LETS GO!
ENVIRONMENTAL LTD

** Specialists in Wastewater Treatment Solutions **

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24th March 2004

TE PANGU BAY LODGE – Effluent Treatment Facility

1 Introduction

The Redevelopment at Te Pangu Bay is located off the Tory Channel. The Lodge provides comfortable accommodation in a secluded setting and comprises of 4 self contained units, and original homestead.

Wastewater generated from the existing buildings has originally been processed in individual septic tanks with standard disposal trenches.

Under the new proposal all wastewater will be processed in a central system in a location as shown in the attached site plan

2 Report Overview

This report covers the estimated wastewater volumes generated; suggested wastewater treatment plant and relocated land application area and method.

3 Flow Calculations

Inflow Source

- Domestic washing machines
- Dishwasher
- Standard electric hot water cylinders
- Dual flush toilets
- Standard showers

Based on AS/NZS 1547:2000 the calculated flow rate is as follows

Guests - Max Occupancy:	18 Persons
Flow Allowance:	160 litres/person/day (lpd)
	2,880 litres per day
Resident Staff/Family:	4 Persons
Flow Allowance:	160 litres/person/day (lpd)
	640 litres per day
Sub total	*3,520 litres per day*
Total Flow Allowance:	**3,520 litres per day**

*1 Flow allowance adjusted to take into consideration dual flush toilets, low flow shower heads and water conserving washing machines.

4 Design Guidelines

4.1 Design Criteria

The proposed accommodation facility accommodates up to 22 Persons over a short period of time in the summer months.

To handle the loadings from the various buildings that will vary between full and nothing for periods of time. The discharged effluent should meet the standards as set by the MDC and comply with AS/NZS 1547:2000.

Incorporate the existing satellite septic tanks into the overall wastewater treatment plant design.

4.2 Requirements

- Minimal operator input
- Reliable, odour free operation
- Environmentally friendly
- Sufficient storage to cover for power outages
- Low maintenance
- Minimal sludge pump outs
- Fully adjustable to meet the varying loads throughout the year
- Cost effective
- Proven technology
- Efficient and timely backup service

5 Proposed Wastewater Treatment System

5.1 System Details

5.1.1 General

The following details are indicative of the arrangement and placement of the treatment tanks. However the combined processing and reserve capacities will be maintained if not increased in the final design.

The proposed system is a STEMPHLOW BM3 Aerated Wastewater Treatment Plant (AWTP) designed as site-specific using propriety components. All the tanks are of a concrete construction and fitted out onsite.

It is envisaged that the overall system will be made up of 5 separate in-ground tanks (pluus 2 original tanks) encompassing a primary process, aeration process, pump out chamber and irrigation system.

The combined area that this system will take up is approximately 18 square metres with the tanks being 2.5 metres long and 1.4 metres wide. Note the system can easily be separated to fit into the contours of the gardens and land.

The System would consist of:

X2 single chamber primary treatment tanks (old tanks)	6,000 litres
X2 single chamber primary treatment tanks	7,800 litres
X2 aeration (secondary treatment tanks)	7,800 litres
X1 clarification/ pumpout tank	3,900 litres

Total tank volume:	25,500 litres
Reserve Capacity:	4,900 litres
Processing Volume:	20,600 litres

Effluent Retention Time: 5.8 days

5.1.2 Overview for the System

Primary Treatment System

Tank capacity: 13,800L

Primary Chamber (anaerobic/septic)

All domestic type wastewater enters this chamber. Anaerobic, and other oxidising bacteria breakdown the suspended solid material. The anaerobic digestion achieves a reduction in B.O.D. (Biochemical Oxygen Demand) of up to 40%. This chamber also receives highly activated aerated sludge from the Clarifying Chamber. The introduction of this highly aerated sludge stimulates the bacteria and enhances the level of solids digestion.

Second Primary Chamber (anaerobic/septic)

The wastewater is able to flow freely from the 1st Primary Chamber to this chamber. This allows for the adequate mixing of the partially treated wastewater. The mixing fully prepares the wastewater for the following processes. The waste passes through the proprietary filters before entering the Secondary Treatment Process. The proprietary filters serve two purposes; one being to retain 90% of the solids in primary tank and the other purpose is to protect the system from surge loadings.

