U050908

Eco System

For The Treatment
Of
Domestic Wastewater.

Producer Statement

Designed and Built in New Zealand
by

KiwiTreat Ltd

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KiwiTreat.

Eco System

For Treatment of Domestic Wastewater

Producer Statement.

Purpose and Scope.

To provide a sewage treatment plant of the aerated activated sludge type suitable for up to eight equivalent persons, that produces treated wastewater of suitable quality to meet the requirements of the Regulatory Authorities.

The system is designed to:

1. Meet the requirements of AS/NZS 1547:2000 On-site domestic wastewater management.
2. Be user friendly.
3. Have extremely low maintenance and service requirements.
4. Be very reliable in operation and performance.
5. Meet the discharge quality requirements of AS/NZS 1546.3.2001 On-site domestic wastewater treatment units.
6. Be acceptable in areas of environmental and conservational interest.
7. Be very cost effective at the treatment and disposal of the resultant liquid.

This system is designed to give continuous peace of mind performance.

Wastewater Characteristics.

Hydraulic Load.

The wastewater volume generated by a household has been calculated using well-proven and documented guidelines.

Sewage flow: Average per day = 1600 litres.
Based on a minimum design flow of 200 litres/person/day, with a peaking factor of 200 litres per hour.

Organic Load.

The strength of the wastewater from a house is calculated in terms of grams per day of BOD_5.
The design figure is 560 grams per day, and is derived from the industry accepted figure of 70 grams of BOD_5 per person per day.

The septic tank reduces the organic load by acting as a primary sedimentation tank and an anaerobic digester. The reduction allowance is 30% of organic strength. This results in a BOD_5 to be treated by the aerobic module of 392 grams per day.

Process Description.

The sewage treatment plant is an activated sludge type, incorporating a measured batch discharge, and with an in-plant surge capacity of 1700 litres.

The initial component of the plant is a septic tank that acts as a primary settling tank and solids digester.

A chamber where aerobic treatment occurs follows this. During the aeration phase, activated sludge is pumped back to the septic tank to enhance the treatment process.

The treated wastewater then passes through a clarifier to the pump station, where it is then pumped to the disposal area through a large sediment filter, when sufficient volume is available for discharge.

Septic Tank.

The primary treatment is achieved by the utilisation of a septic tank upstream of the aerobic module.
A Reln two-chamber 3200 litre septic tank is used, with a primary chamber working volume of 2160 litres, and a secondary chamber working volume of 840 litres.
The Reln tank carries the AS/NZ Standard 1546:1-1998 Lic. 1651, and is made by a Quality Endorsed Company (AS/NZS ISO9001:2000 QEC 5189)

Most of the insoluble waste remains within the primary chamber. The liquid fraction and small volume solids pass through to the secondary (anoxic) chamber, where significant quantities of nitrogen and nitrogenous compounds are removed from the system. This has the effect of maintaining the pH levels of the resultant liquid within an acceptable range for the aerobic bacteria working in the downstream processes.
The inclusion of a bio-filter at the discharge area of the primary tank helps to further improve the quality of the wastewater before the aeration stage, by further reducing the solids fraction. This filter also assists in moderating surge volumes.

Aeration Module.

The aeration module utilizes a second Reln 3200 litre tank, which allows the wastewater to come into contact with both suspended biomass and attached growth biomass. This contact and subsequent degradation of the fine particulate and soluble organic material occurs in the controlled introduction of air. The settled effluent in the aeration chamber is re-seeded with acclimatised stable biomass. This process provides all the advantages of a step treatment system.

The volume available for aeration in this tank is 2090 litres, with an additional volume of 810litres for clarifying the liquid before flowing to the pump station.

The aeration system has a design F/M ratio of 0.05 when taking the plate pack attached biomass into account. The above figures are well within the industry accepted guidelines.

Plate Pack Media.

A high surface area to volume plastic media is fitted to the aeration chamber.

This media provides a suitable growth surface for stable attached growth biomass.

The growth characteristics of this biomass promote good nitrification, some de-nitrification (with inherent stability) and good settling characteristics of the waste sludge.

The media pack has a total surface of 38m2, and a volume of 0.45m3.

Aeration.

The activated sludge tank is subject to **controlled** aeration for 24 hours each day.

This process promotes denitrification and hence stable biomass and suitable pH in the mixed liquor of the aeration tank.

More than 2.4 grams of oxygen per gram of BOD_5 is provided to the system through a venturi. This is the chosen method of aeration, for the following reasons:

1. It supplies large volumes of air in relation to the energy input.
2. It operates without creating a buildup of bacteria around the air discharge area.

3. It aerates to the full depth of the tank, and therefore treats the total volume of the liquid in the aeration chamber.

4. It has the ability to be shut down at specified times for further de-nitrification to take place, which helps promote stable biomass and suitable pH.

5. The venturi system does not require any maintenance or servicing.

The air for the venturi is sourced from outside the tank, so only fresh air is made available for the process.

Clarifier.

A 810-litre clarifier chamber is part of the activated sludge system.
The purpose of this chamber is to assist in the removal of suspended solids before the treated liquid reaches the pump chamber for disposal.
The chamber also controls surging to ensure that the wastewater is properly treated before further downstream processing.

Pump Station.

This 360 litre chamber has a working volume of over 170 litres. The treated liquid is pumped to the disposal area, through a sediment filter.

Disinfection.

Disinfection, if required, is by chlorination, which takes place after the pump out chamber.
The chlorinator remains effective by means of chlorine tablets moving down a magazine system into the operating area as required.
There is no possibility of chlorine contamination of any of the previous treatment stages.

Disposal.

Disposal is through a non drain pressure compensated drip-line via a non-return valve.
The drip-line is protected by a high capacity filter.
The system includes 300 metres of pressure compensated, self-flushing non drain drip-line specifically manufactured for effluent disposal.
The site conditions and the environmental conditions of the area will govern

the size of the disposal area.
It is recognised that treatment quality and the disposal of the resultant liquid are of paramount importance to all concerned.

System Monitoring.

The system is monitored by audible and visual alarms.
The alarms monitor the following:

1. The aeration sequence.
2. The disposal sequence.
3. The correct operation of the disposal line.
4. The venturi system.

Discharge Quality.

Treatment quality of the resultant liquid is recognised to be of paramount importance.
The system is designed to meet the following standards:

BOD5 – not greater than 20mg/litre
Suspended solids – not greater than 30mg/litre.
Faecal coliforms – not more than 30cfu/100 mls, when disinfected.
Free chlorine – not less than 0.5mg/litre, when chlorinated.

Servicing.

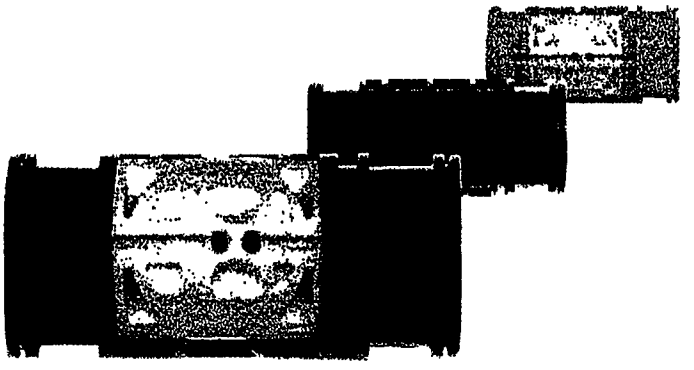
Servicing of the system is recommended to be at six monthly intervals

Home Away

This system can be switched to a slower processing mode which is advantageous in holiday situations when the house is not being used.

Hydro P.C. N.D.

The Pioneer No-Drain Integral Dripline



An integral dripline with incorporated flow-regulated cylindrical no-drain drippers

Main features:

- The built-in no-drain device eliminates water draining from the dripline when water has been turned off
- This feature protects driplines from sucking in of small soil particles or other debris - thus making it **ideal for Subsurface Drip Irrigation systems (S.D.I.) and short pulse irrigation in greenhouses**
- Unique flow regulating concept: A wide effective labyrinth, leading into the flow control chamber, where a sensitive floating diaphragm regulates and maintains a constant flow rate at variable inlet pressure
- Constant flow rates along long run driplines or on undulating terrain
- High clogging resistance due to:
  - The drippers large intake filter being continuously flushed by the water flow
  - Large cross sectional labyrinth
  - Self-cleaning mechanism at the flow regulated water outlet chamber

Applications:

- Sub-surface drip systems

Materials:

- Tubing: Linear LDPE
- Dripper: PE
- Diaphragm: Silicon

Specifications:

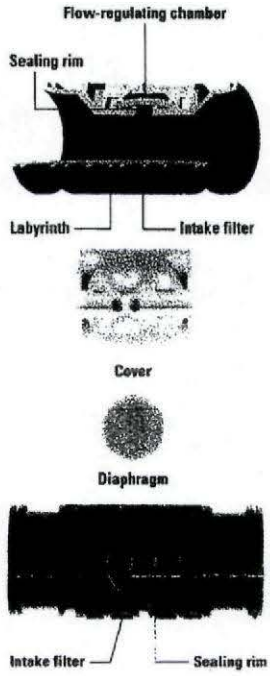
- Flow rates: 1.35, 1.75, 2.35, 3.75 lph
- Operating pressure range: 0.8 - 3.5 bar
- Sealing pressure: 0.1 bar
  Opening pressure: 0.3 bar
- Dripline diameters: 16, 17, 20 mm
- Constant Inside Diameter (I.D.) regardless of dripline wall thickness
- I.D.: 13.8, 15.3, 17.6 mm
- Available in wall thickness of: 1.1, 1.15 mm (45 - 47 mil)
- Manufactured from superior durable plastics for long life
- Protected against UV degradation
- Resistant to chemicals and fertilizers commonly used in agriculture
- Complies with emission uniformity category class A (ISO 9261)

Hydro P.C. N.D.

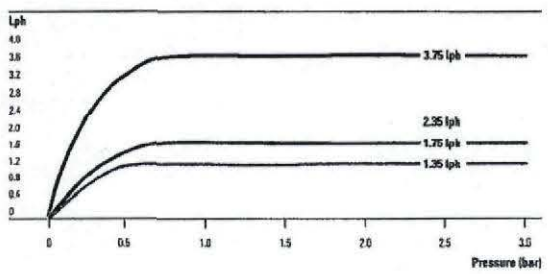
Maximum Recommended Dripline Length (m) on Flat Terrain

Flow Rate (lph)	Emitter Spacing	Pipe Diameter: I.D. 13.8 mm			Pipe Diameter: I.D. 15.3 mm			Pipe Diameter: I.D. 17.6 mm		
		Dripline Inlet Pressure (bar)								
	(m)	1.0	2.0	3.0	1.0	2.0	3.0	1.0	2.0	3.0
1.35	0.2	61	93	112	75	116	139	84	147	180
	0.3	86	132	159	105	163	197	117	206	253
	0.4	108	168	202	133	206	248	147	259	318
	0.5	130	201	243	158	246	297	175	308	379
	0.6	149	232	281	181	283	341	200	354	435
	0.8	186	290	350	224	350	424	248	438	539
	1.0	219	342	414	264	412	499	285	514	634
1.75	0.2	43	76	92	54	94	122	71	124	152
	0.3	62	107	131	76	132	176	99	174	213
	0.4	78	136	167	95	167	226	124	219	269
	0.5	93	162	201	113	200	275	148	261	321
	0.6	107	188	232	130	229	322	169	299	368
	0.8	133	236	290	161	285	410	209	370	457
	1.0	157	278	342	189	335	494	245	435	537
2.35	0.2	36	62	76	41	76	94	54	101	124
	0.3	51	89	108	58	108	133	76	141	175
	0.4	64	112	138	72	136	168	95	178	220
	0.5	77	135	166	87	163	201	113	212	263
	0.6	88	156	191	99	187	232	129	244	302
	0.8	110	194	239	122	232	287	159	302	374
	1.0	130	230	283	144	273	339	187	355	440
3.75*	0.2	26	46	56	30	56	69	40	74	91
	0.3	37	65	80	43	79	98	56	104	129
	0.4	47	83	102	54	100	124	70	132	163
	0.5	57	100	122	64	120	149	84	157	194
	0.6	65	115	142	73	138	171	95	180	223
	0.8	82	144	177	90	171	213	118	223	277
	1.0	96	170	209	107	202	251	139	263	326

* Flow rate for I.D.17.6: 3.6 lph



Hydro P.C. N.D. - Performance Curves



The data in this leaflet is intended to provide general information only.
For design purposes, see PLASTRO EMITTERS manual "Hydraulic performance data for designers".

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PMD01100E

Guideline for irrigation of treated effluent using Plastro Hydro P.C N.D drip-line

This design is based on the following parameters:

Accepted Daily Loading Rate = 5mm. (Set by local council or engineer).

Daily Load 1500 litres

Emitter Plastro Hydro 16/40 P.C N.D Integral Drip-line

Emitter Flow Rate 2.34 lph

Emitter Spacing 0.6 metres

Drip-line Spacing 1.0 metres

Distance from Treatment Plant to Disposal Field = 25 metres

Pump Station Depth 1.3 metres

Field Size 1500 litres/5.0mm per day = 300 m^2

Assume field size is 50 metres x 6 metres

Total Flow Rate Required = $\frac{300 \text{ metres} \times 2.35 \text{ lph}}{0.6 \text{ metre spacing}}$ = 1175 lph

Pump Duty is 1175 lph @ Xm head, where X is the sum of the head losses based on the following table:

Head Loss Table

Item	Head Loss (m)	Comments
Emitter	8.2	Minimum pressure required
Drip-line	0.5	50 metres
Sub-main	3.4	2 x 4 metres drip-line
Main	2.7	50 metres drip-line
Filter	2.0	For a semi blocked filter
Pump Station Depth	1.3	
Elevation	0	No up or down slope
TOTAL	18.1	

Therefore total head loss for calculation is 18.1 x 10% = 20 metres

Hence, Pump Duty required is 1175 lph @ 20 metres.

The pump used is a Tesla Diver 75M with a rated duty of 1200 lph @ 33 metres

Servicing Schedule

KiwiTreat Secondary Treatment System

KiwiTreat Ltd specify that their systems should be serviced in accordance with the following regime:

An annual full service by the manufacturers approved service technician.
Regular servicing by the service technician, or the property owner.
The property owner must undertake specific training from KiwiTreat Ltd.
The owner will be required to submit certification, to the regulatory authority, and KiwiTreat Ltd, that the servicing has been carried out in accordance with the service schedule, specified below.

Servicing Chart

Function	Month 3	Month 6	Month 9	Month 12
Check anaerobic chamber		Service Technician		Service Technician
Clean bio-filter		Service Technician		Service Technician
Check aeration tank		Service Technician		Service Technician
Operation of aeration pump	Owner	Service Technician	Owner	Service Technician
Check pump station		Service Technician		Service Technician
Operation of disposal pump		Service Technician		Service Technician
Clean sediment filter	Owner	Service Technician	Owner	Service Technician
Check drip-line pressure	Owner	Service Technician	Owner	Service Technician
Check disposal area	Owner	Service Technician	Owner	Service Technician
Check high level alarm	Owner	Service Technician	Owner	Service Technician
Chlorinator tablets	Owner	Service Technician	Owner	Service Technician

Note:
The desludging of the anaerobic chamber is the responsibility of the owner and should be carried out every three years.
Chlorinator tablets required only if chlorinator is fitted.

