WASTEWATER MANAGEMENT REPORT

P M LINGARD & M T L EASTON
PIPITEA BAY, OUTER PELORUS SOUND

Our Ref: 24710
Date: October 2012

davidson group

PROJECT PLANNERS
RESOURCE MANAGERS
CIVIL & STRUCTURAL ENGINEERS
BUILDING DESIGNERS
ENVIRONMENTAL ENGINEERS

Our Ref: 24710

19 December 2012

WASTEWATER MANAGEMENT REPORT

P M LINGARD & M T L EASTON
PIPITEA BAY, OUTER PELORUS SOUND

Contents

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Leigh McGlynn, CPEng, MIPENZ, BE

1 INTRODUCTION

Our clients require a new on-site wastewater management system to serve a proposed two bedroomed holiday home.

We have been engaged to assess the site and confirm appropriate wastewater system details for the sustainable discharge of treated domestic wastewater. Our investigation included;

- a general visual inspection;
- excavation of test pits to evaluate the soil properties;
- an assessment of the potential environmental effects;
- site survey work.

2 SITE DESCRIPTION

The property (Lot 2 DP 16958) is located in Pipitea Bay at the south western entrance to Apuau Channel, near Maude Island in the Outer Pelorus Sound. It is 6,300 m² in size and comprises of a west to south west facing slope that rises from the foreshore legal road to the right of way on top of the spur. The slopes are covered in regenerating native bush.

3 DESIGN SUMMARY

• Soil Description	Silty clay
• Ribbon Length	50 – 75mm
• Soil Category	5
• No. of Bedrooms	2
• No. of People	4 maximum
• Water Supply	Spring with low water use fixtures
• Wastewater Flow Allowance	165 l / person / day
• Daily Load	660 l
• Land Application Details	
◦ Method	LPED
◦ Design Irrigation Rate (DIR)	2.5 mm / day
◦ Area (min)	265 m²
• Siphon/Chamber Details	
◦ Type	Super Siphon
◦ Chamber size	1,200 mm diameter
• Treatment Type	4,000 litre septic tank with filter

4 INVESTIGATION

The risk of the wastewater discharge initiating instability on site is considered to be low. The site is not identified as being in the Marlborough Sounds Resource Management Plan as being unstable. In addition, the slopes on site are gentle to moderate and show no signs of instability.

An investigation was carried out in accordance with ASNZS 1547:2000 "On-Site Domestic Wastewater Management" and the Marlborough District Council "Guidelines for New On-Site Wastewater Management Systems". Refer to the site notes in the Appendix.

The moderately sloping westerly landform, near where the proposed dwelling is to be constructed, is clear of surface water and suitable for a wastewater land application system. The exposure to the sun and wind is good and the vegetation is well established bush species, providing good evapotranspiration assistance.

Three test pits were excavated by a combination of spade and auger and logged. Refer to the site notes and logs in the Appendix.

The soil profile consisted of a 50mm to 150mm thick layer of grey, moist, clayey silt topsoil overlying a light brown, slightly moist, firm to very stiff silty clay. The subsoil showed high pedal content and a low to moderate resistance to fracture into small peds typically less than 5.0 mm in size. The maximum depth of the test pits was 1.3 m.

Ribbon length tests were undertaken on samples from the silty clay soil horizon. The soil had a ribbon length that varied from 50 mm to 75 mm. The ribbon lengths, smooth and silky nature and rate of drying of the soil indicate that the soil is a Category 5 silty clay. A 100% reserve area is available.

5 DESIGN

5.1 General

Any land application system should be kept shallow to make maximum benefit of evapotranspiration and biological activity in the upper soil. The system should also be kept as simple as is practically possible to keep costs and maintenance to a minimum.

The fourth Schedule of the Resource Management Act requires that, where the proposed land application system is likely to have a significant adverse effect on the environment, a description of the possible alternative locations or methods of land application shall be undertaken.

In this instance, we consider that there will be no adverse effects on the environment and therefore no detailed descriptions are necessary. Nevertheless, we have assessed the alternative methods available and have recommended a system considered most appropriate for this site.

5.2 Loading

It is proposed to construct a two bedroomed dwelling with a spring water supply and standard water conserving fixtures for the toilet, shower, taps and washing machine. For design purposes, the design wastewater loading is therefore 4 persons at 165 l / person / day i.e. 660 litres / day.

The design wastewater loading was based on Table H3 of AS/NZS 1547:2012.

5.3 Land Application System

5.3.1 Assessment of Land Application Options

We have assessed a number of potential wastewater land application options for the site taking into consideration the underlying geological, hydrogeological and wider environmental conditions. The following options were reviewed:

a) Primary Treatment to Trenches

This is the most basic system and uses the pipe work and aggregate in the trench to evenly distribute effluent onto the surface of the underlying soil which then provides further treatment before being completely assimilated.

However, we consider that the length of trenches required will be excessive / not fit within the area available and construction on the slopes available is not a good option due to the extent of disturbance and vegetation removal that would be required.

b) Primary or Secondary Treatment to Bed

This system has the advantage of reducing the area requirements. However, the slope again precludes the practical construction of this system.

c) Primary Treatment to Low Pressure Effluent Distribution (LPED)

The principle of the Low Pressure Distribution System (LPED) is to discharge primary effluent through a small diameter pipe nestled within a larger pipe to evenly distribute into the topsoil for evapotranspiration uptake by the vegetation covering the area.

There is suitable land for such a system and gravity fall such that a system using a siphon with no power requirement is achievable.

d) Secondary Treatment to Drip Irrigation

The principle of the drip irrigation system is irrigation into the topsoil at a low application rate for evapotranspiration uptake by the dense bush covering the area. Use of drip irrigation will require secondary treatment.

There are no environmental constraints which require treatment to a secondary level and therefore we do not consider it necessary to use a system which is more expensive and has additional ongoing maintenance and service requirements.

Overall, primary treatment to LPED pipe work is considered to be the Best Practicable Option.

5.3.2 Detailed Design of Land Application System

The drawings show the proposed wastewater application area on the slope west of the building site.

For Category 5 soil the Design Irrigation Rate (DIR) is 2.5 mm per day. The required irrigation field area is therefore 265 m². The best distribution option is the use of LPED irrigation laid into the undergrowth of the bushclad areas. We would recommend that the lines are laid at 1.5 m maximum spacings, around the area on an even contour, to enable a simple single-zone field to be effective and minimise disturbance to the land and vegetation.

As the property is to be used as a holiday home, we recommend that the irrigation system receives a flush of clean water prior to being left unused for any significant period.

The final location and layout of the effluent field must be confirmed by the Designer at the time of installation to ensure the best possible siting of the field.

5.4 Distribution

It is proposed to distribute the treated effluent to the land application field by automatic dosing siphon.

Distribution by siphon ensures even loading throughout the whole field. Siphons can be sensitive but reliable products are available on the market. Regular inspections should be carried out to ensure that it has not lost it siphon. Reprime if necessary.

It is proposed to use a Super Siphon which has a drawdown of 400 mm. Therefore, a chamber diameter of 1,200 mm is required to achieve a dose volume of 450 litres. A larger chamber could be used with adjustment to the drawdown.

5.5 Treatment

Treatment of all waste in a single septic tank will be adequate at this site. The tank should be sized to cater for peak loading and for a minimum of 24 hours residence time. A minimum tank size of 4,000 litres is recommended.

The fitment of an approved effluent filter to the outlet of the tank is required to prevent solids exiting the tank, improve treatment performance and the buffering of peak flows.

5.6 Installation, Operation and Maintenance

Appropriate operation and maintenance of the overall wastewater system is paramount to its performance. Records of maintenance work should be made available for Council inspection and records.

Davidson Group Ltd has carried out a site investigation and design in accordance with current codes and modern practice. However, the treatment and land application systems are biological (living) processes and modifications may have to be undertaken to the treatment and/or land application system in some circumstances, such as when there is/are;

(a) An increase in design load
(b) Disposal of inappropriate substances to the septic system
(c) Poor maintenance
(d) Poor workmanship or departure from construction drawings.

We strongly recommend that the homeowner and installer read and note the information included in the Appendix and shown on the drawings to ensure ongoing good practice and maintenance.

Note that inspections by the Designer are required at the time of setting out of the new system and at commissioning with water prior to pipework being covered.

6 ASSESSMENT OF ENVIRONMENTAL EFFECTS

The construction of a new wastewater system within the Marlborough Sounds Resource Management Plan area is a *Limited* Discretionary Activity.

Any potential adverse effects on the environment will be mitigated by the following;

(a) The discharge will be at least 40 m downslope from the nearest waterbody and 600 mm above water tables. The land application area is not within a Natural Hazard Overlay.

(b) The land is moderately sloping and there are no instability issues. The low application rate, minimal land and vegetation disturbance, and dosed distribution will ensure that surface instability will not be instigated.

(c) The proposed on-site system complies with current Council investigation, design and management guidelines.

(d) The site characteristics, design guidelines, assessment of alternatives and management proposals have been fully investigated and have been described in Sections 4 and 5 in this report.

We consider that, given appropriate installation, operation and maintenance, any potential adverse effects will be less than minor.

7 REFERENCES

7.1 Crites, R and Tchobanoglous, A (1998). 'Small and Decentralized Wastewater Management Systems'.

7.2 ARC Environment, Technical Paper No. 58, Third Edition 'On-Site Wastewater Disposal from Households and Institutions'.

7.3 A.S./N.Z.S. 1546.1:2008 'On-Site Domestic Wastewater Treatment Units, Part 1: Septic Tanks.

7.4 A.S./N.Z.S. 1547:2012 'On-Site Domestic Wastewater Management'.

7.5 MDC (11 July 2005) 'Guidelines for New On-Site Wastewater Management Systems'.

7.6 Marlborough Sounds Resource Management Plan.

7.7 Centre for Environment Training 'On-Site Wastewater Management Training Course', Christchurch 2001.

7.8 Davidson Group Ltd, October 2012, "Engineering Report for P M Lingard and M T L Easton Reference 24710".

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R W Davis

RWD:RM

APPENDIX

A1. Site Investigation
- Field Assessment Report
- Test Pit Logs

A2. Owner & Installer Guidelines

A3. Construction Monitoring Schedule

A4. Super Siphon Product Information

A5. Drawing Numbers 24710 sheets;
C1 A Locality and Site Plans
C2 B Plan
C4 A Typical Septic Tank Details
C5 C Siphon Chamber and LPED Details

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ON SITE WASTEWATER MANAGEMENT
FIELD ASSESSMENT REPORT

JOB NAME:	Lingard & Easton		**JOB NO.** 24710
LOCATION:	Pipitea Bay, Outer Pelorus Sound		**DATE:** 8 October 2010
REFERENCE:	**1.**	ARC TP#58	
	2.	AS/NZS 1547:2000 'On Site Domestic Wastewater Management'	

1.	Percolation Rate (if available)		
2.	Site Exposure	- to sun - to wind	Moderate High
3.	Topsoil Depth		50-150 mm
4.	Soil Description:		Tan, light brown to orange, firm to stiff silty clay
5.	Soil Category (1 - 6)		5
6.	Coarse Fragments - size/abundance		None
7.	Ribbon Length		50-75 mm
8.	Soil Structure (Pedal Content)		High
9.	Performance of existing systems nearby		N/A
10.	Nearby water bodies - Separation Distance		Yes – In gully 20-30 m
11.	Nearby wells		No
12.	Intended water supply		Roof
13.	Runoff to be controlled		No
14.	Ground water to be controlled		No
15.	Any stability considerations, If yes, comment.		No
16.	Depth to water table		N/A
17.	Vegetation cover	- Existing - Proposed	Native Native
18.	Gravity head to proposed field?		Downhill (see survey)
19.	Reserve areas available?		Yes

20. Other Comments

Likely to suit siphon to LPED irrigation due to fall, trees, low drainage and no mains power. Will require careful setting out and construction.

