TechnologyOne ECM Document Summary
Printed On 27-Aug-2024

Class	Description	Doc Set Id / Note Id	Version	Date
PUB_ACC	Appendix 9 - Water Supply Design for RM161092	8029145	1	14-May-2024
PUB_ACC	Appendix 10 - Wastewater System Design Report	8029144	1	14-May-2024
PUB_ACC	Appendix 11 - Chorus 10784072 quote letter	8029143	1	14-May-2024
PUB_ACC	Appendix 12 - Aurora 20240315 Electricity Supply Availability Letter 832 Malaghans Road Speargrass Flat Arrowtown	8029142	1	14-May-2024
PUB_ACC	Appendix 13 - UPDATED Earthworks Plan 19.6.24	8101725	1	19-Jun-2024

WEBSTER DRILLING WELL COMPLETION FORM

JOB: DENNISON BH#1 ARROWTOWN
COMPLETION DATE: 15/07/2016
PROPOSED USE: DOMESTIC SUPPLY
TYPE OF WORK: New Well
DRILLER: KERRY STU
DEPTH DRILLED: 10.3M
COMPLETED DEPTH: 10.1M

GRAVEL PACK: 10.3M TO 8.3M

BENTONITE SEAL: 7.5MBGL TO 8.3MBGL

CASING DIAMETER: 100MM **SET FROM:** 10.1M **TO** .3MAGL **STICK UP:** 0.3M
CASING TYPE: PVC PRESSURE PIPE **WALL THICKNESS:** 8mm

SCEERN DIAMETER: 100MM **SET FROM:** 8.6MBGL **TO:** 10.1MBGL
SLOT SIZE: 3MM

HEAD WORKS: N/A
DIP PIPE INSTALLED: N/A **TYPE:** N/A **LENGTH:** N/A

CONCRETE PAD AT SURFACE: YES, 150mm THICK

PUMP TYPE: N/A **INTAKE SET AT:** N/A
RISER PIPE: N/A
TEST PUMPED: YES **START:** 14/07/2016 **FINISH:** 15/07/2016
DURATION: 24HRS **PUMPING RATE:** 40LPM
STATIC W/L: 2.2MBGL **DRAWDOWN TO:** 5.2MBGL

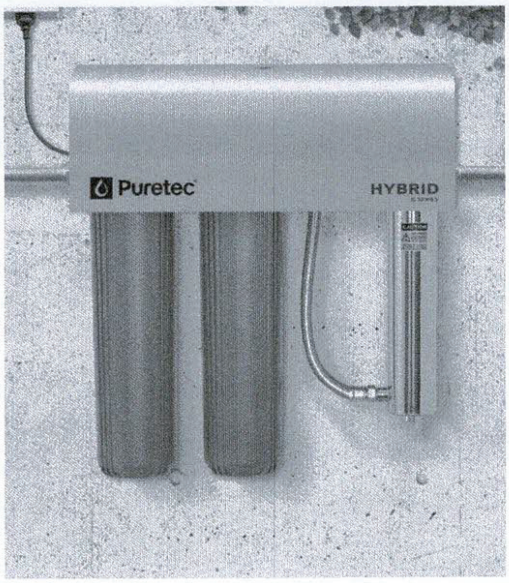
WATER SAMPLE TAKEN: YES **DATE:** **TIME:**
BY: CLIENT **TESTED AT:**

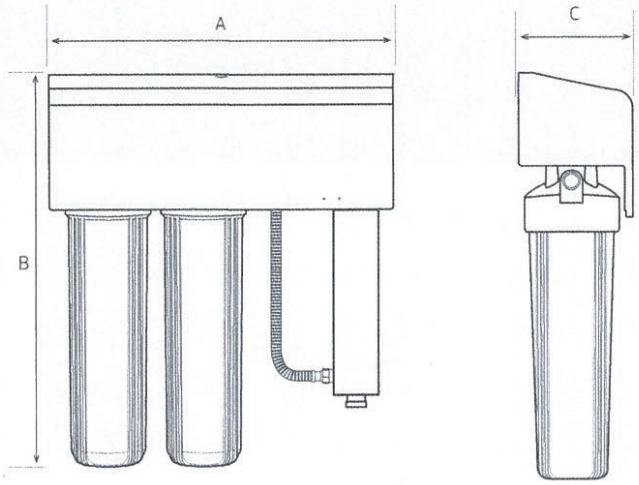
BORELOG

0-0.3m topsoil
.3m-4.0m blue/brown sands few gvls
4.0-6.2m blue schist minimal fractures
6.2-8.6m firm grey schist
8.6m-10.1m blue schist highly fractured
10.1-10.3m hard grey schist

Puretec

HYBRID-G SERIES





Model Number	A	B	C (Depth)
HYBRID-G8	670 mm	700 mm	211 mm
HYBRID-G9	670 mm	760 mm	211 mm

WaterMark
AS/NZS 200, 103
Licence No. WM 74693
ApprovalMark

GENERAL INFO

DESIGNED FOR MAINS & RAINWATER SUPPLIES

Filtration and Ultraviolet All in One Unit with Weather Cover

Puretec Hybrid Systems provide safe and purified water at every tap. Designed for both mains and rainwater supply, this filter system is highly effective in eliminating 99.99% bacteria and parasites in your water. The Hybrid Systems also reduces silt, sludge, dirt & rust giving good general purpose filtration.

SPECIFICATIONS

Model:	**Hybrid-G8**	**Hybrid-G9**
Replacement parts and cartridges:		
1st Stage Filtration	**PL20MP1**	**PL20MP2**
2nd Stage Filtration	**PX01MP1**	**PX01MP2**
High output UV lamp, 46 W	**RL6**	
Flow rate	**75 Lpm**	**130 Lpm**
Maximum temperature	**52°C ***	
Maximum Pressure	**875 kPa**	
Connection:	**1" BSP [25mm]**	

*Important Note: Use only genuine Puretec replacement cartridges. *3 Year Platinum Protection applies to Puretec Systems when used in conjunction with a Puretec filter cartridge. Warranty excludes cartridges.*

HYBRID DOSAGE

Flow rate @40mJ/cm²	**54 Lpm**
Flow rate @30mJ/cm²	**70 Lpm**
Flow rate @16mJ/cm²	**130 Lpm**

FEATURES & BENEFITS

- Dual filtration for extra sediment capacity
- High Strength Light-weight Aluminium bracket with Architectural Grade PVDF electro coating
- Fast plug & play installation
- Designed for harsh climate
- Quick and easy plug-and-play installation
- Equipped with a lamp count-down timer and alarm
- Anti-tamper & childproof lockable lid
- Hinged lid for easy access for lamp change
- 3 Year Warranty

ADDITIONAL INFORMATION

The Hybrid Series Kills 99.99% Of Bacteria & Parasites

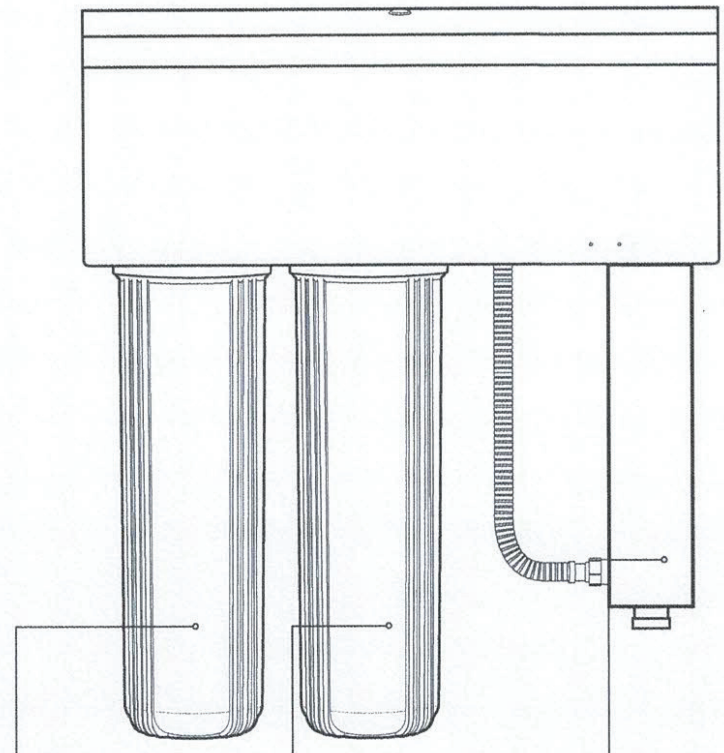
Thanks to its advanced UV technology – called Radfire™ – the Hybrid series kills 99.99% of tank water bacteria. Nothing else even comes close. Radfire™ is a natural water purification process, that's ecofriendly and completely chemical free. So you get safe, purified water at every outlet in the house.

It Filters Your Water Too

As its name suggests, the Hybrid series combines two technologies to clean your water. In addition to killing 99.99% of bacteria with UV rays, it filters out sediment and anything else that manages to pass through your rainwater tank's coarser filter. This not only makes your water safe, but also prolongs the life of your household appliances.

Longer Filter Life

The Hybrid series incorporates Puretec's long life filter technology, so you can go longer between filter replacements, and comes with our **3 Year Platinum Protection Warranty^.**



1 Stage 1 Filtration

A washable 20 micron sediment filter to remove silt, sludge, dirt, rust and other coarse particles

2 Stage 2 Filtration

A solid 1 micron filter to remove fine particles

3 Ultraviolet Protection

Kills 99.99% of bacteria with Radfire ultraviolet technology, a natural purification process that's completely eco-friendly and chemical-free

Features & Benefits

Weather-proof Cover
Light-weight Aluminium bracket with Architectural Grade PVDF electro coating

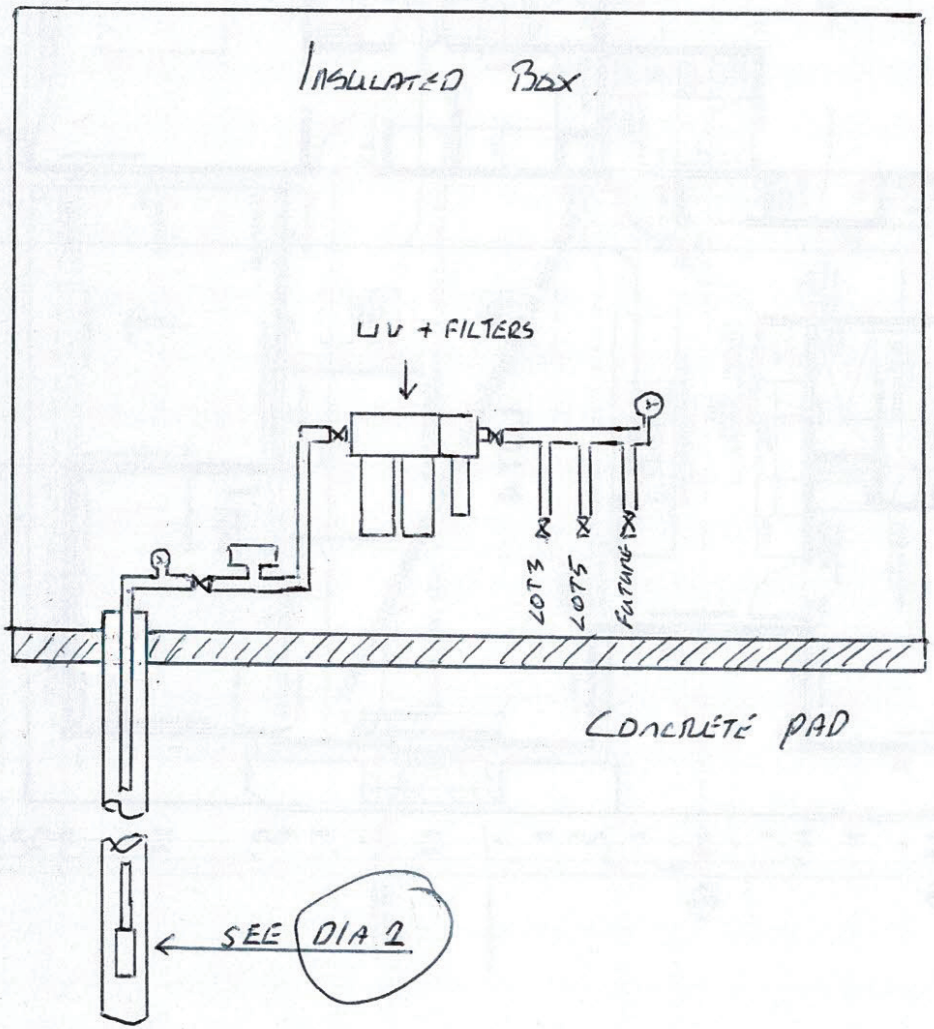
Weather Protection
The Hybrid incorporates a weather cover for outdoor installations

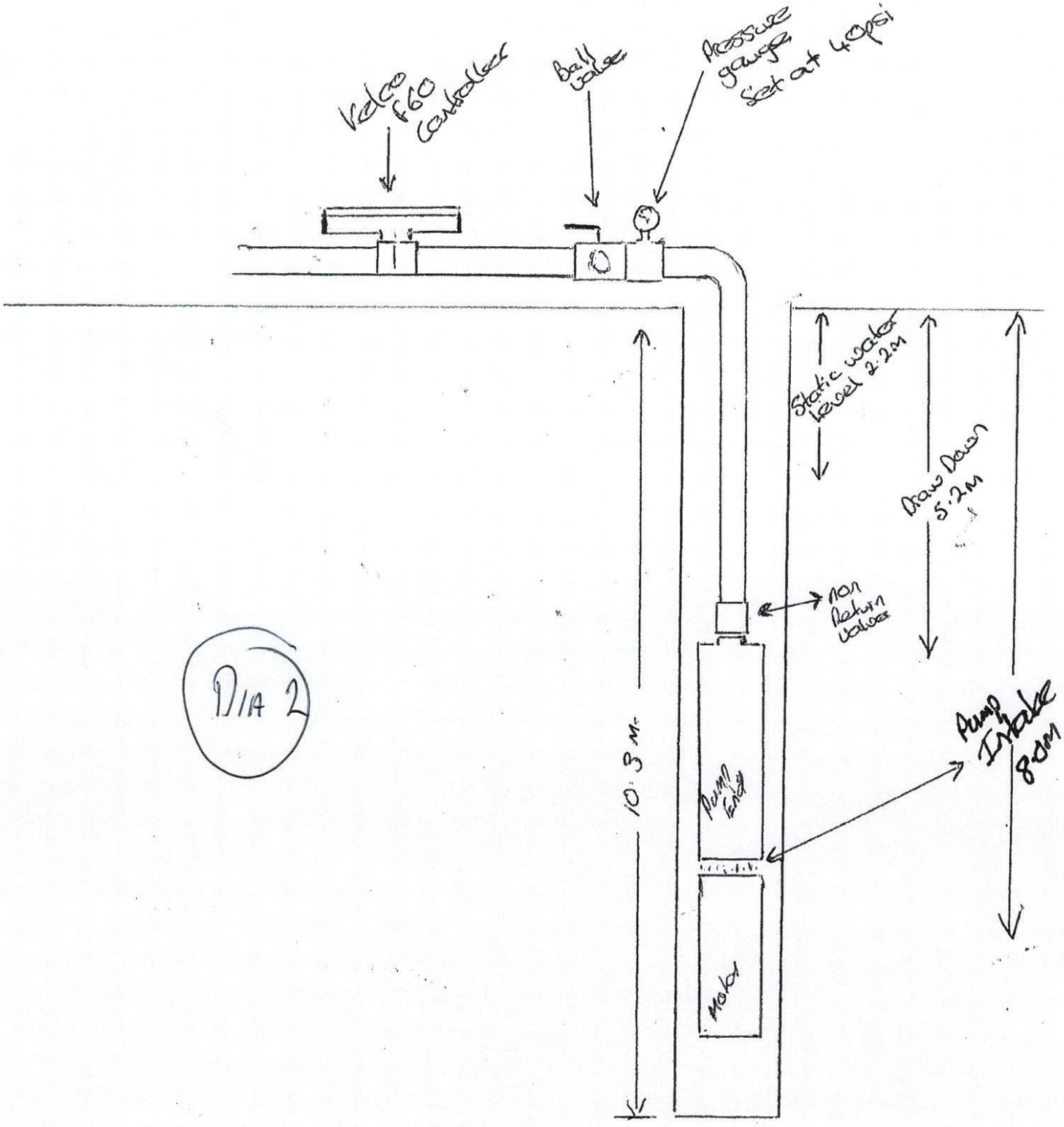
Excellent Corrosion Resistance
Constructed using high strength aluminium bracket, lid and stainless chamber ensures no rusting

Easy Installation
4 mounting points for quick and easy installation

Neatly Concealed Monitor Panel
Monitors the lamp life, failure alarm (audible & visible) and total running days of the Radfire UV unit

Anti-Tamper Design
Anti-tamper and childproof lockable lid


INSULATED BOX
UV + FILTERS
LOT3
LOT5
FUTURE
CONCRETE PAD
SEE DIA 2


Velco F60 controller
Ball valve
Pressure gauge set at 40psi
Static water level 2.2M
Draw Down 5.2M
Non Return Valve
10.3M
Pump Intake 8.0M
Pump End
Motor

DIA 2

LOWARA
a xylem brand

2GS03L4C M-M

Company Contact Phone number Email	Customer Contact Phone number Email	Date 3/10/2017 Item no. Project Project no.

Operating data

1	Pumpe type	Single head pump		Fluid		Water
2	No. of pumps / Reserve	1 /		Operating temperature t A	°C	4
3	Nominal flow	l/min	40	pH-value at t A		7
4	Nominal head	m	30	Density at t A	kg/dm³	1
5	Static head	m	0	Kin. viscosity at t A	mm²/s	1.569
6	Inlet pressure	bar	0.098	Vapor pressure at t A	bar	0.0083
7	Environmental temperature	°C	20	Solids		0
8	Available system NPSH	m	0	Altitude	m	1000

Pump data

9	Pump designation	2GS03L4C M-M		Impeller Ø	Max.	mm	76
10	Design	Electrical borehole pump			designed	mm	76
11	Make	Lowara			Min.	mm	76
12	Speed	1/min	2900	Flow	Nominal	l/min	39.4 (39.4)
13	Number of stages		7		Max-	l/min	50
14	Suction nozzle		/ /		Min-	l/min	
15	Discharge nozzle		/ /	Head	Nominal	m	29.1
16	Max. casing pressure	bar			at Qmax	m	18.8
17	Max. working pressure	bar	4.7		at Qmin	m	46.7
18	Impeller type			Shaft power		kW	.4 (.4)
19	Impeller design			Max. shaft power		kW	.4
20	Head H(Q=0)	m	47	Efficiency		%	52.09
21	Weight	kg	10	NPSH 3%		m	

Materials

22	Pump			
23	Delivery port	Stainless steel	Filter	Stainless steel
24	Valve cap	Stainless steel	Adapter	Stainless steel
25	Valve support	Stainless steel	Coupling	Stainless steel
26	Valve gasket	Nitrilerubber(NBR)	Cable cover screw	Stainless steel
27	Valve locking ring	Stainlesssteel	Cable cover	Stainless steel
28	Upper support	Lexan®		
29	Bush Bearing	Laripur®		
30	Split ring	Stainless steel		
31	Diffuser	Lexan®		
32	Impeller	Lexan®		
33	Stage housing	Stainless steel		
34	Shim	Stainless steel		
35	Pump shaft	Stainless steel		
37	Outer sleeve	Stainless steel		
36	Spacer	Stainless steel		
38				

Motor data

						Cable		
39	Manufacturer	Lowara	Electric voltage	230 V		Cable type		
40	Specific design	1 phase submersible canned motor				Cable cross section	mm²	
41	Type	L4C03M235	Electric current	3.3 A		Environmental temperature	°C	20
42	Rated power	0.37 kW	Degree of protection	IP68		Cable length		0
43	Speed	2820 1/min	Insulation class	F				
44	Frame size	4						
45	Weight	7 kg						

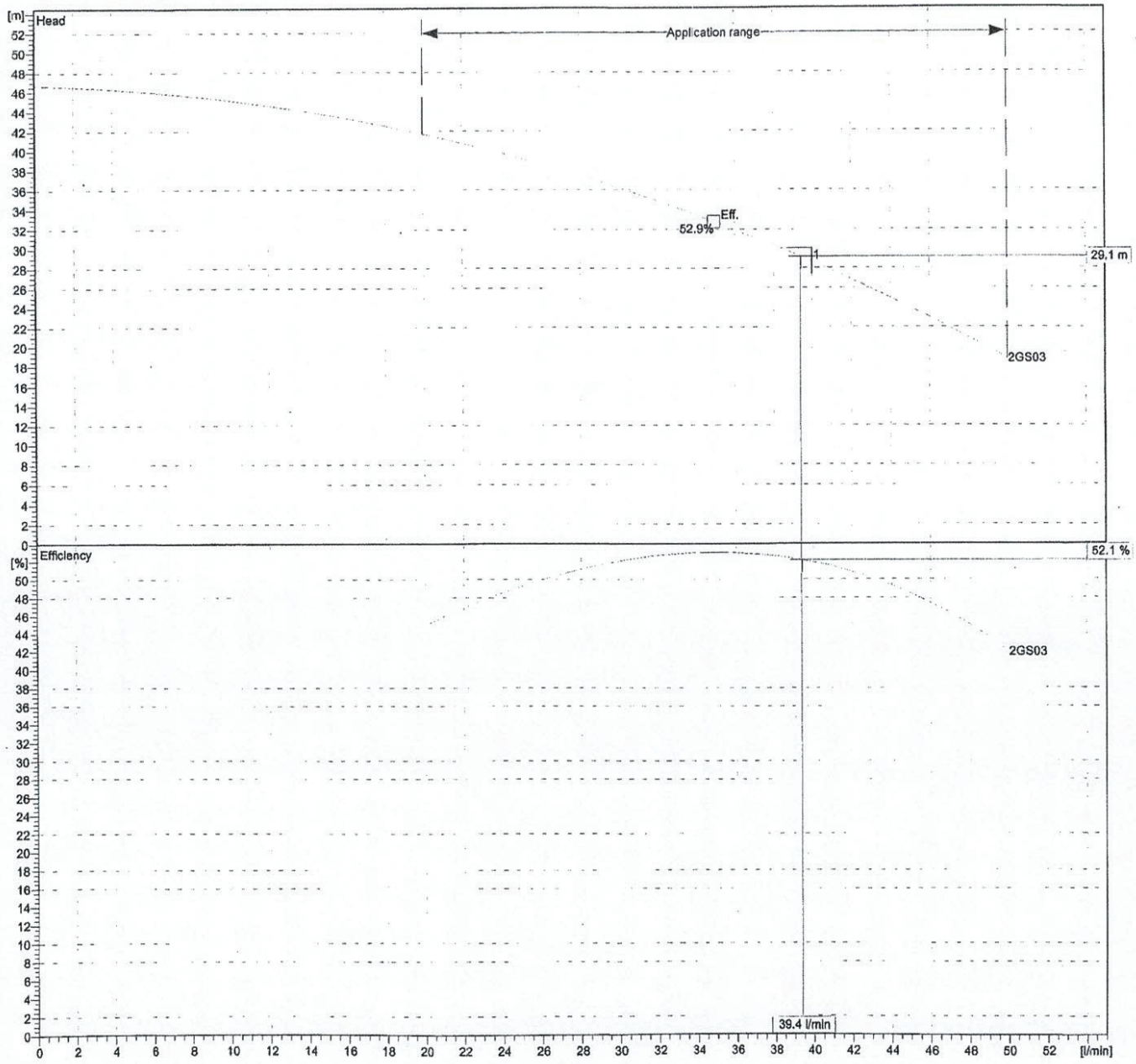
Base plate			Remarks:
46	Name		
47	Weight kg		

LOWARA
a xylem brand

2GS03L4C M-M

Company Contact Phone number Email	Customer Contact Phone number Email	Date 3/10/2017 Item no. Project Project no.
Operating Data Specification Flow 40 l/min Head 30 m Static head 0 m	**Hydraulic data (duty point)** Flow 39.4 l/min Head 29.1 m	**Impeller design** Impeller R 76 mm Frequency 50 Hz Speed 2900 1/min

Power datas referced to:
Water [100%] ; 4°C; 1kg/dm³; 1.57mm²/s
Performance according to ISO 9906 - Annex A



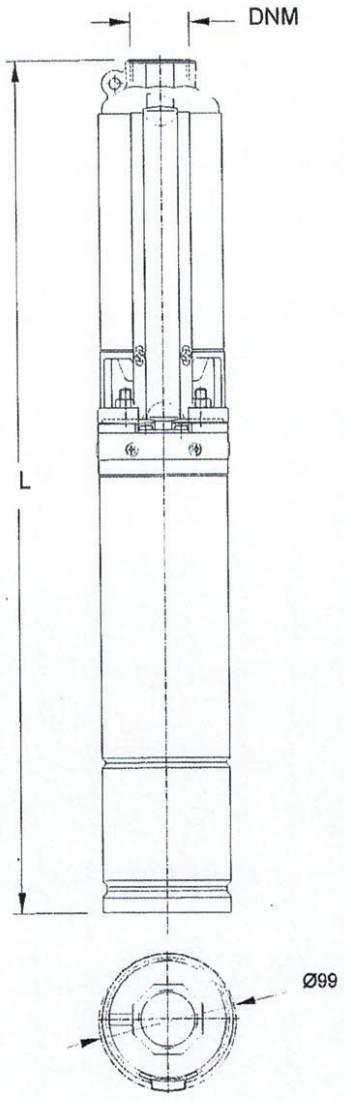
LOWARA
a xylem brand

2GS03L4C M-M

Company Contact Phone number Email	Customer Contact Phone number Email	Date 3/10/2017 Item no. Project Project no.

Dimensions mm

DNM	Rp 1 ¼					Suction side / PN Discharge side / PN Weight 9.9 kg



RML

Ralph Moir Limited
Registered Professional Surveyors
Planning
Property Development
Engineering

DOMESTIC WASTEWATER SYSTEM DESIGN REPORT

MacRae Residence
832 Malaghans Road

4 April 2024

RML File Ref: 24A13

101 Spey Street
(Postal 172 Moana Street)
Invercargill 9810
PH 03 217 2597
CELL 0274 372 662
EMAIL don@moir.co.nz
www.moir.co.nz

TABLE OF CONTENTS

LIST OF ACRONYMS:

1547	-	AS/NZS 1547:2012
CFU	-	Colony Forming Unit
CMA	-	Coastal Marine Area
DLR	-	Design loading rate as provided in 1547, Table L1
ES	-	Environment Southland
FC	-	Faecal Coliform
FOG	-	Fats, Oil and Grease
GW	-	Groundwater
LAS	-	Land Application System
LAWA	-	Land Air Water Aotearoa
LTAR	-	Long Term Acceptance Rate
NZBC	-	New Zealand Building Code
OWMS	-	On-site Wastewater Management System
ORC	-	Otago Regional Council
RC	-	Resource Consent
RML	-	Ralph Moir Limited
QLDC	-	Queenstown Lakes District Council
TA	-	Territorial Authority
TN	-	Total nitrogen
RWP	-	Regional Water Plan
WWTP	-	Wastewater Treatment Plant
PCDI	-	Pressure compensating drip irrigation

PART 1 – PURPOSE OF THIS REPORT

This report is prepared in terms of AS/NZS 1547:2012 (hereinafter referred to as 1547) for the guidance of those involved in the installation, construction, regulation, monitoring, operation and maintenance of an on site wastewater management system (OWMS) for the subject property. A very conservative approach is used to address the harsh winter conditions faced at this site.

