

**Your Ref**

**In reply, please quote**  
LIM0249/24

**If calling, please ask for**  
Kristen Harty



21 September 2023

Stars Realty Limited  
25 Market Street  
Pokeno 2402

**Postal Address**

Private Bag 544, Ngaruawahia 3742  
New Zealand

**0800 492 452**  
**[www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz)**

Kia Ora Kevin,

**LAND INFORMATION MEMORANDUM**

Please find enclosed your Land Information Memorandum for 44 Millstone Lane POKENO

If you have any queries, please do not hesitate to contact me.

Ngaa mihi

A handwritten signature in blue ink that reads "Kristen Harty".

Kristen Harty  
**Land Information Officer**

# Land Information Memorandum

In reply please quote: LIM0249/24  
If calling, please ask for: Kristen Harty

## LOCAL GOVERNMENT OFFICIAL INFORMATION AND MEETINGS ACT 1987

The information supplied in this Land Information Memorandum is based on existing Waikato District Council records that may not be complete. The property has not been inspected or surveyed by the Council. It is the purchaser's responsibility to check the boundaries of the property.

It is assumed that any purchaser will search for the certificate of title that is not held by the Council and will personally inspect the property and its surrounds. This information deals solely with the property named below and does not disclose any relevant information that may affect adjacent properties.

It is the sole responsibility of any purchaser to ensure that the land is suitable for a particular purpose.

### ► Property Details:

Valuation Reference:	03911/016.08
Legal Description:	LOT 10 DP 480134
Area:	3640 square metres more or less
Property Location:	44 Millstone Lane POKENO
Owners:	Stephen John Thompson, Kelly Thompson, Murray Noel McWatt

### ► Property Location:





## ■ Rates

Information regarding –  
44A(2)  
(c) information relating to any rates owing in relation to the land

### ► Rates & Rating Valuation:

Information regarding –  
44A(2)(c) information relating to any rates owing in relation to the land.

<b>Annual rates for 2022/2023</b>	\$ 3526.67	Balance Owing: \$ 556.30 (Balance of 2nd instalment due 22 January 2024)
<b>Value of Improvements</b>	\$ 590,000.00	
<b>Land Value</b>	\$ 360,000.00	
<b>Capital Value</b>	\$ 950,000.00	
<b>Date of Valuation</b>	1 October 2020	

### Valuation

Properties in the Waikato District are re-valued every three years in accordance with the Rating and Valuations Act 1988.

Rates and 2017 and 2020 valuations can be viewed online using the Rating Information Database (RID) available on the Waikato District Council website at <https://www.waikatodistrict.govt.nz/request-it/property/rates-information-database>

### Current Rates

*A copy of the current 2023/2024 rates assessment is attached. The 2023/2024 rates are based on the valuations dated 1 July 2021.*

A new part fee and charge will apply for those ratepayers that connect to specific council services after 1 July. These changes will mean that anyone that builds a new dwelling after 1 July will pay for the services their property receives (e.g., wastewater, storm water, rubbish) through fees and charges, rather than rates, until rates are struck on their property in the following financial year. You will receive an invoice from Council following granting of your Code Compliance Certificate (CCC). Rates are only struck once a year.

For Further Information: <https://www.waikatodistrict.govt.nz/request-it/property/rates-information-database>

### Rates Capital Value

Please note that the rates reflected in this LIM were calculated based on the capital value of the property as at 1 July of the current rating year. Any changes to the capital value of the property that have taken place since 1 July will be reflected in the rating charges for this property in the next rating year. Please contact a member of the rating team on 0800 492 452 if you require further clarification or have any questions.

## ■ Planning

Information regarding –

44A(2)

- (f) information relating to the use to which that land may be put and conditions attached to that use:
- (g) information which, in terms of any other Act, has been notified to the territorial authority by any statutory organisation having the power to classify land or buildings for any purpose:
- (h) any information which has been notified to the territorial authority by any network utility operator pursuant to the Building Act 1991 or the Building Act 2004

### **Proposed Waikato District Plan (Appeals Version)**

Waikato District Council notified its decisions on the Proposed Waikato District Plan on Monday 17 January 2022. The zone of this property is: **Large Lot Residential Zone**.

The following overlays apply to the property: **Waikato River Catchment**

#### **- National Grid**

The provisions relevant to this property may be subject to appeal and any that are subject to appeal are not yet operative.

If the provisions relevant to this property are subject to an appeal, both the Proposed Waikato District Plan Appeals Version and the Operative Waikato District Plan will need to be considered.

### **Operative Waikato District Plan (Franklin Section)**

This only applies where there are outstanding appeals on the provisions of the Proposed Waikato District Plan (appeals version), to the extent they are relevant to any proposed works or project.

#### **Zone: Village**

#### **Policy: Pokeno Concept Plan**

#### **- Hunua Rural Management Area**

#### **- Transmission Line**

#### **- Village Growth Area B**

#### **- Waikato River Catchment**

For further information please refer to the planning maps attached and the Waikato District Plan, which is available to view on our website: <https://www.waikatodistrict.govt.nz>

### **Consent Notice**

A Consent Notice exists for this property and is attached for your information.

### **Designations**

This property is within close proximity (500m) to land that is designated for a particular purpose:

#### **Proposed District Plan:**

- *KRH-1 – North Island Main Trunk Railway*
- *NZTA-1 – State Highway 1*

#### **Operative District Plan:**

- *87 – New Zealand Transport Agency*
- *89 – North Island Main Trunk (N.I.M.T.) Railway*

For further information please refer to the planning maps attached and the Waikato District Plan, which is available to view on our website: <https://www.waikatodistrict.govt.nz>

### **High Voltage Electricity Transmission Lines (>110kV)**

High Voltage Electricity Transmission Lines (110kV & over) go over the property. All buildings must be setback a minimum of 20 metres from these lines.

If you have questions regarding the zoning or rules for any proposed development on this property, you can contact a duty planner:

<https://www.waikatodistrict.govt.nz/services-facilities/land-and-property/making-a-start/duty-planner-service>

## ■ Planning continued

Information regarding –  
44A(2)

- (f) information relating to the use to which that land may be put and conditions attached to that use;
- (g) information which, in terms of any other Act, has been notified to the territorial authority by any statutory organisation having the power to classify land or buildings for any purpose;
- (h) any information which has been notified to the territorial authority by any network utility operator pursuant to the Building Act 1991 or the Building Act 2004

### Development Contributions

- Builders, developers and owners cannot presume that all development contributions have been paid at the time of subdivision.
- The link to the current Development Contributions Policy is;  
<https://www.waikatodistrict.govt.nz/your-council/development-contributions>
- For any queries on specific properties please email  
[DevelopmentContributions@waidc.govt.nz](mailto:DevelopmentContributions@waidc.govt.nz) providing the specific property number and/or property address

Development contributions policies, capital works schedules, catchments and levies are subject to review and change.

Credits are given for any development contributions paid at the time of subdivision, but additional development contributions may be required at time of building consent or service connection.

***For any restrictions on the use of the property please refer to the Record/Certificate of Title.***

#### ► Resource Consents:

Application No	Description	Decision
SUB0095/13	<b>SUBDIVISION CONSENTS</b> - Create 12 Rural Residential Lots	<b>GRANTED</b> 10 September 2013
SUB0095/13.01	- Revocation of Existing Easement	04 December 2014
LUC0585/16	<b>LAND USE CONSENTS</b> - Undertake Earthworks	<b>GRANTED</b> 20 July 2016

**Requisitions:** No known planning requisitions to date.

Planning rules relating to this property are contained in the Waikato District Plan and are not outlined in this LIM report. The Waikato District Plan is available to view on Council's website at [www.waikatodc.govt.nz](http://www.waikatodc.govt.nz).

■ Building

Information regarding –  
44A(2)

- (d) information concerning any consent, certificate, notice, order, or requisition affecting the land or any building on the land previously issued by the territorial authority (whether under the Building Act 1991, the [Building Act 2004](#), or any other Act):
- (e) information concerning any certificate issued by a building certifier pursuant to the Building Act 1991 or the [Building Act 2004](#):
- (ea) information notified to the territorial authority under [section 124](#) of the Weathertight Homes Resolution Services Act 2006:

*It is recommended that a potential purchaser engage a building consultant to complete a pre-purchase inspection of buildings. Irrespective of code of compliance, structures are subject to deterioration over time and works may have been undertaken without building consent. If requested and supplied, a copy of this may be filed on council records for future references and Land Information Memoranda.*

Architects and designers require wind & earthquake information to establish bracing requirements for building development.

► Building Consents/Permits:

Number	Description	Consent/Permit issued date	CCC Issued/ Completed Date
BLD0055/17	Dwelling with attached garage	29 August 2016	06 April 2017
COA1000/24	Certificate of Acceptance	08 September 2023	08 September 2023

**Requisitions:** No known building requisitions to date.

If you feel there has been unauthorised building work undertaken on this property, please note that Council has no authority to issue retrospective building consents. The current owner can, however, apply for a Certificate of Acceptance (COA).

- Please refer to the [BuildWaikato](#) site for further information regarding COAs.

## ■ Water Supply

Information regarding –

44A(2)

- (ba) any information that has been notified to the territorial authority by a drinking-water supplier under section 69ZH of the Health Act 1956:
- (bb) information on—
  - (i) whether the land is supplied with drinking water and if so, whether the supplier is the owner of the land or a networked supplier:
  - (ii) if the land is supplied with drinking water by a networked supplier, any conditions that are applicable to that supply:
  - (iii) if the land is supplied with water by the owner of the land, any information the territorial authority has about the supply:

---

Council rate records indicate that the property is connected to the North Waikato URBAN water supply and charged an annual targeted rate for domestic water supply.

The property is on a metered water supply and being charged on a volume basis for water supply.

*Please contact the Customer Delivery Department at the Waikato District Council to arrange a final water meter reading prior to sale settlement.*

## ■ Drinking Water (potable water supply)

The property is connected to the North Waikato urban water supply; Councils urban water supply systems are full flow pressure systems.

The construction of a bore for the taking of ground water requires consent from the Waikato Regional Council, for further information contact Waikato Regional Council.



## ■ Council Utilities

Information regarding –  
44A(2)

(b) information on private and public stormwater and sewerage drains as shown in the territorial authority's records:

---

### ■ Wastewater

The property is located outside an area currently served by a community system for wastewater disposal.

On-site wastewater disposal must comply with the Waikato Regional Plan and the AS/NZS standard for On-site Domestic Wastewater Management. New on-site effluent disposal systems must be designed and certified by an engineer or suitably qualified person.

#### Existing System

The property has an existing on-site wastewater disposal system. Wastewater disposal systems are sized in relation to the number of bedrooms of a dwelling and the potential occupancy.

Future building works that include additional bedrooms will require an assessment from an engineer or other suitably qualified person approved by the Council, of whether the existing on-site effluent treatment system is capable of adequately treating and disposing of the increased loadings. If upgrades are required, these shall be designed, supervised and certified by an engineer or other suitably qualified person to comply with AS/NZS 1547:2012 and the Waikato Regional Plan.

It is recommended that potential purchasers engage a contractor to inspect the septic tank prior to settlement. The Waikato District Council does not maintain or monitor private wastewater disposal systems and NZ standards indicate a septic tank should be cleaned / emptied every 3 years.

### ■ Stormwater

Stormwater Disposal is served by the Pokeno Urban drainage area, administered by Waikato District Council; please refer to Utilities Map attached. Council rate records indicate that the property is being charged a targeted rate for stormwater disposal.

For any new development, Onsite Stormwater Disposal will be required under the Waikato District Plan & Waikato Regional Plan prior to connection to any public stormwater network or drains.

*For further Information please contact a Project Planning & Engineering Officer at the Waikato District Council.*

## ■ Natural Hazards

Information regarding –

- Whether the site is affected by potential erosion, avulsion, falling debris, subsidence, slippage, alluvion, inundation, peat, contamination or poor soakage.
- whether there is the likely presence of hazardous substances on the site and in particular whether the site has been recorded as being on the Regional Council's HAIL list of potentially contaminated sites.
- Refer to a copy of special features map.

---

### Natural Hazard Register

Council's Hazards Register identifies that the land may be subject to: ***Inundation***.

Attached for your information is a copy of the Geotechnical Investigation Report by Coffey Geotechnics (NZ) Limited, dated 07 November 2014.

The Waikato Regional Council Hazards Portal (Link below) contains information about the natural hazards that may be relevant to the site. Before exploring the Portal, please read the terms of use to understand the limitations of the information contained on the site. The recipient is advised to seek expert advice in terms of the applicability and accuracy of the information as it relates to the site.

<https://waikatoregion.maps.arcgis.com/apps/MapSeries/index.html?appid=f2b48398f93146e8a5cf0aa3fddce92c>

**Under section 71-74 of the Building Act 2004, upon application for a building consent applicant must demonstrate that any proposed building work will be protected from hazards.**

## ■ Additional Information

Information regarding –

44A(3) In addition to the information provided for under subsection (2), a territorial authority may provide in the memorandum such other information concerning the land as the authority considers, at its discretion, to be

---

### ■ Health

There are no outstanding Notices or Orders under the Health Act 1956 and related legislation in respect of the property.

### ■ Refuse

Waikato District Council's goal is to work towards a 'zero waste' target. On 1 July 2016 we introduced a pre-paid service to our refuse and recycling to help Waikato residents reduce the volume of waste they send to landfill. Less waste will save us all more in the long run.

Refuse & Recycling Service Collection Day for this property is **Thursday**.

For further information please see <https://www.waikatodistrict.govt.nz/services-facilities/refuse-and-recycling>

### ■ Utilities

The Waikato District Council does not hold records concerning utility systems it does not administer. For information concerning state highways (administered by NZ Transport Agency), electricity, telephone or gas, the relevant network operator should be contacted.

### ■ Telecommunication

This property may not have a physical connection to a telecommunications network.

Developer obligations are to demonstrate that a telecommunication network is available to serve the property, such network can be either physical or wireless.

Please contact the network utility supplier and/or service provider to confirm what telecommunication connection is available to the property.

Ngaa mihi



Kristen Harty  
**Land Information Officer**

# Land Information Memorandum



- 44 Millstone Lane POKENO
- LOT 10 DP 480134

# Rates Information Database

Use the rates information database to find out rates information about property in the Waikato district.

If you would like your details made confidential, please complete the [Request to Suppress Personal Information](#) form and return to Waikato District Council. Please note that it is not necessary to complete the form if you have no objection to your name and postal address being published in the Complete Rating Information Database.

If you have a question about your rates please contact the rates team on [0800 492 452](#).

Search again

Print this page

Make a rates payment

View district plan

Recent

## Property details

Property location	44 Millstone Lane POKENO
Valuation number	03911/016.08
Legal description	LOT 10 DP 480134

## Property valuation

Capital value	\$950,000.00
Land value	\$360,000.00
Improvement value	\$590,000.00
Effective from	01/07/2021
Property apportionment(s)	
Area	0.36 ha (0.899 acre/3640m²)
Tenure code	Property is not leased. Owner is also occupier
Ownership code	Private: Individual
Rateability code	Rateable
Rating division	Std Property - Not Applicable, ie Not an apportionment
Land use	Lifestyle - Single unit
Land use zone	Lifestyle
Property category	LI201B
Nature of improvement	DWG OI

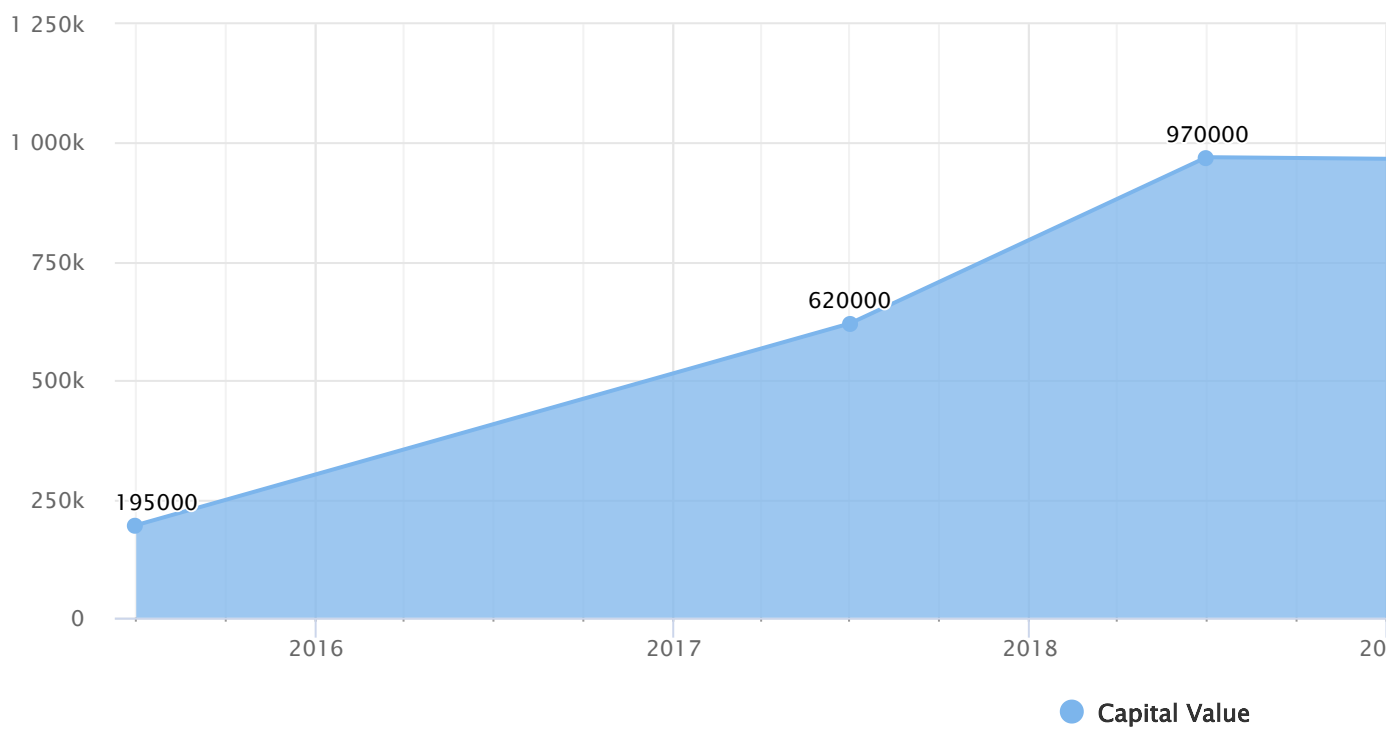
## Property charges (2023/2024)

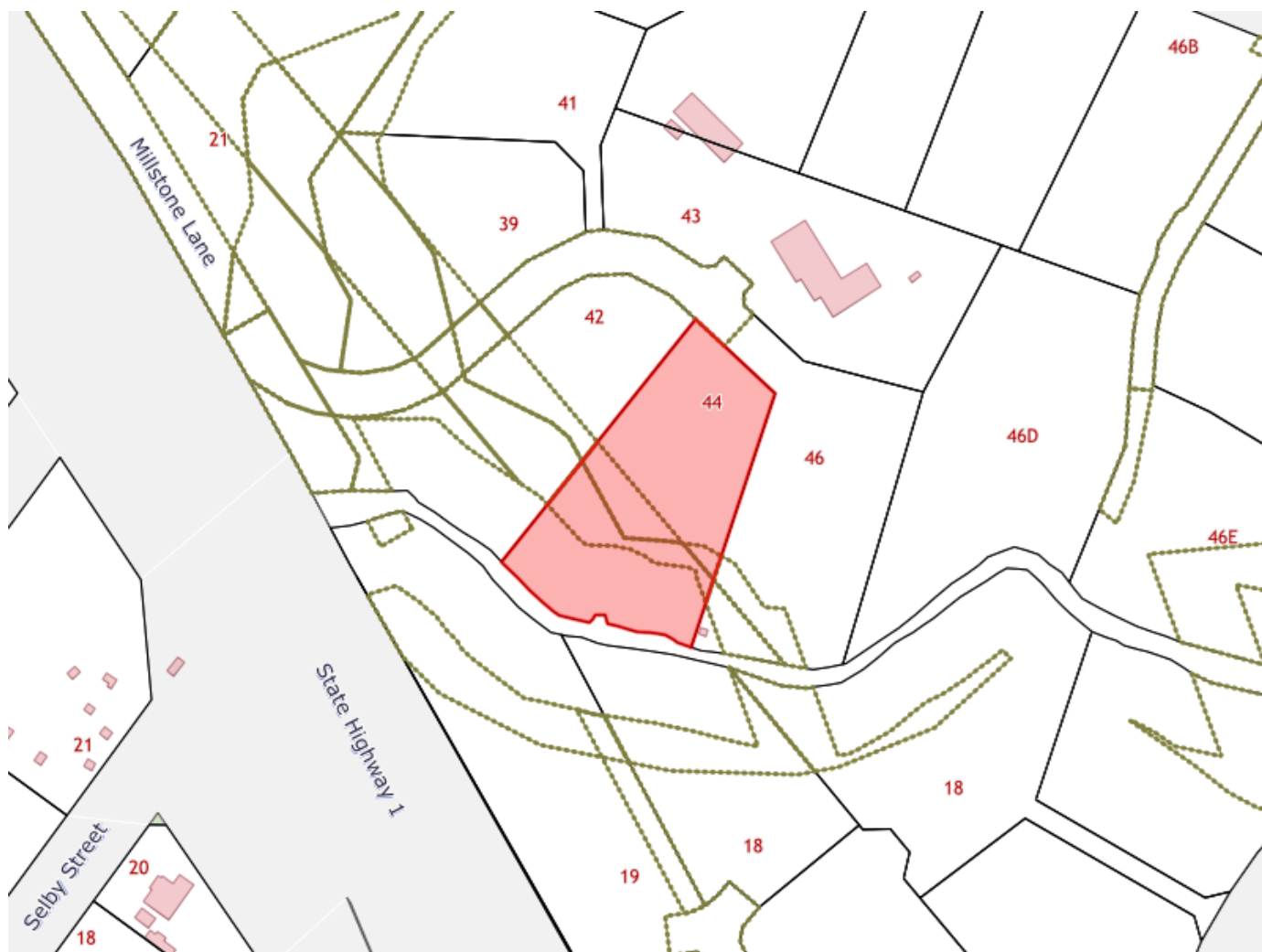


	Targeted rate factor	Factor applicable	Amount
General Rate	0.22918c/\$	950000.00	\$2,177.21
Uniform Annual General Charge (UAGC)	Fixed Charge	1.00	\$462.55
Pokeno Community Centre	per dwelling	1.00	\$23.00
District Wide Urban Stormwater	per property	1.00	\$238.72
District Wide Water Supply - North Waikato	per SUIP	1.00	\$403.58
Northern District Rubbish and Recycling Collection	per dwelling	1.00	\$221.61

Total rates payable \$3,526.67 incl. GST

## Property valuation history





est/ServiceID=22000151/strict.govt.nz/services-facilities/rates/rates-information-database/property/2015001  
: 1, Version Date: 21/09/2023



**RECORD OF TITLE  
UNDER LAND TRANSFER ACT 2017  
FREEHOLD  
Search Copy**



  
R.W. Muir  
Registrar-General  
of Land

**Identifier** 674814  
**Land Registration District** North Auckland  
**Date Issued** 23 February 2015

**Prior References**  
624442

**STATEMENT OF PASSING OVER INFORMATION:**

This information has been supplied to us by a third party. Accordingly, the vendor and Stars Realty Limited is merely passing over the information as supplied to us by others. While we have passed on this information supplied to us by a third party, we have not checked, audited or reviewed the records or documents and therefore to the maximum extent permitted by law neither the vendor nor Stars Realty Limited or any salespersons or employees accept any responsibility for the accuracy of the materials. Intending purchasers are advised to conduct their own investigations.

**Estate** Fee Simple  
**Area** 3640 square metres more or less  
**Legal Description** Lot 10 Deposited Plan 480134  
**Registered Owners**  
Stephen John Thompson, Kelly Thompson and Murray Noel McWatt

**Interests**

Subject to Part IV A Conservation Act 1987 (affects parts formerly Lot 7 DP 13817 and Secs 1, 2 and 5 SO Plan 70555)

Subject to Section 11 Crown Minerals Act 1991 (affects parts formerly Lot 7 DP 13817 and Secs 1, 2 and 5 SO Plan 70555)

9558957.3 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 20.5.2014 at 3:32 pm

Appurtenant hereto is a right of way, right to convey water, electricity, telecommunications and computer media and a right to drain water created by Easement Instrument 9558957.4 - 20.5.2014 at 3:32 pm

The easements created by Easement Instrument 9558957.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to drain water over part marked BT and BZ both on DP 480134 in favour of Waikato District Council created by Easement Instrument 9558957.7 - 20.5.2014 at 3:32 pm

The easements created by Easement Instrument 9558957.7 are subject to Section 243 (a) Resource Management Act 1991

9980707.3 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 23.2.2015 at 2:52 pm

Appurtenant hereto is a right of way, right to drain water, right to convey water, electricity, telecommunications and computer media created by Easement Instrument 9980707.4 - 23.2.2015 at 2:52 pm

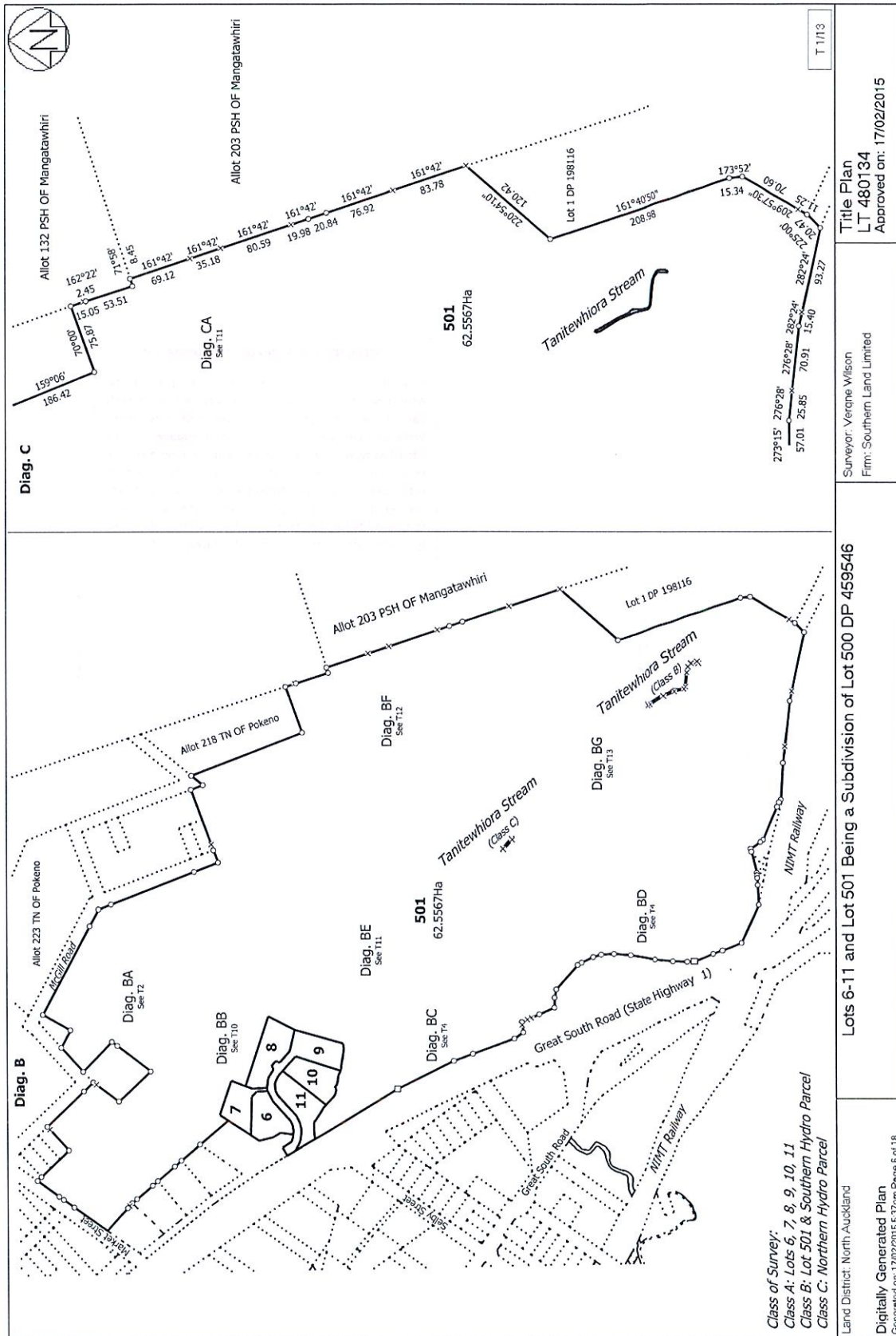
The easements created by Easement Instrument 9980707.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right to drain water (in gross) over part marked BT and BZ both on DP 480134 in favour of Waikato District Council created by Easement Instrument 9980707.5 - 23.2.2015 at 2:52 pm

The easements created by Easement Instrument 9980707.5 are subject to Section 243 (a) Resource Management Act 1991


Land Covenant in Easement Instrument 9980707.8 - 23.2.2015 at 2:52 pm

11826502.3 Mortgage to ASB Bank Limited - 28.8.2020 at 3:02 pm



**CONSENT NOTICE PURSUANT TO  
SECTION 221  
RESOURCE MANAGEMENT ACT 1991**



 [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) 

The Registrar General of Land  
North Auckland Land Registry

IN THE MATTER

of a Consent Notice pursuant to Section 221 of  
the Resource Management Act 1991 ("the Act")

and

IN THE MATTER

of a subdivision Consent pursuant to Sections 105,  
108, 220, and 221 of the Act

I, GAVIN JOHN ION Chief Executive of the WAIKATO DISTRICT COUNCIL, hereby certify that the Waikato District Council has granted its consent to the subdivision shown on Deposited Plan 459546, (and being the land described in the First Schedule), subject to certain conditions, including the requirement that the Owner (as defined in the Act) comply on a continuing basis with the conditions set out in the Second Schedule and that this Notice be registered against the Computer Freehold Registers for Lots 1, 2, 3, 4, 5 and 500 on Deposited Plan 459546

**First Schedule**

An estate in fee simple in all those parcels of land containing 67.8188 hectares more or less being Lot 9 Deposited Plan 199012 comprised in Computer Freehold Register 370116, Lot 27 Deposited Plan 13817 and Lot 2 Deposited Plan 198116 comprised in Computer Freehold Register NA127A/581, Lot 16-19, Lot 24-25 and Lot 28-30 Deposited Plan 13817, Lot 9-10 and Lot 15 Deposited Plan 17425, Lot 1-11 Deposited Plan 210232, Section 99 and Section 244 Town of Pokeno, Section 2-6 Survey Office Plan 69130 and Section 5 Survey Office Plan 70555 comprised in Computer Freehold Register NA138A/72, Lot 7 Deposited Plan 13817 and Section 1-2 and Section 4 Survey Office Plan 70555 comprised in Computer Freehold Register NA138A/355, Section 256-257 Suburbs of Pokeno comprised in Computer Freehold Register NA357/13, Allotment 250 Town of Pokeno comprised in Computer Freehold Register NA385/298, Allotment 232 Town of Pokeno comprised in Computer Freehold Register NA385/299, Lot 8-9 Deposited Plan 13817 comprised in Computer Freehold Register NA423/122, Allotment 66-68, Allotment 73, Allotment 78, Allotment 125-128, Allotment 130, Allotment 133, Allotment 135, Allotment 139-140, Allotment 142 and 144 Town of Pokeno, Allotment 262-263, Allotment 285, Allotment 285A and Allotment 286-287 Suburbs of Pokeno and Defined on Deposited Plan 14238 comprised in Computer Freehold Register NA450/134, Allotment 145-146, Allotment 162, Allotment 170-172, Allotment 175-176, Part Allotment 155 and Part Allotment 179 Town of Pokeno and Allotment 273-274 and Allotment 284 Suburbs of





■ [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) ■  
Pokeno comprised in Computer Freehold Register NA475/206, Lot 20 Deposited Plan 199012 comprised in Computer Freehold Register 370118, Lot 21 Deposited Plan 199012 comprised in Computer Freehold Register 370119, Lot 22 Deposited Plan 199012 comprised in Computer Freehold Register 370120 and Section 1 Survey Office Plan 434064 comprised in Computer Freehold Register 551589

## **Second Schedule**

### **In respect of Lot 1**

#### **Midden Protection**

1. The Owners of Lot 1 shall be advised that the area marked "T" within Lot 1 on Deposited Plan 459546 may potentially be an archaeological sensitive (midden) area. If any earthworks are proposed that may disturb the potentially archaeological sensitive (midden) area the Owners of Lot 1 shall apply for and obtain an authority from the New Zealand Historic Places Trust to modify, damage or destroy the potentially archaeological sensitive (midden) area.

#### **Stormwater Condition**

2. The Owners of Lot 1 shall be advised that:
  - (a) the erection of buildings is prohibited within the easement area marked "Z" on Deposited Plan 459546, which said area is 1.5 metres each side of the centre line of a proposed stormwater pipeline; and
  - (b) specific engineering design of building foundations will be required if buildings are located within a horizontal distance of any future pipeline, equal to the depth from the ground level to the invert of the proposed stormwater pipeline to avoid transfer of building footing loads onto the proposed stormwater pipeline.

### **In respect of Lot 5**

#### **Planting Buffer in proximity of State Highway**

3. The Owner of Lot 5 shall preserve and maintain the buffer planting marked "AC" on Deposited Plan 459546. If any of the plants within the said buffer planting area die or are removed they must be replaced within the next planting season with a similar species of plant.



 [www.waikatodistrict.govt.nz](https://www.waikatodistrict.govt.nz) 

4. The Owner shall undertake plant pest and noxious weed control measures to ensure that such plant pests and noxious weeds do not prevent or significantly alter the buffer planting.

#### **In respect of Lots 1 and 2**

##### **Native Tree Protection**

5. The Owners of Lots 1 and 2 shall preserve and maintain the native tree protection areas marked "S" on Lot 1 and marked "R" on Lot 2 on Deposited Plan 459546.
6. The Owners of Lots 1 and 2 shall maintain any existing stock proof fences to prevent stock from entering these native tree protection areas.
7. The Owners of Lots 1 and 2 shall undertake plant, pest and noxious weed control measures to ensure that such plant pests and noxious weeds do not adversely affect or significantly alter the native tree protection areas.

#### **In respect of Lots 1 and 5**

##### **Riparian Planting Protection**

8. The Owners of Lots 1 and 5 shall preserve and maintain the riparian planting and existing native riparian vegetation (including sedges and rushes) within the riparian planting areas marked "AB" on Lot 1 on Deposited Plan 459546 and marked "V" and "Y" on Lot 5 on Deposited Plan 459546. If any of the plants within the said riparian planting areas die or are removed they must be replaced within the next planting season with a similar species of plant.
9. The Owners of Lots 1 and 5 shall undertake measures to ensure that plant pests and noxious weeds do not adversely affect or significantly alter the riparian planting areas.
10. The Owners of Lot 1 shall maintain the existing 5 wire stock proof fence to protect the riparian planting from stock.
11. The Owners of Lot 5 shall maintain the existing stock proof fence to prevent stock entering the areas of riparian planting and existing native riparian vegetation (including sedges and rushes).



www.waikatodistrict.govt.nz

12. The Owners of Lot 1 shall exclude stock from the riparian planting area and shall maintain the 5 wire stock proof fence to protect the riparian planting from stock,

**In respect of Lots 1, 3, 4 and 5**

**Wastewater and Stormwater Investigation and Design**

13. The Owners of Lots 1, 3, 4 and 5 shall, on application for building consent submit the following investigations/designs to the Council for approval and shall construct the wastewater and stormwater disposal systems prior to occupation/operation of the approved dwelling/structure:
- (a) A specific geotechnical investigation of the proposed building site, effluent disposal site (including a 50% reserve area), stormwater disposal and the proposed access route from the public road or right of way to the proposed building site shall be undertaken by a Geo-professional (as defined in NZS4404:2010) in accordance with the recommendations contained in the Geotechnical Investigation Report titled "*Waterfall Park Residential Subdivision Stages 2 and 2A at Market Road, Pokeno*" prepared by Coffey Geotechnics (NZ) Limited dated 22<sup>nd</sup> April 2013, reference number GENZAUCK14972AC ("the Geotechnical Investigation Report") and the Report titled "*Review of Proposed On-site Wastewater Treatment and Land Disposal for 117 Lot Subdivision Market Road*" prepared by Ormiston and Associates Limited dated June 2013, reference number 3608 (the On-site Wastewater Treatment and Land Disposal Report); and
  - (b) A foundation design carried out by a suitably qualified and competent engineer in accordance with the restrictions and recommendations identified in the specific geotechnical investigation report to be obtained under condition 13(a) of this Consent Notice; and
  - (c) A specific on-site waste water design, utilising a secondary treatment system, carried out by a suitably qualified and experienced professional with demonstrated experience in the design of these systems, who is also certified as an approved designer by the manufacturer of the system in accordance with AS/NZS 1547:2012 (or subsequent update), the Waikato Regional Plan and the restrictions and recommendations identified in the Report titled "*Review of Proposed On-site Wastewater Treatment and Land Disposal for 117 Lot Subdivision Market Road*" prepared by Ormiston and Associates Limited dated June 2013, reference number 3608. In addition the wastewater treatment and disposal



 [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) 

system shall meet the following criteria, unless otherwise agreed in writing, on a case by case basis, with the Council:

- (i) The wastewater treatment system shall be capable of consistently producing secondary quality treated effluent achieving  $20\text{g/m}^3$  5 Day Biological Oxygen Demand and  $30\text{g/m}^3$  Total Suspended Solids; and
  - (ii) A buried Pressure Compensating Dripper Irrigation system shall be used for discharge to the effluent field, with appropriate planting of the area and diversion of any potential surface water flows away from the effluent discharge field; and
  - (iii) The location of the on-site wastewater land disposal system shall be on slopes less than 20 degrees to the horizontal and shall maintain a minimum separation distance of 30m from any surface water or ephemeral stream unless otherwise agreed, in writing, with the Council; and
  - (iv) Compliance with the effluent standard based on the achievement of Secondary Quality Standard grading in the Rotorua OSET NTP for BOD5 and TSS for trials 3 and higher; and
  - (v) The soil category classification of 6 from AS/NZS 1547:2012 and a maximum areal loading rate for the effluent disposal area of  $3\text{mm/day}$  ( $3\text{ litres/square metres/day}$ ) are appropriate; and
  - (vi) The installed system shall be constructed with a minimum of 24 hours storage above an installed high water alarm in the event of failure of the system.
- (d) A specific stormwater management design for the overall development, which caters for both primary and secondary flows, up to and including a 1% AEP storm event and including a 24% adjustment for climate change prepared by a suitably qualified and competent engineer which complies with the rules of the Waikato District Plan (Franklin Section) and the restrictions and recommendations identified in the Geotechnical Investigation Report. The design shall demonstrate hydrological neutrality at the Lot boundaries. The stormwater management design shall ensure that no stormwater is discharged on the effluent disposal area or the reserve disposal area.



Copies of the Geotechnical Investigation Report and the On-site Wastewater Treatment and Land Disposal Report can be obtained from the Waikato District Council. [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz)

#### **In respect of Lots 2, 3, 4, 5 and 500**

##### **Access**

14. The Owners of Lots 2, 3, 4, 5 and 500 ("original Lot") or any Lot created by subdivision of any of those Lots ("additional Lot") shall:
- (a) not use any access to or egress from their original Lot or permit any access to or egress from their original Lot other than by means of the right of way marked A on Deposited Plan 459546, save for any Lot with direct road frontage onto Market Street, such a Lot being permitted to have access direct onto Market Street provided such access complies with all Council and Waikato District Plan standards and rules; nor
  - (b) object to or seek to prevent by any means, including by application to a Court, the use of the specified right of way for the purposes of access to or egress from any original Lot or additional Lot.

#### **In respect of Lots 1, 2, 3, 4 and 5**

##### **Noise Performance Standards**

15. Any new residential dwellings located within 100m of the seal edge of the State Highway on Lots 1, 2, 3, 4 and 5 shall be designed and constructed to ensure that noise from traffic on State Highway 1 will not exceed 35dBa  $L_{eq}(24hr)$  in bedrooms and 40dBA  $L_{eq}(24hr)$  for other habitable rooms in accordance with the Australian and New Zealand Standards AS/NZ2107:2000 Acoustics recommended design sound levels and reverberation times for building interiors.

##### **Transmission Lines**

16. The Owners of Lots 1, 2, 3, 4 and 5 shall be advised of the following conditions:
- (a) No buildings shall be constructed within the Transpower NZ Limited corridor area shown marked "C", "I", "AB", "T", "E", "F", "J", "L", "N", "H" and "W" on Deposited Plan 459546.





17. The Owners of Lots 1, 2, 3, 4 and 5 shall ensure that a dedicated fire fighting water supply, in accordance with the specifications and requirements of SNZ PAS 4509:2008 "New Zealand Fire Service Firefighting Water Supplies Code of Practice" is provided for these Lots when any future development on these Lots is proposed. [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz)

(b) All newly planted trees or vegetation (exceeding a height of 2.5 metres at full maturity) on Lots 1, 2, 3, 4 and 5 must:

- (i) not be located within the Transpower New Zealand Limited corridor area; and
- (ii) when fully grown, not be able to fall within 5 metres of the transmission lines.



(c) All land use activities, including the construction of new buildings/structures, earthworks (filling and excavations), and/or the operation of mobile plant on Lots 1, 2, 3, 4 and 5 must comply with the New Zealand Electrical Code of Practice for the Electrical Safe Distances (NZECP 34:2001). For the purposes of this condition the key considerations are as follows:

- (i) A minimum clearance of 4 metres is required between mobile plant and overhead transmission lines (Clause 5.2.1 of NZECP 34:2001); and
- (ii) A minimum clearance of 6.5 is required between the ground and the overhead transmission lines at all times (Table 4 in NZECP 34:2001); and
- (iii) There are restrictions on earthworks within 6 and 12 metres of a tower or where the earthworks would create an unstable slope (outlined in Clause 2.2.3 of NZECP 34:2001); and
- (iv) There are restrictions on the construction of conductive fences within 5 metres of the visible part of the foundation of a tower (outlined in Clause 2.3.3 of NZECP 34:2001).

#### **Fire Safety Conditions**

17. The Owners of Lots 1, 2, 3, 4 and 5 shall ensure that a dedicated fire fighting water supply, in accordance with the specifications and requirements of SNZ PAS 4509:2008 "New Zealand Fire Service Firefighting Water Supplies Code of Practice" is provided for these Lots when any future development on these Lots is proposed.



 [www.waikatodistrict.govt.nz](https://www.waikatodistrict.govt.nz) 

18. The Owners of Lots 1, 2, 3, 4 and 5 shall, on installation of an approved on-site wastewater treatment plant, enter into and maintain in force at all times, a written maintenance and monitoring contract with an experienced wastewater treatment plant operator, or a person trained in the wastewater treatment operation by the designer of the system, for the ongoing maintenance of the installed treatment and land application systems.

The contract shall specify the frequency of treatment plant inspections and maintenance and shall include an inspection maintenance schedule.



The maintenance/monitoring report shall include, but not be limited to, the following information:

- (a) the date the inspection was undertaken and the name of the service provider, and;
- (b) systems that a list of all components of the treatment and land application were inspected and the state of those components, and;
- (c) any maintenance undertaken during the visit or still required, and a timetable for the expected completion of this work, and;
- (d) a description of the appearance of the filter/s and tanks, and;
- (e) the location and source of any odour detected from the system; and
- (f) a description of the appearance of the land application area (ponding, vegetation growth etc).

The Owners shall ensure that maintenance/monitoring is undertaken in accordance with the approved contract.

Records of maintenance/monitoring undertaken in accordance with the approved contract shall be held and submitted to the Council, annually.

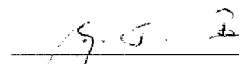


 [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) 

### General Condition

19. The Owners shall pay the Council's costs and disbursements in respect of the preparation, execution and registration of this Notice and the Council's conditions set out in this Notice and any variation or cancellation of them.



**DATED** at Ngaruawahia this 20<sup>th</sup> day of November 2013

  
\_\_\_\_\_  
GAVIN JOHN ION  
Chief Executive

SUB0095113

**CONSENT NOTICE PURSUANT TO  
SECTION 221  
RESOURCE MANAGEMENT ACT 1991**



 [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) 

The Registrar General of Land  
North Auckland Land Registry

IN THE MATTER

of a Consent Notice pursuant to Section 221 of  
the Resource Management Act 1991 ("the Act")

and

IN THE MATTER

of a subdivision Consent pursuant to Sections 104,  
108, 220, and 221 of the Act

I, GAVIN JOHN ION Chief Executive of the WAIKATO DISTRICT COUNCIL, hereby certify that the Waikato District Council has granted its consent to the subdivision shown on Deposited Plan 480134, (and being the land described in the First Schedule), subject to certain conditions, including the requirement that the Owner (as defined in the Act) comply on a continuing basis with the conditions set out in the Second Schedule and that this Notice be registered against the Computer Freehold Registers for Lots 6, 7, 9, 10 and 11 on Deposited Plan 480134

**First Schedule**

An estate in fee simple in all that parcel of land containing 69.5489 hectares more or less being Lot 500 on Deposited Plan 459456 and being all of the land comprised in Computer Freehold Register 624442.

**Second Schedule**

**In respect of Lots 6, 7, 9, 10 and 11**

**Noise Performance Standards**

1. Any new residential dwellings located within 100m of the seal edge of the State Highway on Lots 6, 7, 9, 10 and 11 shall be designed and constructed to meet noise performance standards to ensure that noise from traffic on State Highway 1 will not exceed 35dBa  $L_{eq}(24hr)$  in bedrooms and 40dBa  $L_{eq}(24hr)$  for other habitable rooms in accordance with the Australian and New Zealand Standards AS/NZ2107:2000 Acoustics - recommended design sound levels and reverberation times for building interiors.

**Riparian Planting Protection**

2. The Owners of Lots 6, 7, 9, 10 and 11 shall preserve and maintain the riparian planting and existing native riparian vegetation (including sedges and rushes) within the riparian planting areas marked "AA" on Lot 7, "AB" on Lot 6, "AC" and "AF" on Lot 11, "AD" on Lot 10 and "AE" on Lot 9 on the Riparian Planting Areas Plan prepared by



■ [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) ■

Southern Land Limited dated October 2014, Drawing reference R4083-M2, Revision A. If any of the plants within the said riparian planting areas die or are removed they must be replaced within the next planting season with a similar species of plant. A copy of the Riparian Planting Areas Plan can be obtained from the Waikato District Council

3. The Owners of Lots 6, 7, 9, 10 and 11 shall maintain the existing stock proof fence to prevent stock entering the areas of riparian planting and the existing native riparian vegetation (such as sedges and rushes).
4. The Owners of Lots 6, 7, 9, 10 and 11 shall undertake measures to ensure that plant pests and noxious weeds do not adversely affect or significantly alter the riparian planting areas.

#### **In respect of Lots 9 and 11**

##### **Planting Buffer in proximity of State Highway**



5. The Owners of Lots 9 and 11 shall preserve and maintain the buffer planting marked "PB" on Lot 9 Deposited Plan 480134 and "PZ" on Lot 11 Deposited Plan 480134. If any of the plants within the said buffer planting areas die or are removed they must be replaced within the next planting season with a similar species of plant.
6. The Owners of Lots 9 and 11 shall undertake plant pest and noxious weed control measures to ensure that such plant pests and noxious weeds do not adversely affect or significantly alter the buffer planting.

#### **In respect of Lots 6, 9, 10 and 11**

##### **Transmission Lines**

7. The Owners of Lots 6, 9, 10 and 11 shall be advised of the following conditions:
  - (a) No buildings shall be constructed within the Transpower NZ Limited corridor areas shown marked "BR", "AJ", "AM", "AN", "BU", "AR", "BT", "BV", "AK", "BS" and "BW" on Deposited Plan 480134.
  - (b) All newly planted trees or vegetation (exceeding a height of 2.5 metres at full maturity) on Lots 6, 9, 10 and 11 must:
    - (i) not be located within the Transpower New Zealand Limited corridor area; and



 [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) 



- (ii) when fully grown, not be able to fall within 5 metres of the transmission lines.
- (c) All land use activities, including the construction of new buildings/structures, earthworks (filling and excavations), and/or the operation of mobile plant on Lots 6, 9, 10 and 11 must comply with the New Zealand Electrical Code of Practice for the Electrical Safe Distances (NZECP 34:2001). For the purposes of this condition the key considerations are as follows:
  - (i) A minimum clearance of 4 metres is required between mobile plant and overhead transmission lines (Clause 5.2.1 of NZECP 34:2001); and
  - (ii) A minimum clearance of 6.5 is required between the ground and the overhead transmission lines at all times (Table 4 in NZECP 34:2001); and
  - (iii) There are restrictions on earthworks within 6 and 12 metres of a tower or where the earthworks would create an unstable slope (outlined in Clause 2.2.3 of NZECP 34:2001); and
  - (iv) There are restrictions on the construction of conductive fences within 5 metres of the visible part of the foundation of a tower (outlined in Clause 2.3.3 of NZECP 34:2001).

