SmartAlliances Ltd
PO Box 546
Blenheim, 7240

T: 03 579 6211
F: 03 579 6233
E: info@smartalliances.co.nz

J.Keenan

Proposed Relocated Dwelling, Queen Charlotte Drive, Linkwater

- On-site Wastewater Management Report

23 August 2012 Our ref: 3462

James Keenan
Three (3) Bedroom House
Queen Charlotte Drive, Linkwater.

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Issue No.	1	2	3	4	5	6
Date	23.08.12					
Prepared By	JH					
Approved By	KS					

1 Executive Summary

Smart Alliances have carried out an engineering appraisal of the on-site wastewater management criteria for the proposed relocation for James Keenan (the client) at Lot 2, D.P.414569, Queen Charlotte Drive, Linkwater (proposed 2.38ha Lot created in Resource consent U120053).

The client wishes to relocate a three bedroom house to the property. There is sufficient area to treat and dispose of the wastewater created from the house.

The wastewater management system for the proposed dwelling should comprise a primary treatment unit (septic tank) fitted with a filter at the outlet and a dual flout in a dosing chamber. The wastewater should be distributed into a shallow bed land application area.

The application area should be split into three beds totalling a minimum of 150m^2 in area.

Installation is to be in accordance with the requirements and recommendations of AS/NZS 1547:2012.

The recommendations listed above should not be taken in isolation and must be read in conjunction with the remainder of this report and the context of the proposed residential development at the site.

2 Introduction

Mr Keenan proposes to relocate a three bedroom dwelling to his property located at Lot 2, D.P.414569, Queen Charlotte Drive, Linkwater (proposed 2.38ha Lot created in Resource consent U120053).

The purpose of this report is to present the results of site investigations carried out in relation to the on-site wastewater treatment and land application for the dwelling. The site investigations were carried out on 20 July 2012.

3 Location & Site Description

The property is located on Queen Charlotte Drive, approximately 1.5km west of Kenepuru Road at Linkwater.

The property borders the road reserve and two (2) privately owned neighbouring properties to the southwest and east.

The property is open pasture and comprises of a gentle to moderate sloping landform running south-north from the foothills. Drainage channels are established at the south and east of the property.

Locations of all the features of the property are shown on the site plan attached in Appendix A.

4 Wastewater Assessment

The site investigation has identified that the property is suitable for wastewater disposal by primary treatment (septic tank), dose loaded (dual flout) coupled with shallow bed land application.

The size of the property allows utilisation of the existing land gradients to achieve adequate treated wastewater distribution. Hence our recommendation that a gravity fed system is used.

Three hand augured boreholes, numbered Au1 to Au3, were put down at the site in the proposed land application area. Their locations are shown on the site plan provided in Appendix A.

Based on the soil assessment carried out, an average drainage category of 5 has been adopted. Soil analysis placed the B horizon between a Category 4 clay loam and Category 5 light clay. A conservative approach was adopted to allocate a drainage category of 5. With this considered, and the strongly structured nature of the peds, a maximum design loading rate of 8mm/day is considered appropriate. Logs of the representative soil properties are provided in Appendix B.

Groundwater was not encountered within the subsurface investigation and is anticipated to be at a depth greater than 2m below ground level. An open channel drains the property from the south-west to the north-east. The wastewater field is approximately 29m from the closest point of the western drainage channel.

The site is exposed to both wind and sun.

An assessment of the best practical option has determined that primary treatment (septic tank) coupled a dose loaded (dual flout) and shallow bed land application is appropriate for the site conditions and constraints.

The primary treatment system is expected to achieve the following treatment levels:

BOD after 5 days (average) < 150 g/m^3
Suspended solids (average) < 80 g/m^3

A wastewater design sheet is provided in Appendix B with the design calculation based on the following criteria for the proposed development:

- 6 person occupancy
- Loading of 1200 litres/day.
- Soil category 5
- Design loading rate of 8mm/day

Based on the criteria above, the minimum total area of the application field is $150m^2$.

We therefore recommend the application field be split into three evenly sized beds, each 18m long and 2.8m wide. It is recommended that the field be raised 150mm above ground level to ensure the base of the field is within the 250-300mm topsoil

layer. Flax planting on the raised beds is recommended to provide additional transpiration and aid in disposal. A shallow trench is recommended on the upslope side of the disposal area to direct surface water runoff away from the field. Details of the application bed are shown in Appendix A.

5 Assessment of Environmental Effects

An onsite wastewater system is required as there is no reticulation in the area.

Because of the following reasons we do not envisage the wastewater becoming an environmental risk:

- No ground water in the vicinity of the wastewater field
- Split field – alternate loading, rest period
- Restrictive soil qualities (clay)
- Large property size
- Large distance to marine environment and the environmental buffering capacity of land

The proposed wastewater treatment system that will treat the wastewater created from the relocation generally complies with AS/NZS 1547:2012 and the Council Guidelines.

Field percolation rates vary according to the soil type. We have classified the soil as a category 5 type soil which has limitations for on-site disposal due to a low percolation rate. The soil is prone to biological slime clogging of the clay pores, in dry weather shrinkage channels form in the upper layers of clay and effluent passes through the cracks without effective treatment. In order to overcome this issue adequate disposal area is required to provide long term disposal capacity.

The filter installed at the outlet of the septic tank will improve the BOD_5 and SS and lessen the risk of soil clogging.

The risk from the wastewater system contaminating drinking water is negligible. Set back distances are favourable, soil classification has been conservative and a large disposal area has been designed. There is an approximate 350m distance from the application area to the closest marine environment (Mahakipawa Arm).

In a system failure, it is likely the wastewater will seep above the field or track through the soils and create seepage further down the slope. There will be an unpleasant odour and saturated unusable areas.

The effects will be easily identifiable, inhibit the applicant's use of the land and be generally unpleasant. The owner will want to address the failure and repair / install a new wastewater system.

The property is relatively large and a reserve area is available to relocate the field should the field fail.

The effect of a failed system will primarily affect the applicant's property. The land falls towards the road reserve, with agricultural land lying to the north of this.

Regular maintenance and inspection by the owner will ensure the onsite wastewater system is operating to a suitable standard.

Provided the proposed system is installed, operated and maintained any effects on the environment will be in accordance with the environmental outcome provided for by the Council guidelines. Analysis against each of the criteria from these rules is provided in the tables supplied in Appendix C.

6 Conclusion

There is sufficient area to treat and dispose of the wastewater created from the proposed relocated three bedroom house.

The wastewater management system for the proposed dwelling should comprise a primary treatment unit (septic tank) fitted with a filter at the outlet and a dual flout in a dosing chamber. The wastewater should be distributed into a shallow bed land application area.

The application area should be split into three beds totalling a minimum of 150m^2 area.

Installation is to be in accordance with the requirements and recommendations of AS/NZS 1547:2012.

7 Limitations

This report is valid for five years from the date of issue and covers the onsite wastewater treatment for a three (3) bedroom house on Lot 2, D.P.414569, Queen Charlotte Drive, Linkwater for James Keenan. 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.

8 References

1. NZS 1547:2012 On-site Domestic Wastewater Management.

2. Marlborough District Council Guidelines for New On-site Wastewater Management Systems, July 2005.

3. Marlborough Sounds Resource Management Plan

4. Centre for Environmental Training – Site and Soil Assessment for Onsite Wastewater Management System Design - Course, 18-20 July 2012.

5. Liping Pang (ESR Christchurch). *Microbial removal rates in subsurface media estimated from published studies of field experiments and large intact soil cores*. J.of Environmental Quality. Vol 38. July-Aug 2009. pp 1531-1559.

