



PO Box 57
31 George Street
Blenheim, New Zealand

Tel +64 (3) 577 7487
Fax +64 (3) 577 7485

Email design@smartassociates.co.nz
www.smartassociates.co.nz

Engineering Report

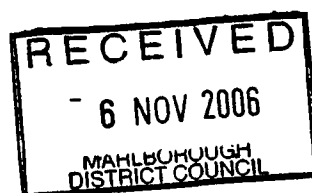
Proposed Residential Dwelling

**759 Kenepuru Road,
Ohingaroa Bay,
Mahau Sound**

for

Fowler Homes Ltd

Dave Dravitzki
Engineering Geologist
Smart Associates Ltd
November 2006



Project F06-1876

Table of Contents

- 1. Introduction**
- 2. Geotechnical Assessment**
- 3. Wastewater Treatment and Disposal**
- 4. Recommendation**
- 5. Limitations**
- 6. References**

Appendices

- A Site Plan and Drainage Field Specification**
- B Geotechnical Report**
- C Wastewater Design Sheet**
- D Ecogent System Specifications**

1. Introduction

- 1.1 Fowler Homes are proposing to construct a new dwelling for B & D Neiman at their property at 759 Kenepuru Road, Ohingaroa Bay, Mahau Sound. It is understood that the proposed dwelling will be a permanent residence with three bedrooms, an office, and a gym.
- 1.2 The property has a westerly aspect with a flat to gentle slope ($<5^\circ$) and is vegetated in lawn.
- 1.3 The property legal description is Lot 1 DP 12278, and the land area is 0.24 ha.
- 1.4 The previously existing dwelling at the site has been removed. An existing shed has been retained. An existing septic tank is located in the southern part of the site, as indicated on the site plan presented in Appendix A of this report
- 1.5 The report was commissioned in response to Item 1 of the Marlborough District Council letter dated 5 October 2005, reference BC061944, which states:

"The original dwelling had two bedrooms. This project has three bedrooms plus a gym and office which have the potential to be used as bedrooms, now or in the future. The existing septic tank and effluent field will need to be assessed by a Chartered Professional Engineer to ensure the present system will cope. It is noted that a resource consent is required for the discharge of domestic wastewater due to additional loading."

- 1.6 Item 2 of the MDC letter states:

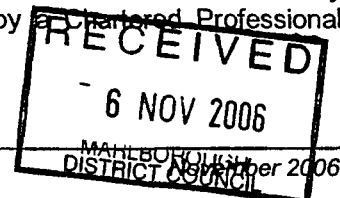
"The site is within the Natural Hazards overlay identified in the Marlborough Sounds. Specific geo-technical evaluation is required by a Chartered Professional Engineer to assess land stability and foundation design."

A geotechnical report addressing the above is provided in Appendix B of this report, the results of which are summarised in Section 2 below.

- 1.7 The site assessment was carried out on 26th October 2006 by Mr Dave Dravitzki of this office.

2. Geotechnical Assessment

- 2.1 The geotechnical assessment (refer Appendix B) generally considers the site to be stable. No evidence of active or historic slope instability was identified at the site at the time investigation reported herein.
- 2.2 The borehole and test data indicate that the subsoils underlying the location of the building area generally comprises gravelly sand alluvial deposits of a loose to medium dense consistency.
- 2.3 It is considered that the site is suitable for the proposed development at the site and for residential building construction on conventional shallow foundations designed and constructed in accordance with NZS 3604:1999 with a minimum founding depth of 0.5m below cleared ground level.
- 2.4 Structural items outside the scope of NZS 3604:1999 for the construction of any proposed dwelling on these sites must be designed by a Chartered Professional Engineer.



3. Wastewater Treatment and Disposal

- 3.1 The location of the existing septic tank at the site is shown on the appended site plan. It is understood from Council records provided to us that the existing wastewater system was installed c. 2001 by GR Lawrence and comprised a primary treatment septic tank and two disposal trenches. The approximate extent of the existing system is shown on the appended site plan.
- 3.2 Preliminary calculations indicated that the existing c. 30m of dispersal trench would not be sufficient to accommodate the increased design loading resulting from the proposed new dwelling at the site, even if maximum loading rates and soil conditions are considered. Furthermore, the proximity of the foreshore and the limited land available due to the size of the proposed building indicated that secondary treatment combined with dose pumped disposal trenches would be required.
- 3.3 The site investigation identified two suitable areas at the site for use as a land application area, located in the western and eastern parts of the site.
- 3.4 Three test pits were dug in the western part of the site (closest to the foreshore) and their locations are shown on the site plan. Based on the soil assessment carried out, an average drainage category of 1 has been adopted for this part of the site. The representative soil properties are:

W 1

(m)	Horizon or Layer and boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture condition	
0.05	A	Topsoil	Dark brown	Loamy humus	2%	Very Loose	Very Soft	Strong	Moist	2
0.3	B1	Alluvial	Brown	Gravelly sand	25%	Loose	Stiff	Massive	Moist	1
0.6	B2	Alluvial	Light brown	Gravelly sand	40%	Moderately dense	Very Stiff	Massive	Moist	1

W 2

(m)	Horizon or Layer and boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture condition	
0.05	A	Topsoil	Dark brown	Loamy humus	2%	Very Loose	Very Soft	Strong	Moist	2
0.3	B1	Alluvial	Brown	Gravelly sand	25%	Loose	Stiff	Massive	Moist	1
0.6	B2	Alluvial	Light brown	Gravelly sand	40%	Moderately dense	Very Stiff	Massive	Moist	1

W 3

(m)	Horizon or Layer and boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture condition	
0.05	A	Topsoil	Dark brown	Loamy humus	2%	Very Loose	Very Soft	Strong	Moist	2
0.3	B1	Alluvial	Brown	Gravelly sand	25%	Loose	Stiff	Massive	Moist	1
0.6	B2	Alluvial	Light brown	Gravelly sand	40%	Moderately dense	Very Stiff	Massive	Moist	1

- 3.5 Two test pits were dug in the eastern part of the site (closest to Kenepuru Road) and their locations are shown on the site plan. Based on the soil assessment carried out, an average drainage category of 3 has been adopted for this part of the site. The representative soil properties are:

W 4

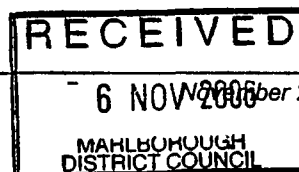
(m)	Horizon or Layer and boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture condition	
0.05	A	Topsoil	Dark brown	Loamy humus	2%	Very Loose	Very Soft	Strong	Moist	2
0.3	B1	Alluvial	Brown	Gravelly sand	25%	Loose	Stiff	Massive	Moist	1
0.6	B2	Alluvial	Yellow-brown	Silty clay loam	5%	Loose	Stiff	Weak	Moist	3

W 5

(m)	Horizon or Layer and boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture condition	
0.05	A	Topsoil	Dark brown	Loamy humus	2%	Very Loose	Very Soft	Strong	Moist	2
0.3	B1	Alluvial	Brown	Gravelly sand	25%	Loose	Stiff	Massive	Moist	1
0.6	B2	Alluvial	Yellow-brown	Silty clay loam	5%	Loose	Stiff	Weak	Moist	3

- 3.6 The foregoing soil property logs indicate that the western part of the site is underlain solely by alluvial gravels and sands, and that the eastern part of the site contains a silty clay loam layer at depth. *
- 3.7 It is considered that while the western part of the site is suitable as a land application area, it is underlain solely by category 1 soils and as such would require to have special design and distribution techniques to help achieve even distribution over the full design surface, as specified by Note 10 of Table 4.2A1 of AS/NZS 1547:2000.
- 3.8 It is understood that it is a costly and difficult-to-source exercise in the Marlborough region to meet the additional requirements for category 1 soils.
- 3.9 A more pragmatic approach would be to utilise the eastern part of the site as the land application area, which would have the benefit of moving the LAA further away from the foreshore.
- 3.10 In accordance with Plan Change 7 Rule 27.2.4.5.5 an assessment of the best practical option has determined that secondary treatment and dose pumped trench wastewater disposal in the eastern part of the site is the most practical option for this property, when soil drainage characteristics and proximity to the foreshore are taken into account.
- 3.11 An Ecogent secondary treatment system and dose pumped trench effluent disposal system is recommended.

A secondary treatment system involves aerobic biological processing and settling or filtering of effluent received from a primary unit. A secondary treatment system such as the system proposed will normally produce average effluent quality equal to or better than:



BOD after 5 days (average)	< 20 g/m ³
Suspended solids (average)	< 30 g/m ³

An Ecogent system specification is attached (Appendix D).

- 3.12 GR Lawrence (agent for Ecogent) advise that the existing septic tank at the site is able to be upgraded to the Ecogent secondary treatment system. It is recommended that the existing dispersal trenches at the site be disconnected and abandoned.
- 3.13 The completed dwelling proposed for the site will have 3 bedrooms, an office, and a gym. For design purposes it has been assumed that the office and gym may potentially be used as bedrooms in the future and therefore a permanent occupancy of 10 people (as per MDC Guidelines for new on-site wastewater management systems) has been used to calculate the design flow of 1800 litres/day. A design allowance of 180 litres/person/day has been used with this allowance being in accordance with Appendix 4.2D of AS/NZS 1547:2000. The dwelling will utilise a rainwater supply water source augmented by a stream supply. A minimum wastewater storage capacity of 4,500 litres is required.
- 3.14 The total length of 600mm wide trench required is 100m (refer wastewater design sheets Appendix C). It is recommended that this length of trench be constructed as 4 trenches of 25m, split into two blocks of 2 trenches that are alternatively dosed via a sequencing valve. A typical effluent trench detail is provided on drawing 002.
- 3.15 Prior to the proposed system becoming operational the system designer must inspect and certify that the system has been installed according to the design. This certification must then be forwarded to Council.
- 3.16 The Marlborough District Council requires that the owner of any advanced wastewater treatment system enters into and retains a maintenance contract with the supplier of the system, or with a recognised maintenance contractor, for maintenance to be carried out at yearly intervals. Records of the maintenance should be forwarded to the Council as soon as practicable following the completion of the inspection or, in the case of remedial works being required, on completion of those remedial works.
- 3.17 Vehicular access to the system for desludging will be available.

4. Recommendation

An Ecogent Secondary Treatment System combined with dose pumped trench effluent disposal is recommended for this site. Installation is to be in accordance with requirements and recommendations of NZS1547:2000.

5. Limitations

This report is valid for two years from the date of issue and covers the design of a wastewater treatment and disposal system for Fowler Homes at 759 Kenepuru Road, Ohingaroa Bay, Mahau Sound. Any other areas are outside the scope of this report.

The reliance by other parties on the information or opinions in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

6. References

1. NZS 1547:2000 On-site Domestic Wastewater Management
2. NZS 1546.3:1998 On-site Domestic wastewater Treatment Units (Part1: Septic Tanks).

