CAMERON GIBSON & WELLS LTD

CONSULTING CIVIL & STRUCTURAL ENGINEERS

9407-3

10 September 1999

Sue McConnochie
Marlborough District Council
PO Box 443
BLENHEIM

Dear Ms McConnochie

U991093 Request for Further Information : R Heywood : Crail Bay

As requested more detailed system design information for the management of wastewater flows derived from the above residence is provided herewith.

The following report outlines the design of a suitable system to be assessed by the Marlborough District Council for compliance with existing drainage requirements in order to obtain the relevant permit. Minor amendments to our plan 9407, Sheet 1 have been made, and noted on the drawing.

The system involves a single–chambered septic tank with flows screened through an effluent filter prior to an Evapo-Transpiration Seepage (ETS) system.

1.0 Septic Tank

Wastewater flows shall drain to a single–chamber Hydroclear polyethylene septic tank (watertight) with a volume of 5000 L.

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Pre-treatment occurs in the septic tank, providing adequate retention of design flows to allow for a significant reduction in contaminant concentrations. The effluent quality is further enhanced by use of a Biotube effluent filter positioned at the chamber outlet. Effluent then gravity drains to the distribution box.

The level of solids accumulated in the tank should be checked annually and serviced as required. The pump-out service interval is anticipated to be between 8 and 12 years at design flows. The Biotube effluent filter typically requires maintenance only as often as the pump-out of tank contents is required.

2.0 Distribution Box

The effluent is transported to the distribution box by way of Ø110 mm MDPE pipe.

3.0 Disposal Field

Evapo-Transpiration Soakage (ETS) technology shall be utilised to release flows to the rootzone area of the soil for further treatment by way of plant uptake. It is expected that the soakage component of the treatment will be minor. The areal loading rate is conservatively set at 20 mm/day. Refer to Appendix One for the design basis of the system.

There are to be two main trenches, each 10 m long and 1500 mm wide. The total wastewater flow is to be treated by one of these trenches, alternating between trenches six monthly by way of the distribution box. A reserve field area is also available if required in the future.

The effluent is transported from the distribution box to the disposal trenches by way of ∅80 mm MDPE pipe. The pipe protrudes into each trench and discharges to the inside of a length of Novaflo. Refer to the details provided on Sheet 1, Appendix Two.

Each trench is to be shallow and back-filled with graded material (details shown on Sheet 1). Suitable evapo-transpiration plantings (some examples are given in Appendix One) will be utilised to take up the large majority of the wastewater, and thereby prevent it reaching the groundwater.

The treatment surface of each trench is level to allow for an even distribution over this area. The Novaflo in each trench is vented in order to promote aerobic treatment processes.

Trickle-Feed disposal trenches are prone to creeping failure over time. This can be countered by providing appropriate rest periods for each trench. The overall effectiveness of the system may deteriorate over time, and at some stage in the future, it may prove necessary to rest the main trenches (utilising the reserve field) in order to rejuvenate the system.

4.0 Conclusion

A wastewater management system has been designed to serve the Heywood residence. The system is appropriate to the site, however, eventually the system effectiveness will decline and the reserve field may have to be employed in order to rest the main trenches.

A main concern regarding the land application of wastewater on this site is the proximity of the nearby stream. The issue of conserving water quality has been addressed by including an ETS system, ensuring the plants will take up the large majority of the wastewater.

A site visit determined the groundwater level in this area is not within 600 mm of the surface, therefore, due to the ETS, there will be no contamination of the groundwater.

An Assessment of Environmental Effects has previously been provided.

If you have any queries regarding the system outlined in this report, please contact the writer.

Yours faithfully

Richard Wells
Cameron Gibson & Wells Ltd

Appendix One

Design basis for the proposed wastewater treatment and disposal system.