**In respect of Lots 6, 7, 9, 10 and 11**

**Wastewater and Stormwater Investigation and Design**



- 8. The Owners of Lots 6, 7, 9, 10 and 11 shall, on application for building consent submit the following investigations/designs to the Council for approval and shall construct the wastewater and stormwater disposal systems prior to occupation/operation of the approved dwelling/structure:
  - (a) A specific geotechnical investigation of the proposed building site, effluent disposal site (including a 50% reserve area), stormwater disposal and the proposed access route from the public road or right of way to the proposed building site shall be undertaken by a Geo-professional (as defined in NZS4404:2010) in accordance with the recommendations contained in the Geotechnical Investigation Report titled "*Waterfall Park Residential Subdivision Stages 2 and 2A at Market Road, Pokeno*" prepared by Coffey Geotechnics (NZ) Limited dated 22<sup>nd</sup> April 2013, reference number GENZAUCK14972AC ("the Geotechnical Investigation Report"); and
  - (b) Any foundation design shall be carried out by a suitably qualified and competent engineer in accordance with the restrictions and recommendations identified in the specific geotechnical investigation report to be obtained under condition 8(a) of this Consent Notice; and



 [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) 

- (c) A specific on-site waste water design, utilising a secondary treatment system, shall be carried out by a suitably qualified and experienced professional with demonstrated experience in the design of these systems, who is also certified as an approved designer by the manufacturer of the system in accordance with AS/NZS 1547:2012 (or subsequent update), the Waikato Regional Plan and the restrictions and recommendations identified in the Report titled "*Review of Proposed On-site Wastewater Treatment and Land Disposal for 117 Lot Subdivision Market Road*" prepared by Ormiston and Associates Limited dated June 2013, reference number 3608. In addition, the wastewater treatment and disposal system shall meet the following criteria, unless otherwise agreed in writing, on a case by case basis, with the Council:
- (i) The wastewater treatment system shall be capable of consistently producing secondary quality treated effluent achieving 20g/m<sup>3</sup> 5 Day Biological Oxygen Demand and 30g/m<sup>3</sup> Total Suspended Solids; and
  - (iii) A buried Pressure Compensating Dripper Irrigation system shall be used for discharge to the effluent field, with appropriate planting of the area and diversion of any potential surface water flows away from the effluent discharge field; and
  - (iv) The location of the on-site wastewater land disposal system shall be on slopes less than 20 degrees to the horizontal and shall maintain a minimum separation distance of 30m from any surface water or ephemeral stream unless otherwise agreed, in writing, with the Council; and
  - (v) Compliance with the effluent standard must be based on the achievement of Secondary Quality Standard grading in the Rotorua OSET NTP for BOD<sub>5</sub> and TSS for trials 3 and higher; and
  - (vi) The soil category classification of 6 from AS/NZS 1547:2012 and a maximum areal loading rate for the effluent disposal area of 3mm/day (3 litres/square metres/day) are appropriate; and
  - (vi) The installed system shall be constructed with a minimum of 24 hours storage above an installed high water alarm in the event of failure of the system.
- (d) A specific stormwater management design for the overall development, which caters for both primary and secondary flows, up to and including a 1% AEP storm event and including a 24% adjustment for climate change prepared by a suitably qualified and competent engineer which complies with the rules of the Waikato District Plan (Franklin Section) and the restrictions and recommendations identified in the Geotechnical Investigation Report. The design shall demonstrate hydrological neutrality at the Lot boundaries.



 [www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz) 

Copies of the Geotechnical Investigation Report and the Review of Proposed On-site Wastewater Treatment and Land Disposal can be obtained from the Waikato District Council.

### **Fire Safety Conditions**

9. The Owners of Lots 6, 7, 9, 10 and 11 shall ensure that when any future development on these Lots is proposed, a dedicated fire fighting water supply, in accordance with the specifications and requirements of SNZ PAS 4509:2008 "*New Zealand Fire Service Firefighting Water Supplies Code of Practice*" is provided for these Lots, prior to occupation of any habitable building on the Lots.

### **Maintenance of Wastewater Treatment Plant**

10. The Owners of Lots 6, 7, 9, 10 and 11 shall, on installation of an approved on-site wastewater treatment plant, enter into and maintain in force at all times, a written maintenance and monitoring contract with an experienced wastewater treatment plant operator, or a person trained in the wastewater treatment operation by the designer of the system, for the ongoing maintenance of the installed treatment and land application systems.

The contract shall specify the frequency of treatment plant inspections and maintenance and shall include an inspection maintenance schedule.

The maintenance/monitoring report shall include, but not be limited to, the following information:

- (a) the date the inspection was undertaken and the name of the service provider, and;
- (b) a list of all components of the treatment and land application systems that were inspected and the state of those components, and;
- (c) any maintenance undertaken during the visit or still required, and a timetable for the expected completion of this work, and;
- (d) a description of the appearance of the filter/s and tanks, and;
- (e) the location and source of any odour detected from the system; and
- (f) a description of the appearance of the land application area (ponding, vegetation growth etc).





www.waikatodistrict.govt.nz


The Owners shall ensure that maintenance/monitoring is undertaken in accordance with the approved contract.

Records of maintenance/monitoring undertaken in accordance with the approved contract shall be held and submitted to the Council, annually.

#### General Condition

11. The Owners shall pay the Council's costs and disbursements in respect of the preparation, execution and registration of this Notice and the Council's conditions set out in this Notice and any variation or cancellation of them.

**DATED** at Ngaruawahia this 2nd day of December 2014

  
\_\_\_\_\_  
GAVIN JOHN ION  
Chief Executive  
SUB0095/13 Stage 2A

# Resource Consent

*(Resource Management Act 1991)*

## DECISION ON APPLICATION SUB0095/13

Pursuant to Sections 34A(1), Section 104B, 220 and 108 of the Resource Management Act 1991, the Waikato District Council, under delegated authority, grants subdivision consent for a discretionary activity under the Operative Waikato District Council:

**Activity:** Two stage subdivision from fourteen underlying titles that will create twelve rural residential lots, two jointly owned access lots and a balance lot.

**Consent Holder:** Pokeno Farms Limited

**Location Address:** Market Street, Pokeno

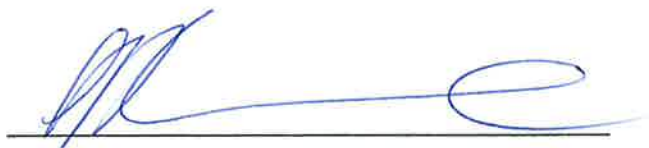
**Legal Description:** As listed in Appendix I

This consent is subject to the conditions detailed in the attached Schedule 1.

The reasons for this decision are detailed in the attached Schedule 2.

Dated at Ngaruawahia this 10th day of September 2013

For and on behalf of Waikato District Council

A handwritten signature in blue ink, appearing to read 'Michelle Carmine', is written over a horizontal line.

Michelle Carmine  
**ASSISTANT CONSENTS MANAGER**

## Schedule I

# Conditions of Consent

Resource Consent No: SUB0095/13

### Stage 2

#### Planning Conditions

##### General

PC1 The Land Transfer Plan to give effect to this resource consent shall be generally consistent with the approved scheme plans below:

- (a) 'Waterfall Park, Scheme Plan Stage 2 Scheme plan –Lots 1-5,55 &500' prepared by Woods Surveyors numbered 60613-02-GE-001, rev 5, dated 'April 2013', and;
- (b) 'Waterfall Park, Scheme Plan Stage 2 Scheme plan –Lots 1-5,55 &500' prepared by Woods Surveyors numbered 60613-02-GE-002, rev 5, dated 'April 2013', and;

Approved documents attached to this consent include the following:

- Privateway 1 and the property boundary adjoining State Highway 1 as illustrated in Drawing SU04 dated 01/09/2011;
- LASF Ltd Plans BP001 and RP001

PC2 The owners of Lots 1,2,3,4 and 5 shall be advised that any new residential dwellings located within 100m of the seal edge of the state highway shall be designed and constructed to meet noise performance standards. This is to ensure that noise from traffic on State Highway 1 will not exceed 35dBa Leq(24hr) in bedrooms and 40dBA Leq(24hr) for other habitable rooms in accordance with the Australian and New Zealand Standards AS/NZ2107:2000 Acoustics – recommended design sound levels and reverberation times for building interiors. The Council's solicitor shall prepare the consent notices for this purpose.

PC3 Prior to the section 224 certificate being signed by Waikato District Council, written confirmation shall be provided from network utility operators for telecommunication and energy supply confirming that the connections and reticulations have been placed to the boundary of Lot 1,2,3,4 and 5.

#### Riparian Vegetation Protection and Planting

PC4 Prior to section 223 certification, the consent holder shall show the following riparian planting areas on the Land Transfer Plan:

- (a) Lot 1 - An area that encompasses the ephemeral stream. This area will be from both sides of the stream to the top of the banks within Lots 1 and extending from the existing right of way to the line of trees bisecting Lots 1 and 2 as shown on Figure 1 of Appendix 2, to the satisfaction of Waikato District Council's Senior Development Engineer;

- (b) Lot 5 - The riparian planting area identified by letter 'Y' shown as yellow on the attached approved scheme plan.

**PC5** Prior to the section 224 certification, the consent holder shall, to the satisfaction of the Waikato District Council Monitoring Department –Team Leader:

- (a) complete the riparian planting and erection of a 5 wire stock proof fence in general accordance with the LASF Ltd Plan RP001, dated 2 October 2012 to the satisfaction of the Waikato District Council Team Leader- Monitoring;
- (b) undertake riparian planting within the riparian planting area of Lot 1 using the type of planting already approved (excluding trees) in the LASF Ltd Plan RP001, dated 2 October 2012. Any newly planted trees or vegetation (exceeding a maximum height of 2.5 metres at full maturity) must:
  - (i) Be setback by a horizontal distance of at least 12 metres either side (total of 24 metres) from the centreline of the Bombay-Meremere A and the Meremere Takanini A 110kV double circuit transmission lines; and
  - (ii) When fully grown, not be able to fall within 5 metres of the said transmission lines.

**PC6** The owners of Lot 1 and Lot 5 shall be advised that the areas of riparian planting and existing native riparian vegetation (such as sedges and rushes) within the riparian planting area identified in PC4 are to be protected and preserved. The Waikato District Council's Solicitor shall prepare a consent notice for this purpose. The consent notice shall include the following conditions:

- (a) The owner shall protect and preserve the areas of riparian planting and existing native riparian vegetation (such as sedges and rushes) shown within the riparian planting areas.
- (b) The riparian planting is required to be maintained in perpetuity – therefore should the planting die or be removed, it must be replaced within the next planting season with equivalent plantings.
- (c) The owner of Lot 5 shall maintain the existing stock-proof fence to prevent stock entering the areas of riparian planting and existing native riparian vegetation (such as sedges and rushes).
- (d) The owner shall undertake measures to ensure that plant, pests and noxious weeds do not prevent or significantly alter the riparian planting areas.
- (e) The owner of Lot 1 shall exclude livestock from the riparian planting area, or erect and maintain a 5 wire stock proof fence in order to protect planting from stock.

## **Native Tree Protection**

**PC7** Prior to section 223 certification, the consent holder shall show the following native tree protection areas on the Land Transfer Plan:

- (a) Lot 1 - The native tree protection area identified by letter 'S' on the attached approved scheme plan.
- (b) Lot 2 - The native tree protection area identified by letter 'R' on the attached approved scheme plan.

PC8 The owners of Lot 1 and 2 shall be advised that the native tree protection areas identified in PC7 are to be protected and preserved. The Waikato District Council's Solicitor shall prepare a consent notice for this purpose. The consent notice shall include the following conditions:

- (a) The owner shall protect and preserve the native tree protection areas and maintain any existing stock-proof fences to prevent stock from entering these areas.
- (b) The owner shall undertake plant, pest and noxious weed control measures to ensure that such plant, pests and noxious weeds do not prevent or significantly alter native tree protection areas.

### **Planting Buffer in the proximity of the State highway**

PC9 Prior to section 223 certification, the consent holder shall show a planting buffer area within Lot 5 on the Land Transfer Plan. The limits of the areas shall correspond to the area between 'Privateway 1 and the property boundary adjoining State Highway 1 as illustrated in Drawing SU04 dated 01/09/2011.

PC10 Prior to the section 224 certification, the consent holder shall complete the planting within the planting buffer area in general accordance with LASF Plan BP001, dated 2 October 2012. Any newly planted trees or vegetation (exceeding a maximum height of 2.5 metres at full maturity) must:

- (i) Be setback by a horizontal distance of at least 12 metres either side (total of 24 metres) from the centreline of the Bombay-Meremere A and the Meremere Takanini A 110kV double circuit transmission lines; and
- (ii) When fully grown, not be able to fall within 5 metres of the said transmission lines.

Planting is to be to the satisfaction of the Waikato District Council Monitoring Department –Team Leader

PC11 The owner of Lot 5 shall be advised that the area of planting buffer identified in PC9 is to be protected and preserved. The Waikato District Council's Solicitor shall prepare a consent notice for this purpose. The consent notice shall include the following conditions:

- (a) The owner shall protect and preserve the areas of planting buffer shown as areas on the Land Transfer Plan.
- (b) The planting buffer is required to exist in perpetuity. Should any planting die or be removed, it must be replaced within the next planting season with equivalent plantings.
- (c) The owner shall undertake plant, pest and noxious weed control measures to ensure that such plant, pests and noxious weeds do not prevent or significantly alter the planting buffer shown as areas on the amended scheme plan.

## Transmission Lines

- PC12 Prior to section 223 certification, the consent holder shall show a Transpower NZ Ltd corridor area within Lots 1, 2, 3, 4 and 5 on the Land Transfer Plan. The corridor area will be 12 meters either side of the centreline of the Bombay-Meremere A and the Meremere Takanini A 110kV double circuit transmission lines.
- PC13 The owners of Lots 1, 2, 3, 4 and 5 shall be advised that the following is to be complied with on a continuing basis. The Waikato District Council's Solicitor shall prepare a consent notice for this purpose.
- (a) No buildings shall be constructed within the Transpower NZ Ltd corridor area;
  - (b) All newly planted trees or vegetation (exceeding a height of 2.5 metres at full maturity) on Lots 1,2,3,4 and 5 must:
    - (i) not be located within the Transpower NZ Ltd corridor area;
    - (ii) when fully-grown, not be able to fall within 5 metres of the transmission lines.
  - (c) All land use activities, including the construction of new buildings/structures, earthworks (filling and excavations), and/or the operation of mobile plant on Lots 1,2,3,4 and 5 must comply with the New Zealand Electrical Code of Practice for the Electrical Safe Distances (NZECP 34:2001). For the purposes of this condition, the key considerations are as follows:
    - (i) A minimum clearance of 4 metres is required between mobile plant and overhead transmission lines (Clause 5.2.1 of NZECP 34:2002); and
    - (ii) A minimum clearance of 6.5 is required between the ground and the overhead transmission lines at all times (Table 4 in NZECP 34:2001); and
    - (iii) Clause 2.2.3 of NZECP 34:2001 outlines restrictions on earthworks within 6 and 12 metres of a tower or where the earthworks would create an unstable slope; and
    - (iv) Clause 2.3.3 of NZECP 34:2001 outlines restrictions on the construction of conductive fences within 5 metres of the visible part of the foundation of a tower.

### Advice Notes:

- (i) It is Transpower NZ Ltd's preference that all mobile plant operated on site maintain a horizontal distance of at least 12 metres from the centre of the transmission line and support structures.
- (ii) All new trees/vegetation planted in the vicinity of any transmission lines are limited to those which at a mature height will not encroach upon the relevant growth limit zone [or notice zone] for the line, as defined in the Electricity (Hazards from Trees) Regulations 2003.
- (iii) Transpower NZ Ltd has a right of access to its existing assets situated in Lots 1, 2, 3, 4, 5 and 500 under s23 of the Electricity Act 1992. Any development on Lots 1, 2, 3, 4, 5 and 500 must not preclude or obstruct this right of access. It is an offence under s163(f) Electricity Act to intentionally obstruct any person in the performance of any duty or in doing any work that the person has the lawful authority to do under s23 of the Electricity Act.

- (iv) Trees and vegetation used for landscaping will need to be located and managed to comply with the Electricity (Hazard from Trees) Regulations 2003.

PC14 Prior to section 224 certification, following completion of earthworks, the consent holder must submit an earthworks as-built plan for the approval of the Waikato District Council. This as-built plan must be accompanied by a report by a suitably qualified and experienced electrical engineer determining the minimum ground (as-built) clearance below the conductors on the Bombay-Meremere A and the Meremere-Takanini A 110kV double circuit transmission lines under worst case conditions. Where the compliance check indicates the required clearances are not achieved, the consent holder must undertake the required remedial work within one month.

Advice Note:

The assessment by the electrical engineer needs to be provided to Transpower NZ Ltd for its review and comment at least one month before it is submitted to the Waikato District Council.

### **Midden Protection**

PC15 Prior to section 223 certification, the consent holder shall show the potential midden area within Lots 1, identified as area 'T' on the approved scheme, on the Land Transfer Plan.

PC16 The owners of Lot 1 shall be informed that a potentially archaeological sensitive area is located within the boundaries of the lot. An authority to modify, damage or destroy the potential midden area should be submitted to the New Zealand Historic Places Trust in the situation where any earthworks are proposed that may disturb the potential midden located within Lot 1. The Waikato District Council's Solicitor shall prepare a consent notice for this purpose.

Advice Note:

- (i) The authority referred to in PC16 is likely to set conditions such as investigation of the archaeological features prior to commencement of subdivision construction earthworks, and monitoring and recording of archaeological features encountered during earthworks;
- (ii) Complying with any conditions in the authority related to information recovery is at a cost to the applicant;
- (iii) From the time of submission to the Historic Places Trust, it may be up to 3 months for the authority to be processed and a further 15 working days after issue before the authority can be acted upon;
- (iv) The Historic Places Trust requires proof of iwi consultation, usually in the form of a letter stating the cultural values of the site and acknowledgement of the application to destroy.



## Accidental Archaeological Discovery

PC17 In the event of any archaeological site or waahi tapu, in addition to the potential midden located within Lot 1 being discovered or disturbed while undertaking works to give effect to the conditions of this consent, the works in the area of the discovery shall cease immediately, and iwi and the Waikato District Council shall be notified within 48 hours. Works may recommence with the written approval of the Waikato District Council. Such approval shall be given after the Waikato District Council has considered:

- (i) Tangata Whenua interests and values,
- (ii) the consent holders interests,
- (iii) any archaeological or scientific evidence.

## Monitoring

PC18 Pursuant to Section 36 of the Resource Management Act 1991 the consent holder shall pay the actual and reasonable Costs incurred by the Waikato District Council when monitoring the conditions of consent.

## Engineering Conditions

EC1 The consent holder shall appoint appropriately qualified and competent developer's representative/s, acceptable to Waikato District Council, to provide all designs, supervision, certification and final signoff. This is to occur in accordance with the requirements of the Franklin District Council Code of Practice for Subdivision and Development Edition 5 October 2010, unless variations are in accordance with "The Waterfall Park Code of Subdivision and Development, July 2013" and subsequent amendments.

### Note:

The Franklin Code of Practice can be found under the following link: <http://www.waikatodistrict.govt.nz/Documents/Franklin-Engineering-Code-of-practice.aspx>  
It is recommended that the consent holder read and understand the Franklin Code of Practice prior to commencement of engineering design or physical works. S224(c) may be withheld if the code of practice is not complied with, unless variations are in accordance with "The Waterfall Park Code of Subdivision and Development, July 2013" and subsequent amendments.

EC2 The consent holder shall notify Waikato District Council's Senior Development Engineer, in writing of the following:

- (a) The name and telephone number of the developer's representative appointed in EC1;
- (b) Site address/consent number;
- (c) Works undertaken on the site;
- (d) Expected duration of works.

EC3 The consent holder shall put erosion and sediment control measures in place in accordance with the requirements of the Waikato District Plan-Appendix B-Rule B6:Earthworks, the Hamilton Development Manual-Part 2:Earthworks, and the Waikato Regional Council's Erosion and Sediment Control Guidelines for Soil Disturbing Activities: January 2009, prior to undertaking the consented activity.

Erosion and sediment controls shall be maintained and remain in place until the Waikato District Council's Senior Development Engineer is satisfied that the risk from erosion and instability has been reduced to a less than minor risk and has provided approval in writing.

## **Roading and Earthworks Conditions**

EC4 Prior to section 224 certification, Lots 1 to 5 inclusive shall be provided with a sealed entrance that complies with the following:

- (a) entrances shall achieve sight/stopping distances that comply with table 6 of the Waikato District Plan (operational in part) 2011: Appendix A for a 50 km/h operating speed; and
- (b) entrances be designed and constructed in general accordance with a Type 2 Vehicle Crossing as shown on Drawing 60613-EC-RD-230 Rev1. The layout shall demonstrate that a 90 percentile car is able to enter/exit the entrance within the sealed area.
- (c) entrances shall detail design methods that will prevent stormwater run-off and detritus from discharging from the property to the road reserve.
- (d) Any gate placed across the entrance shall be set back a minimum of 6m from the road edge, exclusive of any additional distance required to open the gate, to allow a vehicle to clear the live lanes when entering/exiting.

EC5 Prior to section 224 certification, the consent holder shall commission engineering designs/plans for the works described in condition EC4.

These designs/plans are to be undertaken by a suitably qualified and competent engineer/land surveyor, and are to be submitted to, and gain the approval of, the Waikato District Council's Senior Development Engineer.

No works shall be undertaken without this written approval first being obtained.

EC6 Prior to section 224 certification, construction of the works in the plans approved under condition EC5 are to be undertaken by the consent holder and approved by Waikato District Council's Senior Development Engineer.

EC7 Prior to the section 224 certificate being signed by Waikato District Council, a "*Producer Statement – Construction*" shall be provided by the Contractor/s responsible for the works undertaken to satisfy condition EC6, to the satisfaction of Waikato District Council's Senior Development Engineer.

An acceptable format for "*Producer Statement – Construction*" shall be as per Volume 4: Part 9 – Appendix 4(ii) of the Hamilton City Development Manual.

EC8 Prior to section 224 certification, a "*Certificate of Completion of Development Works*", prepared and signed by the Certifying Engineer", (A CPEng as defined in the Franklin Code of Practice) shall be provided to certify that the works have been carried out in accordance with the plans approved under condition EC6, to the satisfaction of Waikato District Council's Senior Development Engineer.

The standard format for a "*Certificate of Completion of Development Works*" shall be as per the Franklin District Council Code of Practice for Subdivision and Development, Edition 5 October 2010, Appendix B

EC9 After completion of the earthworks and prior to application for the issuance of the S224(c) certificate, the consent holder is to provide a "Statement of Professional Opinion as to Suitability of Land for Building Development" completed and signed by a Geo-professional to certify that each individual lot is suitable for:

- (a) Erection of residential buildings; and
- (b) Provide any specific designs/requirements necessary for the construction of residential buildings.

The format for the "Statement of Professional Opinion as to Suitability of Land for Building Development" shall be as per Appendix A of the Franklin District Council's Code of Practice for Subdivision and Development, Edition 5-October 2010.

The "Statement of Professional Opinion as to Suitability of Land for Building Development" is to be accompanied by the following:

- (a) A schedule with dates/results etc of all supervision and testing undertaken to certify the areas of cut/fill, and
- (b) An as-built plan of the earthworks, clearly showing the areas/depths of cut and fill, and defining areas of fill which have been engineered, and those areas of fill which have not been engineered.

### **Stormwater Conditions**

EC10 The Waikato District Council's Solicitor shall prepare a consent notice to advise the new owners of Lot 1 that:

- (a) the erection of buildings is prohibited within the easement area labeled 'Z' on the approved scheme plan. Area 'Z' measures 1.5 meters each side of the centre line of a proposed storm water pipeline, and;
- (b) specific engineering design of building foundations will be required if buildings are located within a horizontal distance of any future pipeline, equal to the depth from ground level to the invert of the proposed stormwater line. This is to avoid transfer of building footing loads onto the proposed pipeline.

EC11 Prior to section 223 certification, the consent holder shall commission engineering designs/plans for the proposed future piping works described in condition EC10.

These designs/plans are to be undertaken by a suitably qualified and competent Engineer, and are to be submitted to, and gain the approval of, the Waikato District Council's Senior Development Engineer. Designs shall include the ultimate catchment area served and calculations regarding pipe size, class and capacity, as well as the position of any overland flow paths necessary to cater for a 1%AEP event plus a 24% allowance for climate change.

#### Advice Note:

Future piping of the ephemeral stream gully system located on Lot 1 may occur after issue of title for lots created under Stage 2. The Waikato District Council is satisfied that should this occur, any future reticulation can be vested in Waikato District Council. This is on the understanding that any such infrastructure would be designed as required under EC11.

## Water Supply Conditions

- EC12 A reticulated water supply connection including meter, backflow preventer, valve and box shall be provided to Lots 1-5 inclusive to the satisfaction of Waikato District Council Senior Development Engineer, prior to issuance of the 224(c) certificate. Any connection/s to existing Waikato District Council water main/rider main shall be installed by Waikato District Council. Any extension to existing Waikato District Council mains, and connections to the new main or rider main, shall be installed/supervised by a qualified Water Service Person holding a National Certificate in Water Reticulation Level 4.

Advice Note:

Mains reticulation has been installed up to and including Lot 5 as part of the engineering conditions for Stage 1 of this subdivision. Connections are only required for lots created under Stage 2.

- EC13 Plans detailing the positioning of the water connections described in EC12 are to be provided to Waikato District Council's Senior Development Engineer for approval prior to installation of the connection. The connection is to be laid out as per drawing WDC 11 which can be found in the Hamilton City Development Manual, Volume 5 – District Council Supplement.

- EC14 As-built plans detailing position, meter number, backflow preventer number are to be provided to the satisfaction of Waikato District Council's Senior Development Engineer prior to issuance of S224(c) certificate.

Waikato District Council requires that all survey data be provided as follows:

Map Projection - NZTM

Datum - NZGD2000

Vertical Datum - Moturiki 1953

## Access to Lots

- EC15 The owners of Lots 2, 3, 4, 5 and 500 ("original lot") or any lot created by subdivision of any of those lots ("additional lot") shall:
- (a) not use any access to or egress from their original lot or permit any access to or egress from their original lot other than by means of the right of way marked A on the scheme plan 'Waterfall Park, Scheme Plan Stage 2' prepared by Woods Surveyors numbered 60613-01-GE-002, rev 1 and dated April 2013, save for any lot with direct road frontage onto Market Street – such a lot being permitted to have access direct onto Market Street provided such access complies with all Council and Waikato District Plan standards and rules; nor
  - (b) object to or seek to prevent by any means, including by application to a Court, the use of the specified right of way for the purposes of access to or egress from any original lot or additional lot.

## Legal Conditions

- LC1 At the time of building consent application, the current and future owner(s) of Lots 1, 3, 4 and 5 shall undertake the following investigations/designs, submit them to Waikato District Council for approval, and construct them prior to occupation/operation of the approved dwelling/structure:
- (a) A specific geotechnical investigation of the proposed building site, effluent disposal site (including 50% reserve area), stormwater disposal and the proposed access route from the public road or right of way to the proposed building site is to be undertaken by a Geo-professional (as defined in NZS4404:2010) in accordance with the recommendations contained within the following reports:
    - (i) 'Geotechnical Investigation Report On Waterfall Park Residential Subdivision Stages 2 and 2A at Market Road Pokeno'. Coffey Geotechnics (NZ) Ltd Reference GENZAUCKI4972AC, Dated 22<sup>nd</sup> April 2013 ; and
    - (ii) 'Review of Proposed On-Site Wastewater Treatment and Land Disposal for 117 Lot Subdivision Market Road'. Ormiston and Associates Ltd. Reference 3608, dated June 2013,: and:
  - (b) Any foundation design is carried out by a suitably qualified and competent engineer in accordance with the restrictions and recommendations identified in the report obtained under LC1(a) above; and
  - (c) A specific on-site waste water design, utilising a secondary treatment system, is carried out by a suitably qualified and experienced professional, with demonstrated experience in the design of these systems, who is also certified as an approved designer by the manufacturer of the system and in accordance with AS/NZS 1547:2012 (or subsequent update), the Waikato Regional Plan and the restrictions and recommendations identified in the report; "Review of Proposed On-Site Wastewater Treatment and Land Disposal for 117 Lot Subdivision Market Road". Ormiston and Associates Ltd. Reference 3608, dated June 2013. The wastewater disposal system shall also meet the following criteria, unless otherwise agreed, on a case by case basis, in writing with Waikato District Councils Senior Development Engineer:
    - (i) That the wastewater treatment system capable of consistently producing secondary quality treated effluent achieving 20g/m<sup>3</sup> 5 Day Biological Oxygen Demand and 30g/m<sup>3</sup> Total Suspended Solids; and:
    - (ii) That a buried Pressure Compensating Dripper Irrigation system be used for discharge to the effluent field, with appropriate planting of the area and diversion of any potential surface water flows away from the effluent discharge field
    - (iii) That the location of the on-site wastewater land disposal system be on slopes less than 20 degrees to the horizontal and maintain a minimum separation distance of 30m from any surface water or ephemeral stream, unless otherwise agreed, in writing, with Councils Senior Development Engineer.
    - (iv) Compliance with the effluent standard must be based on achievement of Secondary Quality Standard grading in the Rotorua OSET NTP for BOD5 and TSS for trials 3 and higher.



- (v) The soil category classification 6 from AS/NZS 1547:2012 and a maximum areal loading rate, for the effluent disposal area, of 3mm/day (3 litres/square metre/day) are appropriate.
  - (vi) The installed system shall be constructed with a minimum of 24 hours storage above an installed high water alarm in the event of failure of the system.
  - (d) A specific stormwater management design for the overall development, which caters for both primary and secondary flows, up to and including a 1% AEP storm event and inclusive of a 24% adjustment for climate change, shall be prepared by a suitably qualified and competent engineer, and shall comply with the rules of the Waikato District Plan- Franklin Section , and the restrictions and recommendations identified in the “Geotechnical Investigation Report On Waterfall park Residential Subdivision Stages 2 and 2A at Market Road Pokeno” Coffey Geotechnics (NZ) Ltd Reference GENZAUCK14972AC, Dated 22<sup>nd</sup> April 2013. The design shall demonstrate hydrological neutrality at the Lot boundaries. The stormwater management design shall ensure that no stormwater is discharged on the effluent disposal area or the reserve disposal area.
- LC2 The owners of Lots 1 to 5 shall ensure that when any future development on the site is proposed, the following matters are complied with prior to occupation of any habitable building on site:
- (a) Lots 1 to 5 are provided with a dedicated fire fighting water supply, in accordance with the specifications and requirements of SNZ PAS 4509:2008 *“New Zealand Fire Service Firefighting Water Supplies Code of Practice*.
- LC3 The current and future owners of Lots 1 to 5 shall, on installation of an approved on-site wastewater treatment plant, enter into, and maintain in force at all times, a written maintenance and monitoring contract with an experienced wastewater treatment plant operator, or a person trained in the wastewater treatment operation by the system designer, for the ongoing maintenance of the installed treatment and land application systems.
- The contract shall specify the frequency of treatment plant inspections and maintenance and shall include an inspection and maintenance schedule.
- The maintenance/monitoring report shall include, but not be limited to, the following information:
- (a) the date the inspection was undertaken and the name of the service provider, and;
  - (b) a list of all components of the treatment and land application systems that were inspected and the state of those components, and;
  - (c) any maintenance undertaken during the visit or still required, and a timetable for the expected completion of this work, and;
  - (d) a description of the appearance of the filter/s and tanks, and;
  - (e) the location and source of any odour detected from the system, and;
  - (f) a description of the appearance of the land application area (ponding, vegetation growth, etc).
- Current and future owners shall ensure that maintenance/monitoring is undertaken in accordance with this approved contract.

Records of maintenance/monitoring undertaken in accordance with the approved contract shall be held and presented to Waikato District Council General Manager Service Delivery, annually.

LC4 Pursuant to Section 221 of the Resource Management Act 1991, consent notices must be prepared and be registered on the Computer Freehold Register by Waikato District Council's Solicitors at the consent holder's expense, containing the following conditions which are to be complied with on a continuing basis by the subdividing land owner and subsequent owners:

- (i) Lots 1,2,3,4 and 5 with PC2
- (ii) Lots 1 and 5 with PC6
- (iii) Lot 1 and 2 with PC8
- (iv) Lots 1,2,3 4 and 5 with PC13, LC2 and LC3
- (v) Lots 1 with PC16 and EC10
- (vi) Lots 2,3,4,5 and 500 with EC15
- (vii) Lots 1,3,4 and 5 with LC1
- (viii) Lot 5 with PC11

Upon the issue of a certificate pursuant to section 224(c) of the Resource Management Act 1991 or at such earlier time as may be required, the consent notices pursuant to section 221 of the Resource Management Act will be issued.

LC5 All easements shown on the application plan 'Waterfall Park, Scheme Plan Stage 2 Scheme plan –Lots 1-5,55 &500' prepared by Woods Surveyors numbered 60613-02-GE-001, rev 5, dated 'April 2013' submitted with application SUB0095/13 and any additional easements required by conditions of consent, shall be created as proposed.

LC6 The easement for right of way contained in easement instrument B DP 208440 and A DP 208440 shall be revoked.

### **Advice Notes**

AN1 The conditions for Stage 2 are essentially the same as for Stage 1 of SUB1055/11, where the physical works have largely been completed. Waikato District Council has been advised that Stage 1 will be replaced by Stage 2. It is therefore necessary to transfer applicable conditions for Stage 2 in order to allow sign off under 224c. Some of the consent conditions for Stage 2 will have been completed already.

AN2 Pursuant to Section 106(2) of the Local Government Act 2002 Development Contributions for the following services shall be paid to Council.



<b>Infrastructure</b>	<b>Number of additional lots where water development contributions are applicable</b>	<b>Fee per lot</b>	<b>Total Amount</b>
<b>Stage 2</b>			
Water Supply	2	\$2,010	\$8,040
Payment received for two lots (27 June 2012)	2	\$ 1,850	
<b>Total Development Contributions (GST excluded)</b>			<b>\$ 4,020</b>

**Note:**

- (i) The amounts of contributions payable at the time of issue of a Section 224c Certificate are those fees and charges prevailing at the time of payment, not at the time of issuing resource consent.
- (ii) The creation of the subdivision SUB0095/13 has been undertaken from an original 14 certificates of title. Development Contributions are to be collected by the Waikato District Council for new development above the existing number of titles that make up the subject site. There are six respective Development Contribution credits applicable for SUB0095/13 Stage 2 (i.e. six new lots and a balance lot), leaving a balance of eight Development Contribution credits. These credits shall be allocated against Lot 500 and are to be used in the subsequent subdivision of Lot 500. Any development contribution credit would not include water development contributions.
- (iii) Two of the seven new lots have existing dwellings connected to the water line that is located in Market Street. Payment for two additional lots has been received in respect to water supply contributions that were applicable to SUB1055/11. A water contribution for two applicable lots of Stage 2, and any increase in contributions since payment, is therefore required.

**AN3** Pursuant to section 208(a) of the Local Government Act 2002 a territorial authority may in the case of a development contribution required under section 198(1)(a), withhold a certificate under section 224(c) of the Resource Management Act 1991 until the required development contribution has been paid.

**AN4** This resource consent for subdivision lapses five years after the date of issue of this decision, unless:

- (a) the Consent is given effect to prior to that date. To give effect to this consent, the survey plan for this subdivision must have been submitted to Waikato District Council pursuant to section 223 of the Resource Management Act 1991; or
- (b) an application is made before the expiry of the above mentioned date for Waikato District Council to grant an extension of time pursuant to section 125 of the Resource Management Act 1991.

## **Stage 2A**

### **Planning Conditions**

#### **General**

PC19 Stage 2 of the SUB0095/13 is to proceed ahead of Stage 2A

PC20 The Land Transfer Plan to give effect to this resource consent shall be generally consistent with the approved application plans below:

- (a) 'Waterfall Park, Scheme Plan Stage 2A Scheme plan –Lots 6-11, 125 and 501 being subdivision of Lot 500 (balance lot) Stage 2' prepared by Woods Surveyors numbered 60613-02-GE-003, rev 2, 1 dated 'April 2013', and;
- (b) 'Waterfall Park, Scheme Plan Stage 2A Scheme plan –Lots 6-11, 125 and 501 being subdivision of Lot 500 (balance lot) Stage 2' prepared by Woods Surveyors numbered 60613-02-GE-004, rev 2, dated 'April 2013', and;

Approved documents attached to this consent include the following:

- Privateway 1 and the property boundary adjoining State Highway 1 as illustrated in Drawing SU04 dated 01/09/2011;
- LASF Ltd Plans BP001 and RP001

PC21 The owners of Lots 6,7,9,10 and 11 shall be advised that any new residential dwellings located within 100m of the seal edge of the state highway shall be designed and constructed to meet noise performance standards to ensure that noise from traffic on State Highway 1 will not exceed 35dBa Leq(24hr) in bedrooms and 40dBA Leq(24hr) for other habitable rooms in accordance with the Australian and New Zealand Standards AS/NZ2107:2000 Acoustics – recommended design sound levels and reverberation times for building interiors. The Council's solicitor shall prepare the consent notices at the applicant's expense for this purpose.

PC22 Prior to section 224 certification, written confirmation shall be provided from network utility operators for telecommunication and energy supply confirming that the connections and reticulations have been placed to the boundary of Lot 6, 7, 9, 10 and 11.

### **Riparian Vegetation Protection and Planting**

PC23 Prior to section 223 certification, the consent holder shall show the following riparian planting areas on the Land Transfer Plan:

- (a) The areas identified as riparian planting and existing native riparian vegetation (such as sedges and rushes) within areas 'AA', 'AB', 'AC', 'AD' and 'AE', shown as yellow on the attached scheme plan.

PC24 Prior to section 224 certification, the consent holder shall complete the riparian planting and erection of a 5 wire stock proof fence in general accordance with the LASF Ltd Plan RP001, dated 2 October 2012. Any newly planted trees or vegetation (exceeding a maximum height of 2.5 metres at full maturity) must:

- (a) Be setback by a horizontal distance of at least 12 metres either side (total of 24 metres) from the centreline of the Bombay-Meremere A and the Meremere Takanini A 110kV double circuit transmission lines; and

- (b) When fully grown, not be able to fall within 5 metres of the said transmission lines.

Planting is to be to the satisfaction of the Waikato District Council Monitoring Department –Team Leader

PC25 The owners of Lot 6, 7, 9, 10 and 11 shall be advised that the areas of riparian planting and existing native riparian vegetation (such as sedges and rushes) within the riparian planting area identified in PC23 are to be protected and preserved. The Waikato District Council's Solicitor shall prepare a consent notice for this purpose. The consent notice shall include the following conditions:

- (a) The owner shall protect and preserve the areas of riparian planting and existing native riparian vegetation (such as sedges and rushes) shown within riparian planting areas.
- (b) The riparian planting is required to exist in perpetuity – therefore should the planting die or be removed, it must be replaced within the next planting season with equivalent plantings.
- (c) The owner shall maintain the existing stock-proof fence to prevent stock entering the areas of riparian planting and existing native riparian vegetation (such as sedges and rushes).
- (d) The owner shall undertake measures to ensure that plant, pests and noxious weeds do not prevent or significantly alter the riparian planting areas.

### **Planting Buffer in the proximity of the State highway**

PC26 Prior to section 223 certification the consent holder shall show a planting buffer area within Lot 9 and Lot 11 on the Land Transfer Plan. The limits of these areas are to correspond to the area between 'Privateway 1 and the property boundary adjoining State Highway 1 as illustrated in Drawing SU04 dated 01/09/2011.

PC27 Prior to the section 224 certification, the consent holder shall complete the planting in general accordance with LASF Plan BP001, dated 2 October 2012. Any newly planted trees or vegetation (exceeding a maximum height of 2.5 metres at full maturity) must:

- (i) Be setback by a horizontal distance of at least 12 metres either side (total of 24 metres) from the centreline of the Bombay-Meremere A and the Meremere Takanini A 110kV double circuit transmission lines; and
- (ii) When fully grown, not be able to fall within 5 metres of the transmission lines.

Planting is to be to the satisfaction of the Waikato District Council Monitoring Department –Team Leader

PC28 The owners of Lot 9 and 11 shall be advised that the area of planting buffer identified in PC26 is to be protected and preserved. The Waikato District Council's Solicitor shall prepare a consent notice for this purpose. The consent notice shall include the following conditions:

- (a) The owner shall protect and preserve the areas of planting buffer areas.
- (b) The planting buffer areas are required to exist in perpetuity. Should any planting die or be removed, it must be replaced within the next planting season with equivalent plantings.

- (c) The owner shall undertake plant, pest and noxious weed control measures to ensure that such plant, pests and noxious weeds do not prevent or significantly alter the planting buffer areas.

## Transmission Lines

PC29 The consent holder must submit a Construction Management Plan (CMP) to the Waikato District Council for approval. The CMP must include the construction drawings and procedures, methods and measures to be applied to address the following:

- (a) Earthworks; and
- (b) Maintenance of adequate clearance at all times between mobile plant and the overhead transmission lines, namely Transpower NZ Ltd's Bombay-Meremere A (BON-MER A) and the Meremere – Takanini A (MER-TEK A) 110Kv double circuit transmission lines and support structures (refer Clause 5.2 of NZECP34:2001).

Notes: The CMP is required because the Bombay-Meremere A and the Meremere-Takanini A 110kV double circuit transmission lines cross the application site and without appropriate management during construction giving effect to the consent has the potential to cause adverse effects on the electricity infrastructure. More specially the CMP is required because ground levels on part of the site may be increased such that clearances between the ground levels on part of the site may be increased such that clearances between the ground and the Bombay – Meremere A and the Meremere-Takanini A 110kV double circuit transmission lines are reduced. Please note that the NZECP34:2001 specifies that a minimum clearance of 4 metres is required at all times between mobile plant and live overhead electric lines unless the electric line owner has given prior written consent.

PC30 The CMP must:

- (a) Be given to Transpower NZ Ltd for its review and comment at least one month prior to being submitted to the Waikato District Council. Any comment provided by Transpower must be included with the CMP submitted to the Waikato District Council;
- (b) Specify the name, experience and qualifications of a person nominated by the owner to supervise the implementation of, and adherence to, the CMP; and
- (c) Include details of the contractor's liability insurance held to cover the costs, direct or indirect, associated with damage to the Bombay-Mere A and Meremere-Takanini A 110kV double circuit transmission lines directly or indirectly caused by activities undertaken to give effects to the subdivision consent.

PC32 No construction activities are to be undertaken without the CMP being first approved by the Waikato District Council, and all construction activities are to be undertaken in accordance with the approved plan.

PC33 Without limiting the generality of Condition PC29, the consent holder:

- (a) Must manage the consented activities so the discharge of dust and/or particulate matter does not create any dust hazard or nuisance to Transpower NZ Ltd's Bombay-Meremere A (BOB-MER A) and the Meremere-Takanini A (MER-TAK A) 110kV double circuit transmission lines and support structures which are within or close to the application site; and

Must not deposit any excavated or other material under or near the Bombay-Meremere A and the Meremere-Takanini A 110kV double circuit transmission lines where the vertical distance from the ground to the conductors would be reduced to less than 6.5 metres (Note: this applies to all activities including possible temporary stockpiles).

- PC34 Prior to the section 224 certification, following completion of earthworks, the consent holder must submit an earthworks as-built plan for the approval of the Waikato District Council. This must be accompanied by a report by a suitably qualified and experienced electrical engineer determining the minimum ground (as-built) clearance below the conductors on the Bombay-Meremere A and the Meremere-Takanini A 110kV double circuit transmission lines under worst case conditions. Where the compliance check indicates the required clearances are not achieved, the consent holder must undertake the required remedial work within one month.

Advice Note:

The assessment by the electrical engineer must be provided to Transpower NZ Ltd for its review and comment at least one month before it is submitted to the Waikato District Council.

- PC35 Prior to s223 certification, the consent holder shall show a Transpower NZ Ltd corridor area within Lots 6, 9, 10 and 11 on the Land Transfer Plan. The corridor area will be 12 meters either side of the centreline of the Bombay-Meremere A and the Meremere Takanini A 110kV double circuit transmission lines.

- PC36 The owners of Lots 6, 9, 10 and 11 shall be advised that the following shall be complied with on a continuing basis. The Waikato District Council's Solicitor shall prepare a consent notice for this purpose.

- (a) No buildings shall be constructed within the Transpower NZ Ltd corridor area;
- (b) All newly planted trees or vegetation (exceeding a height of 2.5 metres at full maturity) on Lots 6,9,10,11,125 must:
  - (i) Not be located within the Transpower NZ Ltd corridor area;
  - (ii) When fully-grown not be able to fall within 5 metres of the transmission lines.
- (c) All land use activities, including the construction of new buildings/structures, earthworks (filling and excavations), and/or the operation of mobile plant on Lots, 6, 9, 10, 11 and 125 must comply with the New Zealand Electrical Code of Practice for the Electrical Safe Distances (NZECP 34:2001). For the purposes of this condition, the key considerations are as follows:
  - (i) A minimum clearance of 4 metres is required between mobile plant and overhead transmission lines (Clause 5.2.1 of NZECP 34:2002); and
  - (ii) A minimum clearance of 6.5 is required between the ground and the overhead transmission lines at all times (Table 4 in NZECP 34:2001); and
  - (iii) Clause 2.2.3 of NZECP 34:2001 outlines restrictions on earthworks within 6 and 12 metres of a tower or where the earthworks would create an unstable slope; and



- (iv) Clause 2.3.3 of NZECP 34:2001 outlines restrictions on the construction of conductive fences within 5 metres of the visible part of the foundation of a tower.

**Advice Notes:**

- (i) It is Transpower NZ Ltd's preference that all mobile plant operated on site maintain a horizontal distance of at least 12 metres from the centre of the transmission line and support structures.
- (ii) All new trees/vegetation planted in the vicinity of any transmission lines are limited to those which at a mature height will not encroach upon the relevant growth limit zone for the line, as defined in the Electricity (Hazards from Trees) Regulations 2003.
- (iii) Transpower NZ Ltd has a right of access to its existing assets situated in Lots 6,9,10,11 and 125 under s23 of the Electricity Act 1992. Any development on Lots 6,9,10,11 and 125 must not preclude or obstruct this right of access. It is an offence under s163 (f) Electricity Act to intentionally obstruct any person in the performance of any duty or in doing any work that the person has the lawful authority to do under s23 of the Electricity Act.
- (iv) Trees and vegetation used for landscaping must be located and managed to comply with the Electricity (Hazard from Trees) Regulations 2003.

**Accidental Archaeological Discovery**

- PC37 In the event of any archaeological site or waahi tapu, in addition to the midden located within Lot 1 being discovered or disturbed while undertaking works to give effect to the conditions of this consent, the works in the area of the discovery shall cease immediately, and iwi and the Waikato District Council shall be notified within 48 hours. Works may recommence with the written approval of the Waikato District Council. Such approval shall be given after the Waikato District Council has considered:
- (i) Tangata Whenua interests and values,
  - (ii) the consent holders interests,
  - (iii) any archaeological or scientific evidence.

**Engineering Conditions**

- EC16 Prior to commencing any engineering design or construction works, the consent holder shall appoint appropriately qualified and competent Developer's Representative/s, acceptable to Waikato District Council, to provide all designs, supervision, certification and final signoff, in accordance with the requirements of the Franklin District Council Code of Practice for Subdivision and Development Edition 5 October 2010 unless variations are in accordance with "The Waterfall Park Code of Subdivision and Development, July 2013" and subsequent amendments.

**Note:**

The Franklin Code of Practice can be found under the following link:  
<http://www.waikatodistrict.govt.nz/Documents/Franklin-Engineering-Code-of-practice.aspx>

It is recommended that the Consent Holder read and understand the Code of Practice prior to commencement of engineering design or physical works. S224(c) may be withheld if the Code of Practice is not complied with, unless variations are in accordance with "The Waterfall Park Code of Subdivision and Development, July 2013" and subsequent amendments.

EC17 The consent holder shall notify Waikato District Council's Senior Development Engineer, in writing, of their intention to begin physical works, a minimum of fourteen days prior to commencing works. Such notification shall include the following details:

- (a) Name and telephone number of the Developer's Representative appointed in accordance with EC16 above.
- (b) Site address/consent number.
- (c) Works intended to be undertaken.
- (d) Expected duration of works.

EC18 The consent holder shall put erosion and sediment control measures in place in accordance with the requirements of the Waikato District Plan-Appendix B-Rule B6:Earthworks, the Hamilton Development Manual-Part 2:Earthworks, and the Waikato Regional Council's Erosion and Sediment Control Guidelines for Soil Disturbing Activities: January 2009, prior to undertaking the consented activity.

Erosion and sediment controls shall be maintained and remain in place until the Waikato District Council's Senior Development Engineer is satisfied that the risk from erosion and instability has been reduced to a less than minor risk and has provided approval in writing.

EC19 The consent holder must ensure that any debris tracking/ spillage onto any public roads as a result of the exercise of this consent shall be removed as soon as practical, and within a maximum of 24 hours after the occurrence, or as otherwise directed by the Waikato District Council's Roading Area Engineer, to the satisfaction of the Waikato District Council's Senior Development Engineer.

The consent holder, upon becoming aware of the need to clean up the roadway, shall advise Waikato District Council's Roading Area Engineer of the need for the road to be cleaned up, and what actions are being taken to do so.

The cost of the cleanup of the roadway and associated drainage facilities, together with all temporary traffic control, shall be the responsibility of the consent holder.

## **Roading and Earthworks Conditions**

EC20 Prior to section 224 certification, Lots 6 to 11 inclusive shall be provided with a sealed entrance that complies with the following:

- (a) entrances shall achieve sight/stopping distances that comply with table 6 of the Waikato District Plan (operational in part) 2011: Appendix A for a 50 km/h operating speed; and
- (b) entrances shall be designed and constructed in general accordance with a Type 1 or Type 2 Vehicle Crossing as shown on Drawing 60613-EC-RD-230 Rev1. The layout shall demonstrate that a 90 percentile car is able to enter/exit the entrance within the sealed area.



- (c) entrances shall detail design methods that will prevent stormwater run-off and detritus from discharging from the property to the road reserve.
- (d) any gate placed across the entrance shall be set back a minimum of 6m from the road edge, exclusive of any additional distance required to open the gate, to allow a vehicle to clear the live lanes when entering/exiting.

EC21 The proposed access leg that is part of Lot 9 (limited to the length that provides access to Lots 2-11), as shown on Woods Drawing 60613-010GE-004, inclusive of stormwater control, shall be designed in accordance with the requirements of Section 22D Waikato District Plan -Franklin Section, and the Franklin District Council's Code of Practice for Subdivision and Development, Edition 5-October 2010 and the approved Engineering Approval prepared by Woods dated May 2013. The access leg shall have a minimum legal width of 10m and shall have a formed carriageway seal width of 3.8m.

EC22 Prior to section 224 certification, construction of the works in the Woods plans titled 'Waterfall Park Rural Subdivision: Stage 2A – Engineering Approval' dated May 2013 are to be undertaken by the Consent Holder and approved by Waikato District Council's Senior Development Engineer.

EC23 Prior to section 224 certification, a "*Producer Statement – Construction*" shall be provided by the Contractor/s responsible for the works undertaken to satisfy condition EC20 and EC21, to the satisfaction of Waikato District Council's Senior Development Engineer.

The standard format for "*Producer Statement – Construction*" shall be as per Volume 4: Part 9 – Appendix 4(ii) of the Hamilton City Development Manual.

EC24 Prior to section 224 certification, a "*Certificate of Completion of Development Works*", prepared and signed by a "*suitably qualified and competent professional*", shall be provided to certify that the works have been carried out in accordance with the plans approved under condition EC22, to the satisfaction of Waikato District Council's Senior Development Engineer.

The standard format for a "*Certificate of Completion of Development Works*" shall be as per Volume 4: Part 9 – Appendix 4(i) of the Hamilton City Development Manual.