Report prepared by:

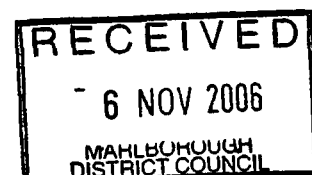


Dave Dravitzki, Engineering Geologist
3 November 2006

Report reviewed by:



Jan Dimmendaal, Chartered Engineer

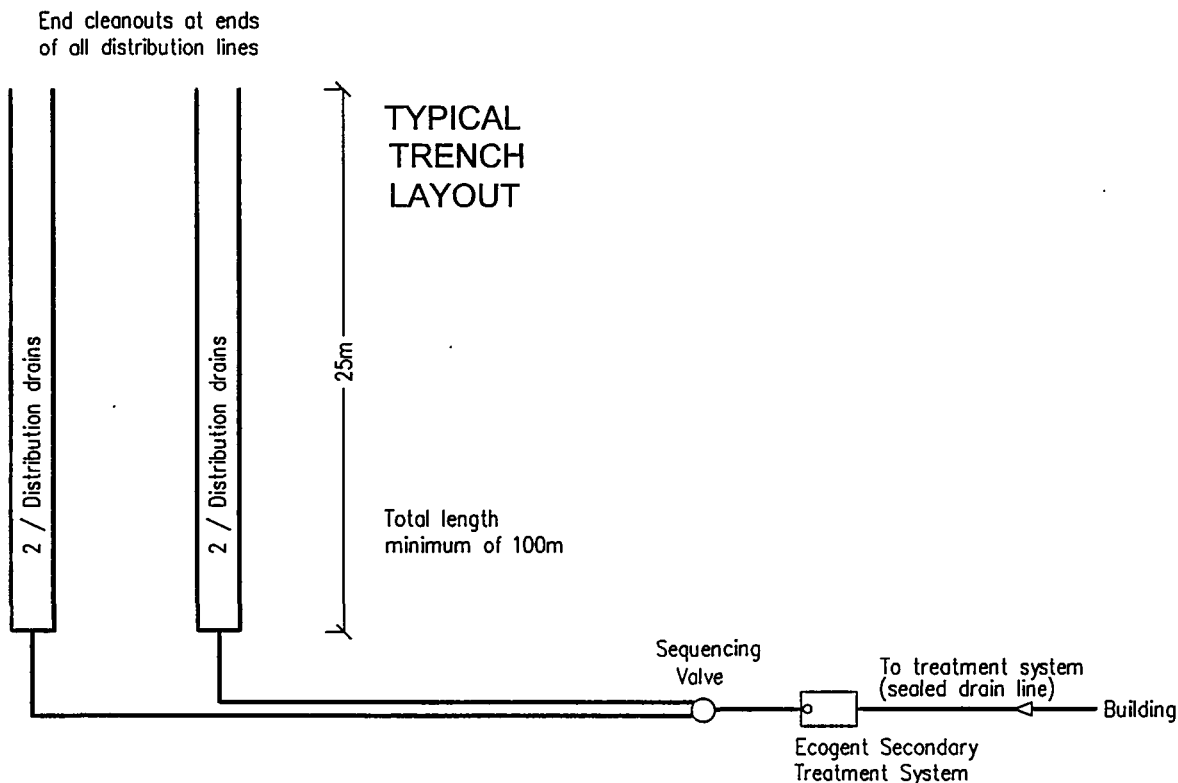


Appendix A

Site Plan and Drainage Field Specification

NOTES

Do not scale from this drawing. Only figured dimensions are to be taken from this drawing. The contractor must verify all dimensions on site before commencing any ordering of materials, work or shop drawings. The contractor must report any discrepancies to the Engineer before commencing work. If this drawing exceeds the quantities taken in any way, the Engineer is to be informed before the work is started. This drawing is Copyright and must not be reproduced without the consent of Smart Associates Ltd. The Engineer is to be given at least 2 weeks notice of the beginning of construction work, and at least 48 hours notice of critical items (eg concrete pour, profiling etc). The Engineer reserves the right to alter the design in light of site circumstances including previously unforeseen design issues.



SYSTEM USE & MAINTENANCE

1. The household sewage should not contain anything other than human waste and toilet paper, and food material such as may go down a kitchen sink drain. Garbage grinders are not recommended, although they need not be forbidden. More frequent de-sludging of the system may be needed if a garbage grinder is used.

Normal use in the house of soaps, detergents, bleaches, plumbing fixture cleaners, drain cleaners and disinfectants will not harm the functioning of the system or the soil absorption system.

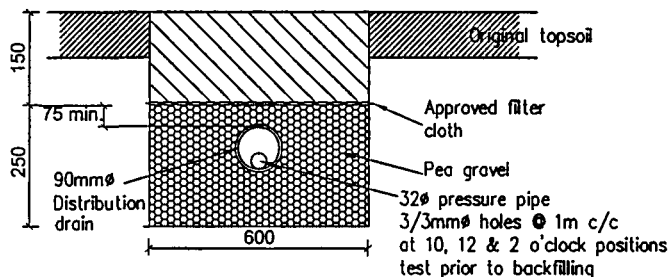
2. Prohibited discharge to the system

- * Oil/grease from a deep fryer (for example).
- * Stormwater or any drainage other than sewerage generated in the house.
- * Petrol, oil or other flammable/explosive substances
- * Garden, garage, and workshop chemicals (e.g. pesticides, paint cleaners, photographic chemicals, motor oil or trade waste).
- * Disposable nappies & sanitary napkins.

3. It is an MDC requirement that any wastewater treatment system be regularly serviced and maintained by a contractor experienced in this field.

NOTE - TRENCHES

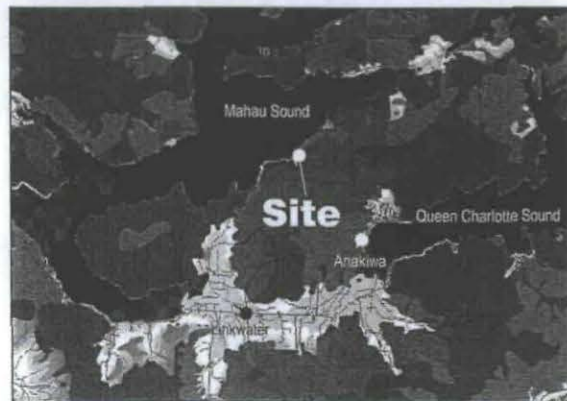
- (1) Trench spacing 1m. minimum between edges
- (2). Distribution drains to be U-PVC 90mmØ perforated pipe with perforations comprising at least 2% of surface area. (20mmØ holes at 100mm centres at 4 & 8 o'clock positions).
- (3) Distribution pipes to be laid flat or at a gradient not greater than 1 in 200.
- (4). Sides & base of trench to be carefully scratched with a pointed tool before laying filter media.



TYPICAL TRENCH CONSTRUCTION

6 NOV 2005

MAHLBOURGH DISTRICT COUNCIL



1 **LOCALITY MAP**
NTS

Approx. Existing Trenches
(to be abandoned)

Lot 2
DP 12278

Existing Septic Tank
- to be upgraded to
Ecogent Secondary
Treatment System

Existing
Garage

Sequencing
valve

Foreshore Reserve

Approx. Edge Beach

Approx. Water Edge

Lot 1
DP 12278

Lot 1
DP 8447



LEGEND

- P1 Penetrometer Test Site
- AG2 Hand Auger Test Site
- W1 Wastewater Test Site

Note: This drawing has been adopted from Cronin
Design Drawing 06225, S7 of 7, dated 02.08.06

Dose Pumped
Effluent Trenches
Min total length 100m



06 1208

2 **SITE PLAN**
1:300

Kenepuru Road

NOTES

Do not scale from this drawing. Only figured dimensions are to be taken from this drawing. The contractor must verify all dimensions on site before commencing any ordering of materials, work or shop drawings. The contractor must report any discrepancies to the Engineer before commencing work. If this drawing exceeds the quantities taken in any way, the Engineer is to be informed before the work is started. This drawing is Copyright and must not be reproduced without the consent of Smart Associates Ltd. The Engineer is to be given at least 2 weeks notice of the beginning of construction works, and at least 48 hours notice of critical items (eg concrete pours, piling etc). The Engineer reserves the right to alter the design in light of site circumstances including previously unforeseen design issues.

SITE PLAN

DRAWN DD
COMPUTER FILE: drawings

CHECKED JD

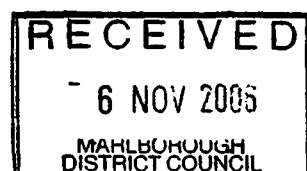
SCALE
(A3) As Shown

DRAWING No.
001

DATE 01.11.06
REVISION /

Appendix B

Geotechnical Report



Geotechnical Report

A SYNOPSIS

1. *Scope of Investigation*

- 1.1. A geotechnical site investigation was requested by the client in order to address the geotechnical considerations relating to the construction of a proposed residential dwelling at the site. This report addresses the geological and geotechnical conditions relating to the subject site, and in adjacent areas where such areas are considered relevant to the subject site, in order to provide an assessment of the land stability and foundation conditions as they relate to the proposed development.
- 1.2. The plans and sections presented with this report are for geotechnical purposes only.
- 1.3. The site assessment was carried out on the 26th October 2006 by Mr Dave Dravitzki of this office.
- 1.4. This report has been prepared in terms of the Marlborough District Council Requirements for the Provision of Geotechnical Reports, File C270-12, dated January 2005.

2. *Summary and Conclusions*

- 2.1 The subsurface conditions underlying the location of the proposed building area at the site have been investigated by means of three hand augered boreholes and three scala penetrometer tests
- 2.2 No evidence of active or historic slope instability was identified in the vicinity of the proposed building area at the site at the time investigation reported herein. The subject site is essentially flat and it is considered that the proposed development at the site is unlikely to be adversely affected by potential slope instability.
- 2.3 The Development Risk is assessed as LOW (geotechnical risk matrix).

3. *Recommendations*

- 3.1 It is considered that the site is suitable for the proposed development at the site and for residential building construction on conventional shallow foundations designed and constructed in accordance with NZS 3604:1999 with a minimum founding depth of 0.5m below cleared ground level. Structural items outside the scope of NZS 3604:1999 for the construction of any proposed dwelling on the site must be designed by a Chartered Engineer.

B. REPORT

1. Site Description

1.1 Introduction

This report presents the details of a geotechnical investigation undertaken at 759 Kenepuru Road, Mahau Sound. It is understood that the proposed development involves the removal of the existing dwelling at the site and the construction of a new residential dwelling, the details of which are shown on the site plan appended to this report.

The report was commissioned in response to Item 2 of the Marlborough District Council letter dated 5 October 2005, reference BC061944, which states:

"The site is within the Natural Hazards overlay identified in the Marlborough Sounds. Specific geo-technical evaluation is required by a Chartered Professional Engineer to assess land stability and foundation design."

1.2 Geological Setting

The New Zealand Geological Map (Begg and Johnston 2000) indicates that the subject site is underlain by Pleistocene to Holocene degradational terrace deposits. The results of the borehole investigation generally confirms the stratigraphy as indicated on the geological map.

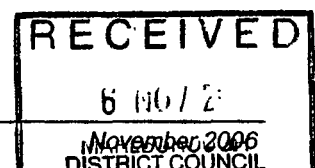
The map also indicates that the site is bordered by ancient landslide deposits within Marlborough Schist of Permian age (Caples Group, textural sub-zone IIB). It is considered likely that the Council Hazard Overlay was identifying the landslide deposits and steeper ground as a potential hazard and not the flat lying terrace deposits, which are likely to have not been extensive enough to have been separated out from the landslide deposits at the scale of the hazard / zoning mapping.

No active faults are identified on the geological map in the vicinity of the site. The greater Marlborough Region is however within an active seismic zone and it should be anticipated that a minimum ground shaking condition equivalent to a Modified Mercalli Intensity of VII to VIII would be experienced during the design life of any proposed dwelling, and it is recommended that any proposed building be appropriately designed to mitigate against the adverse affects of such potential ground shaking.

1.3 Topography and Vegetation

The subject site is located to the west of Kenepuru Road within an area of residential properties. The Mahau Sound foreshore forms the western boundary of the property. The entire site is essentially flat to gently sloping ($<5^\circ$) towards the foreshore. The site is located approximately 50m or greater from the toe of the steeper slopes forming the valley hills to the northeast of the site.

The site was vegetated in lawn at the time of the investigation reported herein. The previously existing building at the site had been removed, although some building debris had yet to be cleared away, as can be observed in the site photographs appended to this report.



1.4 Recent and Historic Instability

No evidence of active or historic slope instability was identified at the subject site at the time investigation reported herein. The site is essentially flat with no slopes of significance located on or within the immediate backslope of the subject site, and it is therefore considered that slope instability at the site is not an issue.

2. Geotechnical Investigations

The geotechnical conditions relating to the proposed dwelling have been determined by three hand augered boreholes, numbered AG1 to AG3, and three scala penetrometer tests, numbered P1 to P3. Logs for the hand augered boreholes and the penetrometer test results are attached to this report. The locations of AG1 to AG3 and P1 to P3 are shown on the appended site plan.

3. Geotechnical Assessment

3.1 Foundation Conditions

The borehole logs for AG1 to AG3 indicate that the site is underlain by surficial topsoil, generally encountered to a depth of approximately 0.05m below the ground surface existing at the time of the investigation reported herein (the existing ground surface).

Beneath the topsoil the subsoils underlying the location of the building area generally comprises gravelly sand alluvial deposits of a loose to medium dense consistency.

On the basis of the recorded compactness, the soil bearing resistance (scala penetrometer) will generally exceed 100 kPa at depths exceeding approximately 0.5m, which should be suitable for the proposed residential development at the site and the construction of conventional shallow foundations constructed in accordance with NZS 3604:1999.

Structural items outside the scope of NZS 3604:1999 for the construction of any proposed dwelling must be designed by a Chartered Engineer.

3.2 Access

Access to the house site can be gained along the existing driveway in the northern part of the site which is at grades less than 1V:6H.

3.3 Land Application Area (Wastewater)

An assessment of the location of the Land Application Area for the on-site wastewater disposal system for the proposed dwelling was carried out, the details of which are presented in the related Engineering Report.

3.4 Stormwater Disposal

It is understood and recommended that all stormwater from roofed and paved areas that is not retained for domestic use be collected in a controlled manner and be directed to discharge into soak pits constructed at the site to service the proposed residential dwelling.

