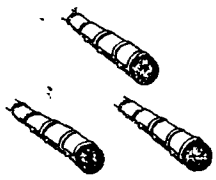

KERRIGAN ENGINEERS LTD

ENGINEERING REPORT

COPY

For Mr & Mrs Wearing

Site Evaluation for Onsite Waste Water Disposal
at Ronga Road, Rai Valley

December 2008 - **FINAL**

By Graham Kerrigan

Job Number: 3007

Engineering Report
Mr & Mrs Wearing
On Site Waste Water Disposal
at Ronga Road,
Rai Valley, Marlborough

CONTENTS

A SYNOPSIS

SCOPE OF INVESTIGATION

The site was inspected on 2 December 2008. The site evaluation generally followed the recommendations of NZS/AS 1547:2000.

Appended to this report is the site and soil evaluation sheets based on the forms of NZS/AS1547:2000.

SUMMARY/ CONCLUSIONS

We consider that there would be no adverse effects on the environment as a result of installing a septic tank and gravity disposal system so long as the considerations /recommendations outlined in this report are followed.

RECOMMENDATIONS

Based on the foregoing report we make the following recommendations with respect to the installation of an on site waste disposal system at this property:

- Install a 4000 litre septic tank with a zabel or similar outlet filter.
- The most ideal disposal bed location is shown on the attached plan – Job no 3007 Sht 1of 1
- The discharge to the disposal bed should be carried out using gravity system.
- The discharge system shall be a conventional bed per the MDC code of practice and NZS/AS 1547 design recommendations.
- The trenches should be cut into the topsoil and overlain to form a mounded bed to ensure runoff does not pond.
- Only registered tradesmen familiar with the construction of an irrigation land application systems and working to the National Plumbing and Drainage code NZS/AS 3500 should carry out all plumbing and drainage works associated with this treatment and land application system.
- Upslope of the bed should include a cut off drain that discharges around the perimeter of the bed.
- Proper drainage control should be maintained throughout the service life of the disposal system to ensure that no runoff enter the bed area.

B REPORT

INTRODUCTION

The purpose of this report is to satisfy Marlborough District Councils Resource Management plan requirements to discharge domestic wastewater.

The following report evaluates the options for wastewater treatment and on site disposal at a property of Lot 3 DP8021.

The property owners are constructing a new three bedroom dwelling with a study at this location. The proposed septic waste system will include primary treatment via a septic tank and will be discharged to land via a gravity disposal system.

SITE DESCRIPTION

The site is located in the Ronga Valley. The base of the valley is approximately 500m wide at the site location. The site is on the eastern side of the road and is approximately 200-300m of relatively flat land prior to the sloping foothills of the valley.

The site is pastural farmland. The proposed house location is in an open pastural field with significant land space to accommodate a discharge drainage field and reserve drainage field.

Because of the significant land available and there being no proximity to bore water collection or waterway, we consider the simplest discharge system is appropriate. There is minor ground slop to the west and this maybe appropriate for gravity discharge to a conventional bed system.

SITE INVESTIGATION

The site was investigated on the 2 December 2008.

The soil profiles determined are approximately 200mm of topsoil overlaying clayey loams overlaying clay bound colluvial (refer to the appendix for the soil & soil assessment). Although the ground is moist there is no evidence of a water table in the proposed bed location.

Based on this investigation the site soils in which the wastes will be discharged is considered category 3 with a daily loading rate of 12mm/day per AS/NZS 1547:2000.

WASTE WATER TREATMENT SYSTEM

The proposed house is a three bedroom and study dwelling.

The estimated daily usage per person is 180 ltr/day as defined by the Marlborough District Council guidelines and NZS/AS 1547:2000. The design occupancy is 8 people.

Based on the daily usage per person (180 ltr/day) the design discharge volume per day will be 1440 litres.

The site is considered suitable for on site waste disposal of primary treated effluent. There are no concerns at the site with respect to proximity to natural water ways, bore water collection, existing septic disposal systems or high ground water table. Hence additional treatment beyond standard septic tank settlement and anaerobic treatment is not warranted.

A 4000 litre septic tank with a zabel or similar outlet filter consistent with Marlborough District Council Code of Practice is required.

The site soils are considered category 3 with a daily loading rate of 12mm/day per AS/NZS 1547:2000. The required bed area is therefore approximately 120m^2. We consider that the bed location adjacent the western boundary would suffice (as shown on the attached plan).