Advice Note:

A "*suitably qualified and competent professional*" is deemed to be an Engineer/ Land Surveyor with current membership in one of the following: CSNZ/ ACENZ/ CEng/ NZIS/ IPENZ, and who can demonstrate competency in all works being certified, to the satisfaction of the Waikato District Council.

EC25 After completion of the earthworks and prior to section 224 certification, the consent holder is to provide a "*Statement of Professional Opinion as to Suitability of Land for Building Development*" completed and signed by a Geo-professional to certify that the new residential lots created under Stage 2A are suitable for:

- (a) Erection of residential buildings; and
- (b) Provide any specific designs/requirements necessary for the construction of residential buildings.

The format for the "*Statement of Professional Opinion as to Suitability of Land for Building Development*" shall be as per Appendix A of the Franklin District Council's Code of Practice for Subdivision and Development, Edition 5-October 2010.

The “*Statement of Professional Opinion as to Suitability of Land for Building Development*” is to be accompanied by the following:

- (a) A schedule with dates/results etc of all supervision and testing undertaken to certify the areas of cut/fill, and
- (b) An as-built plan of the earthworks, clearly showing the areas/depths of cut and fill, and defining areas of fill which have been engineered, and those areas of fill which have not been engineered.

### **Stormwater Conditions**

EC26 Prior to the section 224 certification, the consent holder shall construct and appropriately plant the dry detention pond, generally as shown on Woods drawings 60613-2A-DR-300.

### **Water Supply Conditions**

EC27 An extended rider main and reticulated water supply connection including meter, backflow preventer, valve and box shall be provided to Lots 6-11 inclusive to the satisfaction of Waikato District Council, prior to issuance of the 224(c) certificate

Advice Note:

- (a) Any connection/s to existing Waikato District Council water main/rider main shall be installed by Waikato District Council. Any extension to existing Council mains, and connections to the new main or rider main, shall be installed/supervised by a qualified Water Service Person holding a National Certificate in Water Reticulation Level 4.
- EC28 As-built plans detailing position, meter number, backflow preventer number etc are to be provided to the satisfaction of Waikato District Council’s Senior Development Engineer prior to issuance of S224(c) certificate.

Waikato District Council requires that all survey data be provided as follows:

Map Projection - NZTM

Datum - NZGD2000

Vertical Datum - Moturiki 1953

### **Legal Conditions**

LC7 At the time of building consent application, the current and future owner(s) of Lots 6, 7, 9,10 and 11 shall undertake the following investigations/designs, submit them to Waikato District Council for approval, and construct them prior to occupation/operation of the approved dwelling/structure:

- (a) A specific geotechnical investigation of the proposed building site, effluent disposal site (including 50% reserve area), stormwater disposal and the proposed access route from the public road or right of way to the proposed building site is to be undertaken by a Geo-professional (as defined in NZS4404:2010) in accordance with the recommendations contained within the “Geotechnical Investigation Report On Waterfall Park Residential Subdivision Stages 2 and 2A at Market Road Pokeno” Coffey Geotechnics (NZ) Ltd Reference GENZAUCK14972AC, Dated 22<sup>nd</sup> April 2013 ; and

- (b) Any foundation design is carried out by a suitably qualified and competent engineer in accordance with the restrictions and recommendations identified in the report obtained under LC8(a) above; and
- (c) A specific on-site waste water design, utilising a secondary treatment system, is carried out by a suitably qualified and experienced professional, with demonstrated experience in the design of these systems, who is also certified as an approved designer by the manufacturer of the system and in accordance with AS/NZS 1547:2012 (or subsequent update), the Waikato Regional Plan and the restrictions and recommendations identified in the report; "Review of Proposed On-Site Wastewater Treatment and Land Disposal for 117 Lot Subdivision Market Road". Ormiston and Associates Ltd. Reference 3608, dated June 2013. The wastewater disposal system shall also meet the following criteria, unless otherwise agreed, on a case by case basis, in writing with Waikato District Councils Senior Development Engineer:
  - (i) That the wastewater treatment system capable of consistently producing secondary quality treated effluent achieving 20g/m<sup>3</sup> 5 Day Biological Oxygen Demand and 30g/m<sup>3</sup> Total Suspended Solids; and:
  - (ii) That a buried Pressure Compensating Dripper Irrigation system be used for discharge to the effluent field, with appropriate planting of the area and diversion of any potential surface water flows away from the effluent discharge field
  - (iii) That the location of the on-site wastewater land disposal system be on slopes less than 20 degrees to the horizontal and maintain a minimum separation distance of 30m from any surface water or ephemeral stream, unless otherwise agreed, in writing, with Councils Senior Development Engineer.
  - (iv) Compliance with the effluent standard must be based on achievement of Secondary Quality Standard grading in the Rotorua OSET NTP for BOD<sub>5</sub> and TSS for trials 3 and higher.
  - (v) The soil category classification 6 from AS/NZS 1547:2012 and a maximum areal loading rate, for the effluent disposal area, of 3mm/day (3 litres/square metre/day) are appropriate.
  - (vi) The installed system shall be constructed with a minimum of 24 hours storage above an installed high water alarm in the event of failure of the system.
- (d) A specific stormwater management design for the overall development, which caters for both primary and secondary flows, up to and including a 1% AEP storm event and inclusive of a 24% adjustment for climate change, shall be prepared by a suitably qualified and competent engineer, and shall comply with the rules of the Waikato District Plan- Franklin Section , and the restrictions and recommendations identified in the "Geotechnical Investigation Report On Waterfall park Residential Subdivision Stages 2 and 2A at Market Road Pokeno" Coffey Geotechnics (NZ) Ltd Reference GENZAUCK14972AC, Dated 22<sup>nd</sup> April 2013. The design shall demonstrate hydrological neutrality at the Lot boundaries.

**LC8** The owners of Lots 6, 7, 9,10 and 11 shall ensure that when any future development on the site is proposed, the following matters are complied with prior to occupation of any habitable building on site:

- (a) Lots 6, 7, 9, 10 and 11 are provided with a dedicated fire fighting water supply, in accordance with the specifications and requirements of SNZ PAS 4509:2008 *"New Zealand Fire Service Firefighting Water Supplies Code of Practice."*

LC9 The current and future owners of Lots 6, 7, 9, 10 and 11 shall, on installation of an approved on-site wastewater treatment plant, enter into, and maintain in force at all times, a written maintenance and monitoring contract with an experienced wastewater treatment plant operator, or a person trained in the wastewater treatment operation by the system designer, for the ongoing maintenance of the installed treatment and land application systems.

The contract shall specify the frequency of treatment plant inspections and maintenance and shall include an inspection and maintenance schedule.

The maintenance/monitoring report shall include, but not be limited to, the following information:

- (a) the date the inspection was undertaken and the name of the service provider; and
- (b) a list of all components of the treatment and land application systems that were inspected and the state of those components; and
- (c) any maintenance undertaken during the visit or still required, and a timetable for the expected completion of this work; and
- (d) a description of the appearance of the filter/s and tanks; and
- (e) the location and source of any odour detected from the system; and
- (f) a description of the appearance of the land application area (ponding, vegetation growth, etc).

Current and future owners shall ensure that maintenance/monitoring is undertaken in accordance with this approved contract.

Records of maintenance/monitoring undertaken in accordance with the approved

LC10 Pursuant to Section 221 of the Resource Management Act 1991, consent notices must be prepared and be registered on the Computer Freehold Register by Waikato District Council's solicitors at the consent holder's expense, containing the following conditions which are to be complied with on a continuing basis by the subdividing land owner and subsequent owners:

- (a) Lots 6, 7, 9, 10 and 11 with PC21 and PC25
- (b) Lots 11 with PC28
- (c) Lots 6, 9, 10, 11 and 125 with PC36
- (d) Lots 6, 7, 9, 10 and 11 with LC7, LC8 and LC9

Upon the issue of a certificate pursuant to section 224(c) of the Resource Management Act 1991 or at such earlier time as may be required, the consent notices pursuant to section 221 of the Resource Management Act will be issued.

LC11 All easements shown on the application plan 'Waterfall Park, Scheme Plan Stage 2A Scheme plan –Lots 6-11 and 501 being subdivision of Lot 500 (balance lot) Stage 2' prepared by Woods Surveyors numbered 60613-02-GE-003, rev 2 1 dated 'April 2013', shall be created as proposed.

## Advice Notes

AN5 Pursuant to Section 106(2) of the Local Government Act 2002 Development Contributions for the following services shall be paid to Council.

Infrastructure	Number of additional lots where water development contributions are applicable	Fee per lot	Total Amount
Water Supply	5	\$ 2,010.00	\$ 10,050.00
Total Development Contributions (GST excluded)			\$ 10,050.00

The amounts of contributions payable at the time of issue of a Section 224c Certificate are those fees and charges prevailing at the time of payment, not at the time of issuing resource consent.

The creation of the subdivision SUB0095/13 has been undertaken from an original 14 certificates of title which was consolidated down to seven new lots by way of SUB0095/13 Stage 2 where. Development Contributions are to be collected by the Waikato District Council for new development above the existing number of titles that make up the subject site. There are six respective Development Contribution credits applicable for SUB1055/11 (i.e. six new lots and a balance lot), leaving a balance of two Development Contribution credit. These credits shall be allocated against Lot 501 and will be used in the subsequent subdivision of Lot 501. Any development contribution credit would not include water development contributions. Five water contributions are required given that Lot 8 has an existing reticulated water supply

- AN6 This Resource Consent for subdivision lapses five years after the date of this decision unless:
- the Consent is given effect to prior to that date. To give effect to this consent, the Survey Plan for this subdivision must have been submitted to Waikato District Council pursuant to section 223 of the Resource Management Act 1991; or
  - an application is made before the expiry of the above mentioned date for Waikato District Council to grant an extension of time pursuant to section 125 of the Resource Management Act 1991.



## Schedule 2

# Reasons for Decision

Resource Consent No: SUB0095/13

- 1 Representatives of the Waikato Development Engineering Department have assessed the proposal in regard to roading, utilities, geotechnical and hazard matters. The department is satisfied that adherence to the recommended conditions of consent should result in any adverse environmental effect of the proposal relating to these aspects, being no more than minor.
- 2 Potential cumulative adverse effects associated with waste water disposal methods will be avoided by conditions of consent. This is in context of the new lots created as a result of this subdivision, alongside new lots to be created as part of future stages.
- 3 Conditions of consent will ensure that any adverse effects relating to the proposed earthworks will be avoided.
- 4 All relevant affected party comment has been obtained. The relevant parties are not opposed to the proposal on the understanding that the application has been amended to address any matters raised. It is considered that the proposed development is therefore to have minimal adverse impact on cultural values /features and infrastructure that is in the vicinity of the site.
- 3 Overall it is considered that the adverse effects are no more than minor and that the development undertaken in adherence to consent conditions will be consistent with the objectives and policies of the Waikato District Plan.
- 4 Furthermore the proposal has been found to uphold the sustainable management purpose of the Resource Management Act, adequately provide for Part 2 matters, and be consistent with both the Regional Policy Statement and Regional Plan.
- 5 The application was processed on a non-notified basis and was approved under delegated authority without the need for a Council hearing.

## **Appendix 1 - Underlying Certificates of Title**

### **Resource Consent No: SUB0095/13**

- 1 Lot 9 Deposited Plan 199012 comprised in Computer Freehold Register 370116
- 2 Lot 27 Deposited Plan 13817 and Lot 2 Deposited Plan 198116 comprised in Computer Freehold Register NA127A/581
- 3 Lot 16-19, Lot 24-25 and Lot 28-30 Deposited Plan 13817, Lot 9-10 and Lot 15 Deposited Plan 17425, Lot 1-11 Deposited Plan 210232, Section 99 and Section 244 Town of Pokeno, Section 2-6 Survey Office Plan 69130 and Section 5 Survey Office Plan 70555 comprised in Computer Freehold Register NA138A/72
- 4 Lot 7 Deposited Plan 13817 and Section 1-2 and Section 4 Survey Office Plan 70555 comprised in Computer Freehold Register NA138A/355
- 5 Section 256-257 Suburbs of Pokeno comprised in Computer Freehold Register NA357/13
- 6 Allotment 250 Town of Pokeno comprised in Computer Freehold Register NA385/298
- 7 Allotment 232 Town of Pokeno comprised in Computer Freehold Register NA385/299
- 8 Lot 8-9 Deposited Plan 13817 comprised in Computer Freehold Register NA423/122
- 9 Allotment 66-68, Allotment 73, Allotment 78, Allotment 125-128, Allotment 130, Allotment 133, Allotment 135, Allotment 139-140, Allotment 142 and Allotment 144 Town of Pokeno, Allotment 262-263, Allotment 285, Allotment 285A and Allotment 286-287 Suburbs of Pokeno and Defined on Deposited Plan 14238 comprised in Computer Freehold Register NA450/134
- 10 Allotment 145-146, Allotment 162, Allotment 170-172, Allotment 175-176, Part Allotment 155 and Part Allotment 179 Town of Pokeno and Allotment 273-274 and Allotment 284 Suburbs of Pokeno comprised in Computer Register NA475/206
- 11 Lot 20 Deposited Plan 199012 comprised within Computer Freehold Register 370118
- 12 Lot 21 Deposited Plan 199012 comprised within Computer Freehold Register 370119
- 13 Lot 22 Deposited Plan 199012 comprised within Computer Freehold Register 370120
- 14 Section 1 Survey Office Plan 434064 comprised within Computer Freehold Register 551589

## **Appendix 2**



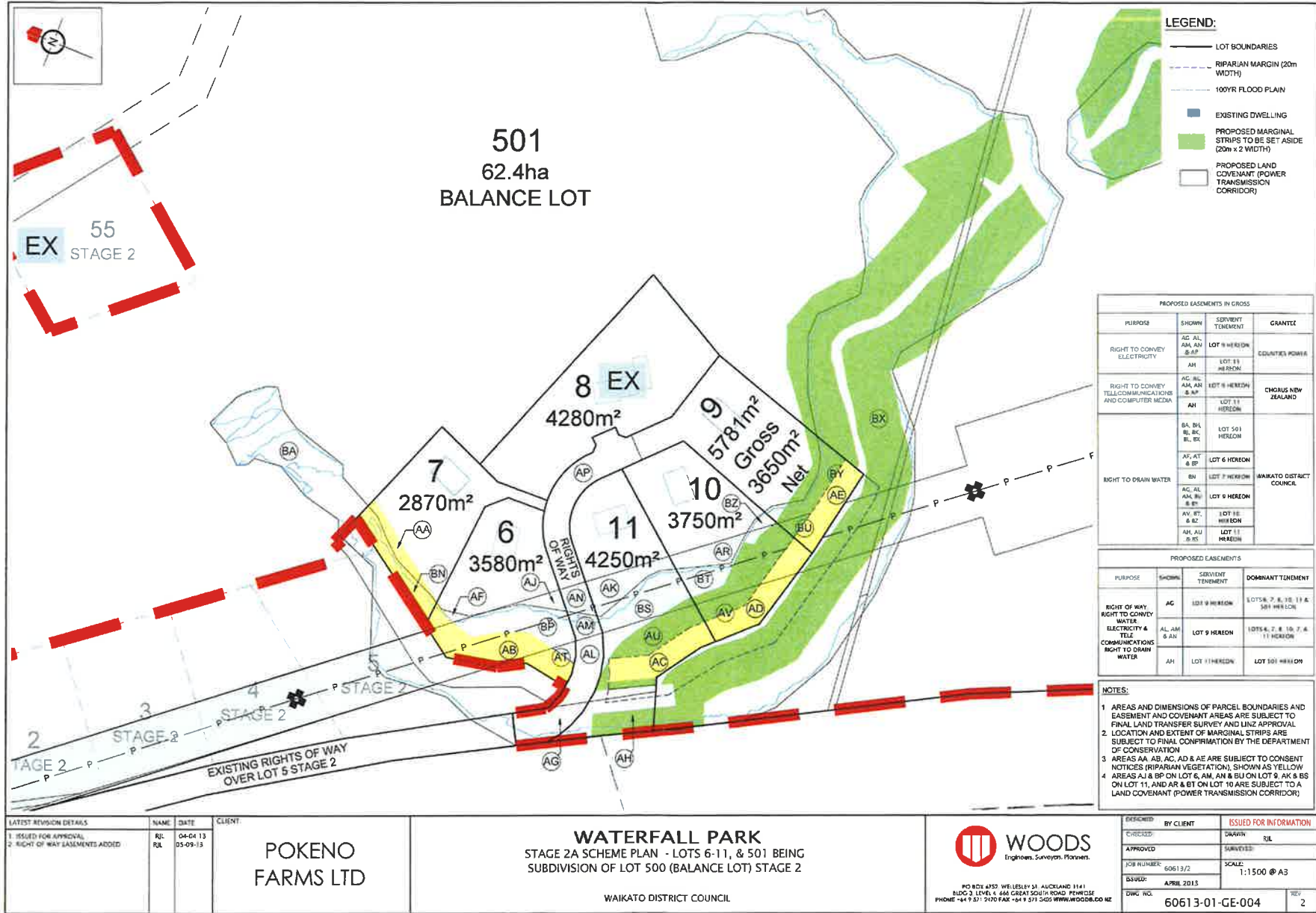
Figure 1: Riparian consent notice area required within Lot 1 that is to be planted and protected from stock if they are kept within this area of Lot 1



APPROVED PLAN  
S 1 9-9-2013

SUB0095/13- Pokeno Farms Limited

Page 29







**LEGEND:**

- LOT BOUNDARIES
- RIPARIAN MARGIN (20m WIDTH)
- 100YR FLOOD PLAIN
- EXISTING DWELLING
- PROPOSED MARGINAL STRIPS TO BE SET ASIDE (20m x 2 WIDTH)
- PROPOSED LAND COVENANT (POWER TRANSMISSION CORRIDOR)

**PROPOSED EASEMENTS IN GROSS**

PURPOSE	SHOWN	SERVIENT TENEMENT	GRANTEE
RIGHT TO CONVEY ELECTRICITY	C	LOT 100 HEREON	COUNTES POWER
	A, CA	LOT 5 HEREON	
	M	LOT 55 HEREON	
RIGHT TO CONVEY TELECOMMUNICATIONS AND COMPUTER MEDIA	A, CA	LOT 5 HEREON	CHORUS NEW ZEALAND
RIGHT TO DRAIN WATER	D, Z	LOT 1 HEREON	WAIKATO DISTRICT COUNCIL
RIGHT TO DRAIN WATER	BF, BH, BJ, BL, BL	LOT 500 HEREON	WAIKATO DISTRICT COUNCIL
	B, D, N	LOT 1 HEREON	
	V, W, BE, CA	LOT 5 HEREON	

**PROPOSED EASEMENTS**

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, RIGHT TO CONVEY WATER, ELECTRICITY & TELECOMMUNICATIONS, RIGHT TO DRAIN WATER	A, CA	LOT 5 HEREON	LOTS 2 & 3 & 100 HEREON
RIGHT TO DRAIN WATER	I	LOT 1 HEREON	LOTS 2 & 3 & 100 HEREON
RIGHT TO DRAIN WATER	J, K	LOT 2 HEREON	LOT 5 HEREON

**NOTES:**

- AREAS AND DIMENSIONS OF PARCEL BOUNDARIES AND EASEMENT AND COVENANT AREAS ARE SUBJECT TO FINAL LAND TRANSFER SURVEY AND LINZ APPROVAL
- LOCATION AND EXTENT OF MARGINAL STRIPS ARE SUBJECT TO FINAL CONFIRMATION BY THE DEPARTMENT OF CONSERVATION
- AREAS P, R, S, T, V, X & Y ARE SUBJECT TO LAND COVENANTS AND CONSENT NOTICES (RIPARIAN VEGETATION), SHOWN AS YELLOW
- AREAS C, I, N & T ON LOT 1, E, F, A & J ON LOT 2, L ON LOT 3, N ON LOT 4, AND H & W ON LOT 5 ARE SUBJECT TO A LAND COVENANT (POWER TRANSMISSION CORRIDOR)

**LATEST REVISION DETAILS**

NO	NAME	DATE	CLIENT
1	ISSUED FOR APPROVAL	04-04-13	POKENO FARMS LTD
2	TRANSFER CORRIDOR UPDATED	25-06-13	
3	JOAL 124 PROVIDED	25-06-13	
4	AMALGAMATION CONDITION AMENDED	14-08-13	
5	LOT 5 RIGHT OF WAY ADDED	03-09-13	

**WATERFALL PARK**  
SCHEME PLAN  
STAGE 2 SCHEME PLAN - LOTS 1-5, 55 & 500  
WAIKATO DISTRICT COUNCIL

**WOODS**  
Engineers, Surveyors, Planners  
PO BOX 6702, WILLESLEY ST, AUCKLAND 1141  
REGD 2 (LVL 1) & 66A GREAT SOUTH ROAD, POKEROO  
PHONE +64 9 371 2470 FAX +64 9 371 2405 WWW.WOODS.CO.NZ

**DESIGNED BY CLIENT**  
CHECKED: [ ]  
APPROVED: [ ]  
FOR NUMBER: 60613/2  
ISSUED: APRIL 2013  
DWG. NO: 60613-01-GE-002

**DRAWN BY CLIENT**  
DRAWN: RL  
SURVEYED: [ ]  
SCALE: 1:1500 @ A3  
REV: [ ]



Your Ref

In reply please quote  
SUB0095/13.01

If calling, please ask for  
Emily Hunt



4 December 2014

Fletcher Vautier Moore Lawyers  
PO Box 90  
Nelson 7040

**Postal Address**

Private Bag 544  
Ngaruawahia, 3742  
New Zealand

0800 492 452  
[www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz)

Dear Sir/Madam

**APPLICATION BY POKENO FARMS LIMITED FOR SUBDIVISION CONSENT TO  
CANCEL CONSENT NOTICE AND REVOKE EASEMENT CONDITIONS AT MCGILL  
RD POKENO**

Please find enclosed a copy of the Certificate of Cancellation to cancel the Easement Instrument 9558957.4 and Certificate of Cancellation of Consent Notice 9558597.3 in so far as they affect Lot 501 DP 480134 Certificate of Title 674816

Yours faithfully

A handwritten signature in blue ink that reads "Beryl McCauley".

Beryl McCauley  
**CONSENTS ADMINISTRATION**

## Certificate of Cancellation

**IN THE MATTER OF** Section 243(a) Resource Management Act 1991

**AND**

**IN THE MATTER OF** Easement Instrument 9558957.4

I hereby certify that the Council's conditions as to the easements created by Easement Instrument 9558957.4 are cancelled insofar as they affect Lot 501 DP 480134 Certificate of Title 674816.

Dated this 4th day of December 2014

**Signed for and on behalf of the  
WAIKATO DISTRICT COUNCIL**

  
\_\_\_\_\_  
Signature of Authorised Signatory

Nicola Joy Laurenson  
\_\_\_\_\_  
Full Name of Authorised Signatory

## Certificate of Cancellation

**IN THE MATTER OF** Section 221 Resource Management Act 1991


**AND**

**IN THE MATTER OF** Consent Notice 9558597.3

I hereby certify that the Council's conditions contained in Consent Notice 9558597.3 are cancelled insofar as those conditions affect Lot 501 DP 480134 Certificate of Title 674816.

Dated this 4th day of December 2014

**Signed for and on behalf of the  
WAIKATO DISTRICT COUNCIL**

  
\_\_\_\_\_  
Nicola Joy Laurenson



# Resource Consent

(Resource Management Act 1991)



[www.waikatodistrict.govt.nz](http://www.waikatodistrict.govt.nz)

## DECISION ON APPLICATION: LUC0585/16

Pursuant to Sections 34A(1), Section 104, 104C, and 108 of the Resource Management Act 1991, the Waikato District Council, under delegated authority, grants Land Use Consent for a Restricted Discretionary Activity to:

**Activity:** Undertake earthworks exceeding 100m<sup>3</sup> to provide a building platform in the Village Zone.

**Applicant:** S L A Ang, J L Ang

**Location Address:** 44 Millstone Lane POKENO

**Legal Description:** LOT 10 DP 480134 comprised in Computer Freehold Register 674814

This consent is subject to the conditions detailed in the attached Schedule 1.

The reasons for this decision are detailed in the attached Schedule 2.

A handwritten signature in blue ink, appearing to read "P. P. S. W.", written over a horizontal line.

**CONSENTS TEAM LEADER**

**Dated:** 20 July 2016



## Schedule I

# Conditions of Consent

**Resource Consent No: LUC0585/16**

### General Conditions

- 1 The development shall be undertaken in general accordance with the information and plans submitted by the consent holder in support of application number LUC0585/16 and officially received by Council on 30 June 2016 except as amended by the conditions below. Copies of the approved plans are attached. In the case of inconsistency between the application and the conditions of this consent, the conditions of consent shall prevail
- 2 Pursuant to Section 36 of the Resource Management Act 1991 the consent holder shall pay the actual and reasonable costs incurred by the Waikato District Council when monitoring the conditions of this consent.
- 3 The consent holder shall ensure that the earthworks do not exceed 140m<sup>3</sup> in volume.
- 4 The Consent Holder shall notify the Waikato District Council Monitoring Department at least 10 working days prior to the commencement of activities associated with this consent.

#### Advice note

To notify Waikato District Council Monitoring Department, email [monitoring@waikato.govt.nz](mailto:monitoring@waikato.govt.nz) with the consent number, address of property and date for when the works will commence.

- 5 Prior to undertaking earthworks/construction works within the subject property, erosion and sediment controls shall be installed and maintained until the Waikato District Council's Team Leader Monitoring is satisfied that the risk from erosion and instability has been reduced to a less than minor level.
- 6 During construction, the consent holder's shall ensure that any debris tracking/spillage onto any public roads as a result of the exercise of this consent is to be removed as soon as practical, and within a maximum 24 hours after the occurrences, or as otherwise directed to the Waikato District Council's Roding Area Engineer.
- 7 During construction, any cut material exported from the site shall be disposed of to either a lawfully established site/s that is permitted to receive this material under the Waikato District Plan.
- 8 All areas of earthworks (excluding any area covered by buildings) shall be revegetated to achieve 80% ground cover within 12 months of the earthworks being commenced.

- 9 During earthworks, the site shall be managed in such a way that dust emissions do not cause an objectionable effect beyond the boundaries of the site to the satisfaction of Waikato District Council's Team Leader Monitoring.

Advice Note:

*For the purposes of this condition, the Waikato District Council Monitoring Department will consider an effect that is objectionable or offensive to have occurred if any appropriately experienced officer of the Waikato District Council determines so after having regard to:*

- *The frequency, intensity, duration, location and effect of dust emission(s);*
- *and/or,*
- *Receipt of complaints from neighbours or the public; and/or,*
- *Where relevant written advice from an experienced officer of the Waikato Regional Council or the Waikato District Health Board has been received.*

## Advisory Notes

1 Lapse Date

This Resource Consent for land use lapses five years after the commencement of the consent, unless:

- (a) the Consent is given effect to prior to that date.
- (b) an application is made to the consent authority to extend the period after which the consent lapses, and the consent authority decides to grant an extension after taking into account
  - (i) whether substantial progress or effort has been, and continues to be, made towards giving effect to the consent; and
  - (ii) whether the applicant has obtained approval from persons who may be adversely affected by the granting of an extension; and
  - (iii) the effect of the extension on the policies and objectives of any plan or proposed plan.

2 Other consents/permits may be required

To avoid doubt; except as otherwise allowed by this resource consent, all land uses must comply all remaining standards and terms of the relevant Waikato District Plan. The proposal must also comply with the Building Act 2004, Hamilton City Infrastructure Technical Specifications and Waikato Regional Plans. All necessary consents and permits shall be obtained prior to development.

3 Archaeological sites may be **affected** by the proposal

It is possible that archaeological sites may be affected by the proposed work. Evidence of archaeological sites may include burnt and fire cracked stones, charcoal, rubbish heaps including shell, bone and/or glass and crockery, ditches, banks, pits, old building foundations, artefacts of Maori and European origin or human burials.

The applicant is advised to immediately stop work and contact Heritage New Zealand Pouhere Taonga if the presence of an archaeological site is suspected.

Work affecting archaeological sites is subject to a consenting process under the Heritage New Zealand Pouhere Taonga Act 2014. If any activity associated with this proposal, such as earthworks, fencing or landscaping, may modify or destroy any archaeological site(s), an authority (consent) from Heritage New Zealand Pouhere Taonga must be obtained for the work to proceed lawfully. The Heritage New Zealand Pouhere Taonga Act 2014 contains penalties for unauthorised site damage.

In addition to contacting Heritage New Zealand Pouhere Taonga, it is requested that you also contact Council's Monitoring Department at [monitoring@waikato.govt.nz](mailto:monitoring@waikato.govt.nz) with the consent number, address of property and date of when works ceased.

#### 4 Enforcement Action

Failure to comply with the conditions of consent may result in Council taking legal action under the provisions of Part XII of the Resource Management Act (1991).

#### 5 Construction Noise

All construction works are required to comply with NZ (New Zealand Standard) 6803: 1999 Acoustics – Construction Noise.



## Schedule 2

# Reasons for Decision

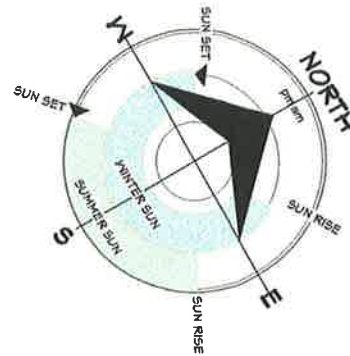
### Resource Consent No: LUC0585/16

- 1 The actual and potential effects created by the proposal exceeding the permitted earthworks volume of 100m<sup>3</sup> by 39m<sup>3</sup> are acceptable because:
  - The earthworks are required to build a suitable building platform are temporary.
  - Traffic movements will be undertaken within normal work hours and are of short duration.
  - The site will be rehabilitated upon completion.
  - The proposed dwelling is able to comply with all other relevant bulk and location rules of the Village Zone.
  - Erosion and sediment control measures will be implemented to ensure all effects are contained on site.
- 2 The proposal is consistent with the objectives and policies of both the operative and proposed District Planning documents.
- 3 The proposal is consistent with the operative Waikato Regional Policy Statement, and all other relevant matters.
- 4 Overall the proposal meets the purpose (section 5) and principles (sections 6-8) of the Resource Management Act 1991

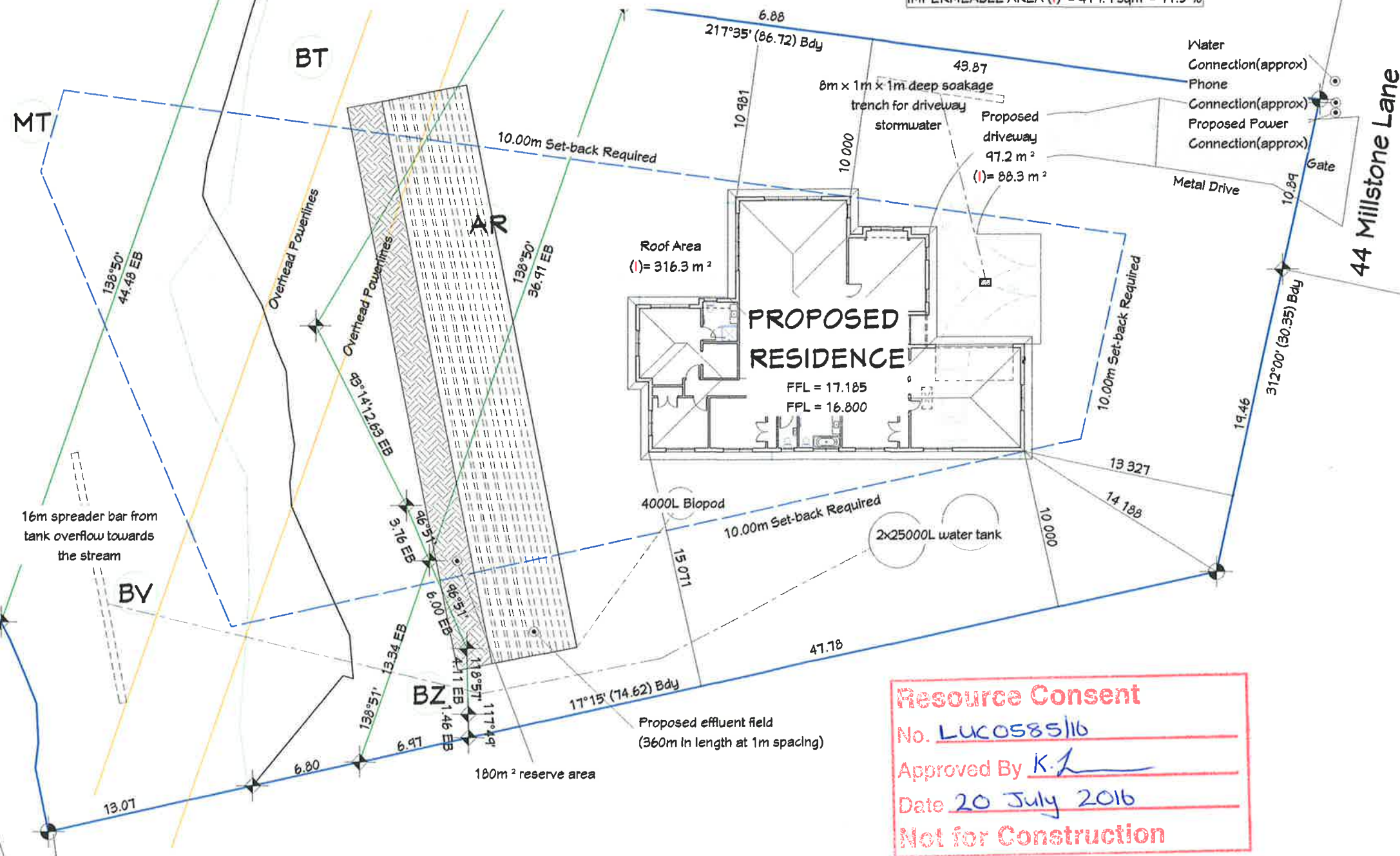


Lot 10  
Dp 480134  
Total Area = 3640sqM

- Refer to surveyors plan for additional site info
  - D.C.P Indicates Daylight Control Point of recession plane
  - Paved surfaces to external doors slip co-efficient to comply with NZBC D1 AS1/M1, For the distance below FFL, refer to cladding details
  - The finished ground level adjoining the concrete slab-on-ground shall be formed so as to carry water away from the building, at a slope of not less than 1:25, for a distance of at least 1.0m from the building as per NZS.3604.2011
  - The flow direction of surface water follows the slope of the natural ground.
- For Further Information & details refer to  
Tilsley Engineering Ltd for Stormwater/ Wastewater Management



SITE COVERAGE	
HOUSE AREA	= 276.0 sqm = 7.6 %
DRIVE AREA	= 110.2 sqm = 3.0 %
IMPERMEABLE AREA (I)	= 419.9 sqm = 11.5 %



Resource Consent

No. LUC0585/16

Approved By K. L.

Date 20 July 2016

Not for Construction



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- This location plan is too large to accurately show dimensions and positioning of the structure. It has been provided as general information to give an approximate location.
- Refer to the Existing Site Plan, Site Works Plan, and the Site Plan for more detailed information.

WAIKATO DISTRICT COUNCIL

30 JUN 2016

Time..... Initials.....  
TUAKAU



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

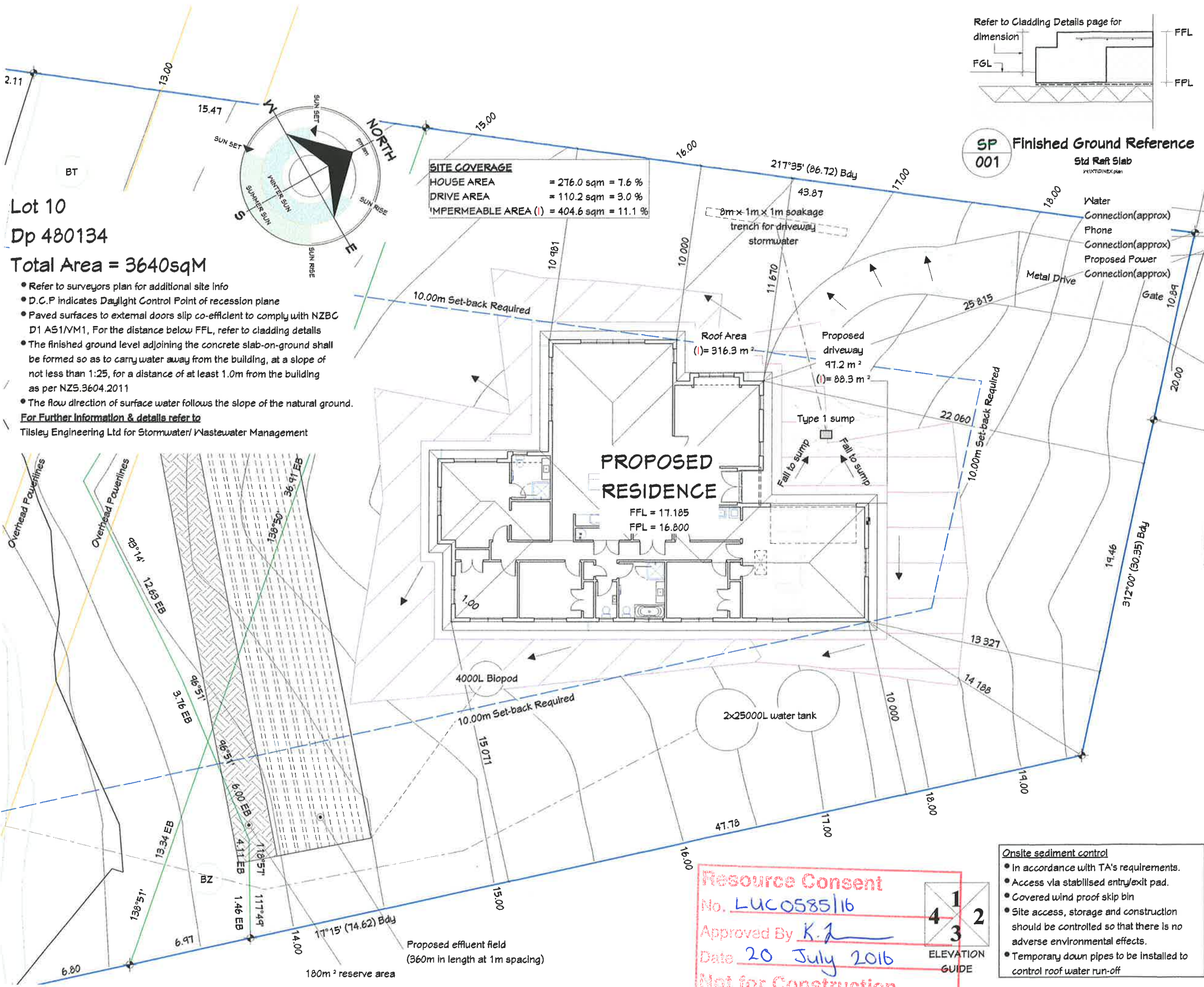
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soll Classification: E  
Soll Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Location Plan

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Chris Shelley
PLAN DATE:	20/04/2016
SCALE: 1:300	SHEET No. 3 OF 12





ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- All information shown in the plans relating to site levels, building levels, and building location, daylight control points (D.C.P) must be checked on site for accuracy after site works have been completed and prior to starting construction. Any variations discovered must be made known to 'The designer' and construction must not start until the plans have been re-assessed and altered if required.

WAIKATO DISTRICT COUNCIL

30 JUN 2016

Time..... Initials.....

TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

**SITE DATA: for zones upto & including**  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Site Plan

JOB No: 5534 SALES: Grant Edwards  
ZOG No: DRAWN: Chris Shelley  
PLAN DATE: 20/04/2016  
SCALE: 1:200 SHEET No. 6 OF 12



1.



2.

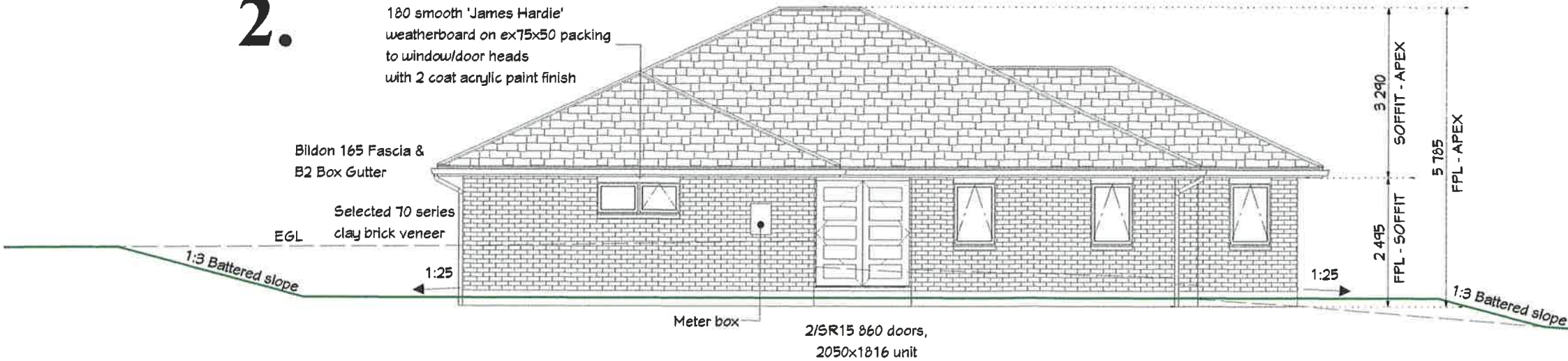


Table 2 Building envelope risk matrix Paragraph 3.1.2. Figure 1					
Risk factor	Risk Severity				Subtotals for each risk factor
	Low	Med	High	Very High	
Wind zone (per NZS 3604)	0	0	1	2	1
Number of storeys	0	1	2	4	0
Roof/wall intersection design	0	1	3	5	0
Eaves width	0	1	2	5	1
Envelope complexity	0	1	3	6	0
Deck Design	0	2	4	6	0
Total Risk Score					2

Resource Consent  
No. LUC0585/16  
Approved By K. J.  
Date 20 July 2016  
Not for Construction



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- If windows & doors are shown upto soffit, window and door sizes are to be measured on site prior to the manufacture of those units.

FFL = Finished Floor Level  
FGL = Finished Ground Level  
FPL = Finished Platform Level  
EGL = Existing Ground Level

SG Indicates safety glass

Safety Glazing

- All glazing is to be in accordance with the NZ Building Code Handbook and NZS.4223, Parts 1, 2, & 3 Code of Practice for Glazing in Buildings.
- All glazing panels to bathrooms and toilets to have safety glazing to the interior panel only
- All glazing to be confirmed by the manufacturer prior to construction

WAIKATO DISTRICT COUNCIL

30 JUN 2016

Time Initials

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including

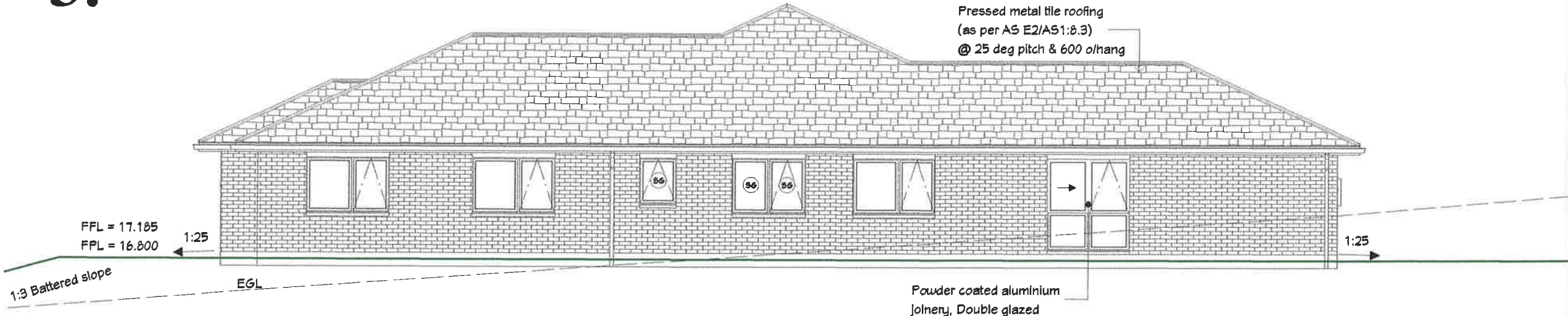
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 44.8mm/hr  
Snowload: 0.0kPa

Elevations .1

JOB No: 5534 SALES: Grant Edwards  
ZOG No: DRAWN: Chris Shelley  
PLAN DATE: 20/04/2016  
SCALE: 1:100 SHEET No. 1 OF 12



3.



4.

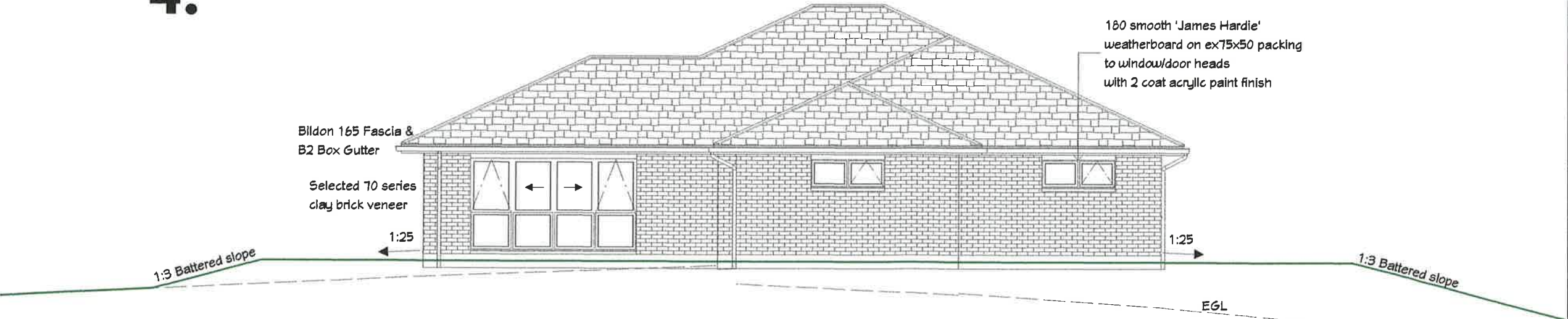


Table 2 Building envelope risk matrix Paragraph 3.1.2. Figure 1						
Risk factor	Risk Severity				Subtotals for each risk factor	
	Low	Med	High	Very High		
Wind zone (per NZS 3604)	0	0	1	2	1	
Number of storeys	0	1	2	4	0	
Roof/wall intersection design	0	1	3	5	0	
Eaves width	0	1	2	5	1	
Envelope complexity	0	1	3	6	0	
Deck Design	0	2	4	6	0	
Total Risk Score					2	

Resource Consent  
No. LUC0585/16  
Approved By K. L.  
Date 20 July 2016  
Not for Construction



ANG

© GOLDEN HOMES HOLDINGS LTD

- NOTES:
- If windows & doors are shown upto soffit, window and door sizes are to be measured on site prior to the manufacture of those units.
- FFL = Finished Floor Level  
FGL = Finished Ground Level  
FPL = Finished Platform Level  
EGL = Existing Ground Level

- SG Indicates safety glass
- Safety Glazing**
- All glazing is to be in accordance with the NZ Building Code Handbook and NZS.4223, Parts 1, 2, & 3 Code of Practice for Glazing in Buildings.
  - All glazing panels to bathrooms and toilets to have safety glazing to the interior panel only
  - All glazing to be confirmed by the manufacturer prior to construction

WAIKATO DISTRICT COUNCIL

30 JUN 2016

CLIENT: Initials  
Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Elevations .2

JOB No: 5534 SALES: Grant Edwards  
ZOG No: DRAWN: Chris Shelley  
PLAN DATE: 20/04/2016  
SCALE: 1:100 SHEET No. 8 OF 12



ANG

NOTES:

Walls = R-2.2 batts  
Ceiling = R-3.6 batts

Design of house meets the minimum requirements of Hegley Acoustic Consultants report including the entire glazing to the house to be double glazed.

WAIKATO DISTRICT COUNCIL

30 JUN 2016

Time ..... Initials .....