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HOW TO GET THE BEST FROM YOUR ON-SITE WASTEWATER MANAGEMENT SYSTEM

Helpful Information for Homeowners/Occupiers

1. GOOD HOUSEHOLD PRACTICES

(a) Reduce solids disposal to treatment tanks as much as possible including food scraps, fats, grease etc. Scrape all dishes before washing and do not install a waste disposal unit unless the wastewater system has been specifically designed to carry the extra load.

(b) Do not put any of the following down sinks, drains or the toilet.

- **(i)** Oil/grease from e.g. a deep fryer;
- **(ii)** Stormwater and any drainage other than wastewater generated in the house;
- **(iii)** Petrol, oil and other flammable/explosive substances;
- **(iv)** Household, garden, garage and workshop chemicals (e.g. pesticides, paint cleaners, photographic chemicals, motor oil and trade waste);
- **(v)** Disposable nappies and sanitary napkins.

(c) In order to keep the bacteria working in the tank and in the land application area:

- **(i)** Use biodegradable soaps;
- **(ii)** Use a low-phosphorus detergent;
- **(iii)** Use a low-sodium detergent in the dispersive soil areas;
- **(iv)** Use detergents in the recommended quantities;
- **(v)** Do not use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants including cold water washing products.
- **(vi)** Do not put chemicals or paint down the drain.

(d) Conserve water. Less water means a lower load on the treatment system and land application area, with ensuing improved and more reliable performance. Conservation measures include:

- **(i)** Installation of water-conservation fittings such as low water use toilets, spray taps and water saving automatic washing machines;
- **(ii)** Taking showers instead of baths;

(iii) Only putting the dishwasher or washing machine on when there is a full load.

(e) Space washing machine and dishwasher use out to avoid overloading the wastewater system. Try not to do a large amount of washing in any one day and avoid running the washing machine and dishwasher at the same time.

(f) For the physical protection of treatment and land application systems:

(i) The treatment unit must be protected from vehicles;

(ii) Pedestrian traffic routes should not cross effluent field areas;

(iii) No vehicles or heavy stock should be allowed on effluent fields;

(iv) Deep rooting trees or shrubs should not be grown over absorption trenches or beds.

2. MAINTENANCE

(a) General

The appropriate maintenance of your treatment and land application systems will be the key to their effective and reliable performance. Please contact a drainlayer or Council if you are unsure about anything or require further advice.

(b) Septic Tanks

Any septic tank (primary wastewater treatment unit) will need to:

(i) Be cleaned out regularly i.e. every three to five years or when scum and sludge occupy two thirds of the volume of the tank (or first stage of a two-stage system). All scum, sludge and septage material must be disposed of in an approved manner. Pump chambers should be cleaned out at the same time if necessary;

(ii) Have grease traps cleaned out regularly (typically three monthly or as required);

(iii) Keep the access cover of the septic tank exposed;

(iv) Have any outlet filter inspected and cleaned, normally at the same time as septic tank cleaning. Remove the cartridge and rinse off with a garden hose, being careful to rinse all septage material back into the tank. It is not necessary that the cartridge be cleaned "spotless". The biomass growing on the filter aids in the pre-treatment process and should be left on the cartridge.

(c) Secondary Treatment Systems

Improved treatment systems, such as aerated plants or media systems, require specialist maintenance and must be looked after under a maintenance contract. Owners should ensure that they are aware of the manufacturers/suppliers recommended maintenance intervals and that a contract is in place for routine checks of mechanical components.

These systems will typically have a primary treatment stage which should be treated as in (b) above.

(d) **Effluent Field**

Reliable performance from your effluent field (including shallow trenches or beds, drip or LPED irrigation fields) will be aided by regular attention including one or more of the following depending on the type of system:

(i) Keep any surface water diversion drains upslope of and around the land application area clear to reduce absorption of rainwater into trenches or beds;

(ii) Evapotranspiration and irrigation areas should have their vegetation maintained to ensure that these areas take up nutrients with maximum efficiency;

(iii) Ensure pumps, alarms and sequencing valves are operating correctly;

(iv) Clean disc filters or filter screens on irrigation-dosing equipment periodically by rinsing back into the primary wastewater treatment unit;

(v) Irrigation systems which discharge wastewater that has only been treated by a septic tank and filter (i.e. LPED systems), must be flushed through with clean water before and after any significant period of non-use.

(vi) Regular maintenance of the treatment system (as per manufacturers recommendations), especially for aerated and media-type systems.

(ii) All tanks located in areas where high seasonal groundwater levels are known to occur shall be weighted down or provided with anchorage in accordance with clause 3.2.2 of A.S./N.Z.S. 1546.1:2008.

(iii) The Contractor shall allow to carry out any treated effluent testing required by Council. Samples should be taken once the system has been in operation for approximately three months. In a holiday home situation, testing should be done in January.

(iv) All pump chambers shall be vented. The commissioning of pumped distribution systems shall consist of at least the following:

- A check of pump out and emergency storage volumes (reserve capacity equivalent to the peak daily flow should be provided).
- Three drawdown tests.
- Testing of the operation of controls and alarms.
- Checking of uniform flow throughout any pressurised distribution network prior to covering over.

(b) Land Application Area

The following excavation techniques shall be observed so as to minimise the risk of damage to the soil.

(i) Plan to excavate only when the weather is fine. Pudding, where washed clay settles on the base of the trench to form a relatively impermeable layer, must be avoided.

(ii) Avoid excavation when the soil has a moisture content above the plastic limit. This can be tested by seeing if the soil forms a "wire" when rolled between the palms.

(iii) During wet seasons or when construction cannot be delayed until the weather becomes fine, smeared soil (smooth) surfaces should be raked to reinstate a more natural soil surface taking care to use fine tines and only at the surface.

(iv) When excavating by machine, fit the bucket with "raker teeth" if possible, and excavate in small "bites" to minimise compaction.

(v) Avoid compaction by keeping people off the finished trench or bed floor.

In particular for trenches and beds:

(vi) If rain is forecast, cover any open trenches to protect them from rain damage.

(vii) Excavate perpendicular to the line of fall or parallel to the contour levels.

(viii) Ensure that the inverts are horizontal or sloped at not more than 1 in 200.

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GUIDELINES FOR INSTALLERS OF ON-SITE DOMESTIC WASTEWATER MANAGEMENT SYSTEMS

References

A.S./N.Z.S. 1546.1:2008 'On-Site Domestic Wastewater Treatment Units, Part 1:Septic Tanks'
A.S./N.Z.S. 1547:2000 'On-Site Wastewater Management'

1. GENERAL

(a) All products and construction shall be in accordance with the relevant standards and in general the best trade practices shall prevail. If there are any questions about any aspect of the work, please contact Council in the first instance.

(b) The Contractor shall act to protect the health and safety of staff and private persons at all times.

(c) The Contractor must be aware of the inspection requirements of Council and/or the Engineer and the need to provide As-Built locations of the treatment and land application systems to Council and the Owner.

(d) The Contractor should also educate the Owner about the functioning of their system, especially the maintenance requirements, and where appropriate put in place a maintenance contract for systems which rely on mechanical action in order to function properly.

2. LOCATION OF TREATMENT AND DISTRIBUTION SYSTEMS AND LAND APPLICATION AREAS

(a) All tanks and the land application area shall be located clear of structures to avoid the undermining of foundations. In general, a minimum clearance of 3.0 metres should be adequate but if in doubt check with Council or an Engineer.

(b) The Contractor must be aware of the required separation distances of tanks and/or the land application area to surface water (ponds, water courses and drainage paths), wells and/or boundaries.

(c) Treatment systems should be sited with consideration for access by desludging trucks.

3. GOOD CONSTRUCTION TECHNIQUE

(a) Treatment and Distribution Systems

(i) When working with existing systems or carrying out maintenance tasks, measures shall be in place to ensure staff are adequately protected from contact with wastewater.

davidson group

PROJECT PLANNERS
RESOURCE MANAGERS
CIVIL & STRUCTURAL ENGINEERS
BUILDING DESIGNERS
ENVIRONMENTAL ENGINEERS

Our Ref: 24710

2 October 2012

CONSTRUCTION MONITORING SCHEDULE

OWNER: P M Lingard and M T L Easton

PROJECT: New Wastewater System

LOCATION: Pipitea Bay, Outer Pelorus Sound

	Inspections Proposed	Estimated Number
1.	Joint site visit with Drainlayer prior to work commencing.	1
2.	Commissioning of wastewater system before coverage of pipework.	1

Notes

1. The Builder/Contractor is to keep the Engineer informed of progress and in particular of the dates that the work will be ready for the inspections above to be made. At least 24 hours notice shall be given to the Engineer.

2. Additional inspections may well be required to satisfy ourselves that the work is in accordance with the documentation or if rework needs to be undertaken.

3. The Contractor shall provide as-built information on the final layout of the wastewater system, including tank, pipework and / or valve positions as appropriate.

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Super Siphon

The **Super Siphon** has been designed to offer you a superior performing product never before achieved with passive dosing. Designers and end users are now able to achieve so much more with the Passive Versatility of **Super Siphon**.

- No Power Required
- No Moving Parts
- Will Not Stall
- Simple to Install or Retrofit
  - just glue to outlet
- Low Cost
- Environmentally Friendly Constuction

OPTIONS INCLUDE:

- Adjustable Drawdown
- Internal or External mounting to tank (great for retrofitting!)
- Parallel configuration for low head automatic hydro-indexing

MADE IN NEW ZEALAND

By Vortech Ltd.

APPLICATIONS FOR THE Super Siphon:

- **Controlled dispersal of Domestic and Industrial Effluent**
- **Horticulture irrigation/dose feeding system**
- **Dam Storage for on-site micro-hydro systems**
- **Measuring/fluid volumes, food, photographic industries, etc.**
- **Storm-water retention control**
- **Dairy Effluent**
- **Ornamental fountains...**

Vortech Ltd. is proud to offer to you the
Super Siphon and the amazing advantages it delivers:

- Broader Performance Envelope - enabling a wider scope in design implementation and applications.
- Unimpeded Flow Rate @ siphon outlet;- 0-150 ltrs/min, >infinitely increasing with the increase of a discharge head.
- Adjustable Stroke; 150mm->500mm
- Durable Recycled Polyethylene
- Cost Benefits for the installer/user,
- Low Head loss through the System; = Draw/down-Stroke + 100mm over the invert of the siphon outlet.
- Easy to Install and Prime.
- Parallel Configuration, offering multiple sequencing valves from the one reservoir.
- 50mm ports, offers a better flow-rate than existing 110mm ported siphons, with all the associated benefits of smaller is better and more economic.
- Pressure Tested; to offer reliability, service and durability.
- No moving parts
- No power or on-going maintenance costs
- Will Not Stall

DISTRIBUTOR **Autoflow Ltd.**

18 North Rd, Kaitaia
Ph: (09) 408 6080
Fax: (09) 408 6081
email: autoflowltd@xtra.co.nz

Super Siphon

Super Siphon

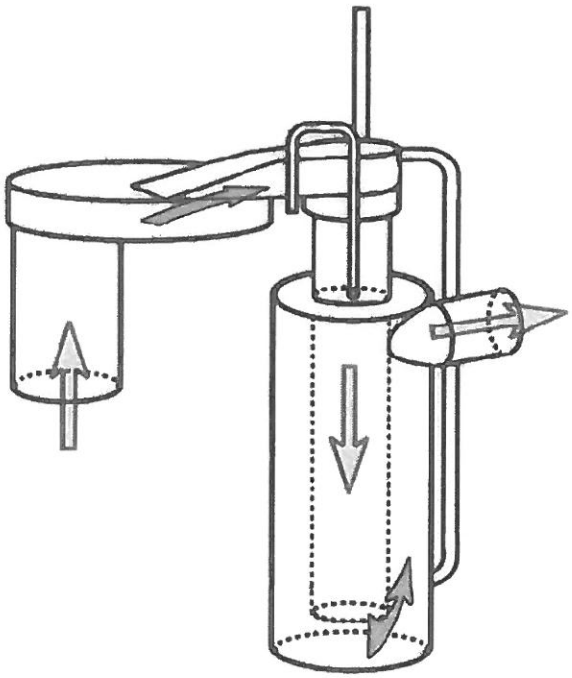
Patent Pending

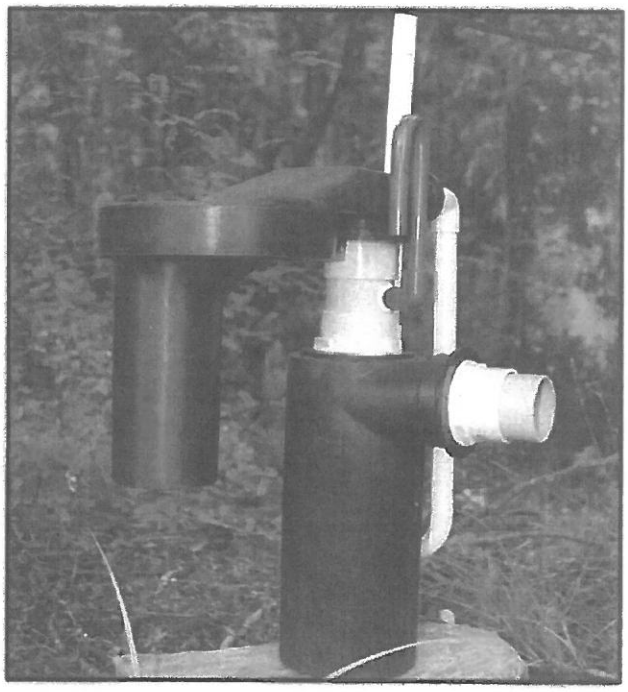
Product Information

Introducing the latest in Siphon Dosing Technology by Vortech Ltd.