RELEVANT DOCUMENTS:
AS/NZS 1547:2012 On-site Domestic Wastewater Management (1547)
Otago Regional Water Plan (RWP)
New Zealand Building Code (NZBC)

PART 2 - SITE DETAILS (desk top study)

Table 1 – Site Detail

OWNER	IP and RB MacRae
ADDRESS	832 Malaghans Road
LEGAL DESCRIPTION	Lot 5 DP 521688
PARCEL SIZE (ha)	16.9372
TERRITORIAL AUTHORITY	Queenstown Lakes District Council
REGIONAL AUTHORITY	Otago Regional Council
PROPERTY DESCRIPTION	The wastewater system will be servicing a proposed five bedroom dwelling. The OWMS is being future proofed to accommodate one additional bedroom making a total for design purposes of six bedrooms.
SPECIAL REGIONAL OR TERRITORIAL AUTHORITY REQUIREMENTS APPLICABLE TO THE SITE	The application site lies within the Lake Hayes catchment which is a nitrogen sensitive area.
RECORDED WATER BORES	RML does not consider any water take bores to be potentially affected by the OWMS.

PART 3 – SITE AND SOIL EVALUATION (field study)

Field Inspection Date	3.2.24
Carried out by	Don Moir

Test pits were excavated adjacent to the proposed LAS under the supervision of Geosolve Limited on 5.3.24.

The soil profile, whilst varying, generally comprised 200mm of silty topsoil overlying silty gravels to depths of between 1.7 and 3.1m.

Figure 2a – Test pit 1

Figure 2b – Test pit 2

Table 4 – Summary of Site and Soil Assessment

DISPERSIVE SOILS - Samples were taken and tested using the modified Emerson Aggregate Test over a 24-hour period. (1547 E7)	Both the worked ball and natural samples slaked but did not disperse.
IMPERMEABLE LAYERS	No impermeable layer found
GROUND SLOPE	Contours are shown on the site plan.
GROUND COVER	Pasture
BUILDINGS (2.0m minimum setback)	Dwelling setback will be approximately 200m.
BOUNDARIES (1.5 minimum setback)	Setback to the closest boundary will be approximately 8m.
FIELD DRAINS (20.0m minimum setback)	Nil within 20m.

WATER BODIES (20.0m minimum setback)	Nil within 50m. Mill Creek (also known as Dan Oconnell Creek) flows through the site. Setback from the LAS will be 174m.
WATER BORES	An existing bore (RM16-32501) is located on the subject site about 330m to the south west. Given the setback distance, relative ground height and it's location upstream of the proposed LAS, RML does not consider there is any potential effect to assess. Water takes F41/0462B and F41/0229 are located slightly further to the south west and for similar reasons will be unaffected.
GROUND WATER DEPTH	Ground water was not found in either pit.
MID WINTER GROUND WATER (perched water table)	n/a
NATURAL HAZARDS	The LAS site is not in a flood hazard area being elevated 10m above Mill Creek. That part of the site situated below RL 409.2 may be at risk of inundation from Mill Creek and accordingly the access covers and vents on the WWTP must be elevated above that level.
EFFECTS ON NEIGHBOURING PROPERTIES	There is no reason why there should be any cross-boundary effect.
CULTURAL RISKS Is consultation with Mana whenua required?	There are no special circumstances that would warrant consultation.
HAIL ACTIVITIES Is there any record of HAIL activity on the site?	A DSI was conducted in relation to previous HAIL activities in the western part of the site and the report found no evidence of contaminants in the soil at levels that would pose a risk to human health. There is no evidence of HAIL activities within the proposed LAS.
ARCHAEOLOGICAL SITES Are sites any sites of archaeological significance recorded on or near the site?	Nil recorded.

WATER BALANCE

A primary factor in assessing the risks and mitigation options for OWMS is consideration of the water balance components for the site. The water balance will also influence the in-soil treatment capability, particularly in terms of nutrient removal and pathogen attenuation.

The hydraulic inputs to the LAS are rainfall, stormwater run-off, interflow and the wastewater load. The hydraulic outputs are evapotranspiration, interflow, surface runoff and deep percolation which is a function of the long-term acceptance rate (LTAR).

The assessment of the soil sets the LTAR using, as a guide, the DLR values provided in 1547, Table L1.

When the hydraulic inputs exceed the outputs there is a high risk of surface ponding in the LAS and subsoil saturation. The saturated sub soils can create anaerobic conditions within the soil matrix if sustained for a significant period of time. These conditions will significantly reduce the LTAR and accelerate failure of the LAS leading to surface ponding of wastewater with consequent health issues. Surface and subsurface drainage can be used as a means of mitigating the risks associated with the stormwater patterns. Evapotranspiration and soil waterlogging may have to be engineered and managed as a means of risk mitigation through appropriate design such as mounding and planting of the LAS.

Ground water includes perched water tables which develop during the winter months above less permeable layers. 1547 recommends vertical setbacks from 0.6 – 1.5m depending on the following factors:

- Wastewater quality
- Ground water depth
- Soil drainage
- Geology and soils
- Landform
- Application method

Groundwater depth within the LAS is deep and does not factor in OWMS design.

The topsoil will saturate on this site for minor periods several times a year most particularly in winter. Application systems must be protected by elevating them above ground level and by shaping them so that rainfall is shed and by diverting any sources of stormwater. Failure to address this issue will result in partially treated wastewater being discharged above ground level thus contaminating surface water. Longer term this will lead to the LAS turning anaerobic and failing due to the corresponding reduction in wastewater infiltration into the soil.

The issue is being addressed by selecting a well elevated area for the LAS and by ensuring that potential stormwater sources are diverted. A very conservative DIR is being applied and dripper lines are being widely spaced apart.

PART 4 – LOADING RATES AND DISCHARGE QUANTITY

Table 5 – LTAR and DLR

ASSESSED LONG TERM ACCEPTANCE RATE AND DLR 1547 - Table L1	Soil Category: 2 / 3 Soil Texture: silty gravel Soil Structure: unstructured DIR 3.0mm/day. An extremely conservative DIR is being applied to avoid any potential impact on Mill Creek.
Reduction in DLR for slope	Nil

Table 6 - Calculation of Discharge

SOURCE OF POTABLE WATER	Bore
NUMBER OF BEDROOMS	6
NUMBER OF PERSONS DESIGNED FOR - Based on 1547 Table J1	10
AVERAGE DAILY DISCHARGE 1547 - Table H3	2000L - based on 200L/h/day.

PART 5 - CONSIDERATION OF RISKS AND OWMS ALTERNATIVES

The OWMS should be cost effective, practical, and operate with a minimum of owner intervention.

RML considers designs that have been previously used in the locality and shown to be effective to be preferable.

The OWMS will use a LAS where partially treated wastewater is discharged to land. There are three principal components.

i) Septic tank or treatment unit where primary and possibly secondary treatment takes place involving reduction in suspended solids through settlement and buildup of sludge in the bottom of the tank and trapping of fats and oils as a scum layer at the top of the tank followed where appropriate by secondary treatment;
ii) Distribution system whereby partially treated wastewater is applied to the soil, and;
iii) Final treatment of wastewater in the soil.

For each component there are a variety of options available.

SEPARATION OF GREYWATER AND BLACKWATER

The construction of two separate systems results in considerable additional cost with no advantage. It is important to appreciate that the quality of greywater is such that it must receive treatment prior to discharge to the soil and such treatment would not be significantly less involved than that applying to blackwater.

SEPTIC TANKS

RML considers single chamber tanks of large capacity to be preferable. It is relevant that the septic tank acts primarily as a settlement chamber with the only significant bacterial activity being anaerobic breakdown of the sludge accumulating in the tank bottom, so that tanks of large volume are preferable.

PRIMARY V SECONDARY SYSTEM

There are basically two styles of treatment system, primary and secondary. Primary systems comprise a septic tank followed by distribution to the soil. Secondary systems use further treatment, often involving aeration, before distribution to the soil.

RML considers that OWMS should be kept as simple as possible, so they require less maintenance and suffer less from a lack of maintenance. Long term performance regardless of the type of OWMS will be enhanced through regular maintenance.

DISTRIBUTION NETWORK SYSTEMS

Partially treated wastewater is applied to the soil where it is further renovated prior to reaching groundwater.

Soak holes and trickle feed systems do not load the soil uniformly and thus have a short life expectancy. They may also discharge wastewater direct to the ground water, which is environmentally unacceptable.

LPED comprises a network of pump dosed trenches where the partially treated wastewater is distributed to the soil by UPVC pipe with holes at nominal spacings.

The AES system is an alternative secondary management option using 300mm pipe in a sand bed.

A further alternative is pressure compensating drip irrigation line. This requires wastewater of secondary treatment quality.

Table 7 - SYSTEM OPTIONS (factors influencing choice of system)

Area available.	Secondary has smaller footprint so is preferable. The site is large enough that this is not significant.
LTAR and DLR.	Soil has medium LTAR and so secondary would help reduce footprint thus impacting on use of property less.
Site slope.	Most LAS' require level trenches which can be difficult to achieve with primary systems due to the long trench lengths required.
Depth to seasonal high ground water.	Sufficiently deep so as not to influence the choice of treatment option.
Duration of topsoil waterlogging.	Topsoil will be waterlogged frequently in winter. This applies regardless of system and must be controlled in all cases.
Dispersive soils	The soil is not dispersive.
High content of stones, cobles or boulders.	The soil is a gravel but that has little relevance with the style of the LAS to be used.
Climatic factors.	Apply regardless of system however rainfall does impact by way of stormwater and sub surface water and so can be more easily controlled by the use of secondary treatment. There will be no evaporation in winter and so this cannot be factored into the design. Frosts can be severe and so pipework must be kept 300mm below ground.

The site and soil conditions are suited to the on-site management of domestic wastewater subject to the following key risks:

- waterlogging of the topsoil during wet periods.
- Proximity to a sensitive receptor (Mill Creek).

These issues are being addressed by:

- locating and siting of the LAS on elevated part of the site
- diverting stormwater
- using secondary treatment and PCDI
- using a conservative irrigation rate

PART 6 - SYSTEM DESIGN – BEST PRACTICAL OPTION

Taking into consideration the site and soil conditions and the factors noted above RML considers the most practical option for this site to be secondary treatment followed by PCDI.

SECONADY TREATMENT:
FujiClean Ace NZ3000 wastewater treatment plant. This plant is rated at up to 3000L per day.

This plant has been chosen because of its high performance, achieving outputs of:
- BOD <10 mg/L
- TSS <10 mg/L)
- TN 33% reduction under loading of 3000L per day.

DOSING SYSTEM
- Pump chamber 2200L
- Davey D53/A-B which has proven to be a reliable pump well suited to this application.
- Pump activation by float switch set to deliver 200L dose and to empty chamber during cycle.
- Remaining 2000L chamber capacity is for emergency storage.
- Chamber to be fitted with sensor to alert owner to pump failure so corrective action can be taken – the sensor should activate a warning lamp mounted in a visually prominent position within the dwelling.
- Reflux (ball type) valve to be fitted downstream of pump.
- Feed pipe to application field 50mm (6 bar) LDPE.

LAND APPLICATION
- Discharge 2000L (maximum) per day (10 x 200L) / DIR 6mm/day = 666.7 m_2
- LAS: 666.7m of Rivulis D5000 PC dripper line
- 10 runs at 66.7m
- Flushing valves, one per pair of lines
- Line spacing 2.0m

HYDRAULIC PERFORMANCE
The LAS will comprise a total of 1,111 3.5L/H emitters resulting in a discharge rate of 65L/minute.

The resulting head loss in the 50mm rising main will be 2.35m which together with a 10m geodetic head results in total head of 12.35m which is at the bottom end of the specified pumps performance curve.

PART 7 – RISK ASSESSMENT FROM PATHOGENS AND NITROGEN

Treated wastewater will move downwards through the soil eventually reaching groundwater. Where the depth of soil is shallow or free draining there is a high risk of pathogen contamination. This is especially important where downstream water bores or other sensitive receptors might be affected.

Mill Creek, considered to be a sensitive receptor, flows through the site and so it is relevant to assess the potential risk to the creek from pathogens.

For analyses purposes the depth to groundwater (vadose zone) is being set at 2m.

Table 8 - Log_{10} **FC** reductions between LAS and bore.

	Log_{10}
Secondary treatment conservative estimate	1.0
Soil 0.5m x 2.47 log_{10}/m (Schijven 2017 Silt loam)	1.23
Vadose zone 1.5m x 0.2 log_{10}/m (Schijven 2017 sand and gravel)	0.3
Horizontal infiltration Worst case of saturated infiltration assumed 174m x 0.05 Log_{10}/m (Schijven 2017 fine sand)	8.7
Total	11.23

Raw WW (CFU/100mL)	1.00E+07
Effluent following log reductions (CFU/100mL)	5.88844E-05

LAWA guidelines for swimmable water quality in New Zealand set a limit of less than 50 Enterococci CFU / 100ml or less than 160 E. coli CFU /100ml and the discharge is well within those guidelines.

NZ drinking water standards set a limit of 1 CFU/100mL and with the above figure being considerably below this, the risk is less than minor.

CUMULATIVE RISK

Cumulative risk is primarily eliminated through the large size of the subject site which is 16.9 hectares.

Because of its solubility and mobility the cumulative effect on groundwater quality from nitrates presents the greatest risk whilst other contaminants are considered less significant.

Table 9 - Calculation of Total Nitrogen (TN)

	TN Balance
Household occupancy is expected to be 4 persons on annual average TN generated = 4 x 15gm/person/day = 60gm/day	60 gm / day
TN quantity per annum	21.9 kg / year
TN reduction in WWTP 33.3% = 7.29kg	14.6 kg / year
TN reduction in soil and vadose zone 10% - 1.46kg (RA Begs at al 2011 – loamy sand assumed)	13.1 kg / year
Final TN applied to sub soil	13.1 kg / year
The LAS is planted in perennial ryegrass which is to be cut and removed annually. Plant uptake can be expected to be 0.02kg/m2 (NZAEI 1984 Table 7.3). Based on a LAS area of 666.7m2, a further 15.5kg is removed leaving a net TN deficit.	- Negative 2.4 kg / year

Proposed ORC nitrogen limits within the Lake Hayes Catchment are 20kg / hectare / annum. The net nitrogen discharge from this OWMS will be a deficit of 2.4kg / year and so the effect is less than minor.

PART 8 - RISK ASSESSMENT - LIMITING FACTORS AND MITIGATION MEASURES

The below table is a summary of the issues identified and many of these will have been discussed more fully elsewhere within this report.
Risk items are scored from 1 to 5 with 5 being severe risk and 1 being low or no risk.

Table 10 – Risk Assessment Summary

ISSUE	RISK	MITIGATION MEASURE(S)	RESIDUAL RISK
Cumulative risk	1	With a parcel size of 16.9ha the risk is less than minor	1
Uniform distribution of wastewater to LAS	3	Pump dosing required	1
Development of mounded water table below LAS	1	Soils are well drained	1
Potential for LAS to be inundated by surface water during wet periods when upper soil is at field capacity	2	Locating LAS in an area free of stormwater (i.e. minimal or no upslope area) / diversion of stormwater	1
Potential for sub-surface water to affect system performance (i.e. is a perched water table likely to develop?)	1	Locating LAS on well elevated area where sub surface water is less of an issue	1
Lot size affecting availability of application area	1	No mitigation required	1
Highly permeable soils leading to ground water contamination or preferential flow paths	2	PCDI	1
Low permeability soils leading to LAS failure	1	n/a	1
Potential for system to be affected by widespread flooding	1	Site well elevated above flood plane	1
Proximity of sensitive receptors	4	Secondary treatment / LAS located away from receptor / conservative DIR	1
Proximity of potable water bores	1	No mitigation required	1
Availability of suitable topography for LAS	1	No mitigation required	1
Potential for maintenance to impact on short and long term system performance	4	There are maintenance requirements that must be observed and these are listed in the maintenance schedule.	**3**
Potential for LAS to fail leading to surface breakout	1	Conservative loading rate	1

Potential for system to be affected by chemical loading or owner abuse	3	Advice to owner is provided	**3**
Buildup of biological growth in LAS	3	The LAS pipework should be de-sludged as per the maintenance schedule.	**3**
Impermeable layers	1	No mitigation required	1
Shallow soils	1	No mitigation required	1
Shallow groundwater	1	No mitigation required	1
Ground slope	1	No mitigation required	1
Potential for stock to damage LAS	2	Stock to be excluded (light sheep grazing is acceptable)	1
Potential for system to impact on neighbours	1	No mitigation required	1
Risk of system being built across the property boundary	1	Boundaries well defined	1
Quality control during installation	5	This is a critical area and so an experienced drainlayer with certification is essential along with TA supervision	1
Potential for frost or cool soil temperatures to affect the biological system performance	3	Conservative loading rate	1
Potential for frost to damage system	3	300mm cover	1
Potential for system loading to exceed design allowance	1	Conservative design approach	1
Requirement for a reserve area for system replacement / extension	1	No mitigation required	1
Potential for WWTP to float due to shallow groundwater	3	Tie down required	1

RESIDUAL RISK

Three issues have been highlighted where risk remains despite the mitigation measures proposed, all of which relate to system maintenance over which the designer has little control other than to provide advice to the owner.

RML anticipates that a condition of consent will be imposed requiring appropriate maintenance of the OWMS.

PART 9 – INSTALLATION AND CONSTRUCTION GUIDELINES

INSTALLATION

1. Check location of existing services.
2. Confirm location of all components with owner. In the event of any discrepancy consult RML.
3. Establish a health and safety programme including appropriate barricading and signage.
4. Clear and prepare the site.
5. Discuss the potential loss of services with the owner if this is a replacement of an existing system.
6. Supply and install septic tank and system components.
7. Commission the system.
8. Erect appropriate fencing of system if required.
9. Satisfy all requirements of the Building Code and this system design.
10. Provide completion documentation to the owner or agent as required.

All materials and workmanship must comply with the relevant Standard applicable and the Building Act. All work is to be carried out by or under the direct supervision of an experienced and qualified Drainlayer. Should the Drainlayer not be familiar with this type of OWMS, RML should be consulted prior to commencing work. The following matters require specific attention but should not be taken as a complete guide to construction:

The Drainlayer must be authorized by Hynds Environmental Limited, suppliers of the WWTP, to install this system.

Refer to the WWTP installation manual which is appended.

The WWTP is to be anchored to avoid flotation.

DISK FILTER

The filter must be placed so it is easily accessed for regular cleaning. RML recommends it be raised above ground level between firmly grounded posts and mounted within a small shed to avoid frost damage.

FLUSH VALVES

The distribution lines are to be fitted with flush valves set in a suitable box to be located where it will be easily accessed and protected from damage. Each valve should be fitted with a short length of hose to allow the flushed sludge to be collected for disposal in the primary chamber of the WWTP.

AS BUILT PLANS

The location of all system components should be recorded in relation to property boundaries and the dwelling to facilitate ease of future location.
The size and class of all pipes should be noted.
The brand and model of pump should be recorded along with the date of commissioning and the results of the commissioning test.

A loading certificate should be supplied as per section 7.4.2(d) of 1547 – see Section 17.

PROTECTING THE LAND APPLICATION SYSTEM

Care needs to be taken in relation to stock and vehicular traffic impact on the LAS. Experience has shown that on lifestyle allotments light sheep grazing has little or no impact on most trench systems but care must still be exercised to ensure such grazing is of very low intensity. Mob stocking, particularly in winter and grazing by heavier stock such as cattle and deer must be completely avoided by appropriate fencing.

The LAS must avoid trafficked areas such as gateways and lanes and adequate setbacks need to be allowed adjacent to tree lines to permit access for hedge trimming.

Experience has shown that proximity to common shelter plants such as Macrocarpas and Leylandi has no impact on pump dosed primary systems but more invasive species such as Willows should be avoided.

OPERATION AND MAINTENANCE SCHEDULE

Refer to the appended maintenance manual.

A maintenance contract with an authorized service agent is strongly recommended.

CRITICAL MAINTENANCE

It is vital that the homeowner is aware of the following information.

The single most important maintenance requirement is the need for regular cleaning of the disk filter located downstream from the WWTP. Over time the filter can be expected to clog and restrict the flow thus forcing the irrigation pump pressure to increase. If left unchecked this is likely to cause premature pump wear.

The filter should be cleaned at monthly intervals until the homeowner establishes more clearly how often this is required.

ENSURE THE POWER SUPPLY TO THE WWTP IS TURNED OFF PRIOR TO REMOVING THE FILTER.

Of equal importance is the need to flush the dripper lines on a regular basis. A single flush valve should be opened, the pump run and any sludge collected in a suitable container and appropriately disposed of.

HEALTH AND SAFETY

All persons involved in the installation, supervision and operation of the system shall at all times ensure that precautions are taken to protect their own health and that of other persons potentially at risk. Before commencing work a health and safety check should be carried out to identify the risks and adopt appropriate mitigation measures.

Table 11 - Risks and solutions may include, but are not limited to:

- Exposure to wastewater where the system is a replacement of an existing system or during routine system maintenance in future.	Use appropriate PPE and wash hands with appropriate antibacterial products along with observing general hygiene precautions.
- open pits and excavations such as the septic tank excavation	Provide barricades and signage as required. Where excavations are to be left un-supervised the barricading must be child proof.
- open covers on system components such as pump chambers and septic tanks	Ensure covers are placed immediately on all buried chambers including when such items are being stored on site prior to installation. All covers are to be child proof.
- potential collapse of deeper excavations in unsound ground	Where the excavation is over 1.2m deep or in unstable ground, no person is to enter the excavation without appropriate caging.
- future risk of collapse of un-trafficable system components such as septic tank	All un-trafficable structures are to be protected by way of appropriate and permanent barricading.
- Exposure to gases during maintenance. Septic tanks and other treatment chambers can contain deadly gases.	Work in these areas must be carried out by competent persons taking appropriate precautions.
- Risk from machinery on site	Ensure all persons have appropriate high visibility clothing. Ensure all machine operators and persons on the site understand the risk of potential injury from heavy machinery working on the site. At all times when approaching heavy machinery ensure the operator is aware of your presence.
- Heavy lifting slings, chains and hooks.	All such equipment must carry a current certification. The lifting machinery must be operated within its rated limit.
- EXISTING SERVICES	Ascertain the location of existing services and take care to avoid damage. Setback clearances to overhead electricity lines must be observed.

PART 10 – TERRITORIAL AUTHORITY INSPECTION

RML is to supervise the system construction and issue a PS4 construction supervision.

The installation contractor is to issue a PS3 construction.

Inspections will be made to ensure compliance with the design. A minimum of two site inspections are recommended, one during construction prior to backfilling and one upon completion.

During construction:

1. Pipework, joints and inspection openings all sound and watertight.
2. WWTP and pump chamber aare water tight and soundly anchored.
3. Dripper lines are specified size and type.
4. System flow test conducted.

Upon completion

1. Inspections raised to ground level.
2. Flush valves and air / vacuum valves set in boxes, marked, and suitably protected.
3. The disk filter is fitted and easily accessed.

PART 11 – COMPLIANCE ASSESSMENT

Table 12 - RWP COMPLIANCE (RULE 12.A.1.4)

a. Discharge capacity (2000L/day max) (L)
b. Discharge within restricted zones?
c. 50m from water bodies and mhws?
d. 50m from any bore?
e. Discharge to drain, water race or groundwater?
f. Effluent contained within the property?
g. Discharge causes flooding, erosion, instability, sedimentation or property damage?

The proposed OWMS will meet all of the above rules with the exception of b. and accordingly resource consent is required from ORC.

Table 14 - NZ BUILDING CODE

Section	Requirement	Met?
B1 Structural	The proposed structures are to be of such a standard to ensure public safety and protection of property.	There are no significant structural components that would trigger the requirements of B1 except for the septic tank which is to be protected from vehicular traffic and which is to meet the requirements of AS/NZS 1546.1:2008
B2 Durability	Requires that septic tanks and associated effluent fields have a durability of 15 years.	The Code is aligned with 1547 which states that system design life should be 15 years.
G1 Personal Hygiene	Safeguard people from illness and loss of amenity.	The system has been designed to adequately treat domestic wastewater on site without compromising the personal hygiene of the occupants.
G9 Electrical	The electrical installation has safeguards against personal injury.	The installation shall meet all requirements of the Electricity Act and Regulations under that Act and shall be carried out by a Licensed Electrician.
E1 Surface water	Safeguard people from illness or injury and other property damage and protect outfalls of drainage systems.	Stormwater and sub surface water is to be diverted from the system. The drainage systems will to be constructed to covey water to an appropriate outfall, avoid blockages and provide for maintenance access.
G13 Foul water	Safeguard people from illness due to illness or contamination resulting from personal hygiene activities and safeguard people from loss of amenity due to unpleasant odours or the accumulation of offensive matter resulting from foul water disposal.	Provide an adequate system for the storage, treatment and disposal of foul water. See below.

Table 15 - SYSTEM REQUIREMENTS UNDER G13 FOUL WATER

Requirement	Met?
Adequate capacity	yes
Adequate vehicular access for collection (septic tank to be accessible for cleaning)	yes
Avoid contamination of water supplies	yes
Avoid contamination of soils, ground water and waterways	yes
System constructed from materials that are impervious to foul water and water	yes
Avoid blockage and leakage	yes
Avoid foul air and gases accumulating within or entering into buildings.	yes
Avoid access by unauthorized people.	Yes
Permit easy cleaning and maintenance.	Yes
Avoid damage from superimposed loads or normal ground movement.	Yes
Resist hydrostatic uplift pressure.	yes

PRODUCER STATEMENT DESIGN

Issued by Don Moir - To be supplied to The Queenstown Lakes District Council

In respect of: design for new on-site wastewater management system at 823 Malaghans Road for IP and RB Macrae.

I Donald Ralph Moir state that I have applied the skill and care reasonably required of a competent on-site wastewater management system design professional in undertaking the site and soil investigation and system design for the work described in this report.

I further certify that I am competent by way of academic qualification and experience to undertake the work described.

As an independent Design Professional, I believe on reasonable grounds that the system will comply with the Building Act and the Resource Management Act and will be a permitted activity under the provisions of the Southland Regional Water and Land Plan and that this site and soil evaluation and system design conforms to AS/NZS 1547:2012.

I am a member of Survey and Spatial NZ and hold the following qualifications B.surv R.P.Surv L.C.S.

I hold Professional Indemnity Insurance for an amount not less than $200,000.

Approved: Don Moir (sighted and verified)

Date: 4 April 2024

PART 12 - DESIGN SUMMARY AND LOADING CERTIFICATE

Table 16 - Design Summary

SOIL CATEGORY	2/3
SOIL TEXTURE	Silt
SOIL STRUCTURE	unstructured
SOIL DRAINAGE	Well drained
DIR (mm/day)	3.0
APPLICATION BED SIZE (sqm)	666.7
OCCUPANCY (persons)	10
LOADING (L/day)	2000
PRINCIPAL LIMITATIONS	Proximity to sensitive receptor
PRIMARY / SECONDARY SYSTEM	Primary
LAS	10 runs of PCDI at 66.7m
WWTP	FujiClean 3000
PUMP CHAMBER SIZE (L)	2,000
RWP COMPLIANT	No

Table 17 - LOADING CERTIFICATE (1547 Section 7.4.2(d))

System capacity (persons)	10
Summary of design criteria	Refer to the preceding table.
Reserve area	Not specified.
Water efficient fittings, fixtures or appliances	n/a
Allowable variations from average design flows – i.e. allowable peak flows	n/a
Changes in loading	Variations in the daily loading are unlikely to materially affect system performance.
System overloading	Prolonged overloading of the system is likely to lead to failure of the land application field resulting in wastewater discharging to the surface.
System underloading	Loading the system at a lower daily volume than the design will have no affect on system performance.
Operation and maintenance	Refer to operators manual
Miscellaneous matters	A maintenance contract with an authorized agent is strongly recommended.