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

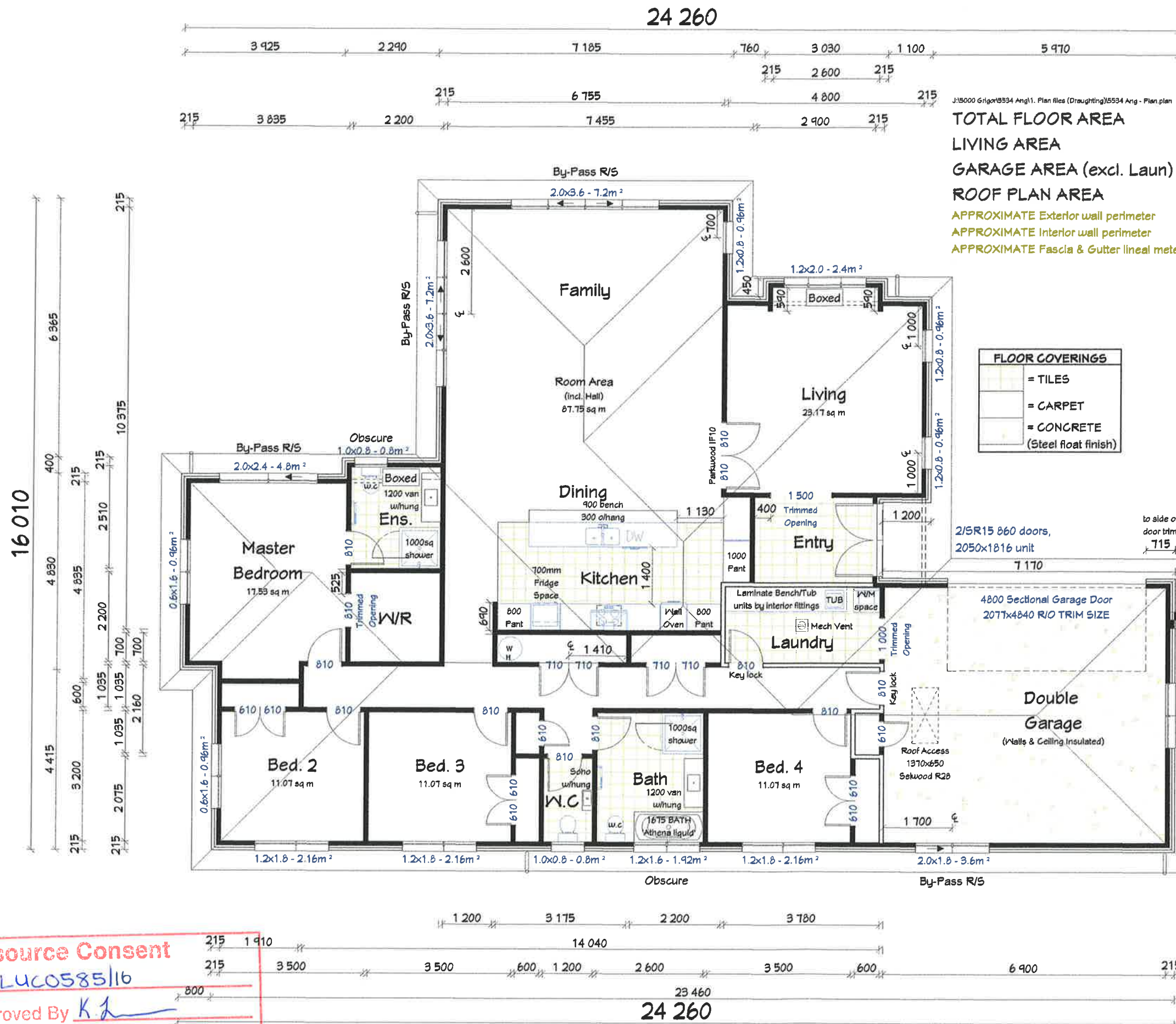
Waikato District Council  
Village Growth Area B

<b>SITE DATA: for zones upto &amp; including</b>	
<b>Ground Bearing:</b>	<b>REF GEOTEC</b>
<b>Sub-soil Classification:</b>	<b>E</b>
<b>Soil Classification</b>	<b>Expansive Soil</b>
<b>Wind Zone:</b>	<b>High</b>
<b>Earthquake Zone:</b>	<b>2</b>
<b>Exposure Zone:</b>	<b>C</b>
<b>Climate Zone:</b>	<b>3</b>
<b>Rainfall Intensity:</b>	<b>44.8mm/hr</b>
<b>Snowload:</b>	<b>0.0kPa</b>

## Floor Plan

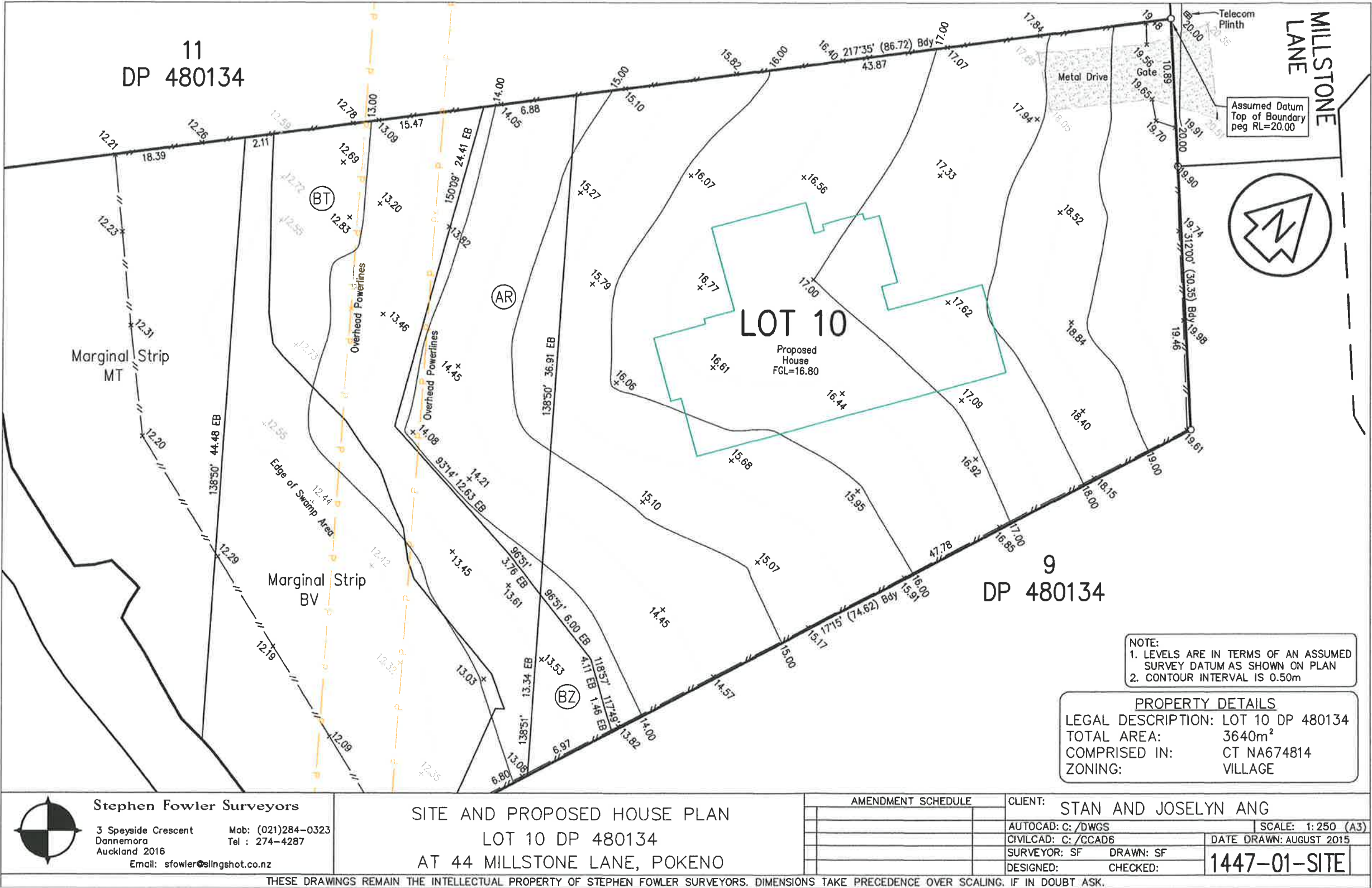
JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Chris Shelley
PLAN DATE:	20/04/2016
SCALE: 1:100	SHEET No. 9 OF 12

ELEVATION GUIDE



**Resource Consent**  
No. LUC0585/16  
Approved By K. L.  
Date 20 July 2016  
**Not for Construction**





ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

This page shows pre-construction site information of the current status of the existing lot, prior to clearing of the site, earth works and/or any demolition if required.

WAIKATO DISTRICT COUNCIL

30 JUN 2016

Time..... Initials.....

TUAKAU

CLIENT:

Ang Residence

Lot 10, Dp 480134

44 Millstone Lane

Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including

Ground Bearing: REF GEOTEC

Sub-soil Classification: E

Soil Classification: Expansive Soil

Wind Zone: High

Earthquake Zone: 2

Exposure Zone: C

Climate Zone: 3

Rainfall Intensity: 94.8mm/hr

Snowload: 0.0kPa

Existing Site Plan

JOB No: 5534 SALES: Grant Edwards

ZOG No: DRAWN: Chris Shelley

PLAN DATE: 20/04/2016

SCALE: N.T.S SHEET No. 4 OF 12

Resource Consent



No. LUC0585116

Approved By K. L.

Date 20 July 2016

Not for Construction



	Fill Area
	Cut Area

- Assumed Datum  
Top of Boundary  
peg RL = 20.00

WAIKATO REGIONAL COUNCIL

© GOLDEN HOMES HOLDINGS LTD

NOTES:

30 JUN 2016

Time..... Initials.....

• Located & identify boundary pegs on site prior to commencing earthworks

- Located & Identify boundary pegs on site prior to commencing earthworks.
- Located & Identify all service connection points on site prior to commencement of earthworks.
- The building platform is to be flat with a Ground Bearing Capacity of no less than shown in the SITE DATA below. If during site works soft soils, expansive clay, presence of peat or organic vegetation matter, or previous earth disturbances are discovered, then an engineer must be engaged to review suitability of the ground in relation to the current foundation design.
- Refer to the Site Plan for the required FPL (finished platform level)
- Public protection from onsite hazards
- Site safety fencing (when required by T.A), 2.0m(min) to prevent site hazards from harming traffic or passers-by, to restrict unauthorized entry by children - ensure fencing is difficult to be climbed, gates and doors do not project beyond site when open, and encloses the whole site.
- All building sites to have O.S.H compliant warning signs erected.
- Any hazardous equipment or materials will be stored onsite only if secured, by portable building lock up or in the house being built (after lock-up stage)
- Sites to be assessed on an individual basis by construction managers for compliance with NZBC clause F5 and if specific hazards exist then a work-site barrier must be erected.

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeroo

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including	
Ground Bearing:	REF GEOTECH
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

## Site Works Plan

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Chris Shelley
PLAN DATE:	20/04/2016
SCALE: 1:200	SHEET No. 5 OF 12

## Resource Consent

Luc0585/16

Approved By K. L.

Date 20 July 2016

Not for Construction



ELEVATION  
GUIDE

180m<sup>2</sup> reserve area





Form 7  
**CODE COMPLIANCE CERTIFICATE**  
**Section 95 Building Act 2004**

FILE COPY

**The Building**

Street address of building: 44 Millstone Lane POKENO  
Legal description of land where building is located: LOT 10 DP 480134  
Valuation number: 03911/016.08  
Property number: 2015001  
Building name: n/a  
Location of building within site/block number: n/a  
Level/unit number: n/a  
Current, lawfully established, use: Detached Dwellings  
Number of occupants per level and per use if more than 1: n/a  
Year first constructed: 2016

**The Owner**

Name of owner: S L A Ang, J L Ang  
Mailing address: 44 Millstone Lane, Pokeno 2402

Street address/registered office: 44 Millstone Lane, Pokeno

**Phone numbers:**

Landline: n/a Mobile: 021-886143  
Daytime: n/a After hours: n/a  
Facsimile number: n/a Email address: 21stan.ang@gmail.com  
Website: n/a

**First point of contact for communications with the building consent authority**

Name: Grigor Construction Limited  
Mailing address: PO Box 201, Takanini 2245

**Phone numbers:**

Landline: 09-2946575 Mobile: n/a  
Facsimile number: 09-2946576 Email address: counties@goldenhomes.co.nz

**Building Work:**

Project: Dwelling with attached garage  
Building consent number: BLD0055/17  
Issued by: Waikato District Council

**Code Compliance**

The building consent authority named below is satisfied, on reasonable grounds, that —

- (a) the building work complies with the building consent

**Signature:**

A handwritten signature in black ink, appearing to read "Wayne Lomax".

**Name:**

**Wayne Lomax**

**Position:**

Building Inspector

**On behalf of:**

Waikato District Council

**Date: 06 April 2017**





**Form 5**  
**BUILDING CONSENT NO: BLD0055/17**  
**Section 51, Building Act 2004**  
**ISSUED BY: WAIKATO DISTRICT COUNCIL**

---

**The Building**

Street address of building: 44 Millstone Lane POKENO  
Legal description of land where building is located: LOT 10 DP 480134  
Valuation Number: 03801/054.18 Property Number: 2015001  
Building name: n/a  
Location of building within site/block number: n/a  
Level/unit number: n/a

---

**The Owner**

Name of owner: S L A Ang, J L Ang  
Mailing Address: 11 Stamford Crescent, Flat Bush, Auckland 2019

**Street address/registered office:** 11 Stamford Crescent, Flat Bush

**Phone numbers:**

Landline: n/a Mobile: 021-886143  
Daytime: n/a After hours: n/a  
Facsimile number: n/a Email address: stan.ang@lionco.com  
Website: n/a

**First point of contact for communications with the Building Consent Authority**

Name: Grigor Construction Limited  
Mailing Address: PO Box 201, Takanini 2245

**Phone numbers:**

Landline: 09-2946065 Mobile: n/a  
Daytime: 09-2946065 Fax number: 09-2946576  
Email address: david.grigor@goldenhomes.co.nz

---

**Building Work**

The following building work is authorised by this building consent:

**Dwelling with attached garage**

Project type: Dwelling \$356,200

Total Value of work: \$356,200

---

This building consent is issued under Section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building).

This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

**Waikato District Council**  
**Building Consent No: BLD0055/17**

**This Building Consent is subject to the following condition(s):**

**I. Inspections:**

When booking your inspections please phone (07) 824 8633 or (0800) 492 452 and quote your building consent number. Whilst we will endeavour to provide inspections in a timely manner, please provide **at least 48 hours notice** prior to any of the following mandatory inspections.

- ✓ *- GRANT - PASS*  
Excavation, Siting and Foundation (prior to pouring concrete) - Owner/builder to locate boundary pegs prior to council carrying out a foundation/siting inspection. \* Pre-floor Building (prior to pouring concrete)
- ✓ Pre-floor Plumbing & Drainage (prior to backfilling) - *GRANT - PASS*
- ✓ Pre-wrap / Structural Framing (pre-wrap) - *GRANT - PASS*
- ✓ Exterior Cladding - *DAVID W - PASSED*
- ✓ Pre-line - *DAVID - J - PASSED*
- Post-line *DAVID W - ?*
- ✓ Drainage - *WAYNE - PASS*
- ✗ Final Building (Code Compliance Certificate) to be called for - *Some final inspections require Council to have access into the building. If no-one is onsite to allow access to the interior of the building it is likely the inspection will fail.*

*WAYNE - Plumbing - PASS*  
*General - Fail.*

*OVER, SW P.P.E, Penetration to Seal.*

---

**The following documents from third parties need to be provided to the BCA to certify that the building work complies with the plans and specifications and in order for Council to issue a CCC:**

**Producer Statements:**

- Sand pad / Sub grade (PS 4) ✓
- Engineering - Structural foundations design elements (PS 4) ✓
- Wastewater disposal system (PS 3) ✓
- Stormwater disposal system (PS 3) ✓
- Glazing as per the acoustic report (4/12/4, PS3) **NOT Required**  
not within the A2.

**Certificates / Memorandums / Statements / Letters:**

- Electrical Compliance Certificate (if applicable) ✓
- Plumbing pressure test ✓
- As laid drainage plan ✓

---

**Compliance Schedule:**

- A compliance schedule is not required for the building.

---

**Building Consent Advisory Notes:**

**Lapsing of a building consent:**

A building consent lapses and is of no effect if the building work to which it relates does not commence within:

- a) 12 months after the date of issue of the building consent or
- b) Any further period that the building consent authority may allow.

**Restricted Building Work:**

- This Building Consent involves Restricted Building Work that must be undertaken or supervised by a Licensed Building Practitioner that holds the appropriate license class.
- If you have not already done so, you are required to notify Council in writing, the name of every Licensed Building Practitioner who is going to be engaged to carry out the Restricted Building Work prior to work commencing. *LBP notification forms can be found on [www.buildwaikato.co.nz](http://www.buildwaikato.co.nz) – Application Forms & Checklists.*
- You will not be able to book inspections for Restricted Building Work until written notification regarding the Licensed Building Practitioners has been received and approved by Council.
- You are required to obtain a Record of Building Work Memorandum from all the Licensed Building Practitioners involved, detailing the Restricted Building Work they have completed. The Record of Building Work Memorandum is to be attached to the application for the Code Compliance Certificate.

Code Compliance Certificate will be issued after your final inspection has been carried out and passed, you have applied for your Code Compliance Certificate and all documentation has been received and approved.

**Signature:**



**Name:** Kylie Escott  
**Position:** Building Administrator

**On Behalf of:** Waikato District Council

**Date:** 29 August 2016



Building Code Clause(s).....E1.....

## PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY: .....Tilsley Engineering Limited (75 Seddon Street, Pukekohe).....  
(Construction Review Firm)

TO: .....Grigor Construction Limited.....  
(Owner/Developer)

TO BE SUPPLIED TO: .....Waikato District Council.....  
(Building Consent Authority)

IN RESPECT OF: ...PS4, Pod Floor.....  
(Description of Building Work)

AT: .....44 Millstone Lane, Pokeno.....  
(Address)  
.....LOT...10..... DP ...480134..... SO ....

...Tilsley Engineering Limited ..has been engaged by... Grigor Construction Limited  
(Construction Review Firm)

To provide ☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with owner/developer

or ☒ other PS4: Pod Floor - Passed.....services  
(Extent of Engagement)

in respect of clause(s) ....B1/VM4..... of the Building Code for the building work described in

documents relating to Building Consent No. ...005 / 17..... and those relating to

Building Consent Amendment(s) Nos. ....N/A..... issued during the  
course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions / variations(s) No. ...N/A..... (copies attached)

or by the attached Schedule ☐ have been issued during the course of the works.

On by the basis of ☒ this ☐ these review(s) and information supplied by the contractor during the course of the works and  
**on behalf of the firm** undertaking this Construction Review, I believe on reasonable grounds that All X Part only of  
the building works have been completed in accordance with the relevant requirements of the Building Consent and Building  
Consent Amendments identified above, with respect to Clause(s) ...B1..... of the Building Code.

I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary  
competency to do so.

I, .....Robert Tilsley.....am:  
(Name of Construction Review Professional)

☐ CPEng No. ...85675.....

☐ Reg Arch No. ....

I am a Member of : ☒ IPENZ ☐ NZIA and hold the following qualifications: ...BE (Civil).....

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less  
than \$200,000\*.

The Construction Review Firm is a member of ACENZ : ☐

SIGNED BY .....Robert Tilsley..... ON BEHALF OF ...Tilsley Engineering Ltd.. Job # JB 1943 SN 4188 Sig #P166....

Date:.... 3<sup>rd</sup> October 2016..... Signature:

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the  
Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building  
Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of  
\$200,000\*.

This form is to accompany **Forms 6 or 8 of the Building (Form) Regulations 2004** for the issue of a Code Compliance  
Certificate.

THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACENZ, IPENZ AND NZIA

October 2013



Building Code Clause(s).....B1.....

## PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY: .....Tilsley Engineering Limited (75 Seddon Street, Pukekohe).....  
(Construction Review Firm)

TO: .....Ang Residence.....  
(Owner/Developer)

TO BE SUPPLIED TO: ...Waikato Council.....  
(Building Consent Authority)

IN RESPECT OF: Compaction of hard fill material Inspection.....  
(Description of Building Work)

AT: .....44 Millstone lane, Pokeno.....  
(Address)

..... LOT...10..... DP ...480134....i SO .....

...Tilsley Engineering Limited ..has been engaged by...Golden Homes .....  
(Construction Review Firm)

To provide ☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with owner/developer

or ☒ other Compaction of hard fill material Inspection - Passed.....services  
(Extent of Engagement)

in respect of clause(s) .....B1/VM1..... of the Building Code for the building work described in

documents relating to Building Consent No. ....0055/17..... and those relating to

Building Consent Amendment(s) Nos. ....N/A..... issued during the  
course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions / variations(s) No. ....N/A..... (copies attached)

or by the attached Schedule ☐ have been issued during the course of the works.

On by the basis of ☒ this ☐ these review(s) and information supplied by the contractor during the course of the works and  
on behalf of the firm undertaking this Construction Review, I believe on reasonable grounds that ☒ All ☐ Part only of  
the building works have been completed in accordance with the relevant requirements of the Building Consent and Building  
Consent Amendments identified above, with respect to Clause(s) ...B1..... of the Building Code.

I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary  
competency to do so.

I, .....Robert Tilsley.....am: ☐ CPEng No. ....85675.....  
(Name of Construction Review Professional)

☐ Reg Arch No. ....

I am a Member of : ☒ IPENZ ☐ NZIA and hold the following qualifications: ...BE (Civil).....

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less  
than \$200,000\*.

The Construction Review Firm is a member of ACENZ : ☐

SIGNED BY .....Robert Tilsley..... ON BEHALF OF ...Tilsley Engineering Limited.. Job # D1856, SN 4067....

Date:....15 September 2016..... Signature:.....  
Sig#

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the  
Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building  
Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of  
\$200,000\*.

This form is to accompany **Forms 6 or 8 of the Building (Form) Regulations 2004** for the issue of a Code Compliance  
Certificate.

THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACENZ, IPENZ AND NZIA

PRODUCER STATEMENT PS4

October 2013



R & T DRAINAGE LIMITED

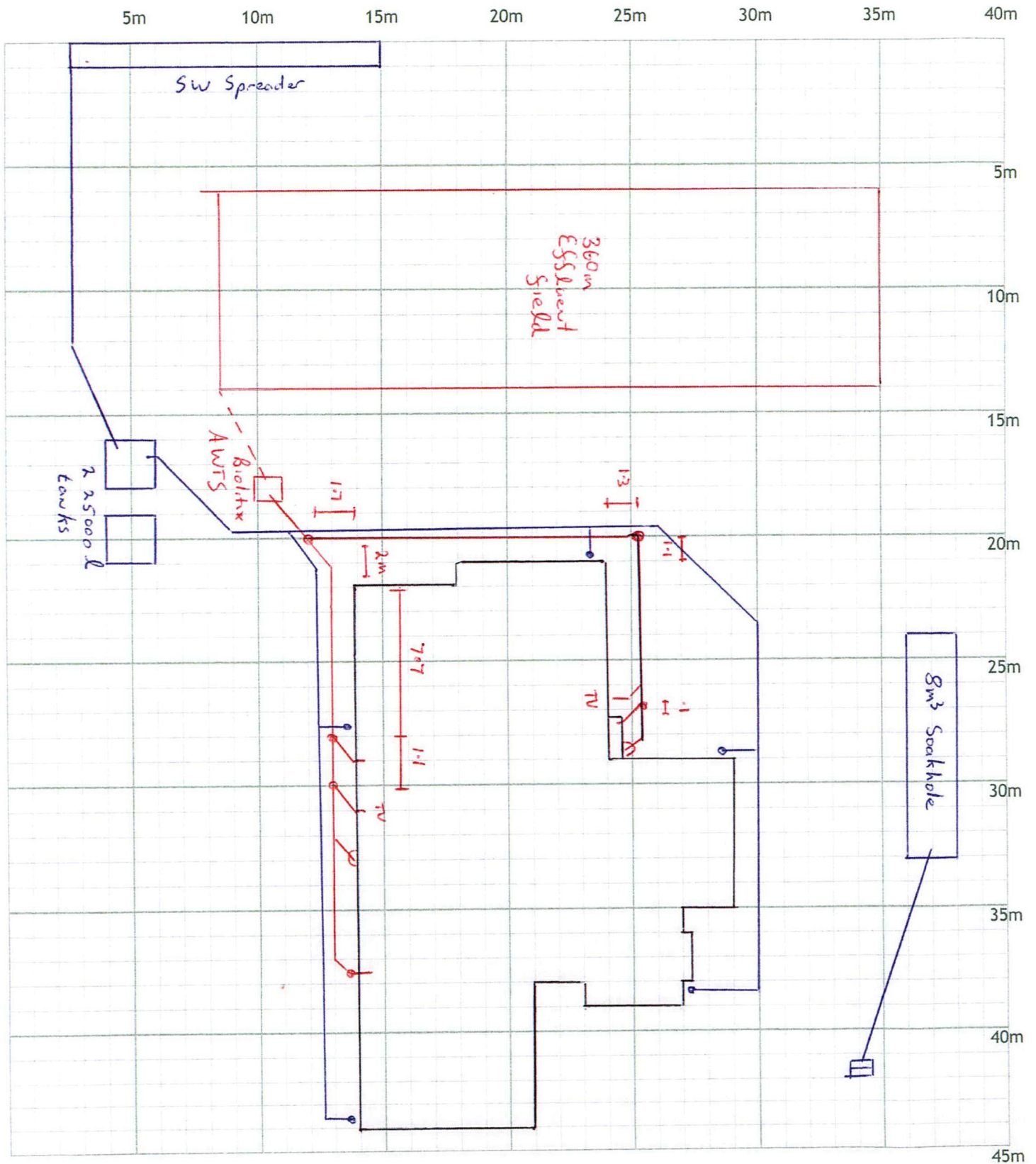
Consent No 0055-17

Lot 10 D.P. 480134 VAL No. \_\_\_\_\_

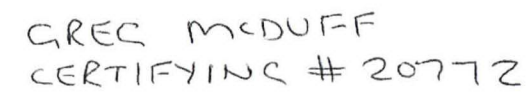
No. 44 Street Millstone Lane

Reg No. 14370

Owner's Name Ang



Drain Passed - By \_\_\_\_\_ Date \_\_\_\_\_



Q

## Producer Statement Construction (PS3)

Issued by:  
(Constructor)

Rob Kroef (14370)

Building Consent number:

0055 - 17

Company Name:

R+T Drainage Ltd

To:

☐

Matamata Piako District Council

☐

Waipa District Council

☒

Waikato District Council

☐

Hamilton District Council

☐

Otorohanga District Council

Waikato Building Consent Group Reg. No.:

0497

Expiry Date:

Other No. (specify):

Owner:

Ang

Project Address:

44 Millstone Lane Patumahoe

Lot:

10

DP:

480134

Description of Building Work:

Biolytix AWTS + Drip field + SW overflow

Scope of work covered by statement:

" " " "

System / Product used (if applicable):

Biolytix BF6

I (Constructor's name):

R+T Drainage Ltd

have been engaged by (owner/developer/contractor):

Owner

The requirements of the Building Regulations

1992, Clause(s): (Please be specific e.g. E2.3.5)

TP58

for the building work described by the drawings and specifications prepared by the design firm titled:

Tisley Engineering Ltd

numbered:

☐ Copies attached

authorised amendments(s):  
(if applicable)

☐ Copies attached

- ☒ I have sighted the Building Consent and read the Advisory Notes. I can confirm that the building works have been carried out in accordance with the requirements of the New Zealand Building Code, the Building Consent, the design drawings and specifications, and in accordance with the listed amendments (if any).
- ☒ I confirm that all work I have undertaken has been within the scope of my skills, knowledge, and experience.
- ☒ I have remained within the scope of works set for me by Waikato Building Consent Group Producer Statement Author register (if applicable).
- ☒ I understand that this Producer Statement, if accepted, may be relied upon for the purpose of establishing compliance with the Building Code and Building Consent.
- ☒ I am satisfied the building work complies with the requirements of the Building Consent and the New Zealand Building Code.

Signed by:  
(Constructor)

R Kroef

Name of Constructor:  
(Print clearly)

Rob Kroef

Date:

20 12 16

Address:

16 Tipperary Lane Patumahoe

Ph:

Mb:

0274380283

Fx:

Email:

Qualifications  
/Experience:

20+ Yrs

The Waikato Building Consent Group Producer Statement Author register is held by the Building Unit Hamilton City Council,  
Private Bag 3010, Hamilton 3240, Ph (07) 838 6634. For information on the Waikato Building Consent Group visit [www.buildwaikato.co.nz](http://www.buildwaikato.co.nz).

PS3 Template Version 1 07/12/10



## SERVICING & MAINTENANCE CONTRACT

THIS AGREEMENT between HYDROVAC Ltd and Stan & Joselyn Ang (the Customer) for the maintenance of your Wastewater Treatment System (Biolytix BF6 40000PAV) installed at 44 Millstone Lane, Pokeno, Auckland which shall operate under the following terms and conditions:

Once each 6 months, HydroVac shall inspect the system and carry out the following work:

- Cleaning where necessary the inside of the tank from which the irrigation network runs.
- Check the air blower/recirculation pump, irrigation pump and electrical system, including the alarm system.
- Clean the irrigation discharge lines and replace or repair dripper field at Customer's expense.
- Check and clean the irrigation filter.
- Check and adjust air intake where necessary.
- Monitor sludge levels and system operation
- Report to the Customer and local authority of any problems which have arisen.

In the event of the alarm system becoming active, the Customer should notify **HYDROVAC Ltd** on 09 4170112 and advise that the system has malfunctioned or the alarm has activated. HYDROVAC Ltd will endeavour to attend to the call within 24 hours of receiving the notification.

If the Customer requests the Company to carry out work to the system other than that specified above or that covered by the guarantee then the Customer will pay the Company's reasonable additional charges for such work and any necessary materials.

Hydrovac Ltd, 45 Brigham Creek Rd, Whenuapai.  
P O Box 81026, Whenuapai, Waitakere 0662. Ph 09 417-0112 Fax 09 417-0113

Also the Customer shall pay the Company's reasonable additional charges for work done and materials supplied pursuant to 1. above where the need for such work and materials results from the Customer's failure to ensure compliance with any operating instructions, suggestions or recommendations given by the Company or from negligent or willfully damaging actions of any person, or from the system being required to bear a workload which is in excess of design loading for the site, or from earthquake, fire, flood, storm, lightning, tempest, landslip, or from persons not authorized by the Company interfacing with the present system in any way, or from the Customer's failure to advise of any alarm warning, or failure to comply with this agreement.

The Company will invoice the Customer for any reasonable additional charges for work done and materials supplied and the Customer shall make payment within fourteen (14) days of receipt of the said invoice.

The maintenance fee is currently \$155.00 incl GST per visit, payable within 7 days of the work being performed. This fee is the current maintenance charge and is subject to change, if an adjustment is required, the Company will notify the Customer in writing prior to the next programmed maintenance visit. An invoice/maintenance form will be provided after each visit.

This contract is effective from 21 March 2017 and expires on the sale of the abovementioned property unless notice is given by the Customer to the Company of termination of this agreement.

DATED this 12<sup>th</sup> day of January 2017

(Customers Name) ... Stan & Joselyn Ang.....

..... (Customer Signature)

Postal Address..... 4 Millstone Lane, Pokeno.....

Ph:..... Mob 021 886 143.....

For and on behalf of HYDROVAC LTD

.....for HydroVac

Date: 16/01/2017

(Company's Representative)

Note: A copy of this agreement will be sent back to you for your records

Hydrovac Ltd, 45 Brigham Creek Rd, Whenuapai.  
P O Box 81026, Whenuapai, Waitakere 0662. Ph 09 417-0112 Fax 09 417-0113

## Plumbing Pressure Test Memorandum (PS3)

Issued by:  
(Plumber)

**Greg Charles McDuff**

Registration  
Number:

**20772**

Company  
Name:

**Charlies Plumbing**

Company  
Address:

**PO Box 39601, Howick**

Company  
Contact  
Details:

Ph:

**0**

Mb:

**027 6377 299**

Fx:

**0**

To:

☐ Matamata Piako District Council  
☐ Hamilton District Council

☐ Waipa District Council  
☐ Otorohanga District Council

☐ Waikato District Council  
☒ Tuakau

Building  
Consent  
Number:

**BLD 0055/17**

Building  
Owner:

**Stan & Joselyn, Ang**

Project  
Address:

**44 Millstone Lane  
Pokeno, , Waikato**

Description  
of Building  
Work:

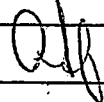
**Completion of a pressure test on the plumbing system**

Scope of work  
covered by  
statement:

We certify that the system was tested to 1500kpa for a period of 30 minutes. This test was conducted in accordance with manufacturer recommendations and complies with the pressure testing provisions of the New Zealand Building Code and Approved Solution G12 AS1 and AS/NZS3500.1.2 as appropriate.

I understand that this Statement, if accepted, may be relied upon for the purpose of establishing compliance with the Building Code and Building Consent.

Signed by:  
(Plumber)



Date:

**24/11/2016**

The Waikato Building Consent Group Producer Statement Author register is held by the Building Unit Hamilton City Council,

Private Bag 3010, Hamilton 3240, Ph (07) 838 6634. For information on the Waikato Building Consent Group visit

[www.buildwaikato.co.nz](http://www.buildwaikato.co.nz)



14 Glasgow Road,  
Private Bag 4,  
Pukekohe 2340



COUNTIES POWER

www.countiespower.com

CN No.: 4554

Record No.: \_\_\_\_\_

Phone 0800 100 202

Fax 09 237 0373

## Record Of Inspection (RoI) Of High-Risk Prescribed Electrical Work Pursuant To The Electricity (Safety) Regulations 2010

<b>Work Location Information</b>			
Location Address: 44 Millstone Lane Pokeno		<input checked="" type="checkbox"/> Physical Installation Address <input type="checkbox"/> Relocatable Address 109 957 5311 CN EE4	
Location Type: <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Educational		<input type="checkbox"/> Non-Domestic Accommodation <input type="checkbox"/> Industrial <input type="checkbox"/> Healthcare <input type="checkbox"/> Miscellaneous (other)	
<b>Work Information</b>			
Energy Type: <input checked="" type="checkbox"/> Grid Electricity <input type="checkbox"/> Independent Electricity			
Work Type: <input checked="" type="checkbox"/> New <input type="checkbox"/> Extension		<input type="checkbox"/> Addition <input type="checkbox"/> Replacement <input type="checkbox"/> Alteration <input type="checkbox"/> Repair following accident	
High-risk Category: <input type="checkbox"/> Not to AS/NZS 3000 Part 2 - (6A(2)a(i)) <input type="checkbox"/> Photovoltaic system - (6A(2)a(iv)) <input checked="" type="checkbox"/> Mains work - (6A(2)b) <input type="checkbox"/> High voltage installation - (6A(2)a(ii)) <input type="checkbox"/> Hazardous area - (6A(2)a(v)) <input type="checkbox"/> Animal stunning or meat conditioning - (6A(2)c) <input type="checkbox"/> Mains parallel generation - (6A(2)a(iii)) <input type="checkbox"/> Installation located in a mine - (6A(2)a(vi)) <input type="checkbox"/> Other - please describe in 'Work description' <input type="checkbox"/> Electrical medical area - (6A(2)a(vii))			
What was inspected / Work description: <input type="checkbox"/> BTS <input checked="" type="checkbox"/> Mains		<input checked="" type="checkbox"/> House <input type="checkbox"/> Shed <input checked="" type="checkbox"/> MEN Switchboard <input checked="" type="checkbox"/> Main Earthing	
Specify the regulation(s) and companion standard(s) followed in carrying out the inspection: Electrical Safety Regulations 2010 ASNZS 3000 PART 2			
What are the results of the inspection:			
Visual 0.6			
Insulation Resistance >999		Mega $\Omega$	
Earth Continuity 0.10		$\Omega$	
Polarity Test P-IE = 233		Volts	
P-IE = 233		Volts	
Earth Loop 0.27		$\Omega$	
PSCC 861		KA/A	
RCD		Ms	
Work Specific details <input type="checkbox"/> HV Photovoltaic			
<b>Certificate Information (Issuer)</b>			
Name of Inspector ISHURAT ALI		Registration # I 250639	
Email Address		Telephone	
<b>Certifying Electrical Work and Certificate of Compliance (CoC) details</b>			
Full Name of Electrical worker(s) Danny Francis		Registration # E 1079	
Full Name of Electrical worker(s)		Registration #	
CoC details 86702		<input checked="" type="checkbox"/> CoC(s) attached	
<b>Declaration</b>			
I hereby confirm that the work described above has been done in / not in accordance with the regulations; and the installation / part installation on which the work has been done is, and will be / not be when enlivened, electrically safe. (Note: Strike out or delete the inapplicable words highlighted by red above.)			
Signature		Work Certification Date 14-03-17	
CUSTOMER COPY - THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED			



(ESC) Certificate No.:

4759

COUNTIESPOWER

# Electrical Safety Certificate

**Location of Installation:**

Address

44 Millstone Lane, Pokereu

**Customer Information:**

Name

Mr S L Ang

Postal Address

11 Stamford Crescent, Flat Bush

Phone &amp; Email

09-2651926

Description of work completed: Inspect, Test, Metering show

I certify that the installation/part of the installation, to which this Electrical Safety Certificate applies, the work completed has not adversely affected any other part of this installation.

1) In accordance with the requirements of the Electricity (Safety) Regulations 2010 and Amendments, and to the testing required in Electricity Regulation 63.

<input checked="" type="checkbox"/>	• Ensure that the polarity and phase rotation of the supply are correct
<input checked="" type="checkbox"/>	• Ensure that the protection of the supply is correctly rated
<input checked="" type="checkbox"/>	• Ensure that the installation or part installation to be connected is compatible with the supply system
<input checked="" type="checkbox"/>	• If the supply is from a MEN system, verify that there is a main earthing system
<input checked="" type="checkbox"/>	• If there is revenue metering equipment, verify its electrical safety by checking and testing it
<input type="checkbox"/>	• If PEW has been done, sight a signed COC that is dated not less than 6 months from this date
<input type="checkbox"/>	• If an inspection was required, sight a ROI signed by the Inspector

**TEST RESULTS SHALL BE RECORDED HERE**

Visual:	O.K.
Earth Continuity:	Recorded in ROI
Bonding:	"
Insulation:	"
Continuity	"
Polarity Results	"
Loop Impedance Results:	"
RCD's	"
Voltage Results:	"
Rotation Results:	"

2) And is connected to a power supply and is safe to use.

Name:

Ithut Ari

Registration/Practicing Licence Number:

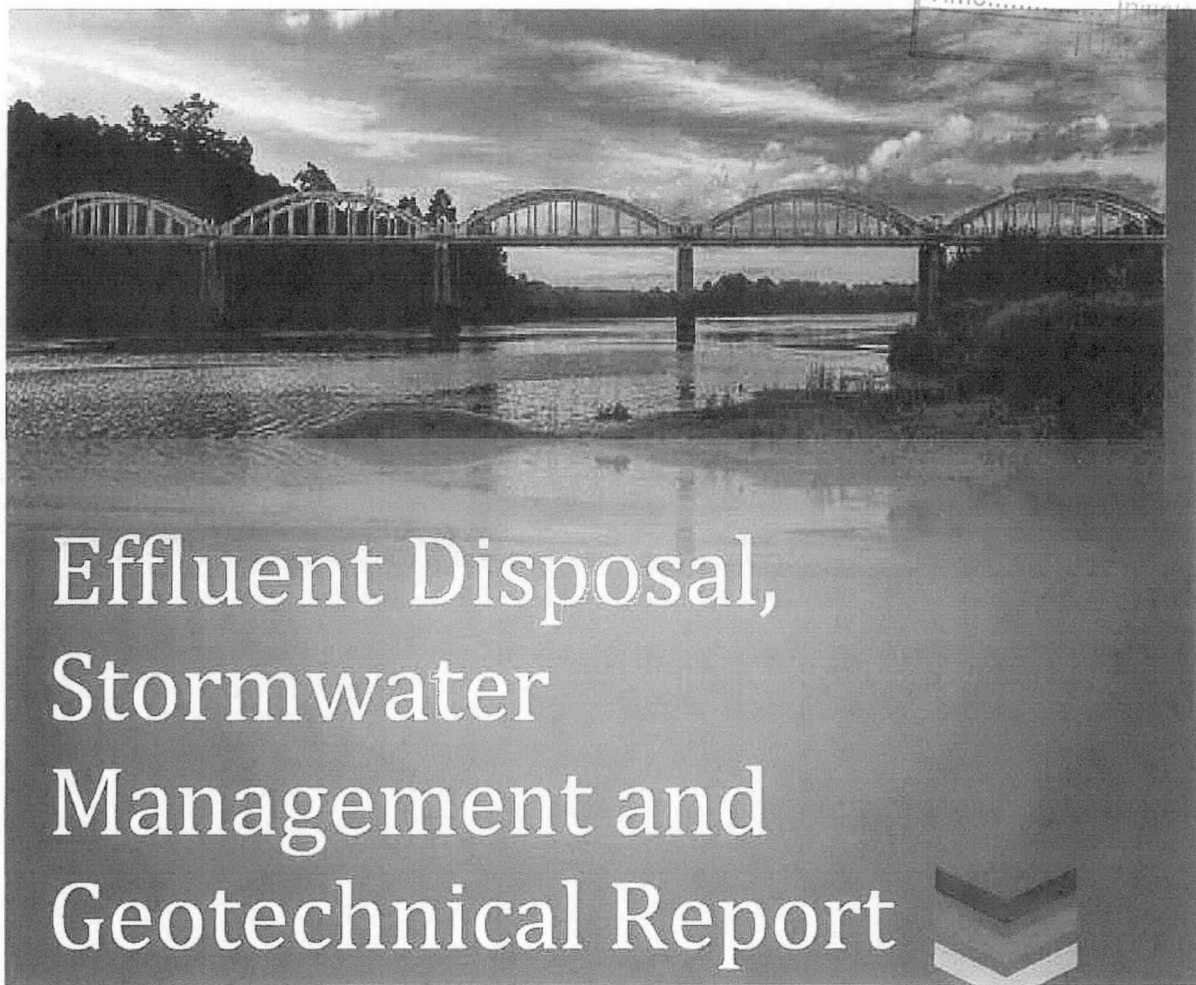
I250639

Signature:

Date:

14-03-17

**CUSTOMER COPY – THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED**



# Effluent Disposal, Stormwater Management and Geotechnical Report



**Tilsley Engineering Ltd**

75 Seddon Street, Pukekohe

Ph: 09 238 3245

info@tilsleyengineering.co.nz

13 May 2016

*Ref: J0834*

**Report prepared for:**

Ang Residence

**Site Location:**

44 Millstone Lane, Waterfall Park,  
Pokeno



## TABLE OF CONTENTS

---

TABLE OF CONTENTS.....	I
INTRODUCTION.....	2
SITE DESCRIPTION.....	2
SITE VISITS AND TESTS .....	2
GEOLOGY.....	3
RESULTS.....	3
<i>BORE HOLE 1:</i> .....	3
<i>BORE HOLE 2:</i> .....	3
<i>BORE HOLE 3:</i> .....	3
EARTHWORKS AND FOUNDATIONS .....	4
ENVIRONMENTAL ASSESSMENT .....	5
WASTEWATER SYSTEM DESIGN .....	5
WASTE WATER QUALITY .....	6
DISPOSAL FIELD AREA .....	6
STORM WATER MANAGEMENT .....	7
RECOMMENDATIONS:.....	8
DISCLAIMER.....	9
APPENDIX A – BACKGROUND INFORMATION .....	11
APPENDIX B – BORE LOGS .....	17
APPENDIX C – CALCULATIONS AND DESIGNS .....	20
APPENDIX D – TP58 CHECKLIST.....	29

## **INTRODUCTION**

---

The clients wish to construct a four-bedroomed dwelling at 44 Millstone Lane, Pokeno.

As such they require an effluent disposal report in accordance with TP58 as well as completing the TP 58 checklist. This report also covers the required storm water control due to the increase of non-permeable areas.

They have requested Tilsley Engineering Ltd to investigate the site and design an effluent system and manage the storm water to suit the soil conditions and other prevailing conditions of the site.

This report addresses this request.

Note: the following reports were studied prior to completing this report;

1. Tilsley Engineering Ltd: 42 Millstone Lane, Pokeno; Effluent Disposal and Stormwater management report.
2. Coffey Geotechnics: Geotechnical investigation report on Waterfall Park Residential Subdivision stages 2 and 2A (2013).
3. Ormiston Associates Ltd: Review of proposed on-site wastewater treatment and land disposal for proposed 117 lot subdivision Market Road, Pokeno (2013).
4. Coffey: Pokeno Farms Ltd, Geotechnical Completion Report on Waterfall Park, Stage 2A at Market Road, Pokeno.

## **SITE DESCRIPTION**

---

The property is described as Lot 10 Deposited Plan 480134 and is 3640m<sup>2</sup> in area and is located at 44 Millstone Lane, Pokeno.

The property is located on the eastern side of the Auckland-Hamilton expressway. The lot slopes uniformly towards the south western boundary and is covered in permanent pasture with a small area covered with native rushes.

A site plan shows the location of the proposed dwelling.

## **SITE VISITS AND TESTS**

---

The site was visited on the 11<sup>th</sup> May 2016 and the soil samples and soil profile were taken and logged in a hand augured borehole located at the proposed effluent disposal site.

The soil profile was logged to 2500mm and the test results are shown on the attached result sheet. The location of the borehole are shown on the site plan.

A standard soakage test was also carried out over four hours.

## **GEOLOGY**

---

The soils of the area are designated "Qvs" on the map.

These are basaltic soils formed from scoria, lapilli and ash originating from local volcanic events, which took place some 1- 2 million years ago.

The weathered surface soils are relatively free draining especially in the top 700mm depth.

The soils below 900mm becomes denser clays and are less well draining.

Onsite soil investigations confirm the underlying geology. No Ground water was encountered in the boreholes.

## **RESULTS**

---

Three boreholes were sunk on the lot. Bore holes indicated on average 350mm of topsoil, followed by stiff brown and red silty clay. The soils strength obtained from the Shear Vane tests within the building platform provided the soil undrained shear strength ranged between 61kPa and 175+kPa.

### ***BORE HOLE 1:***

---

The location of hand augered bore hole 1 has been selected at the Southern side of the lot. The soils obtained from the bore hole show a 300mm of topsoil, this was followed by 450mm of stiff brown and red silty clay 10YR 5\6. The soil undrained shear strength obtained ranged between 92 to 103kPa.

### ***BORE HOLE 2:***

---

The location of hand augered bore hole 2 has been selected at the centre of the lot. The soils obtained from the bore hole show a 400mm of topsoil, this was followed by 1600mm of stiff Orangey Brown Silty Clay 10YR 5\6 with charcoal striations. Beyond 2000mm, the soil becomes volcanic ash with high charcoal and basalt gravel content. The soil undrained shear strength obtained in the top 2000mm of clay ranged between 61 to 175+kPa.

### ***BORE HOLE 3:***

---

The location of hand augered bore hole 3 has been selected at the South Western corner of the lot. The soils obtained from the bore hole show a 400mm of topsoil, this was followed by



600mm of light brown clay. Beyond 1000mm, the silt content increased and the soil becomes volcanic ash with high charcoal and basalt gravel content.

The soils on the Lot have been classified as highly expansive (Class H) based on their shrink/swell index (ref AS2870). The characteristic movement  $Y_s$  for this lot is expected to be of the range of 40-50mm and therefore a specific foundation and structural design should be carried out by a Chartered Professional Engineer who should allow for the expansive soil effect in the design.

Alternatively, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of the building platform is 600mm for NZS 3604 type strip & pad footing.

Ground water was not encountered in any of the bore holes.

## **EARTHWORKS AND FOUNDATIONS**

---

Development of the site for a slab foundation will require moving a small quantity of soil in order to create a level building platform.

The lot is acceptable for both concrete 'raft' style and driven timber pile foundations. Both foundation styles to be designed using an allowable bearing pressure of 100kPa. For raft style foundation; the top clay layer shall be compacted to an allowable bearing pressure of 100KPa, or metal hard fill of 150mm to extend 1m beyond the building perimeter. The allowable bearing pressure for hard fill to reach a minimum of 100KPa. A suitably qualified engineer should be engaged to perform the required compaction testing of the building platform.

Silt control measures will be necessary due to the close proximity to the overland flow path and neighbouring properties.

Future earthworks will need to be undertaken in accordance with any applicable Waikato Council guidelines and the following requirements.

All pipe work entering the dwelling must enter the foundation at 90° and shall not run parallel to the foundation within 1m from the building perimeter.

### **Fill**

In areas where structural fill is to be placed to carry building loads, we recommend that all earthworks procedures and compaction testing are carried out in accordance with NZS4404 and NZS4431.

All fill batters shall be not steeper than 1V:2H. Fill batter faces should be compacted as a separate operation or, alternatively, overfilled and cut back.

### **Cut**

Cut depths associated with building platform development excavation work within the lot will be minimal and may be battered back at a stable slope angle. We consider that stable cut batters can be formed around the building site at slopes of 1V:2H or less. If higher or steeper cut faces are required then these will need to be the subject of specific analysis and design and may require a combination of benching, battering and ground retention to achieve stability.

### **Earthworks limitation**

No cut or fill depths greater than 1.8m should be undertaken without the approval in writing of Waikato Council and that of a Chartered Professional Engineer who is experienced in geo-mechanics and is familiar with the contents of this report. This is because such works may disturb existing equilibrium conditions.

## **ENVIRONMENTAL ASSESSMENT**

---

As per Consent notice issued pursuant to Section 221 of the RMA 1991, it is recommended to install a secondary treatment system with dripper lines on site.

The proposed effluent disposal system is to use an AWT's system plus subsurface dripper line disposal, designed in accordance with TP 58.

Ground water was not encountered in the boreholes and due to the elevated location of the site it is anticipated ground water will be at least 2 metres below ground level. As such, subsurface dripper irrigation will not impact on ground water.

There is a stream present which is approx. 60 m away from the southern perimeter of the proposed building platform therefore the separation between the disposal field and the stream shall be more than 30 metres. There are no major stands of trees or bush within 20 metres of the proposed irrigation field.

There are no embankments within 20 metres of the disposal field and the building site is less than 15-degree slope.

There is no overland flow path on this property.

As such any impact to the environment is considered to be minor.

## **WASTEWATER SYSTEM DESIGN**

---

The proposal is to construct a new 4 bedroomed dwelling, with a water supply being supplied from reticulated trickle feed water supply, hence maintaining water storage levels in the tanks.

Total water usage will be:  $6 \times 180\text{L/day} = 1080 \text{ L/day}$

No of Bedrooms: 4                      Design Occupancy: 6                      Water usage per day: 180L/day

The Category of soil for this site as recommended in Consent notice issued pursuant to Section 221 of the RMA 1991 is Category 6. Reserve area of at least 50% of the primary disposal area shall be maintained on site. The effluent disposal for the proposed

dwelling will have a design loading rate of 3mm. The clients shall install Standard Fixtures including dual flush 11litre flush water cisterns, automatic washing machine and dishwasher.

The calculation sheet is in accordance with TP 58 and the TP 58 checklist is enclosed in this report. The soil category is assessed as category 3 with a loading rate of 3mm giving a dripper line length of 360m.

## **WASTE WATER QUALITY**

---

The longevity of an effluent disposal field is known to depend largely on the Long Term Acceptance Rate (LTAR) of the soil to continue to absorb and process nutrient laden waters. This ability is significantly curtailed if particulate matter is allowed to carry over into the infiltrative zone. It is therefore recommended that a system is employed which carries out a high degree of wastewater purification and that soakage is carried out in the Topsoil horizon.

Research into the various types of treatment has shown that an AWTS (Aerated Wastewater Treatment System) produces a high quality fluid. Both grey and black waters can be combined and gravity fed into the system. Low BODS (Biochemical Oxygen Demand - 5-day test) low TSS (Total Suspended Solids) and low - coliform count can be achieved with these types of plant.

The treatment units are placed just below ground level in a location to permit gravity feed or pump feed for flat areas from the house drains. There are a number of these packaged systems on the market, all competitively priced. These plants are simply installed and require only a separate electrical circuit to power them. They come as a stock size for the normal household. The clients are recommended to install a Biolytix Biopod secondary wastewater treatment plant.

## **DISPOSAL FIELD AREA**

---

As per consent notice, a buried pressure compensating dripper irrigation system shall be used for the discharge of effluent to the effluent field. The location of the onsite waste water land disposal system is on slope lesser than 20 degrees to the horizontal.

Based on 1 dripper/m<sup>2</sup> the irrigation tube length required is 360m. Dripper tubing generally has drippers at 0.3 to 1.0 metre intervals. This will result in more drippers/m<sup>2</sup> than calculated, however we advise installing the full-recommended length of 360 meters. The drippers should be rated at about 2 - 4 litres/hour.