Design Flow

No. of bedrooms	=	2
Design population	=	4 (Gunn, 1994)
Per capital design flow	=	140 L /cap/day (very conservative as this figure is for households with standard facilities, including automatic washing machine)
Design flow, Q	=	560 L /day

Pre-treatment

Septic tank	=	Hydroclear Polyethylene
Capacity	=	5000L
Effluent Filter at outlet	=	Biotube FTO444

Distribution

Transport to Distribution Box	=	110mm MDPE pipe
Transport to Trenches	=	80mm MDPE pipe

Application Rate

Least Conservative LTAR	=	20 mm/day
Most Conservative LTAR	=	10 mm/day

Disposal

Evapo-Transpiration (ETS)

Treatment area	=	560 ÷ 10
	=	56 m^2
Number of trenches	=	2
Width of each trench	=	1.5 m
Length of each trench	=	10 m
Distance between trenches	=	3 m centres

Layout

Evapo-Transpiration (ETS)

The layout of tranches is shown in Sheet 1 of Appendix Two. There are two main trenches and two reserve trenches. The length of each trench is 10 m, the width is 1.5 m.

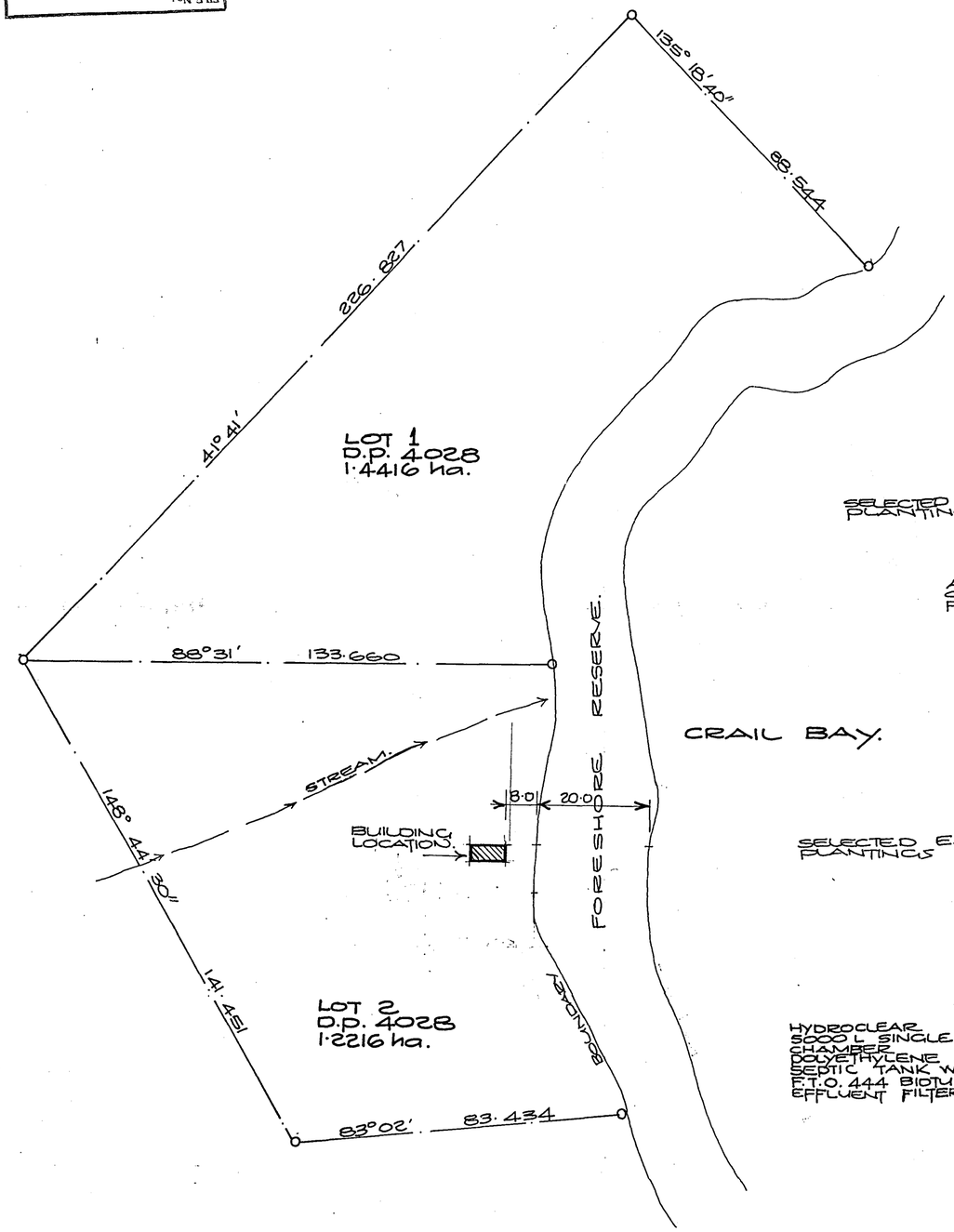
Examples of Suitable Evapo-Transpiration Grasses (Gunn, 1994)