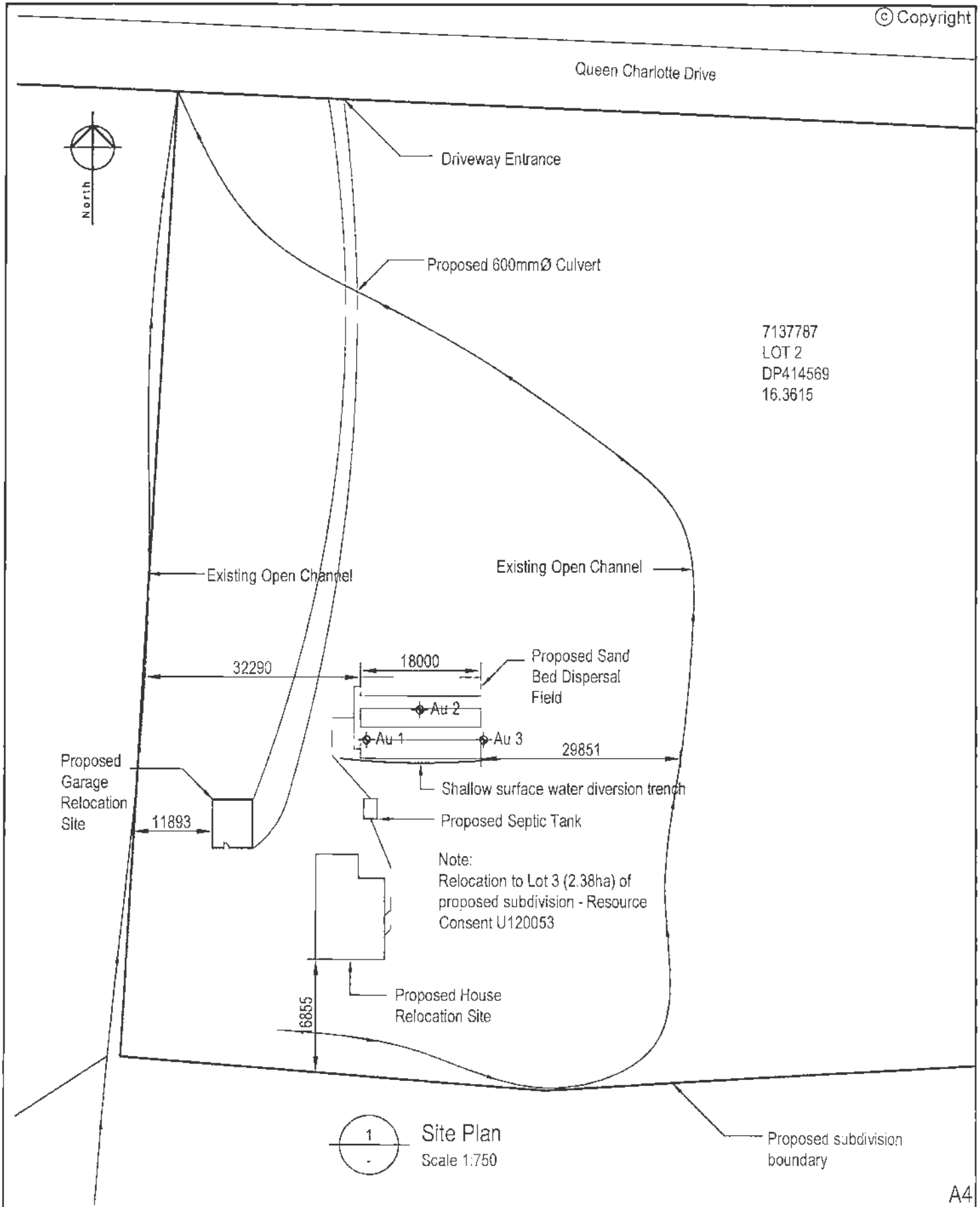
SMART ALLIANCES LTD

Jeremy Harnett
Environmental Scientist
BRS, BEnvMgmt (Hons)

31 July 2012

Appendix A - Drawings

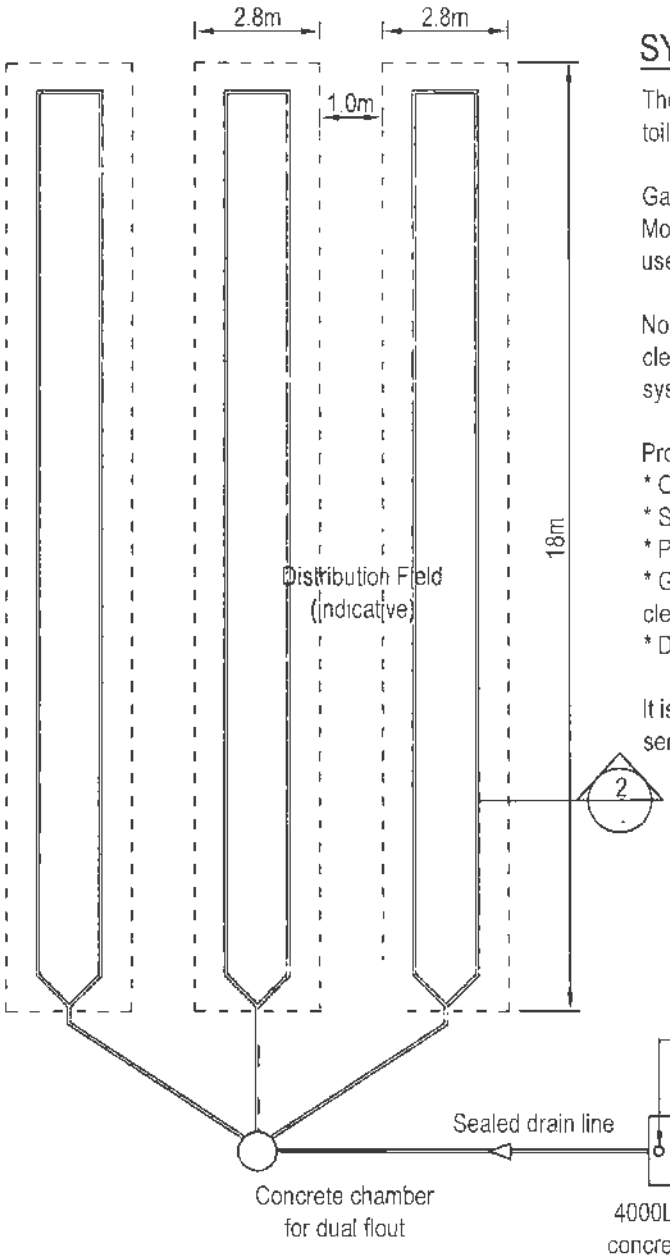
- Site Plan Drawing
- Typical bed application area details



1 / - Site Plan
Scale 1:750

A4

	PROJECT: KEENAN RELOCATE	smartalliances ltd TEL 03 579 6211 FAX 03 579 6233 PO BOX 348 BLENHEIM NEW ZEALAND	DWG NO: 3462-G10 AMENDMENT:
			DATE: 23-08-12 SCALE: 1:750
AMENDMENT DATE DETAILS	DRAWING: SITE PLAN	CAD FILE REF: 3462-DRAWINGS DRAWN: JH APPROVED: KS	ISSUE: REPORT



SYSTEM USE & MAINTENANCE

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.

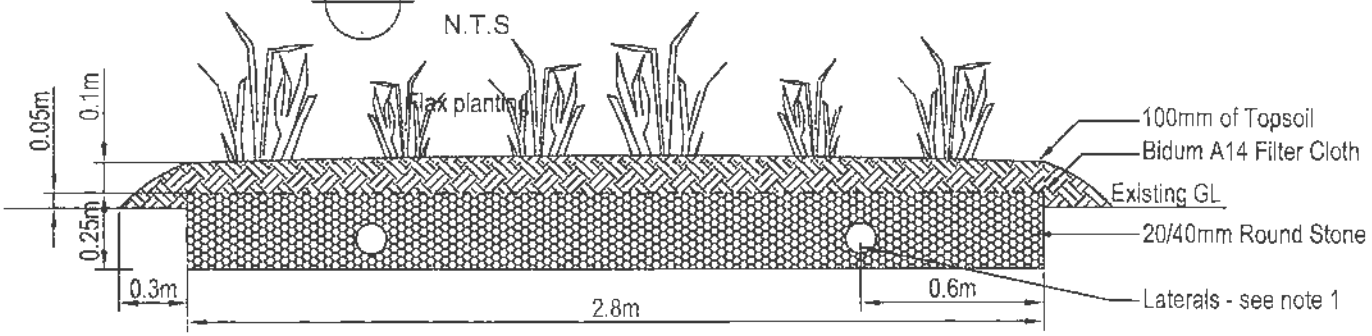
Garbage grinders are not recommended, although they need not be forbidden. More frequent de-sludging of the system may be needed if a garbage grinder is used.

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.

Prohibited discharge to the system:
* Oil/grease from a deep frier (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.

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

1 TYPICAL BED LAYOUT
N.T.S



2 TYPICAL BED CONSTRUCTION
N.T.S

Note:
1 Distribution drains to be U-PVC 100mm Ø perforated pipe laid flat with perforations comprising at least 2 % of surface area. (10mmØ slots at 100mm centres from 4 to 8 o'clock positions).