The Super Siphon has been designed to offer superior performance and reliability for the intermittent dosing of liquid.

- The Super Siphon has no moving parts, requires no additional power input and with its entirely plastic construction is not prone to corrosion or wear.
- The Super Siphon works over a wide range of flow rates right down to zero– it will not stall, even if the outlet is blocked temporarily during dosing.
- The Super Siphon can be installed in a variety of internal or external configurations and is supplied in a standard 400mm drawdown design. It can be modified on site or special ordered for specific drawdown distances.





The Basic Stuff

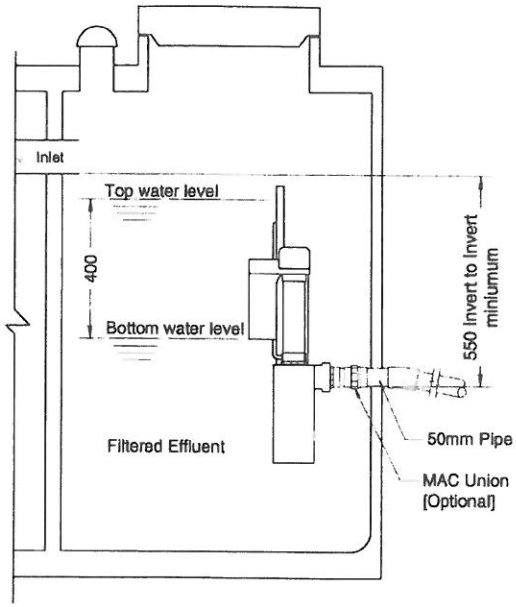
Supplied drawdown distance:	400mm, +/- 10mm		Overall height: (base to top of bell)	620mm
Inlet pipe size:	65mm		Siphon base to outlet invert:	210mm
Outlet pipe size:	2" BSP outlet port, 50mm nominal		Max. width across bell:	350mm
Flow rate minimum:	0 litres/min (Flow can be restricted or completely stopped during dosing without stall)		Top water level over bell:	160mm
Flow rate maximum:	~1000 litres/min (for a 4 metre head)		Weight:	<3kg

Internal Tank Installation

The Super Siphon is supplied in a one piece unit and is installed by gluing the outlet fitting to the 50mm outlet pipe in the tank.

For ease of removal and maintenance a MAC union can be placed between the siphon and tank outlet pipe.

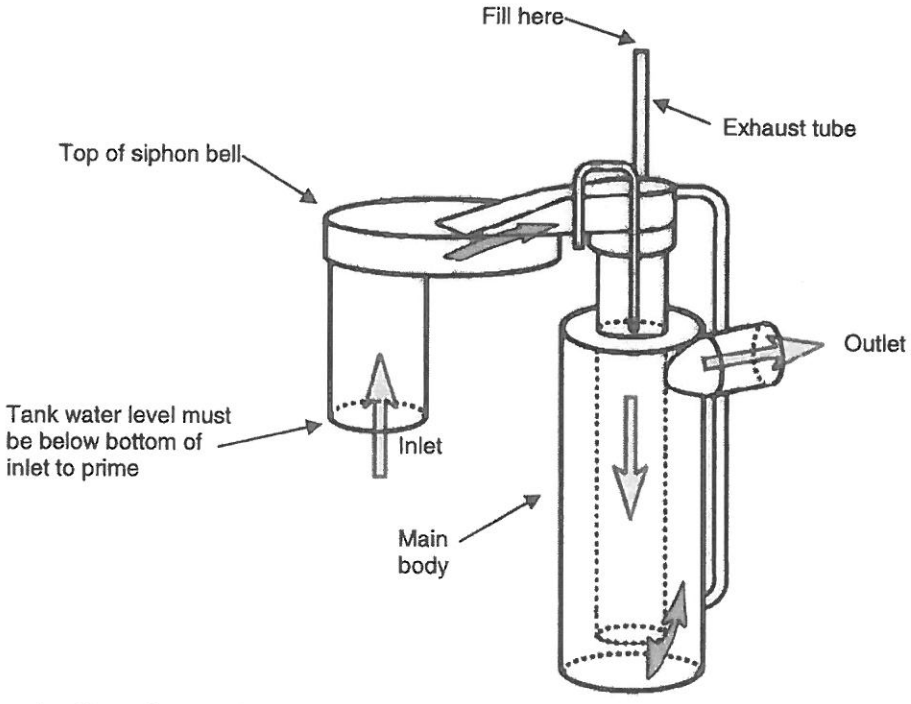
For best performance it is important not to obstruct the Super Siphon outlet. A 2 metre length of 50mm diameter or greater pipe on a falling gradient is required for a non-vented external discharge line.



Priming the Siphon for first use

The Super Siphon's main body must be filled with water (primed) prior to first use. The priming procedure is as follows:

Insure the water level in the tank is below the inlet of the of the siphon and fill the main body of the siphon with not less than 2.5 litres of water. This is achieved by pouring water into the open top of the vertical exhaust tube.



Once primed, allow the tank to fill with water covering the Super Siphon. The Super Siphon will start when the water level reaches approximately 160mm over the top of the bell. The Super Siphon will run (dose) until the water level reaches the bottom of the inlet.

This completes the priming process and Super Siphon will now continue to dose automatically.

Modifying Super Siphon for drawdown distances between 180mm & 400mm

The Super Siphon comes standard with a 400mm drawdown distance (+/- 10mm). That drawdown can be reduced to as little as 180mm by modifying the siphon in the field using the following procedure.

As supplied the Super Siphon has a 400mm drawdown. This 400mm is measured from the bottom of the inlet tube below the bell.

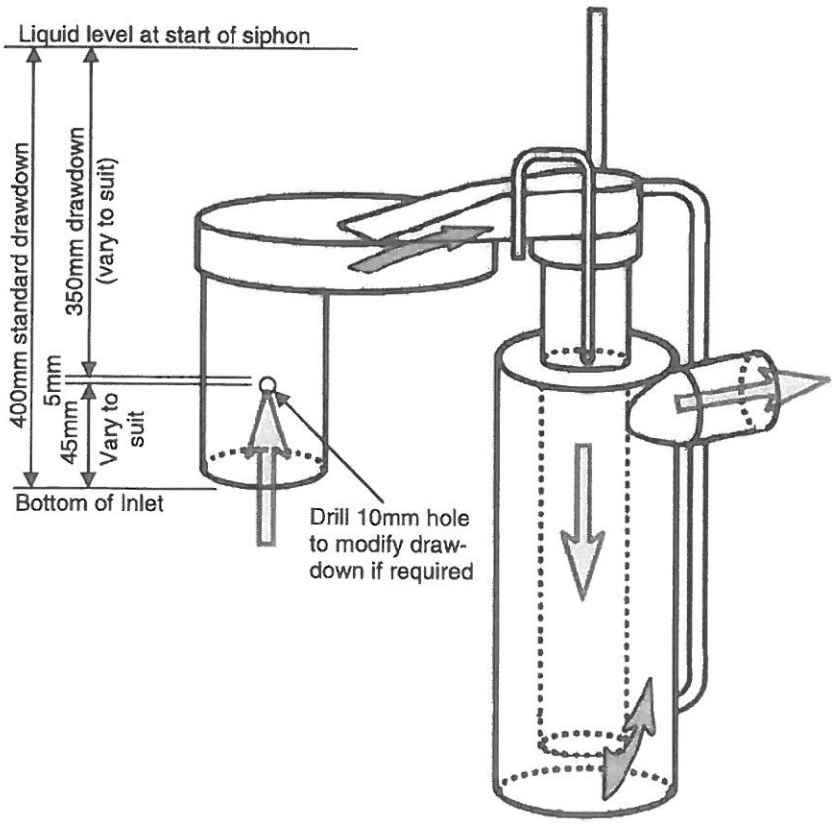
To shorten the drawdown stroke, subtract the desired drawdown distance + 5mm from 400 and drill a 10mm diameter hole in the side of the inlet tube or bell the calculated distance up from the bottom of the inlet.

As an example, if you want a 350mm drawdown...

350mm + 5mm = 355mm
400mm - 355mm = 45mm

Measure up from the bottom of the inlet tube 45mm and drill a 10mm diameter hole.

When the hole is uncovered as the water level falls during dosing the siphon suction will be broken and the dosing will stop at this point.



Troubleshooting

The Super Siphon is designed with no moving parts and is factory tested to give many years with little if any need at all for maintenance. We like to think the Super Siphon will "Thrive on neglect!."

However, should the Super Siphon not appear to be working properly, check the following items:

1. **Is it primed?** Priming of the siphon can be overlooked or in very rare situations it is remotely possible that it may have dried out. To re-prime the siphon, follow the instructions for "Priming the siphon for first use" set out previously in this brochure.

2. **Is it leaking?** The siphon is factory tested to ensure that it does not leak; however, it may have become damaged during transit or installation. For the siphon to operate correctly all joints between components must be airtight. As the water rises around the siphon if you see bubbles forming or rising from the unit, locate the source of the bubbles, clean the surface thoroughly and repair the leak with a high quality silicone sealant designed for use on UPVC and PE plastic and rated for underwater use. Allow to cure and re-submerge the unit in water to check again for leaks and to ensure that the repair has worked. If there are no further bubbles, re-install the unit and re-prime the siphon following the instructions for "Priming the siphon for first use" set out previously in this brochure.

3. **Is it not the siphon at all and does the effluent field need cleaning?** One of the major advantages of the Super Siphon is that it will not stall as other siphons will if the outlet is restricted. Never the less it is considered good preventive maintenance to remove the end caps (or open the stop cocks if fitted) from the ends of the Low Pressure Effluent Distribution (LPED) lines once a year and flush out any sediment build-up or growth within the lines. With the LPED line ends open, re-prime the siphon following the instructions for "Priming the siphon for first use" set out previously in this brochure, let it dose and watch it discharge to ensure it is working properly. Also check the outflow from each of the LPED lines to ensure there are no blockages in any of the lines. Close the ends of the LPED lines and allow the siphon to dose a few more times to ensure the system is operating correctly.