3.5 Development Impact

The development risk is assessed as LOW (geotechnical risk matrix).

4. Control Measures

It is considered that the site is suitable for the proposed development at the site and for residential building construction on conventional shallow foundations designed and constructed in accordance with NZS 3604:1999 with a minimum founding depth of 0.5m below cleared ground level. Structural items outside the scope of NZS 3604:1999 for the construction of any proposed dwelling on the site must be designed by a Chartered Engineer.

5. Management Plans

There are no geotechnical issues associated with the proposed development that require the implementation of any MDC management plan additional to those already in force.

6. Limitations


This report is valid for two years from the date of issue and relates to the geotechnical conditions relating to the proposed dwelling at the subject site. Any other areas are outside the scope of this report.

The reliance by other parties on the information or opinions in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

The conclusions and recommendations reported herein have been prepared with respect to the proposed development at the site, and should not be taken out of context from the proposed development or the remainder of this report.

7. References

1. Begg, J.G. and Johnston, M.R. (compilers) 2000. New Zealand Geological Map 10: Geology of the Wellington area, 1:250,000.



Dave Dravitzki, Smart Associates Ltd
Engineering Geologist
B.Sc, M.Sc
2 November 2006

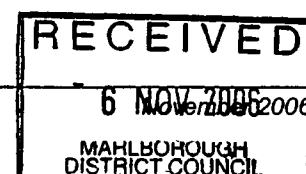




Photo 1: View looking to south towards existing garage and remaining building rubble.

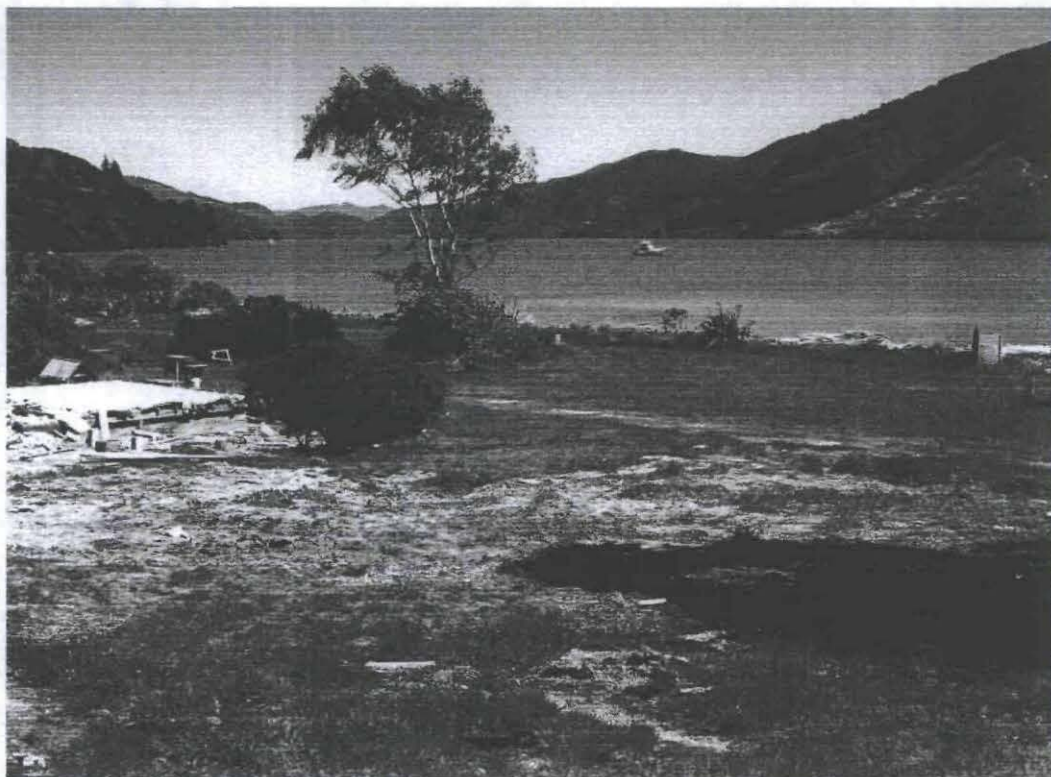


Photo 2: View looking to west towards Mahau Sound.



ASSOCIATES Ltd.
ENGINEERS & ARCHITECTS
31 George Street
P.O.Box 57
Blenheim, N.Z.
Tel: (03) 577 7487
Fax: (03) 577 7486
design@smartassociates.co.nz



Auger Borehole AG1

Project: Fowler Homes

Date: 26.10.06

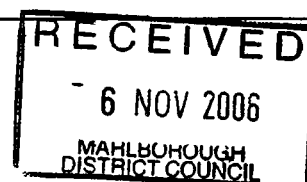
Project No: F06-1876

Bore Ø: 50mm

Drilled by: D. Dravitzki

Horizon	Description	Depth (m)	Comments
A	Sandy silt loam, dark brown, very soft 2% gravels, moist	0.05	Topsoil
B1	Gravelly sand loam, brown, loose, 25% gravels, moist	0.4	Alluvial
B2	Gravelly sand, light brown, medium dense, 40% gravels, moist	0.8	
	Borehole Terminated		

Notes: 1. Groundwater not encountered 26.10.06





ASSOCIATES Ltd.
ENGINEERS & ARCHITECTS
31 George Street
P.O. Box 57
Blenheim, N.Z.
Tel: (03) 577 7487
Fax: (03) 577 7485
design@smartassociates.co.nz



Auger Borehole AG2

Project: Fowler Homes

Date: 26.10.06

Project No: F06-1876

Bore Ø: 50mm

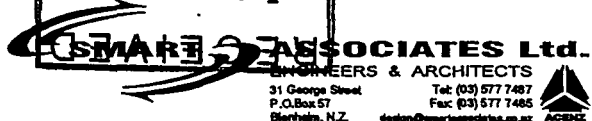
Drilled by: D. Dravitzki

Horizon	Description	Depth (m)	Comments
A	Sandy silt loam, dark brown, very soft 2% gravels, moist	0.05	Topsoil
B1	Gravelly sand loam, brown, loose, 25% gravels, moist	0.35	Alluvial
B2	Gravelly sand, light brown, medium dense, 40% gravels, moist		
	Borehole Terminated	0.7	

Notes: 1. Groundwater not encountered 26.10.06

MAHARONG DISTRICT COUNCIL

900Z AON 9



Auger Borehole AG3

Project: Fowler Homes

Date: 26.10.06

Project No:

F06-1876

Bore Ø:

50mm

Drilled by:

D. Dravitzki

Horizon	Description	Depth (m)	Comments
A	Sandy silt loam, dark brown, very soft 2% gravels, moist	0.05	Topsoil
B1	Gravelly sand loam, brown, loose, 25% gravels, moist	0.4	Alluvial
B2	Gravelly sand, light brown, medium dense, 40% gravels, moist	0.7	
	Borehole Terminated		

Notes: 1. Groundwater not encountered 26.10.06



SMART ASSOCIATES Ltd.
ENGINEERS & ARCHITECTS
31 George Street
P.O.Box 57
Blenheim, N.Z.
Tel (03) 577 7487
Fax (03) 577 7485
design@smartassociates.co.nz



**PENETROMETER
TEST RESULTS**

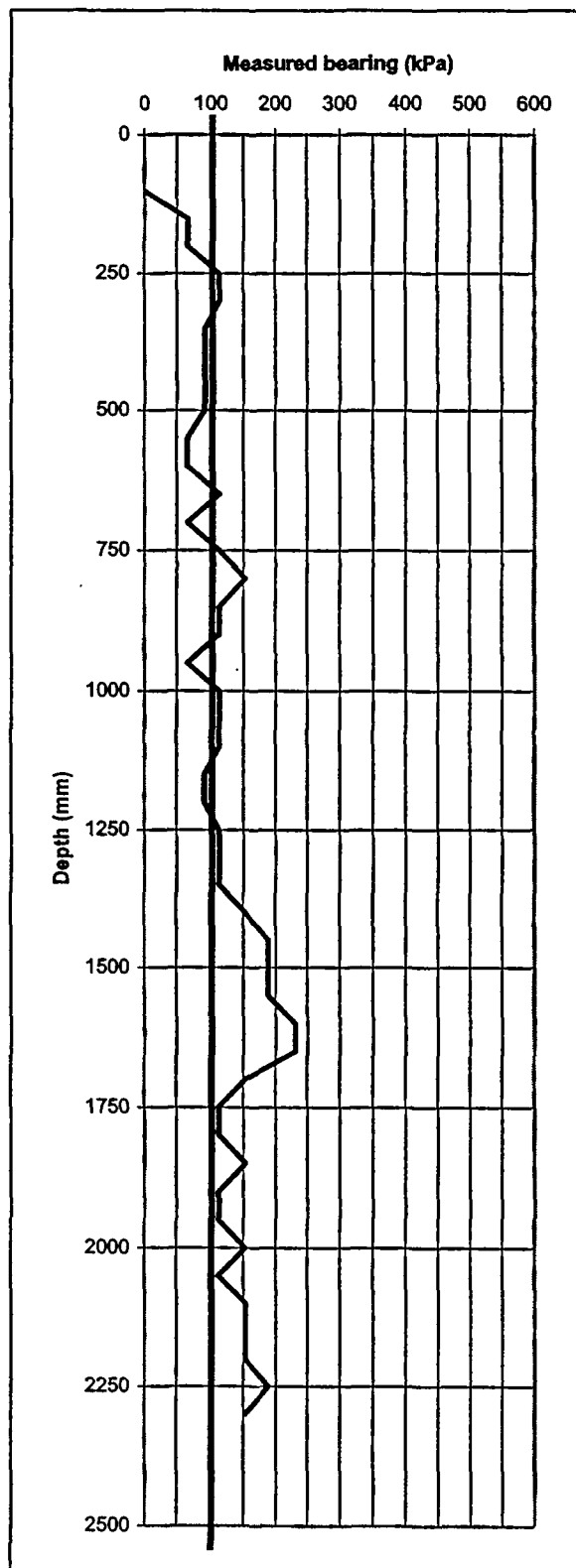
Client: Fowler Homes
Project: Proposed Dwelling
Site: 759 Kenepuru Road
Mahau Sound

Date: 26.10.06
Investigator: D. Dravitzki
Project No: F06-1876

Notes: Test locations refer to drawing.

Test No P1

No. of Blows	e (mm/blow)	Soil bearing resistance (kPa)	Depth (mm)
	0	0	100
1	50	66	150
1	50	66	200
2	25	113	250
2	25	113	300
1.5	33	91	350
1.5	33	91	400
1.5	33	91	450
1.5	33	91	500
1	50	66	550
1	50	66	600
2	25	113	650
1	50	66	700
2	25	113	750
3	17	153	800
2	25	113	850
2	25	113	900
1	50	66	950
2	25	113	1000
2	25	113	1050
2	25	113	1100
1.5	33	91	1150
1.5	33	91	1200
2	25	113	1250
2	25	113	1300
2	25	113	1350
3	17	153	1400
4	13	188	1450
4	13	188	1500
4	13	188	1550
5	10	231	1600
5	10	231	1650
3	17	153	1700
2	25	113	1750
2	25	113	1800
3	17	153	1850
2	25	113	1900
2	25	113	1950
3	17	153	2000
2	25	113	2050
3	17	153	2100
3	17	153	2150
3	17	153	2200
4	13	188	2250
3	17	153	2300



RECEIVED

6 NOV 2006

**MAHLBOURGH
DISTRICT COUNCIL**

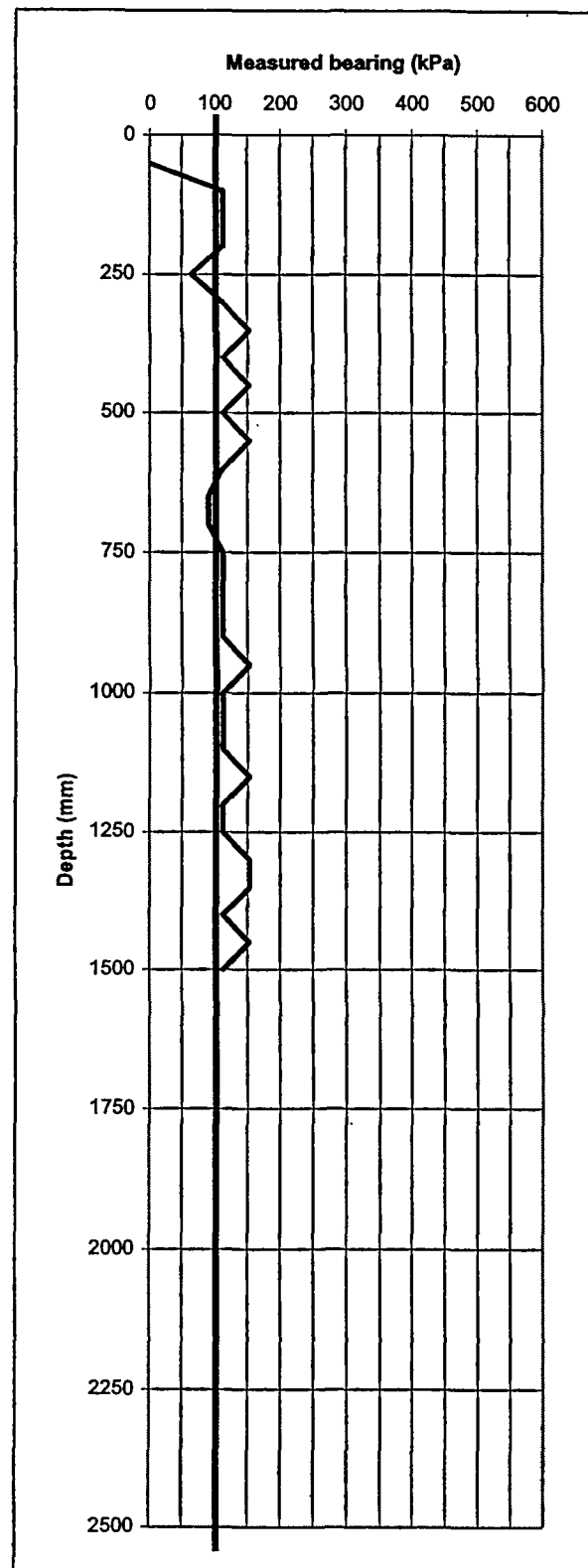
Client: Fowler Homes
Project: Proposed Dwelling
Site: 759 Kenepuru Road
Mahau Sound

Date: 26.10.06
Investigator: D. Dravitzki
Project No: F06-1876

Notes: Test locations refer to drawing.