For reserve field, an area of 180m<sup>2</sup> has been kept on the Southern side of the property as shown on the site plan. The equipment suppliers will offer and provide training and maintenance support for the system. However, it is the owner's responsibility to carry out all general maintenance procedures in order for the system to function as designed. We recommend that a maintenance contract be entered into with a recognized wastewater maintenance company, which includes a 6-monthly inspection for back-flushing and filter changes, as well as other required maintenance on the system.

## **STORM WATER MANAGEMENT**

---

The enclosed calculation sheet shows that attenuation built into the proposed water tanks will allow for a 5% AEP 10min storm event. All runoff from roof areas shall be piped and released into two linked 25m<sup>3</sup> rain collection tanks. The house would be connected to the subdivision trickle feed supply and therefore the two interlinked tanks would contain water up to the attenuation pipe height at all times. Thus, the tanks would safeguard 45.6m<sup>3</sup> (50m<sup>3</sup> - 4.4 m<sup>3</sup>) of water. This would provide the water storage on site for firefighting supply in accordance with NZS 4509:2008. The neighbouring property (42 Millstone Lane, Waterfall Park, Pokeno) has 2x25 m<sup>3</sup> rain collection tanks installed and is within 70m (<90m) of the proposed property also available for firefighting water source.

The overflow from this shall be directed to a 16m long spreader bar located close to the stream as indicated on the site plan. Attenuation shall be achieved by using a 20mm pipe 220mm below the overflow pipe.

Once concreted, the stormwater runoff from the driveway will be directed into an 8m long by 1m wide by 1m deep soakage trench via the Type 1 Sump.

The occupants will use 720L of water per day. This will reduce the volume of storm water that requires disposal but has not been taken into account in the calculation.


For a 1% AEP 10min storm event, the water shall flow down the slope into the existing stream next the site. The stormwater spreader bar and the effluent disposal field shall be located in such a way that there will be no negative effect of this overland flow on the effluent disposal or the neighbour's property in the event that the dripper lines are overwhelmed.

## **RECOMMENDATIONS:**

---

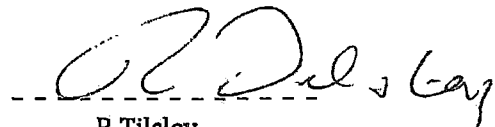
1. The building platforms within the lot are safe and stable. A suitably qualified Chartered Professional Engineer (CPEng) or their representative shall be engaged to inspect and confirm the finished building platform for bearing strength.
2. For the site, a specific foundation design by a Chartered Professional Engineer will be required for the foundations. Design to meet all the requirements as described within this report.
3. All Cut/fill under and around the house foundations to be inspected by a suitably qualified engineer. Cut/fill to reach minimum bearing pressure as per foundation design.
4. Install a 4000-litre capacity Biolytix Biopod BF6 wastewater treatment system.
5. Install 360 metres of sub-surface dripper irrigation in the location shown on the site plan. Lines to be at 1m centres.
6. Storm-water from the roof to flow to two linked 25,000 litre rain water tanks via 80mm minimum diameter pipe. The tanks shall be connected to the subdivision trickle feed supply.
7. The overflow pipe is to be a minimum of 90mm and is to flow to a 16m long spreader bar.
8. Attenuation shall be achieved using 20mm dia orifice pipe connected 0.22m below the overflow pipe.
9. The stormwater collected by the Type I sump from the driveway will be directed into a soakage trench 1m wide by 1m deep by 8m long.

Report written by:



Jimmy Yang  
BE Civil (Hons)

Report reviewed and approved by:



R Tilsley  
BE (Civil) CPEng MIPENZ

## **DISCLAIMER**

---

This report has been prepared solely for the benefit of our client with respect to particular brief given to us, and data or opinions in it may not be used in other contexts, by any other party or for any other purposes. To the maximum extent permitted by law, Tilsley Engineering Ltd disclaims all liability and responsibility (in contract or tort, including negligence, or otherwise) for any loss or damage whatsoever which may be suffered as a result of any reliance by any third party on this report, whether that loss is caused by any fault or negligence on the part of Tilsley Engineering Ltd or otherwise.

Hard copies and electronic copies of this document are available from Tilsley Engineering Ltd. Any copies/reproductions of this document must be in the original format and in colour. Any copies must be reproduced in its entirety.

### **Notice to Reader/ User of this document**

Should you be in any doubt as to the applicability of this report and/or its recommendations for the proposed development as described herein, and/or encounter materials on site that differ from those described herein, it is essential that you discuss these issues with the authors before proceeding with any work based on this document.

This is a factual report of field investigations (and laboratory testing). The field investigations have been undertaken at discrete locations and no inferences about the nature and continuity of ground conditions away from the investigation location are made.

Furthermore, the logs are provided presenting descriptions of the soils and geology based on field observations of the samples recovered in the fieldwork and may not be truly representative of the actual underlying conditions.



LIST OF APPENDICES

APPENDIX A – BACKGROUND INFORMATION ..... 11

*Locality plan and geological map* ..... 11

*Site plan* ..... 12

*NIWA HIRDS data*..... 13

*Photographs*..... 14

*Certificate of title* ..... 16

APPENDIX B – BORE LOGS ..... 17

APPENDIX C – CALCULATIONS AND DESIGNS ..... 20

*wastewater* ..... 20

*Stormwater* ..... 23

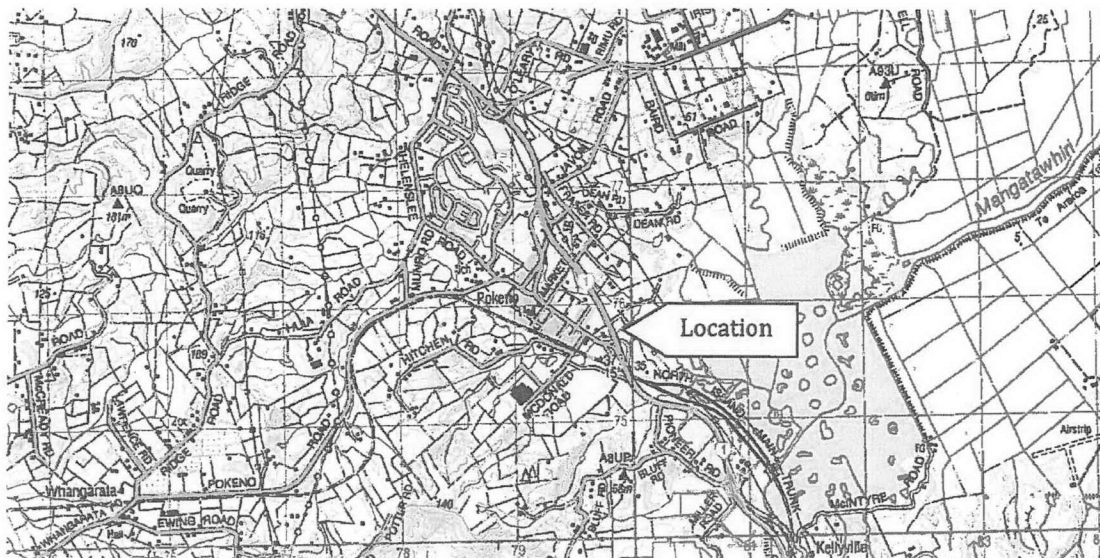
*Spreader bar detail* ..... 27

*Dwelling room layout*..... 28

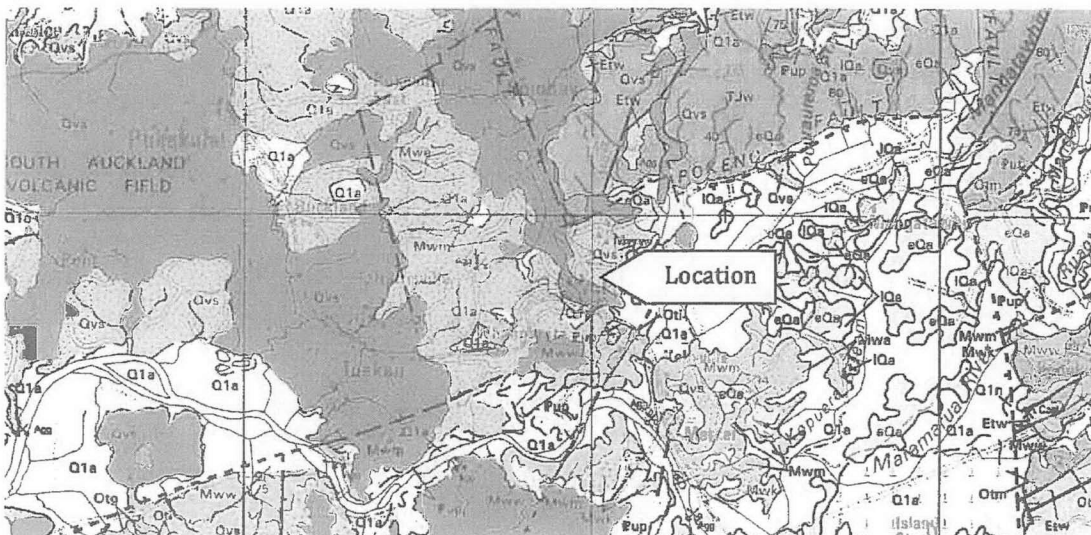
APPENDIX D – TP58 CHECKLIST ..... 29

## APPENDIX A - BACKGROUND INFORMATION

### LOCALITY PLAN AND GEOLOGICAL MAP

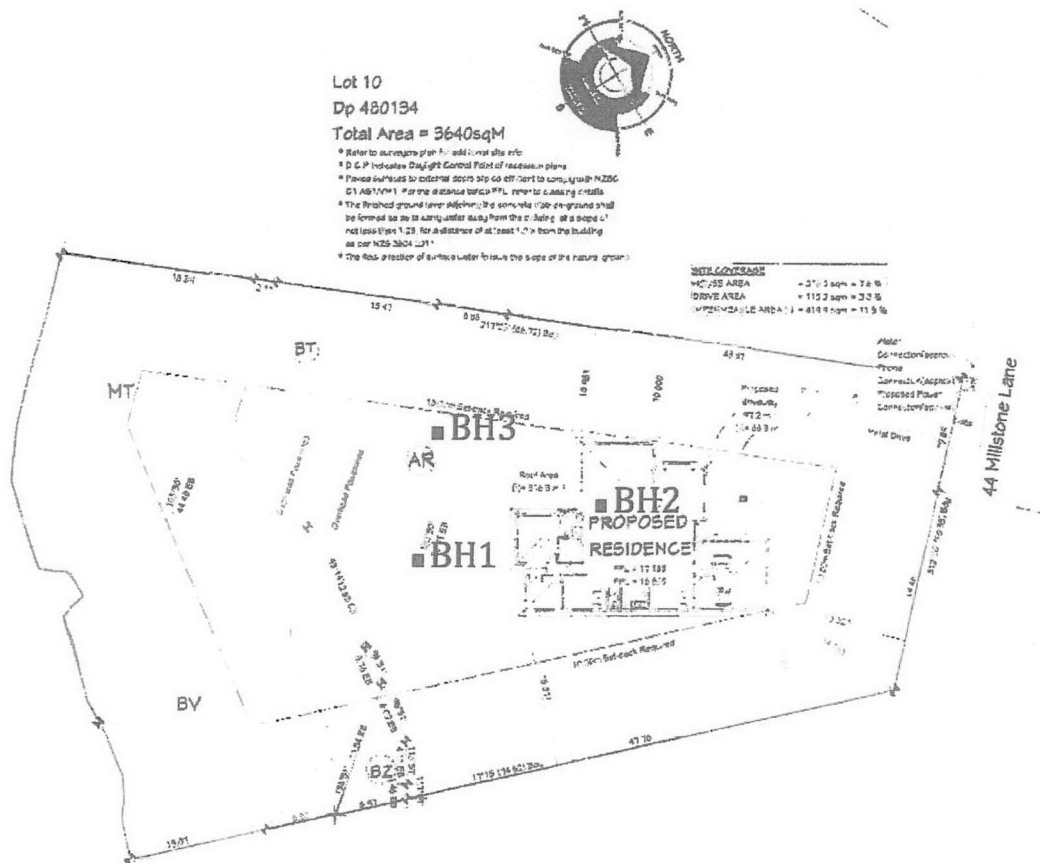


Topo50

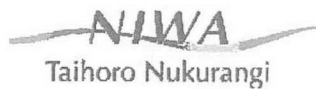


Auckland Geological Map

# SITE PLAN



## NIWA HIRDS DATA



## High Intensity Rainfall System V3

[Calculator](#)   [Help](#)

## Results for 44 Millstone Lane, Waterfall Park, Pokeno

Intensity-Duration-Frequency results (produced on Monday 16th of May 2016)

Sitename: 44 Millstone Lane, Waterfall Park, Pokeno

Coordinate system: NZMG

Easting: 2689993

Northing: 6437855

## Rainfall intensities (mm/h)

ARI (y)	aep	Duration									
		10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
1.58	0.633	55.2	37.5	30.0	20.4	13.1	6.4	4.1	2.6	1.7	1.3
2.00	0.500	60.6	41.1	32.8	22.3	14.2	7.0	4.5	2.9	1.8	1.4
5.00	0.200	79.2	54.0	43.0	29.2	18.6	9.2	5.8	3.7	2.4	1.8
10.00	0.100	94.8	64.5	51.4	35.0	22.3	10.9	7.0	4.4	2.8	2.2
20.00	0.050	112.8	76.5	61.2	41.6	26.4	12.9	8.2	5.2	3.3	2.5
30.00	0.033	124.2	84.6	67.6	45.9	29.2	14.3	9.1	5.8	3.7	2.8
40.00	0.025	133.2	90.9	72.4	49.2	31.3	15.3	9.7	6.2	3.9	3.0
50.00	0.020	141.0	95.7	76.4	52.0	33.0	16.1	10.2	6.5	4.1	3.2
60.00	0.017	147.0	100.2	80.0	54.3	34.5	16.8	10.7	6.8	4.3	3.3
80.00	0.012	157.8	107.4	85.6	58.2	37.0	18.0	11.4	7.3	4.6	3.5
100.00	0.010	166.8	113.4	90.4	61.5	39.0	19.0	12.1	7.7	4.9	3.7

---

## PHOTOGRAPHS

---



View South (visible overhead powerlines)



View West (Visible overhead powerlines)



Soil from BH2 (Left to right: Topsoil, light brown clay, dark red clay, pink clay and at 2m below ground level - volcanic ash)



Soil from BH3 showing light brown clay followed by volcanic ash from 1m to 2.5m below ground level.



# CERTIFICATE OF TITLE



## COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



Search Copy

R. W. M. J. J.  
Registrar-General  
of Land

Identifier **674814**  
Land Registration District **North Auckland**  
Date Issued **23 February 2015**

### Prior References

624442

Estate Fee Simple  
Area 3640 square metres more or less  
Legal Description Lot 10 Deposited Plan 480144  
Proprietors  
Stan Lawrence Ang Ang and Jocelyn Lee Ang

### Interests

Subject to Part IV A Conservation Act 1987 (affects parts formerly Lot 7 DP 13817 and Sees 1, 2 and 5 SO Plan 70555)

Subject to Section 11 Crown Minerals Act 1991 (affects parts formerly Lot 7 DP 13817 and Sees 1, 2 and 5 SO Plan 70555)

9558957.3 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 20.5.2014 at 1:32 pm

Appurtenant hereto is a right of way, right to convey water, electricity, telecommunications and computer media and a right to drain water created by Easement Instrument 9558957.4 - 20.5.2014 at 3:32 pm

The easements created by Easement Instrument 9558957.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to drain water over part marked B1 and B2 both on DP 480144 in favour of Waikato District Council created by Easement Instrument 9558957.7 - 20.5.2014 at 3:32 pm

The easements created by Easement Instrument 9558957.7 are subject to Section 243 (a) Resource Management Act 1991

9980707.3 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 23.2.2015 at 2:52 pm

Appurtenant hereto is a right of way, right to drain water, right to convey water, electricity, telecommunications and computer media created by Easement Instrument 9980707.4 - 23.2.2015 at 2:52 pm

The easements created by Easement Instrument 9980707.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right to drain water (in gross) over part marked B1 and B2 both on DP 480144 in favour of Waikato District Council created by Easement Instrument 9980707.5 - 23.2.2015 at 2:52 pm

The easements created by Easement Instrument 9980707.5 are subject to Section 243 (a) Resource Management Act 1991











Land Covenant in Easement Instrument 9980707.8 - 23.2.2015 at 2:52 pm









10148626.7 Mortgage to Kiwibank Limited - 14.8.2015 at 2:58 pm













Transaction ID  
Instrument Reference 674814

Search Copy Dated 13-09-2023 16:57:00, Page 1 of 2  
Register Only

## APPENDIX B – BORE LOGS

		<b>TILSLEY ENGINEERING LIMITED</b> PO Box 392, Pukekohe Phone: 09 238 3245				75 Seddon Street, Pukekohe info@tilsleyengineering.co.nz														
		<b>Bore Log</b>																		
Bore No: 1		Date: 11/05/2016		Augered by: JY		Client: Ang Residence														
Job No: J0834		Time: 10am		Logged by: JY		Location: 44 Millstone Lane, Pokeno														
Depth (m)	Strata Description	Munsell Chart Number	Soil Symbol	Water Level	Scala Penetrometer (blows/150mm)												Shear Vane Test (Undrained shear strength)			
					400s	750s	1000s	1500s	2000s	2500s	3000s	3500s	4000s	4500s	5000s	5500s	6000s			
					2	3	4	5	6	7	8	9	10	11	12					
0.5	Brown topsoil																			
	Brown and red clay	10YR 5/5														177/85	92kPa			
	Silt content increases																90kPa			
1.0	Yellow and white silty soil																103kPa			
	EOB																			
1.5																				
2.0																				
2.5																				
3.0																				
KEY	Soil Type	Coarse						Organic		Comments										
		Boulders	Cobbles	Peat	Sand	Silt	Clay	Topsoil												
	Graphic Symbol																			

		<b>TILSLEY ENGINEERING LIMITED</b> PO Box 392, Pukekohe Phone: 09 236 3245				75 Seddon Street, Pukekohe info@tilsleyengineering.co.nz												
		<b>Bore Log</b>																
Bore No: 2		Date: 11/05/2013		Augered by: JY		Client: Ang Residence												
Job No: J0834		Time: 10am		Logged by: JY		Location: 44 Millstone Lane, Pokeno												
Depth (m)	Strata Description	Munsell Chart Number	Soil Symbol	Water Level	Scala Penetrometer (blows/150mm)										Shear Vane Test (Undrained shear strength)			
					400Pa 2 3 4 5 6 7 8 9 10 12	750Pa 3 4 5 6 7 8 9 10 12	900Pa 4 5 6 7 8 9 10 12	1600Pa 6 7 8 9 10 12	2000Pa 7 8 9 10 12	30kPa 10 12	50kPa 10 12	100kPa 10 12	150kPa 10 12					
0.50	Brown topsoil																	
	Dark brown and red clay Friable and silty	10YR 5/5															175+kPa	
1.0																	175+kPa	
1.5	Clay silt content increases Clay becomes more moist, increase in water content White silt inclusions																146/85	61kPa
2.0	Volcanic ash with charcoal and fine basalt gravel																92kPa	
2.5																		
	EOB																	
3.0																		
KEY	Soil Type	Coarse						Organic		Comments								
	Graphic Symbol	Boulders	Cobbles	Volcanic ash	Sand	Silt	Clay	Topsoil										
																		

		<b>TILSLEY ENGINEERING LIMITED</b> PO Box 392, Pukekohe Phone: 09 238 3245				75 Seddon Street, Pukekohe info@tilsleyengineering.co.nz												
		<b>Bore Log</b>																
Bore No: 3		Date: 11/05/2016		Augured by: JY		Client: Ang Residence												
Job No: J0834		Time: 10am		Logged by: JY		Location: 44 Millstone Lane, Pokeno												
Depth (m)	Strata Description	Munsell Chart Number	Soil Symbol	Water Level	Scale Penetrometer (blows/250mm)										Shear Vane Test (Undrained shear strength)			
					400Pa	700Pa	900Pa	1000Pa	1600Pa	2000Pa	2000Pa	500Pa	1000Pa	1500Pa				
					2	3	4	5	6	7	8	9	10	12				
	Brown topsoil																	
0.50	Light brown silty clay	5YR 6/5																
1.0	Volcanic Ash layer High gravel content High charcoal content																	
1.5	Clay silt content increases Clay becomes more moist, increase in water content White silt inclusions																	
2.0	Volcanic ash with charcoal and fine basalt gravel																	
2.5																		
	EOB																	
3.0																		
KEY	Soil Type	Coarse													Organic	Comments		
	Graphic Symbol	Boulders	Cobbles	Volcanic ash	Sand	Silt	Clay	Topsoil										
																		

## APPENDIX C – CALCULATIONS AND DESIGNS

### WASTEWATER

Ang Residence

44 Millstone Lane, Pokeno

Lot 10, DP No. 480134

11/05/2016

Time	Hole 1			Hole 2			Hole 3		
	Level	refill	drop	Level	refill	drop	level	refill	drop
9.00am	0								
10.00am	1200	0	300						
11.00am	1000	0	500						

All measurements in millimetres

**Total drop over 2 hours mm's:**

Hole 1          500          Hole 2          Hole 3

**Average drop per hour mm's:**

Hole 1          250          Hole 2          Hole 3

**Average drop over last hour mm's:**

Hole 1          200          Hole 2          Hole 3

Observer: JY

Soil Category 6 TP 58 Classification

TILSLEY ENGINEERING LTD  
PO BOX 392  
PUKEKOHE

Ang Residence  
44 Millstone Lane, Pokeno  
Lot 10, DP No. 480134  
11/05/2016

SEPTIC TANK EFFLUENT FIELD  
DRIPPER LINE LENGTH

---

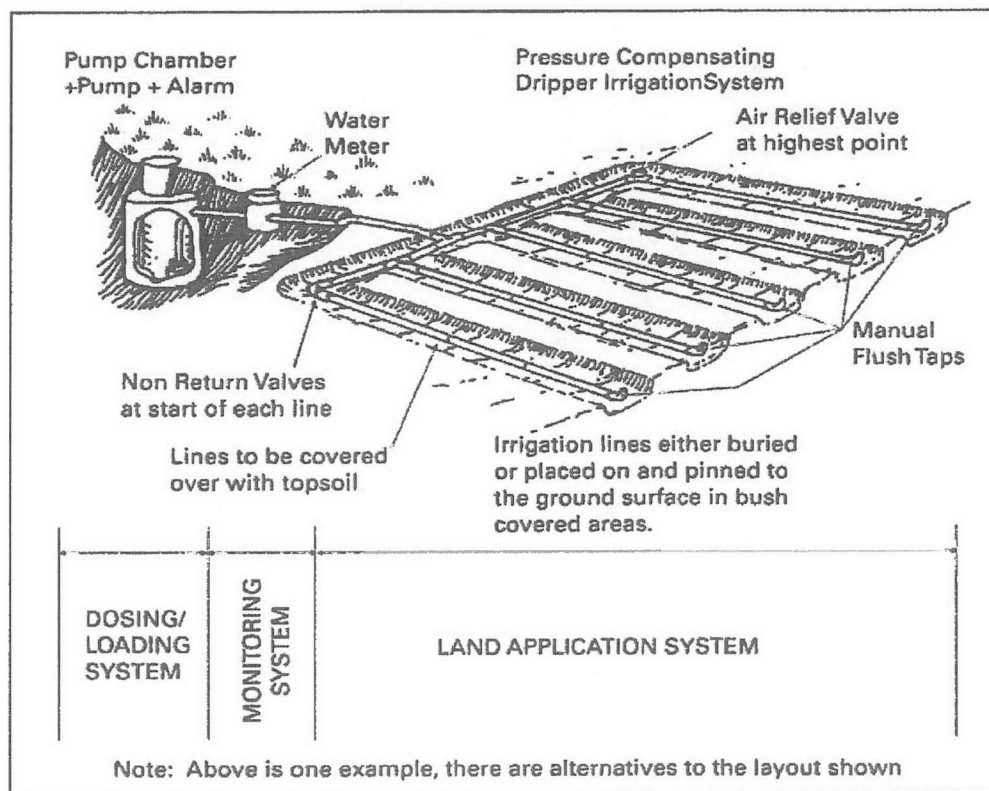
**Note:** Keep all dripper lines as shallow as possible.

Water SupplyRain/Roof water	
Number of Bedrooms	4 Bedrooms
Number of occupants	6 persons
Water consumption per person per day	180 litres/day per person
Water usage	1080 litres/day
Maximum dose rate	3 mm
Soils category estimated from soakage test	Category 6
Length of dripper line required	360m
Total Area required for disposal field	360m <sup>2</sup>
Minimum reserve area (50%)	180m <sup>2</sup>

TILSLEY ENGINEERING LTD  
PO Box 392  
Pukekohe



**Figure 9.1: Schematic Diagram of a Pressure Compensating Drip Irrigation System**

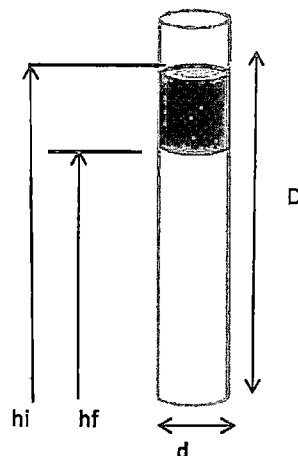


## STORMWATER

**Client** Ang Residence  
**Dwelling**  
**Address** 44 Millstone Lane, Waterfall Park, Pokeno

**Date** 11/05/2016  
**Soakage Results from 100mm diameter 1.5m deep hole**

Time (min)	Accumulative Drop (mm)
0	0
10	60
20	100
30	130
40	160
60	200



### Parameters

Hole diameter (d) 10 cm  
 Hole Depth (D) 150 cm  
 Head (hi) 120 cm  
 Depth (hf) 100 cm  
 time 60 min

Water volume loss

$$V = \frac{\pi d^2}{4} h$$

1570.80 cm<sup>3</sup>  
 1.57 L

Area (water loss through)

$$V = \frac{\pi d^2}{4} + (d * \pi * \text{water depth})$$

3534.29 cm<sup>2</sup>  
 0.35 m<sup>2</sup>

percolation rate = water volume loss / Area(water loss through) / last hour  
 Units = litres/m<sup>2</sup>/min

percolation rate = litres / m<sup>2</sup> / 60 mins

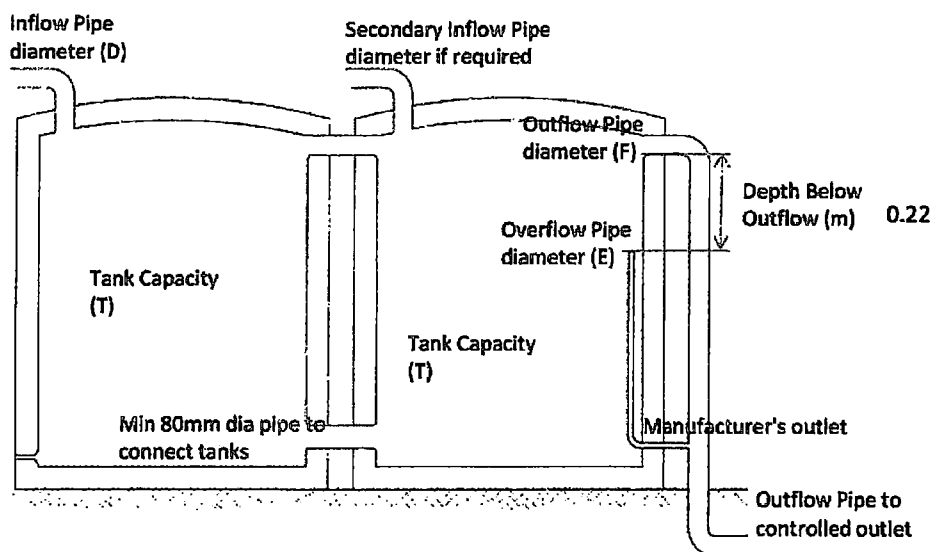
0.07 l/m<sup>2</sup>/min

**Client**                                      **Ang Residence**  
**Address**                                    **44 Millstone Lane, Waterfall Park, Pokeno**  
**Date**                                         **11/05/2016**  
**Stormwater management via detention Tank**

Undeveloped Grass Area	Dwelling	316	m <sup>2</sup>
Modified (C=0.3)		94.80	m <sup>2</sup>
Developed Roof Area		316	m <sup>2</sup>
Modified (C=0.9)		284.4	m <sup>2</sup>
<b>Design Storm</b>			
1 in 20 years (5% AEP), 10min storm NIWA value		112.8	mm/hr
cc. Adjusted for climate change 24%		139.9	mm/hr
<b>Quantity of Flow - Undeveloped</b>			
Undeveloped Grass Area		3.68	l/sec
<b>Quantity of Flow - Developed</b>			
Developed Roof Area		11.050	l/sec
<b>Storage Volume Required</b>			
(Max flow) *10*60		4,420	Litres
		4.4	m <sup>3</sup>
<b>Detention Tank</b>			
Use 2 * 25,000 litre tank			
Number of Tanks being used for Attenuation		2	
Tank Base Dia		3.61	m
Storage depth = Volume / ((Pixdia^2)/4)		0.22	m
<b>Orifice Size</b>			
Q = VA			
Qmax	0.05	l/sec	
V = sqrt(2gh)	2.06	m/s	
Area = Q/V	2.5E-05	m <sup>2</sup>	
Diameter	5.63	mm	
min Diameter	20	mm	

# Detention Tank Detail

Dwelling



The property has access to reticulated trickle feed water supply for maintaining water storage levels in the tank, hence the water level will be maintained at the height of the (Overflow Pipe Diameter E). This will enable the tanks to maintain  $45.6\text{m}^3$  of water for firefighting purposes.

Note: Minimum orifice diameter is 20mm. All orifice must be screened, and details of the screen must be submitted for approval.

D= Inflow pipe size a minimum 100mmdia

T= 25,000 L tank

E= 20 mm

F= Top of Tank outlet, Pipe size to be larger than inflow pipe/s

Capacity to be used for attenuation  $4.4\text{ m}^3$

## Notes:

1. Overflow orifice 'E' is to use an approved manufactures outlet point this may require an internal PVC pipe connected to one of the two base points
2. If different tank dimensions are used other than the specified on the overflow must allow for a minimum of attenuation below the overflow pipe of  $4.4\text{ m}^3$
3. The note of mains supply is not relevant in this case

**Client** Ang Residence  
**Driveway**  
**Address** 44 Millstone Lane, Waterfall Park, Pokeno

**Date** 11/05/2016

Undeveloped Grass Area 88 m<sup>2</sup>  
 Modified (C=0.3) 26.4 m<sup>2</sup>

Developed Roof Area 88 m<sup>2</sup>  
 Modified (C=0.9) 79.2 m<sup>2</sup>

**Design Storm**  
 1 in 20 year (5% AEP), 10min storm NIWA value 112.8 mm/hr  
 cc. Adjusted for climate change 24% 139.872 mm/hr

**Quantity of Flow - Undeveloped**  
 Undeveloped Grass Area 1.03 l/sec

**Quantity of Flow - Developed**  
 Developed Roof Area 3.08 l/sec

**Storage Volume Required**  
 (max)flow\*10\*60 1,846 Litres  
 Surface area to soak away in 24 hours 1.8 m<sup>3</sup>

SA = Volume/percolation/24\*60 Area required 17 m<sup>2</sup>

Choose dimensions of soakage system  
 width 1.0 m  
 length 8.0 m  
 depth 1.0 m

Calculate surface area for soakage  
 Area achieved 17 m<sup>2</sup>

**Storage Capacity of Soakage system**  
 Choose dimensions of soakage system  
 width 1 m  
 length 8 m  
 depth 1 m

50% of Total Trench Volume 4 m<sup>3</sup>  
 Total Volume required 2 m<sup>3</sup>

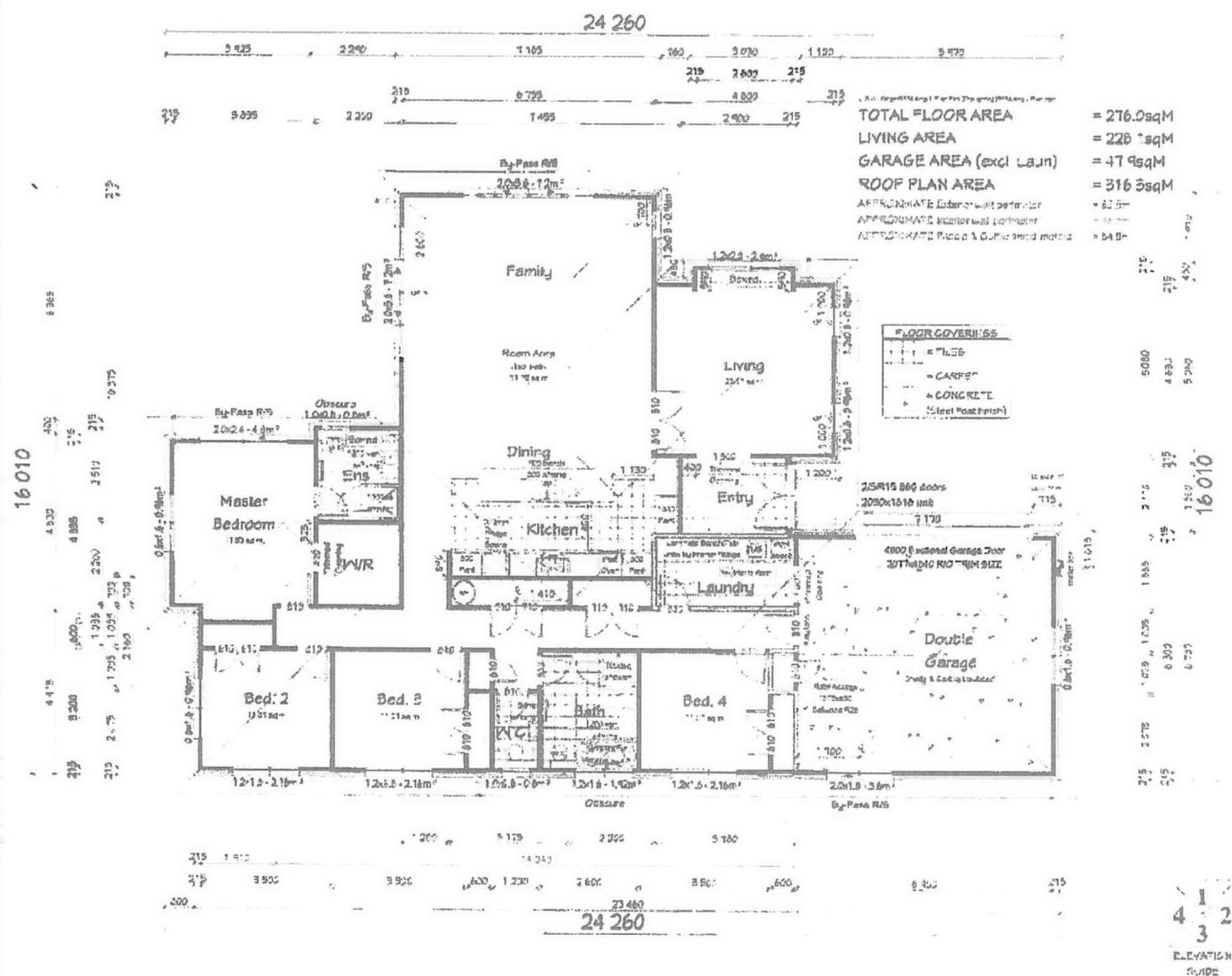
## Design

All roof area shall be directed into a soakage trench 1.0 m Wide 8.0 m Long  
 by 1.0 m deep





## DWELLING ROOM LAYOUT



## **APPENDIX D – TP58 CHECKLIST**

---

On-site Wastewater System  
Design and Management Manual (TF 58)

On-site Wastewater Disposal Site Evaluation  
Investigation Checklist

**On-site Wastewater Systems:  
Design and Management Manual (TP 58)**

**On-site Wastewater Disposal Site Evaluation Investigation Checklist**

**PART A: Contact Details**

**1. Applicant Details:**

Applicant Name	Stan Lawrence Ang		
Company Name			
	First Name(s)	Surname	
Property Owner Name(s)	Stan Lawrence Ang		Ang
	Joselyn Lee		Ang
Nature of Applicant*	Owner		

(\* i.e. Owner, Lessee, Prospective Purchaser, Developer)

**2. Consultant/Site Evaluator Details:**

Consultant/Agent Name	Tilsley Engineering Ltd		
Site Evaluator Name	Jimmy Yang		
Postal Address	75 Seddon Street		
	Pukekohe		
	PO BOX 392		
Phone Number	Business	09 238 3245	Private
	Mobile		Fax
			09 238 3241
Name of Contact Person	Jimmy Yang		
E-mail Address	info@tilsleyengineering.co.nz		

**3. Are there any previous existing discharge consents relating to this proposal or other waste discharge/disposal on the site?**

Yes ☐ No ☒

If yes, give Reference Number(s) and Description

--

**4. List any other consents in relation to this proposal site and indicate whether or not they have been applied for or granted.**

If so, specify Application Details and Consent No.):

(e.g. Land Use, Water Take, Subdivision, Earthworks Storm water Consents)

Building consent
------------------

**On-site Wastewater Systems:  
Design and Management Manual (TP 58)**

**PART B: Property Details**

**1. Property for which this application relates:**

Physical Address of Property	44 Millstone Lane, Waterfall Park, Pokeno		
Territorial Local Authority	Waikato Council		
Regional Council	Waikato		
Legal Status of Activity	Permitted: <input checked="" type="checkbox"/>	Controlled: <input type="checkbox"/>	Discretionary: <input type="checkbox"/>
Relevant Regional Rule(s) [Note 1]	3.5.7.5		
Total Property Area (m <sup>2</sup> )	3640		
Map Grid Reference of Property [Note 2]	Enclosed		
<b>Notes:</b> 1. In the Auckland Region, the relevant Permitted Activity criteria is as specified in the ARC Proposed Regional Plan: Air Land and Water (ARC: ALWP) Decision Version October 2004 Rule 5.5 20-23 (refer Appendix C and in particular C5, in TP58). 2. N2MS 260 series, scale 1:50,000			

**2. Legal description of land (as shown on Certificate of Title):**

Lot No.	10	DP No.	480134	CT No.	674814
Other (specify)					

Please ensure copy of Certificate of Title is attached.

**PART C: Site Assessment - Surface Evaluation**

(Refer TP58 - Sn 5.1 General Purpose of site Evaluation and Sn 5.2.2(a) Site Surface Evaluation)  
Note: Underlined terms defined in Table 1, attached

**1. Has a Desk Study been undertaken for this property?**

Yes ☒ No ☐ (Please tick one)

If yes, please specify the findings of the Desk Study, and if not please specify why this was not considered necessary.

Neighbouring systems working satisfactory
-------------------------------------------

**2. Has a Slope Stability Assessment been carried out on the property?**

Yes ☐ No ☒ (Please tick one)

If No, why not?

Slope angle acceptable
------------------------

E3

**On-site Wastewater Systems:  
Design and Management Manual (TP 58)**

If Yes, please give details of report (and if possible, please attach report):

Author:	N/A
Company/Agency	
Date of Report	
Brief Description of Report Findings	

**3. Site Characteristics (See Table 1 attached):**

Provide descriptive details below:

<b><u>Performance of Adjacent Systems:</u></b>
Satisfactory
<b><u>Estimated Rainfall and Seasonal Variation:</u></b>
1500mm +/- 200mm
<b><u>Vegetation Cover:</u></b>
English Grass
<b><u>Slope Shape:</u></b>
Gradual slope with decreasing gradient
<b><u>Slope Angle:</u></b>
<10 degrees
<b><u>Surface Water Drainage Characteristics:</u></b>
Drains to the South
<b><u>Flooding Potential:</u></b> YES/NO
No
If yes, specify relevant flood levels on appended site plan, i.e. one in 5 year and/or 20 year and/or 100 year return period flood level, relative to disposal area.
<b><u>Surface Water Separation:</u></b>
30m +
<b><u>Site Clearances (Provide general description and specific dimensions in Part 6 below and in Site Plan):</u></b>
See over
<b><u>Site Characteristics:</u></b>
Sloping site

E4



**On-site Wastewater Systems:  
Design and Management Manual (TP 58)**

**4. Site Geology of the subject property**

'Qvs - see report

Geological Map Reference Number    Auckland Geological Map Sheet 3

**5. What Aspect(s) does the proposed disposal system face (please tick)?**

North	<input type="checkbox"/>
North-West	<input type="checkbox"/>
North-East	<input type="checkbox"/>
East	<input type="checkbox"/>

West	<input type="checkbox"/>
South-West	<input type="checkbox"/>
South-East	<input type="checkbox"/>
South	<input checked="" type="checkbox"/>

**6. Site clearances, which should also be shown on the site plan:**

Separation Distance from	Treatment Separation Distance (m)	Disposal Field Separation Distance (m)
Boundaries	>3	>1.5
Surface water	>30	>30
Groundwater	>1.5	>1.5
Stands of Trees/Shrubs	>10	>10
Wells, water bores		
Embankments/retaining walls	>3	>3
Buildings	>3	>3
Other (specify):		

**PART D: Site Assessment - Subsoil Investigation**

*(Refer TP58 - Sn 5.1 General Purpose of Site Evaluation, Sn 5.2.2(b) Site Surface Evaluation and Sn 5.3 Subsurface Investigations)*

*Note: Underlined terms defined in Table 2, attached*

**1. Please identify the soil profile determination method:**

Test Pit	<input type="checkbox"/>	(Depth ____ m)	<input type="checkbox"/>	No. of Test Pits	<input type="checkbox"/>
Bore Hole	<input checked="" type="checkbox"/>	(Depth ____ m)	2.5	No. of Bore Holes	3
Other (specify)					
Soil Report Attached?	Yes <input type="checkbox"/>	<input checked="" type="checkbox"/>	No <input type="checkbox"/>	(Please Tick)	

**2. Was fill material intercepted during the subsoil investigation?**

Yes ☐    No ☒ (Please tick)

If yes, please specify the effect of the fill on wastewater disposal

**On-site Wastewater Systems:  
Design and Management Manual (TP 58)**

**3. Has percolation testing been carried out?**

Yes ☒ No ☐ (Please tick)

If yes, please specify the method

2 hour percolation test.

Test Report Attached? (Please tick) Yes ☒ No ☐

**4. Are surface water interception/diversion drains required?**

Yes ☐ No ☒ (Please tick)

If Yes, please show on site plan

**5. Please state the depth of the seasonal water table:**

Winter	2 (m)
Summer	2 (m)

Please indicate whether measured ☐ or estimated ☒ (please tick)

**6. Are there any potential short circuit paths?**

Yes ☐ No ☒ (Please tick)

If the answer is yes, please explain how these have been addressed

**7. Based on results of subsoil investigation above please indicate the disposal field soil category**

(Refer TP58 Table 5.1):

Is Topsoil Present? Yes If so, Topsoil Depth? 0.4 (m)

Soil Category	Description	Drainage	Tick One
1	Gravel, coarse sand	Rapid draining	
2	Coarse to medium sand	Free draining	
3	Medium-fine & loamy sand	Good drainage	
4	Sandy loam, loam & silt loam	Moderate drainage	
5	Sandy clay-loam, clay loam & silty clay-loam	Moderate to slow drainage	
6	Sandy clay, non-swelling clay & silty clay	Slow draining	<input checked="" type="checkbox"/>
7	Swelling clay, grey clay, hardpan	Poorly or non-draining	

Reasons for placing in stated category

Slow drainage with silty clay

E6

On-site Wastewater Systems:  
Design and Management Manual (TP 58)

## PART E: Discharge Details

### 1. Water supply source for the property (please tick):

Rainwater (roof collection)	<input checked="" type="checkbox"/>
Bore/well	<input type="checkbox"/>
Public supply	<input checked="" type="checkbox"/>

### 2. Calculate the maximum daily volume of wastewater to be discharged, unless accurate water meter readings are available (Refer TP58 Table 6.1 and 6.2):

Number of Bedrooms	4	
Design Occupancy	6	(Number of people)
Per capita Wastewater Production	180	(Litres per person per day)
Other - Specify		
Total Daily Wastewater Production	1080	(Litres per day)

### 3. Do you propose to install:

a) Full Water Conservation Devices?	Yes	<input checked="" type="checkbox"/>
b) Water Recycling — what %?	%	<input type="checkbox"/>

No	<input type="checkbox"/>	(Please tick)
	<input checked="" type="checkbox"/>	(Please tick)

If you have answered Yes, please provide additional information including the estimated reduction in water usage:

Dual flush toilets, low water use dishwasher

### 4. Is Daily Wastewater Discharge Volume more than 2000 litres:

Yes	<input type="checkbox"/>	(Please tick)
No	<input checked="" type="checkbox"/>	(Please tick)

Note if the answer to the above is yes an ARC wastewater discharge permit will be required

### 5. Gross Lot Area to Discharge Ratio:

Gross Lot Area	3640	m <sup>2</sup>
Total Daily Wastewater Production	1080	(Litres per day) (from above)
Lot Area to Discharge Ratio	3.3	

### 6. Does this proposal comply with the Waikato Council Gross Lot Area to Discharge Ratio of greater than 1.5)

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	(Please tick)
-----	-------------------------------------	----	--------------------------	---------------

**On-site Wastewater Systems:  
Design and Management Manual (TP 58)**

**7. Does this proposal comply with the Waikato Council Gross Lot Area to Discharge Ratio of greater than 3**

Yes ☒ No ☐ (Please tick)

**8. Is an Auckland Regional Council Discharge Consent Required?**

Yes ☐ No ☒ (Please tick)

**PART F: Primary Treatment** (Refer TP58 Section 7.2)

**1. Please indicate below the no. and capacity (litres) of all septic tanks including type (single/dual chamber grease traps) to be installed or currently existing:**

Number of Tanks	Type of Tank	Capacity of Tank (Litres)
1	4000l Biolytix Biopod	4000
Total Capacity		

**2. Is a Septic Tank Outlet Filter to be installed?**

Yes ☒ No ☐ (Please tick)

If Yes, please state the type

Geotextile

**PART G: Secondary and Tertiary Treatment**

(Refer TP58 Section 7.3, 7.4, 7.5 and 7.6)

**1. Please indicate the type of additional treatment, if any, proposed to be installed in the system (please tick):**

Secondary Treatment	<input checked="" type="checkbox"/>
Home aeration plant	<input type="checkbox"/>
Commercial aeration plant	<input type="checkbox"/>
Intermittent sand filter	<input type="checkbox"/>
Recirculating sand filter	<input type="checkbox"/>
Recirculating textile filter	<input type="checkbox"/>
Clarification tank	<input type="checkbox"/>
Tertiary Treatment	<input type="checkbox"/>
Ultraviolet disinfection	<input type="checkbox"/>
Chlorination	<input type="checkbox"/>
Other	<input type="checkbox"/>

Specify

**On-site Wastewater Systems:  
Design and Management Manual (TP 58)**

**PART H: Land Disposal Method** (Refer TP58 Section 8)

**1. Please indicate the proposed loading method (please tick):**

Gravity	<input type="checkbox"/>
Dosing Siphon	<input type="checkbox"/>
Pump	<input checked="" type="checkbox"/>

**2. Is a high water level alarm being installed in pump chambers?**

Yes ☐ No ☒ (Please tick)

**3. If a pump is being used, please provide the following information:**

Total Design Head	TBC by drain layer	(m)
Pump Chamber Volume	720	(Litres)
Emergency storage volume	720	(Litres)

**4. Please identify the type(s) of land disposal method proposed for this site (please tick) (Refer TP58 Sections 9 and 10):**

Surface Dripper Irrigation	<input type="checkbox"/>
Sub-surface Dripper Irrigation	<input checked="" type="checkbox"/>
Standard Trench	<input type="checkbox"/>
Deep Trench	<input type="checkbox"/>
Mound	<input type="checkbox"/>
Evapo-transpiration Beds	<input type="checkbox"/>
Other (Please Specify)	

**5. Please identify the loading rate you propose for the option selected in Part H, Section 4 above stating the reasons for selecting this loading rate:**

Loading rate		3	(Litres/m <sup>2</sup> /day)
Disposal Area	Basal	360	(m <sup>2</sup> )
	Areal	360	(m <sup>2</sup> )

**Explanation** (Refer TP58 Sections 9 and 10)

See calculation sheet

**6. What is the available reserve wastewater disposal area (Refer TP58 Table 5.3)**

Reserve Disposal Area (m <sup>2</sup> )	180
Percentage of Primary Disposal Area (%)	50

On-site Wastewater Systems:  
Design and Management Manual (TP 58)

**7. Please provide a detailed description of the design and dimensions of the disposal field and attach a detailed plan of the field relative to the property site:**

**Description and Dimensions of Disposal Field:**

Install Biolytix Biopod BF6 wastewater treatment system. Install 360m length of dripper line laid to contour.

Plan Attached? Yes ☒ No ☐ (Please tick)

If not explain why not

**PART I: Maintenance & Management** (Refer TP58 Section 12.2)

**1. Has a maintenance agreement been made with the treatment and disposal system suppliers?**

Yes ☐ No ☒ (Please tick)

**PART J: Assessment of Environmental Effects**

**1. Is an assessment of environmental effects (AEE) included with — application?**

(Refer TP58 section 4 (particularly 4.4.2), section 5, and section 11 (parts 11.1 & 11.8). Ensure all issues concerning potential effects addressed)

Yes ☒ No ☐ (Please tick)

**2. Are there any specific environmental constraints?**

Yes ☐ No ☒ (Please tick)

If Yes, please explain

**PART K: Is Your Application Complete?**

**1. In order to provide a complete application you have remembered to:**  
(Refer to TP58 section 3.5 for summary list of information to be covered):

Fully Complete this Assessment Form	<input checked="" type="checkbox"/>
Include a Location Plan and Site Plan (with Scale Bars)	<input checked="" type="checkbox"/>
Include a Property Title (Certificate of Title)	<input checked="" type="checkbox"/>
Attach an Assessment of Environmental Effects (AEE)	<input checked="" type="checkbox"/>

**2. Declaration**

I hereby certify that, to the best of my knowledge and belief, the information given in this application is true and complete.