KiwiTreat Eco System
For Treatment of Domestic Wastewater

Pre-installation Considerations.

Siting of tanks

The siting of tanks is subject to regulatory authority approval and may require the submission of a certified engineering design to allow construction close to buildings and in trafficable areas.

General
In general, tanks should be installed clear of any buildings so as not to affect any structural elements of buildings.

As a guide tanks should be installed sufficiently clear of buildings to provide an angle of repose of at least 45 degrees between the bottom of the footing and the base of the tank.

Soil
Tanks should be installed in stable soil conditions. Where there is doubt the installer should give full details and specifications on how it is intended to provide a sound foundation for the tank.

Surface water
Surface waters must be diverted from the tank installation. Special measures need to be taken in cases of high ground water or flood prone areas.

Location on site
The siting of tanks and disposal area is subject to approval by the regulatory authority. In any case, there shall be compliance with building clearances and block/section boundaries as provided for in the by-laws and Regulations.

Drainage
The drainage system shall comply with AS/NZS 3500.2 or the NZ Building Code. All drainage levels should be considered to ensure appropriate gradients leading into the septic tank.

Desludging
The system should be sited with due consideration for future desludging operations. Where access for desludging by a vehicle is not available the application for approval of the installation must state the manner in which it is intended to desludge the tank at the necessary intervals without creating a health nuisance.

KiwiTreat Eco System
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Installation Instructions

Excavation

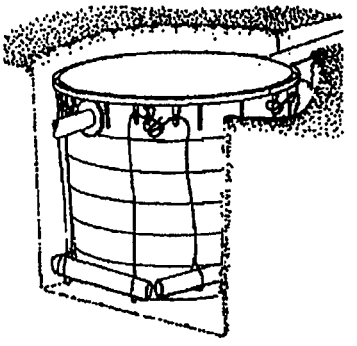
1. Excavate the site for installing the tanks and pump station in ground as per building code and local authority requirements. Ensure adequate fall to septic tank inlet. Additionally, tanks are to be sited:
   - Away from building foundations
   - Away from traffic areas, both vehicular and pedestrian
   - Away from or fenced off from animals tock pastures and areas
2. Refer to tank dimensions for correct levels.
3. Do not bury tank lid. Manhole Cover and Inspection Covers must be finished above normal ground level to allow for ongoing tank inspection and maintenance.
4. In excavation prepare a level 50mm bed of compacted sand or soft fill free of large and/or sharp objects.
5. Carefully lower the tanks into excavation - do not drop.
6. Align the inlets and outlets of each tank.
7. Ensure the tank bases are level.

Pipe Connection

1. Glue the 100mm PVC sewer pipe supplied into the outlet T-junction of the septic tank. Repeat the process at the inlet T-junction of the aeration tank.
2. Connect the septic tank and aeration tank with 100mm coupler supplied.
3. Connect the aeration tank and the pump station using the 25mm male fittings and the 25mm pipe supplied.
4. Connect the sludge return 13mm pipe supplied, between the aeration and septic tanks, via the 15mm tank connectors.
5. The 25mm and 13mm pipe can be located within the pump station.

Pumps

1. Attach the aeration pump (DAB Nova 300) to the riser pipe supplied, and connect the other end of the riser pipe to the venturi pipe system with the mac union attached. Pass the pump cable through the cable gland on the tank lid, and tighten the gland. Fit the small filter supplied to the 15mm threaded tank fitting on the tank lid.
2. Attach the discharge pump (Tesla Diver 75M) to the riser pipe supplied, and connect the other end of the riser pipe to the outlet of the pump station with the mac union attached. Pass the pump cable through the cable gland on the tank wall, and tighten the gland.



Tank Anchoring

1. Tie anchoring ropes to the pre-drilled lugs in the rim of each large tank. Leave the looped end to hang free.
2. Place four durable anchoring beams (not included) through the looped ends of the ropes. The ropes should be tensioned before backfilling.
3. Anchor beams can be made from 100mm PVC sewer pipe and should be 2 metres long and positioned to exceed the tank's extremities.

Bio-filter

Install into the outlet T-junction of the septic tank.

Sediment filter and drip-line.

Install as per separate instructions.

Completion

1. After filling the tanks with water, backfill with clean filling and compact thoroughly. Important – no large or sharp objects in the backfill material.
2. Ensure that any possible surface water run-off is directed away from the pipe trenches and the tanks installation.
3. Fasten all manholes and inspection covers.

Electrics

Install as per separate instructions.

KiwiTreat Wastewater Treatment System

Electrical Requirements.

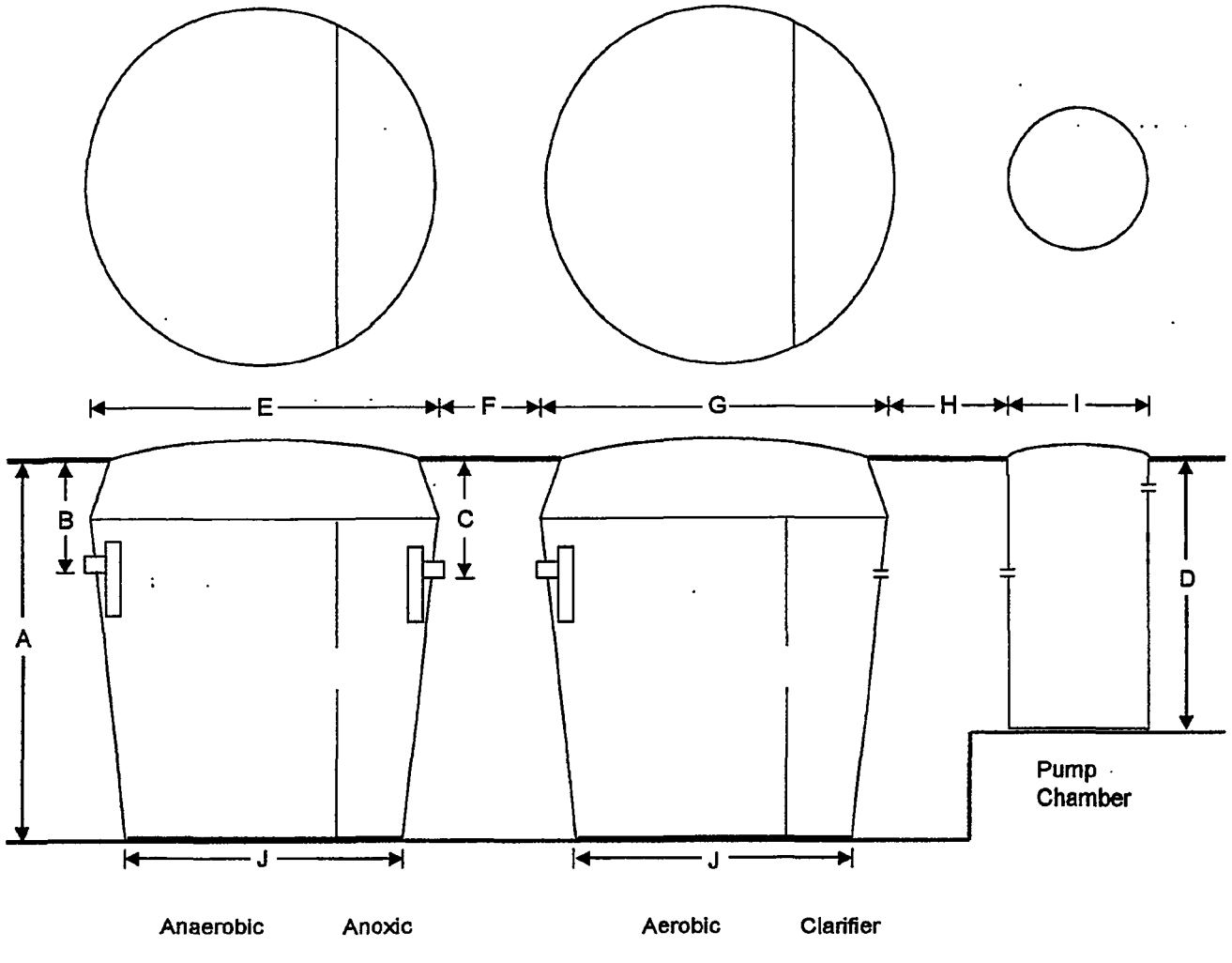
This system has three separate and distinct functions controlled electrically.

1. **Aeration pump.**
Installed in the aeration tank, this pump is a DAB Nova 300A (0.22kW) with an attached float switch controller. The cable from this pump is to be connected to the timer supplied. The timer is to be set to activate the pump for 15 minutes every hour.

2. **Discharge pump.**
Installed in the pump station, this pump is a Tesla Diver 75M (0.55 kW) with a float controller. The pump is supplied with an external control box which houses the capacitor. The wiring diagram is located inside the lid of the control box.

3. **High level alarm.**
The float for this is installed in the pump station. This float is to be connected to the control box supplied. The system is to alarm at high water level.

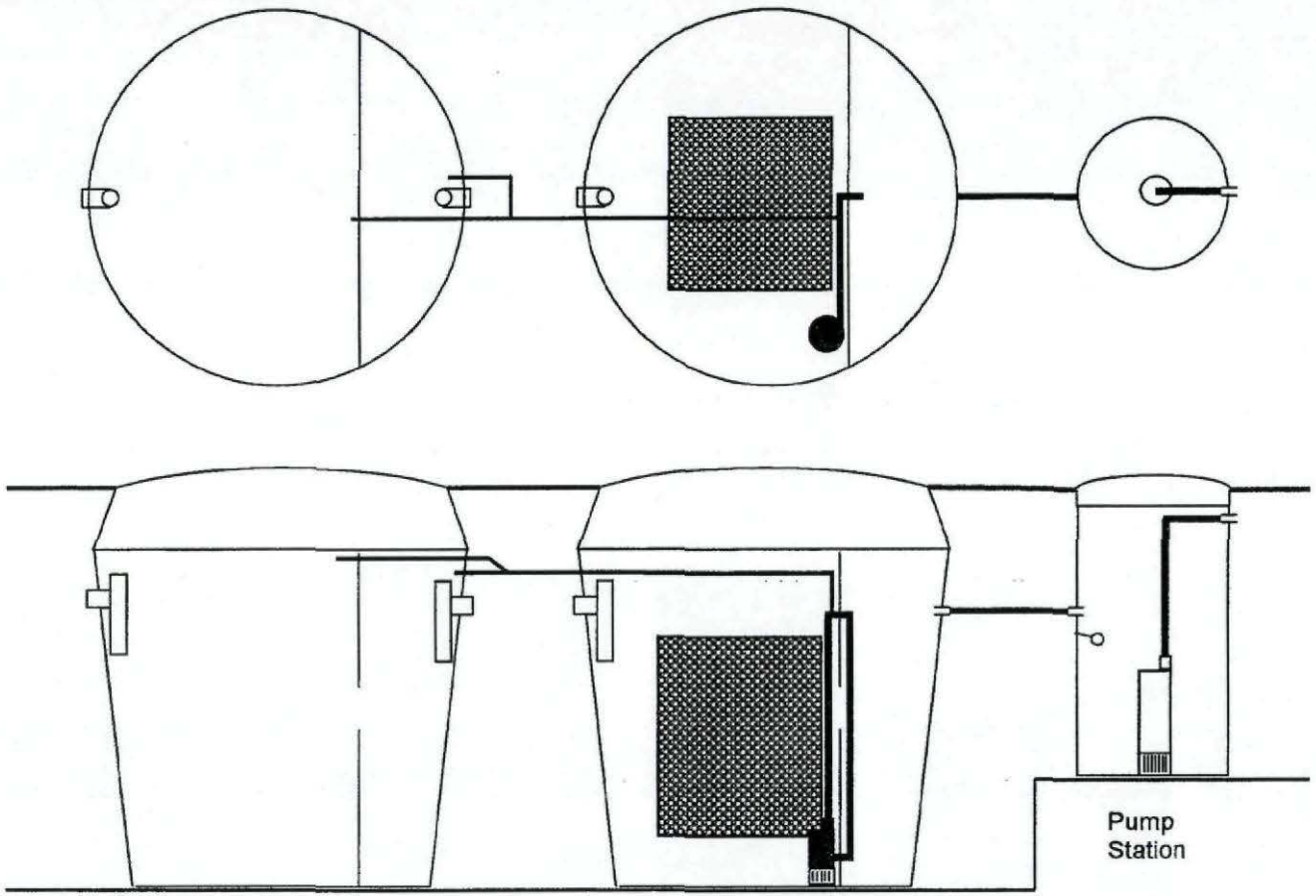
Installation Using Reln Tanks
Layout And Dimensions



Nominal Dimensions (mm)		
A	Base to ground level	1900
B	Inlet invert	480
C	Outlet invert	530
D	Pump chamber base to ground level	1300
E	Septic tank diameter	2000
F	Spacing not less than	500
G	Aeration tank diameter	2000
H	Spacing not less than	500
I	Pump chamber diameter	600
J	Tank base diameter	1600
	Overall height of Reln tank	2038
	Weight of septic tank	139
	Weight of aeration tank	161
	Weight of pump chamber	20

KiwiTreat Eco System

Internal Layout (Diagrammatic)



Legend

Media Pack
Surface area 36m2
Volume 0.45m3

Activated sludge return

Bio-filter

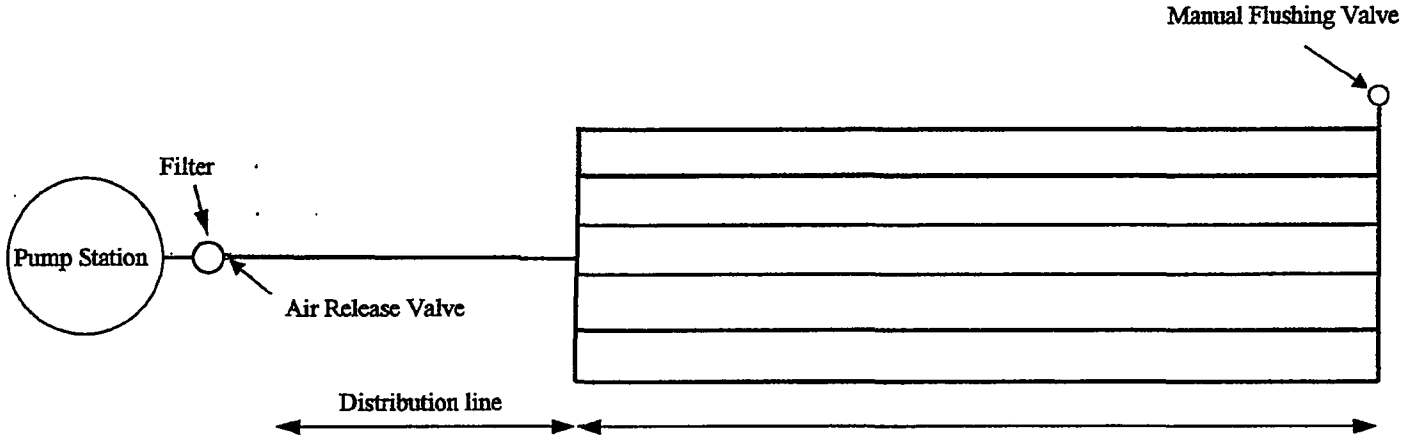
High level alarm float

Working volumes (litres)