Test No P2

No. of Blows	e (mm/blow)	Soil bearing resistance (kPa)	Depth (mm)
	0	0	50
2	25	113	100
2	25	113	150
2	25	113	200
1	50	66	250
2	25	113	300
3	17	153	350
2	25	113	400
3	17	153	450
2	25	113	500
3	17	153	550
2	25	113	600
1.5	33	91	650
1.5	33	91	700
2	25	113	750
2	25	113	800
2	25	113	850
2	25	113	900
3	17	153	950
2	25	113	1000
2	25	113	1050
2	25	113	1100
3	17	153	1150
2	25	113	1200
2	25	113	1250
3	17	153	1300
3	17	153	1350
2	25	113	1400
3	17	153	1450
2	25	113	1500



RECEIVED
6 NOV 2006
MAHLBOUGH
DISTRICT COUNCIL



SMART ASSOCIATES Ltd.
ENGINEERS & ARCHITECTS
31 George Street
P.O.Box 57
Blenheim, N.Z.
Tel: (03) 577 7487
Fax: (03) 577 7485
design@smartassociates.co.nz



PENETROMETER TEST RESULTS

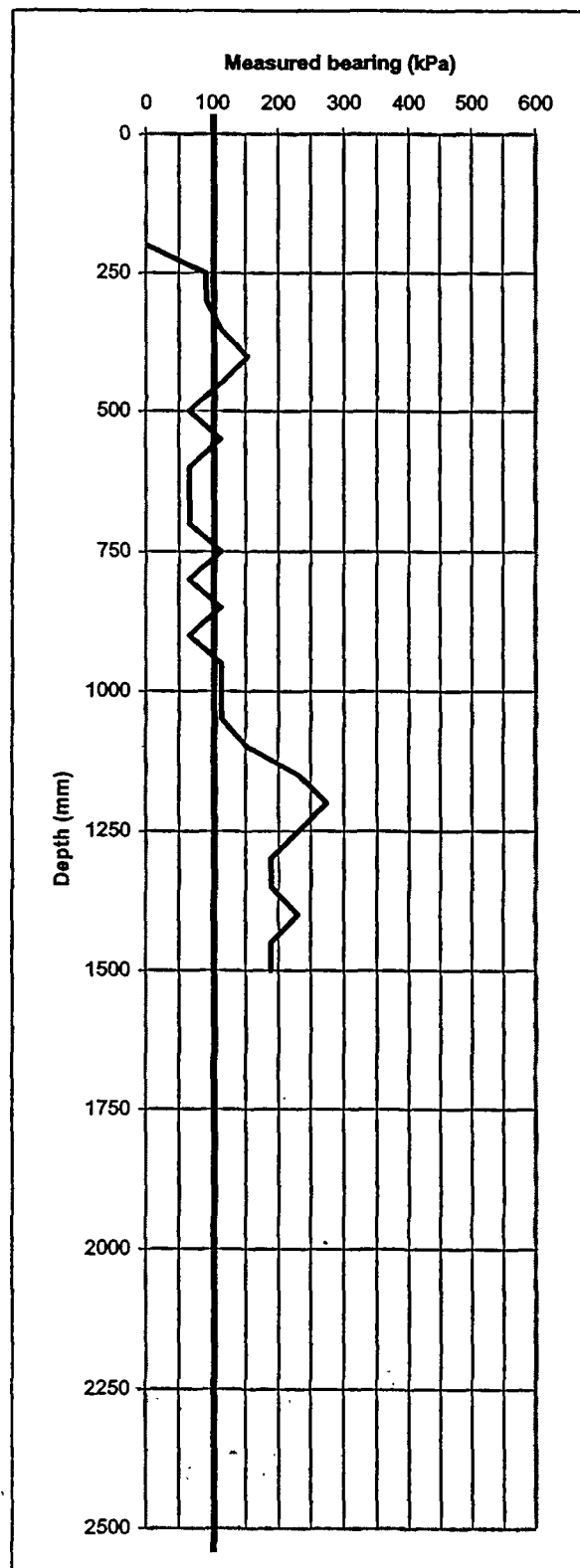
Client: Fowler Homes
Project: Proposed Dwelling
Site: 759 Kenepuru Road
Mahau Sound

Date: 26.10.06
Investigator: D. Dravitzki
Project No: F06-1876

Notes: Test locations refer to drawing.

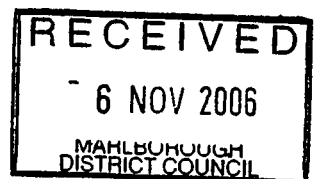
Test No P3

No. of Blows	e (mm/blow)	Soil bearing resistance (kPa)	Depth (mm)
	0	0	200
1.5	33	91	250
1.5	33	91	300
2	25	113	350
3	17	153	400
2	25	113	450
1	50	66	500
2	25	113	550
1	50	66	600
1	50	66	650
1	50	66	700
2	25	113	750
1	50	66	800
2	25	113	850
1	50	66	900
2	25	113	950
2	25	113	1000
2	25	113	1050
3	17	153	1100
5	10	231	1150
6	8	275	1200
5	10	231	1250
4	13	188	1300
4	13	188	1350
5	10	231	1400
4	13	188	1450
4	13	188	1500



Appendix C

Wastewater Design Sheet





ASSOCIATES Ltd.
ENGINEERS & ARCHITECTS
31 George Street
P.O.Box 57
Blenheim, N.Z.
Tel: (03) 577 7487
Fax: (03) 577 7485
design@smartassociates.co.nz
ACENZ

SOIL PERMEABILITY ASSESSMENT / EFFLUENT DESIGN SHEET

To AS/NZS 1547:2000

Site Evaluation: Fowler Homes, 759 Kenepuru Road, Mahau Sound

Job No: F06-1876

Intended water Supply:

~~Public Supply~~ Rain-water (roof-collection) Bore/Well/Dam

Local experience with existing on-site systems:

Septic Tank or similar (Primary treatment):

OK when installed properly with a correctly sized drainage area and maintained.

Secondary treatment:

Work very well in domestic situation producing a relatively high quality effluent.

Recommendation for this site: *Ecogent secondary treatment system with dose pumped effluent disposal trenches*

DRAINAGE CONTROLS:

Need for surface water collector / cut-off drains?

AVAILABILITY OR RESERVE / SETBACK AREAS

Reserve area available for extensions, % of design area:

Setback distance? (between development and disposal system):

Min. as required by Resource Management Act

Ksat, (m/day):

ESTIMATED SOIL CATEGORY: *Category 3 - Moderately well drained loams*

Design

RECOMMENDED D.L.R. 30 mm/day

(NOTE: Where DIR is 10mm/week or less, ETA/ETS trenches to Fig 4.5A7 NZS1547:2000 should be specified to enable the utilisation of such soils)

10 Permanent People At 180L/person/day:

1800 L/day from Appendix 4.2D AS/NZS 1547:2000

DESIGN DAILY FLOW:

1800 L/day

Septic tank size (min):

4,500 (Table 4.3A1)

AREA REQUIRED:

60.0 m²

LENGTH REQUIRED:

100.0 m with 600 wide trench

RESERVE AREA REQUIRED:

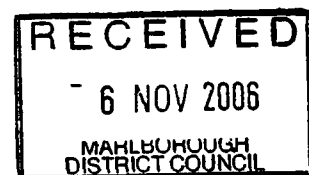
100% of specified drainage area

RECOMMENDATION:

Ecogent secondary treatment and dose pumped effluent disposal trenches to be a minimum total length of 100m (Lines to be laid at 1.6m centres, Pump sized by manufacturer).

Appendix D

Ecogent System Specifications





ECOWASTE PROCESS DESCRIPTION

Treatment

The Ecowaste is a package aerated treatment plant designed for typical households. Wastewater is treated anaerobically by the first stage septic tank. Wastewater then passes through a septic tank effluent filter into the core aerobic treatment tank.

The aerobic treatment tank has 2m³ storage volume with 0.25m³ of NSW BIOPAC SF30 treatment media. The treatment media has a greater than 95% open area to avoid clogging and large surface area to allow treatment microorganisms to adhere and grow. Aerated water is circulated through media to maintain intimate contact between wastewater, microorganisms and oxygen supply. Typical recycle rate is 10:1. System is characterised by very low sludge production and ability to be easily adjusted to suit low flow or high load situations.

Aeration is provided by a 380 watt Grundfos submersible pump and high efficiency Mazzei aerators which dissolve oxygen prior to circulating the flow through the media. The aerator is timer controlled and aeration time can be minimised for periods of inoccupation or low use or increased to deal with temporary increases in wastewater loading. Settled treated wastewater flows to the irrigation chamber through a vertical corrugated plate clarifier, which utilises Dura-Pac media from NSW Environmental. The clarifier reduces suspended solids loads and continues the wastewater treatment process.

The treated wastewater is then pumped to the disposal field via a float controlled irrigation pump. The pumped irrigation water is filtered, for added protection of the disposal field, through a 150 micron spin clean screen filter. If water level rises in the pump chamber due to pump failure or filter blockage a float will operate a visual alarm at the control board. There is a minimum 24 hour emergency storage but in most circumstances there is significantly more time available to remedy any malfunctions.

Disposal

The disposal field utilises Wasteflow disposal pipe. Wasteflow is a flexible polyethylene dripline with pressure compensating turbulent flow emitters regularly spaced along the line. With the dripline typically hidden 50–150mm below the ground, effluent is distributed slowly and uniformly, reducing ponding, even in difficult soils and hilly terrain.

Subsurface disposal of the treated wastewater is essential because domestic wastewater treatment plants do not eliminate disease causing organisms and hence the use of long life subsurface disposal systems is important to protect public health and the environment.

Wasteflow is specifically designed for wastewater disposal and is built to last. The emitters are protected against root intrusion by the Rootguard[®] patented process, and the dripline wall is protected from organic growth with a bactericide lining.

The rampant growth of roots (Kikuya, Willow etc) is a major problem for blockages of drains and irrigation pipe. Wasteflow has a 15 year warrantee against failure due to root blockage. Other advantages are its bactericide lining to stop ongoing slime growth and its strong construction.

Reliability

The Ecowaste is noted for its simplicity with an aeration pump and irrigation pump each with its own integrated float switch. A third float switch activates the high level alarm. The system has a low power usage.

KEY ADVANTAGES OF THE ECOWASTE SYSTEM

The long term satisfactory operation of all wastewater treatment plants is dependant on three key areas, all of which are addressed by the Ecowaste system:

1. Design

Ecogent are a team of registered environmental engineers. We have designed, built and operated water and wastewater treatment plants throughout New Zealand and the South Pacific. We design treatment plants using many different types of core treatment process for many differing types of effluent. These plants range in size from 1m³ to 1000m³ per day and depending on discharge requirements produce effluent up to standards of 5ppm BOD and SS.

We have a network of technical specialists in the industry around the world to assist with design information and specialist materials and equipment.