Name	Robert Tilsley	Signature	
Position	Principal	Date	16/05/16

E10





Building Code Clause(s) E1 & G13

# PRODUCER STATEMENT – PS1 – DESIGN

(Guidance notes on the use of this form are printed on the reverse)

ISSUED BY: Tilsley Engineering Limited (75 Seddon Street, Pukekohe)  
(Design Firm)

TO: Ang Residence  
(Owner/Developer)

TO BE SUPPLIED TO: Waikato District Council  
(Building Consent Authority)

IN RESPECT OF: Stormwater and wastewater design  
(Description of Building Work)

AT: 44 Millstone Lane, Waterfall Park, Pokeno  
(Address)

LOT 10

DP 480134

SO

We have been engaged by the owner/developer referred to above to provide

Stormwater and Wastewater design

services in respect of the requirements of

Clause(s) E1/VM1 & G13 of the Building Code for

All or Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

Compliance Documents issued by Department of Building & Housing N/A

(verification method / acceptable solution)

or

Alternative solution as per the attached schedule ARC TP10, TP108, NZS 1547:2012

The proposed building work covered by this producer statement is described on the drawings titled

Ang Residence and numbered 01

together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

(i) Site verification of the following design assumptions NA

(ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code.

I, Robert Tilsley am: CPEng 85675 #

(Name of Design Professional)

Reg Arch

I am a Member of: ☒ IPENZ ☐ NZIA and hold the following qualifications: BE (Civil) MIPENZ CPENG

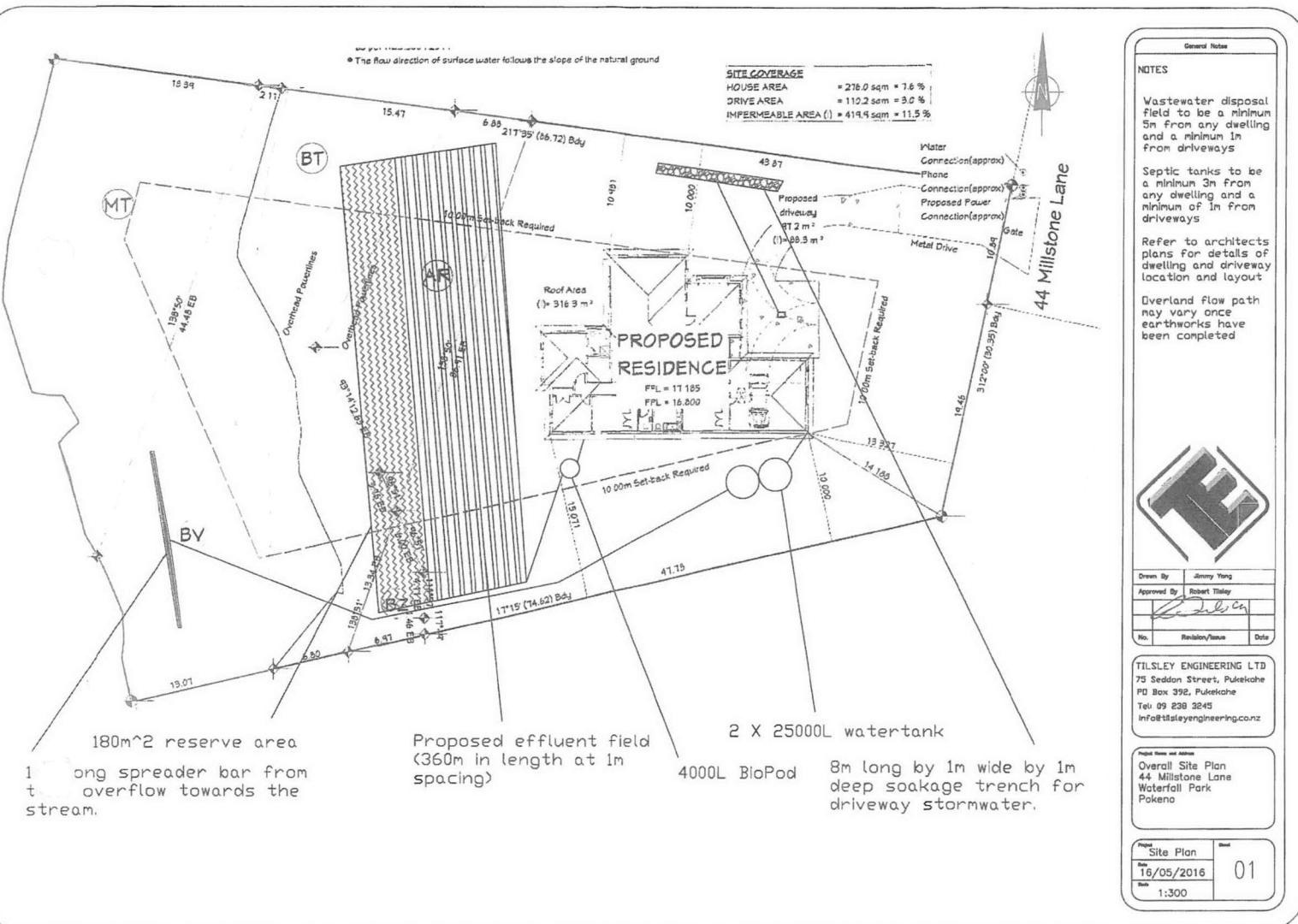
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000\*.

SIGNED BY R Tilsley ON BEHALF OF Tilsley Engineering Ltd  
(Design Firm)

Date 16/05/2016 (signature)

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000\*.

This form is to accompany Form 2 of the Building (Forms) Regulations 2004 for the application of a Building Consent.





## Biolytix BioPod (BF6) Wastewater Treatment System

### Specifications

The Biolytix BioPod (BF6) is an onsite treatment system designed to treat wastewater from domestic sources. It uses a single tank configuration based on an enhanced trickling filter process which mimics a natural soil habitat. The BF6 is certified to comply with AS/NZS 1546.3:2008 and must be operated in accordance with this standard.

### Effluent Quality

The BF6 wastewater treatment system generates secondary treated effluent of the following quality:

- 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>) <20 mg/L
- Suspended solids <30 mg/L

The effluent must be disposed of as stipulated by the responsible authorities. AS/NZS 1547:2000 describes discharge options for secondary-treated effluent. However, the Regional Authority regulations applying to a specific site may be different and more stringent. The local Regional Authority should be consulted before making a decision.

### Maximum Loading

- Flow rate: 1600 L per day
- Organic loading as BOD<sub>5</sub>: 700 g per day
- Suspended solids loading: 700 g per day

Important: The actual maximum loading of an installed BF6 is limited by the capacity of the dispersal system it discharges to. For example, if the BF6 is connected to a land dispersal system with a capacity of 800 L/day, then the BF6 must not be loaded at more than 800 L/day.

### Operation

- Emergency storage capacity: 1450 L
- Temperature and humidity: Operates under normal temperature and humidity conditions experienced in Australia and New Zealand. If required, systems installed in cold and hot climates use insulation.
- Noise < 40 dB L<sub>Aeq</sub> at a distance of 1 m
- Electricity consumption (per year): Treatment process 44 kWh; effluent pump typically 165 kWh (per year). Effluent pump power use can vary significantly depending on the size and location of the dispersal system and the actual household water usage.
- Maintenance: Requires one maintenance service per year (Note: Some Regional Authorities require at least two services per year regardless of the type of on-site wastewater system)
- Minimum serviceable life: 15 years



Biolytix Limited - PO Box 12 455, Panmure, Auckland  
0800 700 618 [www.biolytix.com](http://www.biolytix.com)  
Revised February 2012 © 2012 Biolytix Ltd



## Treatment Process

The BF6 filter bed (Figure 1) is contained in an Everhard injection moulded high grade polypropylene tank and consists of six alternating layers of drainage matrix elements and humus matrix elements. Both layers contain plastic trickling filter media contained in open-mesh bags. In the filter bed there is in excess of 2m<sup>3</sup> of plastic filter media with a high porosity and a high specific surface area. The humus layers additionally contain coco peat, the fibrous structure of which significantly increases the available treatment surface. The three drainage/humus double-layers are separated by a 3mm coarse HDPE mesh fabric.

The resulting filter bed mimics a natural soil habitat, containing a diverse ecosystem of micro and macro-organisms. These organisms aerobically treat the wastewater as it percolates through the bed, prevent the accumulation of sludge, and keep the filter aerated. On commissioning, the filter is inoculated with 1 kg of tiger worms (*Eisenia Fetida*). These worms propagate and burrow through the filter bed, thereby keeping its structure open and porous. A Schego M2K3 air pump is used to provide additional air to the bed at the rate of 350 L per hour.

A geotextile filter layer with a nominal pore size of 80 micron separates the filter bed from the effluent storage sump. Its purpose is to remove fine solids from the treated effluent. To support the bed, the sump is filled to a depth of 300 mm with a matrix of plastic media. It drains into the central pump well, from where the effluent is pumped using a submersible pump to a land dispersal system (e.g. subsurface drip irrigation). The pump is controlled by a factory set float switch. The total bed depth including sump is 1050 mm.

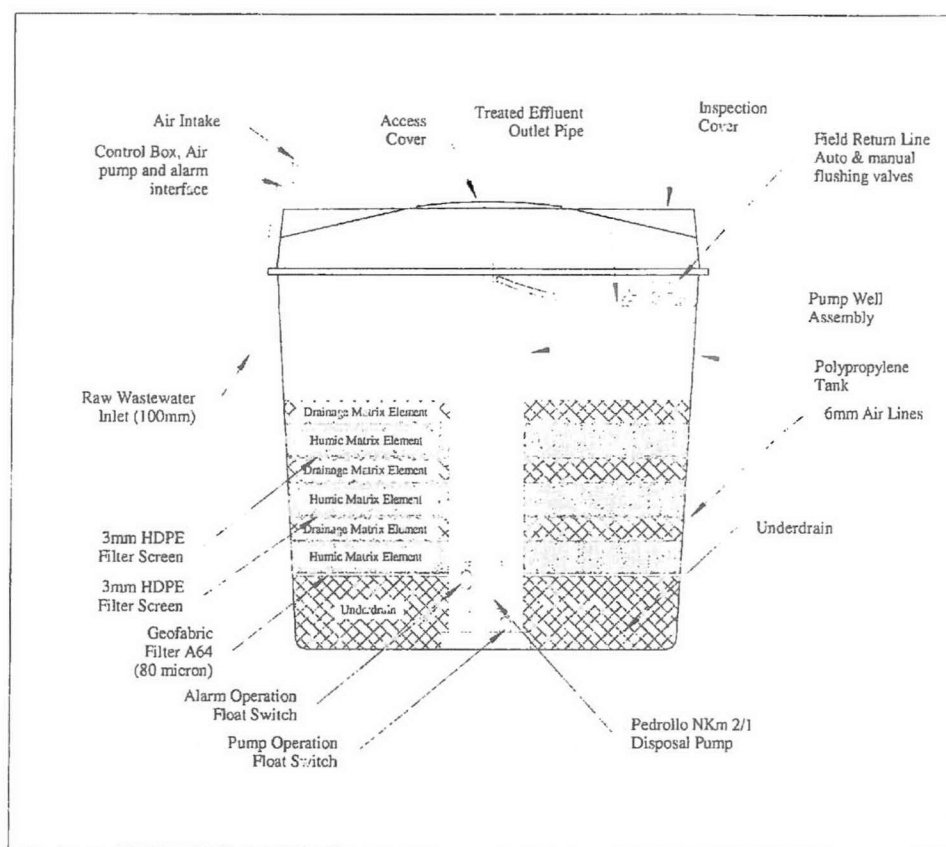


Figure 1 Biolytix BF6 wastewater treatment system

## Configuration Options

### Installation

The BF6 can be installed in-ground or above ground. Local Council restrictions may apply to above-ground installations (Land Use/Building Consent conditions etc.). If installed above ground, the tank needs to be protected against UV radiation, for example by painting it with UV-reflective paint. Available tank sizes are 3000 L and 4000 L. Both tanks have the same bed configuration and provide the same treatment capacity and performance, but use different inlet invert depths as follows:

- BF6-3000 tank: 650 mm
- BF6-4000 tank: 1100 mm

### Effluent Discharge

The BF6 effluent is either gravity drained or pumped to a dispersal system. The pumpout (dose) volume is 220 L per cycle. The standard pump is a high-quality Pedrollo NKm 2/1 submersible pump, the characteristics of which are shown in Figure 2 below. Other Pedrollo pumps may be used instead to suit specific sites. Contact Biolytix to discuss your requirements and for information on the types of pumps available.

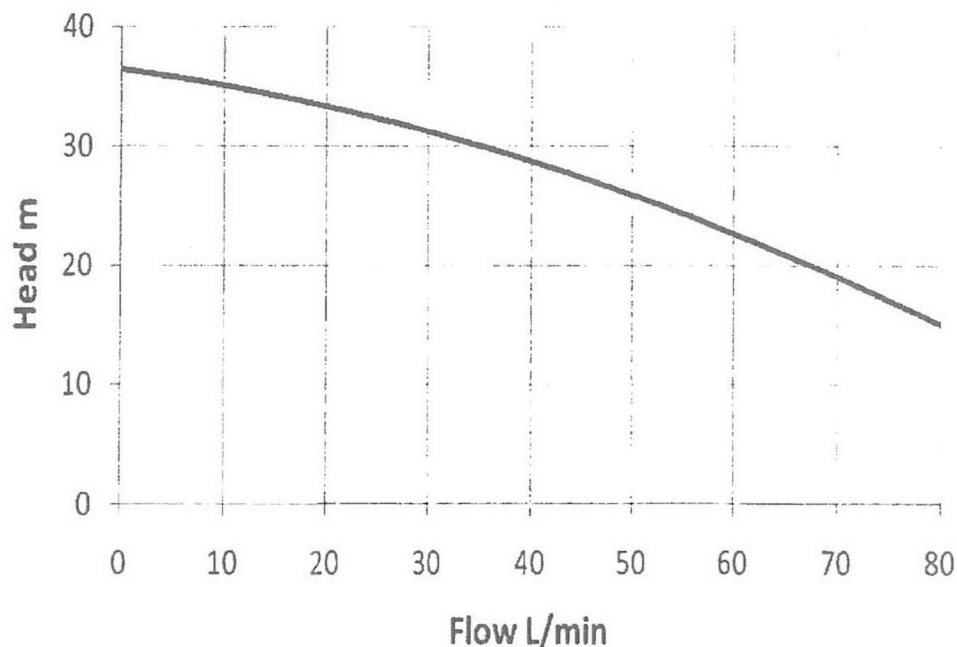


Figure 2 Pedrollo NKm 2/1 characteristic curve (power 0.45 kW)

### Alarm System

The BF6 is equipped with an AS/NZS 1546.3 compliant Audio/visual alarm using a mutable audible signal and an alarm light. The alarm plate is typically mounted in a visible location within the dwelling.

Alarms are triggered by a high-level float switch in the pump well, an air pressure switch on the air supply line or if the power supply to the Biolytix tank is interrupted.



**NEW ZEALAND'S  
MOST ECO-FRIENDLY  
WASTEWATER  
TREATMENT SYSTEM**

**Biolytix<sup>®</sup>**   
Wastewater Naturally

## 10 REASONS WHY YOU SHOULD CHOOSE THE BIOLYTIX BIOPOD

### REASON 1

The Biolytix is an ecosystem in a tank which treats the wastewater without needing costly large mechanical aerators to run, repair or replace. This results in up to 90% less energy being consumed than in most activated sewage treatment systems thereby reducing electricity costs.

### REASON 2

Unlike aerated systems the Biolytix has no smelly septic tank.

### REASON 3

Recommended providing every 8 months which is much less frequent than other systems on the market.

### REASON 4

Silent operation. There are no noisy blowers or pumps that can run up to 24 hours every day on other systems.

### REASON 5

Absolutely no offensive smells due to the fact that the Biolytix uses an aerobic process with no septic tank and no large blowers.

### REASON 6

Independently tested in New Zealand and Council approved.

### REASON 7

Treated wastewater beneficially irrigates lawns and gardens via specialised inlets with incorporated patented technologies for reliability.

### REASON 8

Small Carbon Footprint. Navigable machines emissions which has a global warming potential of more than 30 times CO<sub>2</sub>.

### REASON 9

100% New Zealand made by a New Zealand owned company.

### REASON 10

The most compact, light weight wastewater system on the market. Manufactured from 100% recycled material. Less weight and volume to transport. Ideal for sites with difficult access. Less excavation and less disruption to your landscape.

BIOLYTIX TICKS ALL THE BOXES: TECHNOLOGY ✓ GREEN ✓ SAVINGS ✓

## HOW THE BIOLYTIX BIOPOD WORKS

Biolytix Ltd owns the award winning patent for the Biolytic Filtration Process. This process cleverly mimics nature and turns the problem (the solid waste) into the solution (the humus that cleanses the wastewater as it trickles through it).

### EMPLOYS NATURE TO DO THE WORK

Why use high energy machines when nature can do the work for us?

The Biolytix BioPod is engineered to meet the needs of billions of hard working organisms that treat the wastewater so that it provides:

- A stable environment to live in
- Food as they would naturally find it
- An abundance of oxygen

With these ideal conditions the biolytic organisms can concentrate on what they do best – continually processing solids waste into humus.

The treatment process has no expensive moving parts to service and repair – the organisms simply breed and replenish themselves.

### HARNESS THE ENERGY IN YOUR WASTE

Like solar power Biolytix is leading the way in using nature's energy. The BioPod harnesses the energy in the waste (including the sewage, toilet paper and food waste) to feed the organisms that break down the waste.

Rather than using high energy machines – it uses the energy in your waste to operate.

In contrast to what is found in nature, mechanical wastewater systems are water-based. To drive decomposition in this oxygen-poor environment, they must use energy-intensive aerators to pump oxygen into the wastewater. Even so, only a few parts per million of oxygen is available to the process.

By comparison, in the BioPod worms and other biolytic organisms can draw oxygen directly from the 21% available in the ambient air.

- In a conventional wastewater system often less than 5 parts per million of oxygen is available
- In a Biolytix wastewater system around 210,000 parts per million of oxygen available

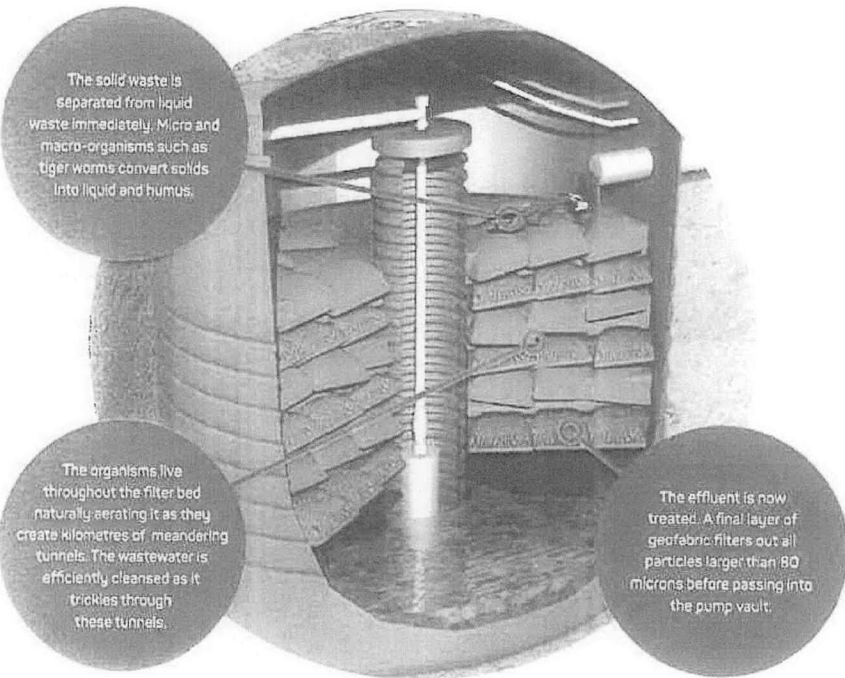
**IN A MECHANICAL SYSTEM... MACHINERY WORKS HARD.  
IN A BIOLYTIX SYSTEM... NATURE WORKS HARD.**

"EVERY PARTICLE OF EARTH FORMING THE BED FROM WHICH THE TURF IN OLD PASTURE LAND SPRINGS, HAS PASSED THROUGH THE INTESTINES OF WORMS."

Thomas Gower



## HOW THE BIOLYTIX BIOPOD WORKS



## THE BIOLYTIX BIOPOD

### BIOLYTIX CAREFULLY RESEARCHED THE REASONS FOR THE PROBLEMS AND HIGH OPERATING COSTS OF AERATED WASTEWATER SYSTEMS AND DEVELOPED A TOTALLY NEW WAY OF TREATING WASTEWATER.

The result is the BioPod, an "ecosystem in a tank". From the outset the BioPod was engineered to be robust and built to last. It eliminates the mechanical complexity and problems of conventional wastewater systems, significantly reducing the running costs and without compromising on the quality of the treated effluent.

The BioPod treats all household wastewater to a level that is suitable for land disposal via irrigation of gardens, lawns and bush. The BioPod is contained in a single lightweight injection moulded polypropylene tank. It is the most compact biological wastewater treatment process in the world making it easier to transport and install.

Inside the BioPod, the layered aerobic filter contains over 2m<sup>3</sup> of engineered, high surface area treatment media. The media supports the organisms that quickly convert sewage into humus. Macro-organisms including worms ensure the solids are managed and the filter bed is naturally aerated avoid the smells associated with other wastewater systems.

The BioPod is essentially an advanced Trickling Filter process with Tiger Worms (*Eisenia Fetida*) added to enhance the reduction of solids in the filter. The tiger worms are at the top of the food chain in a BioPod but all the other micro-organisms typically expected in a wastewater treatment process are also present to assist with the breakdown of organic waste.

BioPods are equipped with an audible and visual alarm to alert the home occupier to an irregularity within the system that may require a service technician.

BioPods are supplied with customisable irrigation kits to disperse the secondary treated effluent to land via pressure compensating drip line irrigation. Treated effluent is evenly distributed to the aerobic topsoil layer to further polish the effluent and complete the treatment process. The highly treated effluent from the BioPod provides a valuable resource for irrigating bush, gardens and lawns.

**FOR A TYPICAL FAMILY HOME AT CURRENT NZ RESIDENTIAL ELECTRICITY PRICES, THE BIOPOD COSTS LESS THAN 20c A DAY TO RUN.**

**"IT MAY BE DOUBTED WHETHER THERE ARE MANY OTHER ANIMALS WHICH HAVE PLAYED SO IMPORTANT A PART IN THE HISTORY OF THE WORLD AS THE WORM."**

Charles Darwin

## TIGER WORMS AT WORK

When the raw sewage arrives in the Biolytix tank the Tiger Worms get to work quickly. They are one of the strongest creatures for their bodyweight and continually break up the sewage creating millions of aerobic channels. The tiger worms quickly turn the sewage into humus. The wastewater is then cleaned as it trickles through the many channels in the tank. The Biolytix worms have helped turn the problem - the solid sewage, in to the solution - the humus that filters the wastewater.

### WORKS AT WORK INSIDE A BIOLYTIX TANK

To show you how effectively the worms work in a Biolytix tank - we filmed inside one! The worms break down the solid waste in just 60 hours. The breakdown has been sped up to just 15 seconds with time-lapse photography.

Please be aware: 'POO-CAM' is rated PG (Pretty Gross) and we recommend you do not watch it before dinner!



TO VIEW 'POO-CAM' VISIT:  
[BIOLYTIX.COM/POO-CAM](http://BIOLYTIX.COM/POO-CAM)

**DID YOU KNOW?**  
WORMS EAT THEIR OWN  
BODY WEIGHT IN WASTE  
EVERY DAY



## BIOLYTIX BIOPOD FOR HOLIDAY HOMES

The BioPod is ideal for holiday homes where occupants may be away from the house for several months at a time.

- A high percentage of BioPods are installed at holiday homes and produce highly treated effluent compliant with Council and consent requirements
- Even without loading for several months the BioPod remains a moist aerobic environment with an abundance of organic content to sustain the populations of worms and other micro-organisms
- During unoccupied periods where there is no fresh 'food' entering the BioPod worms and other organisms feed on and break down the residual organic content in the filter
- The physical filtration process inside the BioPod continues regardless of whether the dwelling is occupied ensuring a highly treated effluent



## ENVIRONMENTALLY RESPONSIBLE

PURCHASING A BIOLYTIX BIOPOD MAY BE THE MOST IMPORTANT HOUSEHOLD ITEM YOU CAN BUY TO REDUCE YOUR CARBON FOOTPRINT

The life cycle advantages of the Biolytix BioPod are:

- An electricity consumption of approximately 90% less than conventional aerated wastewater systems with the associated economic and environmental advantages
- Minimal greenhouse gas production as degradation is by natural aerobic processes. Septic systems are major methane emitters
- Natural aerobic degradation process with minimal sludge accumulation
- Reduced maintenance requirement and costs with a recommended service every 9 months. Removal of accumulated non biodegradable solids along with excess humus is typically undertaken by the service technician at this visit
- The high strength injection moulded tanks are manufactured from 100% recycled material and are not susceptible to concrete corrosion often evident in septic environments. Being lightweight the tanks are more easily transported and installed
- A highly treated effluent is able to be reused for beneficial irrigation of gardens, bush and lawns

## BIOLYTIX TRIALS

THE BIOLYTIX BIOPOD HAS EXCELLED IN INDEPENDENT TRIALS.

### BPS FILTER EFFLUENT QUALITY

Mean data from AS1546.9 independent test by SAI Global

Parameter	Result
Biochemical Oxygen Demand (BOD)	8.7mg/L
Total Suspended Solids (TSS)	5.4mg/L

### BPS FILTER EFFLUENT QUALITY

Mean data from 2014 O&ET trial

Parameter	Result
Biochemical Oxygen Demand (BOD)	6.1mg/L
Total Suspended Solids (TSS)	9.8mg/L



[WWW.BIOLYTIX.COM](http://WWW.BIOLYTIX.COM)

[WWW.BIOLYTIX.COM](http://WWW.BIOLYTIX.COM)



## CONTACT BIOLYTIX

---

PHONE

0800 700 818

EMAIL

[info@biolytix.com](mailto:info@biolytix.com)

POST

PO Box 12499, Penrose  
Auckland 1642, New Zealand

FACEBOOK

[facebook.com/biolytixlimited](https://facebook.com/biolytixlimited)



**REDUCE  
YOUR  
CARBON  
FOOTPRINT  
WITH  
BIOLYTIX**

**"ONE OUTSTANDING ASPECT OF THIS SYSTEM WAS ITS LOW ELECTRICITY USAGE. IT USED AS LITTLE AS 5% OR LESS OF THE ELECTRICITY OF SOME OTHER SYSTEMS MEASURED."**

Environment Bay of Plenty Environmental Discharge Performance Appraisal (May 2007)

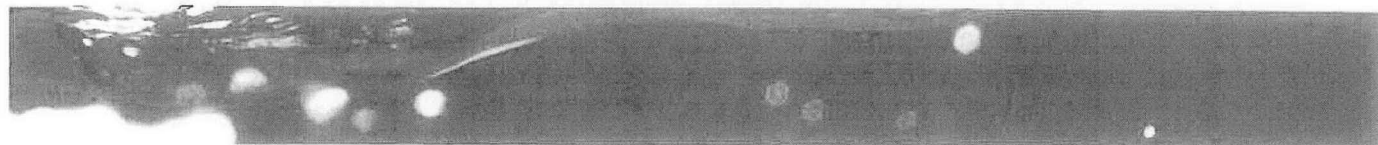
**"WORMS ARE THE INTESTINES OF THE EARTH."**

Aristotle



**AUSTRALASIA'S  
MOST AWARDED  
WASTEWATER  
SYSTEM.**

**AFTER 2.1 BILLION YEARS  
OF RESEARCH AND  
DEVELOPMENT...  
NATURE HAS THE ANSWER**





## **Biolytix® BioPod Wastewater Treatment System**

# Owner's Manual

December 2010

### Important

Your Biolytix® BioPod must be maintained and repaired by a Biolytix-accredited technician.

If an alarm sounds, follow the instructions on the alarm system panel. If you believe your system is malfunctioning, please call Biolytix Customer Support as soon as possible on **1800 246 598** (Australia) or **0800 700 818** (New Zealand). For further information, please refer to the section Maintenance on page 5.

First Things First .....	3
Compliance .....	3
Operation.....	3
Maximum Wastewater Volume.....	3
Intermittent Use .....	4
Wastewater Constituents.....	4
Kitchen Waste .....	5
Maintenance.....	5
Servicing .....	6
Daily Upkeep .....	6
Alarms.....	7
Warranties.....	8
Manufacturer's Warranty .....	8
BioPod Installation.....	8
Soil Dispersal Systems.....	8
Documentation .....	8
Contacts .....	9
Australia.....	9
New Zealand .....	9

## First Things First

Congratulations on choosing a Biolytix® BioPod wastewater treatment system. The BioPod uses patented biological filtration technology relying on a diverse ecosystem of micro- and macro-organisms such as earthworms to provide energy-efficient treatment of household wastewater to a high standard.

Please take your time to read this Manual carefully. It is your responsibility to operate your BioPod as set out in this Manual. Not doing so may void your warranty. If you have questions or would like further information, please contact our Customer Support on 1300 881 472 (Australia) or 0800 700 818 (New Zealand).

This Manual applies to the BF6 BioPod model. Its most recent version can be downloaded from [www.biolytix.com.au](http://www.biolytix.com.au). As Biolytix may sporadically update this Manual, for example when regulations change, we recommend you check annually, whether a new version is available and download it. If you prefer, you can order a hardcopy instead, when you next arrange annual servicing of your system.

**Important: If you are letting your home, you must ensure that your tenants receive and read a copy of this Manual. Biolytix recommend that you make this an explicit condition in the tenancy agreement.**

## Compliance

The Biolytix® BioPod is certified under AS/NZS 1546.3:2008 and approved in New Zealand and ACT/NSW, QLD, NT, SA, TAS, and WA. It complies with the respective regulations and codes in these jurisdictions. To ensure continued compliance after commissioning, it is important that you operate and maintain your system as described in this Manual.

## Operation

Your BioPod is designed to treat household wastewater. To ensure ongoing compliance with regulations and to avoid costly repairs, a couple of simple rules need to be followed. This section explains how to use your BioPod and what may and may not go into it.

### Maximum Wastewater Volume

Your BioPod is connected to some form of soil dispersal system. Usually, this is a subsurface drip irrigation system, but other systems, such as soil absorption trenches, may also be used. The maximum volume of wastewater your BioPod can treat is limited by the capacity of your dispersal system. The capacity of your dispersal system is normally stated in your Land Capability Assessment or Geotechnical Engineer's report. If you cannot find this information, please contact the consultant who compiled this report.

You must avoid overloading your treatment system at any time. As a rule of thumb, one person generates approximately 150 L of wastewater per day. So, if your dispersal system is designed for 6 people, you must not discharge more than 900 L per day. Peak wastewater volumes must not exceed 600 L per hour. If you operate your system close to its capacity limit, or there is a risk you may be exceeding this limit, we recommend the following measures:

- Installation of water-conservation fittings and dual-flush toilets.
- Taking showers instead of baths.
- Only washing clothes when there is a full load; and spreading out your washing over the week instead of doing all in one day.
- Only using the dishwasher when there is a full load.

It is important to avoid the following:

- *Frequent large gatherings and parties:* Large numbers of visitors can significantly increase the volume of wastewater. After your visitors have left, please give your BioPod a few days to recover. Ensure that you do not exceed the capacity of your dispersal system.
- *Taps left running:* One tap left running overnight can waste over 10,000 litres. Please ensure this does not occur. Consider installing water-saving taps. They only use about 20% of the water of conventional taps.
- *Leaking taps and toilet flush mechanisms:* These can waste thousands of litres of water every day and easily overload your BioPod. Please check for leaks frequently and arrange for repairs to be done promptly.
- *Frequent emptying of tubs and spa baths:* These can contain large volumes of water. Check the volumes of all tubs and spas installed in your house. If there are several, we strongly recommend that you do not use all of them at the same time. Large volumes of water should be drained in stages. For example, a large spa could be drained over three days, discharging a third of its volume each day. Give your BioPod a few days to recover after discharging large volumes of water into it.
- *Emptying or backwashing of swimming or spa pools:* Your BioPod is not designed to cope with the resulting large volumes of water. Also, the disinfectants contained in the water of pools can negatively affect the biological treatment process of the BioPod.
- *Illegal connections:* Do not connect downpipes, drainage pipes etc. to your BioPod. This is illegal and will result in overloading.
- *Stormwater ingress:* Avoid landscaping around your BioPod that results in stormwater runoff flowing over its lid or the system getting inundated. The periphery of your BioPod must always be well drained. Problems with your BioPod resulting from unsuitable landscaping and insufficient drainage are not covered by the Biolytix warranty.
- *Power turned off:* Ensure that power to your BioPod is always on. If power is turned off, wastewater will not get pumped out. This can result in environmental hazards and costly repairs.

**Important: Please ensure that all members of your household adhere to these points.**

## Intermittent Use

This section only applies, if nobody is living in your house for several months each year – for example, if your BioPod is installed at a holiday home. Your BioPod can tolerate dry periods of several months. However, when you start using your BioPod again after extended periods of absence, the organisms living in the filter need some time to recover. Therefore, if your BioPod is not used for more than 3 months, we recommend the following steps during the first week after your return to help it regain its full treatment capacity:

- Minimise your water usage.
- Drain spas slowly and in stages, and avoid large parties and social gatherings.
- Avoid using strong cleaning chemicals and disinfectants.
- When cooking, do not pour oil and grease down the drain.

If your BioPod is not used for more than 6 months, re-inoculation with earthworms is required, which can be arranged with a local Biolytix service agent for a small fee. If you return to your home at the same time each year, you may be able to combine the re-inoculation with the annual service (see below for more information on servicing). Please contact Biolytix Customer Support for further advice.

## Wastewater Constituents

Your BioPod uses a highly effective biological process to treat normal household wastewater, which includes wastewater from toilets, bathrooms, the laundry, kitchens, and dishwashing machines. The organisms living in it are resilient and can cope with conventional detergents and other household chemicals, if they are used reasonably and according to manufacturer instructions.



Pharmaceuticals do not pose a problem, as long as they are not disposed of directly into the system (e.g. do not flush unused drugs down the toilet, or pour them down the sink etc.). To ensure a long life of your system, we recommend the following simple rules:

- Use standard domestic cleaning products as sold by major retailers. Eco-friendly products are preferable.
- Choose detergents low in phosphorus and sodium. The Lanfax Laboratories investigated the phosphorus and sodium content of a wide range of laundry detergents. Their findings are published at <http://www.lanfaxlabs.com.au>.
- Use biodegradable soaps.
- Wipe and bin your fats and frying oils rather than rinsing them down the drain.

Harsh chemicals and non-biodegradable materials can negatively affect your BioPod and result in expensive repairs. Specifically, you must ensure that none of the following pollutants enter your BioPod:

#### Chemicals:

- Bleach (small quantities for laundering and products similar to Napisan are acceptable)
- Chlorine and other harsh disinfectants
- Caustic soda (NaOH) and other highly alkaline (pH > 9.5) or acidic (pH < 4) chemicals
- Drano and other drain cleaners
- Commercial cleaning products
- Paints and solvents
- Chemicals that are not typically used in a household
- Pesticides and herbicides
- Other toxic substances
- Fats, oils and grease (except from normal kitchen use)

#### Non-biodegradable materials:

- Disposable nappies and nappy liners
- Baby wipes and other wipes
- Condoms
- Rags
- Other sanitary products that are not biodegradable
- Large amounts of animal hair (this could, for example, be a problem, if you are breeding pets)

Also, you must not dump any waste, including food scraps and grass clippings, directly into your BioPod via its access hatch.

**Important: Please ensure that all members of your household are aware of what may and may not be disposed of into your BioPod.**

## Kitchen Waste

Your BioPod can treat food waste (kitchen scraps) processed through an in-sink garbage grinder such as an In-Sink-Erator. The daily limit is 250 g per person and day, which must not include more than 50 g of meat and bones per day (see section Operation above for information on the maximum number of persons your system can handle). Note that Victoria and Western Australia do not currently allow the disposal of food waste into the BioPod.

## Maintenance

A malfunctioning treatment system can lead to serious problems with the dispersal system and vice versa. Therefore, to ensure compliant and reliable performance, both your BioPod and your dispersal system must be maintained correctly.

## Servicing

Biolytix requires you to have your BioPod serviced annually by a Biolytix-accredited technician. This is very important to ensure its ongoing good performance and compliance with regulations. Insufficient maintenance can result in severe damage to the BioPod and to the dispersal system, which may require expensive repairs. Of course, a complete service record will also increase the re-sale value of your home.

Note that in a few jurisdictions service intervals shorter than 12 months and other special conditions apply. These are stipulated in the approval or consent documentation issued by your regulators. It is very important that you are aware of and observe all regulatory requirements. Together with the documentation for your BioPod, you have received copies of all relevant certificates and approvals. You must read these carefully and comply with them.

**Important: Biolytix offers competitively priced Service Agreements which also offer peace of mind that the maintenance of your system is in the best hands. Please visit [www.biolytix.com.au](http://www.biolytix.com.au) for details or contact our Customer Support Team.**

Using a Biolytix-accredited technician ensures that your BioPod is maintained correctly and in accordance with our Service Manual. This includes checking and flushing your dispersal system. Note that repairs of your dispersal system and additional maintenance costs (e.g. root inhibition etc.) are not included in the service fee and will be charged extra, if required.

While Biolytix encourages best practice and carefully selects its service agents, mistakes and omissions can happen. We therefore recommend that, after your system has been serviced, you check the following:

- Is the power to your BioPod turned on? You can check this by simply placing your hand on the lid of your BioPod near the control box. When you do so, you should be able to distinctly feel the vibration of the air pump.
- Has the service technician replaced the tank access and control box lids and fastened all screws?
- Are there any other indications of unsatisfactory workmanship?

Please also ensure that you receive a Service Report from your service agent and, if you live in Australia, that you forward this report to your council. If you have entered a Service Agreement with Biolytix, we will do this for you and ensure full compliance with all regulatory reporting requirements. Note that it may take up to 30 days to issue your Service Report.

You must never attempt to maintain or repair your BioPod or its dispersal system yourself or otherwise tamper with them. Not only would this void its warranty, tampering with your system could also result in serious environmental and health hazards.

## Daily Upkeep

The following recommendations will ensure that your BioPod stays in good condition and provides safe treatment of your wastewater:

- Protect both the BioPod and the dispersal system from vehicle traffic, including livestock. Do not drive over your BioPod with ride-on mowers.
- Avoid digging where your dispersal system is located. Doing so may damage its pipes.
- The dispersal area is not a suitable play area for children and access should be restricted. It should be designed to deter frequent pedestrian traffic.
- Deep-rooting trees or shrubs must not be grown in or near your BioPod and dispersal area. Contact your local council for advice on suitable plants.
- Where installed, surface water diversion drains and mounds upslope of and around the BioPod and the dispersal system must be kept clean. They protect your system from stormwater runoff and must not be altered or removed.

- Landscaping must not result in stormwater pooling on or around the BioPod or the dispersal system.
- A thin layer of coarse mulch spread over the tank lid helps your BioPod blend into your landscaping and keeps it cool in hot weather. However, you must not cover the access hatch in the tank lid, and the mulch must not be deeper than 100 mm around the edge of the lid. Also, it must not impair drainage of stormwater runoff away from the tank.
- Dispersal areas should be mowed and plants maintained regularly
- Landscaping near or around the BioPod must not impair access.

You are legally responsible for keeping your BioPod in good working order. If you encounter any of the following scenarios, please call Biolytix Customer Support as soon as possible:

- The dispersal area is wet or soggy with wastewater ponding on the surface.
- You notice a strong smell of faeces, rotten eggs, or other unusual odours coming directly from the BioPod.
- Your toilets drain slowly.
- There are loud and unusual noises from the BioPod.
- If you have any other reason to believe your system is malfunctioning.

**Important: It is your responsibility to make a reasonable effort to contact Biolytix promptly, when there is a problem. If a system that requires repairs is not attended to promptly, it will usually deteriorate further rapidly. If this happens and you are responsible for the delays, you could be charged for the resulting extra costs, even if your BioPod is still under warranty.**

## Alarms

Your system is either equipped with an audio/visual alarm or with a telemetry alarm connected to a phone line. The audio/visual alarm is installed on a weather-shielded wall panel. It is a legal requirement that the alarm system of your BioPod is operational at all times.

Telemetric alarms are sent to Biolytix automatically via your phone line (this will not interfere with normal phone calls and will not affect your phone bill).

If an audio/visual alarm occurs, stop it by pressing the 'Mute' button on the alarm panel, then call the number on your alarm panel and follow the instructions on the panel. Alarms reported by phone are registered automatically.

**Important: In the event of an audio/visual alarm, it is your responsibility to make a reasonable effort to contact Biolytix promptly. If a system that requires repairs is not attended to promptly, it will usually deteriorate further rapidly. If this happens and you are responsible for the delays, you could be charged for the resulting extra costs, even if your BioPod is still under warranty.**

Once an alarm is registered, a call-back from a customer service representative is arranged. In conversation with you, the representative will decide, whether a maintenance visit from a qualified service technician is required. You may be charged for this maintenance visit, if:

- The warranty for your system has expired.
- You did not operate your system in accordance with this Manual (i.e. the alarm was not due to a product fault).

If you have a telemetry alarm system, please make sure you let Biolytix Customer Support know the phone number of the line the alarm is connected to, and inform us when this number changes.

**Important:** Audio/visual alarm systems and older versions of the telemetry alarm system do not have battery backup. During a power failure or if the power to your BioPod is turned off, these alarms will not work. It is therefore important that you periodically check that power to your system is turned on. You can do this by simply placing your hand on the lid of your BioPod near the control box. When you do so, you should be able to distinctly feel the vibration of the air pump. You should do this check after power outages and on completion of electrical work in your home.

## Warranties

### Manufacturer's Warranty

Your BioPod is covered by the Biolytix Manufacturer's Warranty. The terms and conditions of this warranty have been provided to you together with this Manual. They can also be downloaded from [www.biolytix.com.au](http://www.biolytix.com.au).

### BioPod Installation

Your BioPod installation is not covered by the Biolytix Manufacturer's Warranty. However, the installer of your dispersal system will normally guarantee their workmanship. Your contract with your installer should contain details of warranties provided.

Repairs to your BioPod that are the consequence of an installation that was not carried out to our specifications or that was not carried out by an installer accredited by us are not covered by the Biolytix Manufacturer's Warranty. We strongly recommend that you have your BioPod installed by an installer accredited by Biolytix.

**Important:** On commissioning, the installer must provide you with the completed Quality Assurance (QA) Documentation. It is your responsibility to send the completed QA Documentation to Biolytix within 30 days of commissioning. Not doing so will void your warranty. We strongly recommend you pay your installer only after you have received the completed QA Documentation. It is good practice to ensure a clause to this effect is in your contract with the installer.

## Soil Dispersal Systems

If your BioPod is connected to an irrigation system, soil absorption trenches, or any other form of soil dispersal system, the following conditions apply:

- Your dispersal system is not covered by the Biolytix Manufacturer's Warranty.
- However, the installer of your dispersal system will normally guarantee their workmanship. Your contract with your installer should contain details of warranties provided.
- Repairs to your BioPod that are the consequence of a dispersal system that was not designed and installed correctly are not covered by the Biolytix Manufacturer's Warranty.
- Do not tamper with or change the configuration of your dispersal system. Doing so will void your Biolytix Manufacturer's Warranty.
- If you purchased irrigation equipment from Biolytix, this equipment is warranted by its manufacturers according to their terms and conditions. Their warranty does not cover installation.

## Documentation

In the course of buying and installing the BioPod and the dispersal system, you should receive the following documents listed below. These documents are important and must be kept in a safe place. If you sell your home, please pass them on to the new owner. If you are letting your house, a copy of the Owner's Manual must be provided to the tenant.



# Thermakraft

CI/SfB	WAIKATO DISTRICT COUNCIL FULL APPLICATION RECEIVED
MAY 2011	11 JUL 2016
Time	Initials TUAKAU

## COVERIEK405

**FIRE RETARDANT  
SELF SUPPORTING ABSORBENT  
BREATHABLE SYNTHETIC  
NON WOVEN ROOF UNDERLAY**

## TECHNICAL SPECIFICATIONS

**Product Specifications** **COVERIEK405** FIRE RETARDANT ABSORBENT BREATHABLE SYNTHETIC NON WOVEN ROOF UNDERLAY can be used as a roof underlay on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1 Paragraph 1.1 with regards to building height and floor plan area; and,
- with masonry tile cladding; and,
- with metal tile and profiled metal roof cladding; and,
- situated in NZS 3604 Building Wind Zones up to, and including 'Very High'.

**COVERIEK405** installation must always be carried out in accordance with:

- Thermakraft "Application and Installation Guidelines"
- Installed by or under the direct supervision of a licensed Building Practitioner or qualified Roofer
- NZBC Acceptable Solution E2/AS1 Paragraph 8.0-8.4
- NZ Metal Roofing Manufacturers Roof and Wall Cladding - Code of Practice
- Metal Roof / Tile Manufacturers specifications

**COVERIEK405** must not be left exposed to direct sunlight or UV light sources during its serviceable life;

**COVERIEK405** must not be left exposed to the elements on the roof for more than 7 days before being covered;

**COVERIEK405** The design application and installation of **COVERIEK405** must follow sound condensation management principles, making use of ventilation and vapour control layers where necessary.

**Durability Requirements** **COVERIEK405** will meet the Performance Requirements of NZBC:

- Clauses B2 Durability B2.3.1(a) not less than 50 years and B2.3.2
- Clause C Part 6 Table 6.2: Flammability Index  $\leq 5$
- Clause E2 External Moisture: Performance E2.3.2 when used as part of the Roof Cladding System
- Clause F2 Hazardous Building Materials: Performance F2.3.1 will not present a health hazard to people

**TABLE 1: NZBC E2/AS1 ALTERNATIVE SOLUTION TO TABLE 23 AS A ROOFING UNDERLAY REQUIREMENT**

NZBC E2/AS1 TABLE 23 ROOF UNDERLAY PROPERTIES	PROPERTY PERFORMANCE REQUIREMENT	ACTUAL PROPERTY PERFORMANCE
Absorbency	$\geq 100 \text{ g/m}^2$	$\geq 150 \text{ g/m}^2$
Vapour Resistance	$< 7 \text{ MN.s/g}$	Pass
pH of Extract	$> 6$ and $< 9$	Pass
Shrinkage	$< 0.5\%$	Pass
Water Resistance	$\geq 100 \text{ mm}$	Pass
Nominal Mass	n/a	180gsm
Flammability Index	$\leq 5$ (AS1530.2)	Fire Retardant

**Roll Dimensions** 1250mm x 40m = 50m<sup>2</sup> 1250mm x 20m = 25m<sup>2</sup>

**Storage** **COVERIEK405** should be stored on end in dry conditions. Protect from the weather and direct sunlight.

0055/17

APPROVED

The recommendations contained in Thermakraft's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Thermakraft (for example quality of workmanship and design), Thermakraft shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards.

**Thermakraft  
Industries (NZ) Ltd**

11 Turin Place, East Tamaki, Auckland, New Zealand  
PO Box 58-112, Botany, Manukau 2163, New Zealand  
Phone: 09-273 3727 Fax: 09-273 3726 Free Phone: 0800 806 595  
Email: sales@thermakraft.co.nz Website: www.thermakraft.co.nz

E. & O. E.

# Thermakraft

## COVERTEK<sup>TM</sup>405

**FIRE RETARDANT  
SELF SUPPORTING ABSORBENT  
BREATHABLE SYNTHETIC  
NON WOVEN ROOF UNDERLAY**

## APPLICATION AND INSTALLATION

### Product Description

**COVERTEK<sup>TM</sup>405** FIRE RETARDANT ABSORBENT BREATHABLE SYNTHETIC NON WOVEN ROOF UNDERLAY consists of a microporous water resistant film, sandwiched between two layers of mould and shrink resistant spun-bonded polyolefin.

### Product Advantage

**COVERTEK<sup>TM</sup>405** can be used in direct fix or cavity fix for roof and wall construction.

**COVERTEK<sup>TM</sup>405** can be used as a Roof Underlay on Timber or Metal Framed Buildings with masonry tiles, metal tiles and profiled metal roof cladding and situated in NZS 3604 Building Wind Zones up to and including 'Very High'.

### Flammability



**COVERTEK<sup>TM</sup>405** has a Flammability Index  $\leq 5$  and therefore meets the requirements of NZBC Acceptable Solutions C/AS1 Part 6 Table 6.2 for surface finish requirements for suspended flexible fabric, and therefore it may be used without restrictions in all buildings.

**COVERTEK<sup>TM</sup>405** is an alternative solution under the NZBC and meets the requirements of NZBC E2/AS1 Table 23 for wall and roof applications.

**COVERTEK<sup>TM</sup>405** can **NOT** be used as an **AIR BARRIER** where walls are not lined eg. attic space at gable ends.

**COVERTEK<sup>TM</sup>405** may be installed during wet adverse conditions without affecting its performance and durability.

### Installation

**COVERTEK<sup>TM</sup>405** can be laid vertically or horizontally on roof slopes of 8 degrees or more without support.

**COVERTEK<sup>TM</sup>405** Fix using stainless steel 8-12mm staples or 20mm flat head clouts, or appropriate proprietary fastenings to suit environmental exposure requirements. Between 3° and 5° pitched roofs, Thermakraft recommends supporting **COVERTEK<sup>TM</sup>405** on Thermakraft Safety Mesh 300mm x 150m, hexagonal netting 50mm / 75mm, Thermakraft Arctic Thermastrap 203, or Thermastrap 201. Fix at 300mm centres. If required to achieve a lap seal (refer NZ Metal Roofing Code of Practice 4.3.8 and 4.3.9), use Thermakraft Window Sealing Tape **ALUBAND**.

**COVERTEK<sup>TM</sup>405** must be installed in a manner that prevents ponding of water.

### Control of Condensation

In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation to prevent moisture build-up in the roof cavities.

Factors which adversely affect the condensation risk in roofing systems include:

- Humid, and/or cold climatic regions
- Warm/Skillion roof construction
- Low roof cavity air volume and restricted air movement
- Omitting Vapour Control Layers
- Ceiling penetrations and entry of warm air into roof cavities
- Occupancy activities which have high moisture loading on conditioned spaces
- Low pitched roof
- Bulk insulation
- Building structures ability to naturally dry Construction Moisture

Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer MRM Code of Practice for details.

# Thermakraft

CI/SfB
MAY 2011

## COVERIEK<sup>TM</sup>405

**FIRE RETARDANT  
SELF SUPPORTING ABSORBENT  
BREATHABLE SYNTHETIC  
NON WOVEN ROOF UNDERLAY**

## TECHNICAL SPECIFICATIONS

**Product Specifications** **COVERIEK<sup>TM</sup>405** FIRE RETARDANT ABSORBENT BREATHABLE SYNTHETIC NON WOVEN ROOF UNDERLAY can be used as a roof underlay on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1 Paragraph 1.1 with regards to building height and floor plan area; and,
- with masonry tile cladding; and,
- with metal tile and profiled metal roof cladding; and,
- situated in NZS 3604 Building Wind Zones up to, and including 'Very High'.