If the Super Siphon still fails to perform as expected please contact the distributor:

AUTOFLOW Ltd
Anthony Garton
Phone: 09-408-6080
Fax: 09-408-6081
autoflowltd@xtra.co.nz

North

LOT 11
DP 323767

RIGHT OF WAY

PROPOSED BUILDING SITE (SUITABLE)

EXISTING TRACK ALONG RIGHT OF WAY

LOT 2
DP 16958

ROAD RESERVE

LOT 1
DP 8407

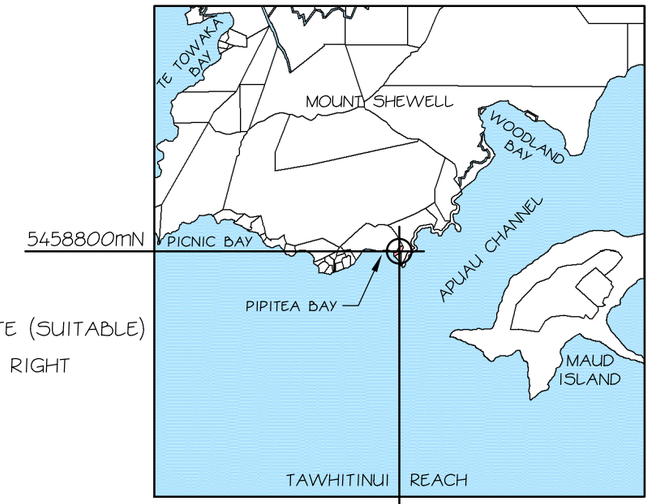
LOT 1
DP 16958

M.H.W.S.

CONSENTED POSITION AND SWING CIRCLE OF EXISTING MOORING 2002.
PROPOSED REVALIDATION OF COASTAL PERMIT U040083 DUE TO EXPIRE 1st MARCH 2014

PIPITEA BAY

CROWN LAND
BLK XII FRENCH
PASS SD



LOCALITY PLAN (NZTM TOPO50)
1:100000

SITE PLAN
1:1000

0mm 100mm

NOTE:
LOCATIONS OF FEATURES ARE APPROXIMATE ONLY AND HAVE NOT BEEN PRECISELY SURVEYED

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BUILDING DESIGNERS
ENVIRONMENTAL ENGINEERS

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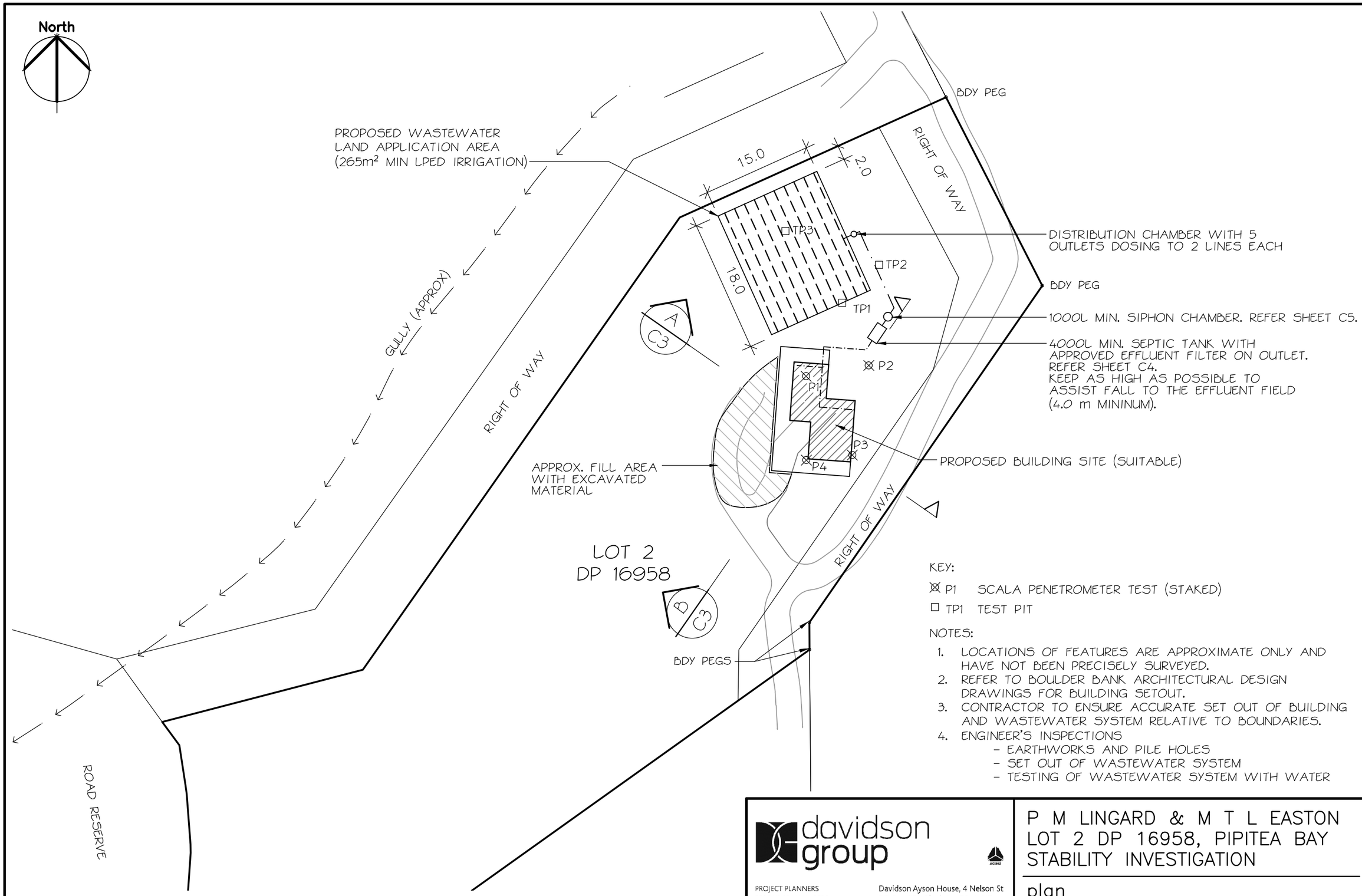
P M LINGARD & M T L EASTON
LOT 2 DP 16958, PIPITEA BAY
STABILITY INVESTIGATION

locality and site plans

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
10/12	A3	24710	C1	A

DES	DRN	CK	REF
RWD	BH	RWD	

North



KEY:

⊗ P1 SCALA PENETROMETER TEST (STAKED)

□ TP1 TEST PIT

NOTES:

1. LOCATIONS OF FEATURES ARE APPROXIMATE ONLY AND HAVE NOT BEEN PRECISELY SURVEYED.
2. REFER TO BOULDER BANK ARCHITECTURAL DESIGN DRAWINGS FOR BUILDING SETOUT.
3. CONTRACTOR TO ENSURE ACCURATE SET OUT OF BUILDING AND WASTEWATER SYSTEM RELATIVE TO BOUNDARIES.
4. ENGINEER'S INSPECTIONS
   - EARTHWORKS AND PILE HOLES
   - SET OUT OF WASTEWATER SYSTEM
   - TESTING OF WASTEWATER SYSTEM WITH WATER

PLAN
1:500

0mm 100mm

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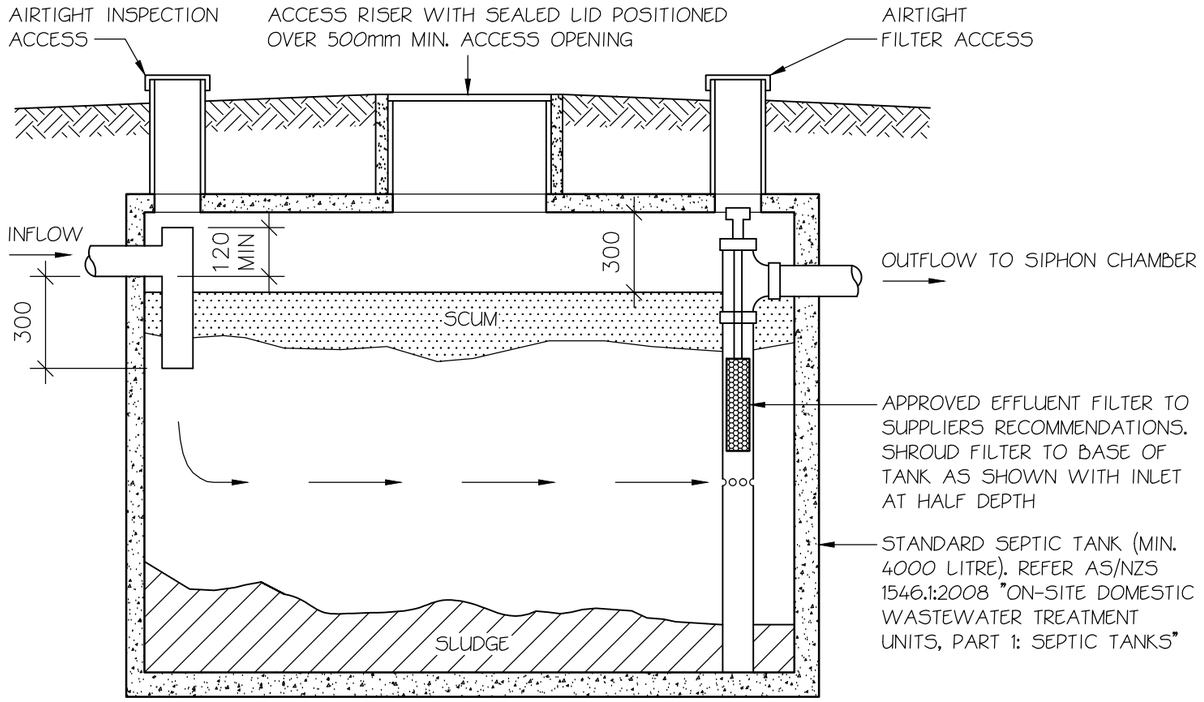
LOT 2 DP 16958, PIPITEA BAY
STABILITY INVESTIGATION

plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
10/12	A3	24710	C2	B

DES	DRN	CK	REF
RWD	KJM	RWD	



TYPICAL CROSS SECTION
NTS

SUGGESTED OPERATION AND MAINTENANCE SEPTIC TANK

1.) THE INFLOWING HOUSEHOLD SEWAGE SHOULD NOT CONTAIN ANYTHING OTHER THAN HUMAN WASTE AND TOILET PAPER, AND FOOD MATERIAL SUCH AS MAY GO DOWN A KITCHEN SINK DRAIN. GARBAGE GRINDERS ARE NOT RECOMMENDED, ALTHOUGH THEY NEED NOT BE FORBIDDEN. MORE FREQUENT DESLUDGING OF THE SEPTIC TANK MAY BE NEEDED IF A GARBAGE GRINDER IS USED. NORMAL USE IN THE HOUSE OF SOAPS, DETERGENTS, BLEACHES, PLUMBING FIXTURE CLEANERS, DRAIN CLEANERS AND DISINFECTANTS WILL NOT HARM THE FUNCTIONING OF THE SEPTIC TANK OR THE SOIL ABSORPTION SYSTEM.

2.) PROHIBITED DISCHARGES TO THE SEPTIC TANK INCLUDE:
OIL/GREASE FROM E.G. A DEEP FRIER.
STORMWATER AND ANY DRAINAGE OTHER THAN SEWAGE GENERATED IN THE HOUSE.
PETROL, OIL, AND OTHER FLAMMABLE/EXPLOSIVE SUBSTANCES.
HOUSEHOLD, GARDEN, GARAGE, AND WORKSHOP CHEMICALS (E.G. PESTICIDES, PAINT CLEANERS, PHOTOGRAPHIC CHEMICALS, MOTOR OIL AND TRADE WASTE).
DISPOSABLE NAPPIES AND SANITARY NAPKINS.

3.) SEPTIC TANKS NEED TO BE PUMPED (SEPTAGE REMOVED WHEN THE SLUDGE AND SCUM HAVE ACCUMULATED TO THE EXTENT THAT THE CLEAR SPACE (BETWEEN SCUM AND SLUDGE) HAS A VOLUME LESS THAN 1500 LITRES). SEPTAGE REMOVAL MAY NEED TO BE DONE AS OFTEN AS EVERY THREE YEARS BUT AT NO LONGER THAN FIVE YEAR INTERVALS.

EFFLUENT FILTER

1.) THE OUTLET FILTER SHOULD PREVENT DISCHARGE OF SUSPENDED PARTICLES > 3mm AND ENSURE TSS < $100g/m^3$.