The Ecowaste is a proprietary domestic wastewater treatment plant manufactured in NZ using Humes reinforced concrete tanks complying with NZ standards. More than 200 Ecowastes have been installed around the country. Ecowastes are also available in lightweight, rotationally moulded plastic tanks for special applications.

Ecogent engineers have been responsible for major projects including, in the local area, the Omaha wastewater treatment plant and golf course irrigation for Rodney District Council and the Ecowaste commercial treatment plants at Leigh Fisheries and Leigh Marae.

2. Installation

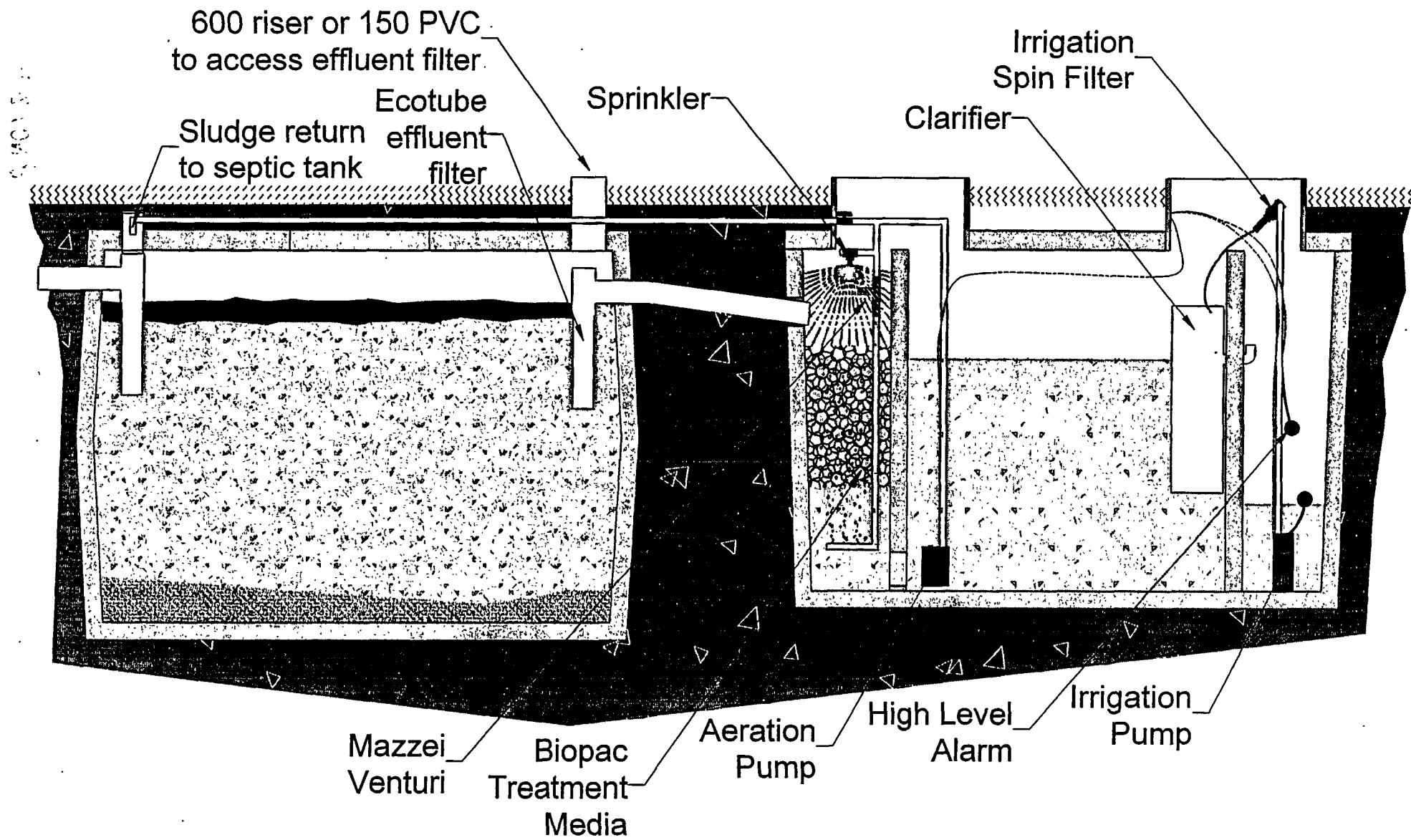
Ecowastes are only installed by trained drainlayers. Ecogent inspects Ecowaste tankage and componentry prior to dispatch to approved drainlayers. An Ecowaste commissioning report is completed by the drainlayer on installation and copied to Ecogent. An Ecogent engineer then inspects the installed system and provides a producer statement for council purposes.

In the Marlborough area Ecowastes are installed by either C & S Contractors or G R Lawrence Contractors. Their local knowledge and high standards help to ensure that common problems such as flooding and water entry to the treatment systems are avoided at the installation stage. This is a common cause of failure of many systems.

3. Maintenance

Maintenance is perhaps the most important criteria and also the most overlooked. Lack of maintenance would be the main reason for the failure of any type of wastewater treatment system.

Ecogent requires the owner of the Ecowaste system to enter into a maintenance agreement with the approved installing drainlayer. The approved drainlayers have been trained in Ecowaste maintenance and complete a comprehensive maintenance checklist during twice annual maintenance visits. Completed checklists are copied to Ecogent for their records. Ecogent are always on hand to provide additional assistance or replacement equipment to the approved maintenance provider and regularly visit plants with the maintenance provider to check on system condition.

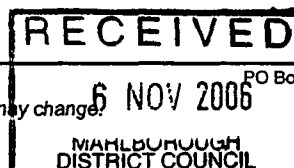




ECOWASTE SPECIFICATIONS

Septic Tank	Variable according to number of bedrooms and pump out frequency that is acceptable to the owner. Sizes range from 1.5 ³ to 5m ³ .
Septic Tank Effluent Filter	Patented twin screen Ecotube, 2.5mm opening size filter with flow modulation. Cleaning frequency typically 3 years but easily removed and washed during maintenance without needing to remove any pumps.
Ecowaste Treatment Unit	3m ³ concrete tank, twin concrete risers and lids. Three days detention at 1m ³ /day. Aerated water flow 4,500 litres per hour. Normal power consumption 1 – 2 kW hours/day depending on effluent loading.
Ecowaste Treatment Media	Aerobic treatment in the Ecowaste is supported on 0.25m ³ of polypropylene submerged fixed media. The media is a specialised media called 'BIOPAC' from NSW Environmental. BIOPAC has a high surface area and high open flow area to provide complete mixing in the reactor and high treatment efficiency.
Aeration	Aeration is provided by a timer controlled 380 watt Grundfos KPC 300 running through a high efficiency Mazzei venturi air injector.
Clarifier	Vertical corrugated PVC plate clarifier utilising NSW Environmental DURA-PAC media
Maximum Treatment Capacity	Long term capacity up to 2m ³ /day (limited by Council permit and disposal field size). However the modular Ecowaste concept easily allows systems with additional capacity to be designed.
Disposal Field	200m – 300m of Wasteflow pressure compensating dripline from Geoflow Inc. The dripline emitters are Rootguard protected for root intrusion control and bactericide lined pipe for slime control. Emitter spacing 600mm. Emitter flow 2 litres per hour. Installation depth within topsoil 50mm to 100mm. Field flush line returned to treatment tank or in a dedicated soak hole. Air valve inside irrigation chamber or at high point in disposal field to relieve suction pressures in the dripline between pump cycles.
Irrigation Pump	Telsa Diver 75M (550 watt) delivers 34m head @ 11 litres/minute which is the pressurised flow rate for a standard disposal field
Irrigation Filter	20mm Plastic 'Spin Clean' filter from Aquarius Brands Inc with 150 micron screen filter.
Control Box	Control boxes are custom built in New Zealand. They are IP65 rated and house circuit breakers for the aerator pump, irrigation pump and high level alarm float. The control box also houses the main isolating switch, high level alarm light, aeration pump timer and timer by pass switch.
Treatment Standards	The treatment parameters for the domestic ecowaste unit are 20ppm BOD and 30ppm TSS. If required the Ecowaste can be constructed for larger flows and/or higher treatment standards. Within 300mm of the Wasteflow emitters in the topsoil layer effluent standards are typically better than 5ppm BOD and SS.

Note: As part of an ongoing process improvement program specifications may change.
This specification is dated May 2005



PO Box 55-144, Mission Bay Auckland
3 f Cain Rd, Penrose
Phone: (09) 579-1080
Fax: (09) 579-1090



Service Date:

Last Service:

Next Service:

ECOWASTE SERVICE REPORT

Client Name:

Serviced by: G.R.Lawrence Ltd

Property Address:

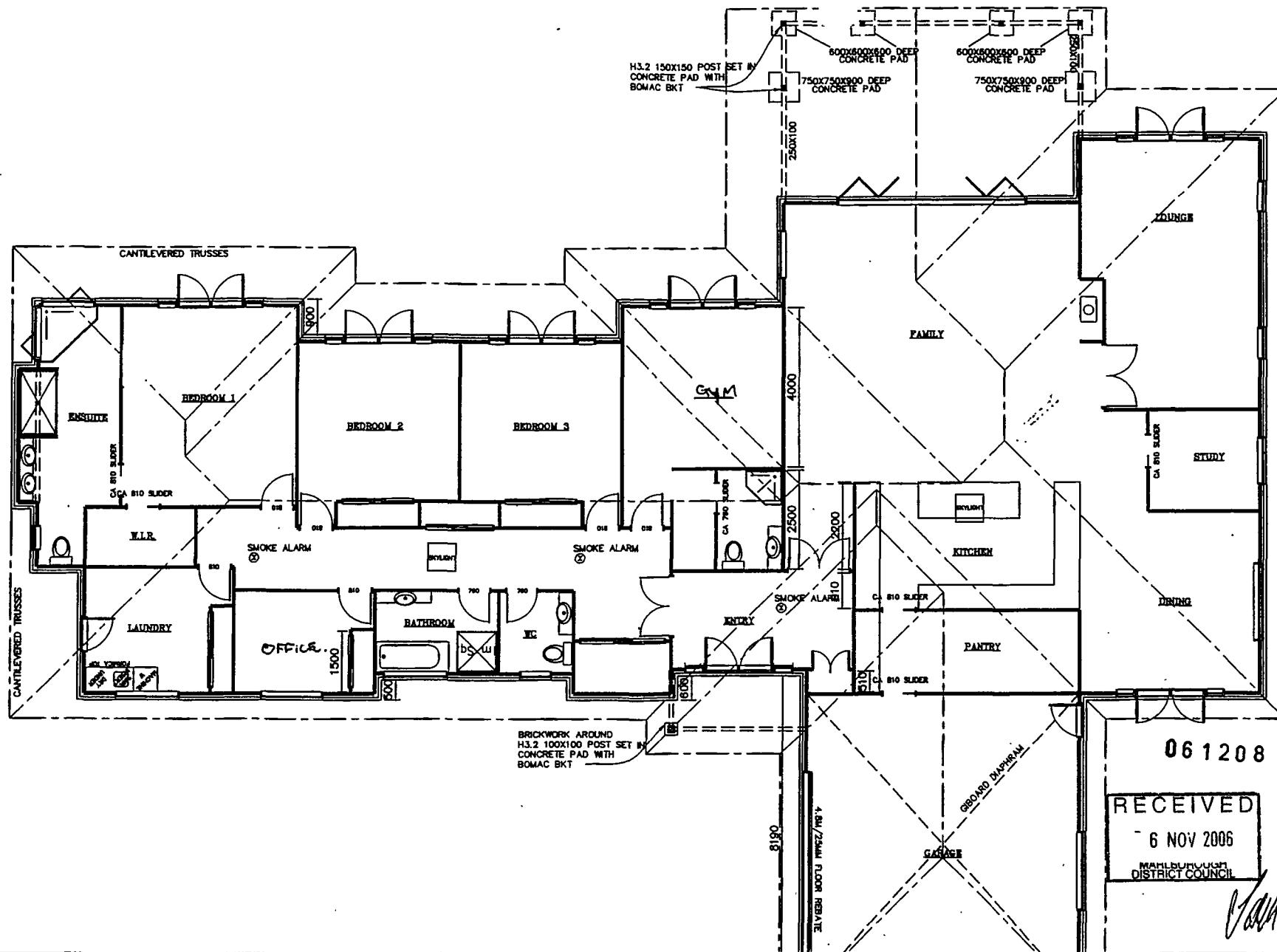
Phone: 03 574 2097

Contact Phone:

Maintenance Task:	Check	Comments:
Check conditions with occupier		
Septic tank/chamber condition		
Septic tank effluent filter cleaned		
Check sludge levels in aeration		
Sludge transfer operating		
Sprinkler operating		
Check venturi air line suction		
Check for air bubbles		
Air inlet/outlet clear		
Aerator pump operating		
Check sludge levels in clarifier		
Check and clean clarifier		
Irrigation pump operating		
High level alarm operating		
Check and replace irrigation filter		
Clean irrigation filter bypass		
Clean and remove sludge from irrigation chamber		
Field return line operating		
Flush irrigation field		
Chlorine dose irrigation field (if necessary)		
Check for ponding/break outs in field		
Control Box condition		
Check aeration levels		
Check aeration by pass switch		
Riser and lid condition		
Mosquitos		
Controller switched on		
Site clean		

Additional Comments:

C:\2006-Plans (Plan)\06225Neiman.dwg, 2/08/2006 1:20:36 p.m., Cronin Design



**CRONIN
DESIGN**

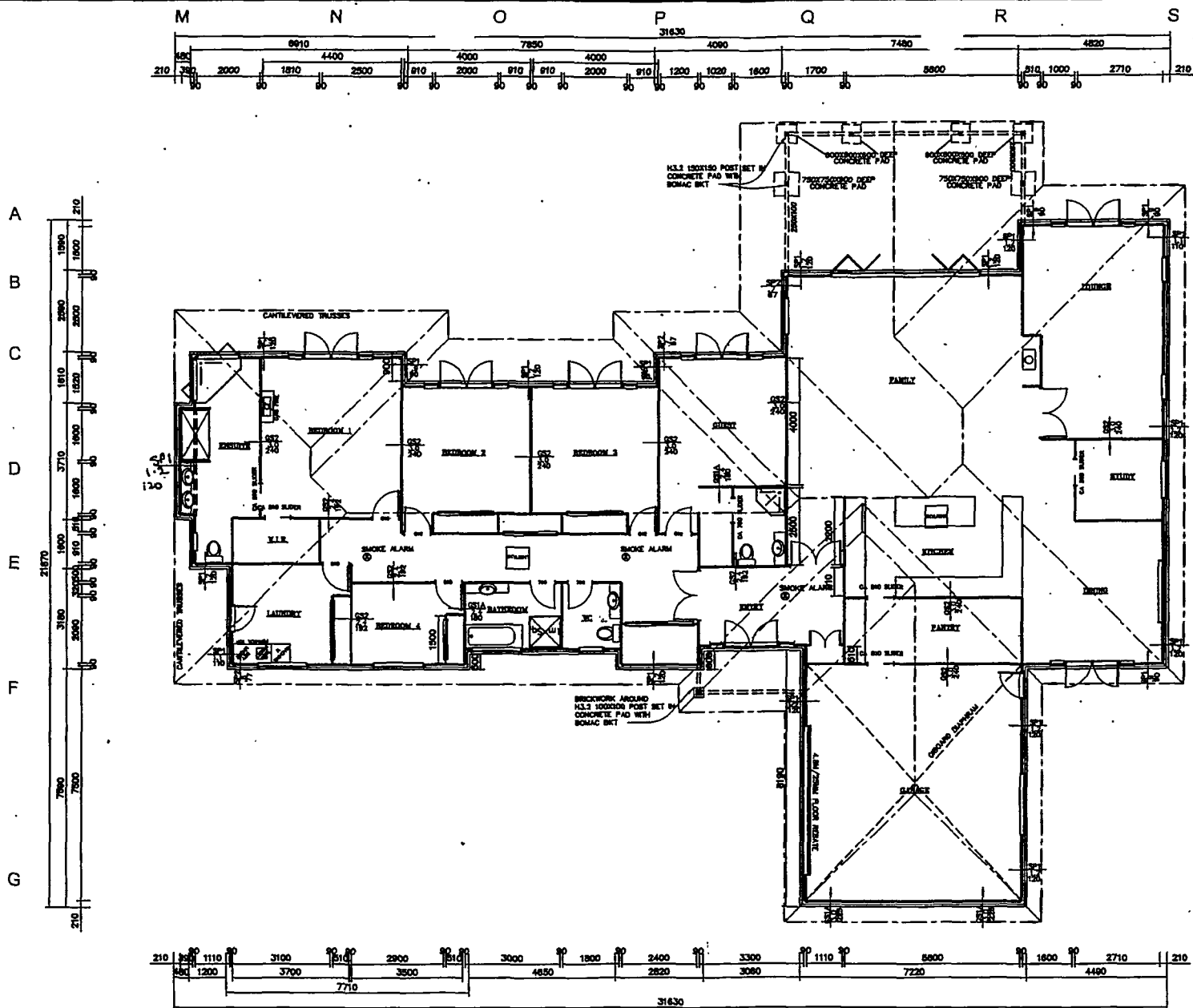
9 Print Place Christchurch
Ph 03 3388394
merv@cronindesign.co.nz

Neiman Residence
Lot 1 Kenepuru Road
PICTON

**Plan 396m²
Lof 110m**

Designed by Merv Cronin - R2002/80	Date 02/08/08	Scale 1:100
New Dwelling		
Drawing No. 06225	RevNo S1 of 7	

C:\2006-Plans (Rain)\06225\neiman.dwg, 2/08/2006 12:13:32 P., Cronin Design



RECEIVED
6 NOV 2006
MARLBOROUGH
DISTRICT COUNCIL

061208

[Signature]

CRONIN
DESIGN

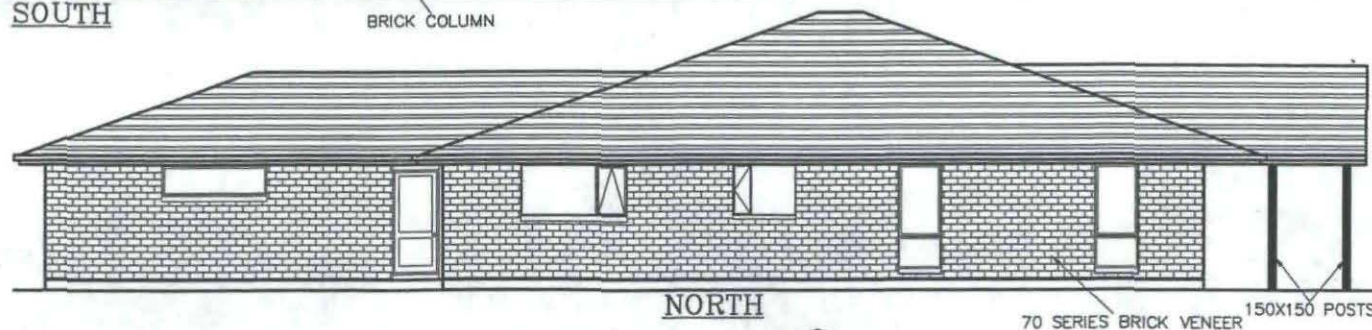
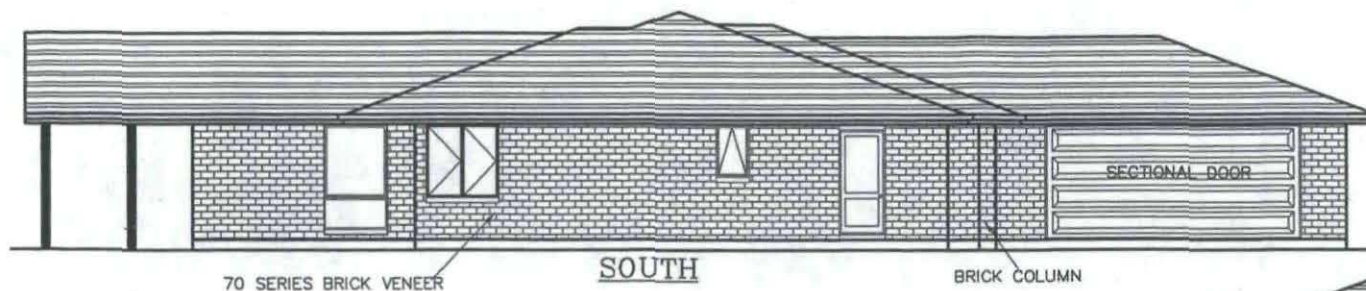
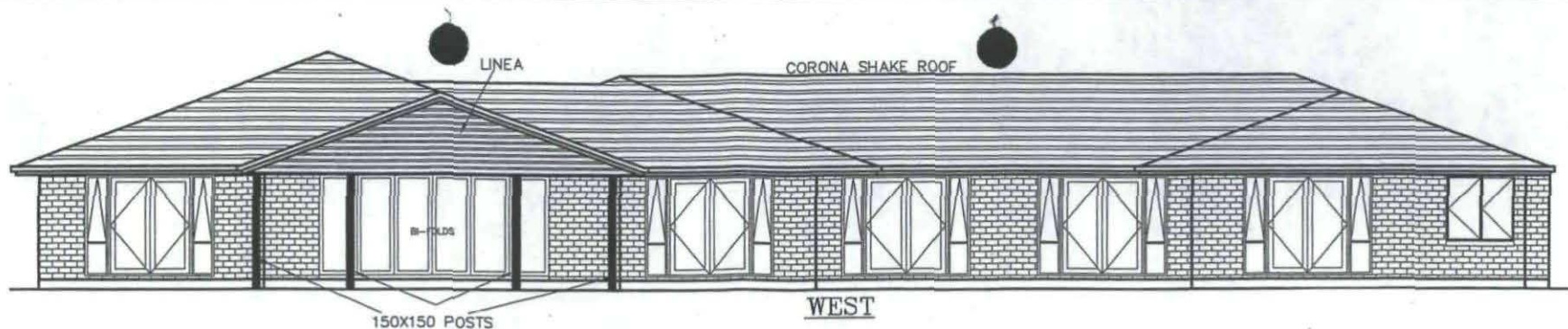
9 Print Place Christchurch
Ph 03 3388394
merv@cronindesign.co.nz

Neiman Residence
Lot 1 Kenepuru Road
PICTON

Plan 396m²
Lof 110m

Designed by Merv Cronin - 5207230	Date 02/08/06	Scale NTS
New Dwelling		
Drawing No. 06225		RevNo S2 of 7