This location is slightly downslop of the proposed residence. So long as requisite fall can be achieved between the house and the septic tank and field, we consider that a gravity disposal system will suffice.

We recommend that only registered tradesmen familiar with the construction of an irrigation land application systems and working to the National Plumbing and Drainage code NZS/AS 3500 should carry out all plumbing and drainage works associated with this treatment and land application system.

SITE STABILITY

The site for the disposal bed is flat and should not pose concerns of slope stability resulting from the discharge of septic wastes.

ASSESSMENT OF ENVIRONMENTAL EFFECTS

The recommendations presented in this report are based on the requirements of NZS/AS 1547:2000. So long as the design and construction are carried out to the recommendations and considerations of this report, and NZS/AS 1547:2000, and the MDC Guidelines for onsite waste disposal, we consider there will only be acceptable environmental effects on this site, or the adjoining properties, or the waterways of the area, and the natural or physical resources of the area.

We consider that there are no site conditions that would diminish the natural break down of the wastes in such as fashion as to cause concern for the environment.

LIMITATION OF REPORT

This report has been prepared solely for the benefit for the Mr & Mrs Wearing with respect to our understanding of their request. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

This report is based on our interpretation of our visual examination and limited soil tests only and does not preclude the possibility of differing soil properties and/or other relevant physical features being present between the test locations or hidden from view. Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards, and should not be construed as legal opinions. Where opinions or judgements are to be relied on they should be independently verified with appropriate legal advice.

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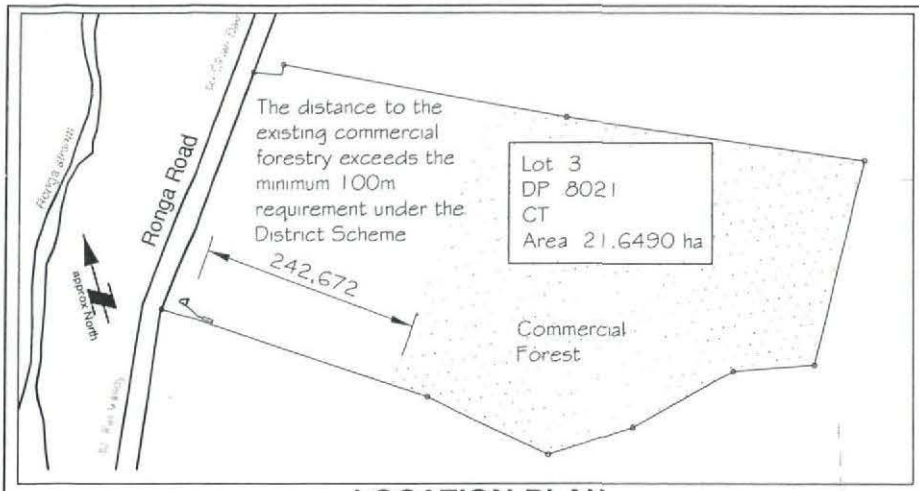
APPENDICIES