Secondary Treatment System

Tank capacity: 7,800L

Aerobic Chamber (aeration/oxygenated)

The semi treated wastewater flows from the Primary Treatment tank to the Aeration Chamber. The oxygen for this chamber is supplied via bank of venturis operating off a single submersible pump within the tank. The venturis force oxygen into the wastewater stream. This achieves a high level of dissolved oxygen impregnation. The Aeration Chamber contains submerged GAIBE media. GAIBE is a porous natural mineral that attracts and enhances the bacterium Nitrobacter and Nitrosomonas, which replenish free oxygen. In addition to ammonia, many wastewaters contain other metal residues that are concentrated by GAIBE during the ion exchange processes. Enhanced aerobic bacterial action results in a very high level of aerobic treatment and a reduction in the accumulation of biological sludge.

Clarifying Chamber (settling and sludge return)

Tank capacity: 1,500L

The treated wastewater passes from the Aerobic Chamber to the Clarifying Chamber. Any minute particles of suspended solids settle to the bottom allowing only clean odourless water to pass to the following chamber. A dedicated venturi run from the aeration pump performs the function of sludge return back to the 1st Primary Tank.

Irrigation Chamber (pump-out)

Tank capacity: 2,400L

The fully treated wastewater flows into the Irrigation Chamber from the clarification chamber. Here a simple energy efficient pump automatically pumps out to irrigate gardens, trees or landscaped area via a network of Netafim RAAM dripper line. A water meter and inline filter is fitted into the discharge line to protect the dripper line emitters.

Tertiary Treatment System

A UV sterilization unit is fitted between clarification and the pump-out chambers. The UV reduces the faecal coliform count to a level where discharged liquid can be can be applied to the land using a surface/ covered dripper line system.

5.1.3 *System Monitoring and Control*

The system comes complete with the most advanced alarm monitoring system available within the industry.

This electrical control unit is a state of the art, tamper-proof, microprocessor controlled, multi-functional, low voltage, safe, fully programmable, expandable system.

This system can be set for "Stay" and "Away" mode to suit periods of dormancy and intermittent use that occur in holiday homes.

If a malfunction occurs, an alarm will sound along with a visual alarm (light) will come on. Once this is switched to "Mute" if the malfunction has not been fixed within 24hrs, the alarm will sound once again.

This technology makes the system almost impervious to flooding and offers very real protection for the environment.

5.1.4 *Safety Features*

A minimum of 24 hours of reserve capacity is built into the design of the system as a contingency to cover any unforeseen events that may impair the operation of the main controller.

Some scenarios accounted for are:

- In the event of a total site power failure, the system can hold an additional 4,900 litres before over-flowing. Any effluent over flowing from the system will occur at the end of the process (pumpout chamber) therefore no raw effluent will end up on the ground
- In the event of Wastewater Treatment Plant having a power outage, an alarm (visual + audio + remote) would sound indicating that a problem has developed.
- The AWTP will be fed from 2 separate supplies – one main supply for the pumps etc and the other separate control supply for the Microprocessor Controller.
- The pump out chamber is fitted with a high water level alarm to give ample warning that the system is running into difficulties.
- In the event of that any one of the pumps blows a fuse an alarm (visual + audio) would sound indicating that a problem has developed without bringing the whole system to a stand still.

5.1.5 *Visual Impact*

All tanks will be installed in-ground.

A fibreglass electrical box (500mmL x 300mmW x 400mmH) will sit on one of the tanks .

Various maintenance access points will be finished at ground level to enable trouble free access in the future.

5.2 *Effluent Quality*

This site specific STEMPHLOW – BM3 Aerated Wastewater Treatment Plant will be capable of exceeding the recommended minimum effluent quality standard set for subsurface dripper line irrigation in AS/NZS 1547:2000;

BOD5	< 20 milligrams per litre
Suspended Solids	< 30 milligrams per litre
Faecal Coliform	< 1000 cfu per 100 millilitres

With the UV sterilization unit it is highly likely that the discharged effluent will be below 10cfu/100mls. Lochmara Lodge in the Marlborough Sounds is currently performing below this level.