Anaerobic chamber	2160
Anoxic chamber	840
Aerobic chamber	2090
Clarifier	810
Pump chamber	170
Total working capacity	6070
Total holding capacity	8500

KiwiTreat Eco System

Preferred layout of disposal line

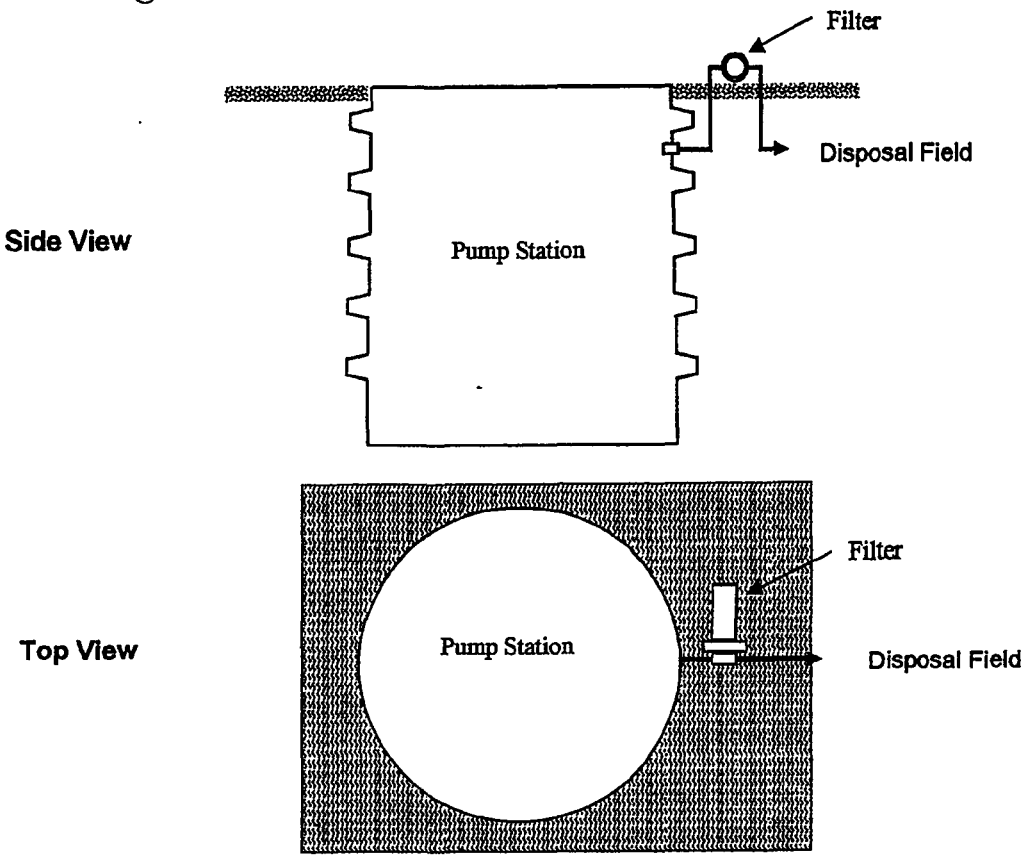


The disposal field must not be located at a level higher than one metre the top of the aeration tank, unless agreed by KiwiTreat Ltd

——— Pressure compensated effluent dripline (300 metres supplied)
——— 20mm low density Polythene pipe (25 metres supplied)

Drip-line is to be buried 100 to 150mm under the surface and in an area free of any material that may damage or limit the effectiveness of the drip-line.

Filter Arrangement



Manual Flushing Valve (MRV)

The MRV is used to remove sediment buildup within the drip-line by means of a cleansing action by momentarily increasing the velocity of the liquid.

The MRV should be flushed at every inspection be the Service Technician.

The MRV should remain open for 30 to 60 seconds, or as long as it takes to remove the sediment from the drip-line.

The MRV is to be installed in the area of lowest elevation in the drip-line.

The MRV is housed in a toby box.

Air Release Valve (ARV)

The ARV ensures that the vacuum that may occur after the pumping cycle does not allow:

1. Debris to be drawn into the drip-line
2. Collapse of the drip-line

The ARV is positioned immediately after the sediment filter, and is housed in a toby box.

Sediment Filter

The filter is installed to capture and retain debris that could reduce the efficiency of the emitters.

The filter used in this system is a 32mm Arag with a 100 mesh (108 micron) stainless mesh.

The sediment filter is installed immediately after the pump station and is housed in a toby box.

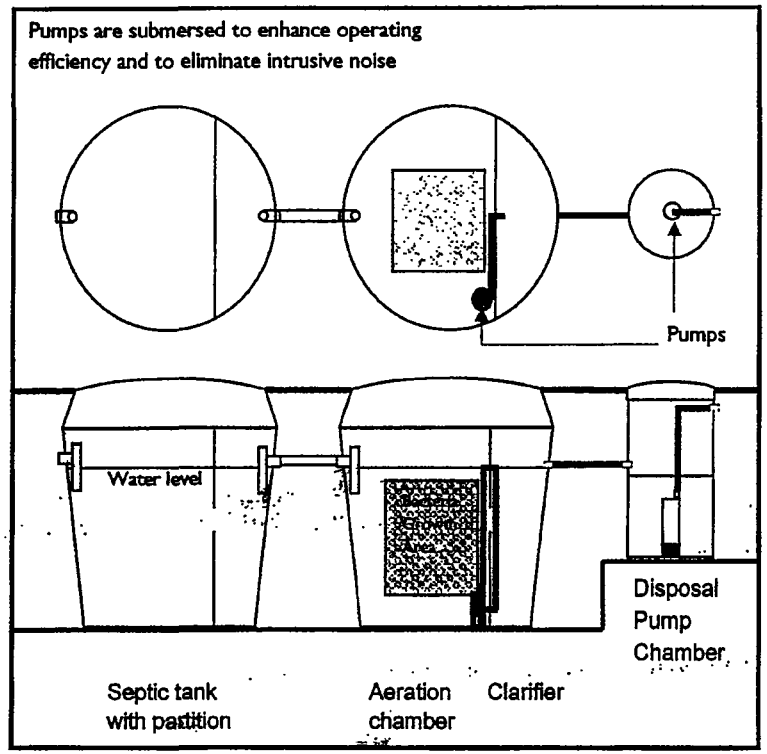
Standard Disposal Field Layout

KiwiTreat recommend that the drip-line be installed subsurface. This minimizes the risk of any contact with the treated wastewater by stock, pets, and children.

It is recommended that the system be installed using the grid system as shown. This evens out flow, reduces friction loss, and ensures against failure by reducing the effect of constriction by, for example, buried stones.

Changes to the recommended grid system may be approved by KiwiTreat Ltd.

The drip-line must be secured on the appropriate fittings using the clips supplied.



Main Dimensions:	
Septic and aeration tanks	
Base to ground level	1900mm
Diameter	2000mm
Weight of all tanks and fittings	320 kgs

Hear the difference

Listening to the birds chirping, or the wind blowing in the trees is easy!

The system is completely quiet in operation.

Thanks to the mechanical parts being submersed in the tanks.

Major Advantages

Timed aeration

The processing stage receives just the right amount of air for correct treatment. This has the benefit of substantially reducing the power costs associated with the aeration process.

And maintenance is less of an issue, as the process is not having to work continuously.

The air injection system

A venturi is used to infuse air into the liquid in the aeration tank.

There are no moving parts to break of wear out

And it is completely silent in operation

Installation

The lightweight, yet strong tanks are a breeze to install. No need for heavy lifting equipment to be on site. Full installation instructions are supplied with the system. All materials and equipment is installed into the tanks before dispatch. The pumps are then removed to protect during transport.

A typical installation

See the difference

Cast your eyes over the lines of an installed KiwiTreat system and you will notice how well it is visually accepted into your environment.

The tank lids are set flush with the ground, and are clear of any additions such as pumps and controllers that would impair the visual appearance

Drip-line

Naturally a top of the line drip-line is used to complement this system. This drip-line has built in pressure compensated emitters to guarantee even distribution of the treated wastewater in your disposal area.

And it is non draining when not under pressure.

And it is protected by a large filter.

Nitrate reduction

Nitrates in groundwater and water courses is recognized by the regulatory authorities as a major problem.

Our system is designed to reduce the amount of nitrates being made available to the disposal area.

Our environment must be protected.

Running costs

The air injection system is normally set to run only a few hours a day.

And only when needed.

This system ensures that running costs are kept to an absolute minimum.

Home away

The system can be simply switched to a mode of reduced treatment if it is not going to be used over longer periods of time. This keeps the working bacteria at a level where they can quickly reach normal operating levels very quickly again on start up. Great for holiday homes.

The powerful difference

Running costs

Electricity consumption for aeration is only 0.44 kW each day.

Around 10 years ago we moved forward from the air blower setup and have effectively reduced the power consumption by 77%

And routine maintenance was eliminated.

Retrofitting

If an existing septic tank is in good operating condition, an aeration tank and drip-line can be easily fitted. This gives an excellent opportunity to purchase a high quality system at a reduced overall cost.

Routine Maintenance

The only mechanical parts of the system are the pumps, and they do not require any regular maintenance. Routine maintenance is not required with this system.

Air injection

The bacteria in the aeration chamber are responsible for the accelerated treatment of the liquid to the stage where the liquid can be sent to the disposal area.

These bacteria require access to oxygen for their survival. The oxygen is released from the air that is mixed into the liquid. Our proprietary air injection system manages this process.

This system extracts the liquid from the aeration camber, pressurizes it, infuses it with air, and returns it to the bottom of the tank.

All with a low energy requirement, no maintenance or noise issues, and a low operating cost.

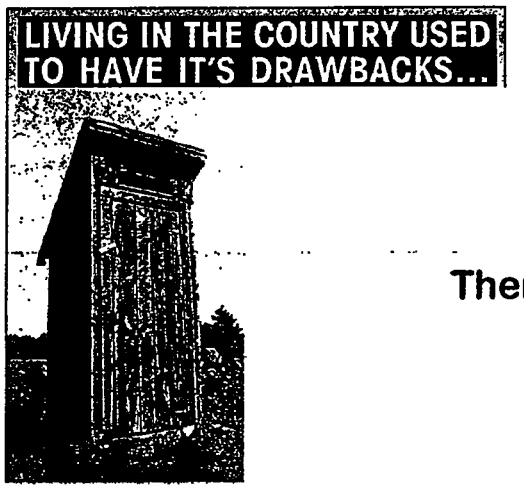
What's the difference?

From the very outset the KiwiTreat philosophy has been one of passionate innovation of routinely questioning benchmarks in design, engineering and manufacturing quality, and persistently raising the bar higher.

Today the dream that spawned the KiwiTreat system has evolved into many forms.

A range of wastewater treatment systems that redefine excellence in engineering and design that has the same unwavering commitment to perfection.

Continually raising the bar....



Then

Now

The safer difference

Quality of treated wastewater.

Naturally the outputs are within the industry standard requirements for aerated wastewater treatment systems.

And an additional bonus is the reduction of nitrate and phosphate levels.

Flexibility

Should the house owner have an unconventional requirement, the system can simply be programmed accordingly. Usually at no additional cost.

Systems can be modified to meet the requirements of site specific areas.

Warranty

The warranty reflects the efficiency, quality, and reliability of the system.

The basics are:

Tanks	15 years
All other components, including pumps;	2 years

(Contact KiwiTreat for full warranty details.)

Backup

In isolated areas or where the environment needs full protection, we can supply systems with backup pumps installed.
The treatment process will never be compromised.

Consistent with our policy of product improvement, we reserve the right to alter specifications without notice.

Technical Specifications

Working volumes (litres)

Septic tank	First chamber	2160
	Second chamber	840
Aeration tank	Aeration chamber	2090
	Settling chamber	810
Disposal pump chamber		170
Total working capacity		6070
Total holding capacity		8500
Total weight		320 kgs

Certification

AS/NZS 1546.1 On-site domestic wastewater treatment units—Septic tanks
AS/NZS 1547:2000 On-site domestic wastewater management
AS/NZS 1546.3:2001 On-site domestic wastewater treatment units—Aerated wastewater treatment systems

KiwiTreat Ltd

Horrelville
R D 1
Rangiora
Phone: 03 312 5787
Fax: 03 312 5780
E-mail: john@kiwitreat.co.nz
www.kiwitreat.co.nz

KiwiTreat

"When only the best will do!"

KiwiTreat Ltd

Building your dream home in the country?

Wastewater treatment systems

Contact us for help to maximise and protect your investment

Guideline for irrigation of treated effluent using Plastro Hydro P.C N.D drip-line

This design is based on the following parameters:

Accepted Daily Loading Rate = ~~5~~ 2.85 mm. (Set by local council or engineer).

Daily Load ~~1500~~ 1380 litres

Emitter Plastro Hydro 16/40 P.C N.D Integral Drip-line

Emitter Flow Rate 2.34 lph

Emitter Spacing 0.6 metres

Drip-line Spacing 1.0 metres

Distance from Treatment Plant to Disposal Field = ~~25~~ 70 metres

Pump Station Depth 1.3 metres

Field Size ~~1500~~ 1380 litres / ~~5.0~~ 2.85 mm per day = ~~300~~ 485 m2

Assume field size is ~~50~~ 70 metres x ~~6~~ 7 metres

Total Flow Rate Required = $\frac{\text{~~300~~ 485 metres x 2.35 lph}}{\text{0.6 metre spacing}}$ = ~~1175~~ 1900 lph

Pump Duty is ~~1175~~ 1900 lph @ Xm head, where X is the sum of the head losses based on the following table:

Head Loss Table

Item	Head Loss (m)	Comments
Emitter	8.2	Minimum pressure required
Drip-line	~~0.5~~ 0.7	~~50~~ metres 70
Sub-main	3.4	2 x 4 metres drip-line
Main	~~2.1~~ 3.8	~~50~~ metres drip-line 70
Filter	2.0	For a semi blocked filter
Pump Station Depth	1.3	
Elevation	~~0~~ 3	~~1.0~~ up ~~or down~~ slope
TOTAL	~~18.1~~ 22.4	

Therefore total head loss for calculation is ~~18.1~~ 22.4 x 10% = ~~20~~ 25 metres

Hence, Pump Duty required is ~~1175~~ 1900 lph @ ~~20~~ 25 metres.

The pump used is a Tesla Diver 75M with a rated duty of ~~1200~~ 1900 lph @ ~~35~~ 30 metres

BLS:KEF

14 February 2006

POWELL FENWICK
CONSULTANTS LIMITED
Your quality engineering partner.

consulting engineers
heating + ventilation
mechanical
structural
electrical
acoustic
civil
fire

Unit 3, Amuri Park
Cnr Bealey Ave & Churchill St
P.O.Box 25-108, Christchurch
New Zealand
(03) 366-1777: phone
(03) 379-1626: fax
engineering@pfc.co.nz: email
www.pfc.co.nz: website

Marlborough District Council
PO Box 443
BLENHEIM

ATTENTION: Jenny Coffing

Our Ref: 050685/S/1

Dear Jenny,

RE: McCORMICK HOUSE

Please find attached the following details for the wastewater management system for the above mentioned property.