Appendix 1

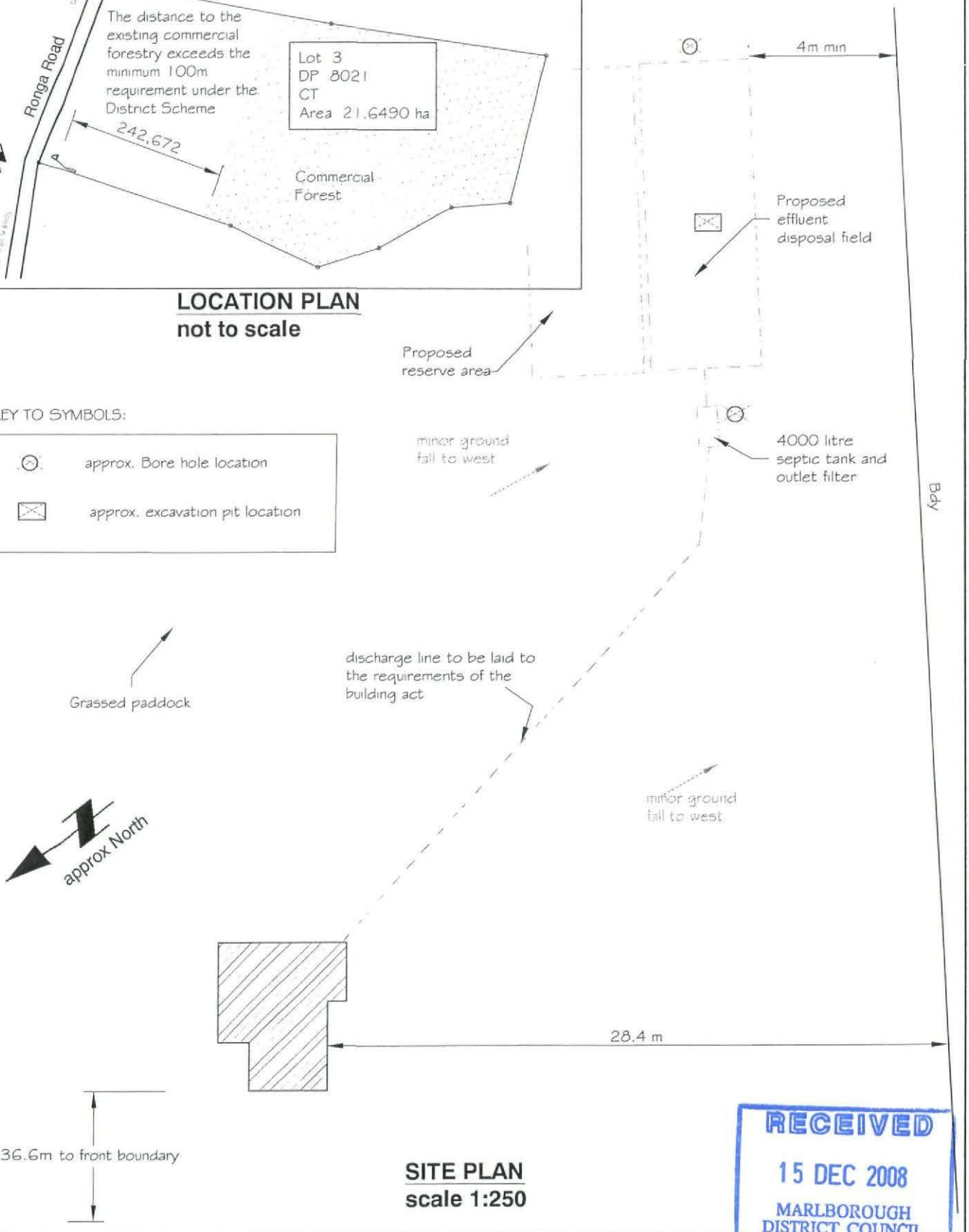
Site plan



LOCATION PLAN
not to scale

KEY TO SYMBOLS:

- approx. Bore hole location
- approx. excavation pit location



SITE PLAN
scale 1:250

RECEIVED
15 DEC 2008
MARLBOROUGH DISTRICT COUNCIL

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Project Title:
WEARING RESIDENCE - RONGA ROAD RAI VALLEY

Sheet Title:
ON SITE WASTE DISPOSAL - RESOURCE CONSENT

DRN:	APPROVED:
ect	
DES:	DATE:
gck	Nov 08
SCALE:	
as shown	

Dwg. No. 3007
Sht. 1 OF 1
rev.

Appendix 2

Site & Soil Evaluation sheets

Job No 3007

SITE AND SOIL EVALUATION REPORT

1.0 SITE INFORMATION (deck-top evaluation)

1.1 Location details

Locality	:	Rai Valley
Owner	:	Mr & Mrs Wearing
Address	:	Ronga Road, Rai Valley
Phone No	:	
Lot No	:	Lot 3 DP8021
Survey plan details	:	
Regional Authority	:	Marlborough District Council
Site plan details	:	Refer site plan

1.2 Geology of site from geological map: Sheet 14

1.3 Climate :

Annual rainfall	:	na
Annual evaporation	:	na

General comment (rainfall intensities, seasonal variation etc)

1.4 Intended water supply source: Possibly ore located greater than 30m from discharge bed

1.5 Local experience with existing onsite systems :

Registered with Marlborough District Council for appraisal of waste disposal systems in this area.