5.3 *Land Application System (STEMPHLOW system)*

5.3.1 *Area*

The proposed area has had the gorse cut back and enhancing the regeneration of native bush on a slope between 25 and 30 degrees. The ground cover is a thin layer (approx 100mm) of organic type soil.

The layer below the topsoil falls into the category 5 soil type being a silty clay loam of moderate structure – Table 4.2A4 AS/NZS 1547:2000.

Recommended Design Irrigation Rate (DIR) for irrigation systems and Category 5 soils is: 20 mm/week.

Note: 1mm is equivalent to 1 litre of water covering 1 square metre per day

Area required for the Land Application Area (irrigation area)

Max Loading	24,640 L/week
DIR	20 mm/week
Area required	**1,200 m^2**

This area could well be situated on the slopes on the eastern side of the property.

All irrigation dripper line laid on the surface should be pegged and covered with the decomposing layer of organic material or soil.

The dripper line will be RAAM 17D 2.3LPH 0.6M (similar to a garden hose with built in emitters) and connected to a low density alkathene supply line from the irrigation pump via a auto sequencing valve.

Te Pangu Lodge - Site

Looking SE onto the proposed land application area

5.3.2 *General Description*

A Network of covered dripper lines in the areas identified on the following attached map will form the Land Application System (irrigation system).

The Land Application System will use the "Dose Loading" method for application in the soil.

5.3.3 *Design Irrigation Rate per dose*

Total estimated daily flow	3,520	litres / day
Number of Doses	15	doses / day
Discharge per dose	233	litres / dose - approx
Estimated Duration	10	min/dose
Design Flow	1400	litres/hour
Irrigation Rate (RAAM 17D)	3.5	litres/hour/metre
Irrigation Zone Size	400	linear metres of RAAM dripper line
Total RAAM Required	1200	metres
Number of Zones required	3	zones
Land Application Area	400	square metres/zone
DIR per dose	0.58	mm / dose

5.3.4 *Materials Schedule*

Discharge Pump	Lowara scuba series (or similar)
Auto Indexing Head	3 Zone outlets
Water Meter	25mm SOCAM PC25
Inline Filter	Long Body Araag, 32mm
Supply Line	25mm LDPE
Main	25mm LDPE
Submain	16mm Lateral
Laterals	NETAFIM RAAM 17D, 2.3 LPH, 0.6M (2,400 metres)
Lateral Spacing	0.6 – 1.0m
Sampling Point	15mm takeoff with isolating valve

5.4 *Quality Management*

As per the manufacturers policy, this AWTP is to be covered by a Maintenance Contract that the property owner will enter into to maintain the system warranty. In accordance with this, **Wastewater Treatment Services Ltd** undertakes to service the system on a six monthly Programmed Maintenance basis – following which a copy of the service report will be sent to the Marlborough District Council, and the owner if requested. The Maintenance Contract remains in force until the system is decommissioned or removed and the payments of the fee during this time must be made by the owner to ensure continuity of the Programmed Maintenance.

5.4.1 *Daily Maintenance*

Record discharge water meter reading — Responsibility: Owners

5.4.2 *Monthly Maintenance*

Clean the discharge filter from the system — Responsibility: Owners

5.4.3 *Routine Service*

This service occurs on average 2 times a year — Responsibility: LGE technician

Typical maintenance service includes (but not limited to):

- Pump testing
- Clean all filters
- Test alarms and alarm triggers
- Check Land Application System for correct operation
- Assess AWTP health
- Check in with resident owners
- View AWTP discharge readings for the previous months operation
- Sludge assessment
- Clean UV sterilisation unit

5.4.4 *Warranty*

The AS/NZS 1547:2000 standard require tank and components (excluding electrical) covered free of defects for 15 years and electrical for 2 years back to base full cover warrantee against defects.

5.4.5 *Desludging*

The primary treatment tanks may require desludging in about 6 years from commissioning. This is consistent with other commercial operating in the area.

5.5 *Power Consumption*

Maximum load:	Aeration pump:	600 W single phase
	Irrigation pump:	Approx 1.0 kW single phase

I would welcome your call to discuss any of the points mentioned above and any other issues related to this project with the goal of specifying and installing a system with no surprises and one that meets the standards set.