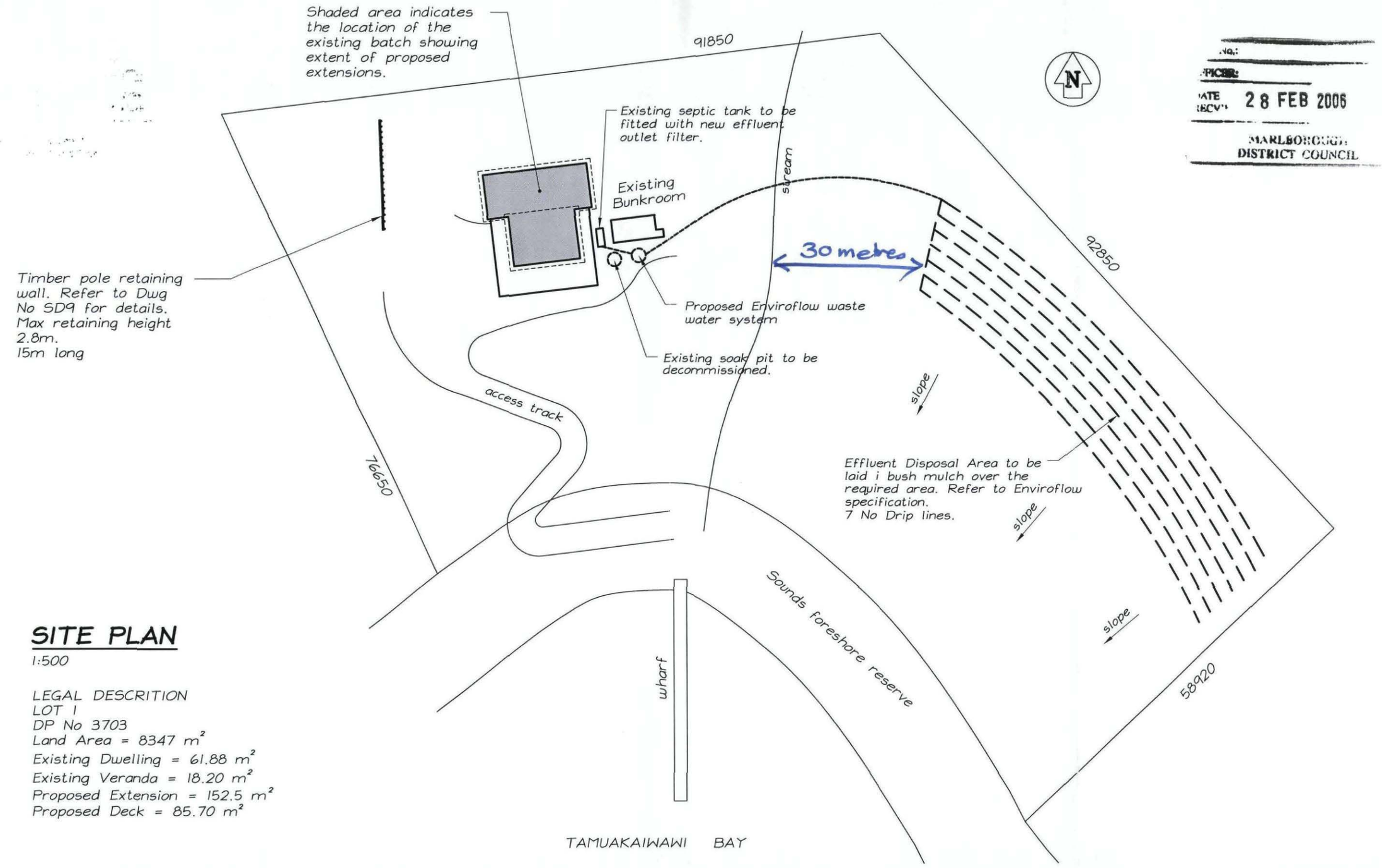
- Enviroflow calculations for the wastewater system including tank size and schematics.
- Enviroflow specification
- Site plan to scale showing location of drip lines
- Site area photo

Please disregard any information supplied previously on alternative systems. Mark Treadgold, Powell Fenwick's Civil Design Engineer has visited site and recommends that the environment waste water treatment system is the best practicable option for the site. The use of this system will result in the existing waste soak pit being decommissioned.

Providing the Enviroflow system is installed as per the manufacturers design and specification there will be no effects on the environment.

Yours faithfully,
POWELL FENWICK CONSULTANTS LIMITED

B L SCHWASS

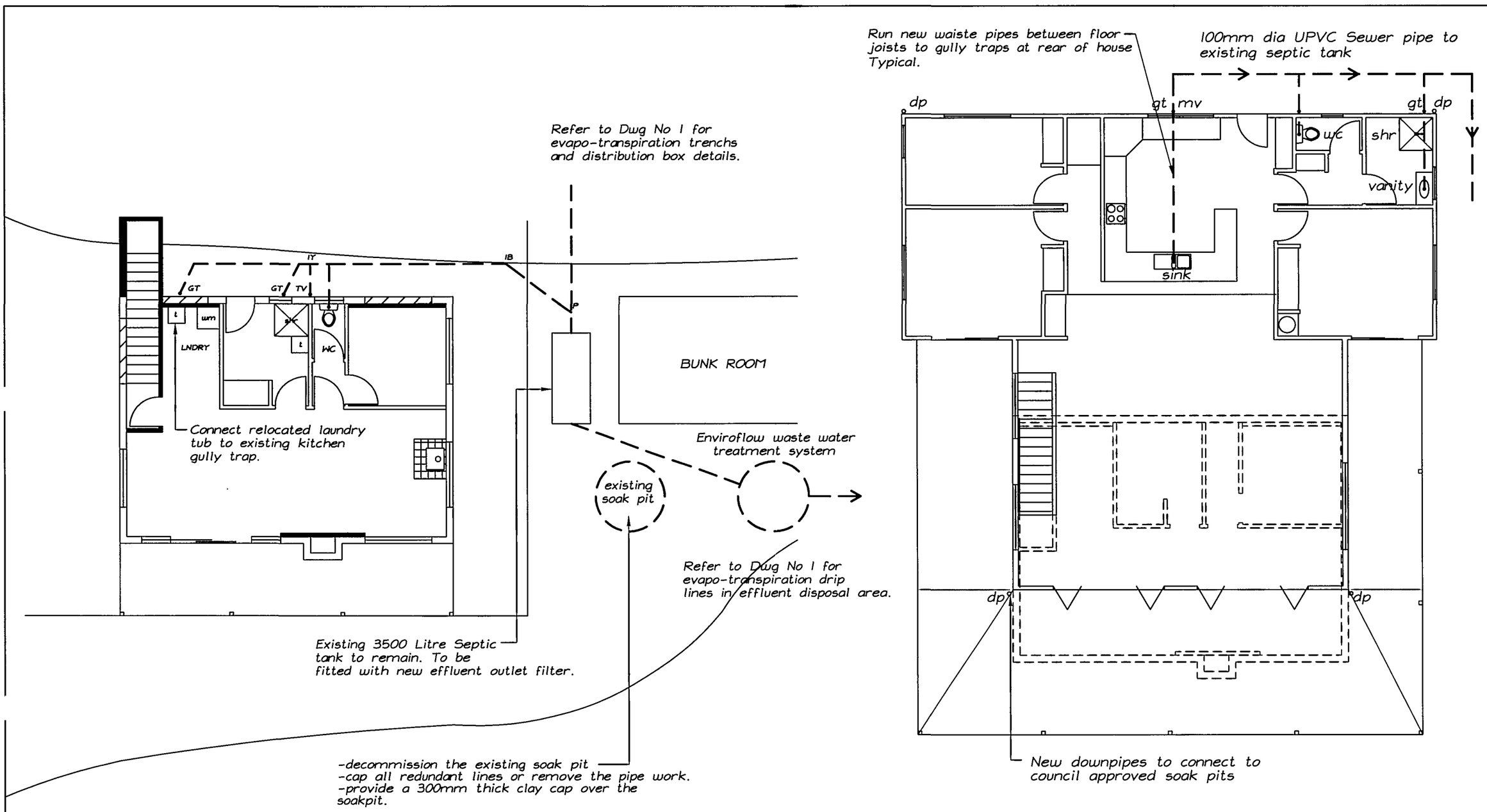


SITE PLAN

1:500

LEGAL DESCRITION
LOT 1
DP No 3703
Land Area = 8347 m^2
Existing Dwelling = 61.88 m^2
Existing Veranda = 18.20 m^2
Proposed Extension = 152.5 m^2
Proposed Deck = 85.70 m^2

	SITE PLAN	PROPOSED ALTERATIONS NORTH WEST BAY PELORUS SOUND FOR Dan McCormick	Scale 1:500 Drawn BLS Date May 05	5018 01 C



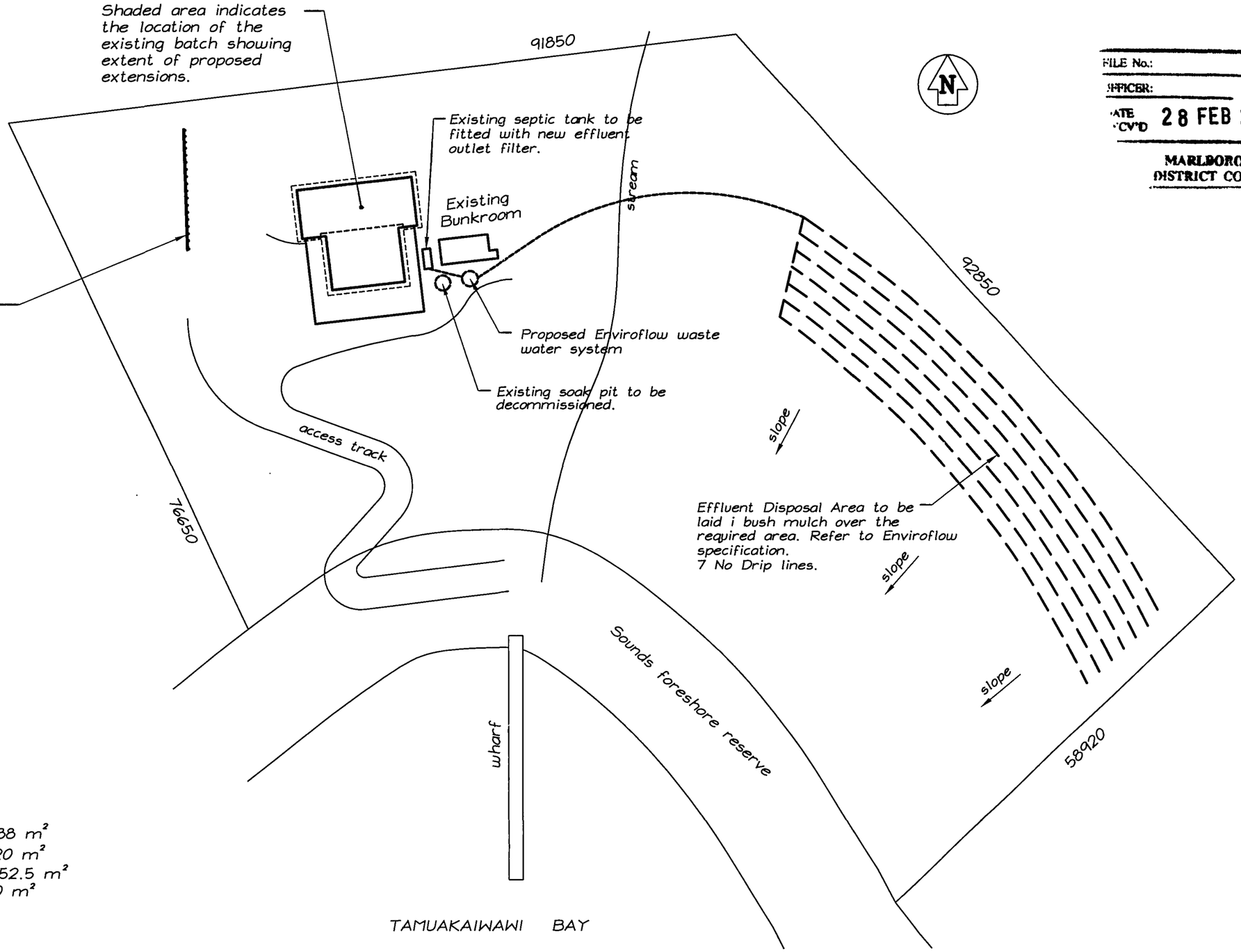
GROUND FLOOR DRAINAGE PLAN

1:100

FIRST FLOOR DRAINAGE PLAN

1:100

	DRAINAGE PLAN	PROPOSED ALTERATIONS NORTH WEST BAY PELORUS SOUND FOR Dan McCormick	Scale 1:100 Drawn BLS Date Sept 05	5018 17 C



FILE No.:

OFFICER:

DATE RCV'D 28 FEB 2006

MARLBOROUGH DISTRICT COUNCIL

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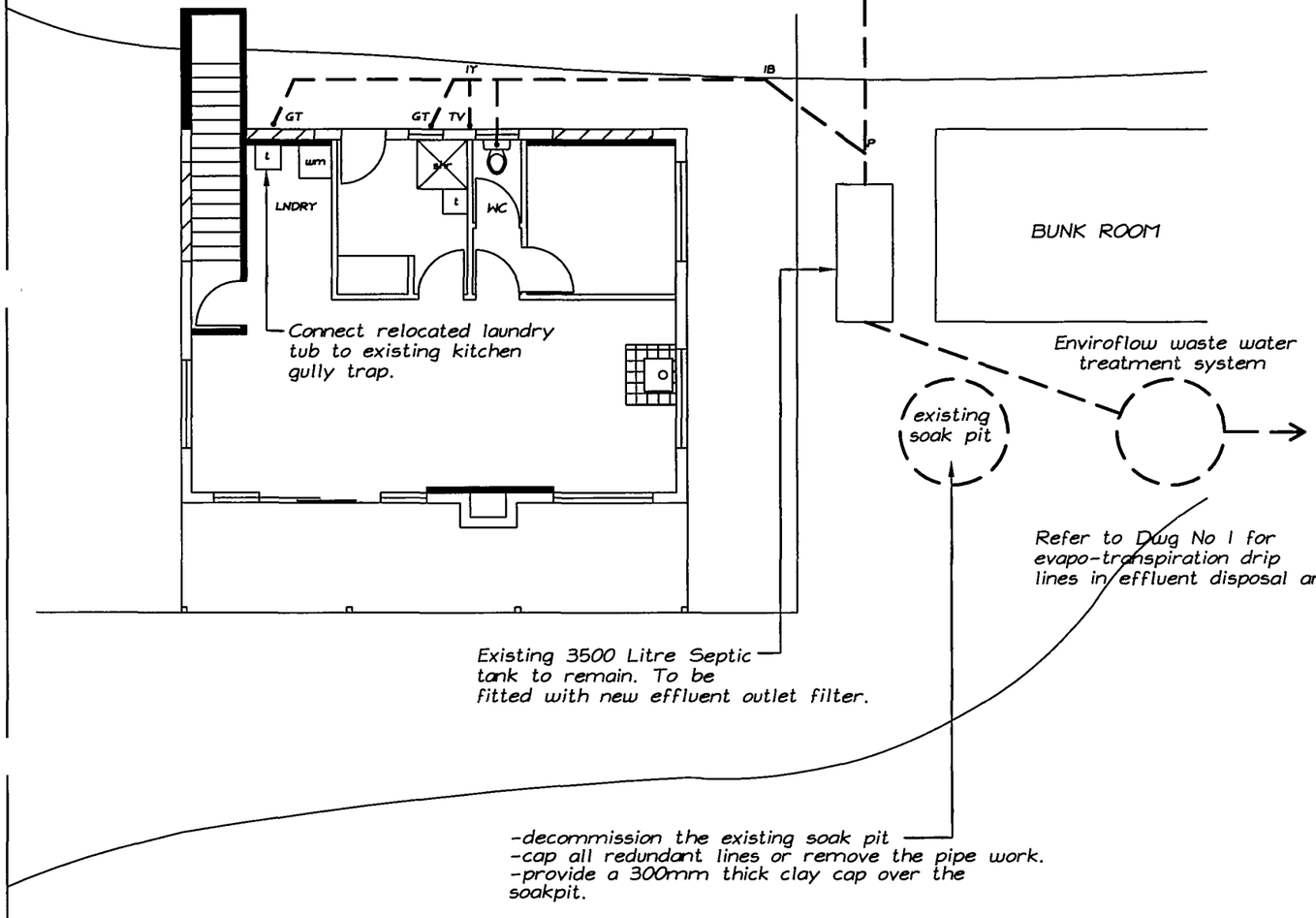

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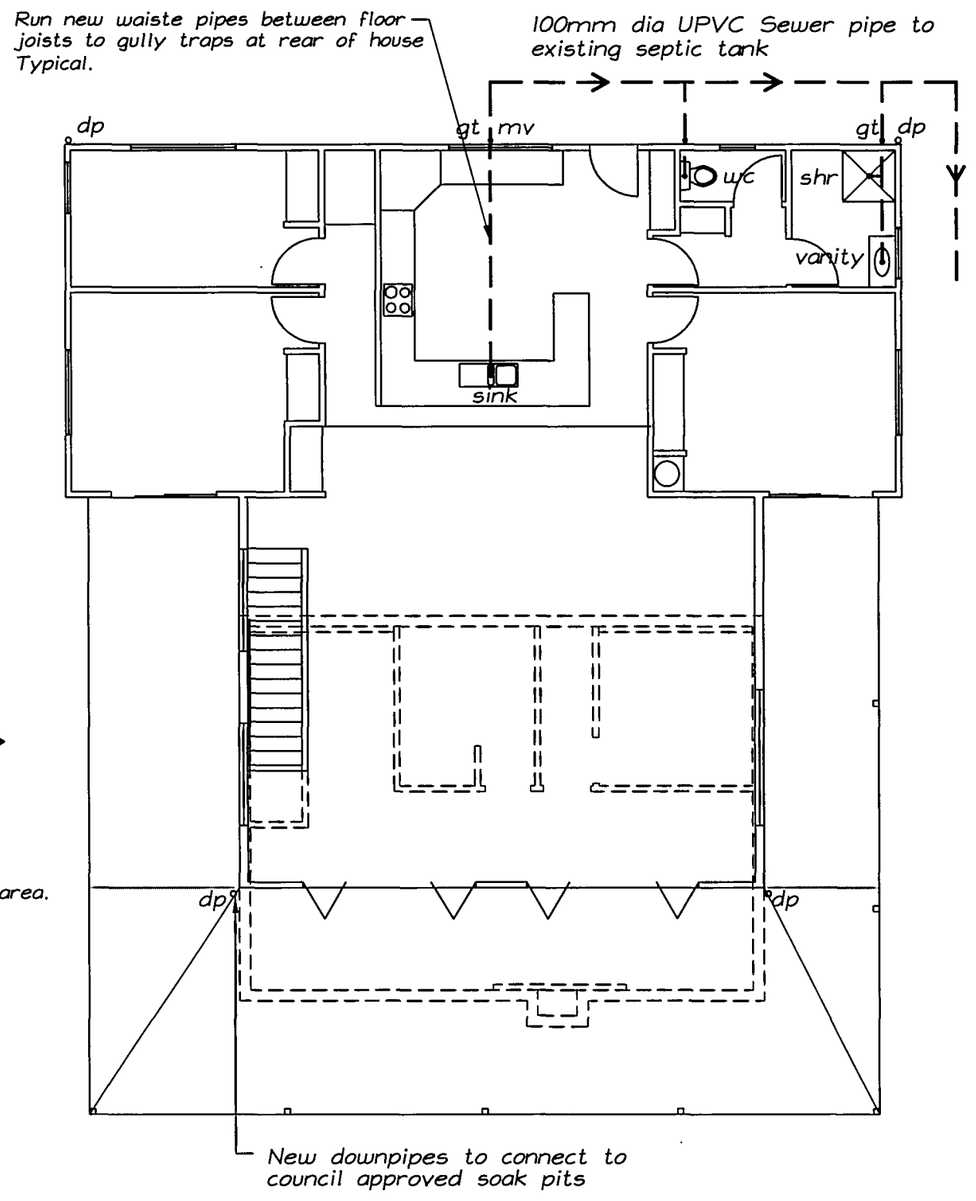

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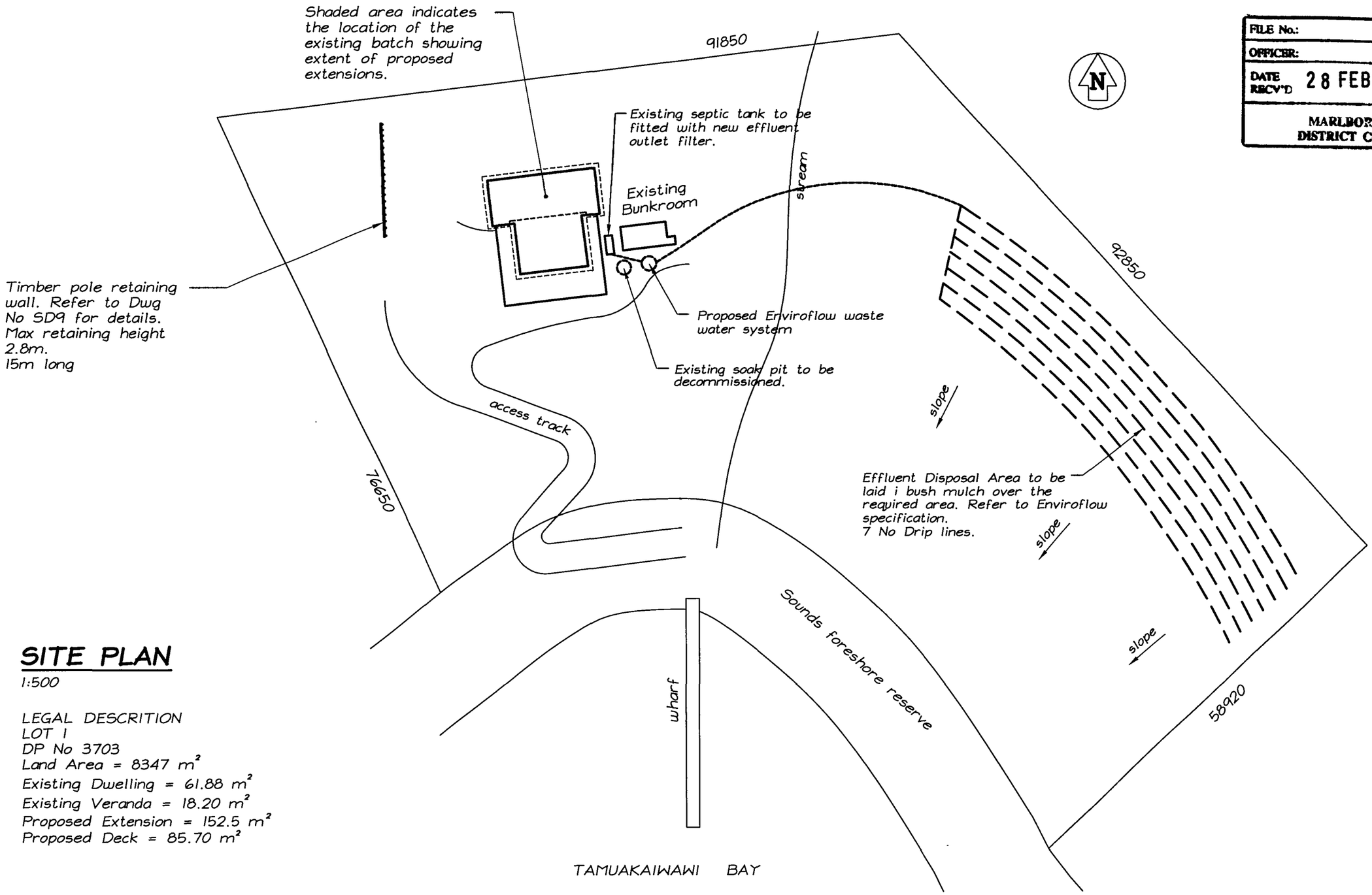

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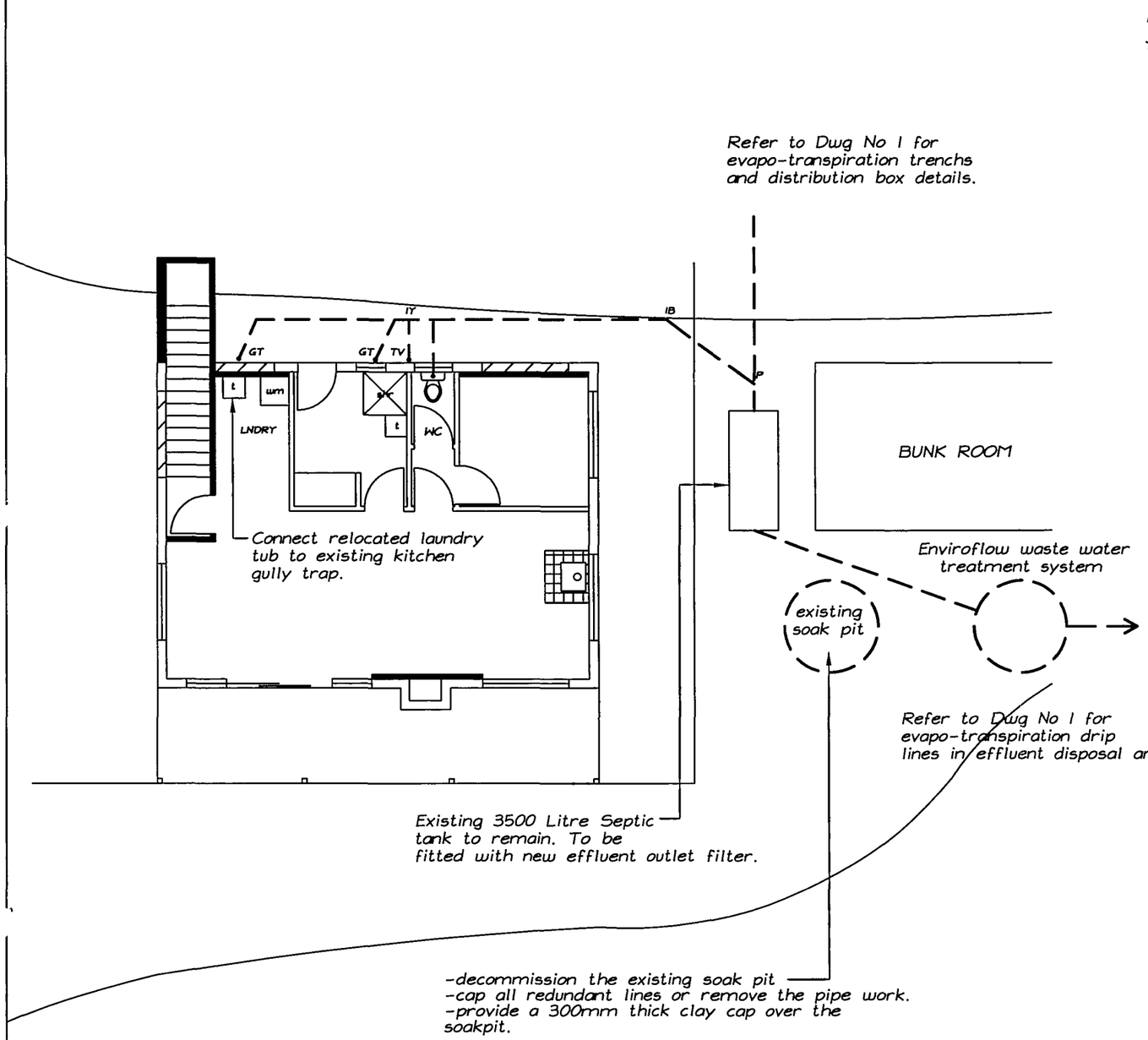

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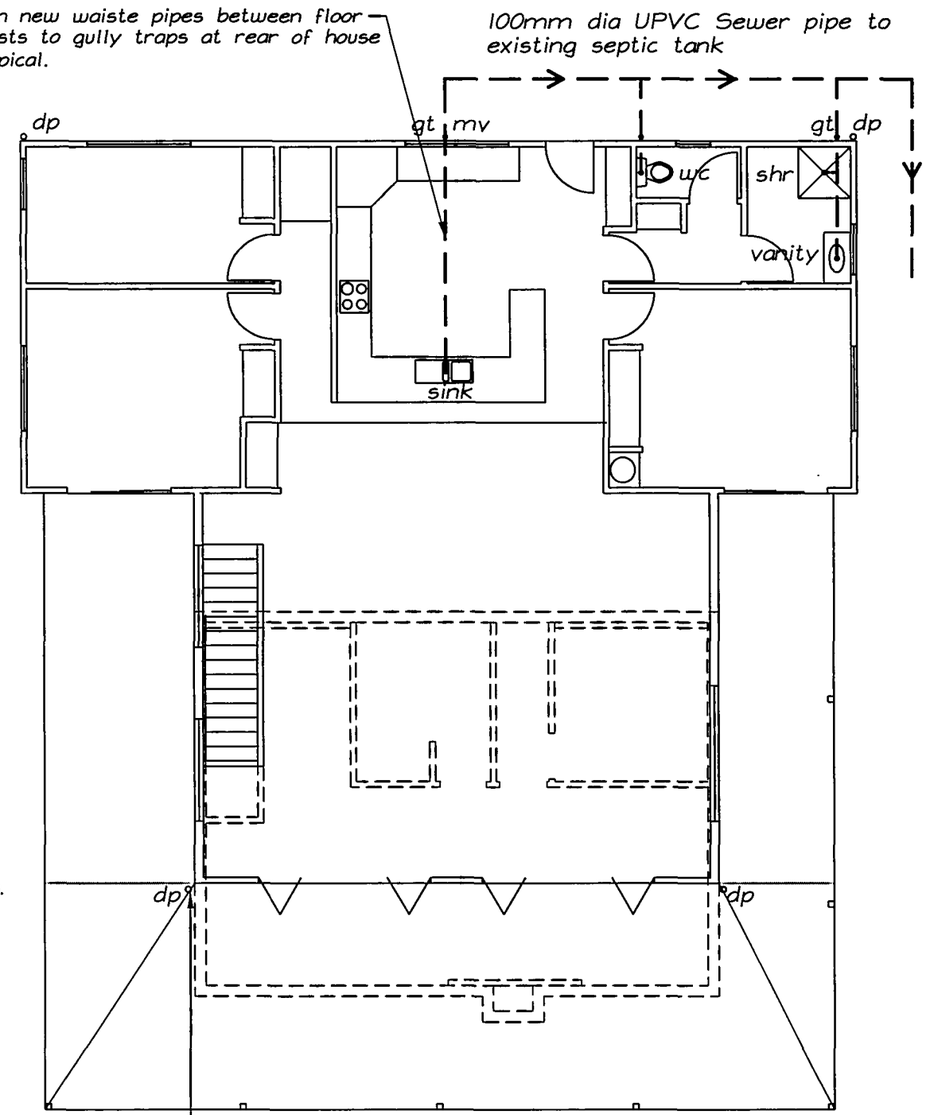