1.6 Preliminary evaluation of solutions which could be feasible

Septic tank and gravity discharge field

1.0 SITE EVALUATOR(S)

1.1 **Name** (principal evaluator) : Graham Kerrigan
Designation : Chartered Professional Engineer
Company : Kerrigan Engineers Limited
Address : 95b Maxwell Road, Blenheim
Phone : 03 5784085
Fax : 03 5793478

2.0 ONSITE EVALUATION

2.1 **Work undertaken**
Details : Site inspection, viewed excavations
Date : 2 December 2008
Weather (on day & preceding week): Dry

2.2 **Topography**

Slope : Generally flat
Ground cover : Grass rural
Drainage patterns : No significant patterns
Site plan details attached : Yes
Waterways : None in proximity
Stands of trees/shrubs : None relevant
Well, bores : Outside 30m
Embankment :
Buildings : None relevant
Other : Nil
Site history (land use) : Pastural

2.3 **Site exposure**

Site aspect : Generally flat site with slight fall to western boundary
Pre-dominant wind direction : Northerly
Presence of shelter belts : Southern boundary
Presence of topographical features : None relevant

2.4 **Environmental concerns** (eg: native plants intolerant of phosphorus load, high water table, swamp, waters etc)
N/A

2.5 **Site stability**

Is expert assessment necessary? No

2.6 **Drainage controls**
Depth of seasonal water-table : None found
Need for cut-off drains/diversion banks : None necessary
Need for surface water collector/cut-off drains: None necessary

2.7 Availability of reserve/setbank areas (show details on sketch plan)

Reserve area available for extensions: Ample room available on site
% of design area :
Setback distance :

2.8 Photographs attached :

3.0 SOIL INVESTIGATION

3.1 Soil profile determination

Method : Viewed exploration pit
Other : Viewed area stripped of topsoil

3.2 Reporting (attach detailed soil/report as appropriate, see soil profile information and data sheet, figure 4.1A1)

Layer	Lower depth mm	Moisture Condition	Colour (moist)	Field Texture	Coarse Fragments %volume	Structure	Sample Taken (Y/N)	Permeability	Other assessment
1	200	Dry	Dark brown	Topsoil	Nil	highly	N	Permeable	
2	500	Dry	Light Brown	Clayey loam	Nil	Highly	Y	Semi permeable	
3	500	Moist	Light Brown	Clayey Gravel	70%	Highly	Y	Minor Permeability	

3.3 Estimated soil category (refer to table 4.1.1 and clause 4.1.4.1)

Summary : DLR = Category 3

Soil layer	1	2	3	4	5	6	7
Soil category	2	4-5	3				

Remarks:

3.4 Recommended DLR

refer to clause 4.1.4.2 : Category 3 : DLR =12

Reasons for DLR recommendations :

Propose to discharge waste into topsoil loam material to utilize soils higher biological and the evapotranspiration potential of the exposed site

4.0 GENERAL COMMENTS

Gravity loading via splitter box. There is ample area for reserve field

Appendix 3

Professional Opinion

KERRIGAN ENGINEERS LTD

OPINION AS TO LAND STABILITY

I **GRAHAM CHRISTOPHER KERRIGAN** hereby confirm that:

I am experienced in the field of soils engineering and more particularly land and foundation stability and am formally recognized by the Marlborough District Council. I am familiar with and understand the purpose of the Marlborough District Council's geo-technical reporting standards. This professional opinion is furnished to the Marlborough District Council regarding slope stability of the property for Mr & Mrs Wearing at Ronga Road, Rai Valley with respect to the proposal to discharge septic waste on site.

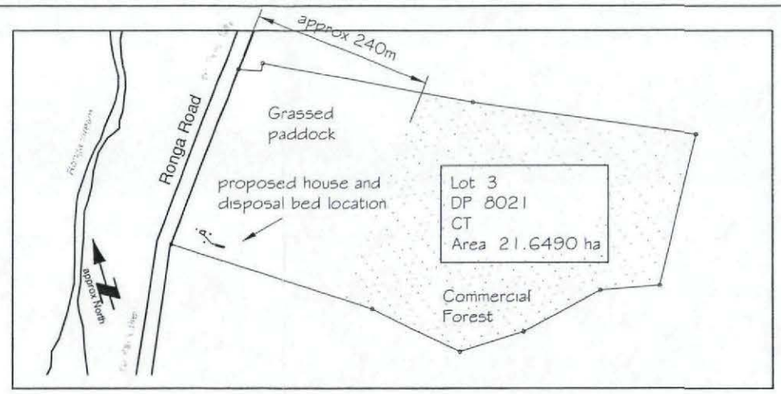
The following professional opinion is based on the assumption that the data obtained from the reported investigation (engineering report titled "Site Evaluation for Onsite Waste Water Treatment at Ronga Road, Rai Valley dated December 2008) is representative of the disposal area under consideration.