PART 13 – APPENDICES

1. FujiClean NZ3000 Technical information
2. WWTP installation manual
3. WWTP maintenance manual
4. WWTP owners manual (please ensure this is supplied to the owner)
5. Davey pump specs
6. Amiad tagline filter
7. Hynds Environmental typical PCDI guidelines
8. Acuflow boxes
9. RML PCDI guidelines
10. RML 2000L pump chamber specs
11. Geosolve test pits

REFERENCES

Moore et al
Moore C, Nokes C, Low B, Close M, Pang L, Smith V, et al. 2010. Guidelines for separation distances based on virus transport between on-site domestic wastewater systems and wells. ESR Crown Research, Client Report No. CSC1001.

Pang et al
Pang, Liping. 2009. Microbial removal rates in subsurface media estimated from published studies of field experiments and large intact soil cores. J.of Environmental Quality. Vol 38. July-Aug 2009. pp 1531-1559.

Schijven et al
Schijven, J., Pang, L., and Ying, G.G. 2017. Evaluation of subsurface microbial transport using microbial indicators, surrogates and tracers. In: J.B. Rose and B. Jiménez-Cisneros, (eds) Global Water Pathogens Project.

FujiClean
Wastewater Treatment Systems

HYNDS WASTEWATER

FujiClean ACE NZ3000 S.I.

Aerated Wastewater Treatment Plant

Technical Sheet WW 3.0ACENZ
Updated July 2023

Technical Information

Product:	FUJICLEAN ACE NZ3000
Model:	3.0 m³/day - FujiClean ACE NZ3000 Advanced Secondary System AWTS
Process:	Contact Media Filtration Technology
Codes:	WWTP3000ACE

Dimensions | Volumes | Weights			
Measurements	**Unit**	**Tank 1 ACENZ3000**	**Tank 2 Pump Station**
Total Height	mm	2515	2515
Entry Height	mm	1715	TBC on site
Exit Height	mm	1615	TBC on site
Length	mm	3880	N/A
Width/Diameter	mm	1840	Ø1372
Total Volume	m³	8.524	1.900
Operating Volume	m³	7.912	0.742
Weight	T	0.55	3.772
Main Service Entry Ø	mm	600	605
Primary Filter Access Ø	mm	450	N/A
Desludge Port Ø	mm	450	605
Inlet/Outlet pipe Ø	mm	Inlet = 100 Outlet = 100	Inlet = 100 Outlet = 32 (Pumped)

Material

Tank	FRP (Fibre Reinforced Plastic)
Media (Spherical-skeleton,netblock,net-hollow-cylindrical)	Polypropylene & Polyethylene
Aeration Ramp	PVC PN 16

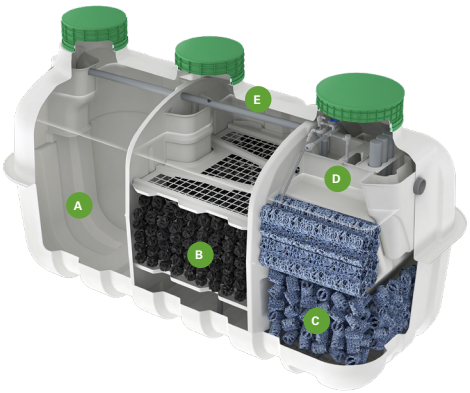
Performances

Influent Quality		
Parameters	**Unit**	**AS 1546.3:2017 Certified Limits**
BOD_5	mg/L	467
	kg/day	1.4
TSS	mg/L	467
	kg/day	1.4
TN	mg/L	100
	kg/day	0.3
Fat & Oil*	mg/L	50
Detergent	mg/L	10
Daily flow	L/day	3000
Application Limits	Domestic wastewater	
	• Double dwelling	
	• Max. 20 people	

Effluent Quality		
Parameters	**Unit**	**AS 1546.3:2017 Certified Limits**
BOD_5	mg/L	≦10
TSS	mg/L	≦10
TN	mg/L	30 (Average)
Dosing Volume	L/Activation	350 - 400

*** A grease trap is required for wastewater coming from a commercial kitchen**

Features



Legend
A. Primary treatment chamber
B. Anaerobic filtration chamber
C. Aerobic contact filtration chamber
D. Clarification chamber
E. Recirculation and sludge transfer

Operation

Installation Limits	
Traffic Load	Not permitted
Safe Loading (Max depth of cover to tank)	450 mm

Useful Volumes	
FujiClean ACE NZ3000 m³	7.912
Pump Station m³	0.742
Emergency Storage m³	1.770 (adaptable)

Maintenance	
Desludging Required (Primary Chamber)	3 Years
Servicing Frequency	6 monthly

Electromechanical Components	
Blower Type	Diaphragm FujiMAC200RII
Blower Rated Output	0.14kW
Average Noise Level	43 dB
Voltage	Single Phase 230V
Air Diffusers	2
Type of Air Diffusers	Air bubble
Type of Sludge Recirculation	Airlift
Controller	FujiClean ACE NZ3000
Pump Type	Submersible FS-756 or FS-5025
Pump Rated Output	0.55kW or 1kW

Consumables (Subject to Recommended Servicing)	
Air Filter	Every 1 year
Diaphragm	Every 1 year
Air Diffusers	Every 8 years

Components and Options

FujiClean ACE NZ3000 Components					
Kit Components	**Quantity**	**Length (mm)**	**Diameter/Width (mm)**	**Heights (mm)**	**Weight (T)**
Treatment System	1	3880	1840	2215	0.55
Filter Access Lid	2	-	Ø450	-	-
Main Access Lid	1	-	Ø600	-	-
Irrigation Filter - 130 Micron	1	-	-	-	-
Pump Station - FBØ1400x2100 w/ concrete lid, lid ring and maestro lid	1	-	Ø1372	2515	3.772

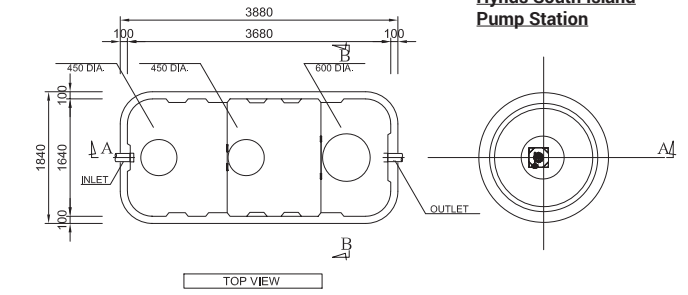
Note: Pump Station to be ordered separately and assembled on site by contractor

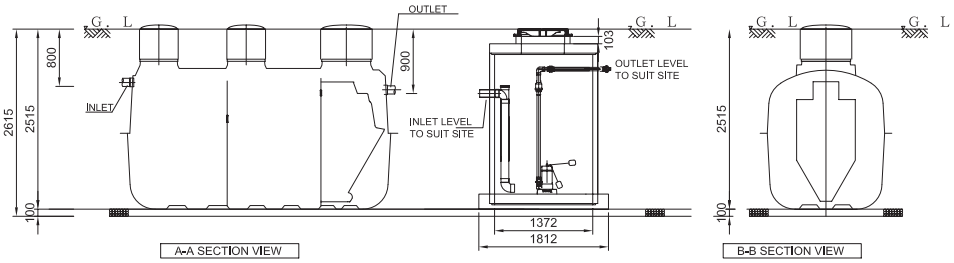
FujiClean ACE NZ3000 Options					
Kit Components	**Quantity**	**Length (mm)**	**Diameter/Width (mm)**	**Heights (mm)**	**Weight (T)**
PP Riser Kit Complete	-	-	2x Ø45 1xØ60	150	-
PP Riser Kit Complete	-	-	2x Ø45 1xØ60	300	-
PP Cover Lids	-	-	2x Ø45 1xØ60	-	-
Pump - FS-756 or FS-5025	-	-	-	-	-
Blower - FujiMAC200RII	-	-	-	-	-

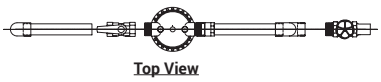
For further details please contact Hynds Waste Water Team

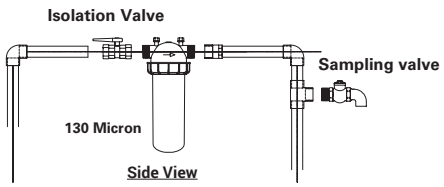
Dimensions

Hynds South Island Pump Station









Irrigation Filter Installation

NOTE: The sampling valve must be locked or rendered inoperable. Location of the sampling valve must be clearly marked "**Wastewater - Do not drink/use**"

Certifications/Accreditations
GLOBAL CERTIFICATION PTY LTD PRODUCT CERTIFIED JAS-ANZ

Warranties	Year	Extension
Tank	**10**	**NA**
Other Components	**2**	**NA**

Conditions of Warranty:

- Refer to Hynds Wastewater Warranty Terms and Conditions
- Commissioning report completed by trained installer
- Documented service history commencing from commissioning date

Supporting Documents and Resources	
Installation Manual	Owner's Manual
Operation and Maintenance Manual	Field Service Report
ReportGlobal Certificate AS1546.3:2017	Installation & Commisioning Report
Loading Certificate (By Designer)	Claims Procedure & Certificate of Warranty
ID card (where applicable)	Service Contract

Important Pump/s Disclaimer: The selected pump must match the hydraulic requirements of the land application system (LAS) for the specific on-site wastewater management system (OWMS). As there are several different LAS designs, each will require pumps to provide the required pressure and flowrate to ensure sustained and effective LAS performance. It is strongly recommended that the specifications of the selected pump for each OWMS are formally provided by the designer of each OWMS.

hyndswastewater.co.nz

0800 425 433

HYNDS WASTEWATER

FujiClean
Wastewater Treatment Systems

HYNDS
WASTEWATER

DOMESTIC WASTEWATER TREATMENT SYSTEM

FUJICLEAN ACE NZ3000

Installation Manual WW-ACE3000-IM (Feb-24)

FOR TRAINED INSTALLATION TECHNICIANS ONLY

Thank you for selecting the FujiClean ACE NZ3000 Wastewater Treatment System. Please read this Installation Manual carefully before commencing installation.

Important: The typical ex-factory valve settings on the ACE NZ1500 differ from ACE NZ3000:

	Aeration (Blue)	Recirculation (Grey)	Effluent (White)
FujiClean 1500	50%	25-35% 3-5L/min	40%
FujiClean 3000	50%	25-35% 9-12L/min	25%

TABLE OF CONTENTS

1. SAFETY PRECAUTIONS

Read the safety precautions carefully before installing the FujiClean ACE NZ3000 plant. The contents of this section are important to ensure safety.

Installation must be carried out in accordance with the relevant safety regulations. Hynds recommends a risk assessment be completed before commencing work. When reading this Installation Manual, please pay special attention to the following symbols.

⚠ WARNING	This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

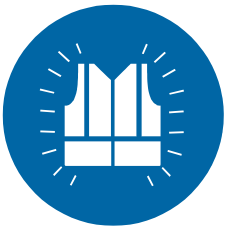
⚠ CAUTION	This symbol refers to a hazard or unsafe practice which can result in personal injury and/or the potential for product or property damage.

Recommended PPE

The following is the minimum PPE recommended during installation.


Safety Glasses


Safety Boots


Hi-Vis Clothing


Gloves

⚠ WARNING

Electrical Safety
- All electrical work must be carried out by a licensed electrician.

Excavation Safety
- Before excavation work is carried out, underground services must be identified, and relevant information obtained (eg. location, type, depth, restrictions).
- All excavation work must be carried out in a safe manner in accordance with the relevant regulations and safe work practices.

Safe Lifting Procedure
- Lifting operations must be carried out in a safe manner and in accordance with all regulations.

Confined Spaces
- The FujiClean 3000 system is considered a Confined Space.
- Personnel are required to work in/around this Confined Space during installation and commissioning.
- Personnel must comply with AS/NZS 2865:2001 Safe Working in a Confined Space and New Zealand Regulations, such as HSWA.
- The contractor is responsible for ensuring staff have the required training, monitoring and appropriate controls in place.

⚠ CAUTION

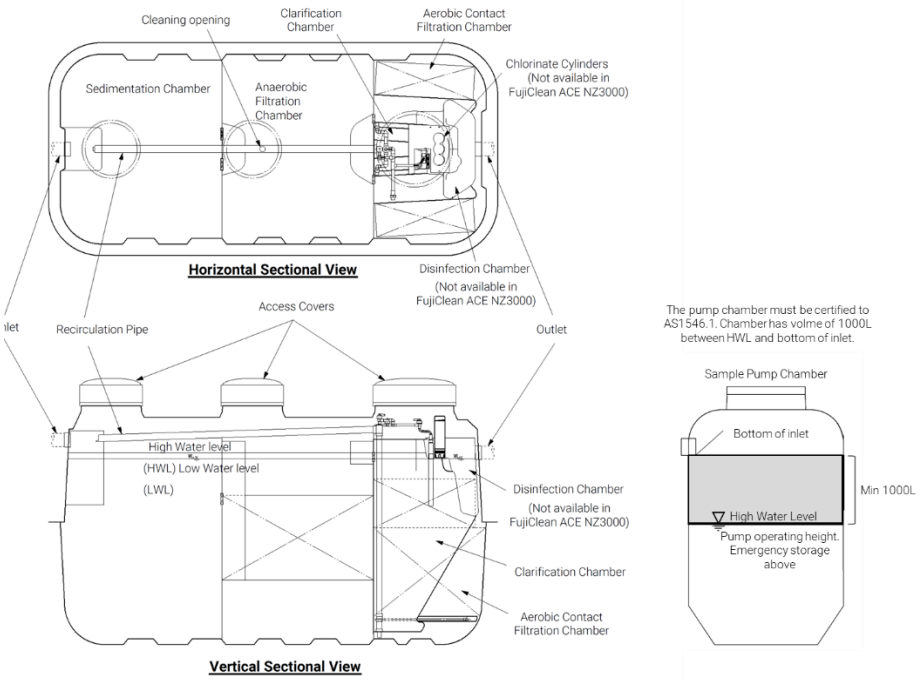
Access Cover Lids
- Ensure the access covers are securely closed during installation and operation.
- Make sure no vehicular traffic loads are applied to the access cover lids during installation and operation.
- Do not stand on the access cover lids.

Preventing Physical Loading of Tank
- Maximum ground cover depth above the top of the system is 450mm. Risers or ground cover exceeding 450mm will void the warranty.
- Ensure the area around the system installation is always free of vehicular traffic. Heavy vehicles can deform the ground and damage the tank, especially if the tank is installed in soft ground. Heavy loads/vehicles must be >4m from the tank.

Above Ground & Half Buried Ground Installations
- The FujiClean ACE NZ3000 system is designed to be installed below ground, as per this installation Manual.
- Do not install this system above ground or half buried above ground without consulting Hynds Wastewater New Zealand for installation instructions.

2. SPECIFICATION OF THE SYSTEM

2.1 Components



2.2 Specifications

Dimensions | Volumes | Weights			
Total Height		2215	mm
Entry Height		1715	mm
Exit Height		1615	mm
Length		3880	mm
Width		1840	mm
Total Volume		8.53	m³
Useful Volume		6.99	m³
Weight		0.55	T
Main Service Entry Ø		600	mm
Primary Filter Access Ø		450	mm
Desludge Port Ø		450	mm
Inlet/outlet pipe Ø	Inlet	100	mm
	Outlet	100	mm

Electromechanical Components	
Blower Type	Diaphragm FujiMAC200RII
Blower Rated Output	014 kW
Average Noise Level	43 dB
Voltage	Single Phase 240V
Air Diffusers	2
Type of Air Diffusers	Air bubble
Type of Sludge Recirculation	Airlift
Controller	FujiClean ACE NZ3000
Pump Type	Submersible FS-756 or FS-5025
Pump Rated Output	0.55kW or 1kW

2.3 Installation in Areas with High Groundwater Levels

The FujiClean system must be installed in an area without flooding risk, including seasonal flooding. The designer is responsible for reviewing water levels, including seasonal flooding and selecting the appropriate tank. Under certain circumstances, the system can be installed when a water table is present.

If there is groundwater in the excavation or the system will be installed in a location with high groundwater levels, it is necessary to seek advice from a Consultant Engineer. Proper ballast design is essential to ensure the stability and integrity of the system.

⚠ WARNING	High groundwater levels can cause the tank to float, potentially damaging the treatment plant. If there is groundwater, STOP WORK and contact the Consultant Engineer.

3. INSTALLATION

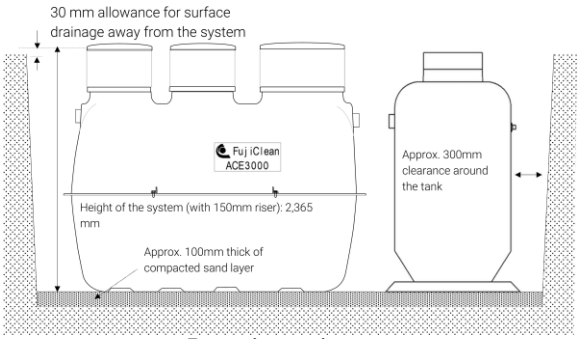
Step 1: Site Preparation

- Inspect the tank and all components for any damage during transportation. if any components are damaged, replace them before completing installation. The air blower, parts bag, and the submersible pump (if ordered) are stored in the middle chamber (anaerobic filtration chamber).
- The system must be installed away from building foundations and traffic areas so external pressure does not damage the system.
- In the event the system requires repair, please contact Hynds Wastewater New Zealand.

⚠ CAUTION	Warranty will be void if the system is installed and subjected to an external load.

Step 2: Excavation and Bedding

- The excavation should allow a min. 300mm clearance around the tank.
- Depth of the excavation should be decided based on the height of the system, terrain, surface drainage, and bedding.
- Spread and compact a layer of bedding sand or granular backfill (≤7mm dia). It should be approximately 100mm thick when compacted.
- Ensure the bed is level.



Excavation requirements

⚠ CAUTION	Warranty will be void if the system is installed incorrectly.

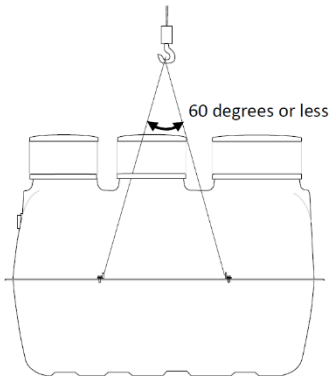
⚠ WARNING	High groundwater levels can cause the tank to float, potentially damaging the treatment plant. If there is groundwater, STOP WORK and contact the Consultant Engineer.

Step 3: Lifting the Plant

- Connect a suitable lifting device (e.g., spreader bar) to the four lifting points as shown in the drawing below.
- Lifting angle must be 60 degrees or less.

⚠ CAUTION	The outlet side of the tank is heavier, adjust the slings or chains so that the tank can be lifted horizontally.

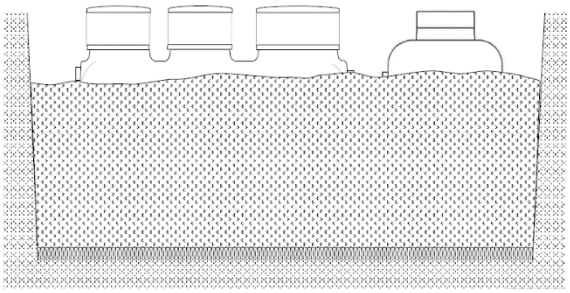
- Carefully lower the tank into the hole and place it on the bedding sand.
- Check tank is level in all directions. Maximum deviation allowed is 1/200, to ensure the system works correctly



Lifting angle of ≤60°

Step 4: Backfilling to Inlet

- Fill tank with water evenly throughout all chambers before any backfill is placed around the system.
- Make sure all lids are closed before backfilling.
- Backfill with another granular backfill, no greater than 7mm dia.
- Backfill must not contain any large stones, rocks, or sharp objects and must be carefully placed around the system.
- Native soil should not be used if it consists of heavy clay, as it may cause subsidence or damage to the system.
- Backfill layers must be watered and compacted.
- Do not use a compactor near the tank.
- Backfill evenly around the system up to the bottom of the inlet.



Layers are watered and compacted

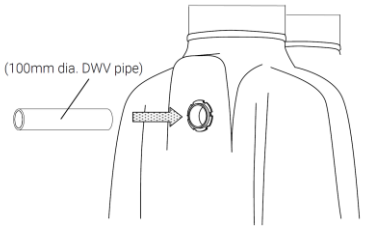
Step 5: Connections – ACE NZ 3000 System

1. Inlet

- Glue the supplied PVC pipe (100mm dia. DWV pipe) into the inlet fitting.
- Inclination of inlet pipe shall be 1/60 or more.

2. Outlet

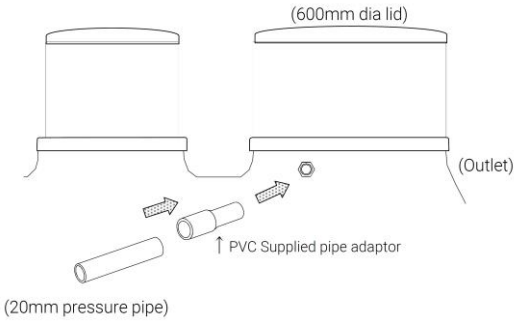
- Glue the supplied PVC pipe (100mm dia. DWV pipe) into the outlet fitting.
- Inclination of outlet pipe shall be 1/60 or more.



Inlet and outlet pipe connection

3. Blower Pipework

- Connect the blower to the system with supplied PVC pipe adaptor and the 20mm dia. pressure pipe
- Total length of pipe shall be 10m or less and the number of corner shall be 5 or less. Increase pipe diameter using reducer, if total length exceeds 10m.



Blower pipework

⚠ CAUTION	▪ Neglecting these processes may cause inundation of ground water. ▪ An out of level base may cause noise issues. ▪ Mounting risers more than 450mm would void the warranty.

Step 6: Connections – Pump Chamber

1. Inlet

- Glue the PVC 100mm dia pipe into the inlet fitting.

2. Pump Pipework

- Connect the pump(s) to the outlet with PVC pressure pipes and fittings. The pipe size and length can vary depending on the project.

Note: Please follow the installation procedure for the pump chamber according to the manufacturer. Internal pipework for the Pump chamber is not included in the supplied parts.

Step 7: Connections – Electrical Components

See Section 4, Electrical Installation.

Treatment monitor Unit

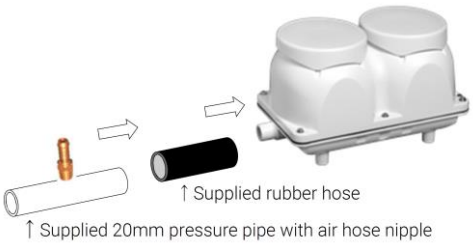
- Connect the control box housing to the pump out chamber with PVC pipes and fittings.

Air Blower

- Connect the air blower to the pressure pipe 20mm dia with the supplied rubber hose.
- Connect the treatment monitor unit to the air blower with the supplied air tube.

Conduit for Pump Cable and Float Switch

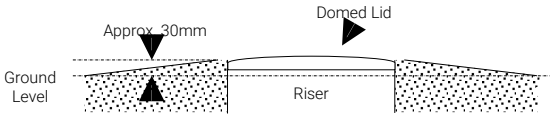
- Connect the control box housing to the pump out chamber with PVC pipes and fittings.
- Connect the float switch cable to the terminal block in an appropriate treatment monitor unit. Adjust and lock the height of the float switch so that the switch is triggered as soon as the pump fails.
- Connect submersible pumps to an appropriate treatment monitor unit.
- Apply seal plugs and silicone caulking onto each end of the pipework.



Example of air blower pipe connection

Step 8: Backfilling

- Backfill to the bottom of the access cover lid. The base of the lid should be approximately 30mm higher than the ground level so that surface water can flow away from the system.
- Completely cover the riser and tank with soil so that the risers and tank are not exposed. The Fibre Reinforced Plastic (FRP) material must be protected from UV sunlight.
- Over time, the backfill will subside. Add extra soil to completely cover the riser and tank.



Step 9: Close Access Cover Lids

- Close and secure all three access cover lids with screws supplied with the system.

Step 10: Owner's Manual

- Email an electronic copy of the owner's Manual to the owner, as well as any other relevant documentation.
- If the customer requests a hard copy, contact Hynds Wastewater New Zealand.

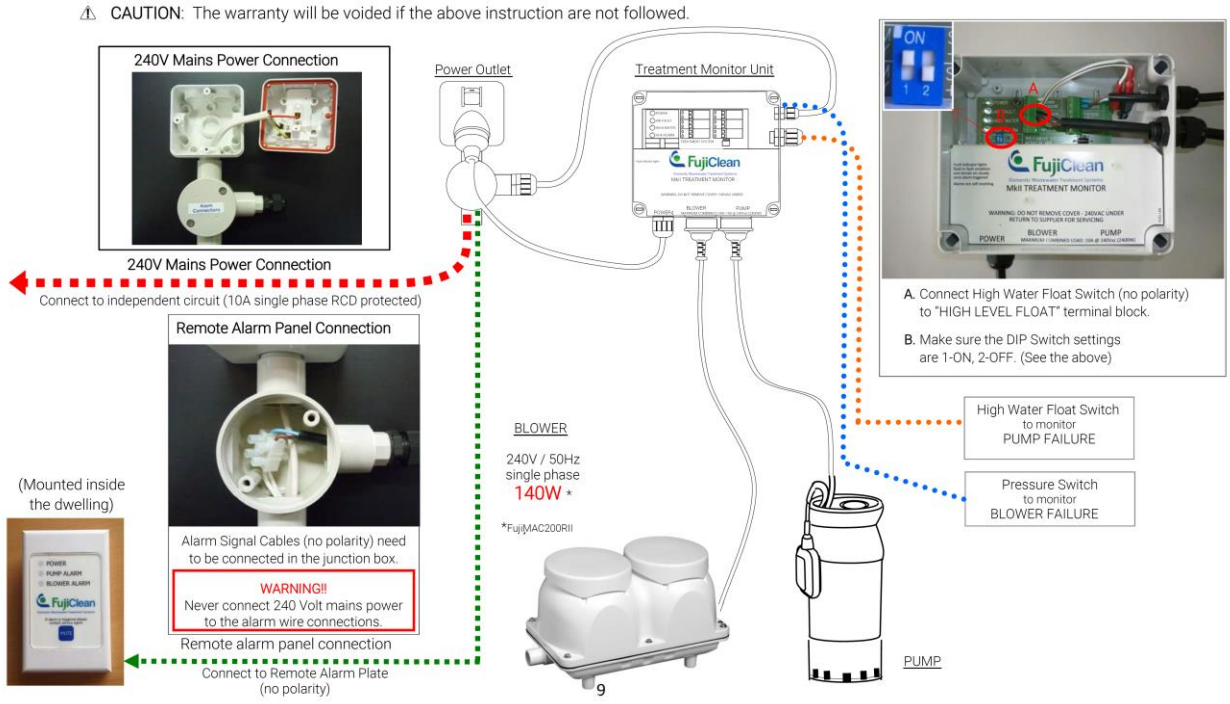
Step 11: Commissioning

- Commission the FujiClean ACE NZ3000 as per the Commissioning instructions on page 12.
- Complete the installation and Commissioning Report.
- Ensure the installation and Commissioning Report is stored for future reference (e.g., Warranty claim). Send a copy of the report to the owner.