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ENVIROFLOW
Waste Water Treatment Systems Ltd

PO Box 8686
Havelock North
Hawke's bay, New Zealand

Telephone (06) 877-5966
Facsimile (06) 877-8903

ENVIROFLOW WASTE WATER TREATMENT SYSTEMS LTD COUNCIL CONSENT APPLICATION BOOKLET

FOR: MR D CORMACK
NORTH WEST BAY
PELORUS SOUND

ENVIROFLOW
Waste Water Treatment Systems Ltd

PO Box 3601
Hamilton Mail Centre
Hamilton, New Zealand
Telephone (06) 857 5966
Facsimile (06) 857 6203
www.enviroflow.co.nz

Application details for the installation of an ENVIROFLOW Waste Water Treatment System

Date 25-1-06

Client Name Dan McCormack

Site Address North West Bay
Pelorus Sound

House details

No. of bedrooms 6. Maximum occupancy 12. Discharge/person 115. (litres/day)

Water source Tank (tank/council) Total system discharge 1380 (litres/day)

Water conservation devices Yes

Site details

Soil category 5 Soil type Clay. Design irrigation rate 20 (mm/week)

Slope of dispersal area: Flat (Moderate) Steep Approximate slope 30°

Ground water level: (<600mm) 0.6m –1.0m 1.0m+

Vegetation on dispersal area Native Bush

Dispersal system details

Dispersal method drip Dispersal area 484 (m2) Application rate 2.85 (mm/day)

Raam dripline: Either 3.5 litre/hour drippers @ 1.0m spacing along line.
~~Or 1.6 litre/hour drippers @ 0.5m spacing along line.~~

Total dripline length 484 (m) Spacing between driplines 1m (m)

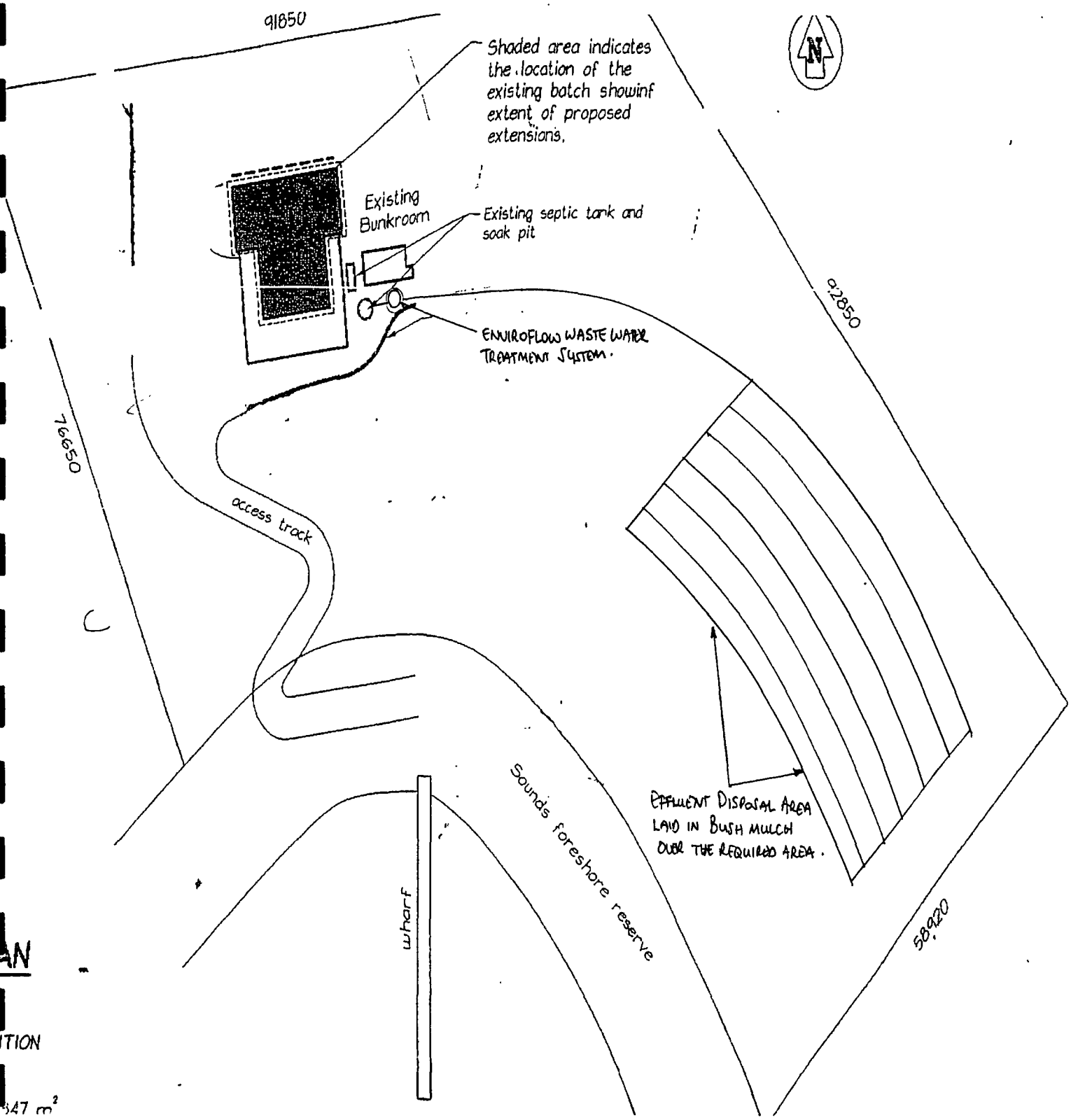
Expected treated water quality:

BOD5 <20 (mg/L) Suspended Solids <20 (mg/L) Faecal coliforms 50 (cfu/100ml)

Other relevant details Water saving devices must be installed.

Name D Simmiss Signed
(On behalf of Enviroflow)

(Please see attached a detailed sketch, showing location of Enviroflow System, dispersal area and other relevant details)



AN

RITION

547 m²

CONTENTS

The specifications of systems detailed in this booklet may alter from time to time as technology advances our systems.

INTRODUCTION

Enviroflow Waste Water Treatment Systems Ltd is a wholly owned New Zealand company that have been manufacturing and installing **Enviroflow** Systems throughout New Zealand since 1994.

The **Enviroflow** System was developed in Australia in 1985 and has over the last 14 years proven performances throughout Australia, the South Pacific Islands and New Zealand.

Effluent from individual homes, through to large resorts, hotels, schools and many other facilities are now being successfully treated by the **Enviroflow** System.

The **Enviroflow** System has allowed houses and other facilities to be built in locations where development had stalled with traditional treatment systems, and proven that high quality effluent treatment can operate successfully in environmentally sensitive locations.

The **Enviroflow** Waste Water Treatment System is a fully enclosed biological filter, producing high quality treated water, offering you the best possible treated effluent for discharge into the environment.

Simply, it is an odourless biological treatment system, using the same process operated in towns and cities throughout the world, but on a smaller scale.

WHY AN ENVIROFLOW?

Arguably the world's most efficient and advanced effluent treatment system.

Protect the future by protecting the environment.

Fully enclosed **Biofilter** ensures no odour, noise or fly nuisance.

Lightweight.

Low running costs - equivalent to what a refrigerator would use a year.

Treatment of effluent usually results in a much greater choice for its disposal e.g. to landscaped or planted area using drip or spray irrigation.

Back-up service is always available. We will ensure your system is working 24 hours a day.

Elimination of contaminated waste.

HOW THE ENVIROFLOW WORKS

Anaerobic Digestion: (Stage One) The combined raw wastes stream enters the first anaerobic digestion tank. Here solids are allowed to settle out and are decomposed over a period by anaerobic bacteria, producing simpler organic compounds in soluble form.

The two tanks are operated in series, ensuring adequate treatment while allowing for the inevitable variation in flow rate throughout the day.

Liquid fractions, together with the decomposition products of the solids digestion then flow by gravity to the second tank or aerobic digestion chamber.

Aerobic Digestion: (Stage Two) Primary treated wastes enter at the centre of the unit and are circulated via a small pump and a series of liquid distributors over the bacterial support medium in the upper section. The wastes flow down through this biomass where bacterial action removes organic material. The flow is cyclic, ceasing for given intervals to allow sludges to settle in the lower section. Air is supplied by a constant force draught system providing oxygen to the aerobic bacteria.

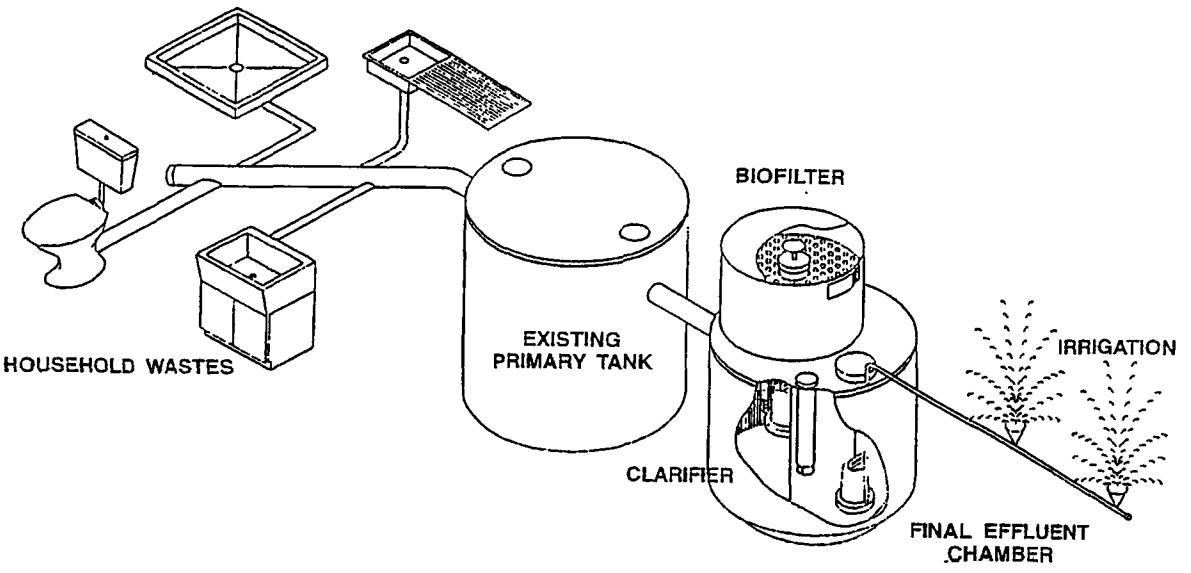
After passing through the media the wastes fall to the outer area of the lower chamber, allowing recycling over the bacterial bed.

Clarification Chamber: (Stage Three) This chamber is located below the Biofilter. Free bacterial cell material settles out in the form of a sludge. This sludge is removed periodically by means of an automatic sludge return system to the inlet of the first primary chamber for re-digestion. (Commercial) The treated water is discharged via an overflow nozzle to a disinfection device, before being allowed to stand for a period before discharge.

Chlorination and Irrigation: (Stage Four) As the treated water passes to the irrigation chamber, it can have final disinfection. This is only necessary if the discharge of the final treated water is to be above ground.

This treatment is adequate to meet the bacterial standard required by authorities for most discharge situations.

Final disposal of effluent will be by agreement with the responsible statutory authority in each situation.



DOMESTIC EFFLUENT DISPOSAL

The **Enviroflow** System will produce an effluent quality that is a resource, suitable for irrigation purposes. In order to achieve this high quality treated water, the system involves a mechanical process. The initial cost of an **Enviroflow** System in many locations will be similar, or less than, the traditional septic tank, but the operating and maintenance costs will be slightly higher.

Application to local authorities

An application should be submitted requesting permission for the installation of an **Enviroflow** Waste Water Treatment System. The application must provide all details on the proposed installation.

Please Note: Contact your local council for their requirements. Most councils have different requirements. If you have any details that require clarification contact **Enviroflow 0800 922 866**.

Site selection for irrigation of treated water

To maximise the benefit of high quality treated water, the siting of your irrigation system should be planned in advance, and discussed with the installer prior to installation.

The following details should be considered:

(i) DISPERSAL AREA: The size of the dispersal area will be dependent on the dispersal system (spray or drip), soil type, water source (tank or town supply) and the number of occupants (bedrooms).

(ii) PLANTS: Plant growth will be enhanced as they take up both nutrients and liquid from the treated water. Where possible use existing gardens, shelter belts, or natural bush areas.

(iii) SPRAY IRRIGATION: This method of dispersal maximises the benefits of evapotranspiration of the treated water. The spray system uses small microsprinklers that provide small droplets (not a fine mist) of water covering small diameter wetted areas. The spray system requires the effluent to be disinfected. (see Final Effluent Quality).

(iv) DRIP IRRIGATION: The drip system uses specially manufactured effluent dripline. This dripline can be laid on the surface of gardens or in the bush, but must be covered by a layer of mulch. In free draining soils the dripline can be buried just below the surface of lawns etc.

(v) WEED CONTROL: To reduce weed control the total dispersal area should be covered with a good layer (100-150mm) of mulch or bark.

(vi) EDIBLE CROPS: The treated water can not be used for irrigation of any edible crops. This is a Health Ministry requirement.

(vii) RUNOFF: To avoid the risk of runoff, the dispersal system should not be located over any natural water courses, or within close proximity to boundaries.

(viii) RAISED GARDENS: By raising or mounding the gardens, the necessary distance can be achieved above the natural ground water level, and will also help to improve evapotranspiration.

ADVANTAGES OF ENVIROFLOW BIOFILTER SYSTEMS

1 **Low running costs**

2 **Components** – pumps and fan are the only electro mechanical components. There is no special mechanical equipment in the system.