Yours sincerely

Mardy Audier

Wastewater Treatment Specialist

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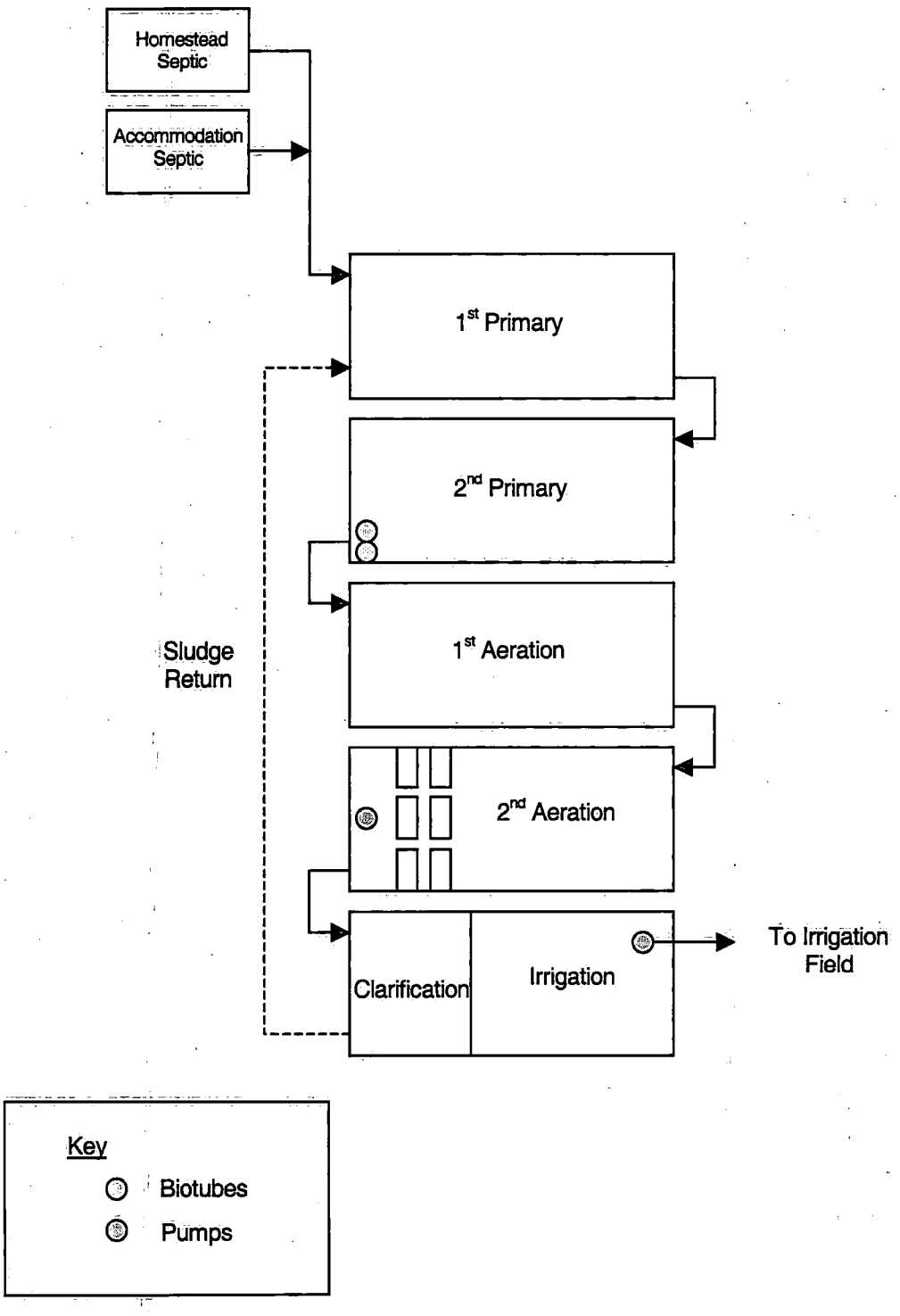
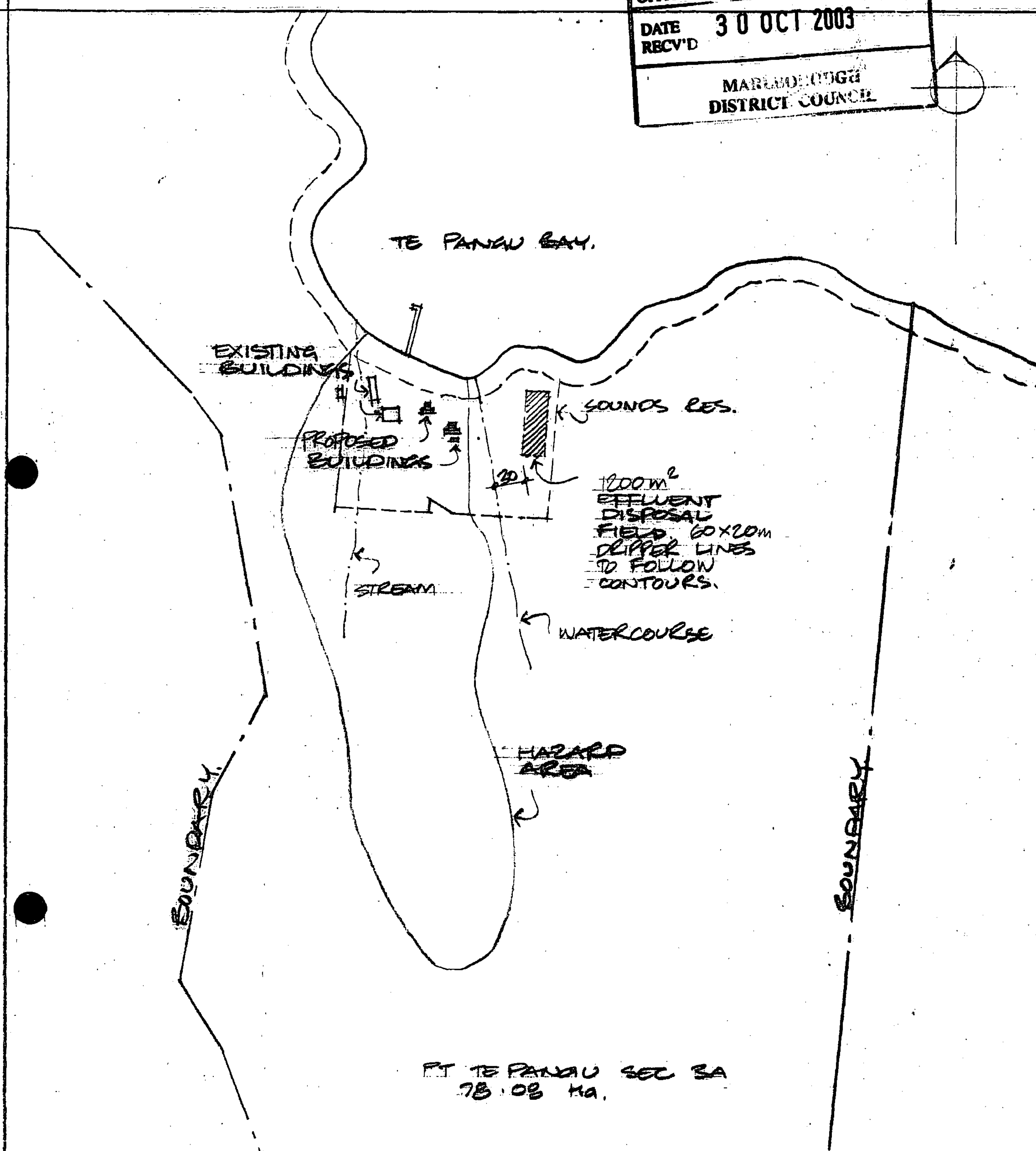
Te Pangu Lodge

