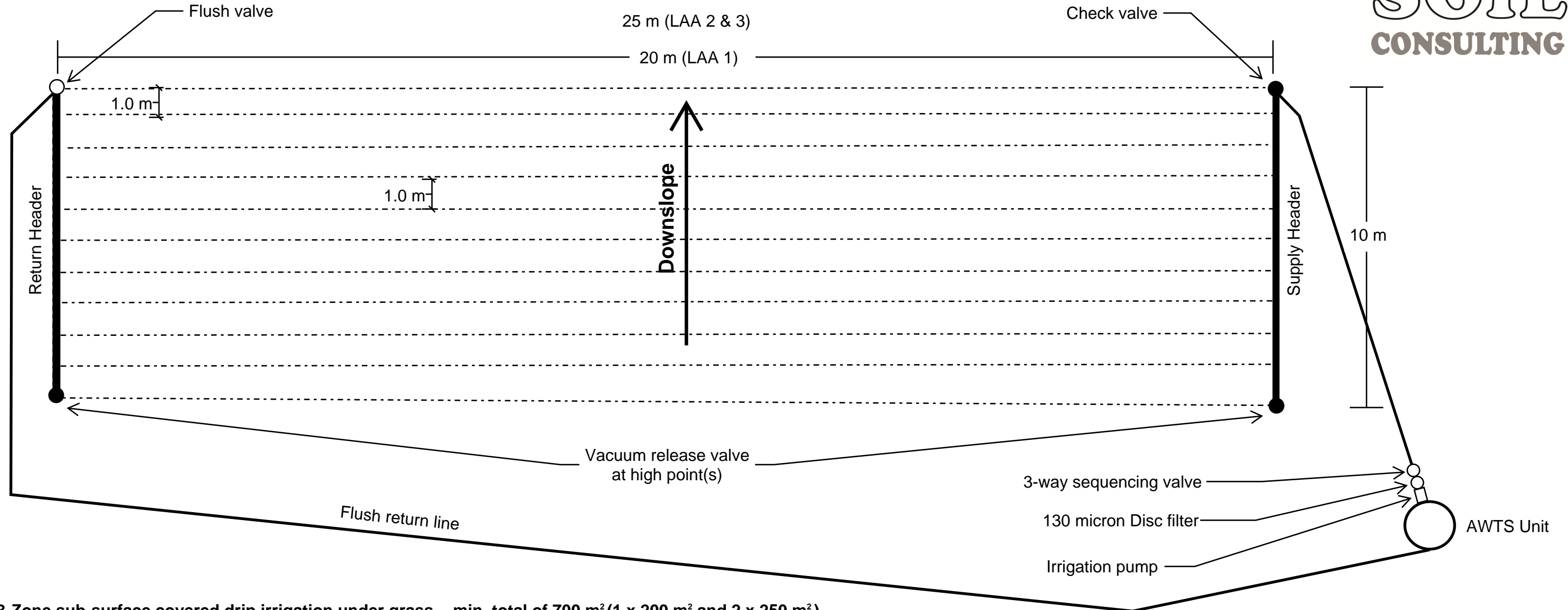
I,Robyn Doyle.....being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008*, that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: the Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au

	Name: (print)	Signed	Date
Designer:	Robyn Doyle		08/02/2024

70 Gumpits Rd, Birchs Bay Sub-surface Irrigation System (not to scale)

DOYLE
SOIL
CONSULTING



3-Zone sub-surface covered drip irrigation under grass - min. total of 700 m² (1 x 200 m² and 2 x 250 m²)

130 micron disc filter and 3-way sequencing valve at irrigation outlet of AWTS unit.

Natural ground surface at land application areas to be scarified prior to installation (not in wet conditions).

Dripper laterals to be laid along the contour (across slope) at 1000 mm spacing. Min. cover 150 mm with good quality sandy loam topsoil

Use Netafim Unibioline (16mm - 2.3 L/hr - 0.3m dripper spacing, pressure compensated, anti-siphon, non-leakage)

Supply and return manifolds (32 mm lilac LDPE) to be buried to a min. depth of 150 mm

Supply mains to be installed at the downslope end of each supply header

Install vacuum breaker/s at the highest point of each irrigation zone (this may be on the supply or the return manifold)

Valves and breakers to be in lilac-coloured surface boxes, installed flush with the finished ground surface.