3 **Polypropylene media** – indefinite lifespan plus 100% clog free.

4 **BOD reduction** – designed to achieve BOD levels between 10mg/L and 30mg/L.

5 **Temperature** – will operate in temperatures ranging from -20°C to +50°C.

6 **Shock loadings** – a longer retention time provides ability to handle shock loading better than other systems. Faster more efficient treatment process.

7 **Quiet**

8 **Proven System** – over 14 years operation.

9 **Covered by Warranties**

10 **Less land dedicated** to disposal than is required for passive systems.

11 **No offensive odours**

12 **Approved by all territorial Authorities**

13 **Flexibility (2 tanks)**

14 **Large capacity 9000 litres.**

FINAL WATER QUALITY

The system will deliver a quality effluent that betters the World Health Standards for irrigated effluent. The World Health Standards for above ground disposal are BOD 30 mg/L, Suspended Solids 30 mg/L and Faecal Coliforms 30 cfu/100ml. In New Zealand the Health Ministry require above ground irrigation to be disinfected. The usual method is disinfection using chlorine resulting in a free chlorine reading of 0.1 mg/L - 0.7 mg/L residue.

Chlorination is the most cost effective method of disinfection, however the **Enviroflow** system can utilise other methods, eg. UV and Ozone treatment.

The **Enviroflow** system consistently produces results better than the above mentioned figures.

These results are proven by independent laboratory testing.

RETROFIT SYSTEMS

As well as providing excellent effluent treatment for new situations, **Enviroflow** offers 'Retrofit' Systems for existing septic tanks which do not function properly.

This type of operation has become a large part of our business as it gives people the opportunity to treat their effluent to better than World Health Organisation standards and therefore protect our environment.

The **Enviroflow** system as well as being user and environmentally friendly is totally adaptable to any situation.

NB: Fresh air inlets to be capped off and air flow holes drilled in existing junctions (to assist airflow) in an existing septic installation.

SPECIFICATIONS - DOMESTIC TREATMENT SYSTEM

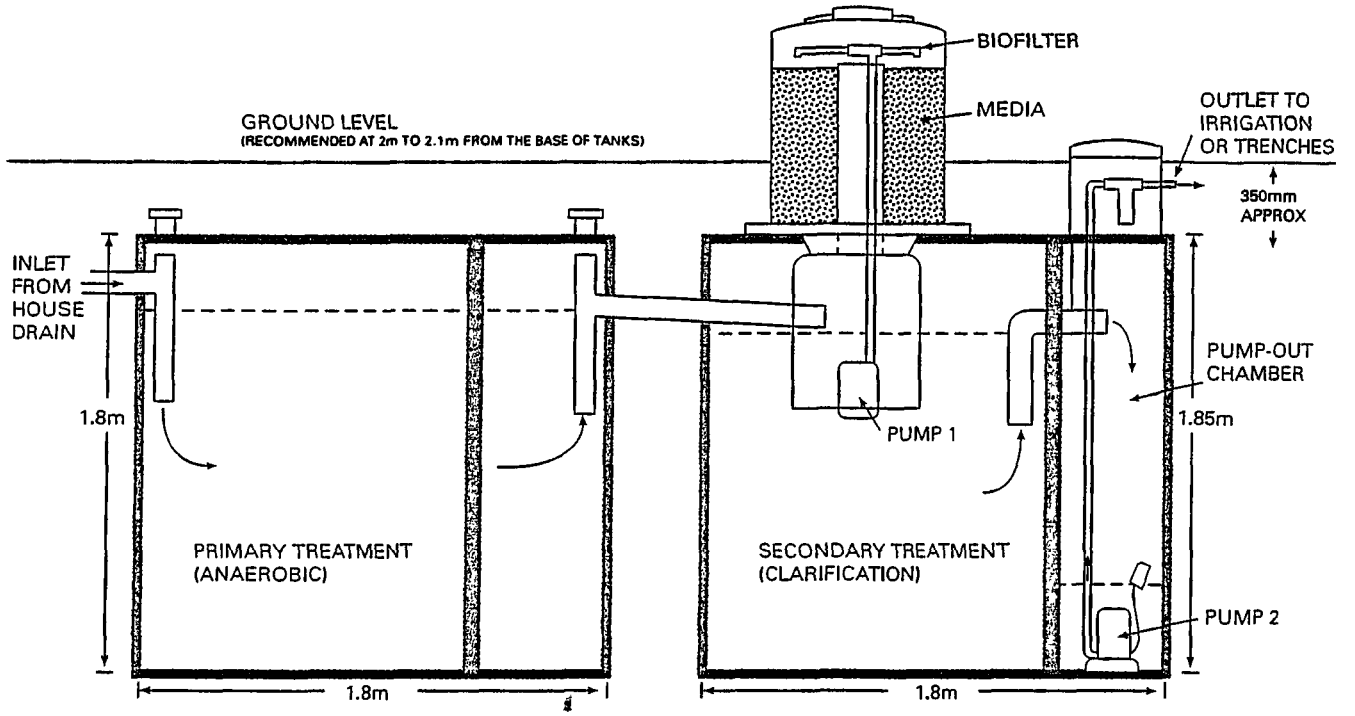
The two tank system allows greater flexibility, each domestic system comprises:

Tank - 1.850h x 1.8d. 4500L capacity

Secondary Tank - 1.850h x 1.8d. 4500L capacity

Biofilter - 1m x 1m (circular tank)

Weight - Primary Tank weight 1 ton. Clarifies with Biofilter weights 1.5 ton.



DOMESTIC ENVIROFLOW SYSTEM
(ALL DIMESIONS AND CHARACTERISTICS SUBJECT TO CHANGE)

PLANTING TREES AND SHRUBS IN IRRIGATION AREA

Most plants will benefit from the irrigation of the final effluent water and nutrients treated by your **Enviroflow** system. The planted area is ideally suited to trees and shrubs, rather than perennials and bedding plants.

The irrigation of edible crops (eg. vegetables) is not permitted by the Health Ministry.

The planted area should be maintained like other parts of your garden. If new shrubs are planted, it is important that they are selected to be suitable for your location, and conditions (eg. coastal plants for coastal locations). Take time to view local gardens in the area to see plants that are performing well, and discuss the selection of plants with your local nursery or garden centre. Plants with an intolerance of higher phosphate levels should be avoided (eg. some of the the Australian native shrubs).

Ensure that plants are kept in a healthy condition, with regular pruning and spraying if necessary, and that a good mulch layer (bark or similar, minimum 25mm cover) is maintained over the total area to eliminate any risk of human contact with the effluent water, and reduce unsightly weeds.

A well maintained garden will not only enhance the environment of your property, but also increase your property value.

PROTECTING THE ENVIRONMENT

The **Enviroflow** system is a natural biological process and care must be taken not to destroy the bacteria within the system.

The use of the following is not recommended: detergents and cleaners containing a chlorine or caustic base; any antibacterial, antibiotic or antiseptic products.

Disposal of sanitary health products such as tampons, napkins and condoms is not recommended.

Do not dispose of spa or pool water into the plant.

ALARMS

The green light situated on the outside of the control box will illuminate when power is on to the system.

The high level buzzer alarm will sound if the pump within the final effluent chamber has malfunctioned. The system has an externally mounted on/off switch to deactivate the alarm after you have notified the company.

You should contact **Enviroflow** if the buzzer is activated by phoning

Freephone 0800 922 866

WARRANTY

The construction elements of the system are guaranteed for 5 years (eg: tanks, biofilter and pipework). All electrical componentry has manufacturers 12 month warranties.

If the system has been subject to misuse or neglect these aspects may void certain warranties (also refer to the section on alarms).

INSTALLATION INSTRUCTIONS

OFF LOADING

Exercise care during all handling operations. Use slings where necessary. Do not bounce or roll components.

Ensure that level, clear ground, free from sharp protuberances is provided for storage.

Safeguard units from toppling or rolling.

Check for any shortages in consignment and notify supplier accordingly in writing within 24 hours.

CAUTION

Ensure that all necessary safety precautions are taken when working in a deep excavation. All work should be carried out in accordance with the Workplace Health and Safety Act and Regulations.

Pay particular attention to the stability of the side walls.

It should not be necessary for anyone to work at the bottom of the excavation except when levelling the base and placing the first back-fill.

NOTE: Both tanks must be filled with water to invert levels prior to backfilling.

Installation and back-filling must be carried out in strict accordance with the manufacturers instructions.

Ascertain the correct orientation and levels of inlet and outlet pipework - refer to General Arrangement drawing provided.

EXCAVATION

Excavate to the correct formation level. Finished ground level must not be more than 350mm above the top of the tanks.

Lay and level, compacted stabilised sand or 20MPa concrete, to the correct base level of the tank. THE SAND SHOULD BE A MINIMUM OF 100mm IN DEPTH.

Lower the unit into position with the aid of slings, taking care not to damage any flanges or pipework.

BACKFILL

Evenly distribute backfill material around each tank, lightly compacting the material at several stages during the process.

Continue in this manner to the underside of the clarifier inlet pipe.

Fill the clarifier and final effluent chamber with water to invert level of outlet pipe.

It is essential that no gaps or voids are left in the fill under the inlet pipe. The fill in this area must be well consolidated to ensure positive and uniform support to the inlet pipe around its entire girth.

Ensure that there is a fall of 10mm in the pipe connecting the primary tank and clarifier.

NOTE: Consult **Enviroflow** before installation if site is located in an area with high water table or overland flow conditions.

4. ELECTRICAL CONNECTIONS

Terminate the incoming power supply at plant controller as shown on wiring diagram provided. Leave the unit with the circuit breaker in the "off" position.

All electrical work shall be carried out by a licensed electrical contractor.

5. PARTS, FITTINGS AND SUPPLIES

The following list contains all those items provided with the plant.

1 x Chlorinator Tube.

Either: Drip System, including 50m x 25mm poly pipe, 200m Dripline and all associated fittings.

Or: Sprinkler System, including 50m x 25mm poly pipe and 15 sprinklers complete with stakes, jets and riser tubes, chlorinator tube and S-D-600 Waste Water Disinfectant Tablets (Trichloroisocyanuric Acid) with above ground irrigation.

ELECTRICAL INSTALLATION INFORMATION

General

1 The plant requires 240 Volt 50Hz 16 amp supply.

2 All fittings exposed to the weather are to be classified weatherproof fittings, meeting all applicable NZ Standards.

3 All conduits used shall comply with applicable NZ Standards and be weatherproof and fixed with approved straps or saddles.

4 All straps, saddles, screws, bolts or any other approved fixing method shall be weather resistant; e.g. galvanised.

Typical Installation Equipment

5 Equipment generally designed into the plant configuration consists of: (a) Control Panel (240 volt) and (b) Irrigation Tank Pumps (240 volt).

6 Control mechanisms operating in conjunction with the above equipment generally consists of: (a) Float switches and (b) Time switches.

Typical Installation Description

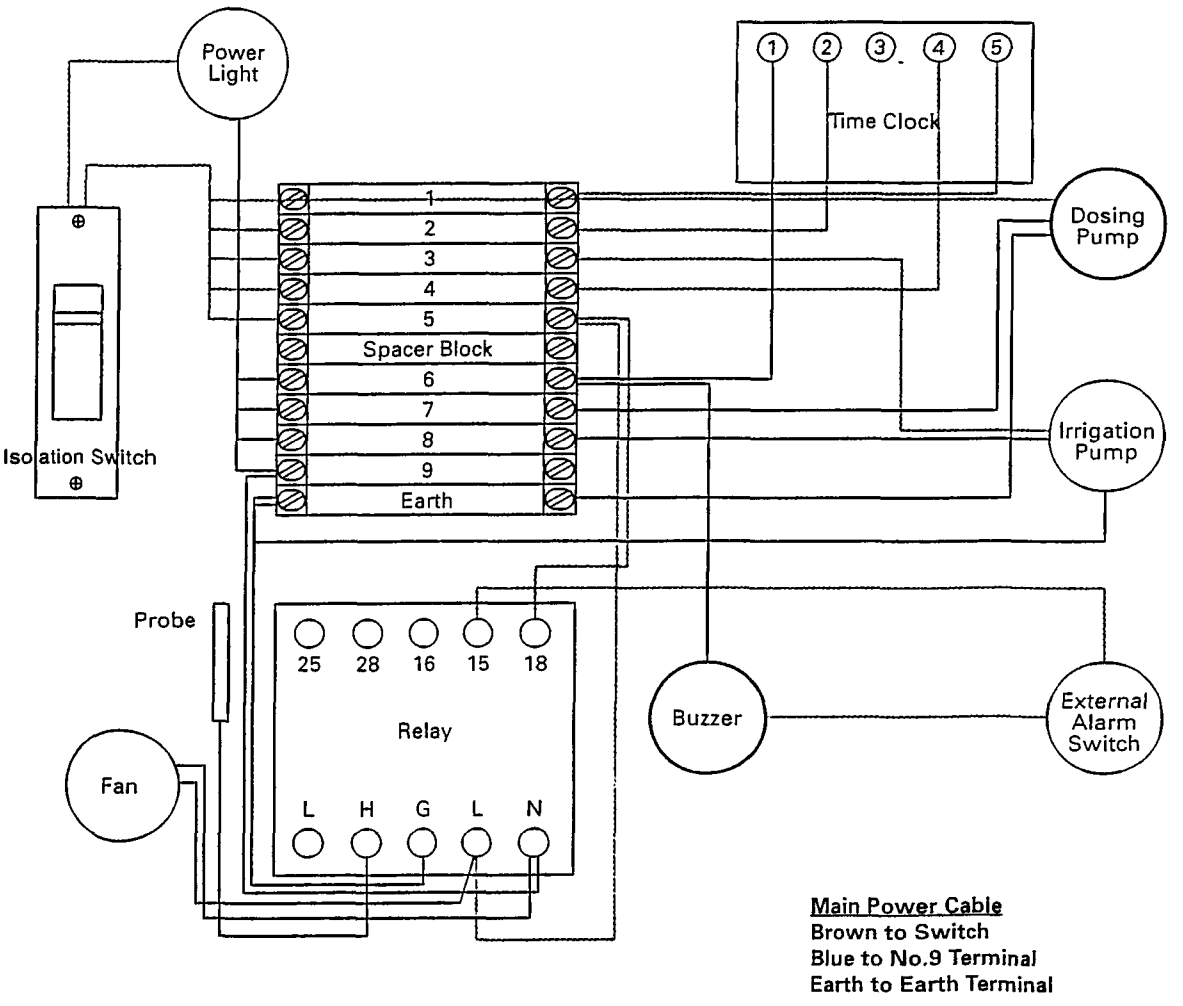
7 Connect from the main or sub board, a 240v 16 amp power supply (2.5mm^2 active, neutral and earth) power connecting to the Control Panel (mounted on the BIOFILTER). Feed wire up through tube, located at base on Biofilter, to control panel.