Do not scale from this drawing

	smartalliances LTD	PROJECT: RELOCATED DWELLING LINKWATER	ISSUE: REPORT
	CLIENT: JAMES KEENAN	DRAWING: WASTEWATER DETAIL	DATE: 23-08-12 · SCALE (A4): N.T.S · DRAWN: JH · REVISION: 01 · APPROVED: KS · DWG NO.: 3462-G11
REV	DATE	DETAILS	

CAD FILE REF: P:\3462-DRAWINGS

Appendix B – Wastewater Details, Calculations and Logs

smartalliances
ENGINEERING / RESOURCE MANAGEMENT / ARCHITECTS LTD

Project: 3462
Client: J.Keenan
Location: Queen Charlotte Dr, Linkwater
Date: 01.08.12

WASTEWATER SYSTEM DESIGN SHEET

To AS/NZS 1547:2012

Number of Existing Bedrooms: 3

Intended water Supply: Bore or Well Supply

Soil Category Determined on Site Category 5

Recommendation for this site: *Primary Treated Effluent in shallow gravity fed bed disposal*

DRAINAGE CONTROLS:
Need for surface water collector / cut-off drains? *No*

AVAILABILITY OR RESERVE / SETBACK AREAS
Reserve area available for extensions, % of design area: *100%*
Setback distance? (between development and disposal system):

DESIGN
Daily Loading Rate: *8.0* mm/day

Occupancy: 6 *Persons*

L/person/day: 200 L/p/d = 1200 L/day from Appendix 4.2D AS/NZS 1547:2012

DESIGN DAILY FLOW:	1200	L/day
SEPTIC TANK SIZE (MIN):	4000	(MDC Specification)
AREA REQUIRED:	150	m²
LENGTH REQUIRED:	54 m with	2.8 metre wide beds
RESERVE AREA REQUIRED:	100%	of specified
BED LENGTH:	18	m
NUMBER OF BEDS:	3	
RECOMMENDED LAA =	**3x 18m by 2.8m beds**	

Wastewater Logs - 3462

One hand augered boreholes, numbered Aug 1 to Aug 3, were put down at the site in the location of the proposed land application area and their locations are shown on the site plan in Appendix A. The representative soil properties are:

Aug 1

Lower Depth (m)	Horizon or Layer Boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture Condition	
0.3	A	Topsoil	Dark brown	Silt Loam	None	Moderate	Firm	Moderate	Slightly Moist	3
0.9	B	Residual	Yellow Brown	Clay loam/Light Clay	None	Firm	Stiff	Strong	Moist	4-5

Aug 2

Lower Depth (m)	Horizon or Layer Boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture Condition	
0.25	A	Topsoil	Dark brown	Silt loam	None	Moderate	Firm	Moderate	Slightly Moist	3
0.9	B	Residual	Yellow Brown	Clay loam/Light Clay	None	Firm	Stiff	Strong	Moist	4-5

Aug 3

Lower Depth (m)	Horizon or Layer Boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture Condition	
0.25	A	Topsoil	Dark brown	Silt loam	None	Moderate	Firm	Moderate	Slightly Moist	3
0.9	B	Residual	Yellow Brown	Clay loam/Light Clay	None	Firm	Stiff	Strong	Moist	4-5

Appendix C – Site Photographs
Assessment of Resource Management Conditions

Disposal Field looking North

Auger 1

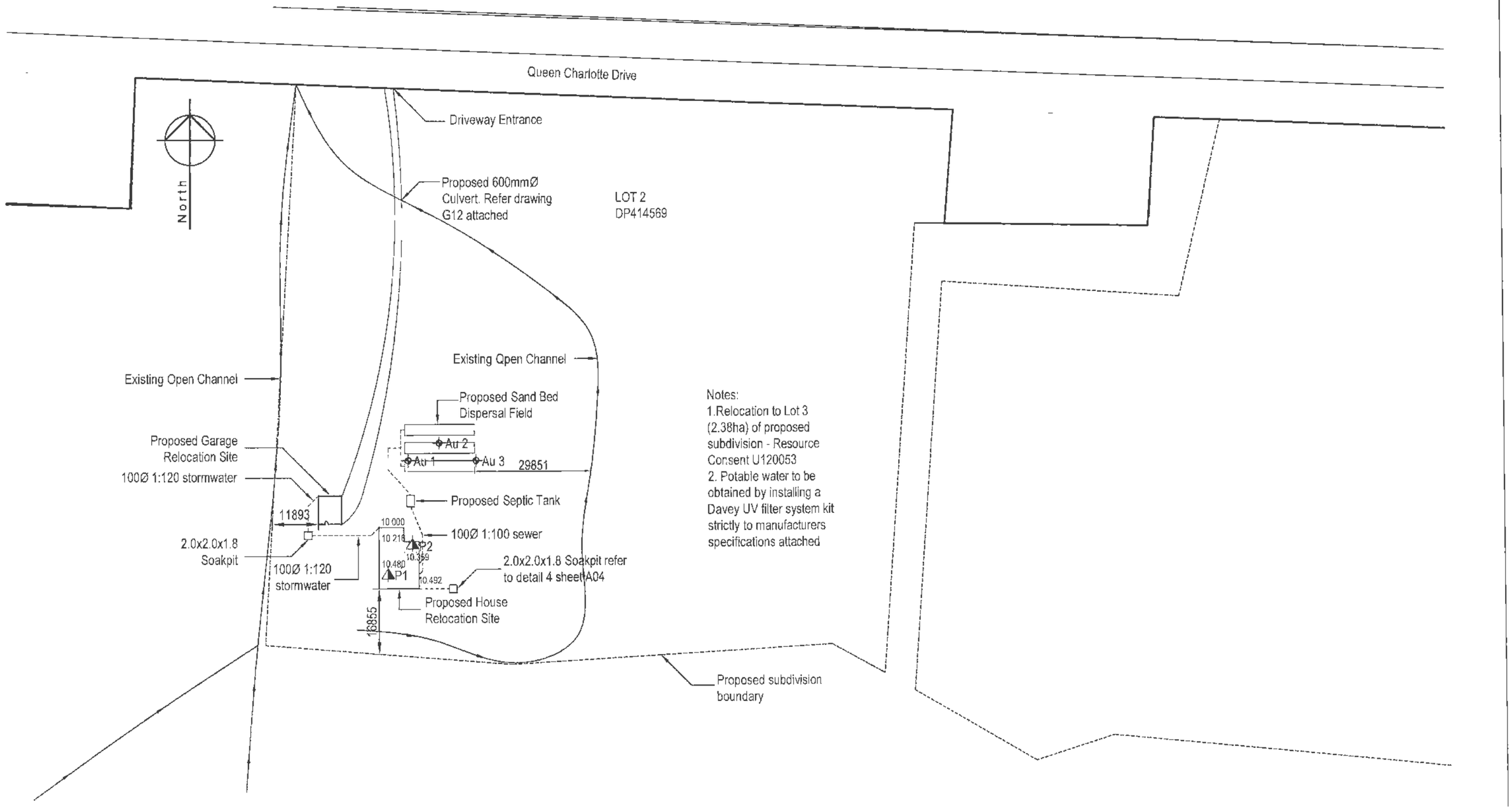
Auger 2

Auger 3 – additional excavation with shovel

36.3.4 The Discharge of Domestic Wastewater Authorized by Resource Consent Prior to 21 April 2005, or the Discharge of Domestic Wastewater, Through any On-site Wastewater Management System Installed after 21 April 2005, into or onto Land.

36.3.4.1 Matters to Which the Council has Restricted the Exercise of its Discretion:	**Analysis**	
(a) The domestic wastewater shall not be discharged into soil determined to be Category 1, 4, 5 or 6 soil (in accordance with the Council's guidelines for the investigation, design, installation and maintenance of on-site wastewater management systems) if it is proposed to use a conventional on-site wastewater management system; and	The discharge is proposed into Category 5 soil. The system proposed to be installed is not a conventional system in order to provide the same level of treatment as would result from a conventional system on Grade 3 soil.	
(b) The term of the discharge permit shall not exceed 15 years;	This limitation can be placed on any resource consent by way of a condition of consent.	
36.3.4.2 Matters to Which the Council has Restricted the Exercise of its Discretion:		
(a) The proximity of the discharge to any surface water, groundwater or coastal water and any actual or potential adverse effects of the discharge on water quality;	**Water Source:**	**Offset:**
	Surface Water	Min 29m
	Ground Water	>2m
	Coastal Water	Min 350m
(b) The proximity of the discharge to any public sewer;	No public sewer in close proximity to the site	
(c) The proximity of the discharge to other discharges of domestic wastewater and the potential for cumulative effects;	Approximately 90m, cumulative effect minimal due to large separation distance	
(d) The potential for the discharge to adversely affect the quality of water in any river or aquifer, or in the coastal marine area;	Low – Refer to Section 5 of the Engineering Report	
(e) The potential for the discharge to initiate instability or make existing instability worse;	Gentle to moderate slopes, no signs of instability, very low risk of the discharge to initiate instability.	
(f) The extent to which the proposed on-site wastewater management system complies with the Council's guidelines for the investigation,	The new system generally complies with NZS1547:2012 and the Councils Guidelines for New On-Site Wastewater Management Systems.	

design, installation and maintenance of on-site wastewater management systems;		
(g) The site conditions, including the nature of the soil and soil depth;	Refer to Sections 3, 4 & 5 of the Engineering Report.	
(h) The nature of the on-site wastewater management system and the appropriateness of the system to the site conditions;	The on-site wastewater management system is a primary treatment system with a filter and dual flout. The system has been designed to suit the site conditions.	
(i) The capacity of the treatment unit and the level of treatment;	4000 Litre tank (as required to provide settling volume and scum and sludge capacity - allowing desludging/pumpout every 3 years) Tank fitted with a filter on the outlet reducing solids to a 3mm size. The treatment level expected from this type of system is in the order of 150g/m^3 BOD_5 and 80g/m^3 SS.	
(j) The rate and method of discharge;	Dose loaded (flout allows for this). 300 litres per load. 1200 litres total daily load so expect four (4) loads per day.	
(k) The size of the land application area and alternative locations for the land application area;	The size of the land application area is 120m^2, this is split into beds 18m in length. The best location is directly in front of the new house as shown on the site plan.	
(l) The necessity for monitoring the performance of the on-site wastewater management system; and	Six monthly inspection of the filter and siphon by the owner and 3 yearly pumpout / inspection by a recognized maintenance contractor.	
(m) The management and maintenance of the on-site wastewater management system, including the ability to access the on-site system for maintenance purposes; and	Access is good off Queen Charlotte Drive. Primary treatment is simple and has minimal moving parts therefore is less likely to malfunction. Management of the system is the owners responsibility, of there are issues with the system that cannot be resolved by owner they must contact a recognized maintenance contractor to service the system.	
(n) Alternative on-site wastewater management systems.	**Type of system:**	**Reasons:**
	Trenches & Beds	Used on this site
	Dripper Line (secondary treatment)	Requires secondary treatment, secondary treatment systems require constant power supply, a lot of maintenance and are prone to malfunction. Not advised here as conditions favour bed option.
	ETS Trenches & Beds	Used where there are low permeability soils, not the case on this site.
	Mound	Used where there is low permeability or rapidly draining soils or high ground water, not the case on this site