2.) THE SEPTIC TANK SHOULD BE PUMPED PRIOR TO REMOVAL OF THE FILTER TO PREVENT ANY SOLIDS FROM ESCAPING TO THE TRENCHES WHEN THE CARTRIDGE IS REMOVED.

3.) THE FILTER SHALL BE CLEANED AT THE SAME TIME AS THE NORMAL SEPTIC TANK SERVICING (3-5 YEARS).

4.) REMOVE THE CARTRIDGE AND RINSE OFF WITH A GARDEN HOSE, BEING CAREFUL TO RINSE ALL SEPTAGE MATERIAL BACK INTO THE TANK.
IT IS NOT NECESSARY THAT THE CARTRIDGE BE CLEANED "SPOTLESS".
THE BIOMASS GROWING ON THE FILTER AIDS IN THE PRE-TREATMENT PROCESS AND SHOULD BE LEFT ON THE CARTRIDGE.

CURRENT AS OF: 27/05/09

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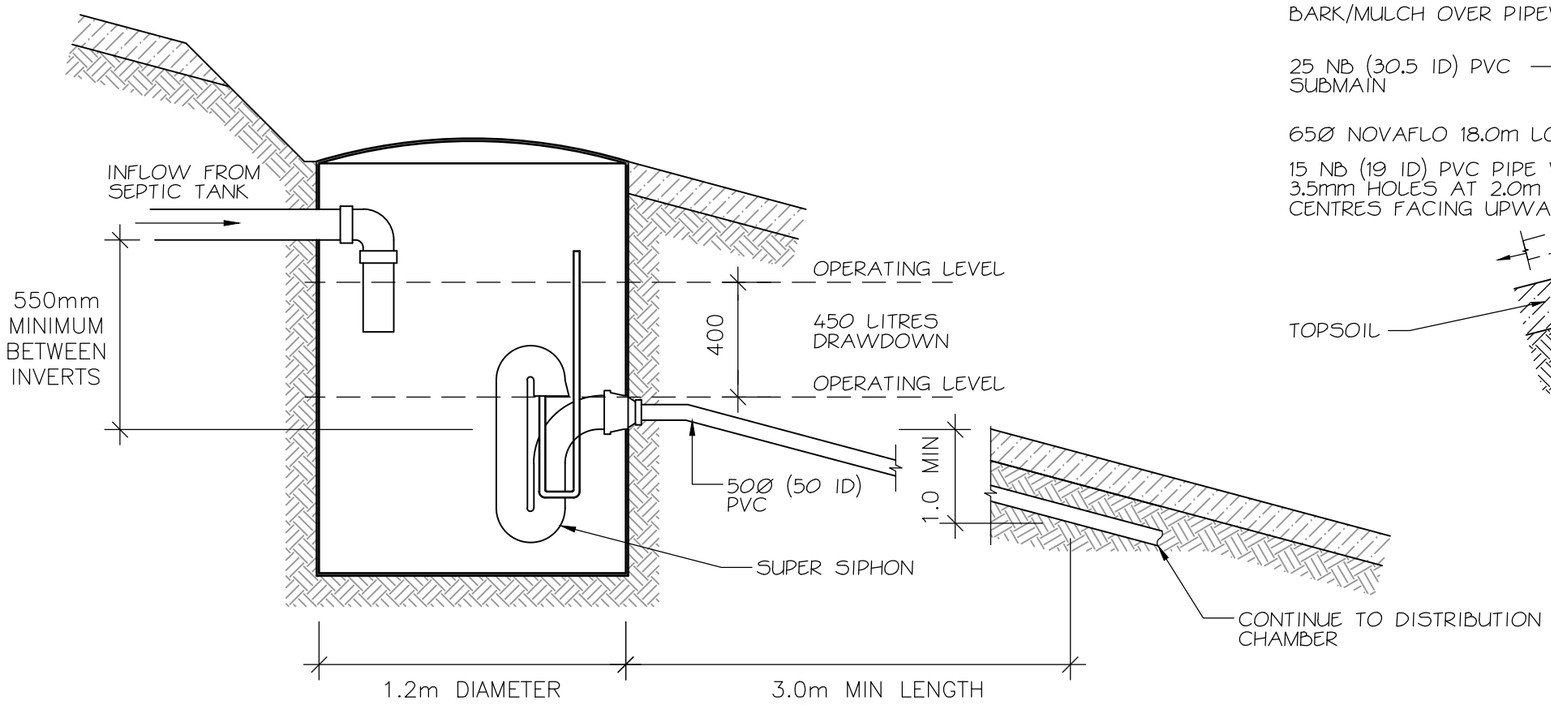
P M LINGARD & M T L EASTON
LOT 2 DP 16958, APUAU CHANNEL
STABILITY INVESTIGATION

typical septic tank details

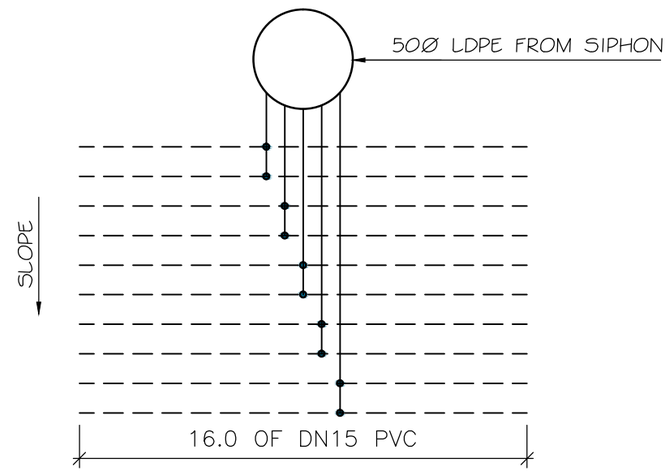
DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
10/12	A3	24710	C4	A

DES	DRN	CK	REF
RWD	B.H.	RWD	S:\FILES\Stddwgs\STD_A3\200\A202

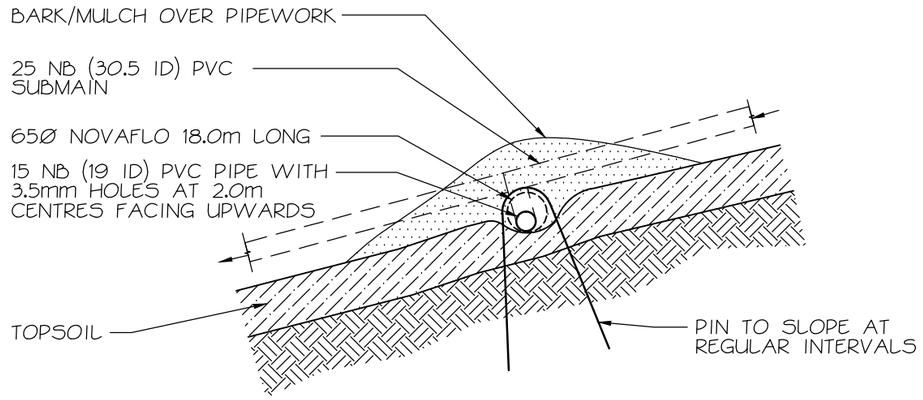
0mm 100mm



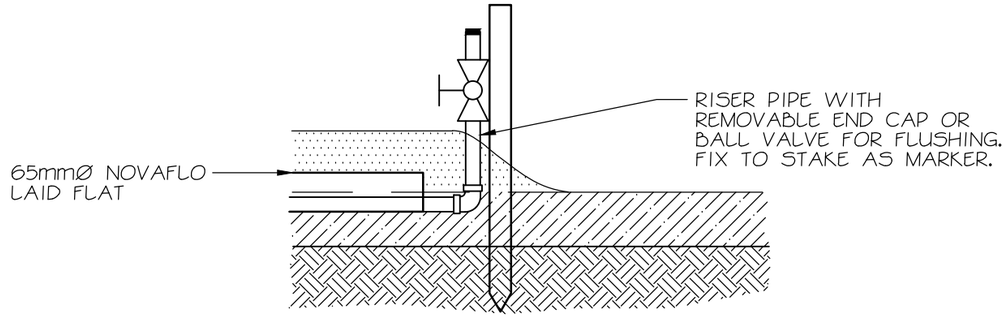
AUTOFLOW SIPHON CHAMBER
NTS



DISTRIBUTION DIAGRAMATIC
NTS



LOW PRESSURE EFFLUENT DISTRIBUTION (LPED) ON SURFACE
1:10



LPED END DETAIL
1:10

NOTES:

1. MATERIALS AND INSTALLATION OF SEPTIC TANK AND DISTRIBUTION SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1547:2000, AS/NZS 1546.1:2008 AND THE MANUFACTURERS SPECIFICATIONS.
2. POSITION AND LAYOUT OF WASTEWATER SYSTEM TO BE CONFIRMED BY THE ENGINEER ON SITE.
3. ENGINEER'S INSPECTIONS - AT TIME OF SETTING OUT
   - COMMISSIONING BEFORE COVERAGE OF PIPEWORK

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P M LINGARD & M T L EASTON
LOT 2 DP 16958, PIPITEA BAY
STABILITY INVESTIGATION

siphon chamber and LPED details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
10/12	A3	24710	C5	C

DES	DRN	CK	REF
RWD	BH	RWD	

0mm 100mm

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WASTEWATER MANAGEMENT REPORT

P M LINGARD & M T L EASTON
PIPITEA BAY, OUTER PELORUS SOUND

Our Ref: 24710
Date: October 2012

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BUILDING DESIGNERS
ENVIRONMENTAL ENGINEERS

Our Ref: 24710

2 October 2012

WASTEWATER MANAGEMENT REPORT

P M LINGARD & M T L EASTON
PIPITEA BAY, OUTER PELORUS SOUND

Contents

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Principals
Ross Davis, CPEng, MIPENZ, BE
Stephen Sheat, CPEng, MIPENZ, BE
Leigh McGlynn, CPEng, MIPENZ, BE

1 INTRODUCTION

Our clients require a new on-site wastewater management system to serve a proposed two bedroomed holiday home.

We have been engaged to assess the site and confirm appropriate wastewater system details for the sustainable discharge of treated domestic wastewater. Our investigation included;

- a general visual inspection;
- excavation of test pits to evaluate the soil properties;
- an assessment of the potential environmental effects;
- site survey work.

2 SITE DESCRIPTION

The property (Lot 2 DP 16958) is located in Pipitea Bay at the south western entrance to Apuau Channel, near Maude Island in the Outer Pelorus Sound. It is 6,300 m² in size and comprises of a west to south west facing slope that rises from the foreshore legal road to the right of way on top of the spur. The slopes are covered in regenerating native bush.

3 DESIGN SUMMARY

• Soil Description	Silty clay
• Ribbon Length	50 – 75mm
• Soil Category	5
• No. of Bedrooms	2
• No. of People	4 maximum
• Water Supply	Spring with low water use fixtures
• Wastewater Flow Allowance	165 l / person / day
• Daily Load	660 l
• Land Application Details	
◦ Method	LPED
◦ Design Irrigation Rate (DIR)	3.0 mm / day
◦ Area (min)	220 m²
• Siphon/Chamber Details	
◦ Type	Super Siphon
◦ Chamber size	1,200 mm diameter
• Treatment Type	4,000 litre septic tank with filter

4 INVESTIGATION

The risk of the wastewater discharge initiating instability on site is considered to be low. The site is not identified as being in the Marlborough Sounds Resource Management Plan as being unstable. In addition, the slopes on site are gentle to moderate and show no signs of instability.

An investigation was carried out in accordance with ASNZS 1547:2000 "On-Site Domestic Wastewater Management" and the Marlborough District Council "Guidelines for New On-Site Wastewater Management Systems". Refer to the site notes in the Appendix.

The moderately sloping westerly landform, near where the proposed dwelling is to be constructed, is clear of surface water and suitable for a wastewater land application system. The exposure to the sun and wind is good and the vegetation is well established bush species, providing good evapotranspiration assistance.