4. ELECTRICAL INSTALLATION

- All electrical power connections to the system must be carried out by a licensed electrician.
- The power supply to the FujiClean ACE3000 is single phase service and requires a dedicated circuit protected by a 10A RCD.
- Connect 3-core cable to a power point (240V Mains Power).
- Connect remote alarm plate to the Treatment Monitor Unit with two wire cable. Since the two-wire alarm cable is enclosed in the same conduit as the mains supply to this unit back to the house, the cable must be rated for 240V to comply with the New Zealand Standards.
- Remote Alarm Plate must be positioned inside the dwelling in an area that is readily visible as per the New Zealand Standard. If this is not possible an LED strobe light must be placed on blower box which is readily visible from inside the dwelling.

⚠ CAUTION	The warranty would void if the above instructions are not followed.



5. COMMISSIONING

5.1 Pre-operational Inspection

Inspect and ensure the following requirements are met:

1. The system is accessible, and nothing inhibits maintenance.
2. Surface water is draining away from the system.
3. The system is filled with water, is level, and each component functions properly.
4. There is no damage to the tank, piping, or other components.
5. There are no air leaks in the air piping and the air piping is connected correctly.

5.2 Start Up the System

⚠ WARNING	FujiClean ACE 3000 is a Confined Space. Comply with AS/NZS 2865:2001 and New Zealand regulations.

1. Make sure electrical power is supplied to the system and all electrical components are plugged in properly.

2. Make sure the blower operates properly. To test: turn OFF the air blower for a few moments to check the alarm is triggered. Note: As there is a 60 second delay designed into the alarm, it will take 60 seconds until the air fault alarm is triggered

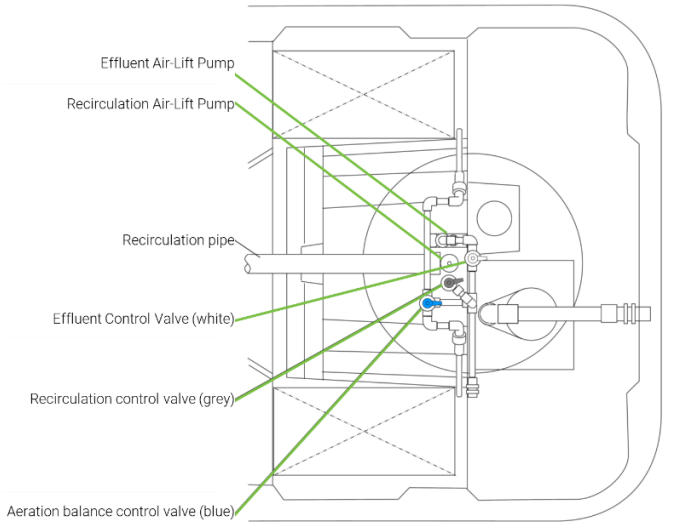
3. Lift up the pump float switch to check the pump operates properly and lift up the high-water float switch to check the alarm is triggered. Note: it will also take 60 seconds until the high-water alarm is triggered. Check the alarm monitoring unit as well as the remote alarm plate for alarm activation.

4. Set the Effluent Control Valve to 25, and then make sure the Effluent Air-lift Pump works while the water level is above the LWL.

5. Visually observe the airflow rates on each side of the Aerobic Contact Filtration Chamber to verify equal flow. if there is an obvious discrepancy in airflow between the two sides, adjust the Aeration Balance Control Valve so the airflow is equal.

6. Measure the recirculation rate at the end of the recirculation pipe while the water level is at the LWL. The recirculation rate should be approximately 4 to 6 times as much as the inflow rate. if the daily inflow volume is obtainable, calculate the appropriate recirculation rate accordingly. otherwise set the rate to 9 – 12 L/min.

7. Complete installation and Commissioning Report.



6. WARRANTY

Certificate of Warranty

February 2019

WARRANTY STATEMENT
The quality waste water treatment product you have purchased from Hynds Waste Water is covered under this comprehensive warranty as outlined in the following document and shall be read in conjunction with Hynds Terms and Conditions of Sale.

1. THE ENVELOPE (TANK)
Unless otherwise agreed in writing by duly authorised persons the structural integrity of the concrete tank shall be WARRANTED for a period of 10 years, commencing from the date of delivery; and all other components (parts only) of 2 years commencing from the date of delivery.

2. THE TREATMENT AND PERFORMANCE
The treatment and performance of the product (as defined in the user's guide supplied with the product) are guaranteed, provided that the terms and conditions set out in this document are complied with.

3. FOREWARD
Hynds Waste Water (hereinafter referred to as "HWW") manufacture and distribute products intended for the treatment of waste water. The purpose of this document is to inform the owner, or installer about
the warranty relating to HWW products. The warranty shall cover all waste water treatment products manufactured or distributed by HWW (hereinafter referred to as the "Product").
Products shall consist of an external envelope in concrete or in polyester and internal components can be accompanied by accessories such as but not limited to sockets, pump, raiser, lids and control panels. In this Agreement or other documents the term "End User Owner" shall be further defined as including or referring to any Purchaser or Customer of Hynds.

4. WARRANTY
HWW warrants to the owner that the product is designed to treat wastewater in compliance with the regulatory requirements in force at the time it is purchased in a new and unused condition.
Notwithstanding anything contained in this Warranty the liability of either Party to the other including the end user owner shall not in aggregate exceed the invoice price of the Goods in respect of which the liability occurs.
The different warranties shall apply from the purchase date by the end user owner of the product, provided that, pursuant to installation, users and operating instructions, the product:

- was correctly sized with consideration to hydraulic and organic loading as specified by the Customers engineer, approved designer or regulatory authority; and
- was correctly installed, connected and commissioned in strict accordance the manufacturers and local authority requirements by an approved and certified contractor, the Customers engineer, approved designer or regulatory authority; and
- is operated consistently within the parameters of which it was designed; and
- the Product receives regular servicing in accordance with the manufacturers and local authority requirements by an approved and certified contractor.

5. EXCLUSION FROM WARRANTY
The following types of damage including but not limited to shall be excluded and therefore void any warranty:
5.1 Any damage resulting from poor handling, transport (by a third party engaged by the customer directly) or storage defect. More generally, any damage caused by a third party that was not authorized directly by the manufacturer or distributor.
5.2 Any damage resulting from a modification of the product without having consulted the manufacturer or distributor beforehand (and having received either Parties written consent) about the modifications made to the product by any individual, company, agent or person.
5.3 Any damage resulting from an installation that does not comply with the requirements specified in HWW's installation guide (supplied with the product or available upon request at the following address: hwwsupport@hynds.co.nz) or those required by the local regulatory authority.
5.4 All damage resulting from a sizing error of the product, in particular with regard to the hydraulic and organic Load of wastewater intended for the product and to the legislation in force at the time the product was installed. The term "Load" shall refer to water, liquids, any elements sent inside the product to be stored or processed therein.
5.5 Any damage resulting from a change of the use of the product leading to a modification of the Load (flow rate and/or nature of wastewater) intended for the product.
5.6 Any damage caused by using the product in a way not compliant with the requirements set out by HWW in the user's instructions for the product (supplied with each product and available upon request at hwwsupport@hynds.co.nz).
5.7 Any damage caused by failing to observe the maintenance or operating instructions for the product as defined by HWW and as contained in the operating instructions for the product or any other document supplied with the product. Instructions are supplied with the product or are available on demand at hwwsupport@hynds. co.nz. The manufacturer reserves the right to review and update the instructions from time to time and it shall be the Customers responsibility to remained informed.
5.8 At the sole discretion of Hynds, any damage resulting from incorrect, incomplete and/or inadequate installation of the product essential to the correct functioning of the product.
5.9 Any damage resulting from a technical intervention on the installation by any individual, company or person who is not approved/certified (by the manufacturer or local regulatory authority), or does not have the correct equipment and knowledge to intervene on the product and its accessories. More generally, any modification or alteration of the product without the prior, written consent of HWW shall cancel the warranty granted by HWW and release the latter from its obligations without limitation.
5.10 Any damage resulting from elements such as the conditions of placement, conditions of installation, nature of the soil type, nature of the water to be treated or other similar external source that in the sole discretion of HWW is communicated inadequately, or with unreasonable delay or not at all to the installer and directly HWW by the end user owner, individual or company authorized by the latter or to whom said task was entrusted.
5.11 Any damage caused directly or indirectly, deliberate or accidental resulting from negligence, tort or unforeseeable circumstances of the installer, the end user owner, individual or company authorized by the latter. For the purposes of clarity this shall by extension also include force majeure, such as earthquake, storm, flooding, volcanic eruption, and as may be further defined.

6. IMITATION AND IMPLEMENTATION OF THE WARRANTY
If the product should malfunction and provided that the terms and conditions of the warranty are complied with, HWW shall proceed or nominate an agent to review as soon as practically possible the repair(s) required in accordance with the degree of malfunction and assessment by HWW, or at the sole discretion of HWW the replacement of the product or component(s) of the product as may be required.
Under no circumstances may HWW be held liable for damages of any kind including liquidated damages, direct or indirect, resulting from incorrect or unsafe use of the product. The end user owner is responsible for the daily supervision of the product, within the limits of their competencies, the latter must inform HWW immediately and without unreasonable delay (defined as not more than 5 business days) upon detecting a defect or malfunction of the product. Notification must be in writing to **hwwsupport@hynds.co.nz.**
Any call on the warranty must be made in writing, if possible using the appropriate form (documented entitled "Claim Card" likewise available upon request at hwwsupport@hynds.co.nz), sent to **hwwsupport@hynds.co.nz**.
If, after inspection, it turns out that the damage or defect ascertained by the end user owner, who has informed HWW, does not comply with the terms and conditions of warranty, and where the HWW cannot be held liable, HWW reserves the right to invoice all expenses incurred including but not limited to travel or time & material operations to the end user owner or individual, company or person(s) who has engaged HWW or their nominated repair agent for services

FujiClean
Wastewater Treatment Systems

HYNDS
WASTEWATER

DOMESTIC WASTEWATER TREATMENT SYSTEM
FUJICLEAN ACE NZ3000

Operation and Maintenance Manual WW-ACE3000-MM (Nov-23)

FOR TRAINED SERVICE TECHNICIANS ONLY

hyndswastewater.co.nz
0800 425 433

Please read this Operation and Maintenance Manual carefully before using the FujiClean ACE NZ3000 and keep it for future reference. The information contained in this manual is subject to change without notice. please contact Hynds Wastewater to request the latest manual.

Important: The typical ex-factory valve settings on the ACE NZ1500 differ from ACE NZ3000:

	Aeration (Blue)	Recirculation (Grey)	Effluent (White)
FujiClean 1500	50%	25-35% 3-5L/min	40%
FujiClean 3000	50%	25-35% 9-12L/min	25%

TABLE OF CONTENTS

1. SAFETY PRECAUTIONS

Read the safety precautions carefully before operating or servicing the plant. The contents of this section are important to ensure safety. Maintenance must be carried out in accordance with the relevant safety regulations. Hynds recommends a risk assessment be completed before commencing work.

When reading this manual, please pay special attention to the following symbols:

⚠ WARNING	This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

⚠ CAUTION	This symbol refers to a hazard or unsafe practice which can result in personal injury and/or the potential for product or property damage

Recommended PPE

The following is the minimum PPE recommended during installation.


Eye Protection


Safety Boots


Disposable Coveralls


Gloves

⚠ WARNING

Electrical Safety
- Do not touch any components in the blower box with wet hands.

Working in Confined Spaces
- The FujiClean ACE NZ3000 system is considered a Confined Space.
- Personnel are required to work in/around this Confined Space when maintaining and servicing this system.
- Personnel must comply with AS/NZS 2865:2001 Safe Working in a Confined Space and New Zealand Regulations, such as HSWA.
- The contractor is responsible for ensuring staff have the required training and monitoring and appropriate controls are in place.

Hazardous Gases
- Ensure there are no naked flames, smoking or other ignition sources (e.g., electrical equipment) around the wastewater tank and vents.

⚠ CAUTION

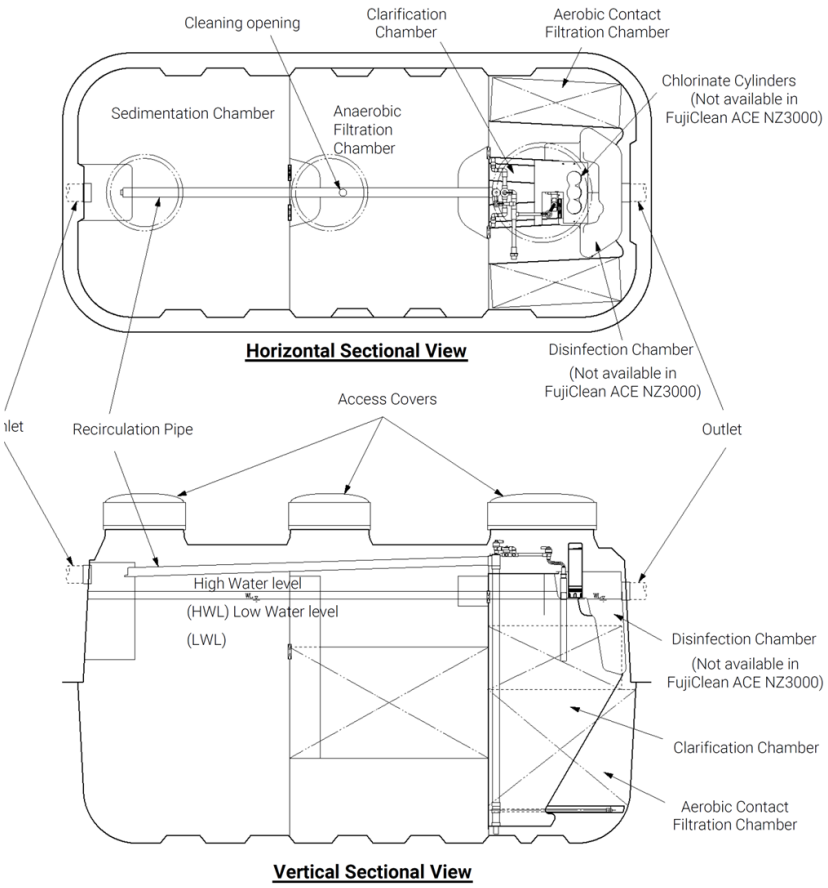
Access Cover Lids
- Ensure the access covers are securely closed during operation.
- Make sure there is no vehicular traffic load applied to the access cover lids during maintenance and operation.
- Do not stand on the access cover lids.

Preventing Physical Loading of Tank
- Ensure the area around the system installation is always free of vehicular traffic. Heavy vehicles can deform the ground and damage the tank, especially if the tank is installed in soft ground.
- Heavy loads/vehicles, including desludging truck must be >4m from the tank.

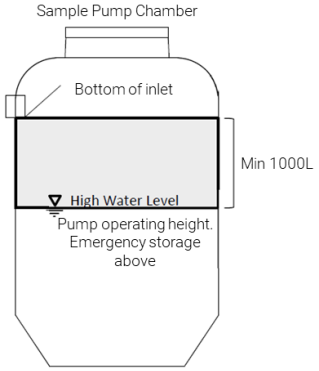
Prevention of Public Health Risk
- All domestic wastewater is a health risk, before and after it has been treated by a FujiClean ACE NZ3000 treatment plant. All precautions must be taken to avoid skin contact inhalation and ingestion of both treated and untreated wastewater.
- Do not use treated water for human consumption, livestock watering or irrigating edible crops.

2. PROCESS DESCRIPTION

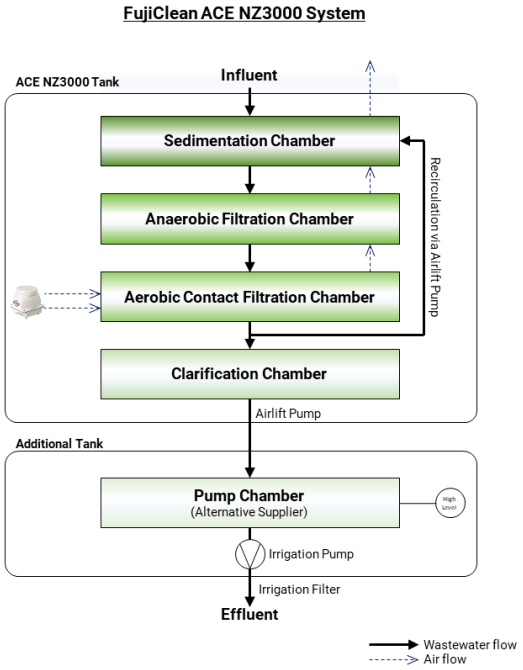
2.1 Components



The pump chamber must be certified to AS1546.1. Chamber has volme of 1000L between HWL and bottom of inlet.



2.2 Treatment Flow



2.3 Treatment Process

Sedimentation Chamber

This chamber is designed to physically separate the solids from the incoming water. Solids settle to the bottom of the chamber and scum floats to the surface.

Anaerobic Filtration Chamber

The water enters this chamber and travels through a spherical-skeleton type of filter media. The filter media provides a physical filtration to separate suspended solids. The filter media also provides a surface for the growth of anaerobic bacteria which decompose nitrates into nitrogen gas, which is vented to the atmosphere.

Aerobic Contact Filtration Chamber

The water enters and flows up through two types of plastic media. Air diffusers at the bottom of the chamber create an oxygen-rich environment for bacteria, which grow on the filter surfaces. The bacteria break down ammonia and organic matter into nitrates.

Clarification Chamber

Water flows into the Clarification Chamber, which is inside the Aerobic Contact Filtration Chamber. Suspended solids settle to the bottom and are pumped back into the sedimentation chamber for re-treatment.

Pump Chamber

The water from the clarification chamber enters the pump chamber with the air-lift pump. This treated water is ready to be pumped for discharge.

It is possible to add tertiary disinfection treatment. Contact Hynds Wastewater if you require further information on disinfection systems

2.4 Performances

FujiClean ACE NZ3000 is designed to treat all domestic wastewater from the kitchen, bathroom, toilet and laundry areas.

The daily design flow rate of FujiClean ACE NZ3000 is 3,000 L/day (8 EP) and is capable of producing Advanced Secondary Quality Effluent to:

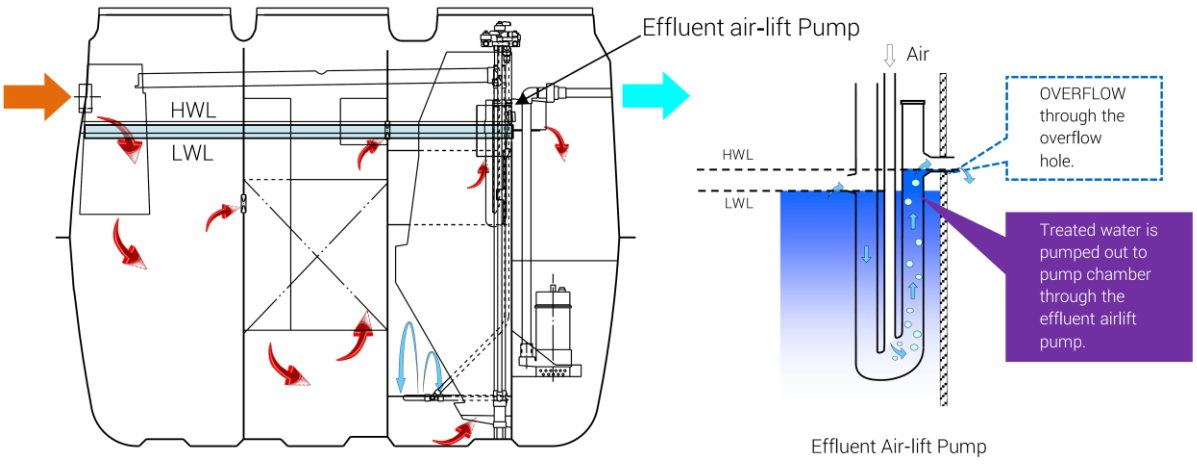
- BOD_5 ≤ 10 mg/L
- Total Suspended Solids ≤ 10 mg/L
- Thermotolerant coliforms < 10 cfu/100ml

2.5 Shock Loading Capacity

Despite its compact size, FujiClean ACE3000 can effectively cope with shock loading. The system has a buffer capacity of 252L.

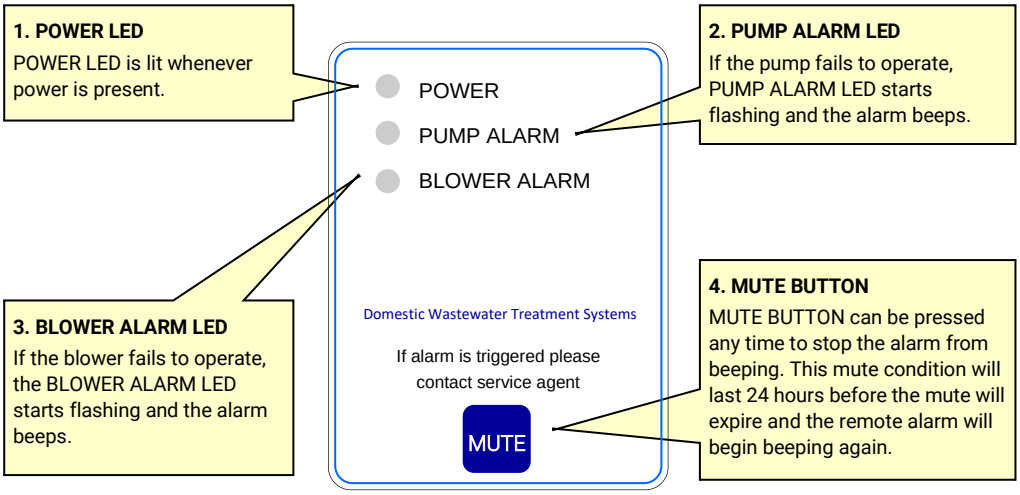
When the water level exceeds the Low Water Level (LWL), the treated water is pumped out to the pump chamber by the effluent air-lift pump.

If the water level exceeds the High Water Level (HWL), the treated water overflows through the effluent weir to a separate pump chamber. When there is no inflow, it takes 15 – 30 minutes for the water level to drop from HWL to LWL.



Shock load buffering

2.6 Alarm System Description



Monitor Unit

The monitor unit is installed at the treatment system and provides connections for the air blower, pump and sensors, along with power and signal to the remote alarm.

The monitor unit has three local LED indicators for easy verification of the power input states:

- **Power:** This LED is lit whenever power is present.
- **High Water:** When the High Water alarm is activated, this LED will begin to flash. After 1 minute the High Water alarm is sent to the remote alarm panel, at which time the LED will remain lit.
- **Air Fault** When the Air Pressure alarm is activated, this LED will begin to flash. After 1 minute the Air Fault alarm is sent to the remote alarm panel, at which time the LED will remain lit.

Remote Alarm Panel

The remote alarm is an electrical switch plate styled unit that informs the owner of the treatment system to its status at a location remote to the system (i.e., in the house). The remote alarm plate uses a non-polarized 2-wire system to transfer both power and data to the remote alarm unit.

Care must be taken to ensure the connection between the monitor unit and the remote alarm is kept tidy and sealed as factors such as moisture and bad connections can interfere with the performance of the alarm system. It is also advised to avoid joins in the cable.

Note: If the 2-wire alarm cable is to be run in the same conduit as the mains supply to this unit from the house, the alarm cable must be 240VAC rated. Caution needs to be exercised when connecting this alarm wiring, as the inadvertent connection to the mains voltage will irreversibly damage both the alarm plate and the control unit.

Muting and Resetting

The mute button can be pressed at any time to stop the remote alarm from beeping. This mute condition will last for 24 hours (modified from the previous 12 hour setting) before the mute will expire and the remote alarm will begin beeping again. Note that the mute timeout period will reset whenever the mute button is pressed so the user can press mute before going to bed to reduce disturbance.

Once an alarm condition exists, the associated alarm LED will be flashing. Pressing the "Mute" button will only silence the alarm. If the "Fault" condition still exists, then the fault will continue to be indicated. However, should the fault clear then the alarm condition will automatically reset and both audible and visual alarms will be cleared.

If at any stage a new alarm condition occurs, the mute will also expire, and the unit will begin beeping again.

3. SERVICING PROCEDURE

3.1 Frequency

The system must be serviced **EVERY 6 MONTHS** by a trained service technician to ensure efficient and effective operation. The service involves the removal of excess sludge and scum build-up from the plant. The frequency of removal depends on the system's loading.

Consumable parts for the blower such as air filters and diaphragms need to be replaced as required.

3.2 Pre-operational Inspection

Inspect and ensure the following requirements:

- The plant is accessible, and nothing inhibits maintenance.
- Surface water is draining away from the plant.
- The plant is filled with water and is level.
- Every component is inspected and functions properly.
- There is no damage to the tank, piping, or other components.
- There are no air leaks in the air piping. Air piping is connected correctly.

3.3 Field Service Procedure

Steps 1-12 check the current status of the FujiClean ACE NZ3000 system. Steps 13-20 optimise the operations of the system. The 6-monthly service requires all steps to be done, and the Field Service Report to be completed.

Current Status Checks

1. Check for the following signs of trouble:
   a. Any obvious signs of physical damage to the plant.
   b. Surface ponding or muddy soil around the plant or disposal area.
   c. Unusual smells around the plant.
   d. Any ground subsidence around the plant.

IMPORTANT	If ground subsidence is found, refer to the Troubleshooting section.

2. Remove blower box lid and inspect all components and vents to ensure they are clean and dry.
3. Ensure blower operates properly. Clean the air filter or replace it. Turn off blower for 1 minute to check the alarm is triggered. (Allow 1 minute alarm delay).
4. Check alarm signal is being received at both the monitoring unit and remote alarm plate.
5. Open all access covers and secure the area around the access openings.

WARNING	The FujiClean 3000 System is a Confined Space Comply with AS/NZS 2865:2001 and New Zealand regulations.

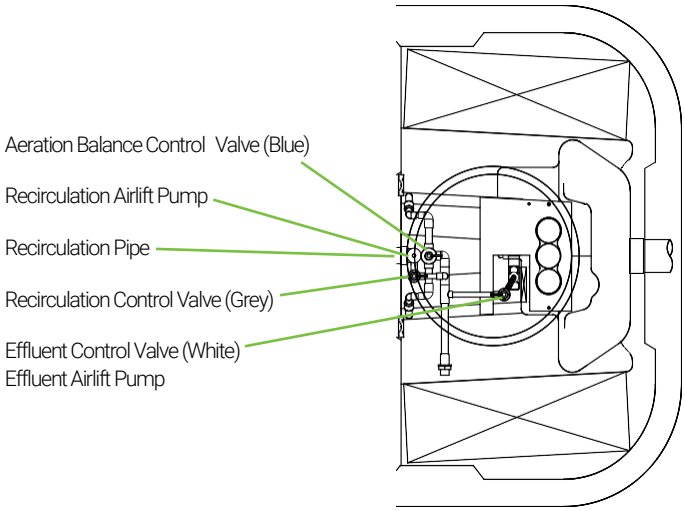
6. Collect a sample of treated effluent from the pump chamber and check the condition.
7. Check high water float switch and pump float switch are operating freely. Lift up pump float switch to check the pump operates properly and lift up high water float switch to check the alarm is triggered. (Allow 1 minute alarm delay)
8. Make sure that the inlet pipe is not blocked.
9. Check scum level of each chamber and measure the sludge accumulation depth of each chamber using sludge/scum measuring judge.
10. Measure the recirculation rate as described in Section 4.1.3 Measuring Recirculation Rate.
11. Check air bubbles are evenly distributed throughout the aeration chamber.
12. Pour some water to raise the water level and check if the effluent air-lift pump is operating properly.