1 Site Plan
Scale 1:1000

Do not scale from this drawing

REV	DATE	DETAILS
01	23-08-12	For Consent

REV	DATE	DETAILS

smartalliances Ltd
1st Floor River View House 10 High Street Blenheim New Zealand
T: 03 578 6211 F 03 578 6233 PO Box 546 Blenheim 7240
E: info@smartalliances.co.nz Website: www.smartalliances.co.nz

CLIENT
James Keenan

ISSUE
For Consent

PROJECT
Keenan Relocate
Queen Charlotte Dr, Picton

DRAWING
Site Plan

DATE
23-08-2012

SCALE (A3)
AS SHOWN

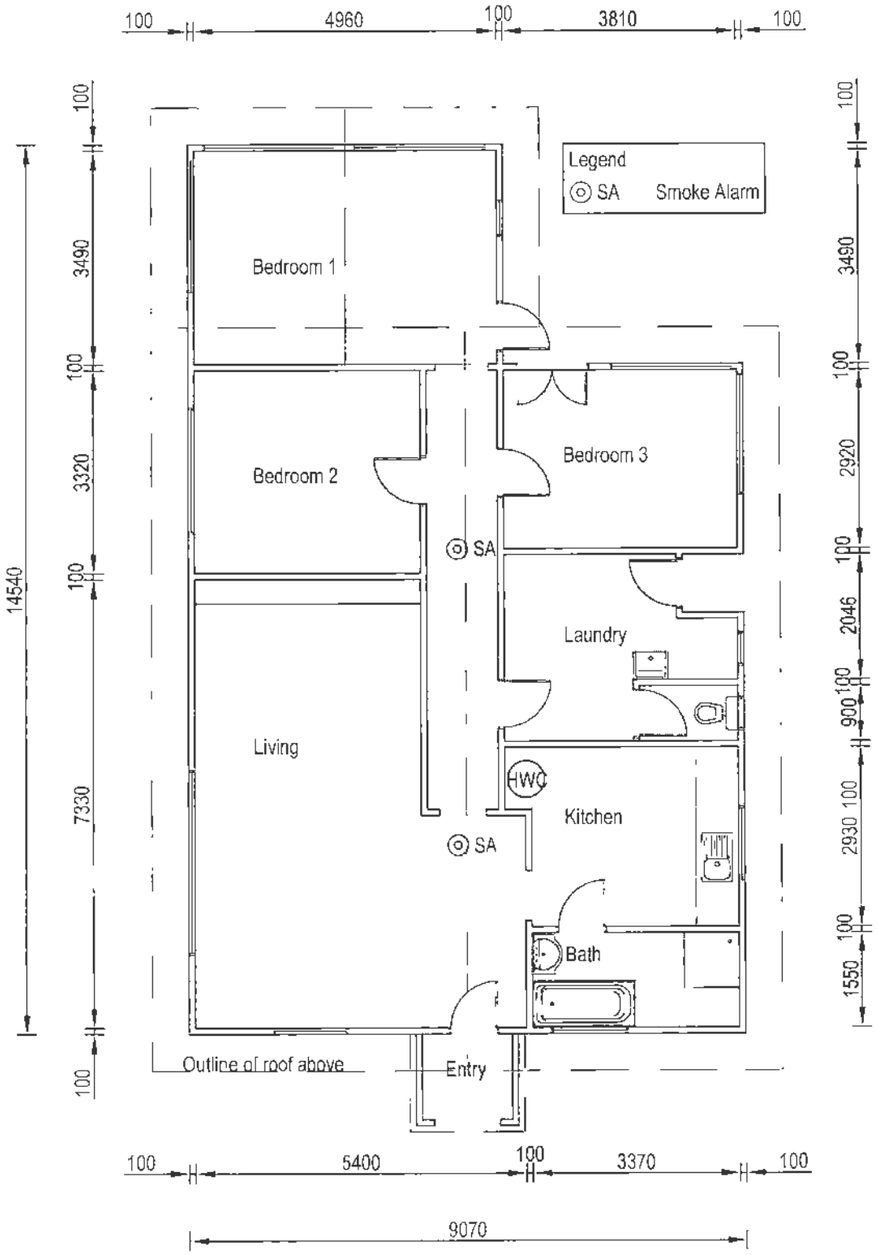
DRAWN
JH

REVISION
01

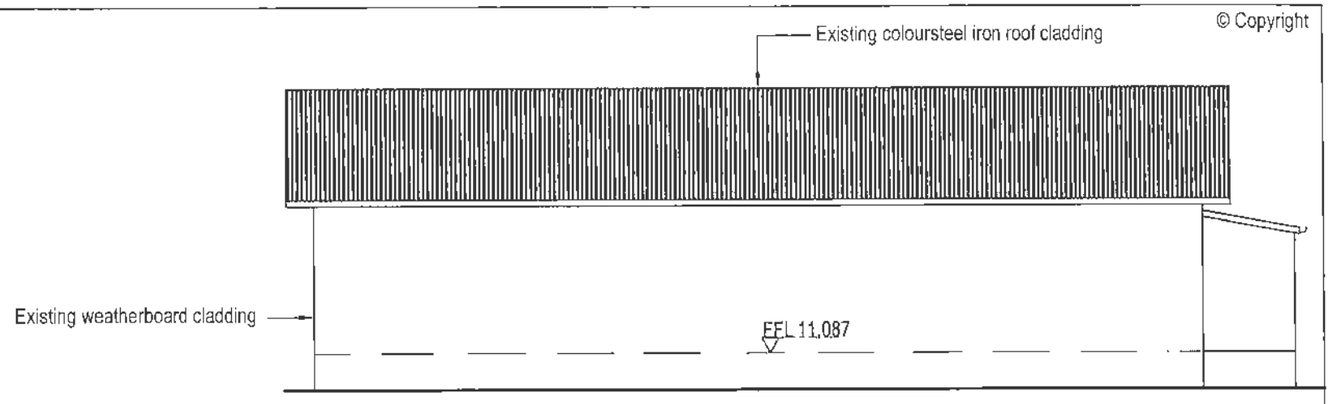
APPROVED
DWN

DWG NO.
3462-A01

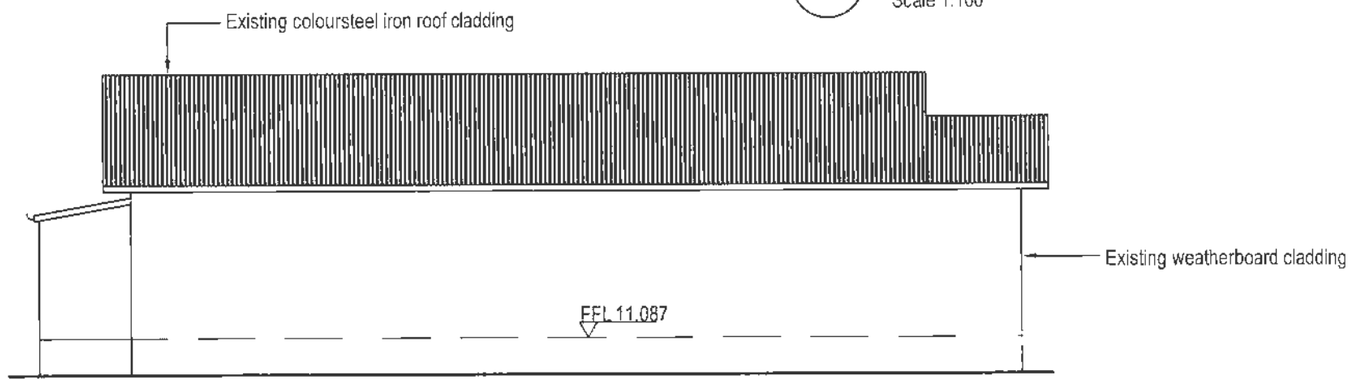
CAD FILE REF: P:\ 3462\Drawings\3462-Arch-01