Paspalum (will tolerate extreme wet and dry)
Poa species
Crested Dogs Tail (Cynosurus cristatus)
Yorkshire Fog (if fairly regularly wet)
Canary Reed Grass (Phalarus Arundinacea)

Appendix Two Drawings

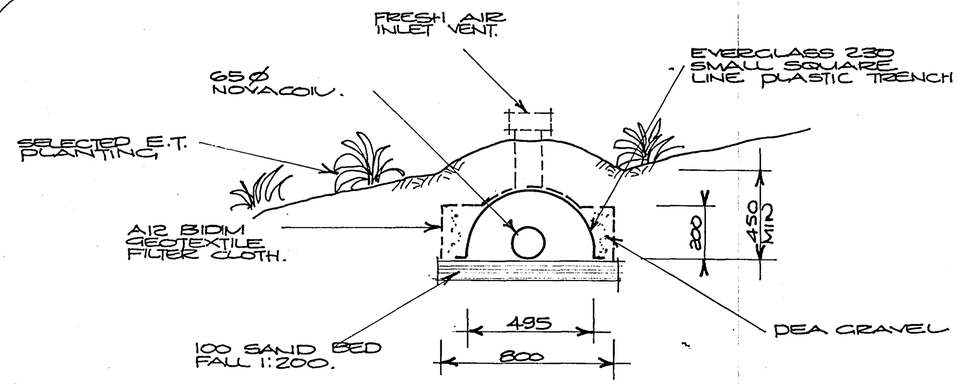
Sheet 1, 9407; Site Plan Amendment A 13/9

991093

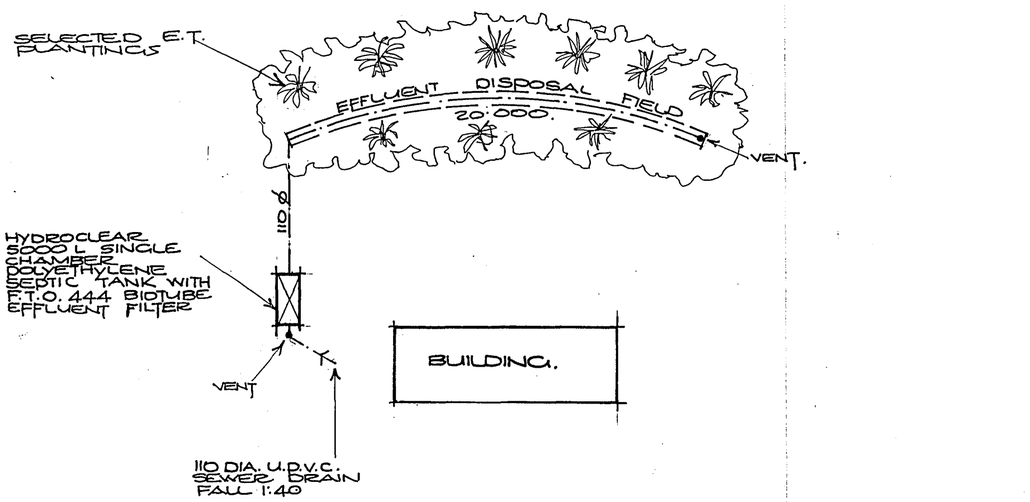


CRAIL BAY.