Proposed AWTS - Flow diagram



FILE No.:
OFFICER:
DATE RECV'D 30 OCT 2003
MARLBOROUGH DISTRICT COUNCIL



REV A 28.10.03 – DISCHARGE FIELD ALTERED.

1:4801 SITE PLAN ~ TO BE READ INCONJUNCTION WITH 1:10000 SITE PLAN W1 & 1:500 SITE PLAN W2

TE PANGU BAY REDEVELOPMENT 9.10.03
TORY CHANNEL MARLBOROUGH SOUNDS A

WAN EDWARDS DESIGN PRIVATE BAG 424 PICTON 5799755

NOTE - SEWERAGE TREATMENT TO BE "STEMPHLOW DM3" AERATED WASTE WATER TREATMENT PLANT INSTALLED BY "LETS GO ENTERPRISES"

NORTH

SOUNDS FORESHORE RESERVE

JETTY

TE PANGU BAY

OLD WOOLSHED

ACCOMMODATION UNITS

WORKSHOP

NEW OVERFLOW FROM EXISTING SEPTIC TANKS TO TREATMENT PLANT

690 FALL

SEPTIC TANK

5 CABINS & ABLUTION BLOCK TO BE DEMOLISHED

NEW SEWERAGE TREATMENT PLANT

PROPOSED NEW ACCOMMODATION UNIT 2

EXISTING SEPTIC TANK REPLACED WITH NEW SEWERAGE TREATMENT PLANT.

SEPTIC TANK

HOMESTEAD

ABLUTION BLOCK

PROPOSED NEW ACCOMODATION UNIT 1

STREAM

DISCHARGE FIELD APPROX 35 m MAX ABOVE TREATMENT PLANT.

TREATED EFFLUENT PUMPED TO DISCHARGE FIELD

SLOPE 25-30°

1200 m² DISCHARGE FIELD 60×20 DRIPPER LINES TO FOLLOW CONTOURS.

WATERCOURSE

30 m minimum

1:500 SITE PLAN

5 0 10 20 30 M

REV. A 28.10.03 - DISCHARGE FIELD SIZE & LOCATION ADDED

TE PANGU BAY

REDEVELOPMENT — TORY CHANNEL — MARLBOROUGH SOUNDS

WAL EDWARDS DESIGN — PRIVATE BAG 424 — PICTON — 03 573 7755

W2 A

AUG '03

File Ref: U031112

Case Officer: Angus Laird

ISO 9002
Form Ref CI 421

23 October 2003

S88 RMA 1991
More info letter

Edwards, Warren Stanley
Private Bag 424
PICTON 7372

Dear Mr Edwards,

Receipt of application for resource consent - U031112 - Edwards, Warren Stanley - Te Pangu Bay Tory Channel

The Council acknowledges receipt of the following application(s) for resource consent:

> Effluent disposal system for accommodation units at Te Pangu Lodge (FR 135 Pt Sec 3A Te Pangu BLK X Arapawa SD)

I have been appointed as your case officer. I have assessed your application for completeness and have determined that further information is required to enable the application to be further processed. The information required is outlined as follows-

a) I note in the application that full design details are to be supplied from Lets Go Enterprises (Nelson). As these details are required for the consent application to be assessed it is not possible to start processing the application with out these.

b) Also the site plan Council has does not show the location, size or area of the proposed discharge field. This should include distances to the nearest water body and would be helpful to include an indication of topography.

c) While I appreciate that these system do (when operated and maintained appropriately) produce waste water of a high 'quality' it is still very much a potential contaminant and as such an AEE needs to demonstrate that the environmental effect from the system will be no more than minor. It may be easier for 'Lets Go Enterprises' to carry this out on your behalf.

Please check that the summary of your application as outlined above. Please notify me if any details are incorrect.

Once you have provided the information I will continue to process your application and determine whether or not -

- It needs to be publicly notified; and
- It contains sufficient information to enable it to be fully assessed and processed.

If your application is to be publicly notified, you will be contacted as soon as possible. If public notification is necessary, the Resource Management Act requires this to be done within 10 working days of an application being "accepted" for processing.

Applicants will be charged actual and reasonable costs for receiving and processing an application as described on the attached fees and charges sheet.

Fees are calculated on the basis of actual cost recovery, and vary for each application. The fee calculated is non-refundable, irrespective of the Council's decision on your application. If your application is withdrawn prior to a decision being issued, you will be liable for the costs incurred up to the time of the withdrawal.

Please do not hesitate to contact me if you have any questions or concerns regarding the above matters.