1 Floor Plan
Scale 1:100



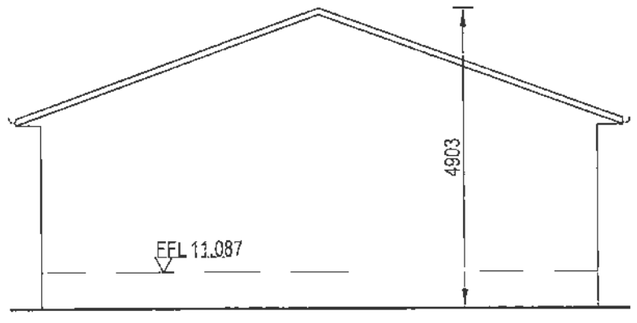
2 East Elevation
Scale 1:100



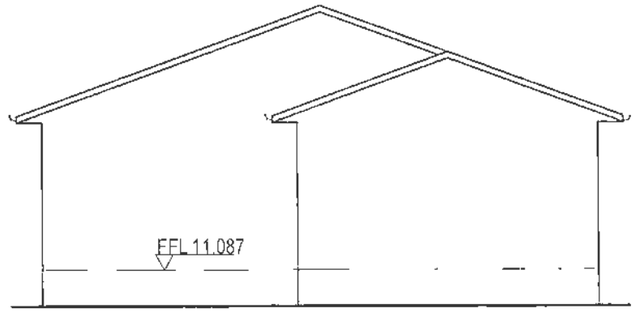
3 West Elevation
Scale 1:100

Note: Subfloor to be left open or to be enclosed with H3.2 timber base boards with 20mm wide slots between for ventilation

Notes:
1. All work to comply with NZS3604:2011 and New Zealand Building Code unless specified otherwise.
2. Check all measurements on site.
3. Timber framing to be Radiata Pine SG8. All deck framing, timber fascias & finishing timbers to be H3.2 treated.



4 South Elevation
Scale 1:100



5 North Elevation
Scale 1:100

Do not scale from this drawing

REV	DATE	DETAILS
01	23-08-12	For Consent

smartalliances Ltd
1st Floor River View House 10 High Street Blenheim New Zealand
T: 03 579 6211 F 03 579 6233 PO Box 546 Blenheim 7240
E: info@smartalliances.co.nz Website www.smartalliances.co.nz

CLIENT
James Keenan

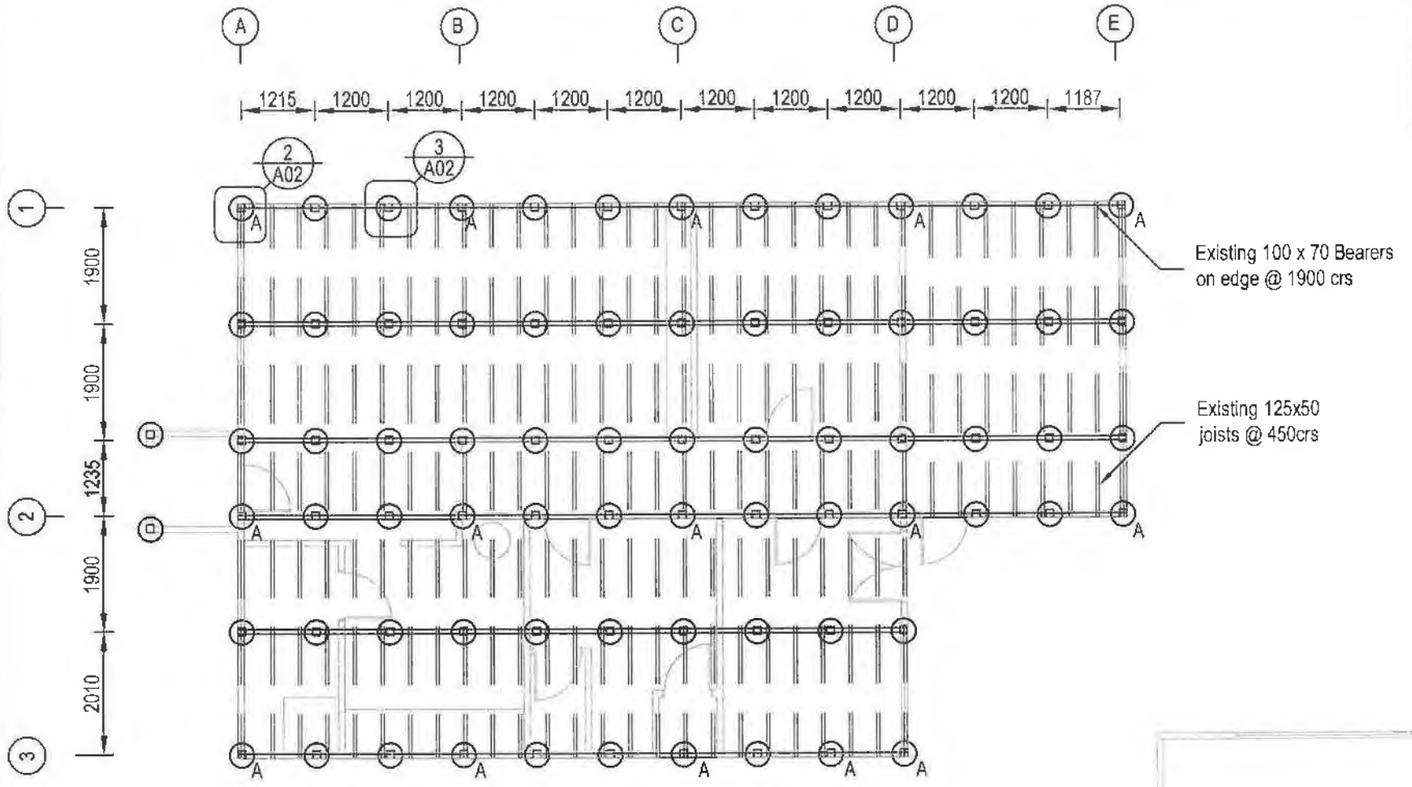
ISSUE
For Consent

PROJECT
Keenan Relocate
Queen Charlotte Dr, Picton

DRAWING
Floor Plan
House Elevations

DATE 23-08-2012
SCALE (A3) AS SHOWN
DRAWN JH
REVISION 01
APPROVED
DWN
DWG NO. **3462-A02**

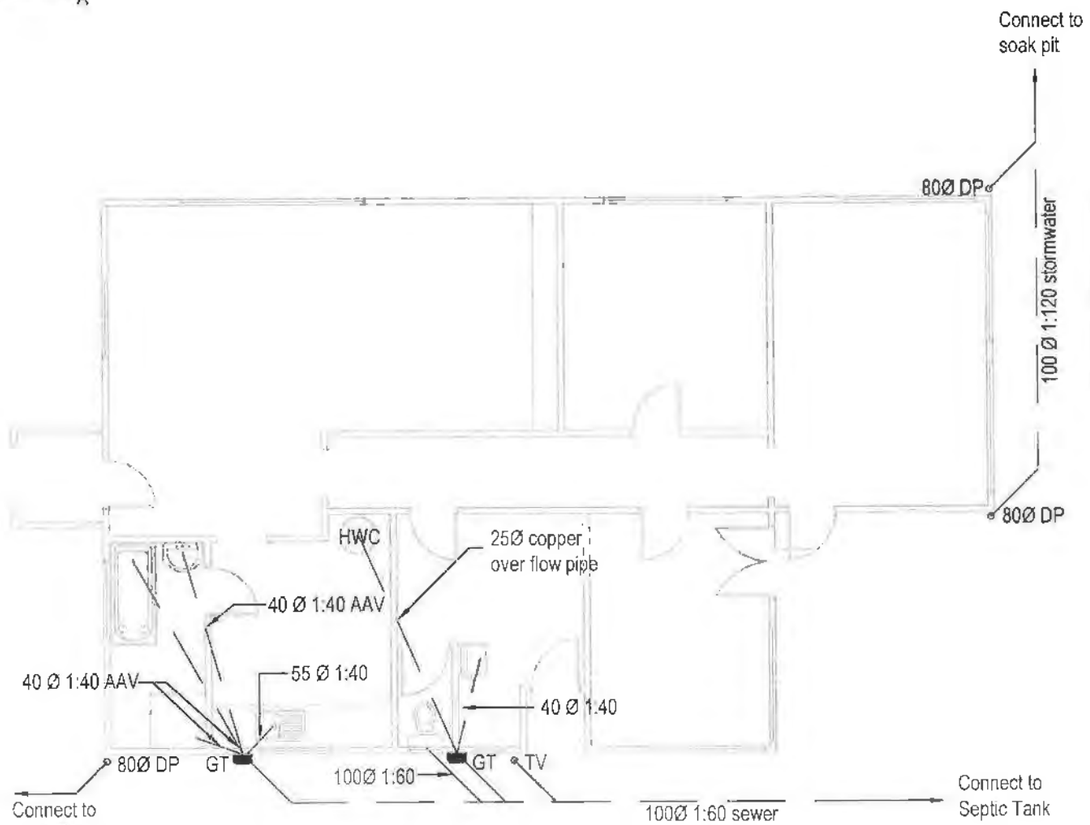
CAD FILE REF: P:/3462/Drawings/3462-Arch-01



1 Subfloor Plan
Scale 1:100

Legend:
- A Anchor Pile
- Ordinary Pile

Note:
1. All pile locations to match existing pile location determined on site.
2. All piles to be 125x125 H5 treatment