SITE PLAN 1:1000.



CROSS SECTION.
EFFLUENT DISPOSAL TRENCH



DRAINAGE PLAN. (1:20).

NOTES.

(1) Verify all dimensions on site
(2) Do not scale from drawing

ACENZ

No.	Amendment	Date

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REGISTERED CONSULTING ENGINEERS PH 548-8259 NELSON

N

Design.	R.W
Drawn.	A.D.
Checked.	
Approved.	
Date.	MAY 99.

job title:

RELOCATED BACH AT CRAIL BAY FOR MR. R.J. HEYWOOD.

drawing title:

SITE PLAN

scale:	
1:1000	
JOB No 9407	SHEET 1

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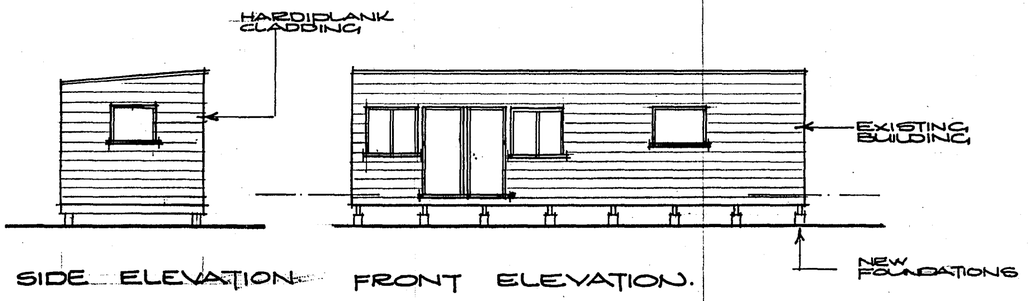
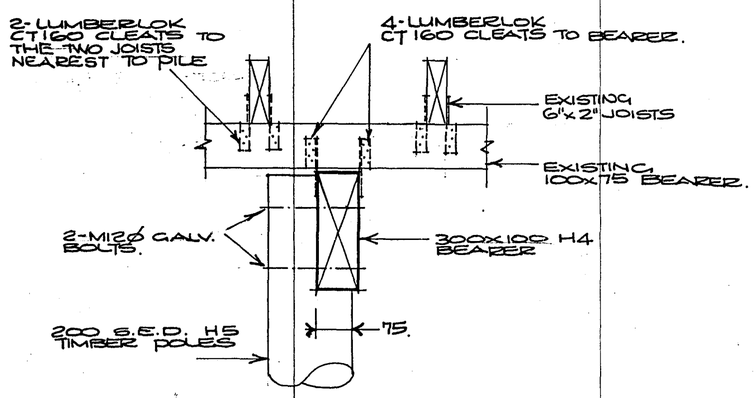
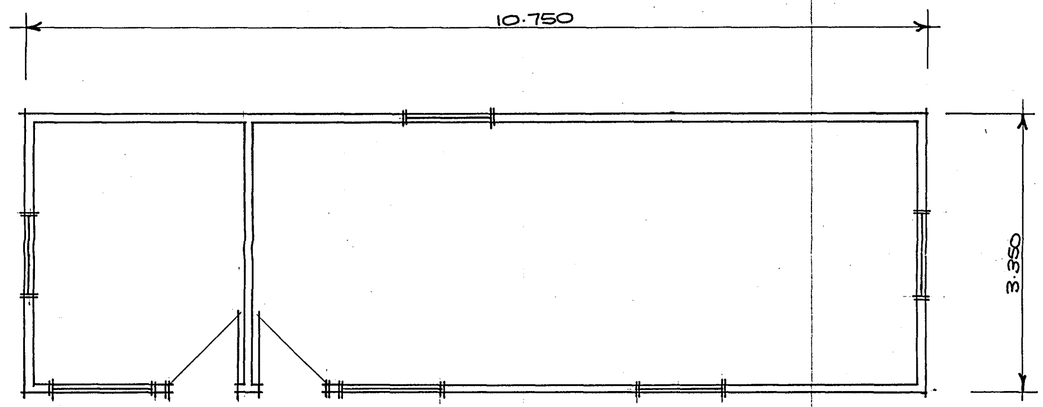