System Optimisation

13. Flush the air-lift pump as described in Section 4.4 Servicing the Effluent Air-lift Pump.
14. perform a backwash operation as described in Section 4.3 Backwash and Sludge Transfer.
15. Prevent blockage as described in Section 4.5 preventing Blockage of Anaerobic Filtration Media.
16. If scum appears in the clarification chamber or the pump chamber, scoop it and transfer it into the sedimentation chamber.
17. Any sludge built up in the clarification chamber or the pump chamber needs to be transferred to the sedimentation chamber.
18. Adjust the recirculation rate as described in Section 4.1.2 Adjusting Recirculation Rate.
19. Close the blower box and lock all access covers.
20. Complete the Field Service Report to issue to the Owner. Send a copy of the report to Hynds Wastewater.

4. OTHER MAINTENANCE PROCEDURES

4.1 Adjusting Valves

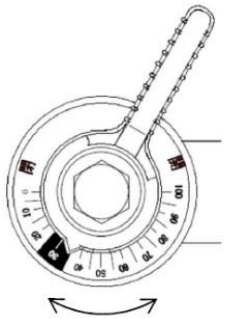


4.1.1 Adjusting Aeration Balance

The aeration system is divided into two parts. The airflow balance between right and left parts is adjustable by the Aeration Balance Control Valve (Blue), which is normally set to 50. The bubbles should be evenly distributed throughout the aeration chamber.

Visually observe the airflow rates on each side of the plant to verify equal flow. if there is an obvious discrepancy in airflow between the two sides, adjust the Aeration Balance Control Valve so that the airflow is equal.

4.1.2 Adjusting Recirculation Rate



The recirculation rate is adjustable by the Recirculation Control Valve (Grey) and is typically set between 25 - 35. The recirculation valve should be adjusted within **9.0 – 12.0 L/ min** (450 – 600 mL/3-sec). Refer to Section 4.1.3 Measuring Recirculation Rate.

If Recirculation Control Valve is reading is less than 20, clean aeration pipes, as described in Section 4.3 Cleaning Aeration pipes.

⚠ **IMPORTANT**	Too much recirculation can cause stirring or agitation in the sedimentation chamber and solids to flow into the anaerobic chamber leading to a decrease in performance and potential for odour.

4.1.3 Measuring Recirculation Rate

Recirculation rate is measured in the Sedimentation Chamber, at the end of the recirculation pipe.

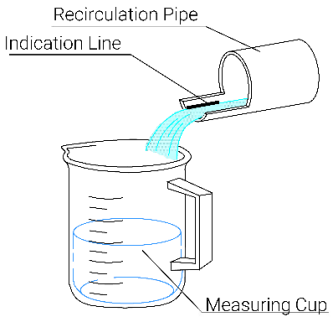
Although there is an indication line on the pipe, this is an indication only, and the flow rate must be measured.

When measuring the recirculation rate:

- Use a measuring cup to determine the flowrate, as shown.
- Ensure there is no inflow to the system
- Ensure water level is at Low Water level (LWL).
- If the water level is higher than LWL, wait until it drops to LWL. The recirculation rate is considerably higher when the water level is above LWL.

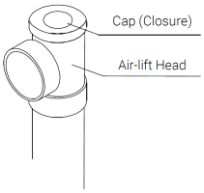
Tip: Flowrate = 2.25 – 3 L / 15-seconds

Adjust the Recirculation Control Valve so that the water level in the pipe is between the horizontal edge of the pipe end and the indication line. If the recirculation rate has increased considerably since the last maintenance, this could indicate a clogged aeration pipe.



4.1.4 Cleaning Recirculation Air-lift Pump

Excessive biofilm build-up in the recirculation air-lift pump could affect the recirculation rate. Remove the cap on the air-lift head, and clean inside the pipe with a pipe cleaning brush and water hose.



4.2 Backwash and Sludge Transfer

Excessive biofilm growth on the contact and filter media may cause partial clogging or short circuiting and deteriorate the performance of the system. It is important to carry out a backwash and sludge transfer at the 6 monthly service.

1. Shut off the Effluent Air-lift pump by turning the Effluent Control Valve (White) clockwise to zero, until it won't turn any more.
2. Turn Recirculation Control Valve (Grey) to 70 – 80 and wait for one minute. This vacuums the sludge build-up at the bottom of the aeration chamber and transfers it to the sedimentation chamber.
3. Reset the Recirculation Control Valve (Grey) to the original position (typically 25-30).
4. Aerate one side of the chamber by turning the Aeration Balance Control Valve (Blue) fully one way. Wait for one minute, and then turn the valve fully in the opposite direction. Wait for another minute, and then reset the valve to the original position (typically 50)
5. Repeat Steps 2 – 4 a few times until there is minimal/no sludge build-up visible in the aeration chamber.
6. Perform Step 2.
7. Reset the Recirculation Control Valve (Grey) and the Effluent Control Valve (White) to the original position. Make sure that the aeration is working properly.
8. Adjust the recirculation as described in Section 4.2.1 Adjusting Recirculation Rate.
9. Check airflow balance is even and that bubbles are evenly distributed through the aerobic chamber.

4.3 Cleaning Aeration Pipes

The following symptoms indicate that the aeration pipes may be partially clogged and need to be flushed or cleaned with a pipe brush:

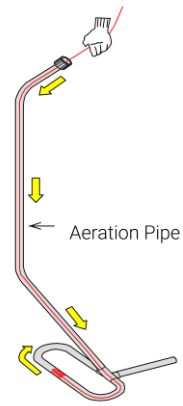
- Bubbles are not evenly distributed throughout the chamber even after adjusting the aeration balance.
- Recirculation rate has increased considerably although the recirculation valve setting has not been changed.

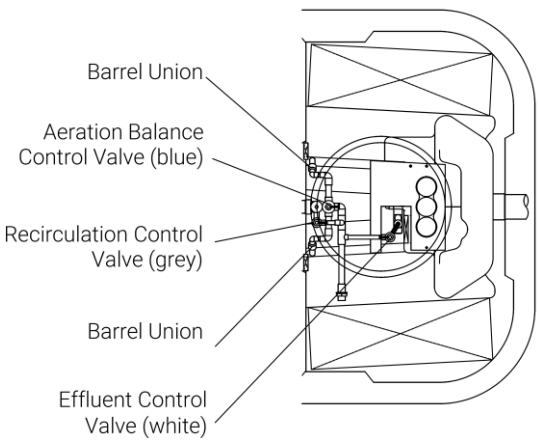
4.3.1 Flushing with Pressure Water

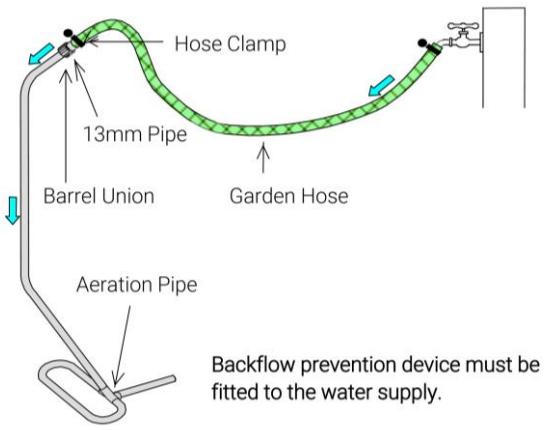
1. Close the Recirculation Control Valve (Grey) and the Effluent Control Valve (White).
2. Turn off the blower.
3. Disconnect a barrel union.
4. Attach a piece of 13mm PVC pipe to the end of a garden hose with a hose clamp, and then connect the pipe with the barrel union.
5. Connect the other end of the hose to a tap and run water through it.
6. Turn off the tap and disconnect the barrel union.
7. Connect the hose and the barrel union to the other side of the aeration chamber.
8. Turn off the tap and reconnect the aeration pipework.
9. Turn on the blower and adjust all the valve settings.

4.3.2 Cleaning with Pipe Brush

1. Turn off the blower.
2. Disconnect a barrel union.
3. Insert a pipe cleaning brush into the aeration pipe to clean it (Wire length of 4,550mm is required to reach the end of the pipe).
4. Reconnect the aeration pipework.
5. Turn on the blower and adjust all the valve settings



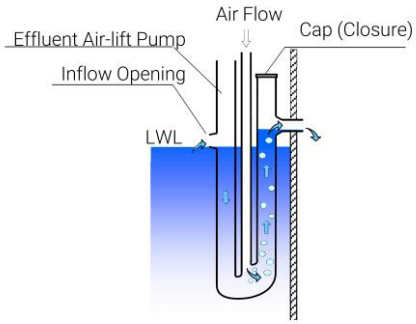




Flushing aeration pipes with pressure water

4.4 Servicing the Effluent Air-lift Pump

The Effluent Air-lift pump can be checked even at the low Water level (LWL). push down the air-lift pump so that the water flows into the inflow opening (or pour water directly into the air-lift pump) and see if the water is discharged to the disinfection chamber.



4.4.1 Setting the Effluent Control Valve

The Effluent Control Valve (White) is normally set to 25% and typically, it does not need adjusting. However, if the air-lift pump does not work while the water level exceeds LWL, the valve needs to be adjusted accordingly.

4.4.2 Flushing the Effluent Control Valve

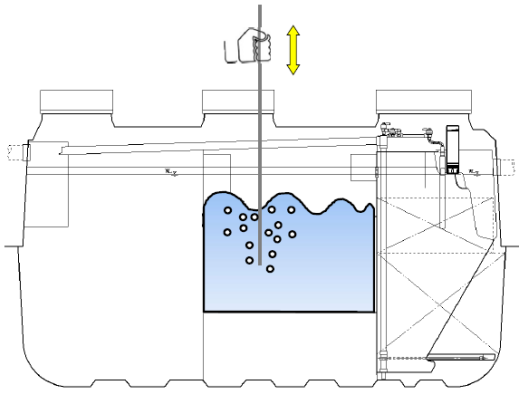
Rotate the valve back and forth from 0 to 100 several times to flush and reset the valve.

4.5 Preventing Blockage of Anaerobic Filtration Media

A build-up of sludge on the anaerobic media can reduce the efficiency of the system, as it prevents bacteria from decomposing the nitrates. Accumulated sludge on the anaerobic media could cause a partial or complete blockage. To prevent sludge build-up and blockage, agitate the anaerobic media at **EVERY SERVICE**. Backwash the anaerobic media if the water level inside the baffle in the anaerobic chamber is higher than outside after degassing.

4.5.1 Degassing / Agitating Anaerobic Media (EVERY 6 MONTHS)

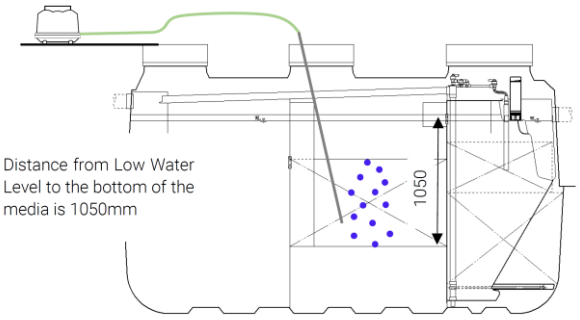
Agitate the filtration media gently by using PVC or stainless steel pipe with less than 20mm outside diameter. Nitrogen gas trapped in the media will be released during this process.



IMPORTANT	Degassing must be done every service.

4.5.2 Backwashing Anaerobic Media (if required)

If the water level inside the baffle in the anaerobic chamber is higher than outside after degassing, backwash anaerobic media. Connect pipe with a blower to backwash the media as shown below. The end of the pipe should be kept just above the bottom of the media so that the accumulated sludge at the bottom of the chamber is not disturbed.



Note: Distance from Low Water Level to bottom of the media is 1050mm.

5. DESLUDGING

5.1 When to Desludge

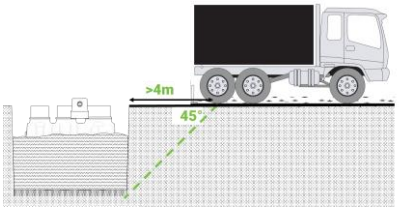
Hynds Wastewater New Zealand recommends desludging **EVERY 3 YEARS**. Accumulated sludge trapped under the anaerobic filtration chamber can lead to the filtration media becoming clogged.

Desludging is required to remove accumulated solids when one or more of the following conditions are present:

1. Biological treatment performance has severely deteriorated due to excessive amounts of oil or chemicals. These substances interfere with bacterial activity.
2. Excessive scum builds up in the sedimentation chamber and/or the anaerobic filtration chamber and large amounts of solids flow into the next chamber. (Refer to Trouble Shooting)
3. Sludge layer ≥550mm in the anaerobic filtration chamber (up to the bottom of the media) and ≥1,200mm in the sedimentation chamber. (Refer to Trouble Shooting)
4. Excessive suspended solids are observed in the aerobic contact filtration chamber and the symptoms do not improve even after performing a sludge transfer.

5.2 Desludging Procedure

1. Turn off all electrical components.
2. Ensure any heavy load is >4m from the plant.

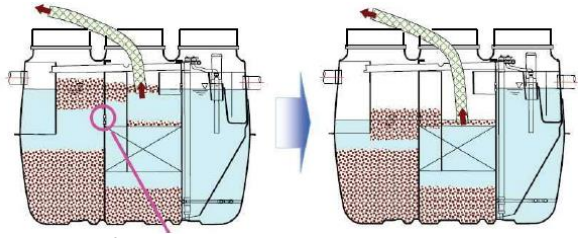


3. Clean the inlet pipe.
4. Transfer suspended solids in the aerobic chamber and scum and sludge in the clarification chamber to the sedimentation chamber.
5. Backwash Anaerobic Media. Refer to Section 4.5.2 Backwashing Anaerobic Media.

⚠ **IMPORTANT**	If sludge remains in the filtration media, desludging may be required more frequently than the expected period.

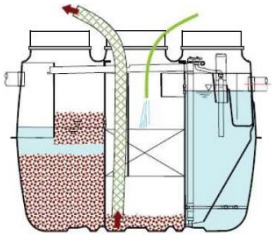
6. Remove scum and sediment build-up on the filtration media in the anaerobic filtration chamber.

   Note: If sludge in the sedimentation chamber is pumped before the anaerobic chamber, as the water level drops, the scum and sediment will be drawn onto the filtration media (Right).

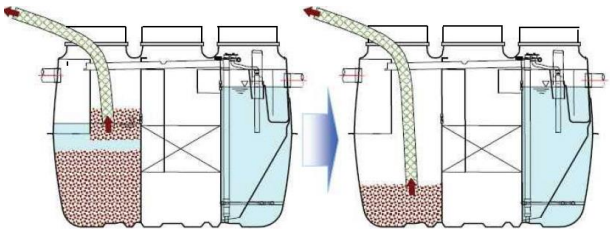


Outflow openings

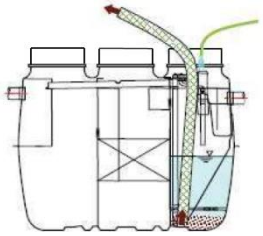
7. Insert suction hose into the baffle. Remove sludge from the bottom of the anaerobic filtration chamber while washing the filtration media and chamber wall with high-pressure water.



8. Remove scum and sludge in the sedimentation chamber.



9. Optional: Although it is unnecessary to vacuum the aerobic contact filtration chamber, it is possible to do so by inserting the suction hose into the clarification chamber and sucking water from the bottom while washing the media and chamber wall with high-pressure water. Also, if necessary, the pump chamber can be vacuumed as well.



10. Fill the plant with water to LWL.
11. Turn on all electrical components.

6. TROUBLESHOOTING

Sedimentation Chamber

Symptom	Solution
Inlet pipe is blocked	▪ Remove the blockage.
Strong and unusual odour persists even with the manhole lids closed	▪ During the first few weeks of operation there may be some odour from the system. This should cease once the bacteria are established. ▪ Improper operation may generate odours. Add seeding material to both anaerobic and aeration chambers, and/or adjust the operational conditions such as recirculation rate.
Excessive scum accumulation (Scum layer reaches the top of the influent baffle.)	▪ If the depth of sludge accumulation is less than 450mm and the anaerobic chamber still has the remaining sludge holding capacity, break the scum layer, otherwise have the plant pumped out.
Excessive sludge accumulation (Depth of sludge layer exceeds 1000mm.)	▪ Check the sludge accumulation in the anaerobic chamber. if the sludge exceeds the holding capacity, have the plant pumped out.
Foreign materials, excessive oil or fat entering the system.	▪ Remind the homeowner to refrain from disposing foreign substances and limited-use substances.

Anaerobic Filtration Chamber

Symptom	Solution
Excessive scum accumulation (less than 100mm)	▪ If the sedimentation chamber still has the remaining sludge holding capacity, transfer the scum to the sedimentation chamber, otherwise have the plant pumped out.
Excessive scum accumulation (more than 100mm)	▪ Have the plant pumped out.
Excessive sludge accumulation	▪ If the bottom sludge layer is thicker than 550mm and excessive sludge has accumulated on the filtration media, have the plant pumped out.
Filtration media is blocked up (The water level in the anaerobic chamber is lower than that in the baffle.)	▪ Perform a degassing operation on the filtration media. ▪ If the problem still persists even after the degassing operation, backwash the filtration media by using a blower.

Aerobic Contact Filtration Chamber

Symptom	Solution
Bubbles are not evenly distributed throughout the chamber or there are no bubbles at all.	▪ Adjust the aeration control valve. ▪ Check to make sure that there is no leakage from the aeration pipework. ▪ Check to make sure that the blower operates properly. ▪ Flush the aeration pipe. ▪ perform a backwash operation.
Dissolved Oxygen is less than 3.0 mg/L	▪ Check to make sure that the blower operates properly. ▪ perform a backwash operation.
Recirculation rate is unable to be adjusted or no recirculation at all	▪ Adjust the recirculation control valve. ▪ Check to make sure that there is no leakage from the aeration pipework. ▪ Check to make sure that the blower operates properly. ▪ Clean the recirculation air-lift pump.

Excessive foaming	▪ Some foaming may occur during the early stage of operation. This should cease once the bacteria are established. Seeding may also be effective.
Excessive suspended solids	▪ Perform a backwash operation.
Abnormal water level (50mm above LWL when there is no inflow)	▪ Clean the effluent air-lift pump and the effluent weir. ▪ Flush the effluent control valve. ▪ If the problem still persists, backwash the filtration media by using a PVC pipe.

Clarification Chamber

Symptom	Solution
Scum forming	▪ Transfer the scum to the sedimentation chamber.
Excessive sludge accumulation	▪ Transfer the sludge to the sedimentation chamber.
pH is too low or too high (pH < 5.8 or pH > 8.6)	▪ Check to make sure the recirculation rate is appropriate. ▪ Remind the homeowner not to dispose any prohibited substances.
Excessive biofilm on the chamber wall	▪ Clean the wall and transfer solids to the sedimentation chamber.
Effluent air-lift pump is not working	▪ Clean the air-lift pump. ▪ Flush the effluent control valve. ▪ Check to make sure there is no leakage from the blower pipework. ▪ Check to make sure that the blower operates properly.
Effluent weir is blocked	▪ Remove the blockage.

Pump Chamber

Symptom	Solution
Excessive biofilm on the wall (more than 5mm thick)	▪ Clean the wall.
Chlorine tablets dissolve too fast or too slow	▪ Adjust the chlorinator.
Poor water clarity with scum or sediment forming	▪ Have the plant pumped out.
Irrigation pump is not working	▪ Ensure the power plug is firmly plugged into AC outlet. ▪ Check to make sure the circuit breaker is not tripped. ▪ Check to make sure the pump float switch is not stuck or entangled.
High water float switch is not working	▪ Check wiring connections.

Blower

Symptom	Solution
Blower is not working	▪ Ensure the power plug is firmly plugged into AC outlet. ▪ Check to make sure the circuit breaker has not tripped. ▪ Ensure the internal diaphragms are in a good condition. ▪ Ensure the internal safety switch is in the correct position.
Air pressure is too low	▪ Rectify air leaks.
Abnormal noise or vibration	▪ Ensure the blower is not touching the wall and cables. ▪ Ensure the mounting legs of the blower firmly contact the base.
Dirty or clogged air filter	▪ Clean or replace the filter.

Submersible Pump

Symptom	Solution
Pump is not working	▪ Ensure the power plug is firmly plugged into AC outlet. ▪ Ensure the float can move freely. ▪ Ensure there is no blockage at the suction filter and impeller.
Dirty or clogged mesh filter	▪ Clean the suction filter with tap water and brush.

Alarm System (Monitor Unit and Alarm Panel)

Symptom	Solution
No LED(s) on monitor unit & power LED flashing at alarm panel (only battery type)	▪ Power is lost to the monitor unit. Check the mains power supply.
Power LED flashing at monitor unit	▪ Power down the monitor unit, disconnect all output, and power back up so the power LED should remain ON. Then reconnect the outputs one at a time to identify what caused the fault.
Power LED flashing at alarm panel (only battery type)	▪ Disconnect and remove the alarm plate and locally connect it to the monitor unit with a different wire. if problem goes away the existing wire is damaged or broken. ▪ Otherwise replace with a new alarm panel and/or a new monitor unit.
Air Fault LED at alarm pane	▪ Ensure the air blower is working, clear air tube is intact, and the pressure switch is working properly by blowing through the clear tube.
High Water Fault LED at alarm panel	▪ Check the water level in the pump out chamber ▪ Ensure the float switch is working properly.
All LED(s) at alarm panel flashing or behaving erratically	▪ Wait for 10-20 minutes until the alarm plate is fully recharged. ▪ Otherwise replace with new alarm panel

Others

Symptom	Solution
Ground subsidence	▪ Ensure the risers and tank are NOT exposed above the ground. ▪ Apply the UV paint/spray coating on the exposed riser or add extra soil to completely cover the riser and tank. The FRP material needs to be protected from UV sunlight.
	
Conduit seal is broken	▪ Ensure the conduit is still well sealed with the foam gasket and silicon sealant on every inspection. ▪ Reseal the conduit with silicon sealant if broken.

7. WARRANTY

Certificate of Warranty

February 2019

WARRANTY STATEMENT
The quality waste water treatment product you have purchased from Hynds Waste Water is covered under this comprehensive warranty as outlined in the following document and shall be read in conjunction with Hynds Terms and Conditions of Sale.

1. THE ENVELOPE (TANK)
Unless otherwise agreed in writing by duly authorised persons the structural integrity of the concrete tank shall be WARRANTED for a period of 10 years, commencing from the date of delivery; and all other components (parts only) of 2 years commencing from the date of delivery.

2. THE TREATMENT AND PERFORMANCE
The treatment and performance of the product (as defined in the user's guide supplied with the product) are guaranteed, provided that the terms and conditions set out in this document are complied with.

3. FOREWARD
Hynds Waste Water (hereinafter referred to as "HWW") manufacture and distribute products intended for the treatment of waste water. The purpose of this document is to inform the owner, or installer about the warranty relating to HWW products. The warranty shall cover all waste water treatment products manufactured or distributed by HWW (hereinafter referred to as the "Product").
Products shall consist of an external envelope in concrete or in polyester and internal components can be accompanied by accessories such as but not limited to sockets, pump, raiser, lids and control panels. In this Agreement or other documents the term "End User Owner" shall be further defined as including or referring to any Purchaser or Customer of Hynds.

4. WARRANTY
HWW warrants to the owner that the product is designed to treat wastewater in compliance with the regulatory requirements in force at the time it is purchased in a new and unused condition.
Notwithstanding anything contained in this Warranty the liability of either Party to the other including the end user owner shall not in aggregate exceed the invoice price of the Goods in respect of which the liability occurs.
The different warranties shall apply from the purchase date by the end user owner of the product, provided that, pursuant to installation, users and operating instructions, the product:

- was correctly sized with consideration to hydraulic and organic loading as specified by the Customers engineer, approved designer or regulatory authority; and
- was correctly installed, connected and commissioned in strict accordance the manufacturers and local authority requirements by an approved and certified contractor, the Customers engineer, approved designer or regulatory authority; and
- is operated consistently within the parameters of which it was designed; and
- the Product receives regular servicing in accordance with the manufacturers and local authority requirements by an approved and certified contractor.

5. EXCLUSION FROM WARRANTY
The following types of damage including but not limited to shall be excluded and therefore void any warranty:
5.1 Any damage resulting from poor handling, transport (by a third party engaged by the customer directly) or storage defect. More generally, any damage caused by a third party that was not authorized directly by the manufacturer or distributor.
5.2 Any damage resulting from a modification of the product without having consulted the manufacturer or distributor beforehand (and having received either Parties written consent) about the modifications made to the product by any individual, company, agent or person.
5.3 Any damage resulting from an installation that does not comply with the requirements specified in HWW's installation guide (supplied with the product or available upon request at the following address: hwwsupport@hynds.co.nz) or those required by the local regulatory authority.
5.4 All damage resulting from a sizing error of the product, in particular with regard to the hydraulic and organic Load of wastewater intended for the product and to the legislation in force at the time the product was installed. The term "Load" shall refer to water, liquids, any elements sent inside the product to be stored or processed therein.
5.5 Any damage resulting from a change of the use of the product leading to a modification of the Load (flow rate and/or nature of wastewater) intended for the product.
5.6 Any damage caused by using the product in a way not compliant with the requirements set out by HWW in the user's instructions for the product (supplied with each product and available upon request at hwwsupport@hynds.co.nz).
5.7 Any damage caused by failing to observe the maintenance or operating instructions for the product as defined by HWW and as contained in the operating instructions for the product or any other document supplied with the product. Instructions are supplied with the product or are available on demand at hwwsupport@hynds. co.nz. The manufacturer reserves the right to review and update the instructions from time to time and it shall be the Customers responsibility to remained informed.
5.8 At the sole discretion of Hynds, any damage resulting from incorrect, incomplete and/or inadequate installation of the product essential to the correct functioning of the product.
5.9 Any damage resulting from a technical intervention on the installation by any individual, company or person who is not approved/certified (by the manufacturer or local regulatory authority), or does not have the correct equipment and knowledge to intervene on the product and its accessories. More generally, any modification or alteration of the product without the prior, written consent of HWW shall cancel the warranty granted by HWW and release the latter from its obligations without limitation.
5.10 Any damage resulting from elements such as the conditions of placement, conditions of installation, nature of the soil type, nature of the water to be treated or other similar external source that in the sole discretion of HWW is communicated inadequately, or with unreasonable delay or not at all to the installer and directly HWW by the end user owner, individual or company authorized by the latter or to whom said task was entrusted.
5.11 Any damage caused directly or indirectly, deliberate or accidental resulting from negligence, tort or unforeseeable circumstances of the installer, the end user owner, individual or company authorized by the latter. For the purposes of clarity this shall by extension also include force majeure, such as earthquake, storm, flooding, volcanic eruption, and as may be further defined.