C:\2006-Plans (Rain)\06225\Neiman.dwg, 2/08/2006 1:23:04 p., Cronin Design



061208

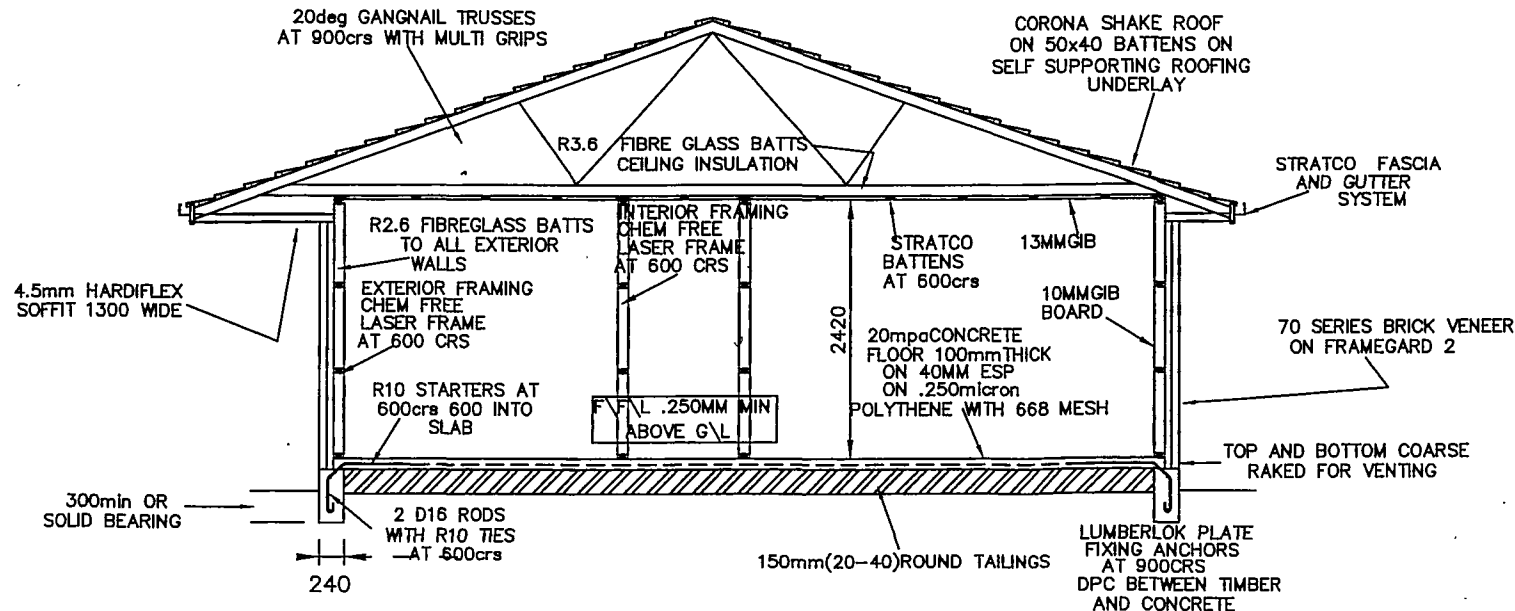
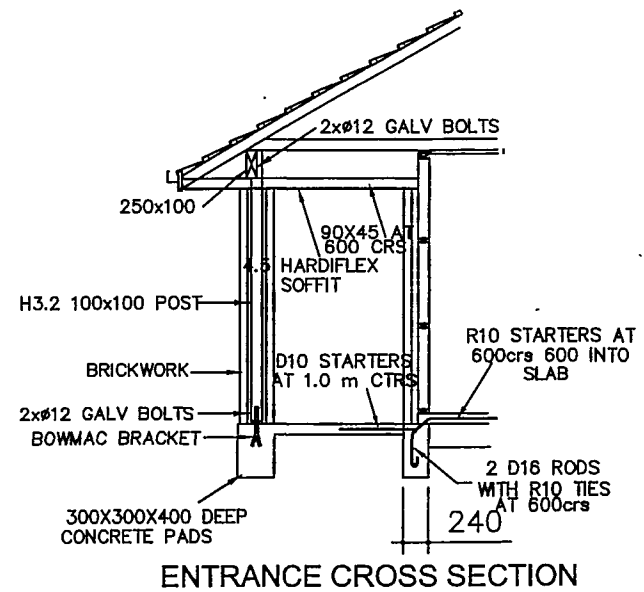
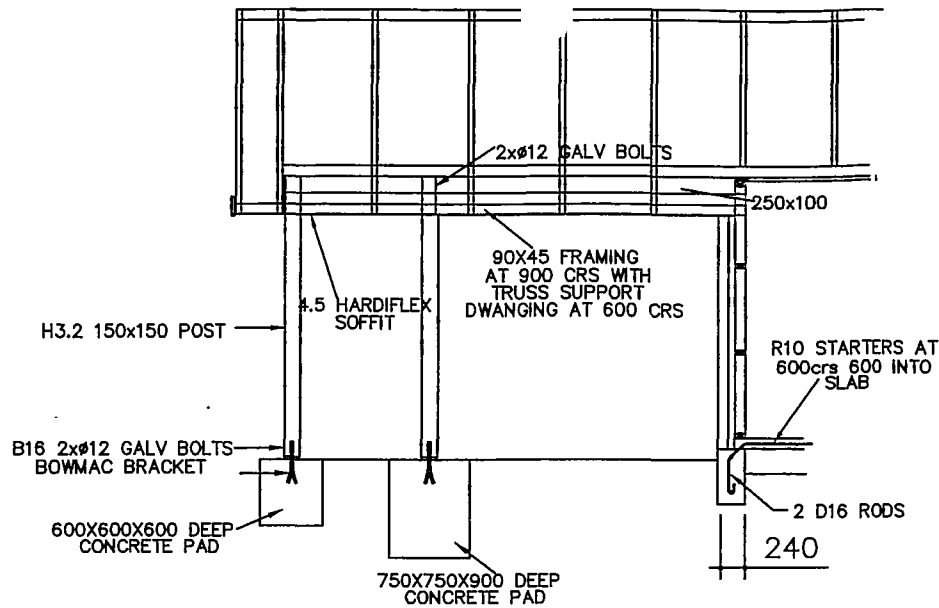
**CRONIN
DESIGN**

9 Print Place Christchurch
Ph 03 3388394
merv@cronindesign.co.nz

Neiman Residence
Lot 1 Kenepuru Road
PICTON

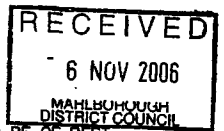
Elevations

Designed by Merv Cronin - 82002.00	Date 02/08/06	Scale 1:100
New Dwelling		
Drawing No. 06225		RevNo S3 of 7



LINTELS

UP TO 2.0M 150X100 TYPE B FIXING
 2.0M TO 2.7M 200X100 TYPE B FIXING
 2.7M TO 3.2M 250X100 TYPE C FIXING
 OTHERS SPECIFIED BY MANUFACTURER



NOTES

- A. ALL WORKMANSHIP TO BE OF BEST TRADESMAN LIKE MANNER
- B. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED BEFORE ANY CONSTRUCTION COMMENCES.
- C. ALL WORK TO CONFORM TO NZ BUILDING CODE 1991 AND AMENDMENTS
- D. THESE PLANS TO BE READ IN CONJUNCTION WITH WRITTEN SPECIFICATIONS ATTACHED.
- E. TIMBER TREATMENT TO NZS3602:2003

061208

**CRONIN
DESIGN**

9 Print Place Christchurch
 Ph 03 3388394
 merv@cronindesign.co.nz

Neiman Residence
 Lot 1 Kenepuru Road
 PICTON

**Cross
Sections**

Designed by Mary Cronin - 02022 30	Date 02/08/06	Scale 1:50
New Dwelling		
Drawing No. 06225		RevNo S4 of 7

C:\2006-Plans (Rain)\06225\Neiman.dwg, 2/08/2006 1:24:07 P., Cronin Design

FIG. 10 TYPICAL WALL SECTION

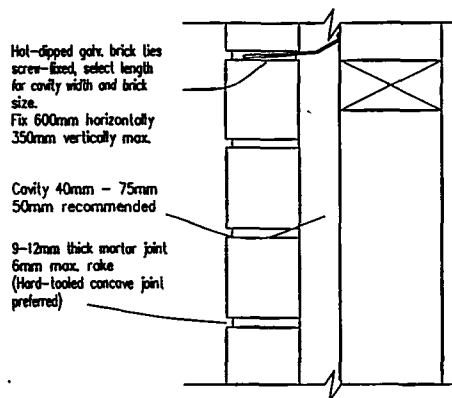


FIG. 41 DOOR JAMB - Aluminium

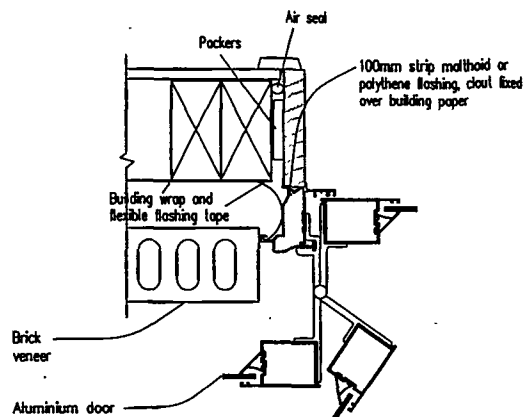


FIG. 26a WINDOW HEAD - Soffit

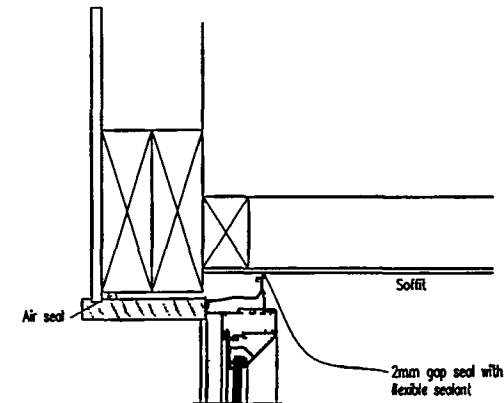
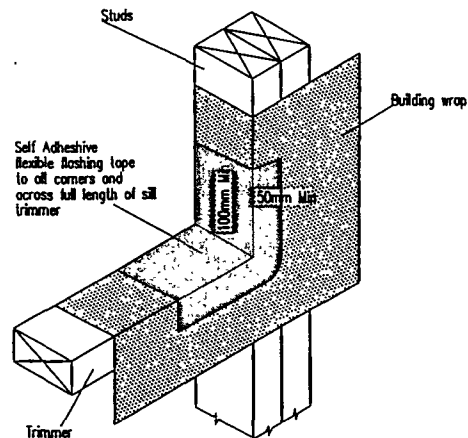


FIG. 37a GARAGE JAMB

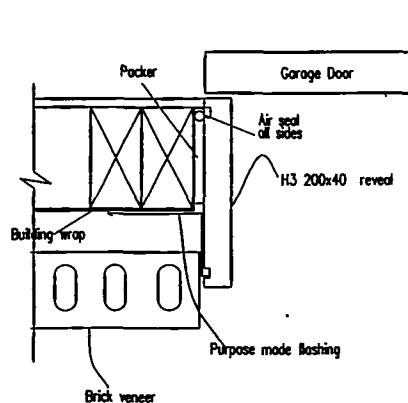


FIG. 26a Metre Box

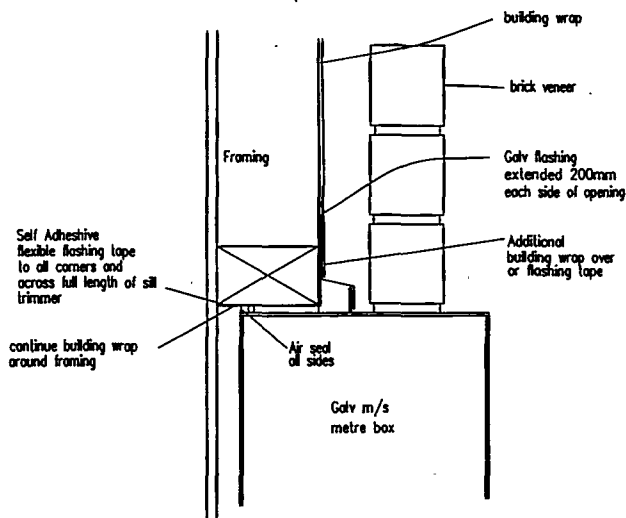


FIG. 37 WINDOW JAMB - Aluminium

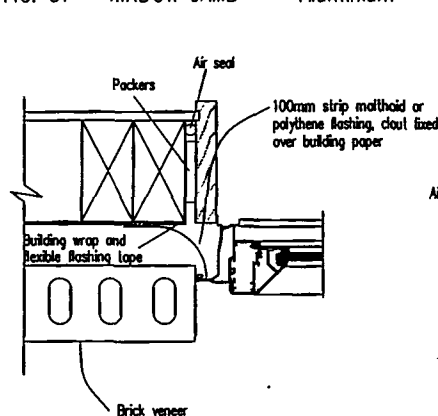
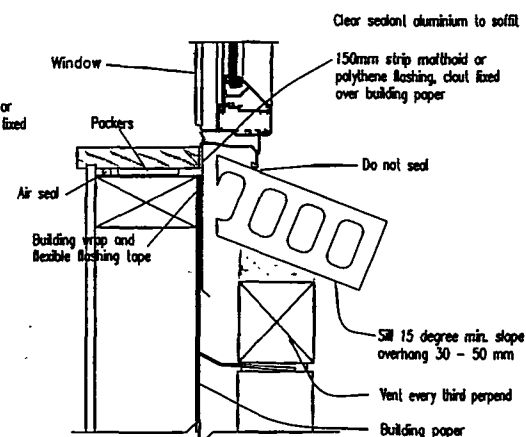


FIG. 39 WINDOW SILL - Aluminium



061208

RECEIVED
- 6 NOV 2003

[Signature]

CRONIN
DESIGN

9 Print Place Christchurch
Ph 03 3388394
merv@cronindesign.co.nz

Neiman Residence
Lot 1 Kenepuru Road
PICTON

Flashing

Merv Cronin - 12/02/00

Date

20/07/06

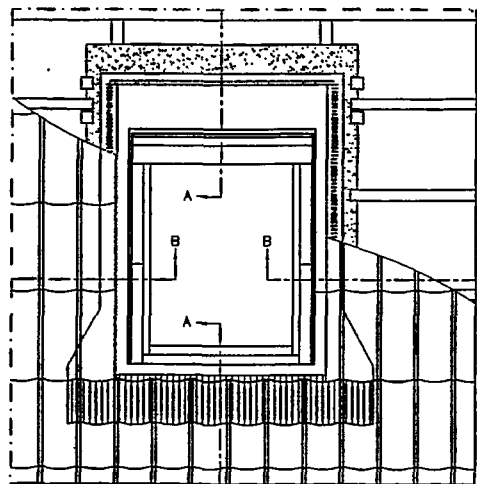
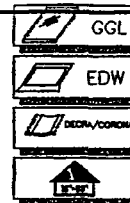
Scale
1:100