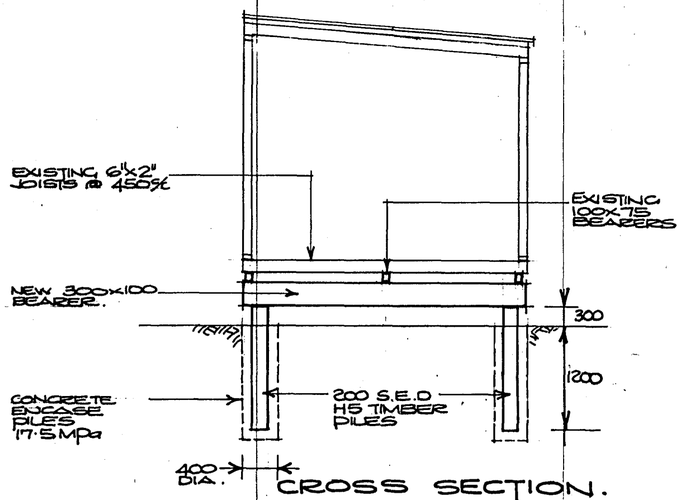
SIDE ELEVATION FRONT ELEVATION.



6 Kn BEARER/PILE CONNECTION.



FLOOR PLAN.



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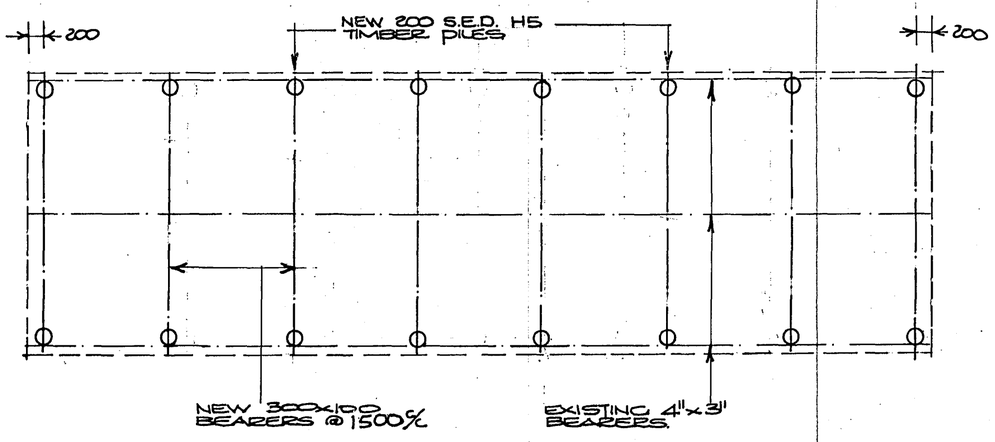

FOUNDATION PLAN.

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FLOOR PLAN
FOUNDATION PLAN
CROSS SECTION
ELEVATIONS.

scale: 1:50; 100

JOB No 9407

SHEET 2.