Legend:

GT	Gully Trap
TV	Terminal Vent
DP	Downpipe
AAV	Air Admittance Valve

2 Plumbing Plan
Scale 1:100

Do not scale from this drawing

REV	DATE	DETAILS
01	23-08-12	For Consent

REV	DATE	DETAILS

smartalliances LTD
ENGINEERING RESOURCE MANAGEMENT ARCHITECTS
1st Floor River View House 10 High Street Blenheim New Zealand
T: 03 579 6211 F: 03 579 6233 PO Box 546 Blenheim 7240
E: info@smartalliances.co.nz Website: www.smartalliances.co.nz

CLIENT
James Keenan

ISSUE
For Consent

PROJECT
Keenan Relocation
Queen Charlotte Dr, Picton

DRAWING
Subfloor Plan
Plumbing Plan

DATE 23-08-2012	SCALE (A3) AS SHOWN
DRAWN JH	REVISION 01
APPROVED DWN	DWG NO. 3462-A03

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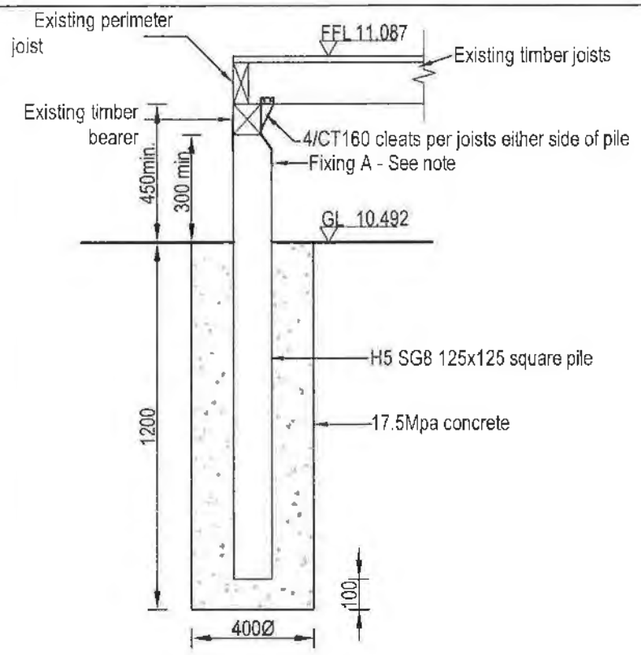
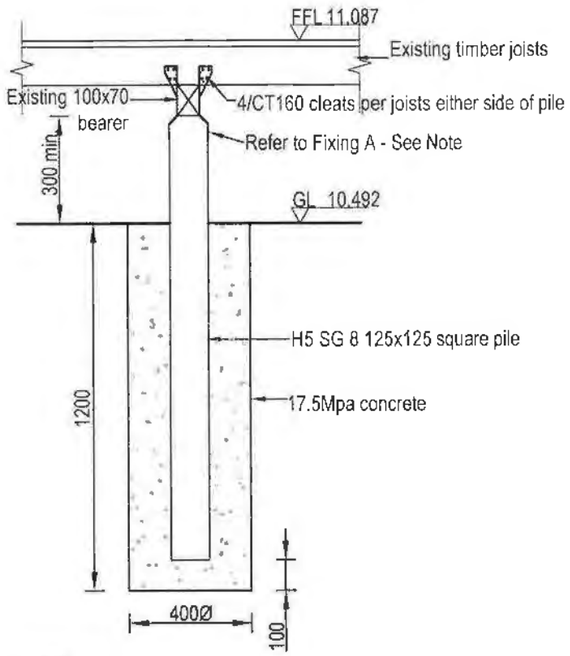
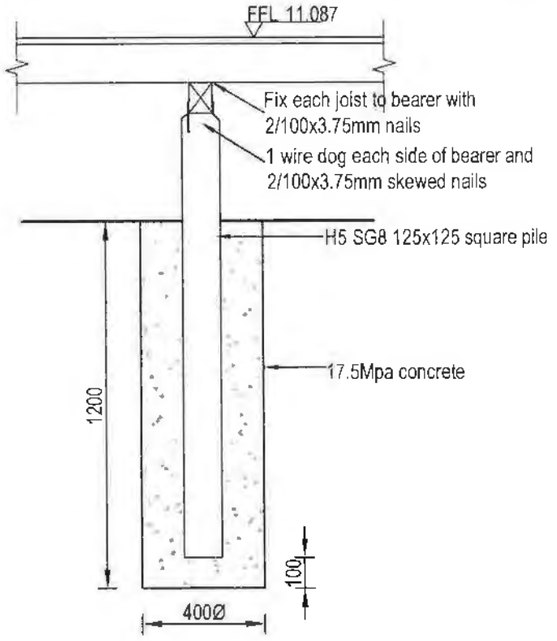


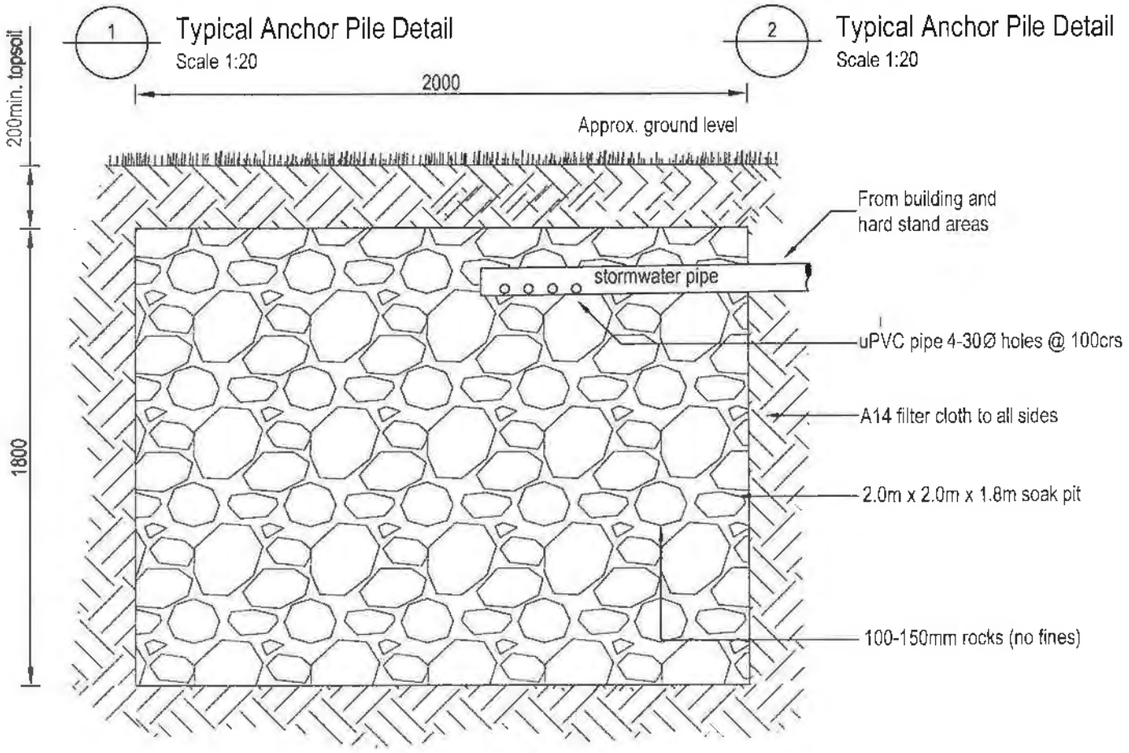
1 Typical Anchor Pile Detail
Scale 1:20



2 Typical Anchor Pile Detail
Scale 1:20

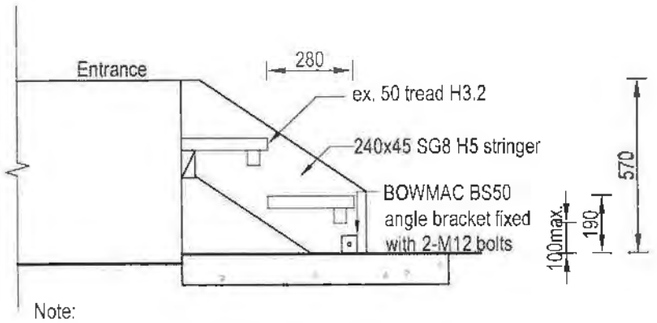


NOTE:
1. Fixing A = LUMBERLOK 12kN anchor pile nailon galv plates to each side of pile. Fix with 16 nails to each plate and 2-galv skew nails to bearer



4 Soak Pit Detail
Scale 1:20

3 Typical Ordinary Pile Detail
Scale 1:20



Note:
Build up ground to required level for steps or if 4 or more steps required, handrail will need to be installed in accordance with NZBC D1

5 Stair Section
Scale 1:20

Do not scale from this drawing

REV	DATE	DETAILS
01	23-08-12	For Consent

smartalliances LTD
1st Floor River View House 10 High Street Blenheim New Zealand
T: 03 579 6211 F: 03 579 6233 PO Box 546 Blenheim 7240
E: info@smartalliances.co.nz Website www.smartalliances.co.nz