Yours faithfully

Angus Laird
RESOURCE MANAGEMENT OFFICER

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The Effluent Treatment System

Stemphlow D.M. 3.
Aerated Waste Water
Treatment Plant.

Full design details will be supplied by

Lets Go Enterprises
Nelson.

Assessment of Environmental Effects.

Neighbourhood - not applicable, nearest neighbour in a different bay.

Visual Effect - Nil. The proposed system will drip clean water at ground level.

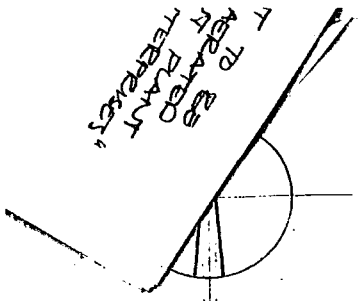
Hazards - no hazardous substances will be discharged.

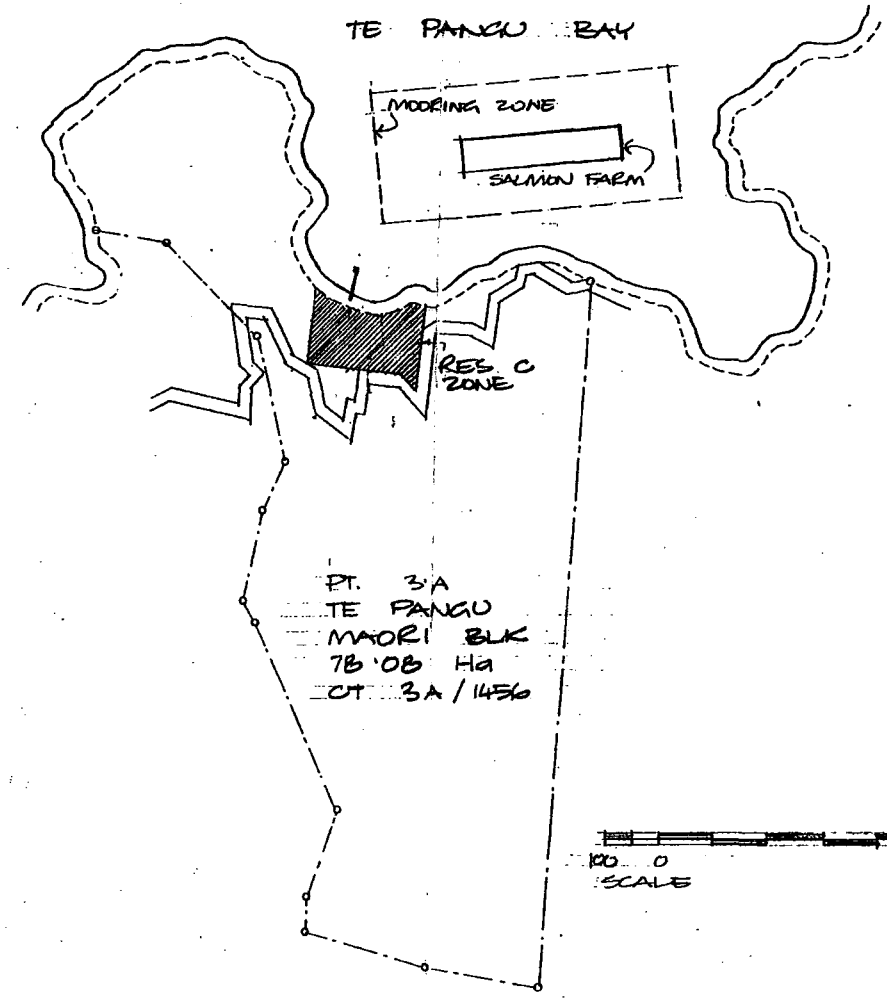
Contaminants - Nil

Physical Effects - positive only.