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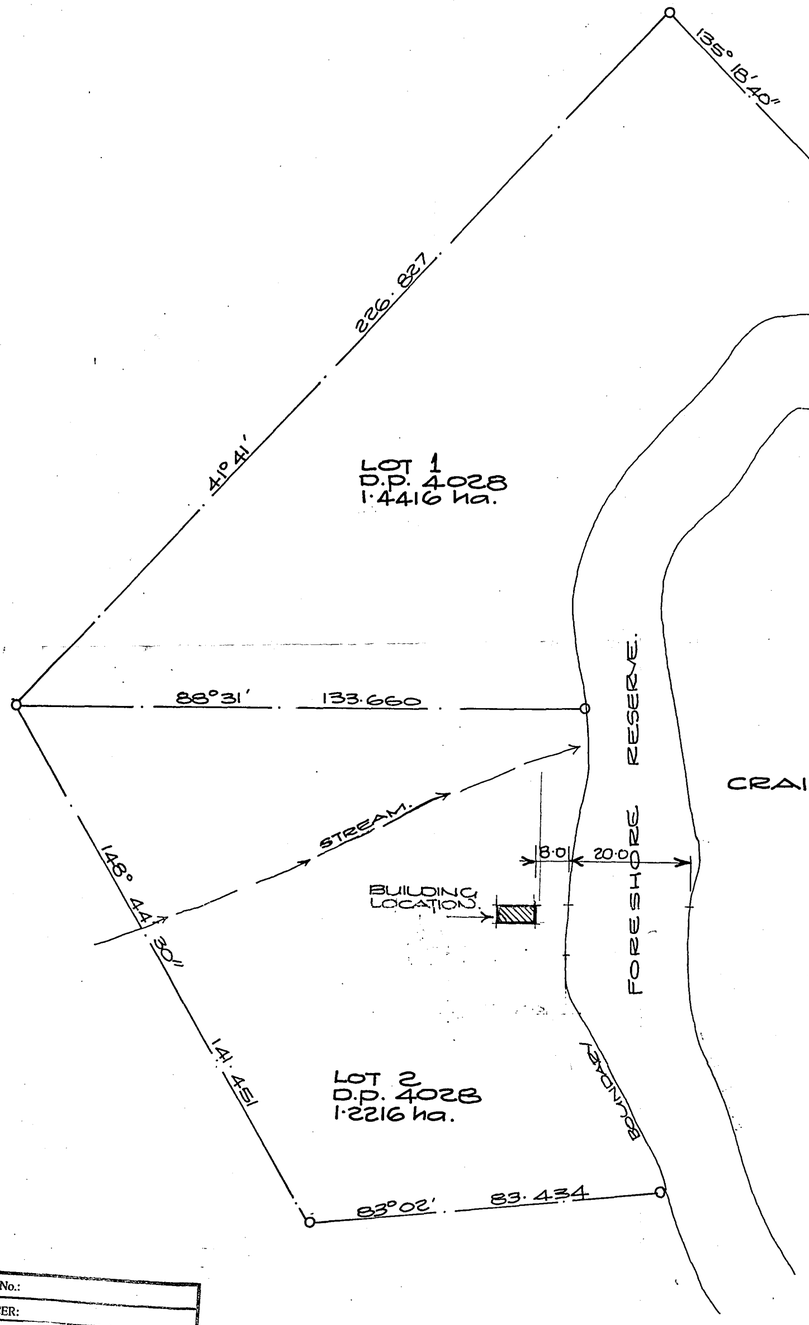
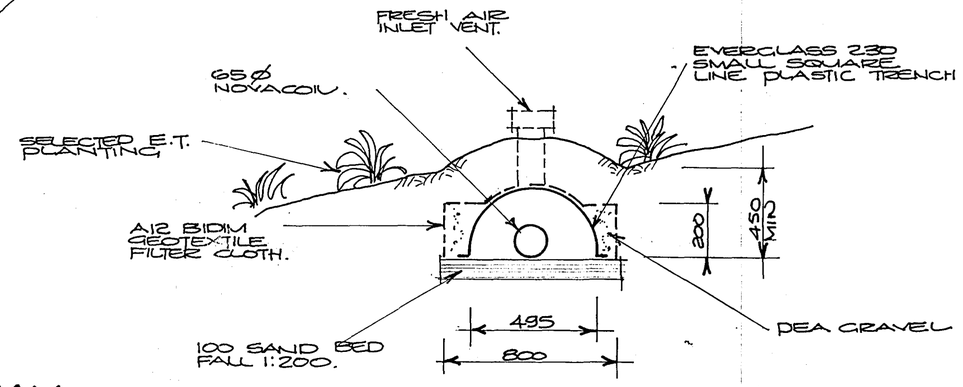


CRAIL BAY.