6. IMITATION AND IMPLEMENTATION OF THE WARRANTY
If the product should malfunction and provided that the terms and conditions of the warranty are complied with, HWW shall proceed or nominate an agent to review as soon as practically possible the repair(s) required in accordance with the degree of malfunction and assessment by HWW, or at the sole discretion of HWW the replacement of the product or component(s) of the product as may be required.
Under no circumstances may HWW be held liable for damages of any kind including liquidated damages, direct or indirect, resulting from incorrect or unsafe use of the product. The end user owner is responsible for the daily supervision of the product, within the limits of their competencies, the latter must inform HWW immediately and without unreasonable delay (defined as not more than 5 business days) upon detecting a defect or malfunction of the product. Notification must be in writing to **hwwsupport@hynds.co.nz.**
Any call on the warranty must be made in writing, if possible using the appropriate form (documented entitled "Claim Card" likewise available upon request at hwwsupport@hynds.co.nz), sent to **hwwsupport@hynds.co.nz**.
If, after inspection, it turns out that the damage or defect ascertained by the end user owner, who has informed HWW, does not comply with the terms and conditions of warranty, and where the HWW cannot be held liable, HWW reserves the right to invoice all expenses incurred including but not limited to travel or time & material operations to the end user owner or individual, company or person(s) who has engaged HWW or their nominated repair agent for services

FujiClean
Wastewater Treatment Systems

HYNDS
WASTEWATER

DOMESTIC WASTEWATER TREATMENT SYSTEM
FUJICLEAN ACE NZ3000

Owner's Manual WW-ACE3000-OM (Feb-2024)

hyndswastewater.co.nz
0800 425 433

Dear Customer,

Thank you for choosing a FujiClean ACE NZ3000 Wastewater Treatment System.

Please read this Owner's Manual carefully before using the FujiClean ACE NZ3000 and keep it for future reference. The information contained in this manual is subject to change without notice. Please contact Hynds Wastewater to request the latest manual.

TABLE OF CONTENTS

1. SAFETY PRECAUTIONS

Please read the Owner's Manual and Safety Precautions carefully before operating the system.

All maintenance must be done by a Trained Service Personnel. If the unit is opened or tampered with by an untrained person, this may void the warranty. Wastewater treatment units are hazardous. Please pay special attention to the following signs:

⚠ WARNING	This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

⚠ CAUTION	This symbol refers to a hazard or unsafe practice that can result in personal injury and/or the potential for product or property damage.

⚠ WARNING

Electrical Safety
- Do not open the electrical box. There are no user-serviceable parts inside. The system must be maintained by a trained service agent.

Fall Prevention
- Ensure access covers are securely closed to prevent children from entering the tank.
- Report to the service agent if any cracks or damage is found on the access covers.
- Lifting operations must be carried out in a safe manner in accordance with the relevant regulations.

Hazardous Gases & Confined Spaces
- Never enter a wastewater tank. Toxic gases in the septic tank can kill in minutes. If maintenance work is required, only trained service agents can enter the tank, and they must comply with Confined Space and NZ Health and Safety regulations.
- Ensure no naked flames, smoking or other ignition sources (e.g., tools) around the wastewater tank and vents.

⚠ CAUTION

Prevent Overload on the Tank
- Ensure the area around the system installation is always free of vehicular traffic. Heavy vehicles can deform the ground and damage the tank, especially if installed in soft ground. Heavy vehicles must be >4m from the tank.

Prevention of Public Health Risk
- Do not use treated water for human consumption, livestock watering, or irrigating edible crops.

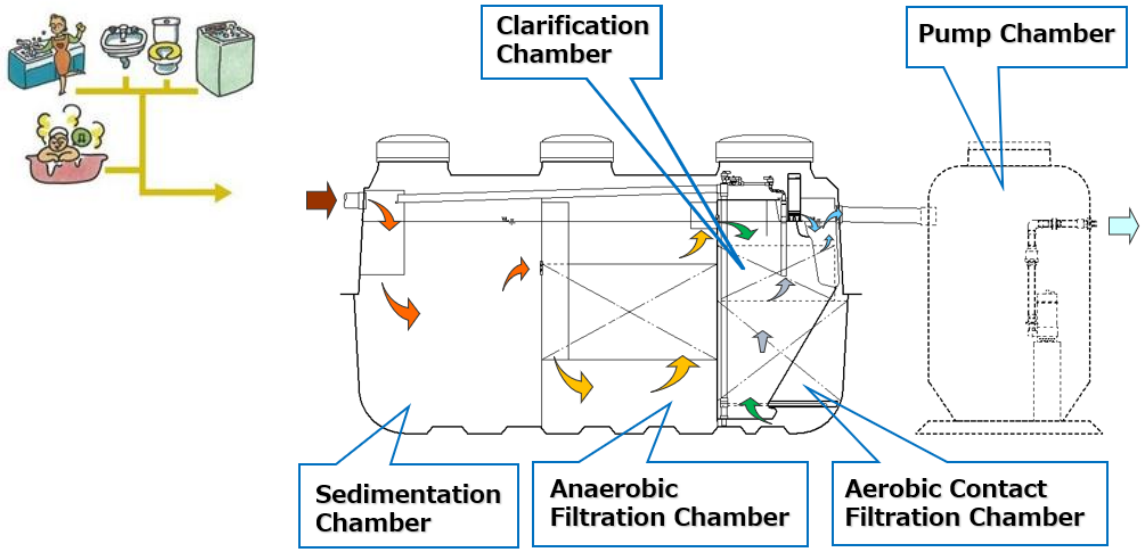
Access Cover Lids
- Keep your tank manholes locked or heavy enough to prevent children from opening them. Make sure the access covers are securely closed during operation.
- Ensure no vehicular traffic load is applied to the access cover lids during the installation and operation. Do not stand on the access cover lids

2. OVERVIEW

2.1 What is an AWTS?

An Aerated Wastewater Treatment System (AWTS) is a small-scale onsite sewage treatment plant. An AWTS uses the processes of aeration followed by clarification to achieve biological treatment of wastewater. FujiClean ACE NZ3000 is an AWTS designed to comply with AS 1546.3(2017) and AS/NZS 1546.1(2008) to meet NZ's regulatory requirements.

2.2 FujiClean ACE3000 Treatment System



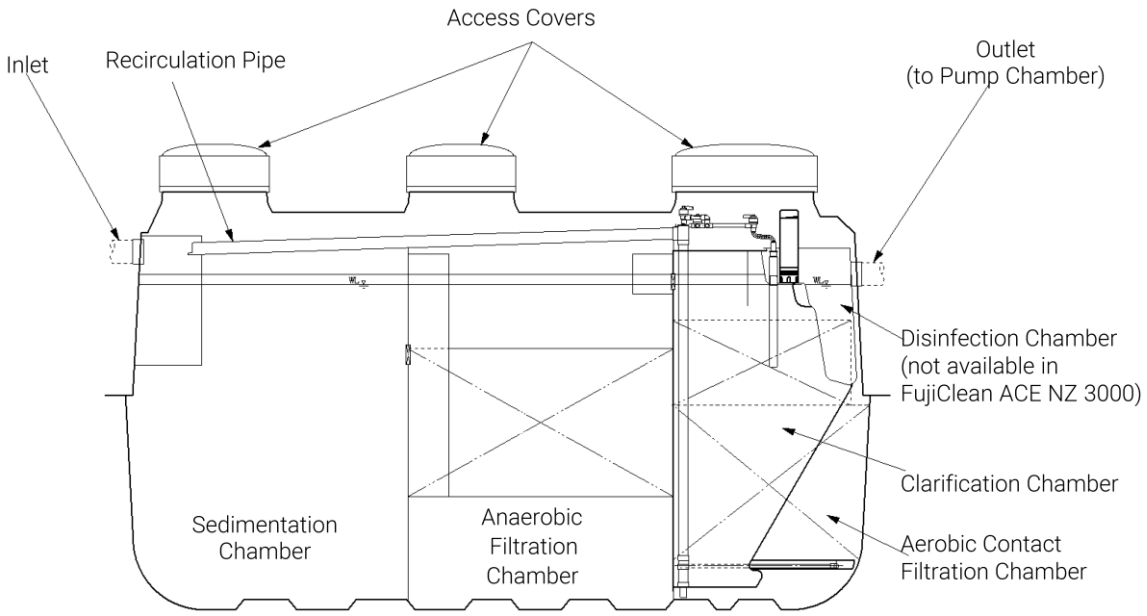
FujiClean ACE3000 is designed to treat domestic-grade wastewater from the kitchen, bathroom, toilet, and laundry areas. The daily design flow rate of FujiClean ACE3000 is 3,000 L/day, and the system is capable of producing advanced secondary quality effluent to:

- $BOD_5 \leq 10mg/L$
- Total Suspended Solids ≤ 10mg/L
- Thermotolerant coliform < 10cfu/100ml

What is BOD?

Biochemical Oxygen Demand (BOD) is a standard measure of water quality. BOD is the amount of oxygen (mg/L) required to break down organic matter. Higher BOD indicates poorer water quality.

3. TREATMENT PROCESS



Sedimentation Chamber

This chamber is designed to physically separate the solids from the incoming water. Solids settle to the bottom of the chamber, and scum floats to the surface.

Anaerobic Filtration Chamber

The water enters this chamber and travels through a spherical-skeleton filter media. The filter media provides a physical filtration to separate suspended solids. The filter media also provides a surface for the growth of anaerobic bacteria that decompose nitrates into nitrogen gas, which is vented to the atmosphere.

Aerobic Contact Filtration Chamber

The water enters and flows up through two types of plastic media. Air diffusers at the bottom of the chamber, creating an oxygen-rich environment for bacteria growing on the filter surfaces. The bacteria break down ammonia and organic matter into nitrates.

Clarification Chamber

Water flows into the Clarification Chamber, which is inside the Aerobic Contact Filtration Chamber. Suspended solids settle to the bottom and are pumped back into the sedimentation chamber for re-treatment.

Pump Chamber (Separate and supplied by others)

The treated water is ready to be pumped for discharge. A separate pump out chamber is required after FujiClean ACE3000. A suitably sized pump out chamber can be sourced locally.

It is possible to add tertiary disinfection treatment. Contact Hynds Wastewater if you require further information on disinfection systems.

4. CARING FOR YOUR SYSTEM

4.1 Owner's Responsibilities

The owner is responsible for:

- Ensuring the system is operating efficiently at all times.
- Promptly fixing the system when problems are detected.
- Ensuring the system is inspected and serviced every 6 months by a trained service technician.
- Ensuring the system is desludged when it is required. To ensure the overall health and performance of your FujiClean ACE NZ3000 wastewater treatment system.

  Hynds Wastewater recommends desludging the system every 3 years or as necessary when the maximum accumulated sludge and scum levels are reached, as specified by the manufacturer. The desludge frequency will depend on sludge and scum accumulation levels, which vary depending on usage. Your service agent will measure the sludge depth at every service interval and advise when desludging is required.

⚠ CAUTION	If the 6-monthly service is neglected, or desludging advice from your service agent is disregarded, the warranty will immediately be void.

4.2 Regular Maintenance

The effective operation of the system is dependent on regular maintenance. The system requires a service **EVERY 6 MONTHS** by a Hynds-trained service agent.

Regular maintenance also involves periodic removal of excessive sludge and scum build-up from the system. The frequency of removal depends on the system's loading. Consumable parts for the blower, such as air filter and diaphragms, must be replaced regularly. The recommended replacement interval for these parts is between 12 and 24 months.

4.3 Tips for Trouble-Free Operation

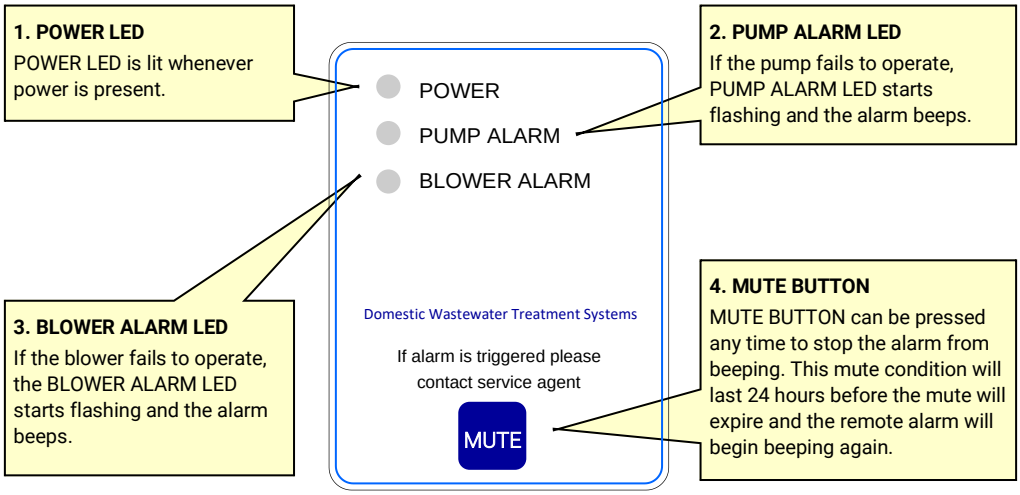
Below is a guide on good maintenance procedures that you should follow:

- Keep your household's water usage below the system's daily design flow rate.
- Do not switch off the power to the system even if you are going on holiday. Contact your service agent if the system will not be used for extended periods.
- Do not use more than the recommended amounts of detergents.
- Do not put fats and oils down the drain. Keep food waste out of your system.
- Do not put large quantities of bleaches, disinfectants, whiteners, or spot removers into your system via the sink, washing machine or toilet.
- Do not allow foreign objects such as sanitary napkins, nappies, baby wipes, flushable wipes or other hygiene products to enter the system.
- Do not dispose of chemicals down the drain. The list below shows examples of chemicals considered harmful to the system.
  - Medicines
  - Paint, Paint Thinners and Paint Strippers
  - Solvents
  - Pesticides and Herbicides
  - Motor Oil, Petrol, Antifreeze, Break Fluid and Other Automotive Fluids

4.4 Irrigation Area/Disposal

Specific requirements and laws exist for the disposal/ reuse of treated wastewater. The irrigation system must be designed and installed by qualified professionals and in accordance with NZ and local council requirements.

5. OPERATION OF REMOTE PANEL



5.1 Normal Operations

Only the green POWER LED is lit when the system is operating correctly to indicate that power is available.

5.2 Pump Alarm

If the pump fails to operate, the PUMP ALARM LED flashes red and the alarm beeps. In such cases, please get in touch with the service agent and minimise your water usage until the problem has been rectified.

5.3 Blower Alarm

If the blower fails to operate, the BLOWER ALARM LED starts flashing red and the alarm beeps. In such cases, please contact the service agent and minimise your water usage until the problem has been rectified.

5.4 Muting and Resetting

The mute button can be pressed anytime to stop the remote alarm from beeping. This mute condition will last 24 hours before the mute expires, and the remote alarm will begin beeping again.

Note: The mute timeout period will reset whenever the mute button is pressed so the user can press mute before going to bed to reduce disturbance during the night. Once an alarm condition exists, the associated alarm LED will flash.

Pressing the MUTE BUTTON will only silence the alarm. If the “Fault” condition still exists, the fault will continue to be indicated. However, should the fault clear, the alarm condition will automatically reset and audible and visual alarms will be cleared. If, at any stage, a new alarm condition occurs, the mute will be overridden and expire, and the alarm will begin beeping again.

⚠ CAUTION	**IN THE EVENT OF A POWER OUTAGE** The FujiClean ACE NZ3000 Remote Alarm Panel has a battery backup and will notify you if power is lost to the system. After power is restored, ensure the system is working correctly by checking the air blower and pump are operating.

Experts in water.

DAVEY

APPLICATIONS

- Non-potable rainwater applications
- Lawn and garden irrigation
- Sump emptying to higher heads
- Treated effluent disposal
- Water transfer from wells

D42A/B D53A/B

Submersible Drainage Pumps

Model Numbers: D42A/B, D53A/B

Submersible sump pump with two and three impeller designs for higher pressure, up to 45m head.

australian owned

WHY CHOOSE THE Davey Submersible Drainage Pumps?

Double mechanical seal, one in oil bath on motor and extra mechanical seal on pump

- Superior reliability
- Long service life

Corrosion resistant 304 stainless steel shaft, motor shell and fasteners

- Long service life

Cast 316 stainless steel motor caps and super tough engineered thermo plastic pump casing

- Outstanding corrosion resistance
- Long life

Centrifugal multistage 2 and 3 impeller designs

- Higher pressures and increased efficiency

Closed vane impellers with long engagement “D” drives

- Positive operation
- Long service life

Patented independently floating neck rings

- Outstanding pump performance
- Long pump life

Corrosion resistant hard wearing polycarbonate impellers

- Long service life

Corrosion resistant stainless steel fine mesh suction strainer with large surface area

- Prevents blockages of the pump by solids

In-built automatic thermal overload

- Protects the motor in the event of blockage or voltage supply problems

HO7RNF oil resistant leads, 10 metres long with 3 pin power plug

- Easy to connect to power supply
- Longer life in dirty water

D42A/B and D53A/B Sump Pumps

OPERATING LIMITS		
Type	**D42A/B**	**D53A/B**
Capacities to	120 lpm	130 lpm
Maximum total head	32m	45m
Maximum submergence	12m	
Maximum pumped water temperature	40ºC	
Maximum soft solids	1.9mm O.D.	
Outlet size (BSP)	1" F	

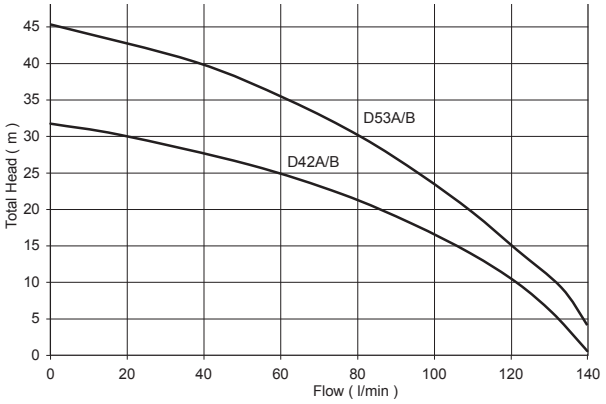
SUITABLE FLUIDS

Clean water of neutral pH containing up to 1% small solids. Some wear should be expected while pumping hard solids in suspension.

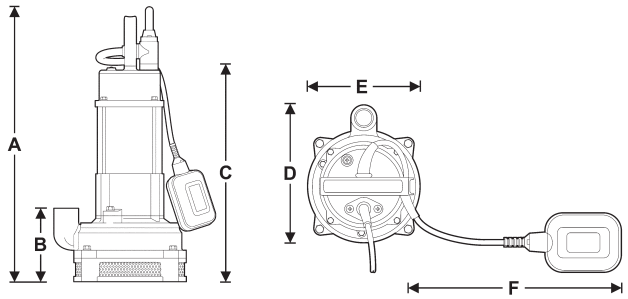
MATERIALS OF CONSTRUCTION	
Part	**Material**
Impeller	Glass filled polycarbonate
Lock nut	304 stainless steel
Pump casing	Glass filled polycarbonate
Diffuser and blanking ring	Glass filled noryl
Mechanical seal – pump	Carbon/ceramic
Mechanical seal – motor	Silicon carbide / ceramic oil in bath
Shaft seal elastomer	Nitrile rubber
Pump shaft	304 stainless steel
O-rings	Nitrile rubber
Motor shell	304 stainless steel
Bottom bearing housing	Cast 316 stainless steel
Upper motor cover	Cast 316 stainless steel
Handle	304 stainless steel
Fasteners	304 stainless steel
Float and power supply leads	HO7RN-F oil resistant

ELECTRICAL DATA		
Type	**D42A/B**	**D53A/B**
Supply voltage	220-240V	
Supply frequency	50Hz single phase	
Speed	2 pole, 2850rpm	
Full load current	4.3A	5.7A
Locked rotor current	14A	
Input power (P_1)	1.00kW	1.31kW
Output power (P_2)	0.60kW	0.84kW
IP rating	X8	
Insulation class	Class F	
Starting	P.S.C.	
Lead	10m long	

HYDRAULIC PERFORMANCE



DIMENSIONS (mm)



Type	A	B	C	D	E	F	Outlet B.S.P.	Net Weight (kg)
D42A/B	475	130	370	235	195	330	1"F	12.6
D53A/B	535	170	430	235	195	330	1"F	16.5

INSTALLATION & PRIMING

Use a rope to position and retrieve the pump. Do not lower or retrieve the pump using the power lead as this may damage the cable entry seals, causing water leaks and unsafe operation.

Do not use this product for recirculating or filtering swimming pools, spas, etc. While these pumps are built to high safety standards, they are not approved for installations where people will be in the water while they are operating.

Do not pump abrasive materials. Sand and grit in the water being pumped will accelerate wear, causing shortened pump life.

Keep your pump clean, particularly in situations where lint, hair or fibrous materials may get bound around the pump shaft. Regular inspection and cleaning will extend pump life.

Make room for the float switch to operate. Automatic models have a float switch to turn them on when the water level rises and turn them off again when it has been pumped down to the safe operating level of the pump. If the float switch is not free to rise and fall, correct pump operation may not be possible.

Do not run your pump dry. Non-automatic models must be switched off manually or by way of an external float/level switch when the water level is reduced to the top of the pump housing.

davey.com.au | daveynz.co.nz

amiad® WATER SYSTEMS | AMIAD

TAGLINE Filters

Irrigation high quality all plastic filters for flowrates up to 50 m³/h (220 gpm)

flowrates	filtration degrees	diameters	maximum operating pressure
up to 50 m³/h 220 gpm	500-80 micron	20mm - 75mm ¾" – 3"	8 bar 116 psi

features:

- Easy maintenance: no tools required for extracting the elements from the filter housing for rinsing
- High quality, excellent mechanical strength and corrosion resistance
- Low pressure loss
- Interchangeable filter elements for wide range of flowrates, various filtration degrees and irrigation applications
- Screen cylinders or Disc elements

Amiad TAGLINE Filter Series

General

With their Screen and Disc elements Amiad TAGLINE filters are made for wide range of irrigation applications. The TAGLINE filters are available in various filtration degrees to cover the needs of modern irrigation systems. TAGLINE filters are made from high quality engineered plastic materials providing excellent mechanical strength, durability and ease of installation.
Amiad's TAGLINE filters are easy to maintain; no tools are needed for extracting the filter element from the filter housing for rinsing.

Filter Elements

Amiad supplies a variety of filter elements for its plastic filters that cover a wide range of flowrates, filtration degrees and applications.

Screen Elements: (1)
These screen elements are constructed of molded plastic ribs that support a stainless steel weave-wire or weaved polyester screen for filtration degrees of 800 to 50 micron.

Perforated Stainless Steel Elements: (2)
Suitable for coarse filtration (straining) between 3,500 and 500 micron.

Disc Elements: (3)
The disc elements are designed for effective removal of organic substances. The elements are constructed using engineered plastic discs that are stacked onto a telescopic core. The discs are grooved on both sides and intersect to form the filtration element when compressed.

The effective filtration area is comprised of both the outside surface and the channels formed by the intersecting grooves. Suspended organic particles adhere to the grooved surface adding depth to the filtration process.
Cleaning the disc element is made simple by the unique design of the telescopic core which allows the discs to separate during the cleaning process while maintaining perfect sealing when the element is in the filter housing.

(1) (2) (3)

Filtration Degrees Available

The following table lists the various filter elements of Amiad's TAGLINE filters and the optional filtration degrees for each filter element. For ease of operation and maintenance the various filtration degrees are color coded. Please consult your dealer for the most suitable filter element for your application requirements.

Color	Black	Yellow	Red	White	Blue	Blue
Micron	80	100	130	200	300	500
Mesh	200	155	120	75	50	30
¾", 1"	▲	■▲	■▲	▲	■▲	▲
1½"	▲	■▲●	■▲●	▲●	■▲	▲
2", 2" S, 3"	▲	▲●	▲●	▲●	▲	▲

■ Polyester Screen ▲ St.St. Weaveire Screen ● Disc Element

Technical Specifications

Filter Type	¾"	1"	1½"
General Data			
Maximum flow rate*	3 m³/h (13.2 gpm)	5 m³/h (22 gpm)	15 m³/h (66 gpm)
Inlet/Outlet diameter	20 mm (¾")	25 mm (1")	40 mm (1½")
Filtration degrees	500, 300, 200, 130, 100,80 micron		
Max. working pressure	8 bar (116 psi)		
Max. working temperature	60°C (140°F)		
Working temperature range	60°C (140°F)		
Weight [empty]	0.16 kg (0.35 lbs)	0.17 kg (0.37 lbs)	Screen = 1.0 kg (2.2 lbs) Discs = 1.2 kg (2.6 lbs)

* Consult Amiad for optimum flow depending on filtration degree & water quality.

Engineering Data

Filter Element Data		
Filteration area	Screen = 110 cm² (17 in²)	Screen = 340 cm² (52.7 in²) Discs = 460 cm² (71.3 in²)
Filter Element types	Nylon screen, weave wire screen	Nylon screen, weave wire screen, disc element

Construction Materials*		
Filter housing	Polypropylene	
Filter Lid	Polypropylene	
Housing seal	NBR	
Screen	Construction= Polypropylene Mesh = Nylon Seals = NBR	Construction = Polypropylene Mesh = St. St Seals = NBR
Discs	Construction = Polyethylene Seals: NBR	Construction = Polyethylene Grooved discs = Polyethylene Seals = NBR

* Amiad offers a variety of construction materials. Consult us for specifications.

Technical Specifications

Filter Type	2”	2” - S	3”
General Data			
Maximum flowrate*	25 m³/h (110 gpm)		50 m³/h (220 gpm)
Inlet/Outlet diameter	50 mm (2”)		80 mm (3”)
Filtration degrees	500, 300, 200, 130, 100,80 micron		
Max. working pressure	8 bar (116 psi)		
Max. working temperature	60°C (140°F)		
Weight [empty]	Screen = 3.6 kg (7.9 lbs) Discs = 4.4 kg (9.7 lbs)	Screen = 4.2 kg (9.2 lbs) Discs = 5.4 kg (11.9 lbs)	Screen = 4.5 kg (9.9 lbs) Discs = 5.7 kg (12.5 lbs)

* Consult Amiad for optimum flow depending on filtration degree & water quality.

Engineering Data

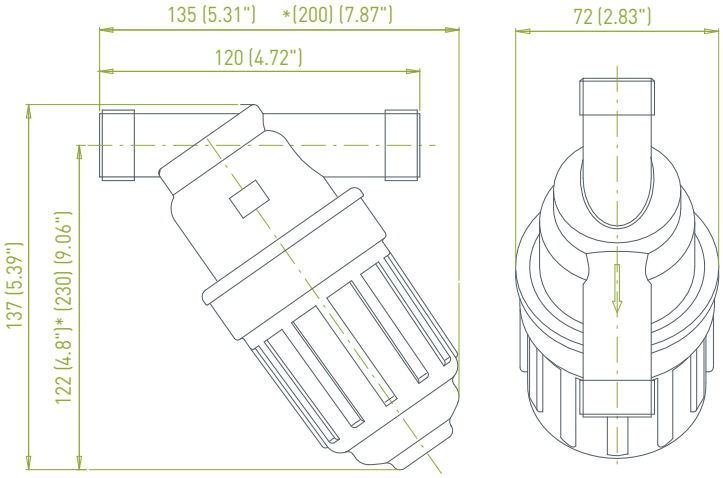
Filter Element Data		
Filteration area	Screen = 465 cm² (72 in²) Discs = 790 cm² (122.4 in²)	Screen = 700 cm² (108.5 in²) Discs = 1185 cm² (183.6 in²)
Filter element types	Nylon screen, weave wire screen, disc element	

Construction Materials*	
Filter housing	Polypropylene + Glass Fibers
Filter lid	Polypropylene + Glass Fibers
Tightening nut	Polypropylene + Glass Fibers
Housing seal	NBR
Screen	Construction = Polypropylene Mesh = St. St. or Polyester Seals = NBR
Discs	Construction = Polypropylene Grooved discs = Polypropylene Seals = NBR

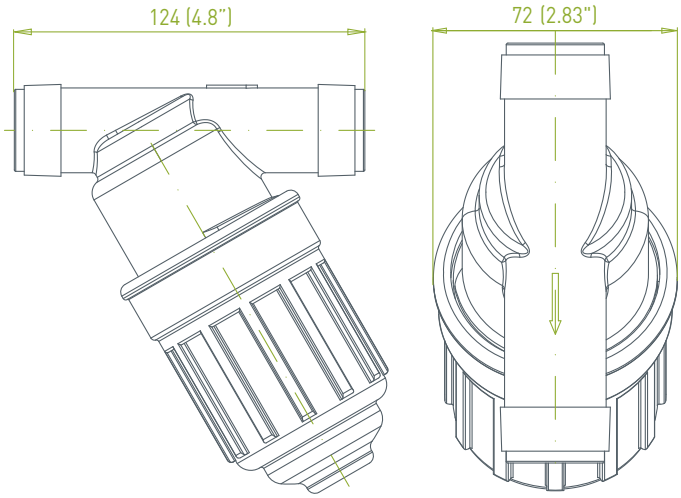
* Amiad offers a variety of construction materials. Consult us for specifications.