**COVERIEK<sup>TM</sup>405** installation must always be carried out in accordance with:

- Thermakraft "Application and Installation Guidelines"
- Installed by or under the direct supervision of a licensed Building Practitioner or qualified Roofer
- NZBC Acceptable Solution E2/AS1 Paragraph 8.0-8.4
- NZ Metal Roofing Manufacturers Roof and Wall Cladding - Code of Practice
- Metal Roof / Tile Manufacturers specifications

**COVERIEK<sup>TM</sup>405** must not be left exposed to direct sunlight or UV light sources during its serviceable life;

**COVERIEK<sup>TM</sup>405** must not be left exposed to the elements on the roof for more than 7 days before being covered;

**COVERIEK<sup>TM</sup>405** The design application and installation of **COVERIEK<sup>TM</sup>405** must follow sound condensation management principles, making use of ventilation and vapour control layers where necessary.

**Durability Requirements** **COVERIEK<sup>TM</sup>405** will meet the Performance Requirements of NZBC:

- Clauses B2 Durability B2.3.1(a) not less than 50 years and B2.3.2
- Clause C Part 6 Table 6.2: Flammability Index  $\leq 5$
- Clause E2 External Moisture: Performance E2.3.2 when used as part of the Roof Cladding System
- Clause F2 Hazardous Building Materials: Performance F2.3.1 will not present a health hazard to people

**TABLE 1: NZBC E2/AS1 ALTERNATIVE SOLUTION TO TABLE 23 AS A ROOFING UNDERLAY REQUIREMENT**

NZBC E2/AS1 TABLE 23 ROOF UNDERLAY PROPERTIES	PROPERTY PERFORMANCE REQUIREMENT	ACTUAL PROPERTY PERFORMANCE
Absorbency	$\geq 100 \text{ g/m}^2$	$\geq 150 \text{ g/m}^2$
Vapour Resistance	$< 7 \text{ MN.s/g}$	Pass
pH of Extract	$> 6$ and $< 9$	Pass
Shrinkage	$< 0.5\%$	Pass
Water Resistance	$\geq 100\text{mm}$	Pass
Nominal Mass	n/a	180gsm
Flammability Index	$\leq 5$ (AS1530.2)	Fire Retardant

**Roll Dimensions** 1250mm x 40m = 50m<sup>2</sup> 1250mm x 20m = 25m<sup>2</sup>

**Storage** **COVERIEK<sup>TM</sup>405** should be stored on end in dry conditions.  
Protect from the weather and direct sunlight.

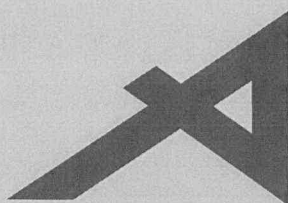
The recommendations contained in Thermakraft's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Thermakraft (for example quality of workmanship and design), Thermakraft shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards.

**Thermakraft**  
Industries (NZ) Ltd

11 Turin Place, East Tamaki, Auckland, New Zealand  
PO Box 58-112, Botany, Manukau 2163, New Zealand  
Phone: 09-273 3727 Fax: 09-273 3726 Free Phone: 0800 806 595  
Email: sales@thermakraft.co.nz Website: www.thermakraft.co.nz

E. & O. E.





## BRANZ Appraised

Appraisal No.743 [2011]

BRANZ Appraisals

Technical Assessments of products  
for building and construction

## BRANZ APPRAISAL No. 743 (2011)

Amended 31 January 2012

## THERMAKRAFT COVERTEK 405 FIRE RETARDANT SELF- SUPPORTING ROOF UNDERLAY

Thermakraft Industries (NZ) Ltd

PO Box 58-112

Botany

Manukau 2163

Auckland

Tel: 0800 806 595

Fax: 09 273 3726

Web: [www.thermakraft.co.nz](http://www.thermakraft.co.nz)



**BRANZ**

BRANZ Limited  
Private Bag 50 908  
Porirua City  
New Zealand

Tel: +64 4 237 1170

Fax: +64 4 237 1171

[www.branz.co.nz](http://www.branz.co.nz)



## Product

1.1 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay is a synthetic building underlay for use under roof claddings. The product consists of a micro-porous water resistant film laminated to two layers of non woven spun-bonded polyolefin.



## Scope

2.1 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay has been appraised for use as a self-supporting roof underlay on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with masonry tile roof cladding; and,
- with metal tile and profiled metal roof cladding; and,
- situated in NZS 3604 Wind Zones up to, and including 'Extra High'.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:

**Clause B2 DURABILITY:** Performance B2.3.1(a), not less than 50 years, B2.3.1(b), 15 years and B2.3.2. Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay meets these requirements. See Paragraphs 9.1 and 9.2.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. When used as part of the roof cladding system, Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay will contribute to meeting this requirement. See Paragraphs 12.1 and 12.2.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of the New Zealand Building Code compliance.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

## Technical Specification

4.1 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay is a synthetic building underlay for use under roof claddings. The product consists of a micro-porous water resistant film laminated to two layers of non woven spun-bonded polyolefin. Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay is coloured white on the top bottom faces.

4.2 The product is supplied in rolls 1.250 m wide x 20 m and 40 m long. The product is printed with the Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay logo repeated along the length of the roll. The rolls are wrapped in clear polythene film.

### Accessories

4.3 Accessories used with Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay which are supplied by the installer are:

- Fixings - stainless steel staples, clouts, screws or proprietary underlay fixings, or other temporary fixings to attach the roof underlay to the framing.

## Handling and Storage

5.1 Handling and storage of the product, whether on or off site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

## Design Information

### Timber and Steel Framing

7.1 Timber and steel roof framing must be provided in accordance with the requirements of the NZBC and the roof cladding manufacturer.

### General

7.2 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay is intended for use as an alternative to conventional kraft paper roof underlays, which are fixed over timber or steel framed roofs in order to limit the entry of wind into the roof cavity, and to assist in the moisture management of the roof cladding system.

7.3 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the roof weathertight and some wetting of the underlying structure is always possible before the roof cladding is installed. Hence, the entire building must be closed-in and made weatherproof before moisture sensitive materials such as ceiling linings and insulation materials are installed.

7.4 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay must not be exposed to the weather or ultra violet light for a total of more than 7 days before being covered by the roof cladding.

7.5 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay is suitable for use under roof claddings on buildings as a roof underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23. Refer to Table 1 for the material properties of Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay.

**Table 1: NZBC E2/AS1 Table 23 Requirements**

NZBC E2/AS1 Table 23 Roof Underlay Properties	Property Performance Requirement	Results
Absorbency	$\geq 100 \text{ g/m}^2$	Pass > 150 g/m <sup>2</sup>
Vapour Resistance	$\leq 7 \text{ MN s/g}$	Pass
Water Resistance	$\geq 100 \text{ mm}$	Pass
pH of Extract	$\geq 6$ and $\leq 9$	Pass
Shrinkage	$\leq 0.5\%$	Pass
Mechanical	Edge tear and tensile strength	Edge tear (Average): Machine direction = 204 N Cross direction = 191 N Tensile strength (Average): Machine direction = 3.94 kN/m Cross direction = 3.66 kN/m

7.6 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay is suitable for use at pitches less than 8° (minimum 3°). When used at pitches less than 8°, Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay must be installed horizontally. At pitches greater than 8°, Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay can be installed vertically or horizontally and must span no greater than 1200 mm in one direction.

## Structure

8.1 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay is suitable for use in Wind Zones of NZS 3604 up to, and including, 'Extra High'.

## Durability

9.1 Thermakraft Covertek 405 Fire Retardant Self-Supporting Roof Underlay meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years for roof underlays used where the roof cladding durability requirement or expected serviceable life is not less than 50 years, e.g. behind masonry roof tile cladding, and code compliance with NZBC Clause B2.3.1 (b), 15 years for roof underlays used where the roof cladding durability requirement is 15 years.

### Serviceable Life

9.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 7 days, and provided the roof cladding is maintained in accordance with the cladding manufacturer's instructions and the roof cladding remains weather resistant, Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay is expected to have a serviceable life equal to that of the roof cladding.

### Control of Internal Fire and Smoke Spread

10.1 Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay has an AS 1530 Part 2 Flammability Index of  $\leq 5$  and meets the requirements of NZBC Acceptable Solution C/AS1 Part 6, Table 6.2 for surface finish requirements for suspended flexible fabrics, and therefore it may be used with no restrictions in all buildings.

### Outbreak of Fire

11.1 Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

### External Moisture

12.1 Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay must only be used under roof claddings that meet the requirements of the NZBC, such as those covered by NZBC Acceptable Solution E2/AS1, or roof claddings covered by a valid BRANZ Appraisal.

12.2 Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay, when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding system's compliance with NZBC Clause E2.

## Installation Information

### Installation Skill Level Requirements

13.1 Installation must always be carried out in accordance with the Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay Technical Literature and this Appraisal, by competent tradespersons with an understanding of roof underlay installation.

### Underlay Installation

14.1 Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay must be fixed at maximum 300 mm centres to all framing members with large-head clouts 20 mm long, 6-8 mm stainless steel staples, self drilling screws or proprietary underlay fixings. The membrane must be pulled taut over the framing before fixing.

14.2 Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay may be run vertically or horizontally at roof pitches greater than 8° and must be laid horizontally at roof pitches less than 8°. It must extend from the ridge and overhang the fascia board by 20-25 mm. Vertical laps must be no less than 150 mm wide. Horizontal laps must also be no less than 150 mm, with the direction of the lap ensuring that water is shed to the outer face of the underlay. End laps must be made over framing and be no less than 150 mm wide. To assist with achieving the correct lap dimension, Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay has a 150 mm lap line printed continuously along the top face.

14.3 When fixing the product in windy conditions, care must be taken due to the large sail area created.

14.4 Any damaged areas of Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

### Inspections

14.5 The Technical Literature must be referred to during the inspection of Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay installations.

## Basis of Appraisal

The following is a summary of the technical investigations carried out:

### Tests

15.1 The following tests have been carried out on Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23: tensile strength, edge-tear resistance and resistance to water vapour transmission in accordance with AS/NZS 4200.1, shrinkage in accordance with AS/NZS 4201.3, resistance to water penetration in accordance with AS/NZS 4201.4, surface water absorbency in accordance with AS/NZS 4201.6 and pH of extract in accordance with AS/NZS 1301.421s. A range of these tests were completed before and after Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay was exposed to ultra-violet light.

15.2 The Flammability Index of Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay has been evaluated in accordance with AS 1530.2.

### Other Investigations

16.1 A durability opinion has been given by BRANZ technical experts.

16.2 An evaluation of the expected performance of Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay in direct contact with metal roof cladding has been completed by BRANZ.

16.3 The practicability of installation of Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay has been assessed by BRANZ and found to be satisfactory.

16.4 The Technical Literature, including installation instructions, has been examined by BRANZ and found to be satisfactory.

### Quality

17.1 The manufacture of Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

17.2 The quality of supply to the market is the responsibility of Thermakraft Industries (NZ) Ltd.

17.3 Building designers are responsible for the design of the building, and for the incorporation of the roof underlay into their design in accordance with the instructions of Thermakraft Industries (NZ) Ltd.

17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Thermakraft Industries (NZ) Ltd.

## Sources of Information

- AS 1530.2: 1993 Test for Flammability of Materials.
- AS/NZS 1301.421s: 1988 Determination of the pH value of aqueous extracts of paper, board and pulp - cold extraction method.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays - materials.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays - Methods of test - Shrinkage.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays - Methods of test - Resistance to water penetration.
- AS/NZS 4201.6: 1994 Pliable building membranes and underlays - Methods of test - Surface water absorbency.
- NZS 3604: 2011 Timber-framed buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition (Amendment 12, 10 October 2011).
- The Building Regulations 1992.



**BRANZ**

In the opinion of BRANZ, Thermakraft Covertex 405 Fire Retardant Self-Supporting Roof Underlay is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Thermakraft Industries (NZ) Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

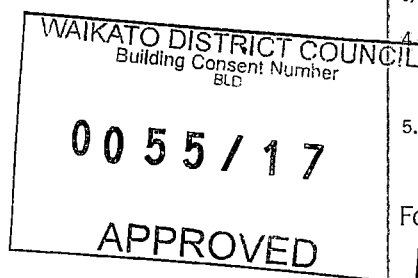
### Conditions of Appraisal

1. This Appraisal:
  - a) relates only to the product as described herein;
  - b) must be read, considered and used in full together with the technical literature;
  - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
  - d) is copyright of BRANZ.
2. Thermakraft Industries (NZ) Ltd:
  - a) continues to have the product reviewed by BRANZ;
  - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
  - c) abides by the BRANZ Appraisals Services Terms and Conditions.
  - d) Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
  - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
  - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
  - c) any guarantee or warranty offered by Thermakraft Industries (NZ) Ltd.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Thermakraft Industries (NZ) Ltd or any third party.

For BRANZ

P. Burghout  
Chief Executive

Date of issue: 16 May 2011



### Amendment No. 1, dated 31 January 2012.

This Appraisal has been amended to update clause changes as required by the introduction of NZS 3604: 2011 and NZBC Acceptable Solution E2/AS1 Third Edition, Amendment 5.



Waterproofing Warehouse  
4/12 Strathaird Road, Bundall, 4217  
www.wpw.com.au  
Phone: +61 07 55921329  
Fax: +61 07 55921227



---

# ARDEX WPM 001

## (Superflex Bathroom & Balcony Premixed)

---

Single Component Undertile Waterproofing Membrane

WAIKATO DISTRICT COUNCIL	
FULL APPLICATION RECEIVED	
11 JUL 2016	
Time.....	Initials.....
TUAKAU	

---

ARDEX Australia Pty Ltd  
20 Powers Road  
Seven Hills NSW 2147  
Tel: (02) 9851 9199  
Fax: (02) 9674 5621  
Email: [techinfo@ardexaustralia.com](mailto:techinfo@ardexaustralia.com)  
Internet: [www.ardex.com](http://www.ardex.com)

ARDEX New Zealand Ltd  
32 Lane St, Woolston  
Christchurch, New Zealand  
Tel: (03) 384 3029  
Fax: (03) 384 9779  
Email: [techinfo@ardexaustralia.com](mailto:techinfo@ardexaustralia.com)  
Internet: [www.ardex.com](http://www.ardex.com)

# Ardex WPM 001

## (Superflex Bathroom & Balcony Premixed)

### Single Component Undertile Waterproofing Membrane

#### PRODUCT DESCRIPTION

Ardex WPM 001 (Superflex Premixed) is a tough, ready to use waterproofing membrane specifically designed for use under tiles. Ardex WPM 001 has been uniquely formulated with synthetic microfibres to increase its strength and eliminate the need for a separate reinforcement mat. Ardex WPM 001 is based on the most advanced acrylic polymer technology, and is totally resistant to re-emulsification once cured.

Ardex WPM 001 is flexible, safe to use, low in odour, and is fully compatible with polymer modified tile adhesives. Ardex WPM 001 is one of the fastest drying one part acrylic membranes on the market – normally ready to tile in 48 hours @ 23°C.

#### FEATURES/BENEFITS

- Fast drying: Ardex WPM 001 can be tiled over in 48 hours in non critical areas\*
- Liquid reinforced: Excellent strength, eliminates need for reinforcing mat
- Flexible: Accommodates normal building movement class 3 membrane as per AS 4858
- Advanced acrylic: Will not re-emulsify once cured
- Designed for tiling - Fully compatible with Ardex tile adhesive systems
- Water based, Safe to use, low odour & easy cleaning
- CSIRO Appraisal #91 for undertile waterproofing in shower recesses
- Conforms to the requirements of Australian Standards 4858

\*Critical areas include areas where the membrane is applied at greater than 0.5mm or over impermeable substances such as over bond breakers or incorporating other reinforcement. Longer drying times are necessary in these areas.

#### APPLICATION RANGE

##### Performance Levels

Commercial and residential

##### Location

Internal wet areas, balconies, decks, and other areas that will be tiled or otherwise protected from regular foot traffic.

##### Surfaces

Walls & floors.

#### Substrates

Concrete	Cured for min. 28 days or sealed when set with one coat of Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. Wet concrete should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Renderers and screeds	Cured for min. 7 days or sealed when set with one coat of Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. Wet render should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Fibre cement	Suitable for wet area grade fibre cement.
Plasterboard	Wet area grade only.
Plywood	Structural plywood (PAA branded), marine grade or other wet area grade only.
Particleboard	Wet area grade, internal use only (special preparation is required – contact Ardex).
Permanent Immersion	In conditions of permanent immersion. It is recommended that Ardex WPM 002 (Superflex Two Part) is used. Must be covered with tiles for full immersion.

Contact Ardex for use over existing membranes, covering materials, and any other substrates not listed.

#### SPECIFICATION CLAUSE

##### Ardex WPM 001 (Superflex Premixed)

The waterproofing membrane shall be Ardex WPM 001 (Superflex Premixed): a one part acrylic modified fibre reinforced membrane formulated to provide a tough, long lasting water barrier under tiling systems.

#### PACKAGING

Single component: 20kg (approx 15 litres) or 6.5kg (approx 5 litres).

#### SHELF LIFE

12 months when stored in the original unopened packaging, in a dry place at 23°C. Do not store in direct sunlight. Replace lid tightly after use. Use remaining contents from part used containers within 3 months.

TABLE 1

	Thickness per Coat		Total Dry Film Thickness (2 coats)	Theoretical Coverage		Per Unit
	Dry Film	Wet Film		Per coat	For 2 coats	
FLOORS	0.5mm	1.0mm	1.0mm	15m <sup>2</sup>	7.5m <sup>2</sup>	20kg(15L) unit
WALLS	0.25mm	0.5mm	0.5mm	30m <sup>2</sup>	15m <sup>2</sup>	20kg(15L) kit

COVERAGE

Two coats are recommended for an effective waterproof membrane.

Coverage will vary depending on the porosity of the surface.

One 20kg (15 litre) unit will cover approximately 9-11m<sup>2</sup> (based on two coats) depending on area requirements between wall and floor surfaces to be treated. Refer Table I.

DRYING TIMES

Recoat time

1-2 hours at (23°C/50% RH) between first and second coats. Alternatively, if a polyester mat is used between coats then the second coat can be applied whilst the first coat is still wet.

Dry through

The slowest drying areas are those where the membrane has been applied over a silicone bond breaker, eg. wall and floor junctions. The membrane cannot be tiled over until these critical areas are completely dry. Ardex WPM 001 is totally dry in 48 hours at 23°C/50% RH, but can take up to 72 hours at 10°C/50% RH in corners or for thick films.

Fully cured

The shower should not be used until the membrane has reached its full strength. Ardex WPM 001 membrane is fully cured after 3 days at 23°C, or after 5 days at 10°C.

Drying times will vary depending on humidity, surface temperature and surface porosity.

Do not apply on substrates where the surface temperature is below 10°C or above 35°C.

CLEANING

Wash hands, brushes, rollers, etc, with water while the membrane is still fresh. Remove cured material with mineral turpentine.

PRECAUTIONS

Do not use the product in the following situations:

- Areas subject to negative hydrostatic pressure or rising damp, unless treated with Ardex WPM 300.
- Where the substrate is wet – wet surfaces can be sealed with one coat of Ardex WPM 300 at a coverage rate of 3.0 square metres per litre and allowed to cure overnight.
- Where rain is imminent.
- Where the membrane will be left exposed and subjected to regular foot traffic.
- On glazed, glass or other totally impervious surfaces (eg. areas pre-treated with water repellants).
- Where the surface temperature is below 10°C or greater than 35°C.
- All floor areas must have adequate falls either built into the substrate or achieved with a sand/cement screed prior to application of the Ardex WPM 001.

For substrates or situations other than those listed contact Ardex.

SAFETY DATA

Ardex WPM 001 is non-toxic. However, the contents should not be swallowed or inhaled. In case of eye contamination, rinse thoroughly with clean water. If irritation continues seek medical advice.

Material Safety Data sheets are available from Ardex upon request.

QUALITY PRODUCT

Ardex WPM 001 is manufactured and tested to Ardex procedures which are maintained in accordance with Quality System Standard ISO 9001.



# Ardex WPM 001

## (Superflex Bathroom & Balcony Premixed)

### Single Component Undertile Waterproofing Membrane

#### USER NOTES

The technical details and recommendations contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is the responsibility of the user to ensure that the product is used in accordance with Ardex instructions and in applications for which they are intended.

#### APPLICATION

Apply Ardex WPM 001 by brush or roller. A medium nap (12-15mm pile) paint roller is recommended. New rollers should be dampened with water before being used for the first time.

For best results with a paint brush use a good quality, 50mm long bristle variety.

To achieve the required dry film thickness per coat, application must consist of laying the product onto the surface and light finish the surface. Do not try to apply in the same manner as a building paint. A conventional building paint is normally applied at 25-40 micrometers wet film thickness while Ardex WPM 001 needs to be applied at between 0.5 and 1.0 millimeters per coat depending on product and application (Refer Table 1).

#### Critical Areas:

##### INTERNAL WET AREAS

1. Construction should be in accordance with Australian/New Zealand Standard 3740.
2. All render and tile bed requirements should be completed before application of the membrane and tiles or other floor coverings should be direct bonded to the membrane.
3. Ensure wall & floor sheets are installed as per sheet manufacturer's recommendations.

4. Ensure suitable brick/concrete hobs are used (do not use timber), and that the top of the hob does not slope outwards.
5. Ensure that falls to the waste are min 1:60 (ie. approx. 30mm in 2mtr)) before waterproofing. Ensure outlet pipes are fixed securely and that the waste or drainage flanges are recessed into the floor.
6. Avoid sheet joints in shower recess floor. Ensure that sheets are securely fixed to the wall at the bottom edge, and sheet joints are sealed with a neutral cured silicone sealant spread approximately 5mm on either side of the joint.
7. Treat nail and screw holes with neutral cure silicone sealant.
8. Seal the perimeters of taps, shower outlets and waste outlets with neutral cure silicone sealant.
9. Apply a bead of neutral cure silicone sealant to all horizontal and vertical corners.
10. Apply a bead of neutral cure silicone sealant to the junction of the hob or angle and walls.
11. Waste outlets shall incorporate a puddle flange or similar in accordance with AS3740 & the top surface shall be set flush with the surface to which the membrane is to be applied. A bead of neutral cure silicone shall be applied across the intersection of the puddle flange and the screed/floor.
12. Apply the membrane to the entire shower recess floor and down into waste or drainage flange. Apply the membrane over the hob and at least 100mm beyond the outside edge of the hob (ideally to entire wet area floor).
13. Apply the membrane 1800mm up the walls or to the height of the shower rose within the shower recess.
14. Install the shower screen to inside edge of the hob.

Fig.1 – Shower Recess – Critical Areas

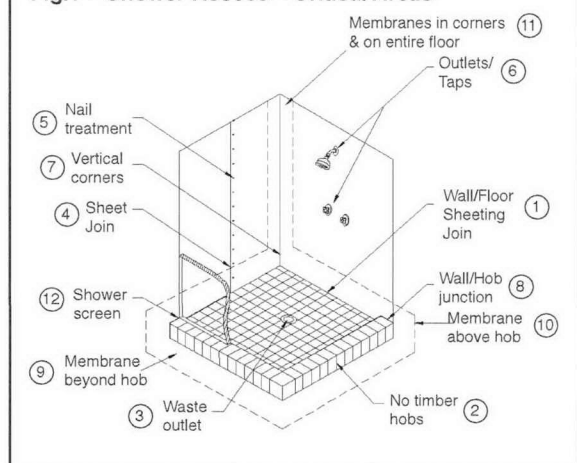
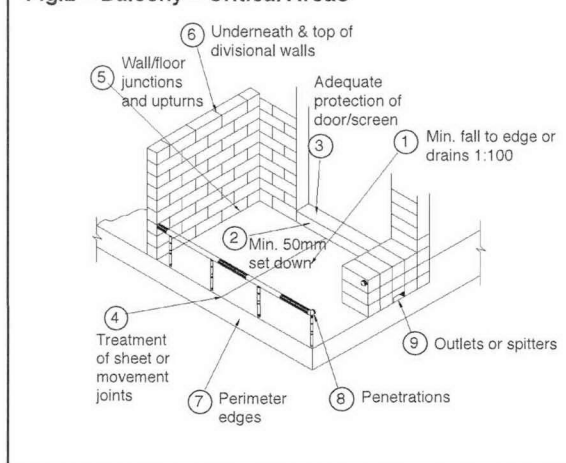


Fig.2 – Balcony – Critical Areas



## BALCONIES AND DECKS

1. Ensure that the deck is constructed with falls to edge/drains of min 1:100 (ie. 20mm in 2mtr) or else achieve the fall with a sand/cement screed.
2. Ensure a min set down (step down) of 50mm to the finished floor level (ie. top of tiles).
3. Ensure suitable flashing is installed, ideally prior to the installation of the balcony screen/ sliding door.
4. Treat any sheet joints with a neutral cure silicone prior to waterproofing.
5. Prepare and seal all wall/floor junctions with a bead of neutral cure silicone.
6. Apply the membrane up the step down and as far up underneath the screen door flashing as possible (ideally waterproof prior to installing door).
7. Where possible, apply the membrane prior to building divisional walls.
8. Apply the membrane to the entire balcony floor and at least 50mm up the wall above the top surface of the finished tiles and finished below the wall drainage vents.
9. Apply the membrane to the top of the parapets and divisional walls, or else install suitable metal capping.
10. Apply the membrane down over the front edge of the balcony onto the drip rail.
11. Carefully seal any gaps around balcony penetrations prior to applying the membrane.
12. Apply the membrane down into outlets and drains, ensuring excess material is removed.
13. Ensure all weep holes are above the membrane application area.

## APPLICATION NOTES

### Surface preparation

- Ensure all surfaces are structurally sound and totally dry. The pores of concrete surfaces should be open (absorbent surface). All sheet substrates must be securely fixed in accordance with the manufacturers instructions.
- Falls to outlets of at least 1:60 or approx. 25mm in 2mtr (wet areas) or 1:100 externally, must be achieved prior to tiling.
- The surface to be coated should be free from dust, oil, paint, curing compounds and any other contaminating materials.
- Damaged concrete should be repaired (leveled) and surface defects including all cracks and sharp protrusions should be treated prior to the application of the membrane.

- Remove laitance on concrete or screeds by mechanical means.
- Highly dense (>40MPa) or steel trowelled concrete should be roughened by suitable mechanical means (shot blasting, grinding, etc).

### Priming

The primer is a critical part of the waterproofing system. Apply one coat of Ardex WPM 265 water based primer by brush or roller to all areas to be waterproofed including the floor waste. Allow the primer to completely dry prior to the application of the Ardex WPM 001 membrane. This will take around 20-30 minutes depending upon weather conditions and porosity of the substrate. Coverage is approximately 6m<sup>2</sup> per litre. Plastic (eg. PVC) pipes should be primed with a solvent based plumbers pink primer. Prime metal surfaces with a suitable metal primer such as epoxy polyamide primer.

## GENERAL APPLICATION

### Crack preparation

#### Cracks <2mm:

Clean and remove any loose particles in the crack. Prime the crack and adjacent area carefully with Ardex WPM 265 water based primer and allow to dry before applying two coats of Ardex WPM 001 membrane in a band at least 200mm wide equidistantly across the crack, along the length of the crack.

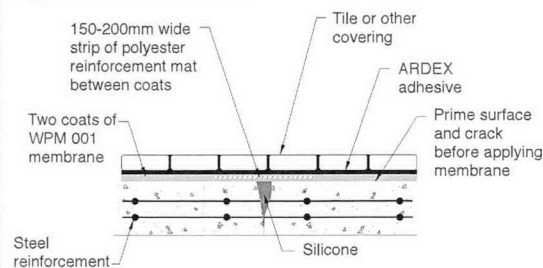
#### Cracks 2-6mm:

(Refer Fig. 3) Prepare and prime the crack as above. Apply a bead of neutral cure silicone into the crack and extend it 5mm either side. Apply a 300mm wide band of Ardex WPM 001 equidistantly across the crack along the entire length of the crack. Place a 200mm wide band of Ardex "Deckeb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the cloth preferably using a fluted roller, and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

#### Cracks >6mm:

Contact your local Ardex representative.

**Fig.3 Movement Joints**



# Ardex WPM 001

## (Superflex Bathroom & Balcony Premixed)

### Single Component Undertile Waterproofing Membrane

#### Movement/construction joints

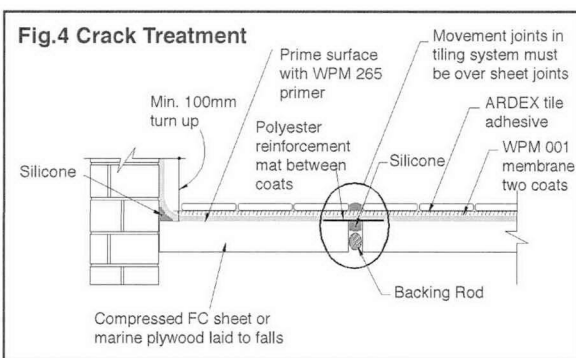
##### Movement joints (<6mm)

Use same procedure as in crack preparation.

Clean and prime the joint before filling it with a bead of neutral cure silicone and extending it 5mm each side of joint. Apply a 300mm wide band of Ardex WPM 001 equidistantly across the crack along the entire length of the crack. Place a 200mm wide band of Ardex "Deckeb" polyester woven cloth reinforcement over the applied membrane. Thoroughly wet out the mat and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat.

##### Construction joints (>6mm)

Use the same procedure as above, but replace the reinforcing mat with the Ardex Joint Bridging Band. Note: if tiling, movement joints should be taken to the surface of the tiles. Fill the joints between the tiles immediately above the movement joints with an appropriate joint sealant. (Refer Fig.4)



#### Corners & coving areas

After priming with Ardex WPM 265 water based primer and allowing to dry, apply a generous bead (10mm) of neutral cured silicone sealant to seal all junctions between two substrates in coving areas and corners. Smooth over the silicone so that it extends 5mm up the wall and 5mm over the floor and allow to touch dry.

Apply a first coat of Ardex WPM 001 to the area and allow the membrane to dry.

Apply a second coat ensuring that excess product is removed from the junction (the final dry film thickness should be around 1.2-1.5mm and a minimum of 1.0mm). Alternatively, if a polyester reinforcement mat is used between coats then the second coat can be applied as soon as the mat is fully bedded into the first coat.

#### WALL/FLOOR JUNCTION

After priming with Ardex WPM 265 water based primer and allowing to dry, apply a 300mm wide band of Ardex WPM 001 equidistantly across the crack along the entire length of the crack. Place a 200mm wide band of Ardex "Deckeb" polyester woven mat reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. The Ardex WPM 001 should be applied to at least 100 mm up the wall surfaces as per the recommendations for the application of Ardex WPM 001 to floors.

#### Walls

Two coats of Ardex WPM 001 are required to achieve a minimum total dry film thickness of 0.5mm.

After priming with Ardex WPM 265 water based primer and allowing to dry, apply two coats of Ardex WPM 001 (to achieve a minimum dry film thickness of 0.5mm) in two opposite directions. Wall sheets joints should be treated with a neutral cure silicone, PVC duct tape or base jointing compound. In balcony situations take the membrane up underneath any existing cover flashing or install appropriate flashing. Allow the first coat to dry before applying the second coat.

#### Floors

Two coats of Ardex WPM 001 are required to achieve a minimum total dry film thickness of 1.0mm. The flooring recommendations should be extended at least 100 mm up all perimeter walls.

Prime the surface with Ardex WPM 265 water based primer and allow to dry.

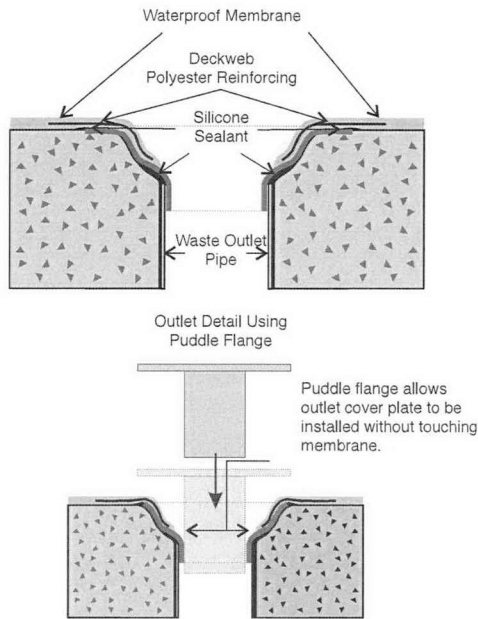
Apply the first coat over the primed surface and allow it to dry (1-2 hours at 23°C, 50%RH) before applying a second coat in an opposite direction. In shower recesses a drainage flange must be installed on all timber/sheeted floors, and are strongly recommended on all other substrates. Where possible rebate the flange into the floor. Seal the perimeter of the flange with neutral cure silicone treatment. If a flange is not installed the membrane must be applied down into the pipe. (Refer Fig.5) Allow the membrane to dry completely before tiling. Refer drying times above.

#### Waste Outlet

Prime the surface with Ardex WPM 265 water based primer and allow to dry. Surfaces of outlet flange must be primed with an appropriate primer.

Apply Ardex WPM 001 over the adjacent floor surface extending down into the waste outlet flange overlapping the edge of flange by at least 30 mm. Place Ardex "Deckweb" polyester woven mat reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. (Refer Fig. 5)

Fig.5 – Waste Outlet



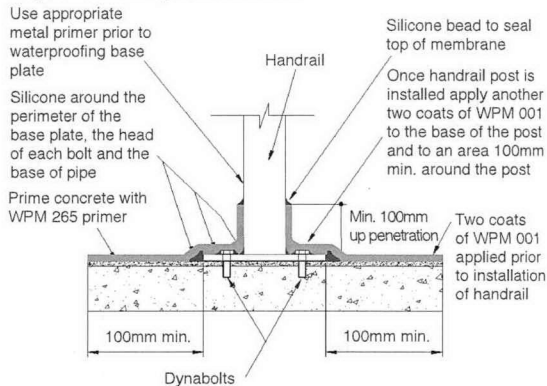
**Balcony penetrations (Refer Fig.6)**

All upstands are to be mechanically fixed through the membrane, which must be fabricated with a base plate flange.

Prime the metal with an appropriate metal primer such as an epoxy polyamide primer and allow to dry. Apply a 10mm bead of neutral cure silicone around the perimeter of the penetration. Apply the first coat of Ardex WPM 001 on the substrate and the flanged metal.

Allow first coat to dry before applying a second coat ensuring a finished dry film thickness of no less than 1.0mm is achieved. Place a suitable flashing collar around the penetration sealing it with a suitable sealant.

Fig.6 – Balcony Penetration



**Tiling systems**

It is advisable to conduct a flood test of the shower once the membrane has cured (normally after 72 hours), and before the tiling commences. A broad range of Ardex tile adhesives can be used over Ardex membranes. Contact Ardex or your nearest Ardex stockist for advice on the most suitable system.

**TECHNICAL DATA**

**Ardex WPM 001 (Superflex Premixed)  
Characteristics of liquid**

Form & Colour	Blue viscous paste
Type	Single part
Specific Gravity	Approx. 1.34kg/litre
pH of Liquid	9.0
Viscosity of Liquid (RVT Brookfield, spindle 7 speed 10)	52,000cps
Non Volatile Matter (volume) AS1321.10	50.3%±1
Tensile Strength 7 days dry AS1145	1.04 MPa
Elongation at Break 7 days dry AS1145	630%

Conforms to requirements of class 3 membrane of AS 4858.

NOTE: Most of the tests have been carried out in the Ardex laboratory under standard conditions (23±2°C, 50±5% R.H)

---

#### DISCLAIMER

The technical details, recommendations and other information contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is your responsibility to ensure that our products are used and handled correctly and in accordance with any applicable Australian Standard, our instructions and recommendations and only for the uses they are intended. We also reserve the right to update information without prior notice to you to reflect our ongoing research and development program.

The supply of our products and services is also subject to certain terms, warranties and exclusions, which may have already been disclosed to you in prior dealings or are otherwise available to you on request. You should make yourself familiar with them.

#### ARDEX Australia Pty Ltd

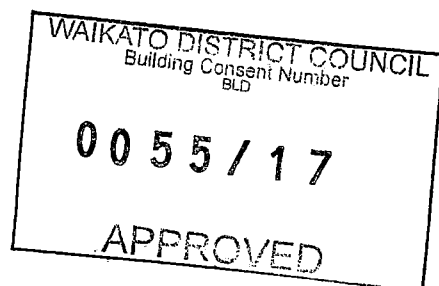
New South Wales	Ph (02) 9851 9100	Fax (02) 9838 7970
Queensland	Ph (07) 3817 6000	Fax (07) 3881 3188
Victoria/Tasmania	Ph (03) 9308 9255	Fax (03) 9308 9332
South Australia	Ph (08) 8268 2511	Fax (08) 8345 3207
Western Australia	Ph (08) 9455 1644	Fax (08) 9455 1227

#### ARDEX New Zealand Ltd

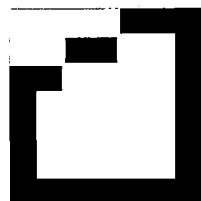
Auckland	Ph (09) 5800 005	Fax (09) 5799 963
Wellington	Ph (04) 5685 949	Fax (04) 5686 376
Christchurch	Ph (03) 3843 029	Fax (03) 3849 779

**Technical Services Toll Free: 1800 224 070**

Date: August 2006







# Brickwork Specification

## Specification S1

WAIKATO DISTRICT COUNCIL	
FULL APPLICATION RECEIVED	
11 JUL 2016	
Time.....	Initials.....

### MonierBrick

This is a comprehensive general specification for the installation of MonierBrick brick veneers. As with all project specifications it is important to ensure that the content is entirely relevant to the project: that items are added if not covered in this general specification, and items that do not apply to a given project are removed.

## 1.1 Preliminary

Refer to the Preliminary and General Clauses of this specification and to the General Conditions of Contract, which are equally binding on all trades. This section of the specification shall be read in conjunction with all other sections.

## 1.2 Scope

This section of the contract consists of the supply and laying of all brickwork indicated on the drawings and specified herein and all associated lintels, ties etc. required for a complete contract.

## 1.3 Workmanship

Bricklaying shall be carried out by qualified tradesmen employed by a contractor specialising in the laying of bricks and supervised by a registered mason. Bricklaying materials and workmanship shall conform in all respects to all the relevant requirements of NZS 4210: 2001 Masonry construction: Materials and Workmanship (SANZ), NZS 4230:1990 Code of Practice for Design of Masonry Structures and NZS 3604:1999 and NZS 4229:1999

## 1.4 Related Documents

In this section of the specification, reference is made to the latest revisions of the following documents:

AS/NZS 4455:2008	Masonry Units and Segmental Pavers
NZS 3602:2003	Timber and Wood Based Products for use in Building
NZS 3604:2011	Timber Framed Buildings (SANZ)
NZS 4210:2001	Masonry construction: Materials and Workmanship (SANZ)
NZS 4230:2004	Design of Masonry Structures (SANZ)
AS/NZS 1170:	Structural Design Actions
NZS 1170.5:2004	Structural Design Actions – Earthquake Actions – New Zealand
NZS4229: 1999	Masonry Buildings not requiring Specific Design
SNZ HB 4236:2002	Masonry Veneer Wall Cladding -Summary of all Standards relating to brick veneer

Reference shall also be made to the sections of this specification, which apply to Reinforcing Steelwork.

### 1.4.1 Monier Related Technical Documents

**MonierBrick brick veneers** shall be installed in strict accordance with **Monier's technical data**, which include:

Design Note A2	Construction Details
Design Note A3	Construction Details - Windows, Openings, Arches, Lintels
Design Note A4	Fire Resistant Ratings
Design Note A7	Steel-less Lintels
Design Note B1	Special Effects, Finishing, Curves and Arches
Design Note B2	Fences & Retaining Walls
Design Note TB1	Two Storey System

Technical Help 0800 507 600

[www.monier.co.nz](http://www.monier.co.nz)

WAIKATO DISTRICT COUNCIL	
Building Consent Number	
BLD	
0055 / 17	
APPROVED	



## Monier Brickwork Specification Specification S1 — Dec 2011

# 1.5 Materials

---

## 1.5.1 General

All materials shall be the best of their respective kinds free from impurities, imperfections and other faults likely to impair the finished walls.

## 1.5.2 Bricks

---

Bricks shall be first quality selected 70mm bricks or 90mm **Monier clay bricks** as specified.

Brick slips, if required, shall be **Monier bricks** cut to 20mm by **Monier** or site cut. If brick veneer is to be plastered use **Monier Plaster Presto** bricks.

## 1.5.3 Mortar

---

Shall be manufactured from cement, sand, lime and / or additives complying with the relevant standards in NZS 4210:2001. All mortar shall have a minimum compressive strength of 12.5 MPa to the requirements of the Standard.

Mortar, which is to be coloured, shall incorporate no more than 3% oxide by weight. Allow to produce a sample panel 600 x 5 course high for approval. Mortar shall incorporate an approved waterproofing and plasticising agent and this may be substituted for the lime if used in the correct proportions specified by the manufacturer.

'Dricon' Trade Mortar may be used.

# 1.6 Bricklaying

---

All pallets shall be checked by the bricklayer, on site for colour, batch number and quality prior to commencing any laying. Any problems with the product must be sorted out with MonierBrick before the bricks are laid.

The bricks must be laid from at least three pallets where practical, to provide an even spread of colour over the area of the wall. Do not lay any bricks, which have obvious defects.

If it appears there will be a shortage of bricks on the job, STOP immediately until more are delivered in order that the new ones can be blended with sufficient ones left on the job.

Bricks shall be laid dry, in stretcher bond, with  $\frac{1}{2}$  bond pattern (ie. corner bricks are cut to 190mm for 70mm bricks), plumb and level in accordance with the best trade practice and in full accordance with **Monier's Specification**, details and recommended procedures.

All bricks shall be fully bedded in mortar.

Supply and install bricks using the appropriate screw fixed brick ties to all veneer walls.

Brick ties must be laid in the middle of the mortar course as required by NZS 3604 unless an alternative solution is provided (such as the BRANZ report ST0577 on ties positioned directly on top of MonierBrick 70 series brick).

Ties are to attach to timber support members or structural concrete.

Use stainless steel brick ties in salt sea spray zones.

Provide soldier courses to openings if and where shown.

All joints generally shall be 10 mm, +/- 3mm. All joints both horizontal and vertical (perpends) shall be consistent in thickness and fully filled with mortar. No joint may be less than 7mm or more than 13mm with the exception of the first joint on the foundation which can be up to 20mm.

Take particular care to maintain a clean cavity either by the use of boards in the cavity, which are raised as the work proceeds, or by the thorough cleaning of the cavity at the end of each laying period. Clean out openings (wash outs) shall be provided along the base every 10<sup>th</sup> brick and at corners.

Co-operate with the CONCRETOR and CARPENTER in the set out, and planning of the job.

Bricks shall be cut to a clean sharp edge using a diamond saw. It should not be necessary for any piece of brick less than 50mm in length to be laid.

Window sills should all be laid at the same slope, 15 - 20 degree slope, with an over hang of 30 - 50mm unless otherwise detailed. Bricks shall be evenly spaced and of an even thickness and appearance.

Keep all bricks on site dry so they do not become saturated. Keep the tops of pallets covered, bricks stacked around site covered and the top of uncompleted veneers covered. This requirement applies during any inclement weather or when the job has been left for the day. All brick veneer must be fully protected from rain for a period of 6 hours after the bricks have been laid.

Brick ties shall be positioned along the wall at max. 600mm centres and max. 400mm vertically.



### **Systems.**

Form wall cavity between structural wall and brick veneer (minimum 40mm) and maintain cavity dimension indicated on the drawing. Ensure the cavity is maintained clear of mortar droppings and clean mortar off ties as the work proceeds. Clean off mortar daggs and protrusions from the cavity face. It is essential that care be taken at this stage to avoid any bridging of the cavity.

Form weepholes in the bottom course of walls at ground level, intermediate beams and ledges and wherever the cavity is closed at the base such as window and door openings. Weepholes shall be formed wherever the cavity is closed at the base. Weepholes shall be formed every third perpend ( 1000sqmm/lineal metre of wall) and shall be clean and free of mortar and other restrictions. Where **Monier bricks** are to be painted or plastered, the area may be reduced to 500sq.mm/sq.metre of wall, top and bottom.

Supply and fix ties to all veneer walls as bricks are laid. Tie sizes shall vary to suit the varying widths of cavities. Wall tie anchorage shall be 35mm minimum into the mortar, with 15mm minimum cover from weather face. Additional ties shall be placed within 200mm of the edge around openings and at the end of unsupported wall panels.

It shall be the Bricklayer's responsibility to supply and fix all galvanized or stainless steel angle lintels as shown on the drawings and conforming with NZS 3604:1999. If the **Monier Steel-less Lintel system** is to be used the bricklayer is to adhere strictly to the specification detailed in Design Note A7.

## **1.7 Mortar Joints and Pointing**

---

Mortar shall be mixed in accordance with NZS4210 using the materials previously specified. All mortar shall be mixed in a mechanical power mixer for 4 - 8 minutes, in the proportions specified to achieve a slump of 75mm ± 6mm. No re-tempering of mortar will be allowed after 1 ½ hours from mixing.

Mortar shall incorporate the colouring agent specified. Ensure that the agent is well and evenly spread throughout the mix and is accurately batched between mixes.

Mortar must be mixed by volume and the main contractor advised at the commencement of the contract of the ratio to be used. All joints are to be tooled smooth.

## **1.8 D.P.C.**

---

Before the commencement of brickwork co-operate with the builder in the coating of the base of cavities and faces of block work with three (3) coats of Mulseal bituminous latex emulsion d.p.c. or similar. Ensure that the substrate for the damp-proofing is clean and free from dust, protrusions and mortar droppings.

All window and door openings are to have 200 - 300mm wide polythene flashings, which are to extend a minimum of 200mm each side of the opening, as well as a metal head flashing of aluminium or stainless steel. The polythene flashing is to span the cavity and tuck into the back of the lintel. The sides and sills of all openings are to be flashed in a similar manner.

Bricks below ground are to be sealed to prevent ground salts rising up the wall, and a d.p.c is to be incorporated into a mortar course in the bottom three rows of bricks to prevent salts rising up the wall.

## **1.9 Movement Control Joints**

---

Where seismic control joints are positioned through any buildings, they are to extend in a vertical 10mm line through the veneer.

**Monier clay bricks** do not require movement control joints under normal circumstances, however, on panels that are greater than 10m without any openings, install one 10mm joint at 5.0 - 6.0m intervals.

## Monier Brickwork Specification Specification S1 — Dec 2011

### 1.10 Building

---

As the work proceeds, build into brickwork all necessary bolts, METALWORK items including steel angle lintel bars and other fittings and fixings shown on the drawings or otherwise required for the work. The bricklayer shall ascertain from all other subcontractors all particulars relating to their work which affects brickwork with regard to order of the execution of the work and details of all such provision of fixings, sleeves, chases, holes etc. and of all necessary items to be built in and shall ensure that all such items are provided for and/or positioned. No claim will be recognized or allowed for extra cost of cutting away or drilling brickwork already executed in consequence of any neglect of the BRICKLAYER to ascertain these particulars and make the necessary provisions beforehand.

Ensure that the correct level of timber treatment has been used in the framing prior to laying the bricks. In general, (NZS3602) on external walls, untreated framing is permitted on single storey, H1.2 min on 2 storey veneers.

### 1.11 Grouting

---

Grouting shall be fine grout conforming to NZS 4210: 2001 Clause 2.2 for reinforced brick masonry.

### 1.12 Cleaning and Completion

---

Take precautions during the erection of the brick walls to avoid mortar splash and surface damage. Clean all face work as the work precedes using clean water and sponges. On completion, the brickwork is to be left in a clean condition, free of mortar smears and staining. Acid is not to be used to clean the bricks unless **Monier** give approval to do so.

Vanadium salt stains (bright green/yellow/blue) if present, are to be removed by the bricklayer on completion of the project by washing the bricks with CLR Clear or a solution of Sodium Hydroxide (Caustic Soda) 60gm/litre of water.

Scaffold planks should be kept at least 150mm clear of the face of the brickwork to allow mortar droppings to fall clear and not foul the brickwork. At the end of the each days work, or during wet weather, the plank nearest the wall should be propped on edge to prevent any mortar build-up from being splattered on the wall.

### 1.13 Two Storey Brick Veneer

---

Brick veneer over 4.0m in height must be installed in strict accordance with the details on the plans and **Monier's Design Note TB1**. The bricklayer must be fully conversant with this document prior to commencing work.

### 1.14 Slip Bricks

---

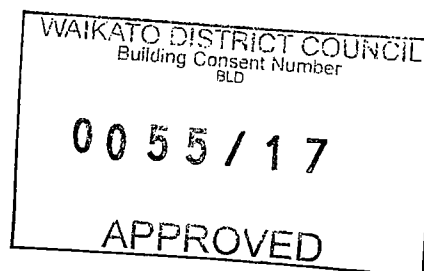
Brick Slip work is to be installed as per the details and instructions on the working drawings, which apply only to a **Monier brick product**. Should further assistance be required contact the **Monier Technical Helpline**.

#### 1.14.1 Specific Details

---

Refer to the **Monier's Technical Literature**, available at [www.monier.co.nz](http://www.monier.co.nz) for confirmation of any ambiguous or required details to ensure full compliance with NZS codes and MonierBrick related details.

The **Monier Technical Helpline** for their products is **0800 507 600**.





# N-10

## Thermal break and cavity construction



Version 1.2



Chartered Professional Engineers



## Contents

Title Page .....	i
Contents .....	iii
1.0 Introduction.....	1
1.1 Project Brief.....	1
1.2 Background.....	1
2.0 Thermal breaks.....	2
2.1 Thermal break requirements .....	2
2.2 Condensation.....	3
2.3 Ghosting.....	4
2.4 Thermal Break Recommendations .....	5
2.4.1 Minimum .....	5
2.4.2 Better .....	5
2.4.3 Best.....	5
3.0 Wall and Cavity Construction.....	6
3.1 Thermal break types .....	6
3.1.1 Unventilated air gaps.....	6
3.1.2 Strips of insulation .....	7
3.1.3 Sheets of insulation.....	7
3.2 Underlay.....	7
3.3 Wall Construction Recommendations .....	9
3.3.1 Direct-fixed Cladding.....	9
3.3.2 Cladding Fixed Over a Cavity .....	10
4.0 Thermal Efficiency Requirements .....	12
4.1 Wall R-value Graphs .....	12
4.2 Roof R-value Graphs.....	13
5.0 Conclusions .....	15
6.0 References .....	16
7.0 Appendix A – Wall R-values	
8.0 Appendix B – Roof R-values	



## **1.0 Introduction**

### **1.1 Project Brief**

NASH NZ commissioned Redco NZ Ltd to investigate the requirements, to formulate minimum construction details and to give clear guidance for thermal breaks and cavity construction on light steel frame buildings within New Zealand, with the requirement to identify the correct requirements for a thermal break on light steel framing to comply with the current New Zealand Building Code (NZBC) in non-cavity and cavity wall construction.