In my professional opinion having examined the site it is reasonable for Council to assume that the data referred to above is representative of the area under consideration.

In my professional opinion, and having regard to the specifics of the site which I have investigated to the extent that acceptable engineering practices require, and with the plans and specifications being made in accordance with acceptable engineering principles and practices and following the recommendations set out in the referenced report, a construction, in accordance with such plans and specifications, will meet proper engineering standards and should not cause slope instability to the disposal area.

G C Kerrigan
MIPENZ(Civil & Structural)CPEng IntPE(NZ)

December 2008

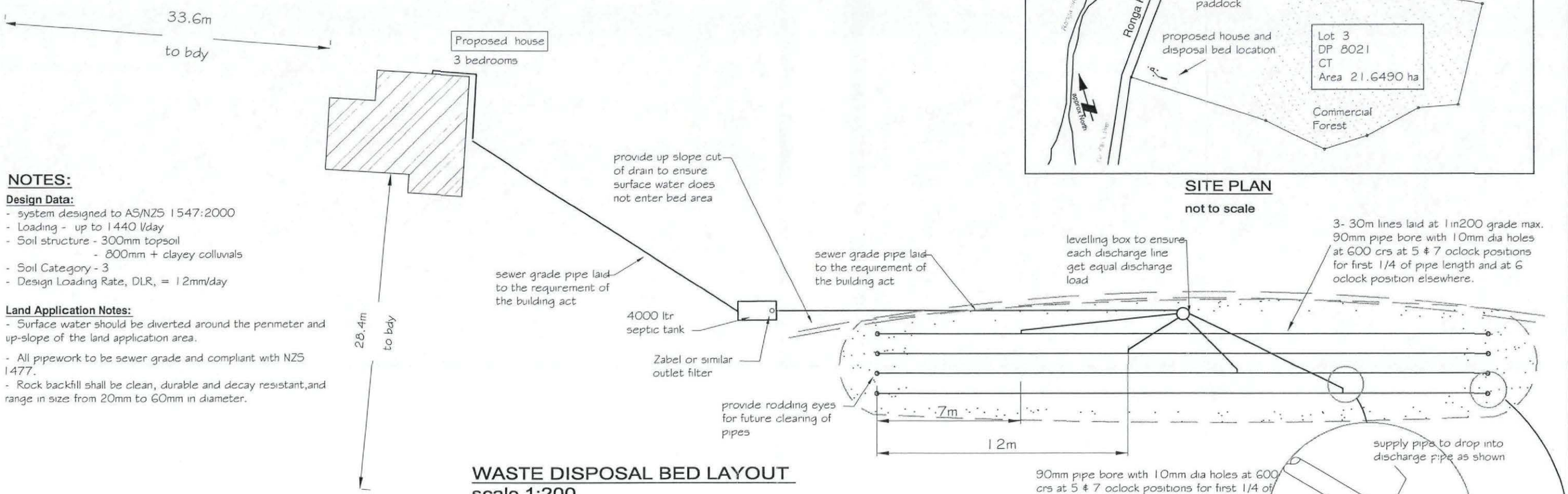


SITE PLAN
not to scale

NOTES:

Design Data:
- system designed to AS/NZS 1547:2000
- Loading - up to 1440 l/day
- Soil structure - 300mm topsoil
  - 800mm + clayey colluvials
- Soil Category - 3
- Design Loading Rate, DLR, = 12mm/day

Land Application Notes:
- Surface water should be diverted around the perimeter and up-slope of the land application area.
- All pipework to be sewer grade and compliant with NZS 1477.
- Rock backfill shall be clean, durable and decay resistant,and range in size from 20mm to 60mm in diameter.