SC031001

TORY CHANNEL





1:10000 SITE PLAN

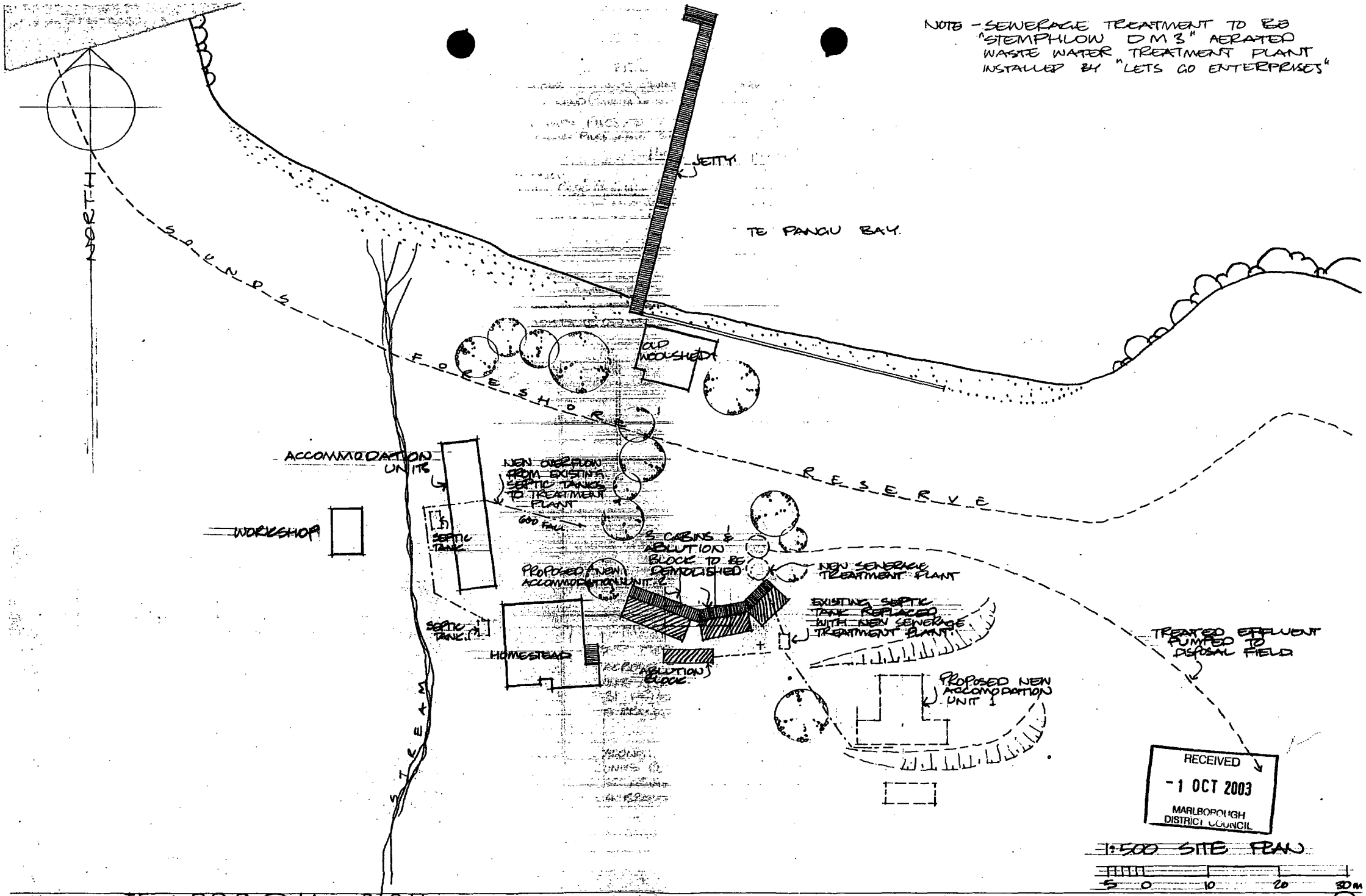
MARLBOROUGH DISTRICT COUNCIL
Approved subject to all work complying with the N.Z. Building Code.

..... Date .....

RECEIVED
-1 OCT 2003
MARLBOROUGH DISTRICT COUNCIL

TE PANGU BAY REDEVELOPMENT TORY CHANNEL MARLBOROUGH SOUNDS

W1



TE PANGU BAY

REDEVELOPMENT — TORY CHANNEL — MARLBOROUGH SOUNDS

W2

WILL EDWARDS DESIGN — PRIVATE BAG 4911 PICTON — 05 5209755 — AUG '03