¾”

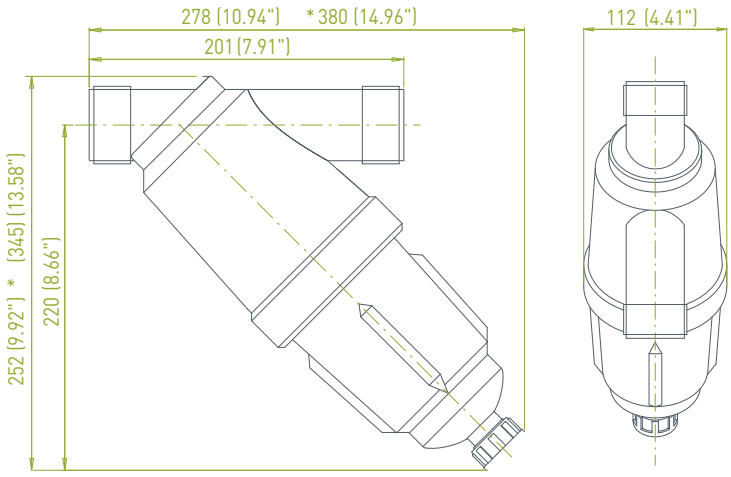
Dimentional Drawing



1”

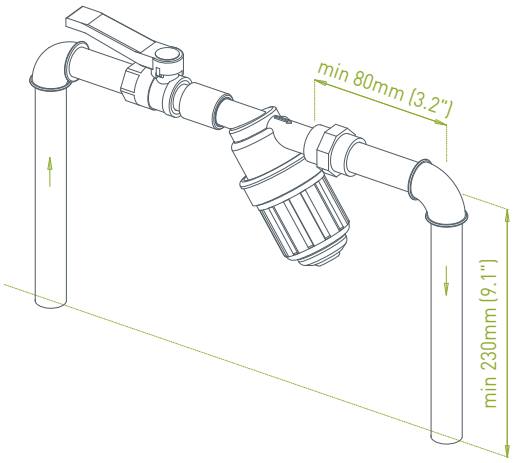


1½”



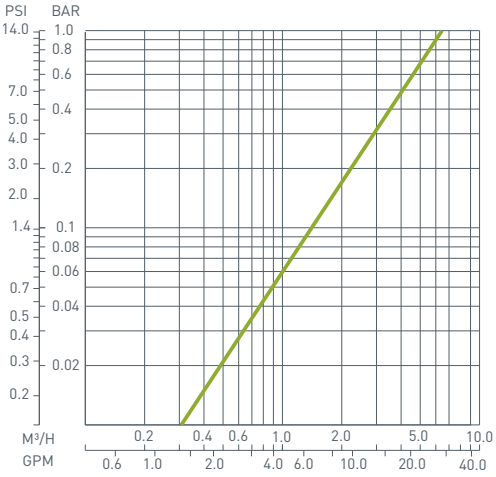
Dim: mm (inch)
*Approx. length required for maintenance

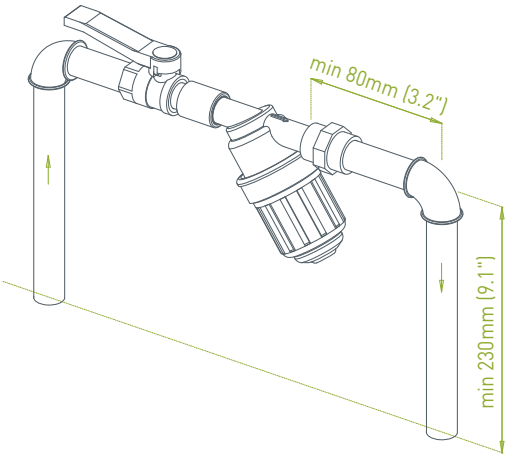
Typical Installation Drawing

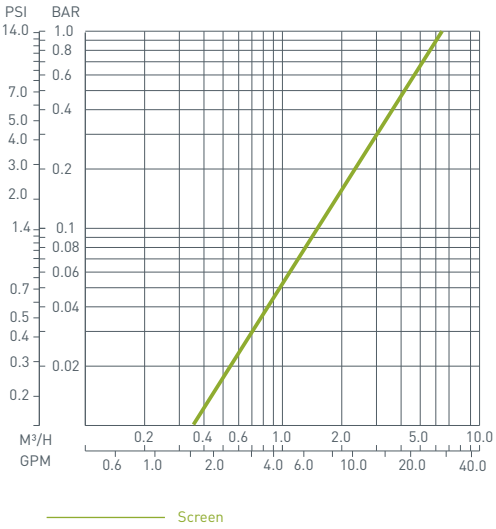


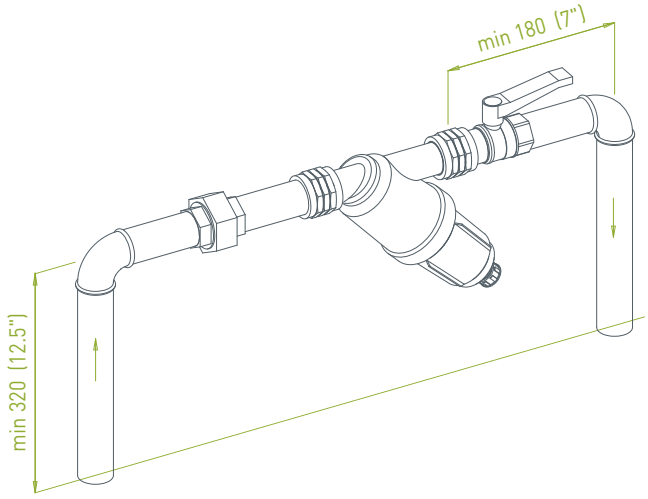
Pressure Loss Graph

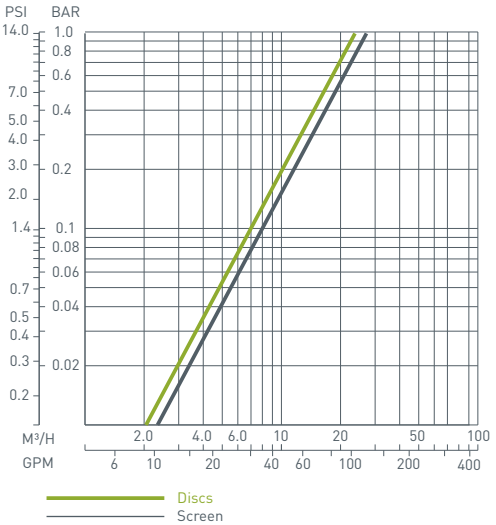
in clean water







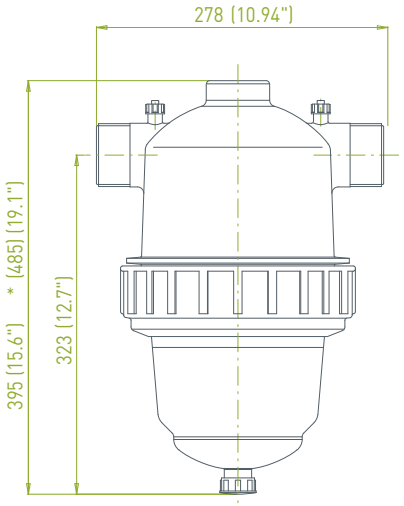




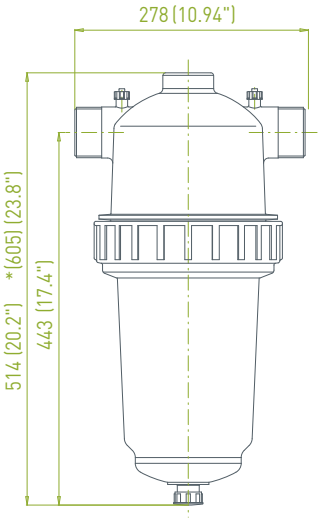
Dim: mm (inch)

2”

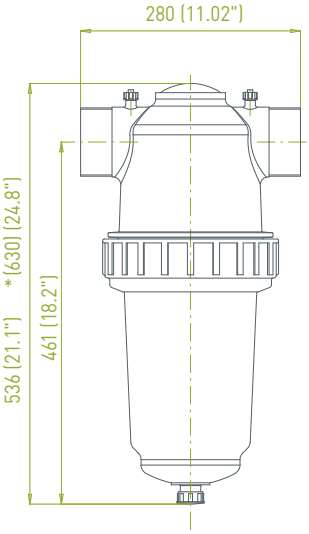
Dimentional Drawing



2”- S

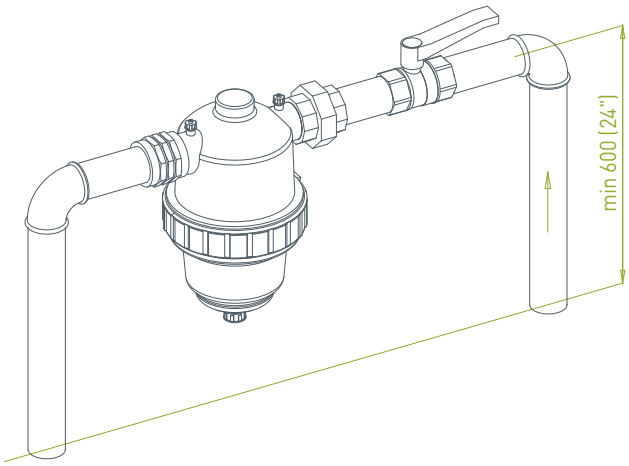


3”

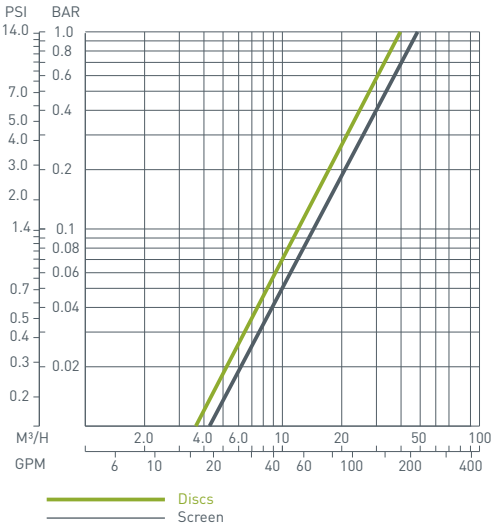


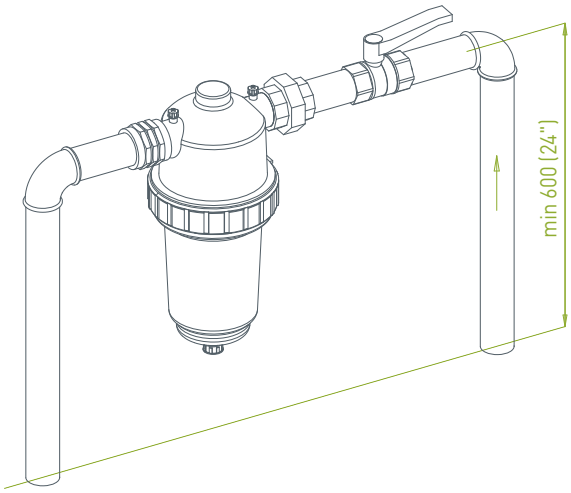
Dim: mm (inch)
*Approx. length required for maintenance

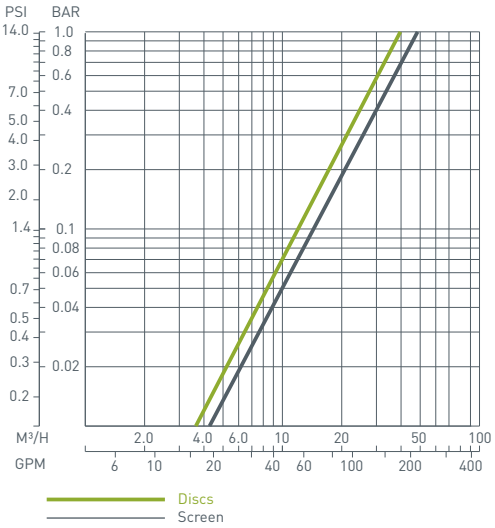
Typical Installation Drawing

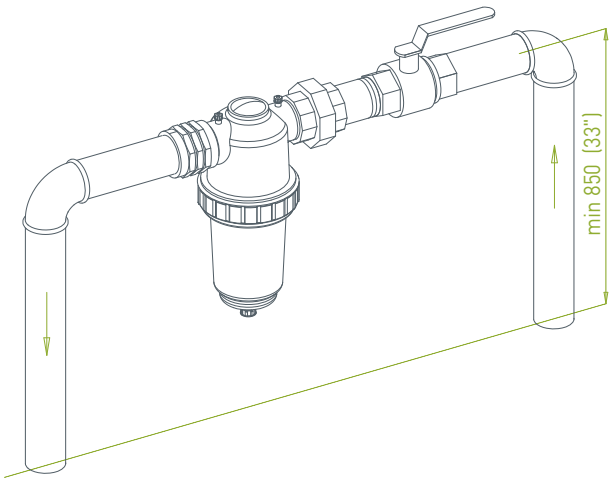


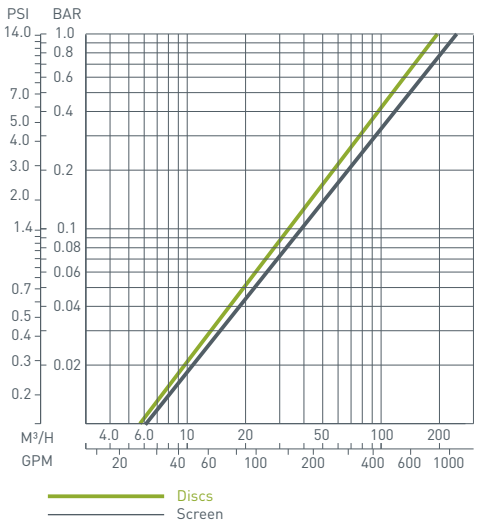
Pressure Loss Graph
in clean water











Dim: mm (inch)

Headquarters

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The Americas

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amiad® WATER SYSTEMS ARKAL FILTOMAT AMIAD

www.amiad.com

910101-000385/05.2018

Scan for more information

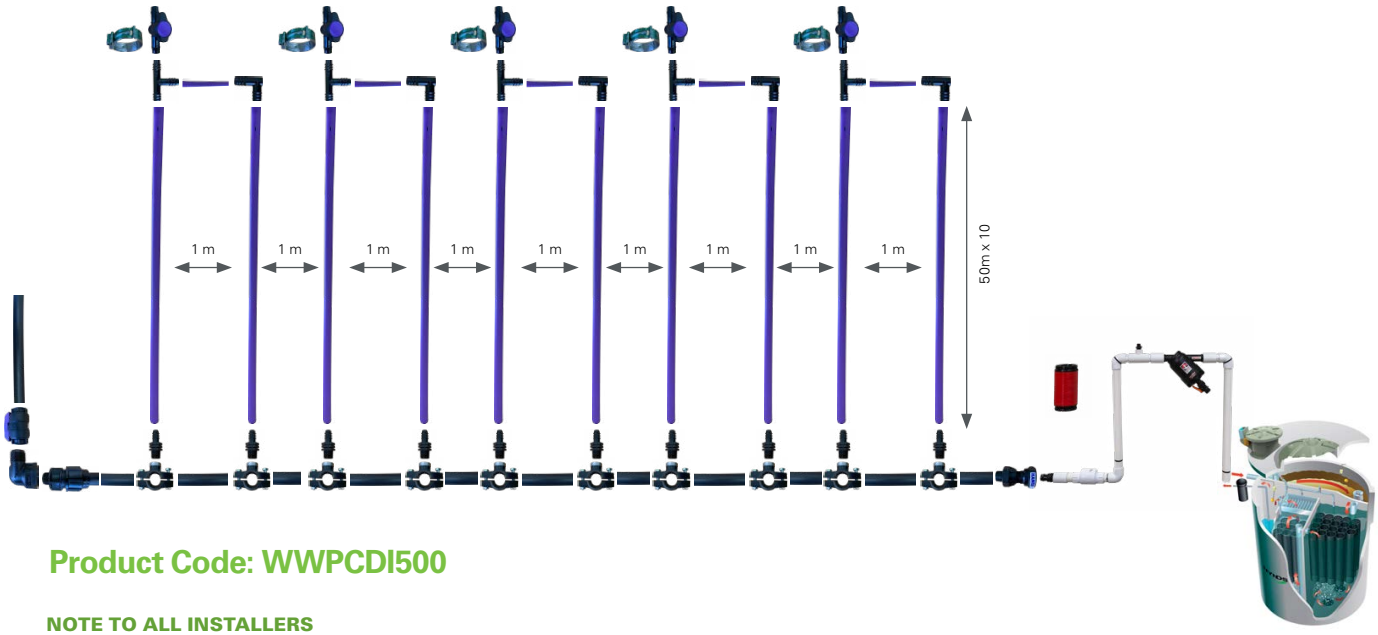
Updated: November 14, 2022

Technical Support Sheet

Generic PCDI 500m²

Example layout of a generic 500m²

Pressure Compensating Drip Irrigation (PCDI) Flat Field



Product Code: WWPCDI500

NOTE TO ALL INSTALLERS

A. Always consult with the designer of the PCDI field to confirm detailed specifications. These specifications will very likely be different to those included in this kit.

B. All installers are expected to have their own supply of common PCDI components and fittings, for example: DNL valves, joiners, tees, saddles, air valves, 16mm 3 barb tees, elbows.

C. COBRA ratchet clips to be used on all single or double barb fittings.

D. Air Release Valves to be installed at highest point on sloped field.

DISCLAIMER

1. IMPORTANT: PCDI design, pump selection details and component specification are site specific. The component specification provided in this document are for a generic 500m² PCDI flat field and may not be sufficient for your irrigation field.
2. Each PCDI field must be designed by a suitably qualified designer (SQD) who is required to specify all component requirements and accepts full professional responsibility for the design. Hynds Wastewater accept no responsibility for the details provided in this document as being fit-for-purpose for a specific site requiring a PCDI field.
3. Additional components (for example DNL valves, indexing valve, water meter and/or a Schrader valve) may be required.
4. The details of this kit must be checked and approved by the SQD prior to installation.
5. It is recommended that the SQD issues a design producer statement (PS1 for the specific PCDI field design).
6. Each PCDI field design and pump selection must be endorsed by a suitably qualified designer (SQD) who is required to specify all component requirements and accept full professional responsibility for the system design.

HYNDS WASTEWATER

TABLE 1

Product	Picture Reference	Quantity	Supplier Code	Hynds Code
Irrigation Elbow 16mm Triple Barb		5	DLE16	IRRDLE16
Irrigation Tee 16mm Triple Barb		5	DLT16	IRRDLT16
Tapping Saddle 32x15mm BSP Female Metric		10	MTS03215	TS3215M
Connector Ø16 15mm Irrigation Male Threaded Lateral		10	LMD1615	IRRLTC1615
Coupler Nylon 25mm LDPE Straight		1	LDFC25	LDF-C25
Quick Action Valve Ø16 Irrigation Dripline (Short Handle)		5	DLV16P	IRRDLQAV16
Ball Valve Ø25 Nyglass Philmac		1	NBV25P	VB025P
Coupler Ø32 25mm Male PN16		1	MDMC32	ODF2513.32
Elbow Ø25 Male & Female Threaded (1" BSP)		1	SMFE25	EMFT25
Cobra Clip 16.5-18.0mm (Green)	 fit with cobra tool	5	COBRACLIP16	CC16

TABLE 2 COMPONENTS TO BE PURCHASED SEPARATELY - INSTALLER TO CONFIRM

Product	Picture Reference	Quantity	Supplier Code	Hynds Code
Rivulis D5000 SD CX 16/45/2.0/0.6		500m	PTAS1620060CX-1	IRRET16.1002L
Rivulis D5000 SD CX 16/45/3.5/0.6		500m	PTAS1635060CX-1	IRRET16.1003.5L
Irrigation Pipe Ø16 x 25m No Drippers purple		as required	PT16-25	IRRET16.25
Pipe 25 x 25m Coil		as required	25 Black LDPE	300.25.025

TABLE 3 OPTIONAL COMPONENTS

Product	Picture Reference	Quantity	Supplier Code	Hynds Code
Amiad Tagline 50mm TS Filter c/w 130 MicDIsc & 2x 50/25 Socket Reducers	 includes 2x Socket Reducers	1	TL50TS-130D	IRRF50TSF130MD
Cobra Clip Tool		1	COBRATOOL	CCHT
Vacuum Breaker Plastic Ø15 Breaker Tefen		1	TVB15	VBPT015
Saddle Clamp Ø13 Irrigation		2	LPS13	IRRLPC13

TABLE 4 CONTRACTOR TO SUPPLY

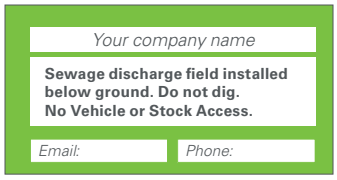
Product	Picture Reference	Quantity	Supplier Code	Hynds Code
8 gauge S/S screws, 25mm long. No 2 square drive		24		
Dripper field signs		2		

TABLE 5 PUMP RECOMMENDATIONS FOR DRIP FIELD SIZE 500 M²

Flow rate / emitter	Pump	Flow rate
1.6 Lph	Diver 75 M-A	22 L/min
2.0 Lph	Diver 75 M-A	28 L/min
3.5 Lph	Diver 75 M-A	49 L/min

Note: *The pump discharge pressure is a determined by the selected pump's performance curve and will within 10 - 40m pump head*

DISCLAIMER: Each PCDI field design and pump selection must be endorsed by a suitably qualified designer (SQD) who is required to specify all component requirements and accept full professional responsibility for the system design.

Branches Nationwide *Support Office & Technical Services 0800 93 7473*

ACUFLO®

BOUNDARY INGROUND BOXES

INGROUND BOXES

ACUFLO®

. DEFLECTION TESTED . RESISTENCE TESTED . LOAD TESTED . NINE SIZES .

The superior strength of polypropylene allows up to 50% more weight loading of polyethylene for the same deflection and has an immediate recovery rate. This means polypropylene can be used in areas traditionally suited to metallic product without the expense and theft problems associated with such materials as aluminum.

- New Zealand's only inground box manufactured in superior strength Polypropylene
- Superior antislip pedestrian tread pattern design exceeds AS/NZS 3661:1 (test report available)
- Bases available for all sizes, providing additional support and reduces the risk of mud infiltration
- 20 Years field proven outdoor UV resistance
- Squared corners reduces paving costs
- Large top & bottom stabilizing flange for maximum strength underload
- Metal detection rods fitted to underside of lid. Lid secured to boxes with stainless steel flexible wire
- Outward tapper insures box stays secure in the ground after installation
- Fully ribbed sides avoids side wall deflection
- Colour coded lids and personalized engraving

ISO 9001 CERTIFIED GCS

NEW ZEALAND MADE

ISO 14001 CERTIFIED GCS

Toby Box

Standard 150mm storm water PVC pipe can be fitted inside the Toby cover.
Pipe can be cut to length to suit valve depth.
Optional base available for firm seating and avoids debris build up.

Midi Box

Tested for top loading up to 3500 Kgs . Side wall deflection tested up to 350 newtons without failure or permanent damage. (Test reports available)
Outward taper insures box stays secure in ground after installation.
Suitable for Inline water meters, Valves, Flow controllers and Manifolds with meters.
(AMB300 & 350 only)

Jumbo & Tapper Boxes

Tested for top loading up to 5000 Kgs. Side wall deflection tested up to 350 newtons without failure or permanent damage. (Test reports available)
The large lid size (420 x 260MM) provides easy access. Suitable for inline water meters up to 50mm in size, Double check valves and multivalve installations up to 3 manifolds can be accommodated in one box.