SITE PLAN 1:1000.



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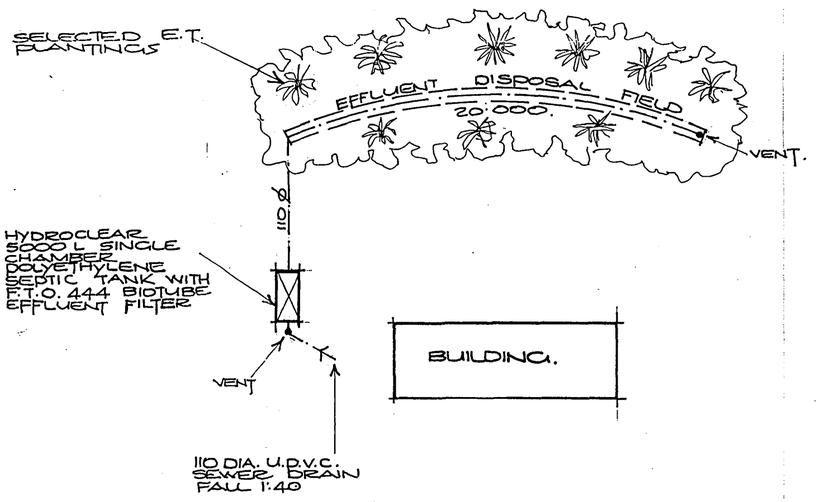
EFFLUENT DISPOSAL TRENCH



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SITE PLAN

scale: 1:1000

JOB Nº 9407

SHEET 1

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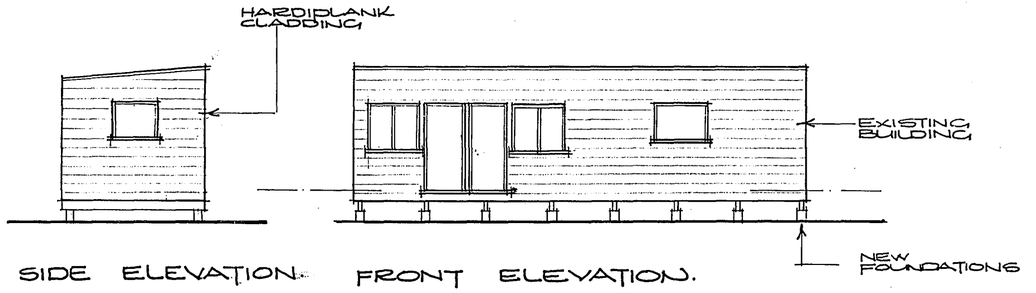
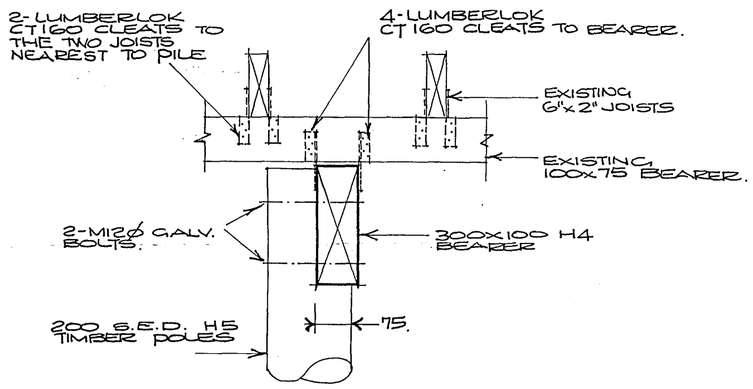


SIDE ELEVATION. FRONT ELEVATION.