New Dwelling

Drawing No. 06225

RevNo S5 of 6

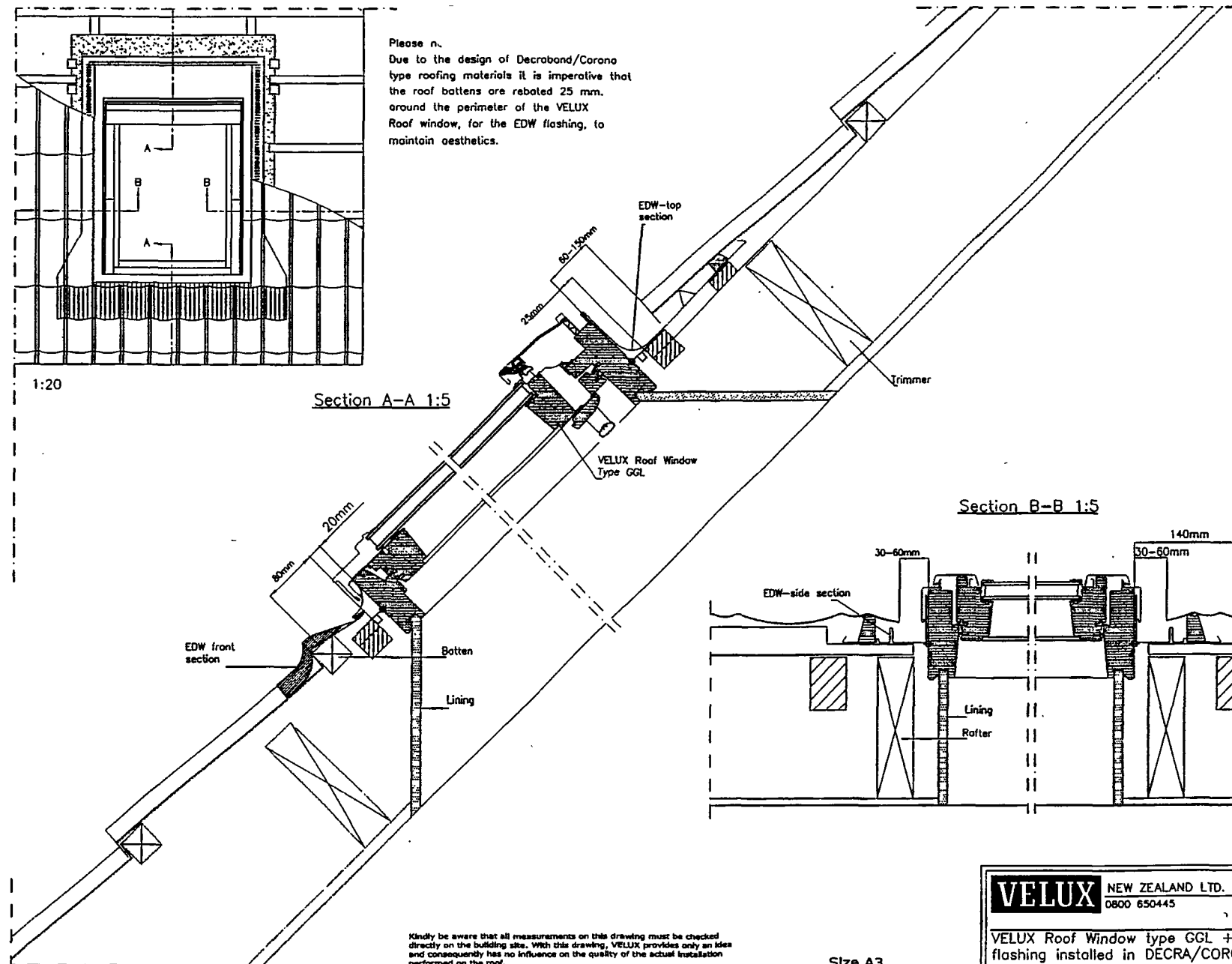
C:\2006-Plans (Rain)\06225\Neiman.dwg, 2/08/2006 1:25:42 P., Cronin Design



1:20

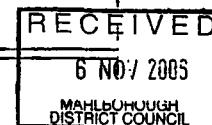
Section A-A 1:5

Please note:
Due to the design of Decrabond/Corona type roofing materials it is imperative that the roof battens are rebated 25 mm. around the perimeter of the VELUX Roof window, for the EDW flashing, to maintain aesthetics.



Section B-B 1:5

061208



Kindly be aware that all measurements on this drawing must be checked directly on the building site. With this drawing, VELUX provides only an idea and consequently has no influence on the quality of the actual installation performed on the roof.

Size A3
Scale 1:5 / 1:20

VELUX	NEW ZEALAND LTD.
	0800 650445
VELUX Roof Window type GGL + EDW flashing installed in DECRA/CORONA.	
File name / no. GGL_EDW_W_D - 04 06	

**CRONIN
DESIGN**

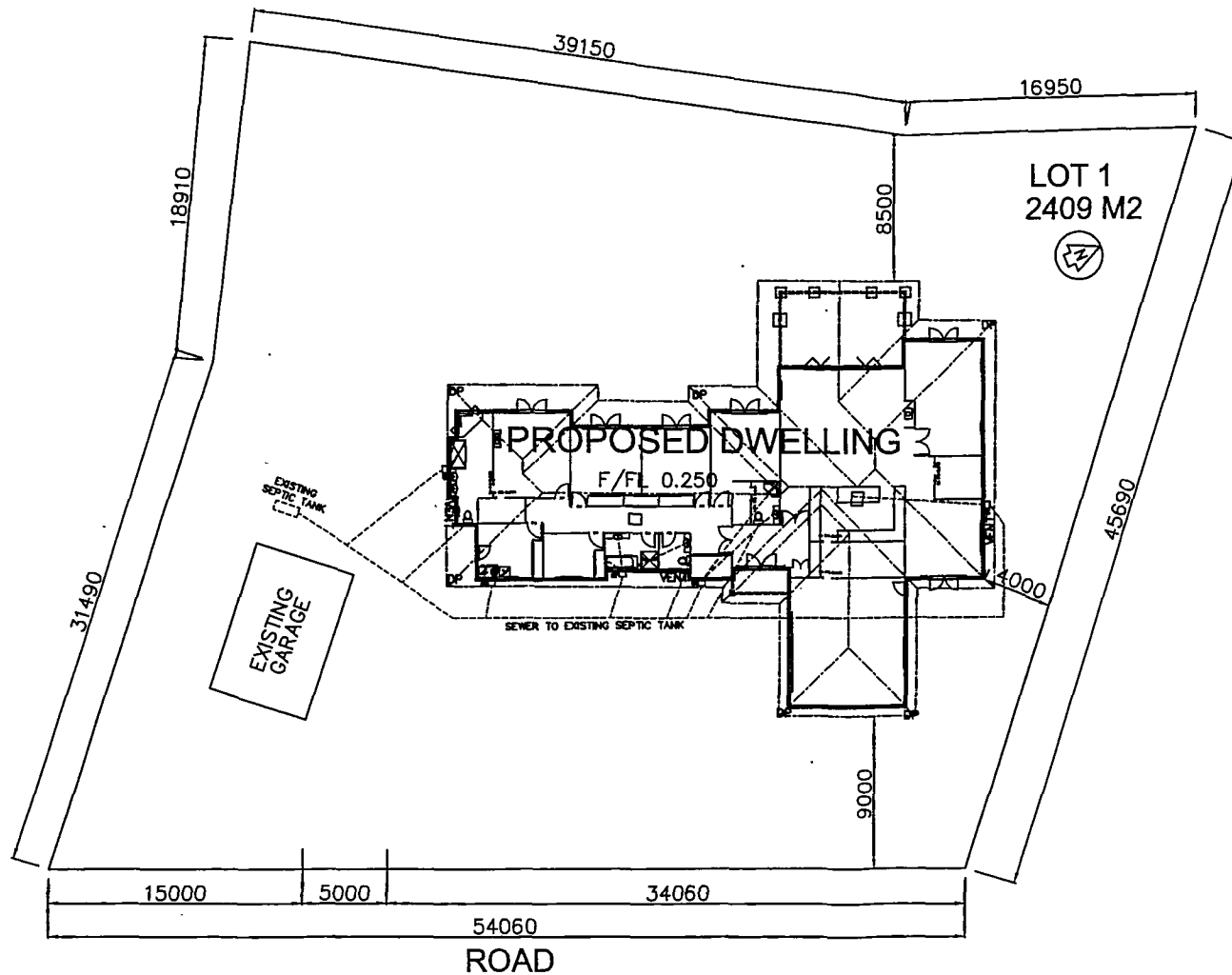
9 Print Place Christchurch
Ph 03 3388394
merv@cronindesign.co.nz

Neiman Residence
Lot 1 Kenepuru Road
PICTON

VELUX

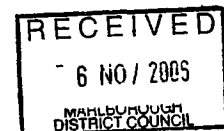
Designed by Merv Cronin - 520228	Date 02/08/06	Scale 1:100
New Dwelling		
Drawing No. 06225		RevNo S8 of 7

C:\2006-Plans (Rain)\06225\Neiman.dwg, 2/08/2006 1:36:16 PM, Cronin Design



100MM SEWER AND STORMWATER
1:120 MIN FALL
40MM WASTE PIPES
FROM FITTINGS
OVER 3.5M LONG TO BE VENTED
MIN FALL 1:40
DOWN PIPES INTO SOAK HOLES

061208



CRONIN
DESIGN

9 Print Place Christchurch
Ph 03 3388394
merv@cronindesign.co.nz

Neiman Residence
Lot 1 Kenepuru Road
PICTON

Site Plan

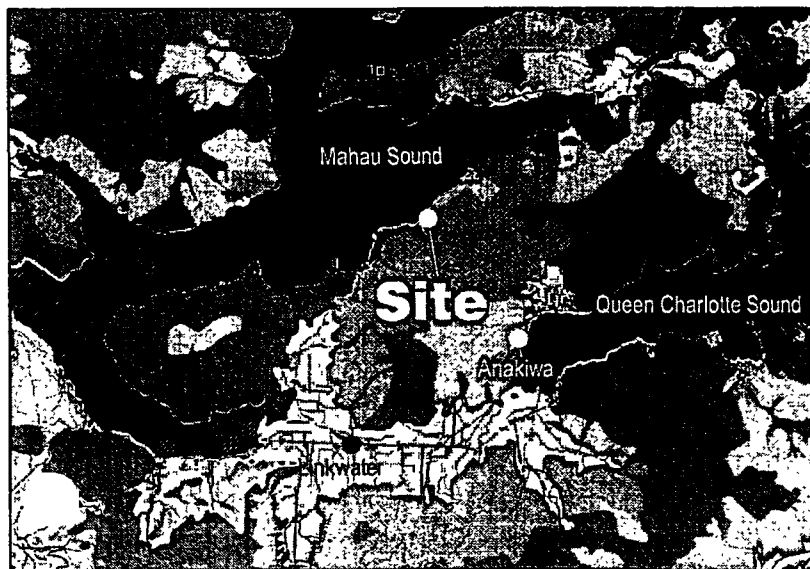
Designed by
Merv Cronin - R2002.90

Date
02/08/06

Scale
1:300

Drawing No. 06225

RevNo S7 of 7



1 **LOCALITY MAP**
NTS

Approx. Existing Trenches
(to be abandoned)

Lot 2
DP 12278

LEGEND

- P1 Penetrometer Test Site
- AG2 Hand Auger Test Site
- W1 Wastewater Test Site

Existing Septic Tank
- to be upgraded to
Ecogent Secondary
Treatment System

Existing
Garage

Sequencing
valve

Proposed
Dwelling

Lot 1
DP 12278

Lot 1
DP 8447

RECEIVED
6 NOV 2006
MAHLBOURGH
DISTRICT COUNCIL

061208

Note: This drawing has been adopted from Cronin
Design Drawing 06225, S7 of 7, dated 02.08.06

Dose Pumped
Effluent Trenches
Min total length 100m

Kenepuru Road

2 **SITE PLAN**
1:300

NOTES

Do not scale from this drawing. Only figured dimensions are to be taken from this drawing. The contractor must verify all dimensions on site before commencing any ordering of materials, work or shop drawings. The contractor must report any discrepancies to the Engineer before commencing work. If this drawing exceeds the quantities taken in any way, the Engineer is to be informed before the work is started. This drawing is Copyright and must not be reproduced without the consent of Smart Associates Ltd. The Engineer is to be given at least 2 weeks notice of the beginning of construction works, and at least 48 hours notice of critical items (eg concrete pours, prelining etc). The Engineer reserves the right to alter the design in light of site circumstances including previously unforeseen design issues.

SITE PLAN

DRAWN DD

CHECKED JD

SCALE
(A3) As Shown

COMPUTER FILE: drawings\

DRAWING No.

001

DATE 01.11.06

REVISION /