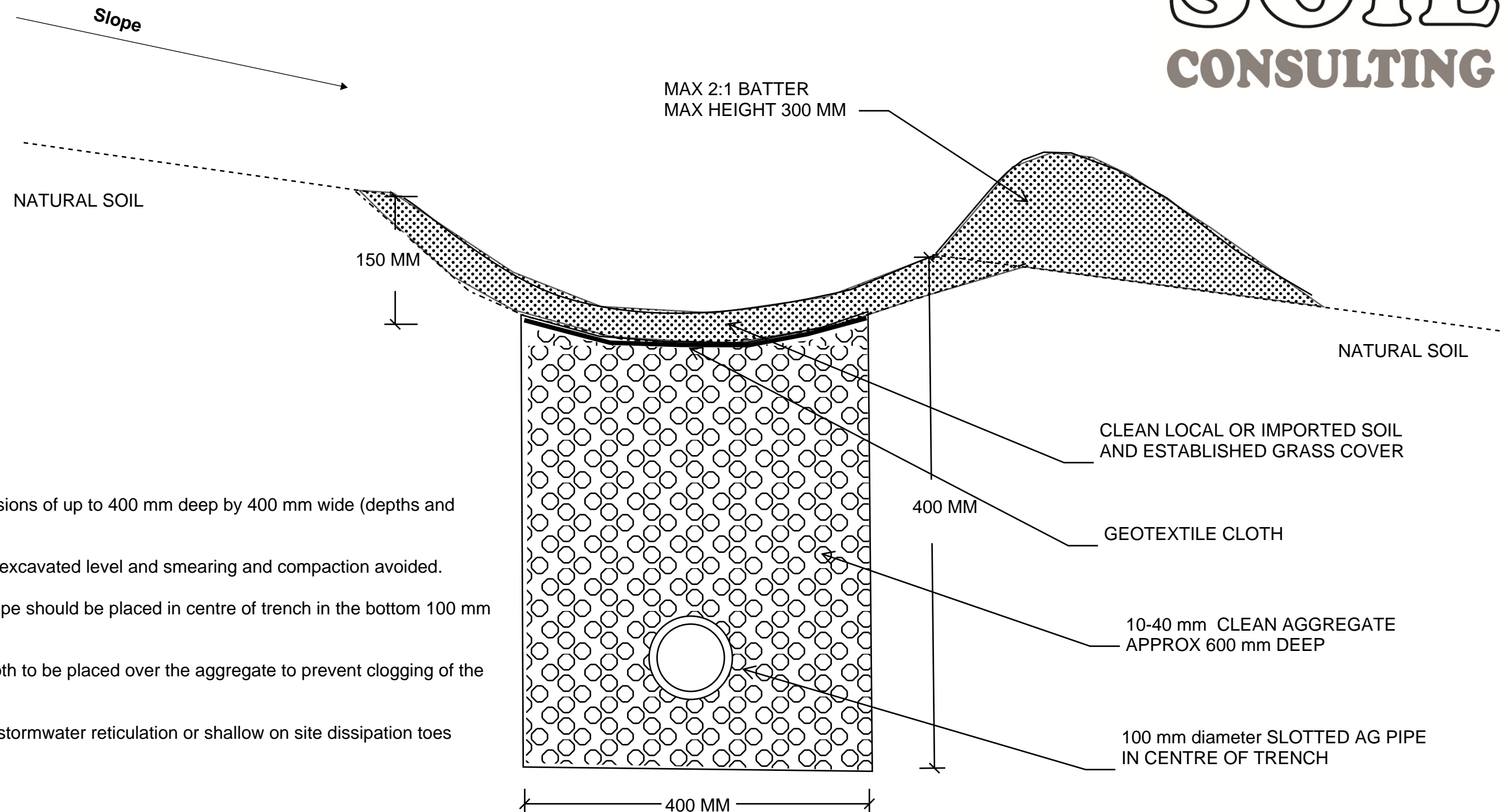
Flush valve to be installed, discharging either back in o the AWTS pump-out chamber (pictured above) or into a small trench 600 mm x 400 mm x 400 mm filled with 200 mm aggregate.

The minimum irrigation pump capacities are 28 L/min @ 13.5 m dynamic head, to 35 L/min @ 10.5 m dynamic head. If the minimum pump capacity is not achievable with the standard pump of the new AWTS unit (check pump curve data), a Zenox ZHS-040 (or pump of equivalent capacity) is recommended

During system testing, a minimum pressure of 100kpa (i.e. 10m of head) should be provided at the high point most distant from the AWTS discharge pump in each irrigation zone.

Condition and performance of the land application area to be monitored and reported on by maintenance contractor.

All onsite wastewater management systems are site-specific. Installer to refer DSC report and design spec sheets, and contact the system designer with any questions or proposed changes to the system prior to proceeding with changes.



Design notes:

Cut-off trench dimensions of up to 400 mm deep by 400 mm wide (depths and widths minimum).

Base of trench to be excavated level and smearing and compaction avoided.

100 mm slotted ag-pipe should be placed in centre of trench in the bottom 100 mm of the aggregate

Geotextile or filter cloth to be placed over the aggregate to prevent clogging of the pipes and aggregate

Trench discharge to stormwater reticulation or shallow on site dissipation toes across the contour.