Three test pits were excavated by a combination of spade and auger and logged. Refer to the site notes and logs in the Appendix.

The soil profile consisted of a 50mm to 150mm thick layer of grey, moist, clayey silt topsoil overlying a light brown, slightly moist, firm to very stiff silty clay. The subsoil showed high pedal content and a low to moderate resistance to fracture into small peds typically less than 5.0 mm in size. The maximum depth of the test pits was 1.3 m.

Ribbon length tests were undertaken on samples from the silty clay soil horizon. The soil had a ribbon length that varied from 50 mm to 75 mm. The ribbon lengths, smooth and silky nature and rate of drying of the soil indicate that the soil is a Category 5 silty clay. A 100% reserve area is available.

5 DESIGN

5.1 General

Any land application system should be kept shallow to make maximum benefit of evapotranspiration and biological activity in the upper soil. The system should also be kept as simple as is practically possible to keep costs and maintenance to a minimum.

The fourth Schedule of the Resource Management Act requires that, where the proposed land application system is likely to have a significant adverse effect on the environment, a description of the possible alternative locations or methods of land application shall be undertaken.

In this instance, we consider that there will be no adverse effects on the environment and therefore no detailed descriptions are necessary. Nevertheless, we have assessed the alternative methods available and have recommended a system considered most appropriate for this site.

5.2 Loading

It is proposed to construct a two bedroomed dwelling with a spring water supply and standard water conserving fixtures for the toilet, shower, taps and washing machine. For design purposes, the design wastewater loading is therefore 4 persons at 165 l / person / day i.e. 660 litres / day.

The design wastewater loading was based on Table H3 of AS/NZS 1547:2012.

5.3 Land Application System

5.3.1 Assessment of Land Application Options

We have assessed a number of potential wastewater land application options for the site taking into consideration the underlying geological, hydrogeological and wider environmental conditions. The following options were reviewed:

a) Primary Treatment to Trenches

This is the most basic system and uses the pipe work and aggregate in the trench to evenly distribute effluent onto the surface of the underlying soil which then provides further treatment before being completely assimilated.

However, we consider that the length of trenches required will be excessive / not fit within the area available and construction on the slopes available is not a good option due to the extent of disturbance and vegetation removal that would be required.

b) Primary or Secondary Treatment to Bed

This system has the advantage of reducing the area requirements. However, the slope again precludes the practical construction of this system.

c) Primary Treatment to Low Pressure Effluent Distribution (LPED)

The principle of the Low Pressure Distribution System (LPED) is to discharge primary effluent through a small diameter pipe nestled within a larger pipe to evenly distribute into the topsoil for evapotranspiration uptake by the vegetation covering the area.

There is suitable land for such a system and gravity fall such that a system using a siphon with no power requirement is achievable.

d) Secondary Treatment to Drip Irrigation

The principle of the drip irrigation system is irrigation into the topsoil at a low application rate for evapotranspiration uptake by the dense bush covering the area. Use of drip irrigation will require secondary treatment.

There are no environmental constraints which require treatment to a secondary level and therefore we do not consider it necessary to use a system which is more expensive and has additional ongoing maintenance and service requirements.

Overall, primary treatment to LPED pipe work is considered to be the Best Practicable Option.

5.3.2 Detailed Design of Land Application System

The drawings show the proposed wastewater application area on the slope west of the building site.

For Category 5 soil the Design Irrigation Rate (DIR) is 3.0 mm per day. The required irrigation field area is therefore 220 m². The best distribution option is the use of LPED irrigation laid into the undergrowth of the bushclad areas. We would recommend that the lines are laid at 1.5 m maximum spacings, around the area on an even contour, to enable a simple single-zone field to be effective and minimise disturbance to the land and vegetation.

As the property is to be used as a holiday home, we recommend that the irrigation system receives a flush of clean water prior to being left unused for any significant period.

The final location and layout of the effluent field must be confirmed by the Designer at the time of installation to ensure the best possible siting of the field.

5.4 Distribution

It is proposed to distribute the treated effluent to the land application field by automatic dosing siphon.

Distribution by siphon ensures even loading throughout the whole field. Siphons can be sensitive but reliable products are available on the market. Regular inspections should be carried out to ensure that it has not lost it siphon. Reprime if necessary. The siphon chamber should be sized for a dose load of 380 litres.

It is proposed to use a Super Siphon which has a drawdown of 400 mm. Therefore, a chamber diameter of 1,200 mm is required to achieve a dose volume of 450 litres. A larger chamber could be used with adjustment to the drawdown.

5.5 Treatment

Treatment of all waste in a single septic tank will be adequate at this site. The tank should be sized to cater for peak loading and for a minimum of 24 hours residence time. A minimum tank size of 4,000 litres is recommended.

The fitment of an approved effluent filter to the outlet of the tank is required to prevent solids exiting the tank, improve treatment performance and the buffering of peak flows.

5.6 Installation, Operation and Maintenance

Appropriate operation and maintenance of the overall wastewater system is paramount to its performance. Records of maintenance work should be made available for Council inspection and records.

Davidson Group Ltd has carried out a site investigation and design in accordance with current codes and modern practice. However, the treatment and land application systems are biological (living) processes and modifications may have to be undertaken to the treatment and/or land application system in some circumstances, such as when there is/are;

(a) An increase in design load
(b) Disposal of inappropriate substances to the septic system
(c) Poor maintenance
(d) Poor workmanship or departure from construction drawings.

We strongly recommend that the homeowner and installer read and note the information included in the Appendix and shown on the drawings to ensure ongoing good practice and maintenance.

Note that inspections by the Designer are required at the time of setting out of the new system and at commissioning with water prior to pipework being covered.

6 ASSESSMENT OF ENVIRONMENTAL EFFECTS

The construction of a new wastewater system within the Marlborough Sounds Resource Management Plan area is a *Limited* Discretionary Activity.

Any potential adverse effects on the environment will be mitigated by the following;

(a) The discharge will be at least 20 m from the nearest waterbody and 600 mm above water tables. The land application area is not within a Natural Hazard Overlay.

(b) The land is moderately sloping and there are no instability issues. The low application rate, minimal land and vegetation disturbance, and dosed distribution will ensure that surface instability will not be instigated.

(c) The proposed on-site system complies with current Council investigation, design and management guidelines.

(d) The site characteristics, design guidelines, assessment of alternatives and management proposals have been fully investigated and have been described in Sections 4 and 5 in this report.

We consider that, given appropriate installation, operation and maintenance, any potential adverse effects will be less than minor.

7 REFERENCES

7.1 Crites, R and Tchobanoglous, A (1998). 'Small and Decentralized Wastewater Management Systems'.

7.2 ARC Environment, Technical Paper No. 58, Third Edition 'On-Site Wastewater Disposal from Households and Institutions'.

7.3 A.S./N.Z.S. 1546.1:2008 'On-Site Domestic Wastewater Treatment Units, Part 1: Septic Tanks.

7.4 A.S./N.Z.S. 1547:2000 'On-Site Domestic Wastewater Management'.

7.5 MDC (11 July 2005) 'Guidelines for New On-Site Wastewater Management Systems'.

7.6 Marlborough Sounds Resource Management Plan.

7.7 Centre for Environment Training 'On-Site Wastewater Management Training Course', Christchurch 2001.

7.8 Davidson Group Ltd, October 2012, "Engineering Report for P M Lingard and M T L Easton Reference 24710".

DAVIDSON GROUP LTD

R W Davis

RWD:RM

APPENDIX

A1. Site Investigation
- Field Assessment Report
- Test Pit Logs

A2. Owner & Installer Guidelines

A3. Construction Monitoring Schedule

A4. Super Siphon Product Information

A5. Drawing Numbers 24710 sheets;
C1 Locality and Site Plans
C2 Plan
C4 Typical Septic Tank Details
C5 Siphon Chamber and LPED Details

DAVIDSON GROUP LTD

ON SITE WASTEWATER MANAGEMENT
FIELD ASSESSMENT REPORT

JOB NAME: Lingard & Easton **JOB NO.** 24710

LOCATION: Pipitea Bay, Outer Pelorus Sound **DATE:** 8 October 2010

REFERENCE: 1. ARC TP#58
2. AS/NZS 1547:2000 'On Site Domestic Wastewater Management'

1.	Percolation Rate (if available)		
2.	Site Exposure	- to sun - to wind	Moderate High
3.	Topsoil Depth		50-150 mm
4.	Soil Description:		Tan, light brown to orange, firm to stiff silty clay
5.	Soil Category (1 - 6)		5
6.	Coarse Fragments - size/abundance		None
7.	Ribbon Length		50-75 mm
8.	Soil Structure (Pedal Content)		High
9.	Performance of existing systems nearby		N/A
10.	Nearby water bodies - Separation Distance		Yes – In gully 20-30 m
11.	Nearby wells		No
12.	Intended water supply		Roof
13.	Runoff to be controlled		No
14.	Ground water to be controlled		No
15.	Any stability considerations, If yes, comment.		No
16.	Depth to water table		N/A
17.	Vegetation cover	- Existing - Proposed	Native Native
18.	Gravity head to proposed field?		Downhill (see survey)
19.	Reserve areas available?		Yes

20. Other Comments

Likely to suit siphon to LPED irrigation due to fall, trees, low drainage and no mains power. Will require careful setting out and construction.

DAVIDSON GROUP LTD

HOW TO GET THE BEST FROM YOUR ON-SITE WASTEWATER MANAGEMENT SYSTEM

Helpful Information for Homeowners/Occupiers

1. GOOD HOUSEHOLD PRACTICES

(a) Reduce solids disposal to treatment tanks as much as possible including food scraps, fats, grease etc. Scrape all dishes before washing and do not install a waste disposal unit unless the wastewater system has been specifically designed to carry the extra load.

(b) Do not put any of the following down sinks, drains or the toilet.

- **(i)** Oil/grease from e.g. a deep fryer;
- **(ii)** Stormwater and any drainage other than wastewater generated in the house;
- **(iii)** Petrol, oil and other flammable/explosive substances;
- **(iv)** Household, garden, garage and workshop chemicals (e.g. pesticides, paint cleaners, photographic chemicals, motor oil and trade waste);
- **(v)** Disposable nappies and sanitary napkins.

(c) In order to keep the bacteria working in the tank and in the land application area:

- **(i)** Use biodegradable soaps;
- **(ii)** Use a low-phosphorus detergent;
- **(iii)** Use a low-sodium detergent in the dispersive soil areas;
- **(iv)** Use detergents in the recommended quantities;
- **(v)** Do not use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants including cold water washing products.
- **(vi)** Do not put chemicals or paint down the drain.

(d) Conserve water. Less water means a lower load on the treatment system and land application area, with ensuing improved and more reliable performance. Conservation measures include:

- **(i)** Installation of water-conservation fittings such as low water use toilets, spray taps and water saving automatic washing machines;
- **(ii)** Taking showers instead of baths;

(iii) Only putting the dishwasher or washing machine on when there is a full load.

(e) Space washing machine and dishwasher use out to avoid overloading the wastewater system. Try not to do a large amount of washing in any one day and avoid running the washing machine and dishwasher at the same time.

(f) For the physical protection of treatment and land application systems:

(i) The treatment unit must be protected from vehicles;

(ii) Pedestrian traffic routes should not cross effluent field areas;

(iii) No vehicles or heavy stock should be allowed on effluent fields;

(iv) Deep rooting trees or shrubs should not be grown over absorption trenches or beds.

2. MAINTENANCE

(a) General

The appropriate maintenance of your treatment and land application systems will be the key to their effective and reliable performance. Please contact a drainlayer or Council if you are unsure about anything or require further advice.

(b) Septic Tanks

Any septic tank (primary wastewater treatment unit) will need to:

(i) Be cleaned out regularly i.e. every three to five years or when scum and sludge occupy two thirds of the volume of the tank (or first stage of a two-stage system). All scum, sludge and septage material must be disposed of in an approved manner. Pump chambers should be cleaned out at the same time if necessary;

(ii) Have grease traps cleaned out regularly (typically three monthly or as required);

(iii) Keep the access cover of the septic tank exposed;

(iv) Have any outlet filter inspected and cleaned, normally at the same time as septic tank cleaning. Remove the cartridge and rinse off with a garden hose, being careful to rinse all septage material back into the tank. It is not necessary that the cartridge be cleaned "spotless". The biomass growing on the filter aids in the pre-treatment process and should be left on the cartridge.