WASTE DISPOSAL BED LAYOUT
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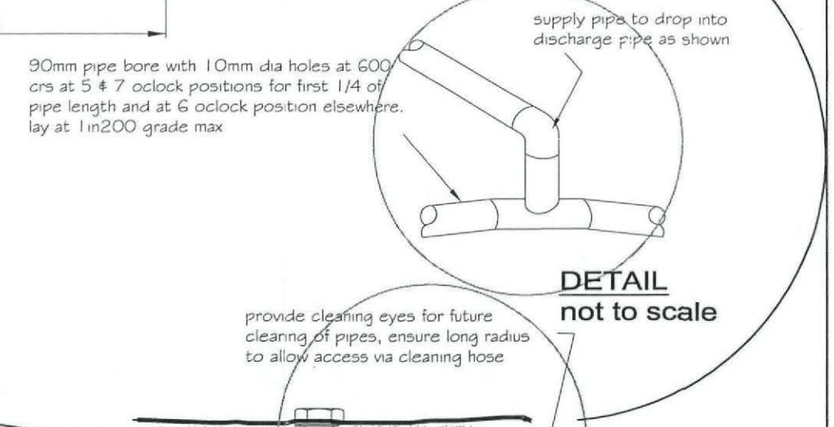

DETAIL
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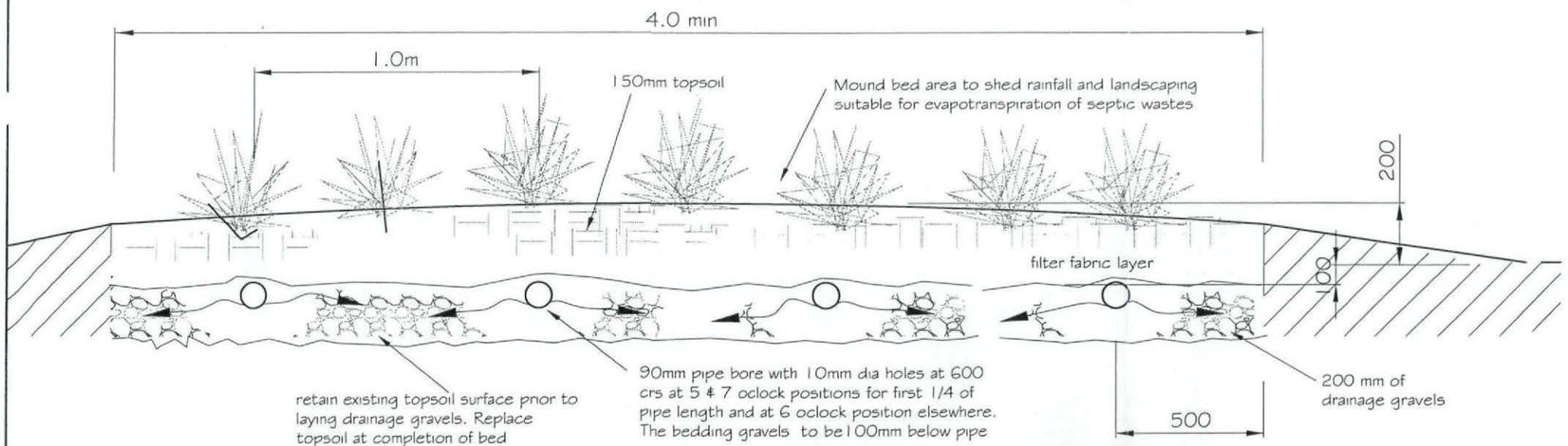

CONVENTIONAL BED SECTION
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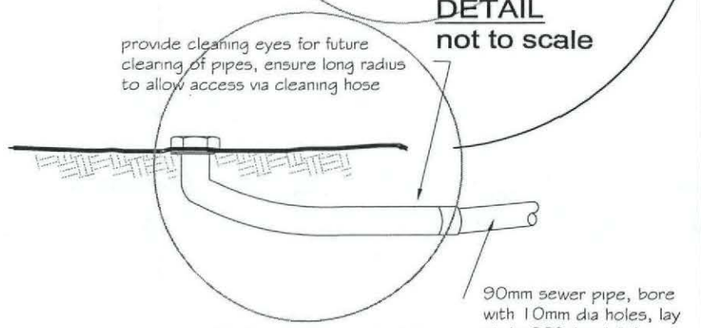

CLEANING EYE
scale 1:20

Rev.	Revision Note.	Appr.	Date.

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Project Title:
WEARING RESIDENCE - RONGA ROAD RAI VALLEY

Sheet Title:
ON SITE WASTE DISPOSAL - GRAVITY DISCHARGE TO CONVENTIONAL BED

DRN:	APPROVE:
ECT	
DES:	DATE:
GCK	Dec 2008
SCALE:	
AS SHOWN	

Dwg. No. 3007
Sht. 1
rev.