Diversion Drain Detail

70 Gumpits Rd, Birchs Bay

Wastewater system:

Existing AWTS and new pumpwell with grinder pump

Minimum total subsurface irrigation area: 700m²
 - via three irrigation zones
 - Scarify ground surface at LAA before laying down irrigation line
 - Laterals installed along the contour
 - 1.0 m lateral spacing
 - Cover with 150mm seeded topsoil

LAA 1 dims: 20 x 10 m
 LAA 2 & 3 dims 25 x 10 m

Supply mains to be installed at the downslope end of each supply header. Flush returns to the distribution chamber of the AWTS

Installer to ensure irrigation pump capacity sufficient for servicing the new land application system - see wastewater design report for pumping duties.

Upslope diversion drain and livestock exclusion fencing required at LAA's 2 & 3

Min downslope boundary setback: 7.5 m
 Min upslope and side boundaries setback: 1.5m
 Min setback to downslope surface water: 11m

Approximate test hole locations

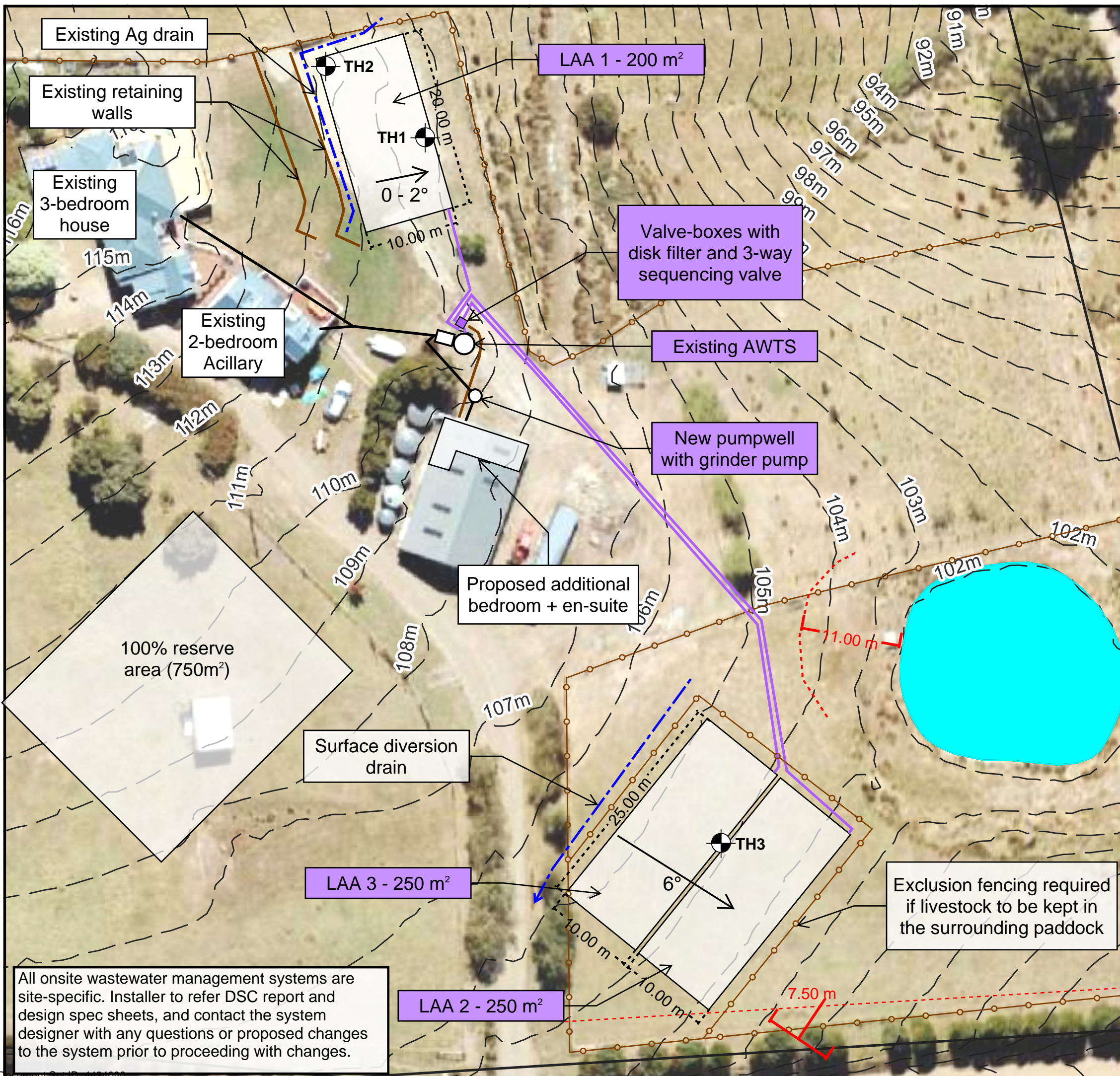
Refer to DSC report

Robyn Doyle
 Building Services Designer
 Hydraulic
 CC7418

5/3/2024

Prepared by
 Rowan Mason

20/2/24



All onsite wastewater management systems are site-specific. Installer to refer DSC report and design spec sheets, and contact the system designer with any questions or proposed changes to the system prior to proceeding with changes.