8 Test all functions and equipment to specifications provided.

9 Provide Main or Sub-board circuit board labels to clearly identify appropriate circuits.

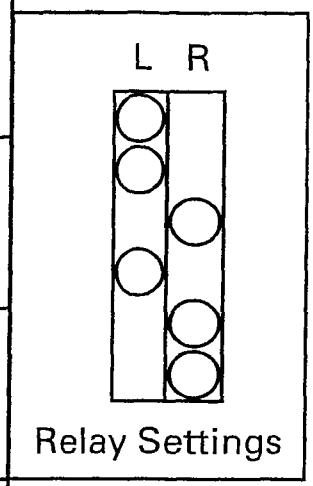
Control Panel Wiring Circuit

10 Attached is the wiring circuit diagram for the control panel, which only requires 240/16A power main connection. All functions, timers and sensors are preprogrammed and set.



- This diagram may differ from model to model

	Red	Blue	Green (Earth)
Power Light	Main Switch	6 Terminal	
Fan	2 Terminal	8 Terminal	
Buzzer	15 on Relay	6 Terminal	
Relay	L to 5 Term 18 to 5 Term	N to 9 Terminal	G to Earth Terminal
Dose Pump	1 Terminal	7 Terminal	Earth Terminal
Irrigation Pump	3 Terminal	8 Terminal	Earth Terminal
Probe		H on Relay	
Time Clock	No 2 to 2 Terminal No 4 to4 Terminal No 5 to 1 Terminal		
External Alarm Switch	15 Terminal to Switch Switch to Buzzer		



Relay Settings

MAINTENANCE

Maintenance for the first 2 six monthly checks after commissioning is free. After this period an annual maintenance fee is levied for 6 monthly maintenance checks as itemised. A copy of which will be left for your information.

The cost of maintenance is $90 +GST per 6 months.

Maintenance will be undertaken by an Enviroflow service technician authorised by the company.

ENVIROFLOW
Waste Water Treatment Systems Ltd

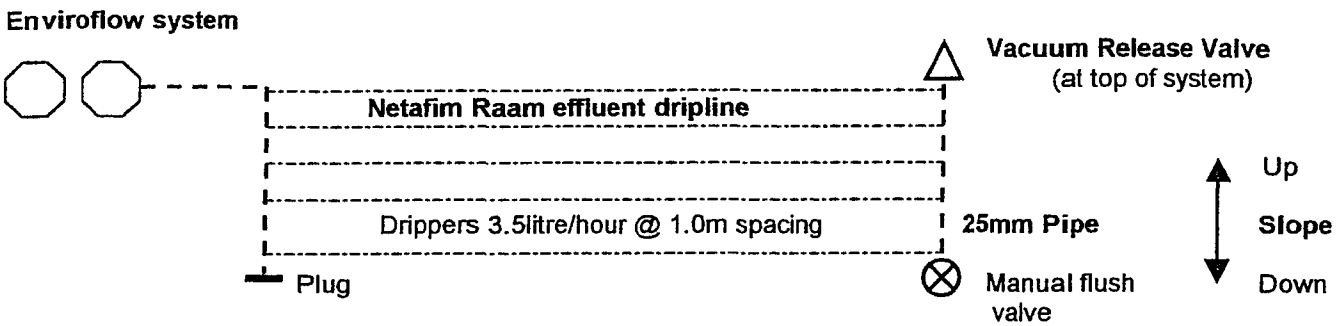
PO Box 8686
Havelock North
Hawke's Bay, New Zealand

Telephone (06) 877-5966
Facsimile (06) 877-8903

ENVIROFLOW DRIP IRRIGATION SYSTEM

Installation Diagram

(Diagrammatic layout only)



Notes:

The Enviroflow system uses the Netafim Raam purple effluent dripline. The dripline is coloured purple to identify it as discharging wastewater. The pressure compensating (same flow with varying pressures) drippers are inserted inside the dripline at a spacing of 1.0 metre apart, and deliver 3.5 litres/hour each. The dripline can be run upto 50 metres in one direction on flat ground, and will give uniform discharge over this length.

The Enviroflow system comes complete with 200 metres of the dripline, which will deliver 700litres/hour, onto the dispersal area, controlled by a dose load pump located in the pump-out chamber. A 25mm polythene pipe will deliver the treated water to the driplines, connected with reducing tees to the dripline at both ends.

The Netefim Raam drippers are protected by an Arkal 25mm disc filter (red rings, 130 microns), located in the top of the pump-out chamber. This filter is easily accessible, and should not need to be cleaned between the six monthly service periods.

The Netafim Raam drip system will have a vacuum release valve, located at the highest point of the system, to allow air into the driplines when the dose loading pump finishes the pump cycle. At the lowest point of the system, at the end of the 25mm flush line, a manual flush valve will be fitted, to allow regular flushing of the system at the six monthly services.

ENVIROFLOW DRIP IRRIGATION SYSTEMS

Site selection for the drip system

- On heavy clay soils, it is preferable not to disturb the soil structure, with trenches etc.
- Where possible use existing gardens, shelter belts (check the council for distances allowed from boundary) or natural bush/scrub, for the area to disperse the treated water.
- The drip irrigation system can be laid on the surface and covered with bark or mulch, and the area planted with trees and shrubs. In areas of existing bush, use the natural ground litter to cover the driplines.
- Ensure that surface water does not run onto, or over the dispersal area.
- In areas with high water tables, gardens can be mounded up to achieve the necessary distance above ground water.

Notes on installation:

- The Vacuum Release Valve should always be placed at, or near the highest point of the site.
- The Manual Flush Valve should be at the opposite end of the system. from the Enviroflow, and at the downhill end of the pipe.
- Raam Dripline should be laid along the contour of the slope (not up or down).
- Ensure that Raam Dripline is not kincked/twisted, or have stones etc. placed over it.
- The Vacuum Release and the Flushing Valve should be placed in the valve boxes, or in a steep bush situation marked clearly with a coloured stake.
- If dripline is placed on the surface (before it is covered with bark or natural tree mulch) it should be pinned in place at least every 5 metres, to ensure it does not move down the site.
- The dripline should not be placed over a natural watercourse. (to stop treated water discharging directly to surface water)
- Test run the system, before it is buried, or covered over. Ensure no leaks, and that the treated water gets to all areas of the system.

Parts supplied with each system

Drip Irrigation

Product	Quantity
Wingfield director 25mm to 1" BSP	1
Wingfield end plug 25mm	1
Wingfield Valve Quick Action 25mm	1
Wingfield elbow 25mm x 15mm BSP female	1
Bermad vacuum Breaker 15mm	1
Wingfield Reducing tee 25x13mm	20
Lateral Tube 13mm x 5m	1
Lateral Tube 25mm x 50m	1
Raam Purple Wastewater Dripline,3.5lph,1.0m,200m roll	1
Raam x 13mm connector	20
Raam Black rings	20
Valve boxes 150mm x 150mm	2

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Suggestions for planting the dispersal area.

Most plants will benefit from the irrigation of the final treated water and nutrients from the Enviroflow system. The planted area is ideally suited to trees and shrubs, rather than perennials and bedding plants.

The Health Ministry does not permit the irrigation of edible crops.

The plants that are used in the irrigated dispersal area should preferably be fast growing, and suited to the environment of the location (e.g. coastal plants for beach front sections). Take time to view local gardens in the area to see plants what are performing well in the location. Many of the New Zealand native plants are fast growing, attractive and grow well in their correct environment. Plants with an intolerance of higher phosphate levels (some Australian natives) should be avoided. Ensure that all plants are kept in a healthy condition, with the dripline covered by a good layer of mulch at all times to eliminate any risk of human contact with the treated water, and reduce unsightly weeds.

A well maintained garden will not only enhance the environment of the property, but will also increase the properties value.

Suggested native trees for planting in dispersal area.

Species	Common name	Height at 10 years
Carex dipsacea	Native grass	75cm
Carex flagellifera	Native grass	60cm
Carex secta	Pukio	1.0m
Carex virgata	Swamp sedge	1.0m
Cortaderia fulvida	Toetoe	1.5m
Phormium cookianum	Mountain flax	1.5m
Phormium tenax	NZ flax, harakeke	2.5m
Hebe stricta	Koromiko	1.8m
Schafflera digitata	Pate	3.0m
Coprosma propinqua	Mingimingi	3.0m
Leptospermum scoparium	Manuka	3.5m
Cordyline australis	Cabbage tree	5.0m
Cordyline banksii	Forest cabbage tree	4.0m
Pittosporum colensoi tenuifolium	Black mapou	3.0m
Pittosporum eugenioides	Lemonwood	3.0m
Pittosporum tenuifolium	Kohuhu	5.0m
Pseudopanax arboreus	Five finger	4.0m
Pseudopanax colensoi	Mountain five finger	3.0m
Pseudopanax crassifolius	Lancewood	3.0m
Sophora microphylla	Kowhai	4.0m
Plagianthus regius	Ribbonwood	5.0m
Laurelia novae-zelandiae	Pukatea	30m
Dacrycarpus dacrydioides	Kahikatea	40m

ENVIROFLOW SERVICE REPORT

Date _____ Serviceman_____

Client _____ Ph.No._____

Location _____Guarantee Y___ N___

General

Working condition _____
Odour in vicinity _____
Condition of plant area _____

Biofilter

Condition of:

- Filter module_____
- Dose pump _____

Biomass thickness _____
Biomass colour_____
Odour_____

Electrical components

Condition of:

- Time clock_____
- Isolator _____
- Fan _____
- Terminals _____
- General wiring _____

Primary tank

Checked _____

Signed _____

Treated water tank

Condition of:

- Inside tank _____
- Pump _____
- Level probe _____
- Irrigation filter _____

Chlorine tabs. used _____

Irrigation lines

Condition of:

- General area _____
- Irrigation lines _____

System flushed out _____

Treated water quality

ph level _____
CL level _____
Clarity _____

Comments

_____
_____
_____
_____

ENVIROFLOW

WASTE WATER TREATMENT SYSTEMS LTD

PO BOX 8686
HAVELOCK NORTH
HAWKES BAY, NEW ZEALAND
TELEPHONE (06) 877-5966
FACSIMILE (06) 877-8903

AGREEMENT FOR THE SUPPLY OF A WASTE WATER TREATMENT PLANT

ENVIROFLOW agrees to supply a Waste Water Treatment Plant in accordance with the conditions set out in this document, and attached instructions.

CUSTOMER PH. HOME PH BUSINESS

DELIVERY ADDRESS POSTAL ADDRESS(if different)

TOTAL PRICE DEPOSIT BALANCE

INSTALLER(Company Name)_____ TERRITORIAL/ REGIONAL AUTHORITY:_____

ENVIROFLOW SYSTEM TO BE SUPPLIED DELIVERY DATE_____

Either Complete Enviroflow System (two tanks) or Retrofit Enviroflow System, (secondary tank)

Cross out the one not applicable

Other (please specify)_____

IRRIGATION:

Drip irrigation system:

Other:_____ High Head Pump required (metres) _____

STANDARD CONDITIONS OF SALE

1. The customer will apply for and obtain from the relevant authorities, all Building and Resource Management Consents.
2. Enviroflow will supply a system complete with all necessary apparatus, including the irrigation system, as specified in the design of the particular plant.
3. The customer, or Enviroflow representative, will arrange for their drain layer to provide all requisite drainage in accordance with the relevant Authority requirements to the location of the Plant, and connect to the plant.
4. The customer, or Enviroflow representative, will arrange for their drain layer to ensure the correct Primary chamber invert level at the plant site. If risers are required they are at the Customers additional cost.
5. The customer or Enviroflow representative will ensure sufficient water is put into the tanks to stop them from floating.
6. The customer or Enviroflow representative will arrange for their electrician to connect from the plant control panel, to the properties electrical supply, in line with the ELECTRICAL CIRCUIT SPECIFICATIONS.
7. The ENVIROFLOW warranty is 5 years on the plant, and 12 months on electrical componentry. ENVIROFLOW guarantees to repair any part of the system requiring repair or replacement due to defective manufacture, provided that the company is given notice of the problem:
   a) Within 24 hours of the customer becoming aware of the problem
   b) Within 5 years from the date of installation except for defects in electrical components and pumps for which such period shall be 12 months instead of 5 years.

ENVIROFLOW gives no warranty on pumps, the pumps supplied with the system are covered by a warranty given to Enviroflow by the pump manufacturer, which is currently 12 months and if, a fault should occur with in this period Enviroflow will ensure the pump warranty given to Enviroflow will be passed onto the customer, except in situations where misuse or damage occurs to the pump in situations beyond Enviroflow control.

The customer will be liable for all reasonable costs incurred in any repair or modification of an Enviroflow Plant outside the above mentioned guarantees a subject to misuse or operation outside the parameters of the plant design.

The customer acknowledges receipt of ENVIROFLOW information and operations manual inclusive of installation instructions and Electrical Specifications details.

In accordance with the Territorial/ Regional Authorities requirements, the system has to be serviced every 6 months. Service costs for the first 12 months are included in the contract price. The customer agrees to a continuing service contract with Enviroflow servicing the plant every 6 months, at a normal cost of $200.00 + G.S.T. (variations due to location and system type and increased costs may occur). The service includes the inspection of pumps, Biofilter, irrigation system, checking of effluent clarity and chlorine content if required and providing a written report to the customer and Council. If the customer does not comply with the conditions of the maintenance criteria, then Enviroflow reserves the right to void all warranties. This may also effect the Territorial/ Regional Authority building and/or resource consent. Any repairs undertaken after the expiry of the warranties, Enviroflow will endeavour to notify the customer of the repairs, before the repairs are carried out. If Enviroflow Staff are unable to contact the customer by telephone a notification card will be left at the property for the client to contact the office. A Form will be required to be signed giving Enviroflow the authority to carry out the stated repairs and to charge the repairs. Any unpaid repair will incur collection expenses and interest .

The Enviroflow system remains the property of Enviroflow Waste Water Treatment Systems Ltd until paid for in full.

Any costs incurred by Enviroflow in the event of Enviroflow having to invoke repossession of its property will be incurred by the customer .

This guarantee commences on the date of purchase and is subject to the Consumer Guarantee Act 1993 as applicable

Where this Act does not apply, Enviroflow shall not be liable for any loss of profits or any consequential, indirect or special loss, damage or injury of any kind whatsoever suffered by the purchaser arising directly or indirectly from the product or any defect and the purchaser shall indemnify Enviroflow against any claim by any other person whatsoever in respect of any such loss, damage or injury. Nothing in this guarantee is intended to have the effect of contracting out of the provisions of the Consumers Guarantees Act 1993 except to the extent permitted by the Act and this guarantee is to be modified to the extent necessary to give effect to that intention.

CUSTOMER (name)_____ Signed_____ Date_____

ENVIROFLOW (representative)_____ Signed_____ Date_____

CUSTOMER COPY

Jenny Keene-5175

From: DEBBIE SIMMISS [SIMMISS@XTRA.CO.NZ]
Sent: Wednesday, 8 March 2006 4:16 p.m.
To: Jenny Keene-5175
Subject: Dan Mc Cormack property

Dear Jenny,

This is to confirm your request for the information stating the treatment capacityper day of the Enviroflow Waste Water Treatment System that will be installed at the property of
Mr Dan Mc Cormack in the Sounds.
The treatment capacity of the Enviroflow System is 2- 2500 litres per day.

Kind Regards

Debbie Simmiss