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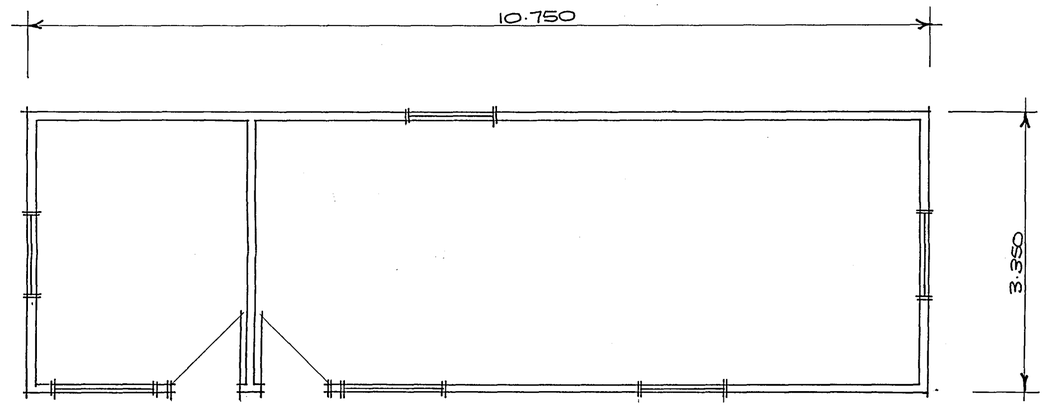

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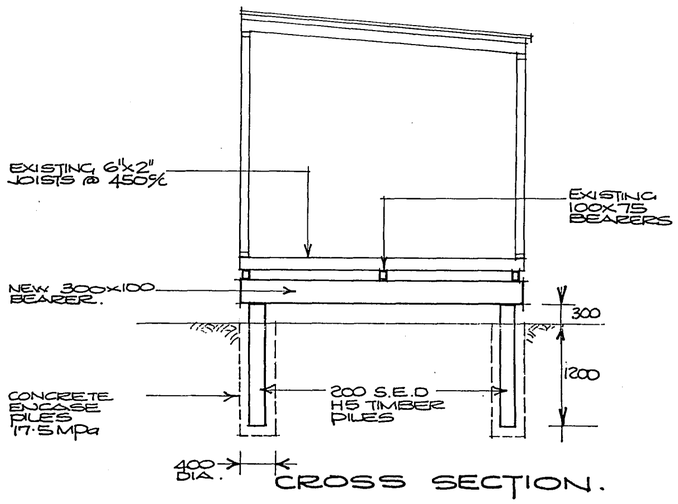

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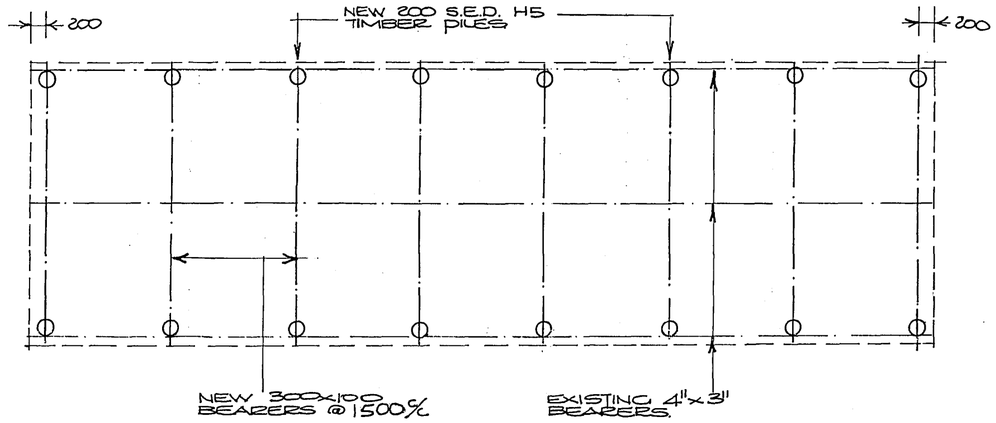

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JOB NO 9407	SHEET 2.