CLIENT: James Keenan

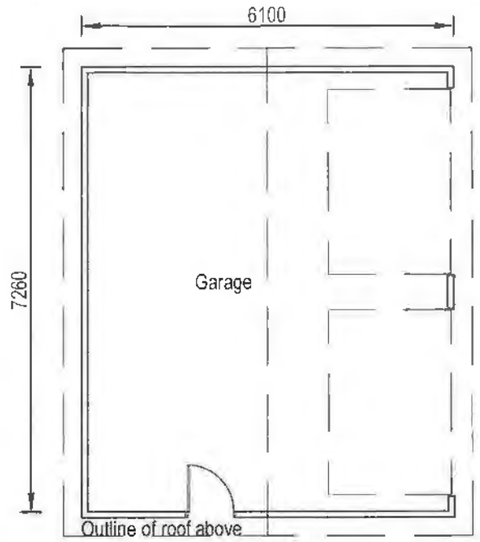
ISSUE: **For Consent**

PROJECT: Keenan Relocation
Queen Charlotte Dr, Picton

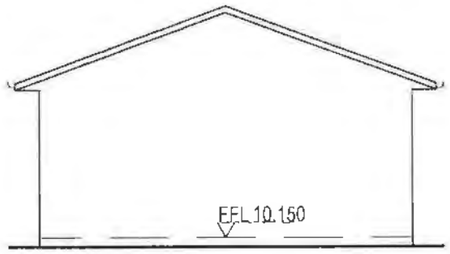
DRAWING: Detail

DATE: 23-08-2012
SCALE (A3): AS SHOWN
DRAWN: JH
REVISION: 01
APPROVED: DWN
DWG NO.: **3462-A04**

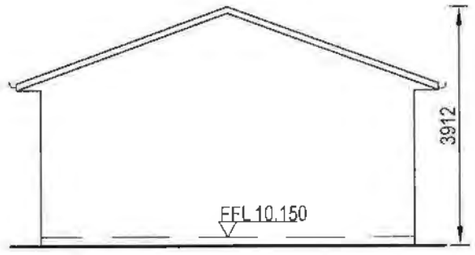
CAD FILE REF. P:/ 3462/Drawings/3462-Arch-01



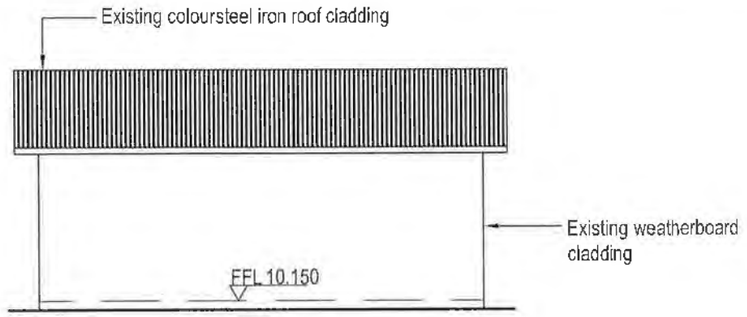
1 / - Garage Floor Plan
Scale 1:100



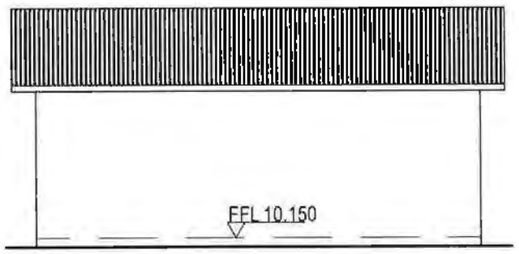
2 Garage North Elevation
Scale 1:100



3 Garage South Elevation
Scale 1:100



4 Garage East Elevation
Scale 1:100



5 Garage West Elevation
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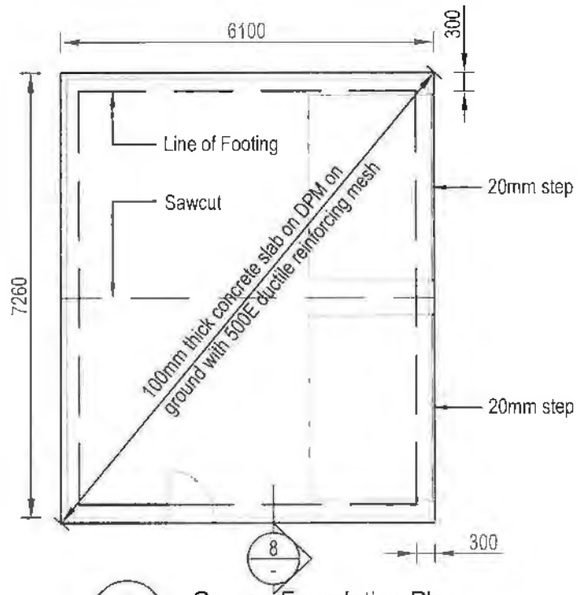
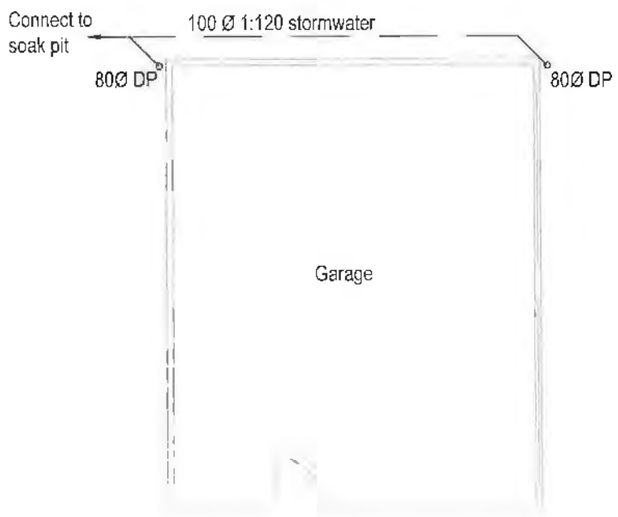
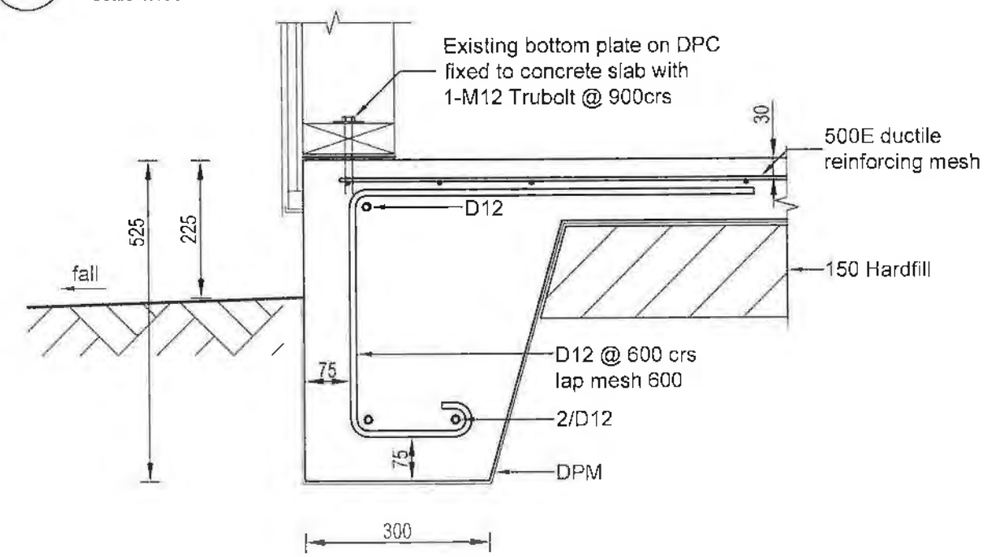


6 / - Garage Foundation Plan
Scale 1:100



7 / - Garage Drainage Plan
Scale 1:100



8 / - Garage Foundation Detail
Scale 1:10

Do not scale from this drawing

REV	DATE	DETAILS
01	23-08-12	For Consent

REV	DATE	DETAILS

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1st Floor River View House 10 High Street Blenheim New Zealand
T: 03 579 6211 F: 03 579 6233 PO Box 546 Blenheim 7240
E: info@smartalliances.co.nz Website www.smartalliances.co.nz