(c) Secondary Treatment Systems

Improved treatment systems, such as aerated plants or media systems, require specialist maintenance and must be looked after under a maintenance contract. Owners should ensure that they are aware of the manufacturers/suppliers recommended maintenance intervals and that a contract is in place for routine checks of mechanical components.

These systems will typically have a primary treatment stage which should be treated as in (b) above.

(d) Effluent Field

Reliable performance from your effluent field (including shallow trenches or beds, drip or LPED irrigation fields) will be aided by regular attention including one or more of the following depending on the type of system:

(i) Keep any surface water diversion drains upslope of and around the land application area clear to reduce absorption of rainwater into trenches or beds;

(ii) Evapotranspiration and irrigation areas should have their vegetation maintained to ensure that these areas take up nutrients with maximum efficiency;

(iii) Ensure pumps, alarms and sequencing valves are operating correctly;

(iv) Clean disc filters or filter screens on irrigation-dosing equipment periodically by rinsing back into the primary wastewater treatment unit;

(v) Irrigation systems which discharge wastewater that has only been treated by a septic tank and filter (i.e. LPED systems), must be flushed through with clean water before and after any significant period of non-use.

(vi) Regular maintenance of the treatment system (as per manufacturers recommendations), especially for aerated and media-type systems.

(ii) All tanks located in areas where high seasonal groundwater levels are known to occur shall be weighted down or provided with anchorage in accordance with clause 3.2.2 of A.S./N.Z.S. 1546.1:2008.

(iii) The Contractor shall allow to carry out any treated effluent testing required by Council. Samples should be taken once the system has been in operation for approximately three months. In a holiday home situation, testing should be done in January.

(iv) All pump chambers shall be vented. The commissioning of pumped distribution systems shall consist of at least the following:

- A check of pump out and emergency storage volumes (reserve capacity equivalent to the peak daily flow should be provided).
- Three drawdown tests.
- Testing of the operation of controls and alarms.
- Checking of uniform flow throughout any pressurised distribution network prior to covering over.

(b) **Land Application Area**

The following excavation techniques shall be observed so as to minimise the risk of damage to the soil.

(i) Plan to excavate only when the weather is fine. Pudding, where washed clay settles on the base of the trench to form a relatively impermeable layer, must be avoided.

(ii) Avoid excavation when the soil has a moisture content above the plastic limit. This can be tested by seeing if the soil forms a "wire" when rolled between the palms.

(iii) During wet seasons or when construction cannot be delayed until the weather becomes fine, smeared soil (smooth) surfaces should be raked to reinstate a more natural soil surface taking care to use fine tines and only at the surface.

(iv) When excavating by machine, fit the bucket with "raker teeth" if possible, and excavate in small "bites" to minimise compaction.

(v) Avoid compaction by keeping people off the finished trench or bed floor.

In particular for trenches and beds:

(vi) If rain is forecast, cover any open trenches to protect them from rain damage.

(vii) Excavate perpendicular to the line of fall or parallel to the contour levels.

(viii) Ensure that the inverts are horizontal or sloped at not more than 1 in 200.

DAVIDSON GROUP LTD

GUIDELINES FOR INSTALLERS OF ON-SITE DOMESTIC WASTEWATER MANAGEMENT SYSTEMS

References

A.S./N.Z.S. 1546.1:2008 'On-Site Domestic Wastewater Treatment Units, Part 1:Septic Tanks'
A.S./N.Z.S. 1547:2000 'On-Site Wastewater Management'

1. GENERAL

(a) All products and construction shall be in accordance with the relevant standards and in general the best trade practices shall prevail. If there are any questions about any aspect of the work, please contact Council in the first instance.

(b) The Contractor shall act to protect the health and safety of staff and private persons at all times.

(c) The Contractor must be aware of the inspection requirements of Council and/or the Engineer and the need to provide As-Built locations of the treatment and land application systems to Council and the Owner.

(d) The Contractor should also educate the Owner about the functioning of their system, especially the maintenance requirements, and where appropriate put in place a maintenance contract for systems which rely on mechanical action in order to function properly.

2. LOCATION OF TREATMENT AND DISTRIBUTION SYSTEMS AND LAND APPLICATION AREAS

(a) All tanks and the land application area shall be located clear of structures to avoid the undermining of foundations. In general, a minimum clearance of 3.0 metres should be adequate but if in doubt check with Council or an Engineer.

(b) The Contractor must be aware of the required separation distances of tanks and/or the land application area to surface water (ponds, water courses and drainage paths), wells and/or boundaries.

(c) Treatment systems should be sited with consideration for access by desludging trucks.

3. GOOD CONSTRUCTION TECHNIQUE

(a) Treatment and Distribution Systems

(i) When working with existing systems or carrying out maintenance tasks, measures shall be in place to ensure staff are adequately protected from contact with wastewater.

davidson group

PROJECT PLANNERS
RESOURCE MANAGERS
CIVIL & STRUCTURAL ENGINEERS
BUILDING DESIGNERS
ENVIRONMENTAL ENGINEERS

Our Ref: 24710

2 October 2012

CONSTRUCTION MONITORING SCHEDULE

OWNER: P M Lingard and M T L Easton

PROJECT: New Wastewater System

LOCATION: Pipitea Bay, Outer Pelorus Sound

	Inspections Proposed	Estimated Number
1.	Joint site visit with Drainlayer prior to work commencing.	1
2.	Commissioning of wastewater system before coverage of pipework.	1

Notes

1. The Builder/Contractor is to keep the Engineer informed of progress and in particular of the dates that the work will be ready for the inspections above to be made. At least 24 hours notice shall be given to the Engineer.

2. Additional inspections may well be required to satisfy ourselves that the work is in accordance with the documentation or if rework needs to be undertaken.

3. The Contractor shall provide as-built information on the final layout of the wastewater system, including tank, pipework and / or valve positions as appropriate.

DAVIDSON GROUP LTD

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RWD:RM

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Principals
Ross Davis, CPEng, MIPENZ, BE
Stephen Sheat, CPEng, MIPENZ, BE
Leigh McGlynn, CPEng, MIPENZ, BE

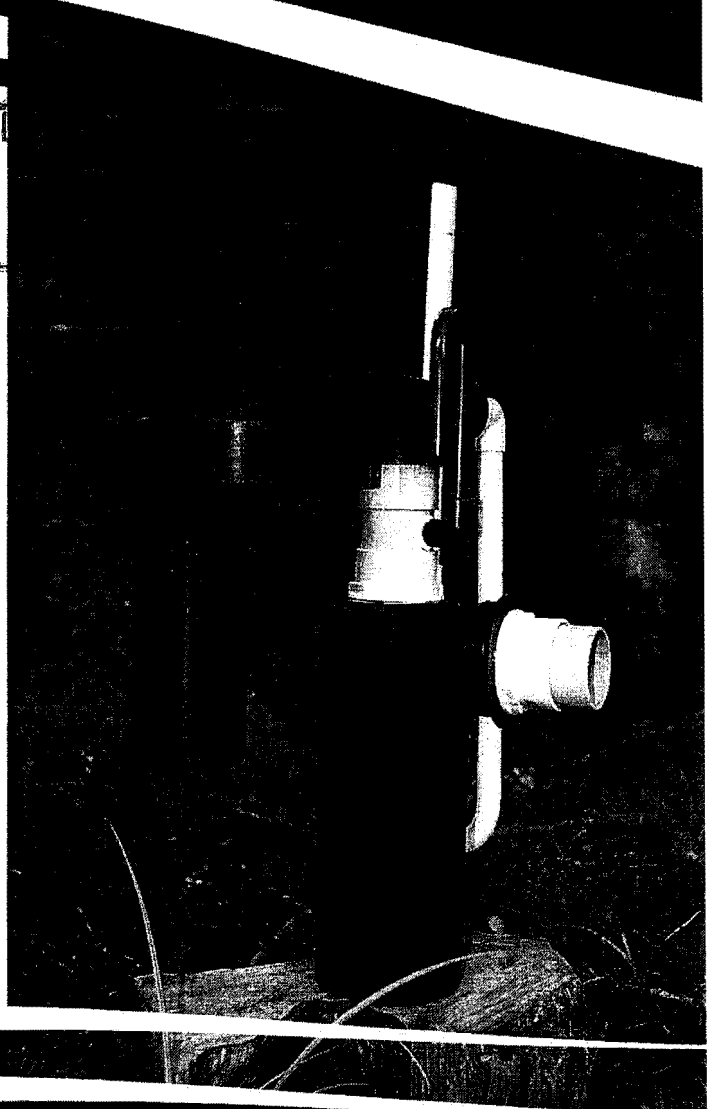
Super Siphon

The **Super Siphon** has been designed to offer you a superior performing product never before achieved with passive dosing. Designers and end users are now able to achieve so much more with the Passive Versatility of **Super Siphon**.

- No Power Required
- No Moving Parts
- Will Not Stall
- Simple to Install or Retrofit
  - just glue to outlet
- Low Cost
- Environmentally Friendly Constuction

OPTIONS INCLUDE:

- Adjustable Drawdown
- Internal or External mounting to tank (great for retrofitting!)
- Parallel configuration for low head automatic hydro-indexing



MADE IN NEW ZEALAND

By Vortech Ltd.

APPLICATIONS FOR THE Super Siphon:

- **Controlled dispersal of Domestic and Industrial Effluent**
- **Horticulture irrigation/dose feeding system**
- **Dam Storage for on-site micro-hydro systems**
- **Measuring/fluid volumes, food, photographic industries, etc.**
- **Storm-water retention control**
- **Dairy Effluent**
- **Ornamental fountains...**

Vortech Ltd. is proud to offer to you the
Super Siphon and the amazing advantages it delivers:

- Broader Performance Envelope - enabling a wider scope in design implementation and applications.
- Unimpeded Flow Rate @ siphon outlet;- 0-150 ltrs/min, >infinitely increasing with the increase of a discharge head.
- Adjustable Stroke; 150mm->500mm
- Durable Recycled Polyethylene
- Cost Benefits for the installer/user,
- Low Head loss through the System; = Draw/down-Stroke + 100mm over the invert of the siphon outlet.
- Easy to Install and Prime.
- Parallel Configuration, offering multiple sequencing valves from the one reservoir.
- 50mm ports, offers a better flow-rate than existing 110mm ported siphons, with all the associated benefits of smaller is better and more economic.
- Pressure Tested; to offer reliability, service and durability.
- No moving parts
- No power or on-going maintenance costs
- Will Not Stall

DISTRIBUTOR **Autoflow Ltd.**
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Ph: (09) 408 6080
Fax: (09) 408 6081
email: autoflowltd@xtra.co.nz