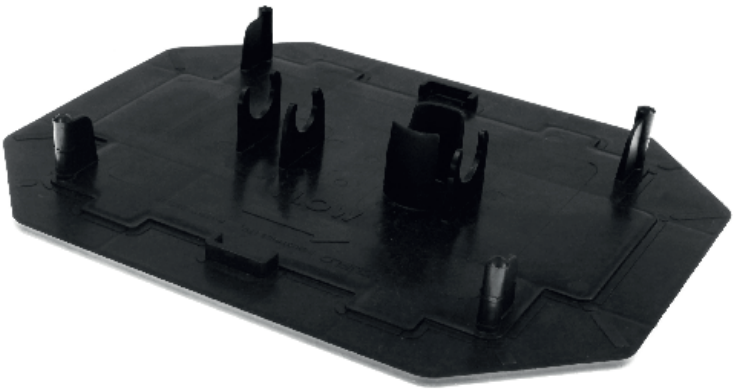
ATC160
Lid size: 160mm diameter

Internal Box Dimensions (mm)

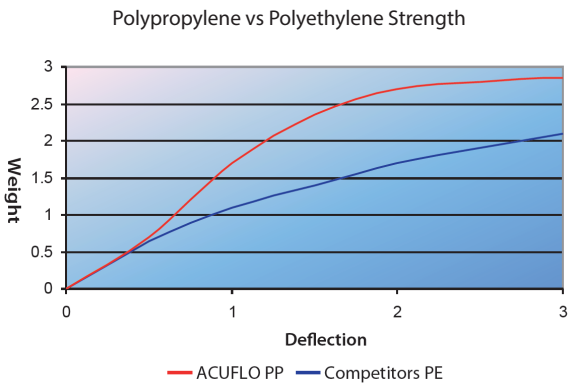
	L	W	H
AMB200:	**360**	**x 255**	**x 215**
AMB300:	**360**	**x 255**	**x 275**
AMB350:	**360**	**x 255**	**x 325**
Lid size:	**260**	**x 210**	

	L	W	H
AMBJ200:	**520**	**x 320**	**x 200**
AMBJ250:	**560**	**x 365**	**x 255**
AMBJ320:	**560**	**x 365**	**x 325**
Lid size:	**420**	**x 260**	

	L	W	H
AMBT240:	**430**	**x 210**	**x 200**
AMBT285:	**430**	**x 210**	**x 290**
Lid size:	**420**	**x 260**	



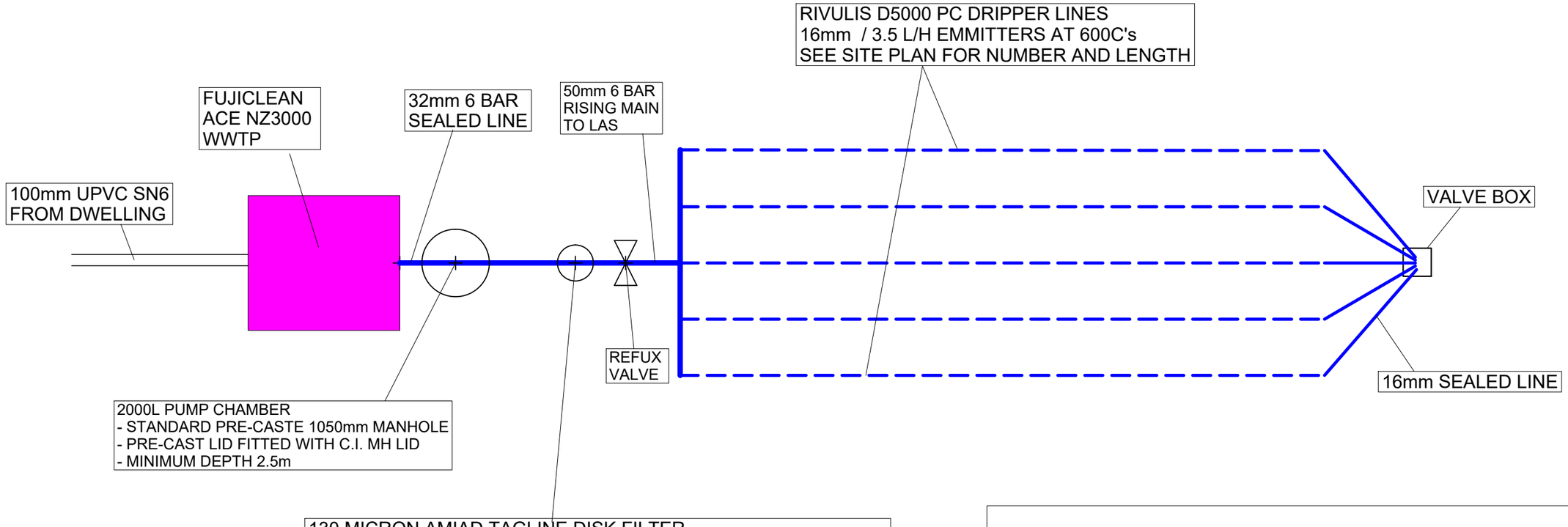
Full range of bases available for all boxes

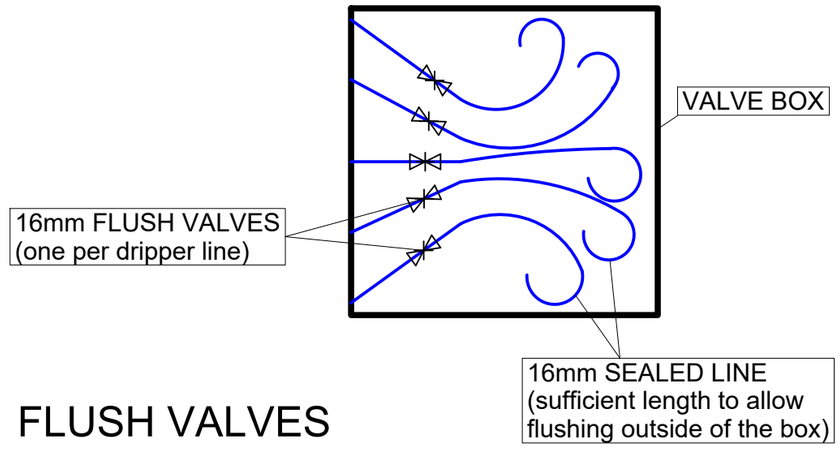


ACUFLO® INDUSTRIES LTD

31 Reeve Street, Levin. New Zealand | Phone 06 368 4996 | Fax 06 367 9201
PO Box 660 | sales@acuflo.co.nz | www.acuflo.co.nz

NOTES:
-ENSURE ANY HIGH POINTS IN THE 25mm FEED LINE ARE FITTED WITH AIR RELEASE VALVE
-ALL SOURCES OF STORMWATER ARE TO BE DIVERTED FROM THE APPLICATION AREA
-PC DRIPPER LINES SHOULD GENERALLY FOLLOW THE NATURAL CONTOUR
-DRIPPER LINES AND FITTINGS TO BE PROTECTED FROM STOCK AND HEAVY VEHICLES
-BURY DRIPPER LINES 300mm





DRIP IRRIGATION - SCHEMATIC LAYOUT

NOT TO SCALE DIMENSIONS mm

DOMESTIC WASTEWATER MANAGEMENT

832 MALAGHANS ROAD

DRAWING: 24A13
DRAWN BY: DRM

RALPH MOIR LIMITED
REGISTERED PROFESSIONAL SURVEYORS
ENGINEERING PLANNING WASTEWATER

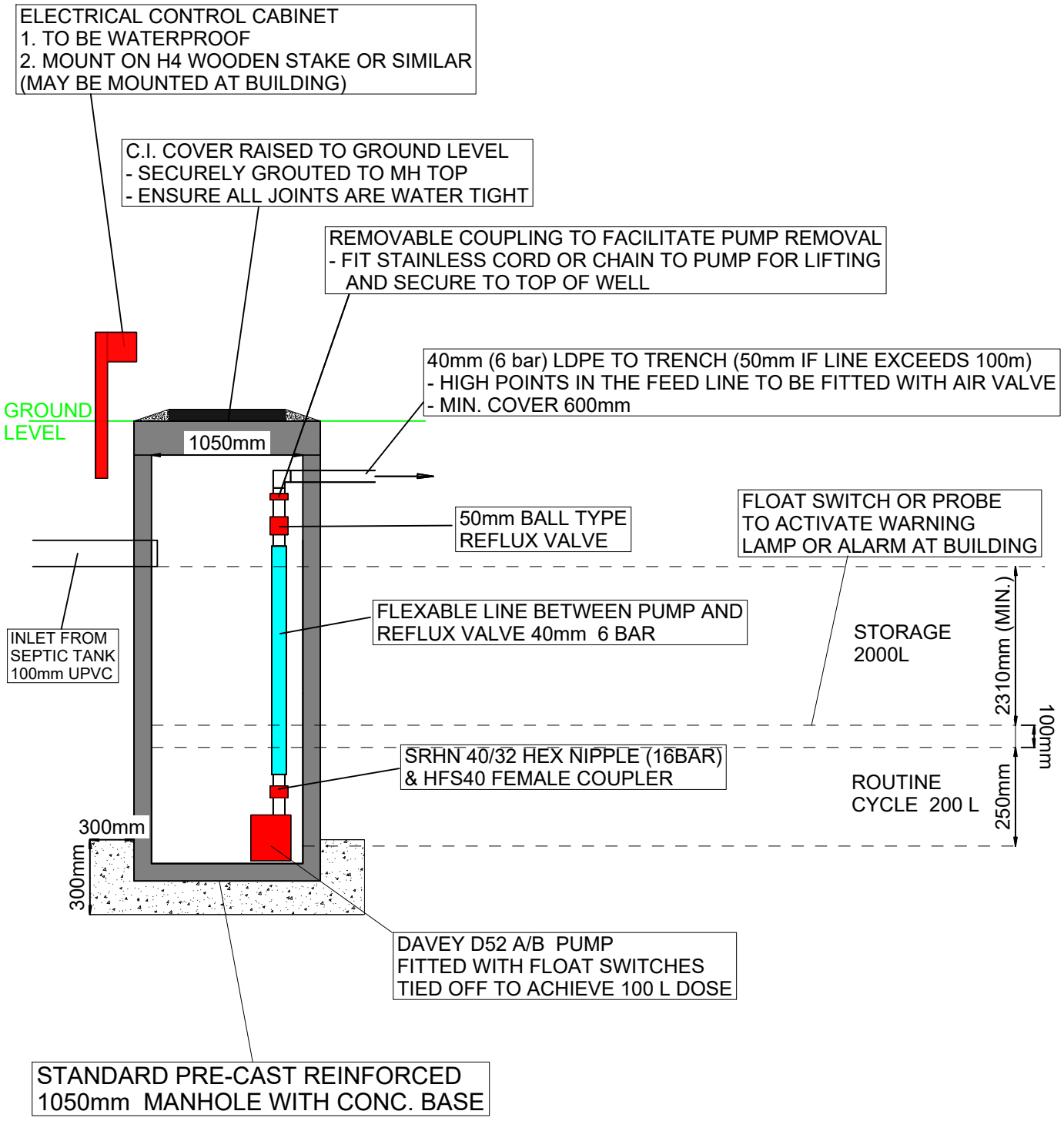
PH 03 217 2597 / 0274 372 662
EMAIL don@moir.co.nz

FILE REF:

PLOT FILE: D1, PLOTTED: Fri Mar 29 10:09:02 2024

A4

THE PUMP CHAMBER IS TO BE FILLED WITH WATER AND MONITORED FOR 24 HOURS PRIOR TO COMMISSIONING TO VERIFY WATER TIGHTNESS - EVIDENCE OF THE TEST IS TO BE PROVIDED



2000L PUMP CHAMBER

NOT TO SCALE

DOMESTIC WASTEWATER MANAGEMENT SYSTEM TYPICAL DETAIL

PH 03 217 2597 / 0274 372 662
office@moir.co.nz

Drawn by DRM

RML RALPH MOIR LIMITED

SURVEYING PLANNING ENGINEERING
STORMWATER WASTEWATER

TEST PIT LOG

HOLE NO.: TP01

CLIENT: Ron Macrae
PROJECT: 832 Malaghans Road
JOB NO.: 230249

SITE LOCATION: 832 Malaghans Road, Arrowtown
COORDINATES: 1267556.0 mE, 5014330.0 mN (NZTM2000)
LOCATION METHOD: GIS\Web map viewer
ELEVATION: 418 m (NZVD2016)

CONTRACTOR: Parcell Contracting
EQUIPMENT: 8T Excavator
ACCURACY: ±1m
OPERATOR: Luke

START DATE: 05/03/2024
END DATE: 05/03/2024
LOGGED BY: WF
CHECKED DATE: 06/03/2024

SOIL / ROCK TYPE	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH / RL	LEGEND	SCALA PENETROMETER (Blows / 0 mm)	SHEAR STRENGTH (kPa) Vane: Values	WATER
TOPSOIL	Organic SILT, with rootlets, dark brown . Soft. 0.20 m			TS			
FAN DEPOSIT	Sandy gravelly SILT with some cobbles and boulders, light brown, massive. Stiff, sand: fine to coarse, gravel: fine to coarse, cobbles: angular schist, boulders: angular schist. 0.90 m		0.5 / 417.5				Groundwater Not Encountered
	Sandy fine to medium GRAVEL with a trace of silt, grey. Medium dense to dense, gravel: subangular to subrounded, sand: fine to medium. 3.10 m		1.0 / 417.0 1.5 / 416.5 2.0 / 416.0 2.5 / 415.5 3.0 / 415.0				
SCHIST BEDROCK	Slightly weathered, grey , foliated, pelitic SCHIST. Moderately strong. 3.20 m End Of Hole: 3.20 m						

PHOTO(S)

REMARKS

Test pit dry. Walls remained stable during excavation. Unable to excavate further with 8 T excavator.

WATER

- Standing Water Level
- Out flow
- In flow

TEST PIT LOG

HOLE NO.: TP02

CLIENT: Ron Macrae

PROJECT: 832 Malaghans Road

JOB NO.: 230249

SITE LOCATION: 832 Malaghans Road, Arrowtown
CONTRACTOR: Parcell Contracting
START DATE: 05/03/2024

COORDINATES: 1267461.0 mE, 5014299.0 mN (NZTM2000)
EQUIPMENT: 8T Excavator
END DATE: 05/03/2024

LOCATION METHOD: GIS\Web map viewer
ACCURACY: ±1m
LOGGED BY: WF

ELEVATION: 421 m (NZVD2016)
OPERATOR: Luke
CHECKED DATE: 06/03/2024

SOIL / ROCK TYPE	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH / RL	LEGEND	SCALA PENETROMETER (Blows / 0 mm)	SHEAR STRENGTH (kPa) Vane: Values	WATER
TOPSOIL	Organic SILT, with rootlets, dark brown . Soft. 0.10 m						
FAN DEPOSIT	Sandy fine to coarse GRAVEL with some cobbles, boulders and minor silt, grey/brown. Medium dense to dense, gravel: subrounded to subangular, sand: fine to coarse, cobbles: angular schist, boulders: angular schist. 1.70 m		0.5 420.5 1.0 420.0 1.5 419.5 2.0 419.0 2.5 418.5 3.0 418.0	TS	1 2 3 4 5 6 7 8 9 10 11 12 13 14	50 100 150 200	Groundwater Not Encountered
	End Of Hole: 1.70 m						

PHOTO(S)

REMARKS

Test pit dry. Walls remained stable during excavation. Unable to excavate further with 8 T excavator. Possible refusal on schist bedrock.

WATER

- Standing Water Level
- Out flow
- In flow

MALAGHANS ROAD

TP1

420.0

TP2

418.0

416.0

416.0

5 FLUSHING VALVES SET
IN ACUFLOW BOX
WITH SPARE LINE TO
FACILITATE EXTRACTION

LAS: 10 RUNS OF 66.7m OF 16mm RIVULIS D5000 3.5L/H
PC DRIPPER LINES AT 2.0m SPACINGS
- EMMITER SPACINGS 600mm
- BURY TO 300mm TO AVOID FROST
- ENSURE ALL SOURCES OF STORMWATER ARE DIVERTED
- THE LAYOUT MAY NEED TO BE VARIED TO AVOID
ROCK OUTCROPS

414.0

330m TO EXISTING BORE

410.0

50mm 6 BAR
RISING MAIN

174

414.0

412.0

410.0

408.0

AIR VALVE
(only required if
there is a high point)

MILL CREEK

408.0

408.0

APPROXIMATE HOUSE LOCATION

RISING MAIN TO BE
ENCASED IN STEEL PIPE
SECURELY FASTENED
TO BRIDGE

REFLUX
VALVE

408.0

130 MICRON
DISK FILTER

410.0

410.0
412.0
414.0
416.0
418.0
420.0
422.0
424.0

2000L PUMP CHAMBER WITH
DAVEY D53A/B PUMP (or equivalent)
- FIT HIGH LEVEL FLOAT SWITCH TO
ALARM IN CASE OF PUMP FAILURE

ALL WASTEWATER FIXTURES ARE TO
BE SET ABOVE POTENTIAL FLOOD LEVEL

418.0

420.0

422.0

424.0

418.0

FUJI CLEAN ACNZ 3000 WWTP
(position subject to variation)

ALL INSPECTION COVERS AND VENTS ARE TO BE RAISED
ABOVE POTENTIAL INUNDATION LEVEL OF 409.2m

HEIGHTS IN TERMS NZVD16

DOMESTIC WASTEWATER MANAGEMENT

823 MALAGHANS ROAD

RALPH MOIR LIMITED
REGISTERED PROFESSIONAL SURVEYORS
ENGINEERING PLANNING WASTEWATER

PH 03 217 2597 / 0274 372 662
EMAIL don@moir.co.nz

DRAWING: 24A13 240404
DRAWN BY: DON MOIR
A3 HORZ SCALE: 1 : 1000

FILE REF: 24A13

PLOT FILE: D1, PLOTTED: Thu Apr 4 14:56:41 2024

Chorus New Zealand Limited

21 March 2024

Chorus reference: 10784072

Attention: Craig Woodcock

Quote: New Property Development

1 connections at Lot: 5, Deposited Plan: 521688, Otago

Your project reference: N/A

Thank you for your enquiry about having Chorus network provided for the above development.

Chorus is pleased to advise that, as at the date of this letter, we are able to provide reticulation for this property development based upon the information that has been provided:

Fibre network	$71,716.54

The total contribution we would require from you is **$82,474.02 (including GST)**. This fee is a contribution towards the overall cost that Chorus incurs to link your development to our network. This quote is valid for 90 days from 21 March 2024. This quote is conditional on you accepting a New Property Development Contract with us for the above development.

If you choose to have Chorus provide reticulation for your property development, please log back into your account and finalise your details. If there are any changes to the information you have supplied, please amend them online and a new quote will be generated. This quote is based on information given by you and any errors or omissions are your responsibility. We reserve the right to withdraw this quote and requote should we become aware of additional information that would impact the scope of this letter.

Once you would like to proceed with this quote and have confirmed all your details, we will provide you with the full New Property Development Contract, and upon confirmation you have accepted the terms and paid the required contribution, we will start on the design and then build.

For more information on what's involved in getting your development connected, visit our website www.chorus.co.nz/develop-with-chorus

Kind Regards

Chorus New Property Development Team

AURORA ENERGY LIMITED
PO Box 5140, Dunedin 9058
PH 0800 22 00 05
WEB www.auroraenergy.co.nz

15/03/2024

Craig Woodcock
Jea Town Planners & Surveyors

Sent via email only: craig@jea.co.nz

Dear Craig,

ELECTRICITY SUPPLY AVAILABILITY FOR A PROPOSED TWO LOT SUBDIVISION.
832 MALAGHANS ROAD, SPEARGRASS FLAT, ARROWTOWN. LOT 5 DP 521688.

Thank you for your inquiry outlining the above proposed development.

Subject to technical, legal and commercial requirements, Aurora Energy can make a Point of Supply[1] (PoS) available for this development.

Disclaimer

This letter confirms that a PoS **can** be made available. This letter **does not** imply that a PoS is available now, or that Aurora Energy will make a PoS available at its cost.

Next Steps

To arrange an electricity connection to the Aurora Energy network, a connection application will be required. General and technical requirements for electricity connections are contained in Aurora Energy's Network Connection Standard. Connection application forms and the Network Connection Standard are available from www.auroraenergy.co.nz.

Yours sincerely

Niel Frear
CUSTOMER INITIATED WORKS MANAGER

[1] Point of Supply is defined in section 2(3) of the Electricity Act 1993.

EARTHWORKS DEPTH KEY:

- Fill Depth 0.0m to 0.5m
- Fill Depth 0.5m to 1.0m
- Fill Depth 1.0m to 1.5m
- Fill Depth 1.5m to 2.0m
- Cut Depth 0.0m to 0.5m
- Cut Depth 0.5m to 1.0m
- Cut Depth 1.0m to 1.5m
- Cut Depth 1.5m to 2.0m
- Cut Depth 2.0m to 2.5m
- Cut Depth 2.5m to 3.0m
- Cut Depth 3.0m to 3.5m
- Cut Depth 3.5m to 4.0m

EARTHWORKS SUMMARY

Areas	
Access and platform area	5,384m²
Rockfall Protection Bund area	425m²

Volumes	
Cut	2,695m³
Fill	811m³

NOTES

- Contour Interval = 0.5m
- No allowance for pavement surfces
- Earthworks surface 200mm below proposed finish levels

NORTH

Lot 1

Lot 2

Deepest cut - 3.8m

Rockfall Protection Bund

ISSUED FOR REVIEW - 27.02.24

JEA TOWN PLANNERS & SURVEYORS
Level 2, 38 Shetaver Street
PO Box 95, Queenstown, 9300

CLIENT: MacRae

NOTES:
- ALL DIMENSIONS SHOWN ARE IN METERS UNLESS SHOWN OTHERWISE.
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- THIS PLAN MAY BE SUBJECT TO FINAL SURVEY.

PROPOSED EARTHWORKS
2 LOT SUBDIVISION
832 MALAGHANS ROAD - SHEET 1 OF 3

REV.	DATE	REVISION DETAILS	BY
A	12.04.24	ROCKFALL BUND ADDED	MF
B	30.04.24	AMEND EARTHWORKS	MF
C	03.05.24	AMEND EARTHWORKS	MF

SURVEYED	SIGNED	DATE	JOB NO.	DRAWING NO.
MF	CW	31.05.23	23016	04.01
DRAWN	CHECKED	DATE	SCALE	
CW	CW	19.06.24	1:2000m @ A3	
DATUM & LEVEL				REV.
MT NIC 2000 - NZVD16				C

C:\Users\JEA Craig\John Edmonds and Associates\John Edmonds and Associates - Shared Documents\Clients\2023\23016 - 832 Malaghans Road - Macrae\Survey\CAD\23016.04.01D Earthworks.dwg Plotted: 19.06.2024

EARTHWORKS DEPTH KEY:

- Fill Depth 0.0m to 0.5m
- Fill Depth 0.5m to 1.0m
- Fill Depth 1.0m to 1.5m
- Fill Depth 1.5m to 2.0m
- Cut Depth 0.0m to 0.5m
- Cut Depth 0.5m to 1.0m
- Cut Depth 1.0m to 1.5m
- Cut Depth 1.5m to 2.0m
- Cut Depth 2.0m to 2.5m
- Cut Depth 2.5m to 3.0m
- Cut Depth 3.0m to 3.5m
- Cut Depth 3.5m to 4.0m

EARTHWORKS SUMMARY

Areas	
Access and platform area	5,384m²
Rockfall Protection Bund area	425m²

Volumes	
Cut	2,695m³
Fill	811m³

NOTES

- Contour Interval = 0.5m
- No allowance for pavement surfces
- Earthworks surface 200mm below proposed finish levels

NORTH

Section A

Section B

Section C

Deepest cut - 3.8m

Rockfall Protection Bund

ISSUED FOR REVIEW - 27.02.24

JEA TOWN PLANNERS & SURVEYORS
Level 2, 38 Shetever Street
PO Box 95, Queenstown, 9300

CLIENT: MacRae

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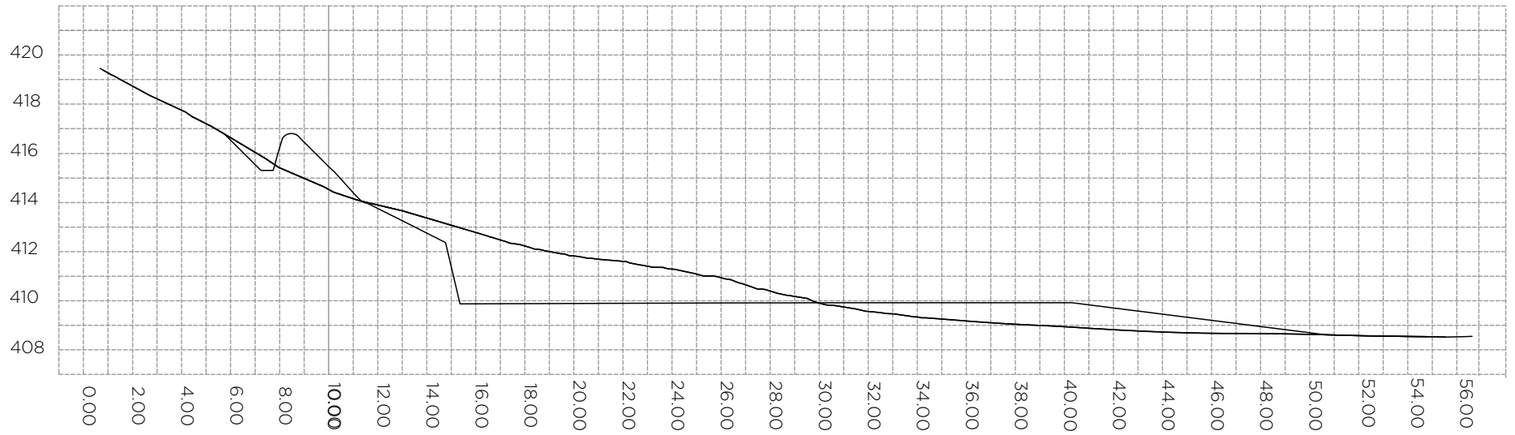
PROPOSED EARTHWORKS
2 LOT SUBDIVISION
832 MALAGHANS ROAD - SHEET 2 OF 3

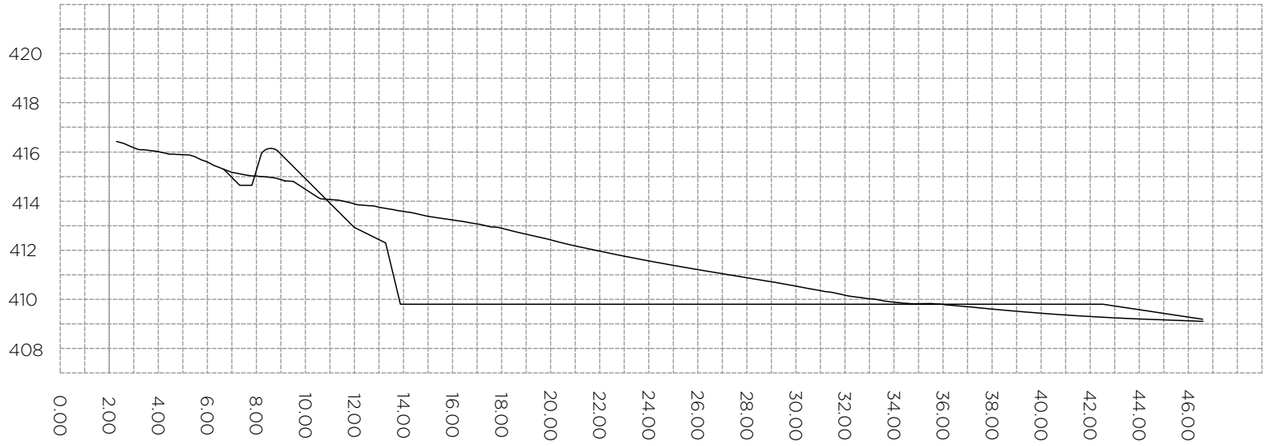
REV.	DATE	REVISION DETAILS	BY
A	12.04.24	ROCKFALL BUND ADDED	MF
B	30.04.24	AMEND EARTHWORKS	MF
C	03.05.24	AMEND EARTHWORKS	MF

SURVEYED	SIGNED	DATE	JOB NO.	DRAWING NO.
MF	CW	31.05.23	23016	04.01
DRAWN	CHECKED	DATE	SCALE	
CW	CW	19.06.24	1:500m @ A3	
DATUM & LEVEL				REV.
MT NIC 2000 - NZVD16				C

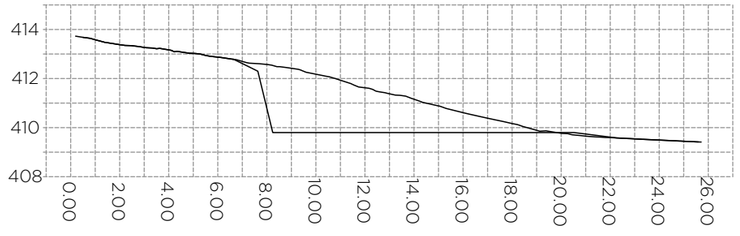
C:\Users\JEA Craig\John Edmonds and Associates\John Edmonds and Associates - Shared Documents\Clients\2023\23016 - 832 Malaghans Road - Macrae\Survey\CAD\23016.04.01D Earthworks.dwg Plotted: 19.06.2024



SECTION A



SECTION B



SECTION C

ISSUED FOR REVIEW - 27.02.24

JEA TOWN PLANNERS & SURVEYORS
Level 2, 36 Shetover Street
PO Box 95, Queenstown, 9300

CLIENT: MacRae

NOTES:
- ALL DIMENSIONS SHOWN ARE IN METERS UNLESS SHOWN OTHERWISE.
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SECTIONS
2 LOT SUBDIVISION
832 MALAGHANS ROAD - SHEET 3 OF 3

REV.	DATE	REVISION DETAILS	BY
A	12.04.24	ROCKFALL BUND ADDED	MF
B	30.04.24	AMEND EARTHWORKS	MF
C	03.05.24	AMEND EARTHWORKS	MF
D	19.06.24	CORRECT SECTION LEVELS	CW

SURVEYED	SIGNED	DATE	JOB NO.	DRAWING NO.
MF	CW	31.05.23	23016	04.01
DRAWN	CHECKED	DATE	SCALE	
CW	CW	19.06.24	1:200 @ A3	
DATUM & LEVEL				REV.
MT NIC 2000 - NZVD16				D