CLIENT
James Keenan

ISSUE
For Consent

PROJECT
Keenan Relocation
Queen Charlotte Dr, Picton

DRAWING
Garage Plan and Elevations
Garage Details

DATE
23-08-2012

SCALE (A3)
AS SHOWN

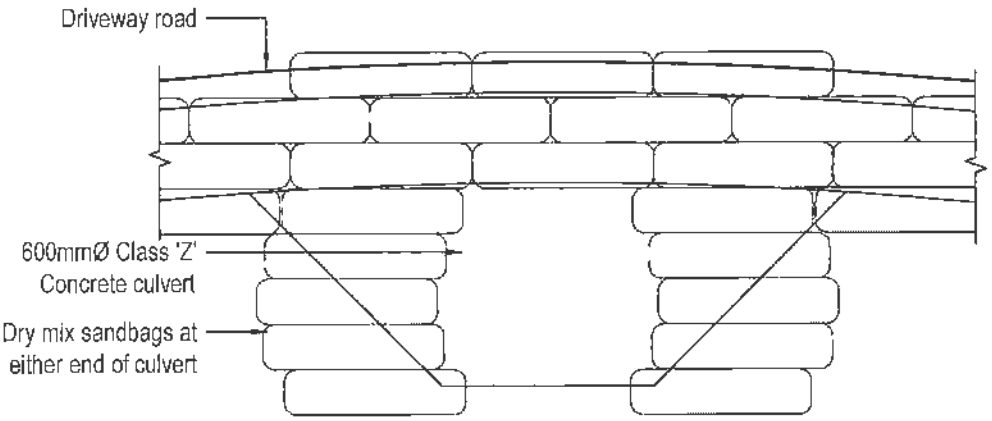
DRAWN
JH

REVISION
01

APPROVED
DWN

DWG NO.
3462-A05

CAD FILE REF: P:\ 3462\Drawings\3462-Arch-01

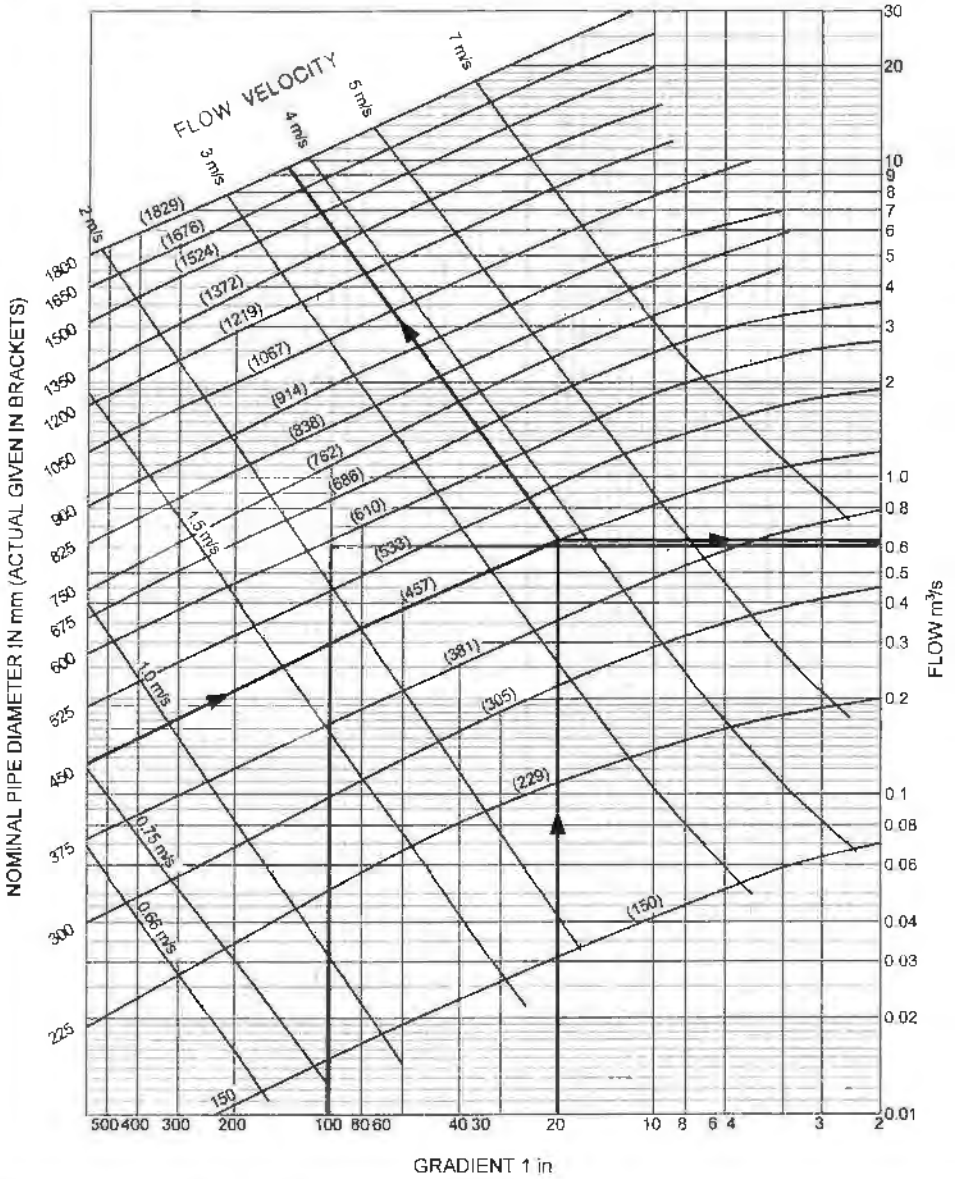


1 CULVERT DETAIL (@ ENDS)
Scale 1:25

A4

	PROJECT KEENAN RELOCATE	smartalliances Ltd TEL 03 579 6211 FAX 03 579 6203 PO BOX 546 BLENHEIM NEW ZEALAND	DWG NO 3462-G12 AMENDMENT DATE 23-08-12 SCALE AS SHOWN
AMENDMENT DATE DETAILS	DRAWING CULVERT DETAIL	CAD FILE REF: 3462-DRAWINGS DRAWN JH APPROVED KS	ISSUE CONSENT

Figure 3: Pipe Flow Relationships for Different Combinations of Internal Diameter, Velocity and Gradient
(Based on Manning's formula using n = 0.013 with an allowance for air entrainment)
Paragraphs 2.3.4 and 3.2.1



Example: A 450 internal diameter pipe with a gradient of 1 in 20 will have a flow of 0.63 m^3/s at a velocity of 3.75 m/s

smartalliances
ENGINEERING / RESOURCE MANAGEMENT / ARCHITECTS LTD
TEL 03 579 6211 FAX 03 579 6233
P.O. BOX 546 BLENHEIM NEW ZEALAND

Project:	House Relocation		
Client:	James Keenan		
Ref:	3462	Eng:	KS
Date:	20/08/12	Page:	1 of 1

Rational Method:

$\frac{CIA}{360}$

C = 0.5 (conservative)

I = 100 mm/hr

A = 4.2 ha

$\frac{0.5 \times 100 \times 4.2}{360} = 0.58 m^3/sec$

Use 600 ⌀ culvert.

Basic Preliminary Site Investigation

Application by James Keenan for Resource Consent to Relocate a dwelling and construct a wastewater disposal field and culvert at Lot 2 DP414569, Queen Charlotte Drive, Linkwater

1 Site Identification

1. Street Number, street name, suburb and town.

Between 1094 and 1112 Queen Charlotte Drive, Linkwater

2. Legal description and Certificate of Title Reference.

Lot 2 DP414569

3. Geographic co-ordinates.

2581126.128 5990614.119

4. Current site plan. ☒

5. Locality map. ☒

2 Site History

6. History of the site and previous uses – present day to initial use.

Dairy farm grazing block

7. Outline of contaminants associated with each landuse.

N/A

8. Details of relevant permits, licences, resource consents.

Subdivision Consent, title issued

9. Review of aerial/site photographs ☒

10. Review of environmental reports ☒

11. Summary of local knowledge of site by staff/residents – present and former.

Historically grazed. No known issues.

12. Historical uses of adjacent land.

Mixed. Farming and residential.

13. Complaint history.

None

14. Details/location of current or for UST and AST.

None

15. On-off site disposal locations.

None

3 Site condition and surrounding environment

16. General site condition, topography, current use.

Open pasture, gentle to moderate sloping site running south-north from the foothills. Currently grazed.

17. Condition of buildings and roadways.

To be formed

18. Presence of Drums, wastes and fill materials.

None

19. Odours

None

20. Visible signs of contamination such as identifiable waste products, discolouration or staining of soil, bare soil patches – on-site and at boundary.

None

21. Visible signs of plant stress

None

22. Location of chemical storage, bunding, waste storage area.

None

23. Location of former buildings, processes or activities on site.

None

24. Adjacent and surrounding land use and the potential for contamination from these sources.

Residential activity and minor farming upgradient

4 Risk Assessment

25. Land use contamination potential.

Minimal

26. Hot spot contamination potential.

None

5 Environmental Setting

27. Geology – Description of types of strata, soil types and fill information.

Open pasture, gentle to moderate slopes, category 4-5 soils dominate.

28. Hydrogeology – location of springs, wells groundwater.

Groundwater likely to be in excess of 2m

29. Hydrology – Surface water i.e. drains, storm water channels.

Cut off drains established for improved drainage

6 Conclusions and Recommendations

30. Brief summary of relevant findings.

Proposed activity contains minimal risk to the environment. Suitably designed wastewater and culvert installations.

31. Assumptions made in making conclusions.

All work to be carried out as per design.

32. Clear statement that the consultant considers site suitable for the current and where applicable the proposed use.

The site is suitable for the relcated dwelling, wastewater disposal and culvert construction.

33. A statement detailing all limitations and constraints on the use of the site.

All work to be carried out as per design.

34. Recommendations for further work, if appropriate.

None

Jeremy Harnett
Environmental Scientist

24-08-12