Super Siphon

Super Siphon

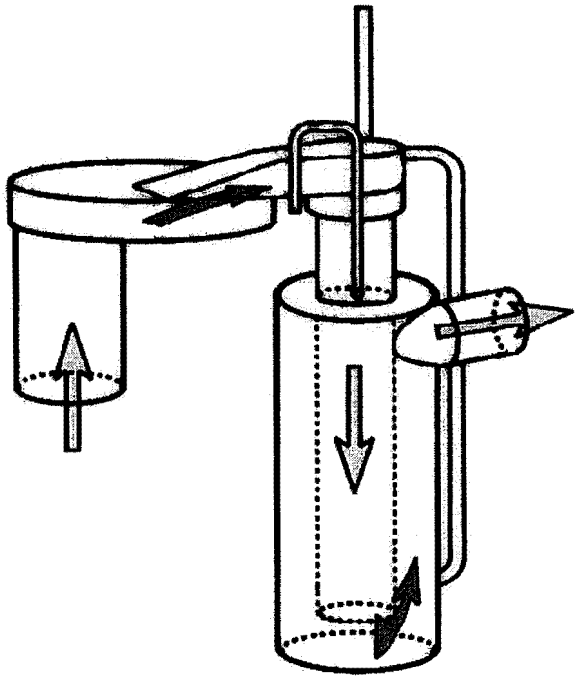
Patent Pending

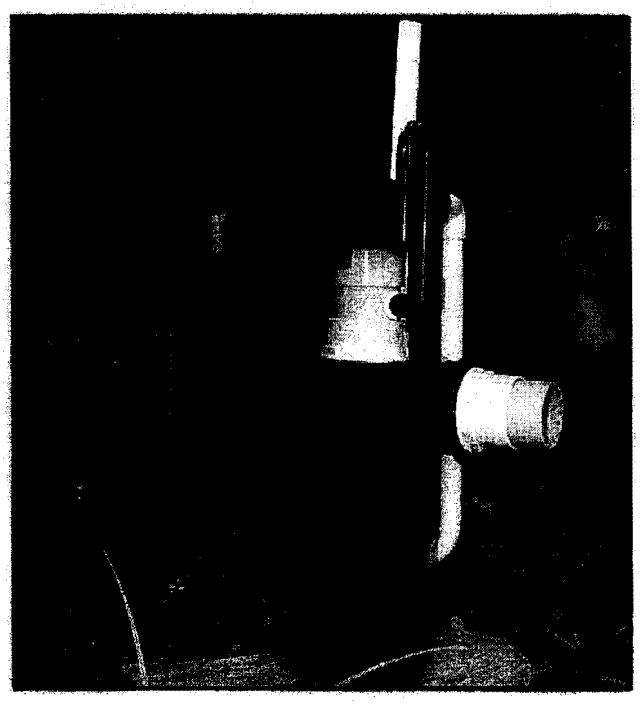
Product Information

Introducing the latest in Siphon Dosing Technology by Vortech Ltd.

The Super Siphon has been designed to offer superior performance and reliability for the intermittent dosing of liquid.

- The Super Siphon has no moving parts, requires no additional power input and with its entirely plastic construction is not prone to corrosion or wear.
- The Super Siphon works over a wide range of flow rates right down to zero– it will not stall, even if the outlet is blocked temporarily during dosing.
- The Super Siphon can be installed in a variety of internal or external configurations and is supplied in a standard 400mm drawdown design. It can be modified on site or special ordered for specific drawdown distances.





The Basic Stuff

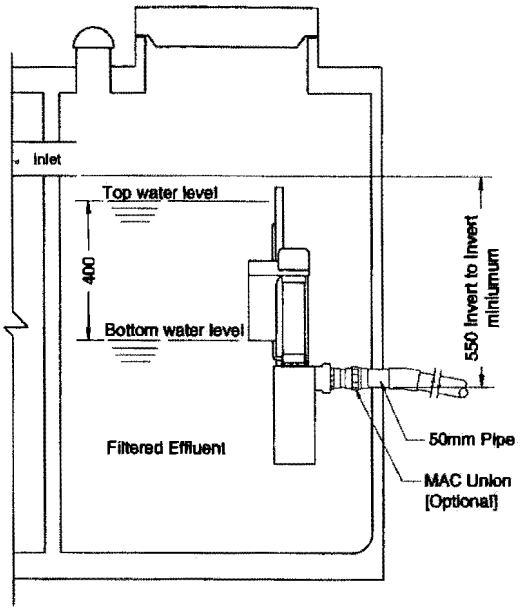
Supplied drawdown distance:	400mm, +/- 10mm		Overall height: (base to top of bell)	620mm
Inlet pipe size:	65mm		Siphon base to outlet invert:	210mm
Outlet pipe size:	2" BSP outlet port, 50mm nominal		Max. width across bell:	350mm
Flow rate minimum:	0 litres/min (Flow can be restricted or completely stopped during dosing without stall)		Top water level over bell:	160mm
Flow rate maximum:	~1000 litres/min (for a 4 metre head)		Weight:	<3kg

Internal Tank Installation

The Super Siphon is supplied in a one piece unit and is installed by gluing the outlet fitting to the 50mm outlet pipe in the tank.

For ease of removal and maintenance a MAC union can be placed between the siphon and tank outlet pipe.

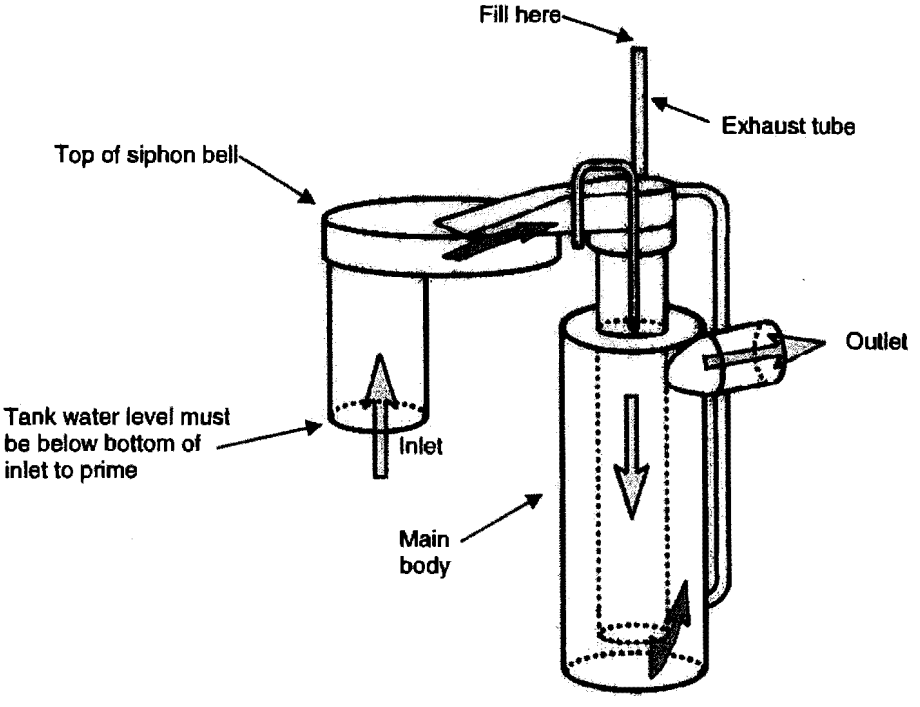
For best performance it is important not to obstruct the Super Siphon outlet. A 2 metre length of 50mm diameter or greater pipe on a falling gradient is required for a non-vented external discharge line.



Priming the Siphon for first use

The Super Siphon's main body must be filled with water (primed) prior to first use. The priming procedure is as follows:

Insure the water level in the tank is below the inlet of the of the siphon and fill the main body of the siphon with not less than 2.5 litres of water. This is achieved by pouring water into the open top of the vertical exhaust tube.



Once primed, allow the tank to fill with water covering the Super Siphon. The Super Siphon will start when the water level reaches approximately 160mm over the top of the bell. The Super Siphon will run (dose) until the water level reaches the bottom of the inlet.

This completes the priming process and Super Siphon will now continue to dose automatically.

Modifying Super Siphon for drawdown distances between 180mm & 400mm

The Super Siphon comes standard with a 400mm drawdown distance (+/- 10mm). That drawdown can be reduced to as little as 180mm by modifying the siphon in the field using the following procedure.

As supplied the Super Siphon has a 400mm drawdown. This 400mm is measured from the bottom of the inlet tube below the bell.

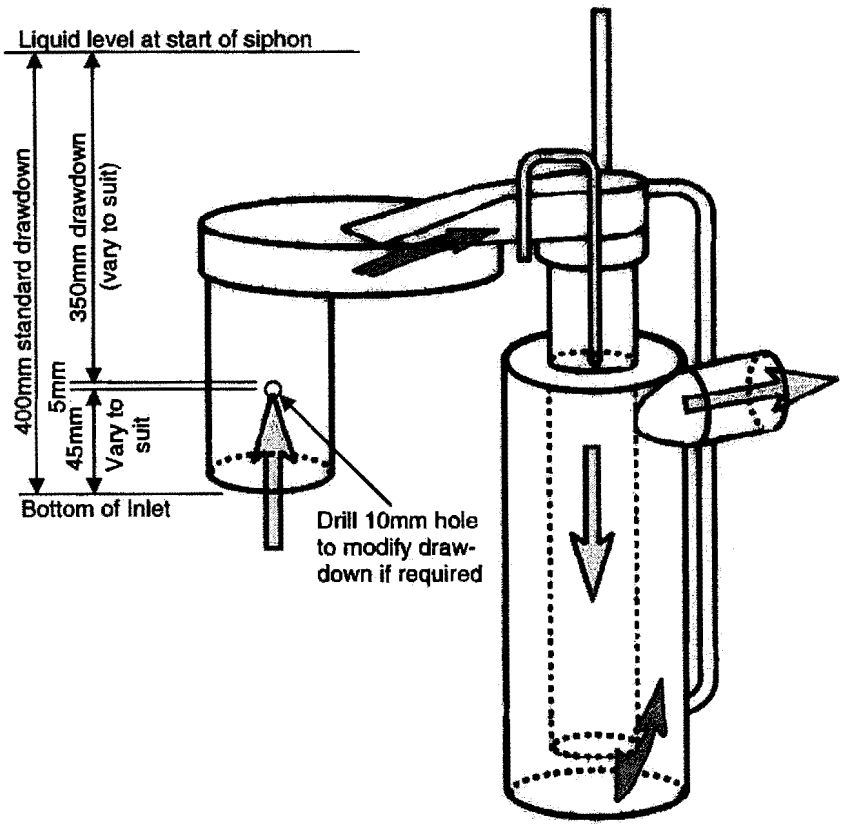
To shorten the drawdown stroke, subtract the desired drawdown distance + 5mm from 400 and drill a 10mm diameter hole in the side of the inlet tube or bell the calculated distance up from the bottom of the inlet.

As an example, if you want a 350mm drawdown...

350mm + 5mm = 355mm
400mm - 355mm = 45mm

Measure up from the bottom of the inlet tube 45mm and drill a 10mm diameter hole.

When the hole is uncovered as the water level falls during dosing the siphon suction will be broken and the dosing will stop at this point.



Troubleshooting

The Super Siphon is designed with no moving parts and is factory tested to give many years with little if any need at all for maintenance. We like to think the Super Siphon will "Thrive on neglect!."

However, should the Super Siphon not appear to be working properly, check the following items:

1. **Is it primed?** Priming of the siphon can be overlooked or in very rare situations it is remotely possible that it may have dried out. To re-prime the siphon, follow the instructions for "Priming the siphon for first use" set out previously in this brochure.

2. **Is it leaking?** The siphon is factory tested to ensure that it does not leak; however, it may have become damaged during transit or installation. For the siphon to operate correctly all joints between components must be airtight. As the water rises around the siphon if you see bubbles forming or rising from the unit, locate the source of the bubbles, clean the surface thoroughly and repair the leak with a high quality silicone sealant designed for use on UPVC and PE plastic and rated for underwater use. Allow to cure and re-submerge the unit in water to check again for leaks and to ensure that the repair has worked. If there are no further bubbles, re-install the unit and re-prime the siphon following the instructions for "Priming the siphon for first use" set out previously in this brochure.

3. **Is it not the siphon at all and does the effluent field need cleaning?** One of the major advantages of the Super Siphon is that it will not stall as other siphons will if the outlet is restricted. Never the less it is considered good preventive maintenance to remove the end caps (or open the stop cocks if fitted) from the ends of the Low Pressure Effluent Distribution (LPED) lines once a year and flush out any sediment build-up or growth within the lines. With the LPED line ends open, re-prime the siphon following the instructions for "Priming the siphon for first use" set out previously in this brochure, let it dose and watch it discharge to ensure it is working properly. Also check the outflow from each of the LPED lines to ensure there are no blockages in any of the lines. Close the ends of the LPED lines and allow the siphon to dose a few more times to ensure the system is operating correctly.

If the Super Siphon still fails to perform as expected please contact the distributor:

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Anthony Garton
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autoflowltd@xtra.co.nz