The specific objectives for the project are summarised as:

- 1) Identify the minimum R value required between a light steel frame system and the outer face of any cladding.
- 2) Determine how any thermal break should be applied to framing and whether there is a requirement for the break on plates and nogs, and how this applies to different common claddings.
- 3) Determine the acceptable locations that building wrap can be used within the wall cavity.
- 4) Specify the thermal break requirements for cavity construction.
- 5) Produce simple solution graphs for standard wall and roof construction R values for light steel frame construction.
- 6) Provide information to the DBH for changes to any legislation that may be required.

### **1.2 Background**

NASH NZ had an earlier report prepared in 1992, HERA Report R4-72<sup>1</sup>. The testing carried out for that report laid the foundations for all thermal break consideration in New Zealand since. At that time the NZBC requirement was for a minimum of R1.5 for framed wall construction, for both condensation control and energy efficiency. The energy efficiency requirements have since been increased and are likely to be further increased in time. The requirements for framed walls, using the Schedule method, are now R1.9 in Climate Zones 1 and 2, and R2.0 for Climate Zone 3.

Also cavity construction has become the generally accepted method of construction.

This report aims to update the situation, and to ensure that the correct information to enable the light steel framing industry to comply with the requirements of NZBC is available to all involved, to ensure correct complying systems are implemented.

This report has been compiled using research from the sources listed in the References and from calculations completed using the methods contained in NZS 4214:2006.



## 2.0 Thermal breaks

Thermal breaks reduce the effects of thermal bridging. Thermal bridging occurs where there is a high heat conductance path. In light steel wall framing this occurs anywhere steel members penetrate through the insulation such as at studs, nogs, bottom plates, and top plates. These members allow heat to move from the warmer interior to the colder exterior through the steel, by-passing any insulation placed between them. This leads to localised cold areas over the framing on the interior face. If the surface temperature is below the internal dew point condensation can form on these cold bridges. As well as the risk of condensation, thermal bridges will also significantly reduce wall R-values.

Thermal breaks, created by fixing insulation to the outside faces of the steel framing, can significantly reduce the amount of thermal bridging. This insulation should be placed on the exterior rather than the interior face, otherwise the condensation could occur within the wall build up. Insulation placed as thermal breaks reduces the thermal bridging and as such is more effective in increasing the overall wall R-value than the same amount of insulation placed within the framing.

## 2.1 Thermal break requirements

The minimum thermal break requirement for light steel framing is stated in Clause E3 of the New Zealand Building Code<sup>2</sup>, which sets the requirements for the control of internal moisture. The two most relevant sub clauses being:

### *“FUNCTIONAL REQUIREMENT*

*E3.2 Buildings must be constructed to avoid the likelihood of –*

*(a) Fungal growth or the accumulation of contaminants on linings and other building elements; and...*

and

### *“PERFORMANCE*

*E3.3.1 An adequate combination of thermal resistance, ventilation and space temperature must be provided to all habitable spaces, bathrooms, laundries, and other spaces where moisture may be generated or may accumulate.”*

Acceptable solutions to meet these requirements are then outlined in E3/AS1:

### *“1.1 Thermal resistance*

*1.1.1 R-values for walls, roof and ceilings shall be no less than:*

*a) For light timber frame wall or other framed wall construction with cavities, 1.5.”*

and

*“1.1.4 For the construction to be acceptable:*

*...*

*d) Where steel studs are used, a thermal break shall be provided for each steel member. Wood fibre insulating board or expanded polystyrene (EPS) strips, 12mm minimum thick and fixed directly behind the external cladding provide an effective thermal break.”*



The durability of wood fibre board has been questioned and should be checked with the manufacturer and territorial authority before use.

## 2.2 Condensation

Acceptable Solution E3/AS1 requires that the control of fungal growth is achieved by minimising the risk of internal condensation through maintaining the correct balance between interior temperature and ventilation. There are no minimum heating requirements for most buildings in New Zealand, but insulation will help to maintain a suitable interior temperature. A minimum R-value of R1.5 is specified for framed wall construction, as well as the requirement for a thermal break on steel studs. The thermal breaks nominated as providing an effective break are 12mm of wood fibre insulating board (no longer recommended due to durability) or 12mm of EPS.

These thermal breaks are not necessary to meet the overall R1.5 value as this can be achieved without the use of a thermal break, if the right cladding, wall insulation and stud depth are provided. Instead the thermal breaks are there to reduce cold bridging, which can lead to condensation on the framing and or inside face of the wall, which in turn can lead to fungal growth.

The two thermal breaks nominated in E3/AS1 have been drawn from the testing carried out by HERA into the thermal performance of steel framed walls published in report R4-72. The two thermal breaks were two of the breaks used in the 78mm deep wall assemblies tested and assessed for the risk of condensation. Thermal images were taken across the steel framed walls, so the variation in surface temperature could be determined. Then simplified hygrothermal design calculations, which are now described in ASHRAE 2009<sup>3</sup>, were used to calculate the temperature index, TI. This index is the ratio of the temperature variation across a surface to the temperature difference between the exterior and interior of the wall. The temperature index was then compared to New Zealand specific values proposed by H.A. Trethowen<sup>4</sup> to assess the risk of condensation. This risk was calculated to be low in all cases where the tested thermal breaks were included. The R-values of the tested thermal breaks which were then referenced in E3/AS1 ranged from R0.22 for 12mm of wood fibre insulating board (Triple S) to R0.32 for 12mm of expanded polystyrene (EPS).

The framing depth used in the testing was 78mm. Since the testing was carried out the standard framing depth has increased to 89mm. This extra depth slightly reduces the amount of thermal bridging.

Since HERA Report R4-72 was published a thermal break of R0.2 has been taken by NASH as being adequate to minimise the risk of condensation and this is still considered adequate as a minimum value.

Recently BRANZ has promoted a minimum thermal break R-value of R0.3 based on the value of the referenced EPS strip of R0.32.

In practice, thermal break strips of 10mm EPS (R0.25) are commonly used as an alternative solution based on these strips still providing an R-value within the range of that provided by the referenced materials.





**With this background, it is now proposed that the minimum thermal break R-value be taken as R0.25.**

In order to update and clarify this issue, it should be recommended to the Department of Building and Housing that the wording of E3/AS1 Clause 1.1.4 d) be amended to:

***d) Where steel framing is used, a thermal break with a minimum R-value of 0.25 shall be provided at the outside face of each steel member. Expanded polystyrene (EPS) strips, minimum 10mm thick provide this value, but other materials or methods may be used to provide this minimum R-value of 0.25.***

### 2.3 Ghosting

A phenomenon widely reported in the United States literature on steel framing is that referred to as "ghosting". Ghosting occurs where darker areas are found over thermal bridges, due to the greater rate of accumulation of airborne dust and dirt on colder surfaces compared to adjacent warmer surfaces. These darker areas are often mistakenly assumed to be fungal growth. However, this is an aesthetic issue rather than a health or durability issue. Previous research carried out by United States Steel<sup>5,6</sup> indicated that minor (acceptable) ghosting occurred on surfaces with a 2°C temperature difference on the inside wall surface while considerable (unacceptable) ghosting occurred with a temperature difference of approximately 5°C (ghosting appearing in under two years). The seriousness of the problem is therefore dependant on the time it takes for ghosting to appear and how often the wall is redecorated.

The testing carried out for HERA Report R4-72 found a maximum surface temperature variation of 5°C with R0.2 thermal break strips. The temperature difference between inside and outside was with approximately a 15°C. Parallel research carried out by Oak Ridge National Laboratory<sup>7</sup> (ORNL) in the US also recorded surface variations for a range of wall assemblies with a 28°C temperature difference. The two most relevant thermal breaks were ½" sheets of XPS (R0.5) and plywood (R0.1). The XPS gave a surface temperature variation of 3.7°C and the plywood 7.2°C.

The 28°C temperature difference used in the US testing is conservative for the New Zealand climate. However the results provide a thermal break R-value that should eliminate any risk of ghosting. The 5°C temperature variation recorded in the HERA testing would indicate under New Zealand conditions a thermal break with an R-value of R0.2 has a considerable risk of ghosting. This provides a lower limit for thermal break performance.

In both the HERA and ORNL cases, testing was carried out on a minimum wall build-up to concentrate solely on the performance of the wall framing. In the HERA testing 10mm plasterboard was direct fixed on both faces. In practice there is usually a larger wall build-up which will reduce the temperature variation across the inside surface of the wall. The framing tested by HERA (70mm deep, 32mm wide, 1.2mm total coating thickness (TCT)) is also different to that typically used today (90mm deep, 40mm wide, 0.75mm TCT). The shallower section and thicker TCT would cause more thermal bridging and therefore a greater temperature variation across the inside surface. However the wide section used today would increase thermal bridging. Given these differences and considering New Zealand's climate, a thermal break between R0.3 and R0.5 is required to minimise the risk of ghosting. This is comparable to the minimum thermal break required in other countries.



Germany and The Netherlands, which have colder climates, require R0.5 sheathing and the US recommends a minimum of R0.54 sheathing, depending on the climate zone.

## 2.4 Thermal Break Recommendations

From the research carried out into the thermal performance of light steel framed walls we would recommend the following thermal breaks based on a 'minimum', 'better' and 'best' rating.

### 2.4.1 Minimum

This is the lowest performance thermal break that will satisfy the present Building Code requirements of E3, Internal Moisture. The risk of condensation is minimised, but thermal bridging still significantly reduces the thermal performance of insulation placed between studs and makes meeting H1 targets difficult. Ghosting could also be a significant issue depending on climate zone and cladding. The "Minimum" thermal break is therefore not recommended for walls shaded for over 50% of the day in winter.

"Minimum" thermal break:

All Climate Zones	R0.25 strips (e.g. 10mm EPS), with a width equal to width of the section (plus 30mm if outside underlay), placed over all wall framing (studs, plates and nogs)
-------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------

### 2.4.2 Better

"Better" thermal breaks effectively eliminate the risk of condensation and minimise the risk of ghosting. They also ensure there is a good overlap between the wall insulation and thermal break to stop bridging at the edges of the flange and minimises the effects of poor installation.

'Better' thermal break:

Climate Zones 1 & 2	R0.35 strips (e.g. 10mm XPS or 15mm EPS) with a width equal to the width of the section (plus 30mm if outside underlay)
Climate Zone 3	R0.40 sheath (e.g. 15mm EPS sheets)

### 2.4.3 Best

As well as the advantages of the "Better" thermal break recommendations, "Best" thermal breaks reduce the temperature difference across the face of the wall to the point where they are negligible. They also significantly boost the walls thermal performance, to increase the thermal efficiency of the building or allow a reduction in insulation placed between the framing.

'Best' thermal break:

Climate Zone 1 & 2	R0.40 sheath (e.g. 15mm EPS sheets)
Climate Zone 3	R0.50 sheath (e.g. 15mm XPS or 20mm EPS sheets)



### 3.0 Wall and Cavity Construction

The thermal break can be constructed in different ways:

The most direct way is by fixing insulation directly to the framing. However, the thermal break can also be achieved with a uniform unventilated air gap, provided one of the faces has a high emittance, such as that provided by galvanised steel. This could be provided by fixing the wall underlay to the outside of solid thermal breaks, but in practice there is very little advantage in doing this.

To minimise the possibility of internal condensation a minimum thermal break of R0.25 is required and to minimise ghosting this should be at least R0.3. A minimum thermal break needs to be applied over all thermal bridges caused by steel framing. Thermal bridges are formed everywhere the framing cuts through the insulation, so this includes studs, top plates, bottom plates and nogs.

The type of thermal break used and its location depends on the cladding type and whether a cavity is required, which is stipulated by NZBC E2 External Moisture.

E2 stipulates the performance requirements for the control of external moisture. To meet these requirements Acceptable Solution E2/AS1, describes how various wall claddings should be detailed. The scope of these solutions is limited to timber framed buildings, however these solutions have been shown to be applicable to light steel framed buildings designed to NASH 3405. Depending on the type of cladding and situation it is used, E2/AS1 can require a cavity. A cavity is defined as:

*"A cavity space, immediately behind the wall cladding, that has vents at the base of the wall"*

A cavity space can be known as a "drained cavity" or as a "drained and vented cavity" and as per E2/AS1 it has been referred to as a "cavity" in this report.

At present, common practice is to use either use 10mm EPS (R0.27) or XPS (R0.37) strips or sheets for thermal breaks. Where a cavity is required 20mm EPS (R0.56) or XPS (R0.74) strips can be used. The strips are usually placed outside the wall underlay and used to form the cavity. Typically they are only fixed to the studs. When sheets are used they are fixed under the underlay and cover the whole wall.

### 3.1 Thermal break types

Three types of thermal breaks have been considered, unventilated air gaps, strips of insulation and sheets of insulations.

#### 3.1.1 Unventilated air gaps

It is possible to achieve a R0.3 thermal break with approximately 10mm unventilated air gap provided one surface has a high emittance such as galvanised steel<sup>8</sup>. A 5mm air gap was tested in HERA Report R4-72 and found to provide a thermal break of at least R0.2.

The simplest way of creating this type of thermal break is to fix the wall underlay over the outside of other solid thermal breaks. Solid thermal breaks are required on the studs, bottom plate and top plate, so the only saving would be at the nogs. The underlay also



needs to be well fixed to avoid any air movement in or out of the air gap formed over the noggs.

In practice, there appears to be very little advantage of relying on unventilated air gaps created in this way for thermal breaks. The position of the wall underlay is restricted to being fixed outside the thermal break strips, so the thermal break strip can't be used to form the cavity. The achievable R-value of an unventilated air gap is also limited, which will be an issue if R-value requirements are increased further.

Even though using unventilated air gaps specifically as thermal breaks might not be advantageous, their insulating ability negates the effects of small gaps in solid thermal breaks, provided the underlay is installed outside the thermal break.

### 3.1.2 Strips of insulation

A thermal break can also be formed using strips of insulation, which are at least the width of the flange, stuck or screwed to the framing. Strips use the least amount of material and are typically made from expanded polystyrene (EPS) or extruded polystyrene (XPS). The recommended width and how well the strips are fitted is mainly dependant on where the underlay is located.

If the strips are located outside of the underlay, which has become common practice when a cavity is required, they need to be fitted tightly together without any gaps and should overlap the insulation. For materials with a thermal conductivity lower than  $0.040\text{W/m}^\circ\text{C}$  (EPS and XPS) the overlap should be at least 15mm each side of the section. For materials with a thermal conductivity of  $0.041\text{W/m}^\circ\text{C}$  to  $0.12\text{W/m}^\circ\text{C}$ , the overlap should be 30mm. This ensures there are no areas where the steel is exposed to the outside.

If the breaks are located inside the underlay workmanship is less critical and the width of the strips can be reduced. Any exposed steel will be covered by an unventilated air gap, which will act as a thermal break anyway. Walls for the original HERA tests were assembled this way. This position of the underlay also provides a thicker wall section area to fit insulation into.

### 3.1.3 Sheets of insulation

Sheets of insulation can also be fixed to the framing to form a thermal cavity. Typical materials are XPS, EPS and Urethane foam. The main advantage with sheets is that insulation added to the outside of the framing is more effective than that added between the studs. External insulation reduces both thermal bridging and adds insulation. Detailing, which allows insulation to be added to the outside of the framing will easily accommodate future increases in insulation requirements.

## 3.2 Underlay

The location of the underlay affects the performance of the thermal break and the location of possible condensation. The benefits of placing the underlay on the outside of the thermal break to the performance of the thermal break have been outlined in previous sections, so the main issue is condensation. Depending on the type of construction, internal conditions, and climate, there is a possibility of condensation in most regions of New Zealand. It is generally agreed that under New Zealand conditions and construction if condensation



occurs, it occurs on the wall underlay. Putting the underlay outside of the thermal break is therefore recommended to avoid any condensation coming into contact with the steel framing where it could potentially cause corrosion problems.

The only time there is an advantage in placing the underlay under the thermal break is when thermal break strips are used to form a cavity. For any other type of construction there is no advantage and it should be fixed outside the thermal breaks. Advice from BRANZ published in Build 110<sup>9</sup> states that for walls constructed with a cavity and a breathable underlay fixed to the outside of the framing, as detailed in Figure 4 of Build 99, condensation will never form under New Zealand conditions. Therefore, for this type of wall assembly there should not be a problem fixing the underlay to the framing.

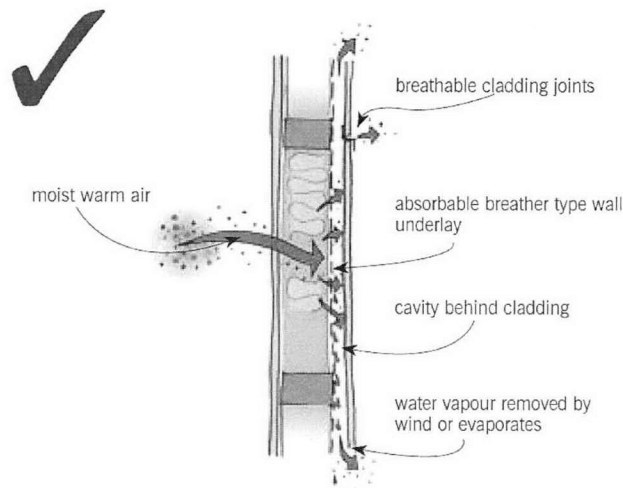


Figure 4: Options to remove water vapour outside through a wall.

Figure 4 of Build 99

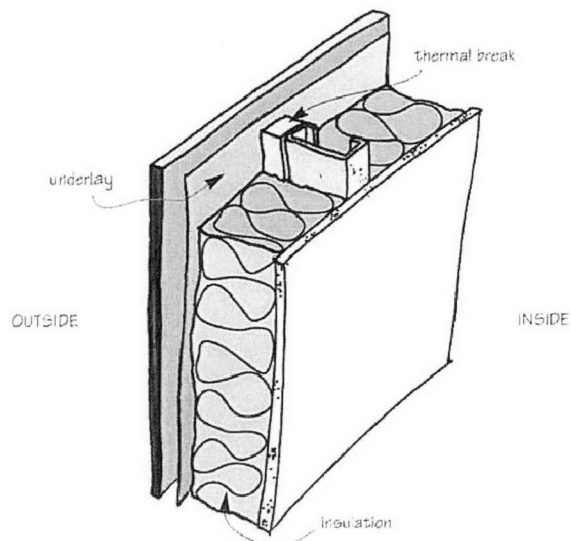
If under any circumstances, condensation were to form, it would readily evaporate from the cavity when the conditions returned to normal. Unlike timber, where this condensation could be absorbed and possibly become an issue, steel studs do not absorb any moisture. Fixing the underlay under the thermal break strips is therefore acceptable provided the strips are used to form a cavity.

Care needs to be taken in choosing the appropriate building underlay when it is in direct contact with the steel framing. Generally an absorbent paper-based underlay is recommended, however the suitability of specific products should be checked with the manufacturer. Further guidance can also be found in NZS 2295.

In summary, the selected underlay should generally be fixed to the outside of the thermal break. This reduces the effects of gaps in the thermal break and ensures that any condensation that might form will be kept away from the steel framing. It is, however, acceptable to fix the underlay to the framing under the thermal break if the thermal break is being used to form a cavity.

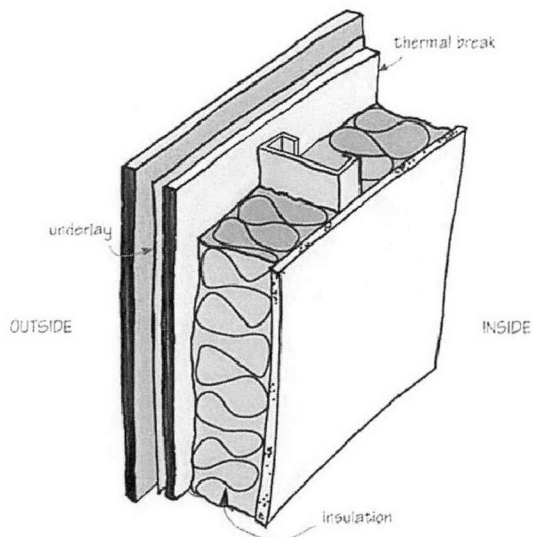
### 3.3 Wall Construction Recommendations

#### 3.3.1 Direct-fixed Cladding



Thermal break strips inside underlay

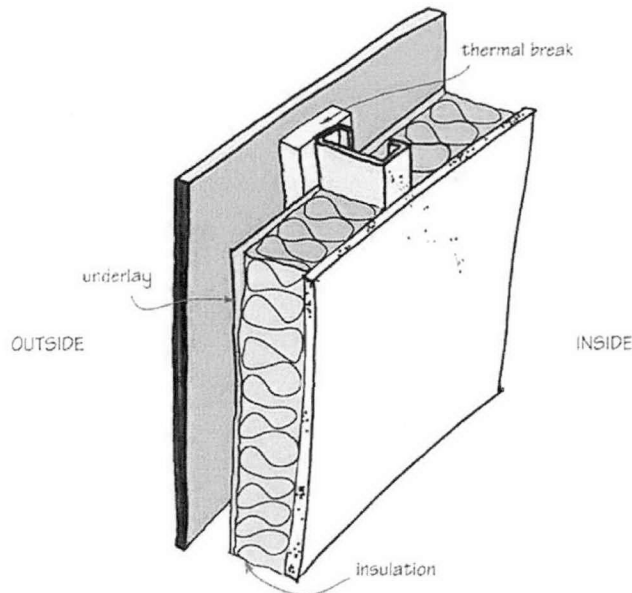
Wall underlay fixed to the outside of the thermal break ensures that any possible condensation is kept away from the framing, gaps in thermal break are not critical and there is a greater depth for insulation.



Thermal break sheath inside underlay

Wall underlay fixed to the outside of sheet insulation maximises thermal performance and ensures that any condensation would be kept away from the framing.

### 3.3.2 Cladding Fixed Over a Cavity



Thermal break strips outside underlay

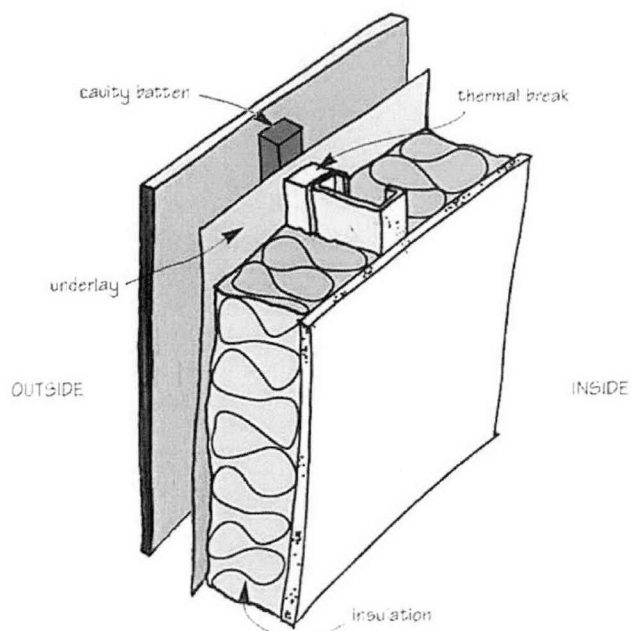
Thermal break strips fitted outside the underlay are acceptable with a cavity. The thermal break needs to be fitted with no gaps and needs to lap the insulation either side of the section as follows:

- For Materials with a thermal conductivity lower than  $0.040\text{W/m}^{\circ}\text{C}$  (EPS and XPS) this should be at least 15mm.
- For materials with a thermal conductivity of  $0.041\text{W/m}^{\circ}\text{C}$  to  $0.12\text{W/m}^{\circ}\text{C}$  this would need to be 30mm.

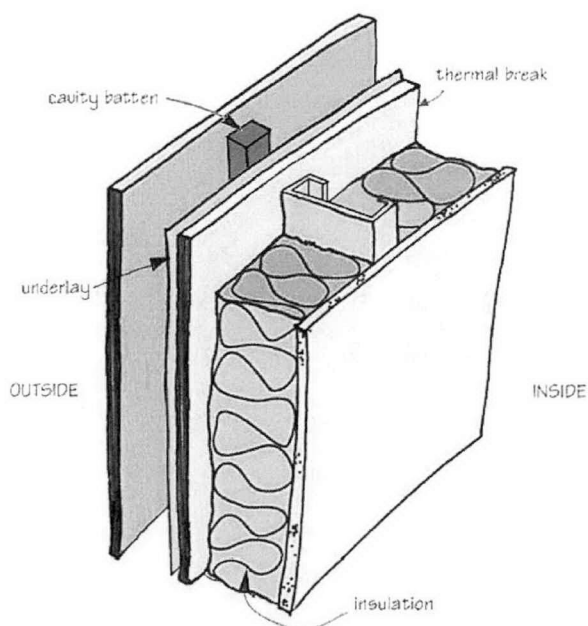
The thermal breaks fixed to the nogs, bottom and top plates must be thinner than those used on the studs so that the cavity can drain and ventilate. If 20mm battens were used on the studs, 10mm EPS strips could be used on the nogs and plates. The reduced depth of the horizontal thermal breaks would provide an opening of approximately  $5600\text{mm}^2$  per stud spacing, which is greater than the minimum E2 requirements for both the cavity spacers,  $2000\text{mm}^2$  (E2 9.1.8.2) and the cavity base closure,  $1000\text{mm}^2/\text{m}$  (E2 9.1.8.3) The reduced depth will therefore allow adequate air movement through the cavity.

The cavity closure should be made from plastic to avoid thermal bridging along the bottom plate.





Thermal break strips inside underlay



Thermal break sheath inside underlay



## 4.0 Thermal Efficiency Requirements

H1 of the Building Code stipulates the energy efficiency requirements for buildings. To demonstrate a building meets these requirements, H1/AS1 describes three methods that can be used, Schedule, Calculation and Modelling. The most relevant for the majority of residential buildings are the schedule and calculation method. To help with these methods simplified R-value graphs have been produced to NZS 4214:2006.

The Schedule method requires that each building element, wall, roof, floor, etc has a minimum insulation value taken from the schedules. These depend on the type of construction and the buildings location. For example buildings in the South Island (Zone 3) require higher insulation values than those in the Far North (Zone 1).

The Calculation method allows a little more flexibility and looks at the overall heat loss from the building. It requires the calculation of the heat loss from a reference building similar to the one proposed, but with a specified percentage of glazing and all the building elements insulated as specified in the schedule method. The heat loss from the reference building is then compared it to the actual heat lost from the proposed building and provided that the proposed building has a lower overall heat loss than the reference building, the actual element insulation values can be lower than the ones specified in the schedule method. However there are limits on maximum reduction and E3 requirements still need to be met.

The following graphs have been provided to assist specifiers in working out the insulation and thermal break R-values required to achieve the overall building element thermal performance specified in the above mentioned methods.

### 4.1 Wall R-value Graphs

These graphs have been created for range of typical wall assemblies using the isothermal planes method set out in NZS 4214:2006. Where possible, R-values have been taken from NZS 4214:2006. Unlike present typical timber frame insulation practice, steel framing usually uses thermal breaks. This means that the overall thermal performance of the wall is dependant on both the R-value of the insulation between the studs and the R-value of the thermal break. The graphs show the different insulation and thermal break combinations that will achieve the required overall thermal performance required.

Studs centres at 400mm and 600mm have been considered, which covers general residential construction. R-values for studs at 450mm centres can be taken from the values for 400 with little disadvantage. One row of nogs has been assumed. A total coating thickness (TCT) of 0.75mm has been used in all the graphs, because this is the thickest typically used. The thermal advantage of using steel with a TCT of 0.55mm is approximately R0.045 for studs at 600mm centres. 10mm of plasterboard has been taken on the internal face of all walls.

In addition to the specific wall assemblies, generic graphs have also been produced. These cover any cladding type and allow the user to add their cladding R-value. The user subtracts the thermal performance of the cladding assembly from the required R-value and then uses the chart to find the possible insulation and thermal break combinations that will achieve it.



These graphs have been split into four, covering studs at 400 and 600 centres, and strip or sheet thermal breaks.

The graphs can be found in Appendix A.

## 4.2 Roof R-value Graphs

Calculating the thermal performance of roof structures is more complicated than walls due to the 3D nature of the construction. In a wall the thermal bridge is continuous and constant all along the length of the framing members, but in a roof the thermal bridges are discrete penetrations (e.g. web members of a truss). These discrete penetrations create a "penetration" form of thermal bridge, which has a much lower thermal transfer than a continuous line thermal bridge. Also ceiling battens further complicate the issue. Very little research has been carried out in this area, but the best research found is from the US. Two reports in particular are, "Effect of Steel Framing in Attic/Ceiling Assemblies on Overall Thermal Resistance"<sup>10</sup> and "Thermal Performance of Cold-Formed Steel Ceiling/Roof Framing Assemblies"<sup>11</sup>. The latter investigates traditional ceiling joist and rafter construction while the former also considers trusses. The former concludes by providing simplified formulas for calculating thermal performance, to be used in design. The testing and analysis carried out for the report also found that the effects of thermal bridging reduced with distance from the "penetration" and didn't extend further than 600mm along the bottom chord. The report also noted that the penetrations in adjacent trusses/framing did not affect each other.

In both cases the ceiling tested (1/2" plasterboard) was directly fixed to the underside of the framing, which was spaced at 600mm centres, had a TCT thicker than 0.75mm, and "penetrations" (web members) spaced further apart than in typical New Zealand construction. The framing spacing and thicker TCT would give conservative results compared to typical New Zealand construction, while the spacing of penetrations would give less conservative results.

With roof trusses there are two areas to consider, near the heel of the truss, where the penetrations become congested, and mid span where the penetrations are further apart. Due to the greater number of penetrations near the heel thermal bridging at the heel will be greater and has been considered differently when calculating the overall R-value.

The following formulae derived from the former report have been used to determine the overall roof R-values.

In calculating the ceiling R-values, an average 10m wide trusses at 900mm centres has been considered. The truss has been divided into three areas, two 0.6m long sections at each end of the truss and one 8.8m long section in the middle. The 0.6m sections were considered the same way as walls with a 20mm air gap between the truss and plasterboard. The 8.8m centre section was calculated using the formula recommended by the report "Effect of Steel Framing in Attic/Ceiling Assemblies on Overall Thermal Resistance":

$$R_{\text{penetration}} = 0.864 \cdot R_{\text{insulation}} + 0.0581$$



As there was no interaction between adjacent trusses spaced at 600 centres or greater, the first 600 of width was calculated as described above and then the rest was calculated assuming no thermal bridging.

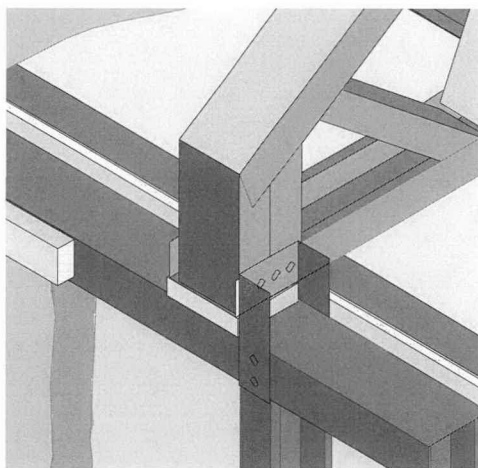
$$R_{\text{system}} = 600/\text{spacing} \cdot R_{\text{penetration}} + (\text{spacing}-600)/\text{spacing} R_{\text{full}}$$

The overall R-value was then taken as an average over the whole truss.

Two other issues to consider regarding the thermal performance of the roof are cold areas of framing under the insulation and thermal bridging between the heel of the truss and wall.

The penetrations through the insulation cause local cold spots on the framing beneath the insulation, which could lead to condensation. However the attic space is considered ventilated and dry with a low humidity. Any condensation forming on the bottom chord of the truss during the evening should therefore evaporate during the day and not accumulate causing problems.

Thermal bridging through the heel of the truss into the top plate of the wall can also occur. To prevent bridging, a thermal break should be provided between the heel of each truss and the top plate. This thermal break shall have a minimum R-value of 0.25 and can be achieved by the use of HD EPS or custom made plastic packers. These packers are commonly of the order of 25mm thick to match the depth of ceiling battens.



Detail showing a packer the under heel of a truss



## 5.0 Conclusions

A minimum thermal break with an R-value of 0.25 applied to all thermal bridges is adequate to meet the requirements of the New Zealand Building Code. On walls this would need to be on the studs, nogs, and bottom and top plates. From testing results this has been shown to minimise the risk of condensation, as required by the Code. This minimum thermal break might not be enough to prevent 'ghosting' (darker areas found over thermal bridges). Depending on the climate the rate of ghosting could be unacceptable, especially in colder areas. A set of better and best recommendations have therefore been made, which will ensure good visual and thermal performance.

The best location for the building underlay is considered to be outside of the thermal break. However if a cavity is used it is acceptable to fix the underlay directly to the framing under the thermal break, providing care is taken to ensure the thermal break is installed with no gaps and that it overlaps the insulation placed between the framing.

Care needs to be taken in choosing the appropriate building underlay when it is in direct contact with the steel framing. Generally an absorbent paper-based underlay is recommended, however the suitability of specific products should be checked with the manufacture. Further guidance can also be found in NZS 2295.

Simplified R-value graphs for both wall and roof construction have been created to NZS 4214:2006 to help with meeting HI requirements. These can be found in Appendices A and B.

Further research is recommended into the following areas:

- Thermal performance of typical roof truss and ceiling framing assemblies. This could demonstrate improved roof R-values to those calculated for this report, which are based on conservative assumptions.
- Thermal imaging of walls constructed using the recommended assemblies would provide more detailed information on the conditions required for condensation and ghosting.



## 6.0 References

- <sup>1</sup> Carson, W.J., Clifton G.C. and Trethowen H.A., "The Thermal Insulation Performance of Light-weight Steel Framed External Wall Elements". HERA Report R4-72, January 1993
- <sup>2</sup> Department of Building and Housing 2004. The New Zealand Building Code Clause E3: Internal Moisture. NZBC. Wellington, New Zealand.
- <sup>3</sup> 2009 ASHRAE Handbook Fundamentals, "Heat, air and moisture control in building assemblies – Fundamentals; Simplified hygrothermal design calculations and analyses; Surface humidity and condensation". American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA, 2009, pp. 25.12-13.
- <sup>4</sup> Trethowen H.A 1992. Private Communication. (Extracts from draft for NZS 4214:1978 relating to Temperature Index and condensation risk.)
- <sup>5</sup> Ratliff, G.D. and Roeder, G.M., "Thermal and Structural Behaviour of Walls Made with Steel Studs with Slit Webs". United States Steel Report 57.019-052(5), December 1971.
- <sup>6</sup> Crise, D.J., "Thermal Performance of Walls Framed with Steel Studs with Slit Webs". United States Steel Report 48.019-005(3), November 1972.
- <sup>7</sup> Barbour E., Goodrow J. Kosny J. and Christian J.E., "Thermal Performance of Steel Framed Walls". Oak Ridge National Laboratory Report C/ORNL93-0235. November 1994.
- <sup>8</sup> New Zealand Standard. "NZS 4214:2006 Methods of Determining the Total Thermal Resistance of Parts of Buildings". Standards Association of New Zealand. Wellington. 2006.
- <sup>9</sup> BRANZ, "Build 110, Letters, Water Vapour in Walls" Build 110, ISSN: 0110 4381. BRANZ. February/March 2009.
- <sup>10</sup> Petrie, T. W., Kosny, J., Atchley, J.A. and Desjarlais, A. O. "Effect of Steel Framing in Attic/Ceiling Assemblies on Overall Thermal Resistance". Insulation Materials: Testing And Applications: Fourth Volume, ASTM STP 1426, A. O. Desjarlais and R.R. Zarr, Eds. American Society for Testing Materials, West Conshohocken, PA, 2002.
- <sup>11</sup> Steven Winter Associates 1999. "Thermal Performance of Cold-Formed Steel Ceiling/Roof Framing Assemblies". American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA, ASHRAE Research Project 981-TRP. July 1999.



## 7.0 Appendix A – Wall R-values





### Any cladding with studs @ 600

Steel frame - cavity or direct fixed - 90mm framing, TCT ≤ 0.75, 10mm plasterboard

To find the required insulation possibilities to achieve an overall wall R-value carry out the following steps:

1. Decide on the required R-value.

(e.g. R = 1.9)

2. Determine the cladding and cavity R-value from Table 1.0 below and subtract this value from the R-value required to get the "Adjusted R-value"

(e.g. Adjusted R-value = 1.9 - 0.12 = 1.78 (Brick veneer with cavity))

3. Decide which type of thermal break to use, sheath or strips.

(e.g. sheath)

4. Use the adjusted R-value in the appropriate graph for the thermal break type to find the thermal break / framing insulation options that would give that value. From the Adjusted R-value look across and each time you cross a thermal break R-value line drop down to find the frame insulation R-value required to achieve the adjusted R-value with that thermal break.

(e.g. Possible options would be:

thermal break R0.4 with insulation R1.8,

thermal break R0.3 with insulation R2.2,

thermal break R0.2 with insulation R2.8.

5. These are the possible thermal break and cavity insulation combinations that with the specified cladding and cavity will achieve the overall desired wall R-value.

Table 1.0

Cladding	R-Value	
	20 to 50mm Cavity	Direct Fixed
Timber weatherboards	0.22	0.31
Cement weatherboards	0.14	0.13
AAC (50mm)	0.24	0.36
Stucco (20mm)	0.10	0.05
Corrugated Steel	0.09	0.03
Fibre cement sheet (7.5mm)	0.10	0.06
EIFS (50mm)	0.72	1.43
Brick veneer (70mm)	0.12	-
Plywood (12mm)	0.13	0.12
General	$0.09 + 0.45 * \text{R-value of cladding}$	$0.03 + \text{R-value of cladding}$

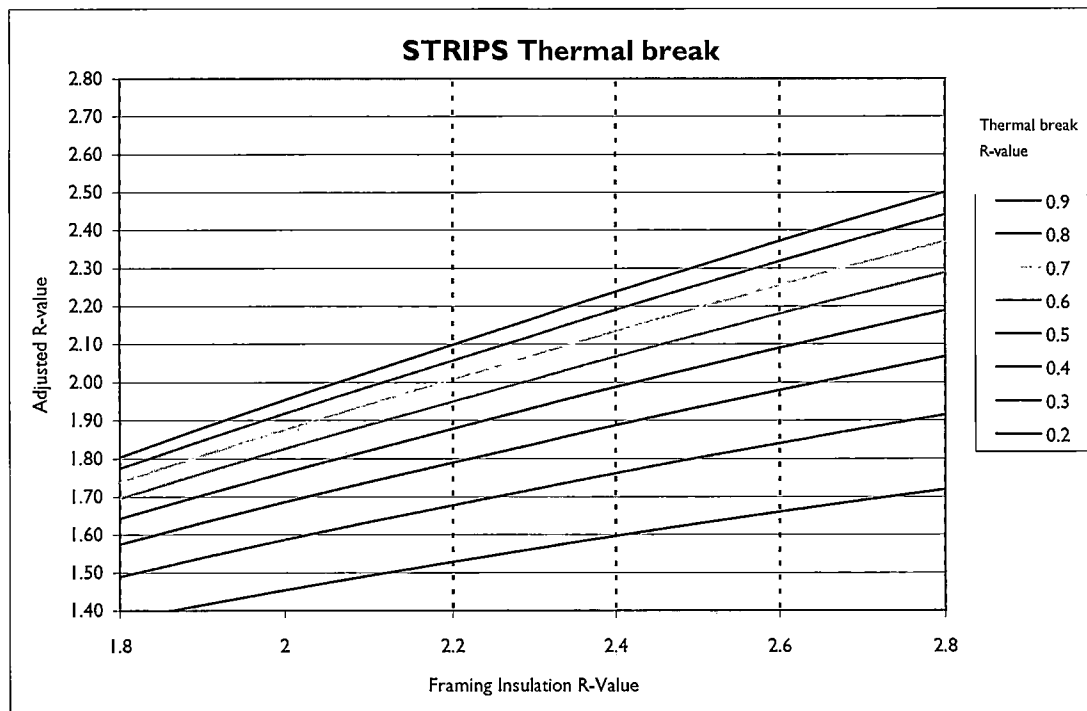
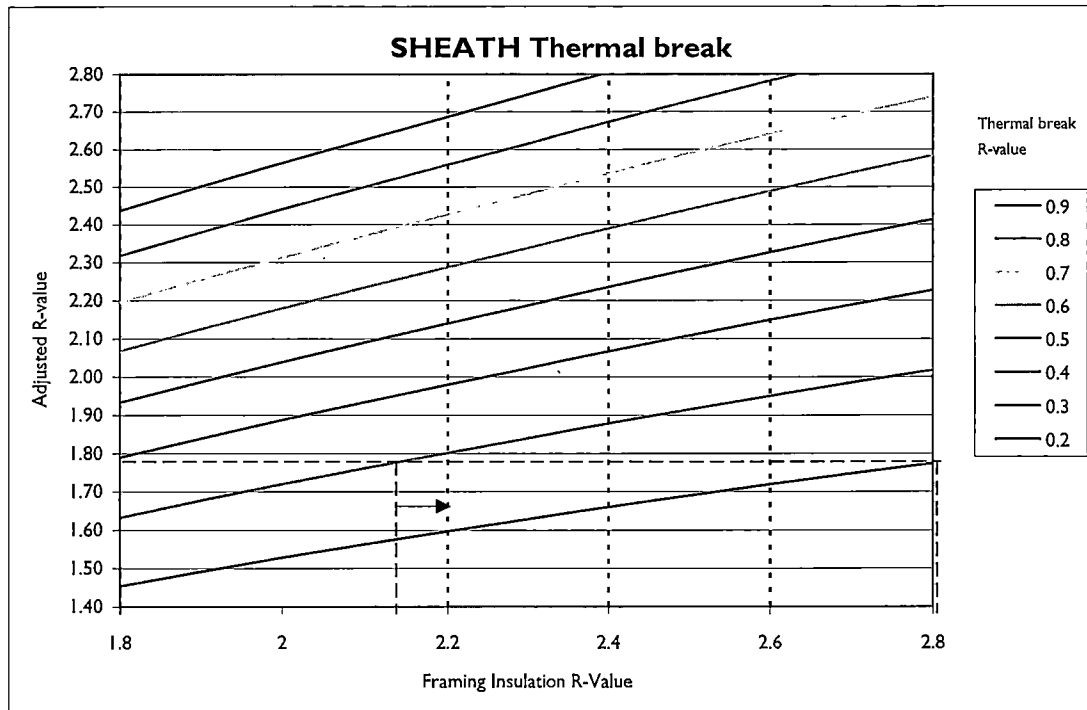
Table 2.0

Typical thermal breaks	Thickness (mm)	R-Value
EPS	10	0.29
	15	0.42
	20	0.56
	40	1.11
XPS	10	0.37
	15	0.56
	20	0.74
	40	1.48



### Any cladding with studs @ 600

Steel frame - cavity or direct fixed - 90mm framing, TCT ≤ 0.75, 10mm plasterboard



----- Typical framing insulation R-value



### Any cladding with studs @ 400

Steel frame - cavity or direct fixed - 90mm framing, TCT ≤ 0.75, 10mm plasterboard

To find the required insulation possibilities to achieve an overall wall R-value carry out the following steps:

1. Decide on the required R-value.

(e.g.  $R = 1.9$ )

2. Determine the cladding and cavity R-value from Table 1.0 below and subtract this value from the R-value required to get the "Adjusted R-value"

(e.g. Adjusted R-value =  $1.9 - 0.12 = 1.78$  (Brick veneer with cavity))

3. Decide which type of thermal break to use, sheath or strips.

(e.g. sheath)

4. Use the adjusted R-value in the appropriate graph for the thermal break type to find the thermal break / framing insulation options that would give that value. From the Adjusted R-value look across and each time you cross a thermal break R-value line drop down to find the frame insulation R-value required to achieve the adjusted R-value with that thermal break.

(e.g. Possible options would be:

thermal break R0.5 with insulation R1.8,

thermal break R0.4 with insulation R2.2,

thermal break R0.3 with insulation R2.6.

5. These are the possible thermal break and cavity insulation combinations that with the specified cladding and cavity will achieve the overall desired wall R-value.

Table 1.0

Cladding	R-Value	
	20 to 50mm Cavity	Direct Fixed
Timber weatherboards	0.22	0.31
Cement weatherboards	0.14	0.13
AAC (50mm)	0.24	0.36
Stucco (20mm)	0.10	0.05
Corrugated Steel	0.09	0.03
Fibre cement sheet (7.5mm)	0.10	0.06
EIFS (50mm)	0.72	1.43
Brick veneer (70mm)	0.12	-
Plywood (12mm)	0.13	0.12
General	$0.09 + 0.45 * \text{R-value of cladding}$	$0.03 + \text{R-value of cladding}$

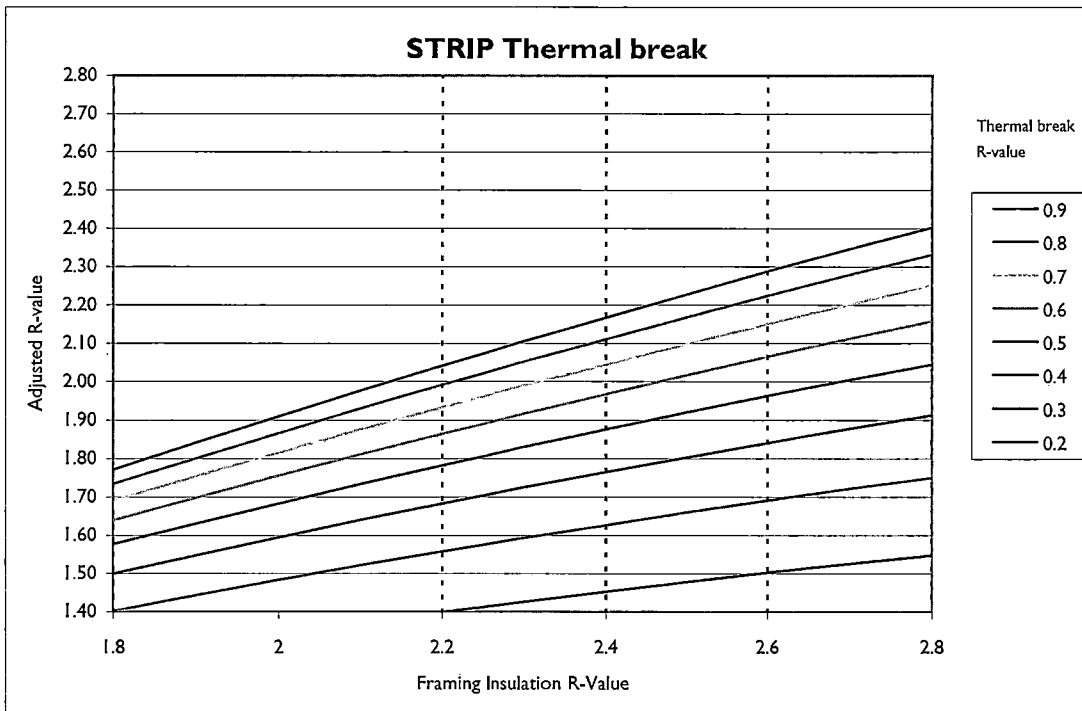
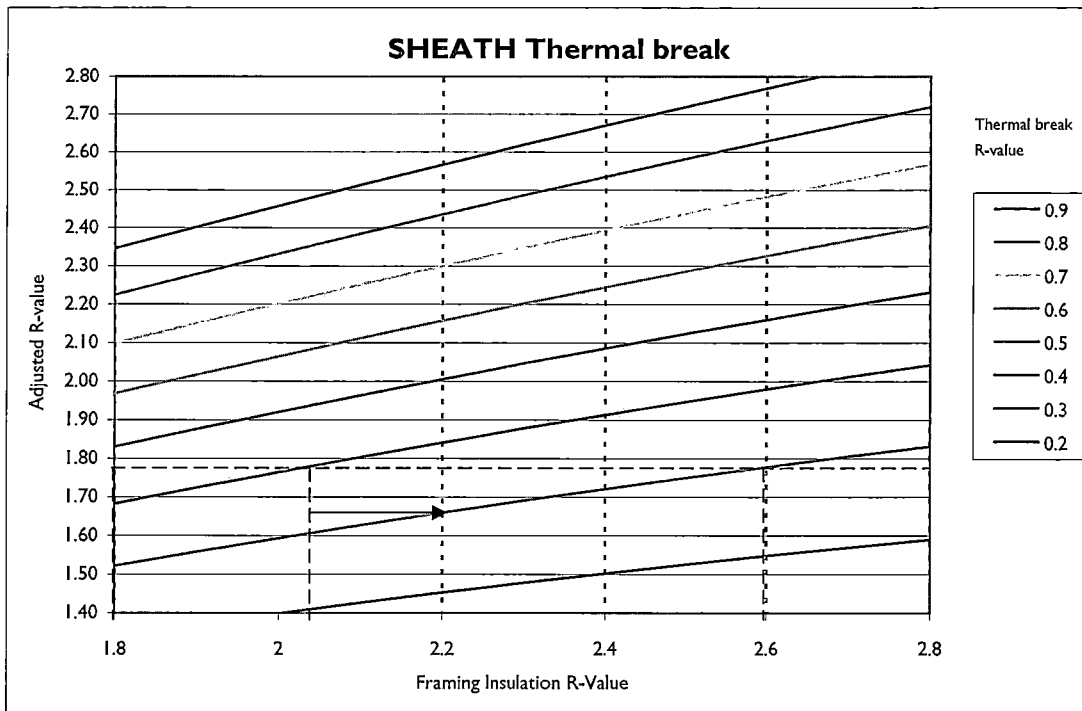
Table 2.0

Typical thermal breaks	Thickness (mm)	R-Value
EPS	10	0.28
	15	0.42
	20	0.56
	40	1.11
XPS	10	0.37
	15	0.56
	20	0.74
	40	1.48



### Any cladding with studs @ 400

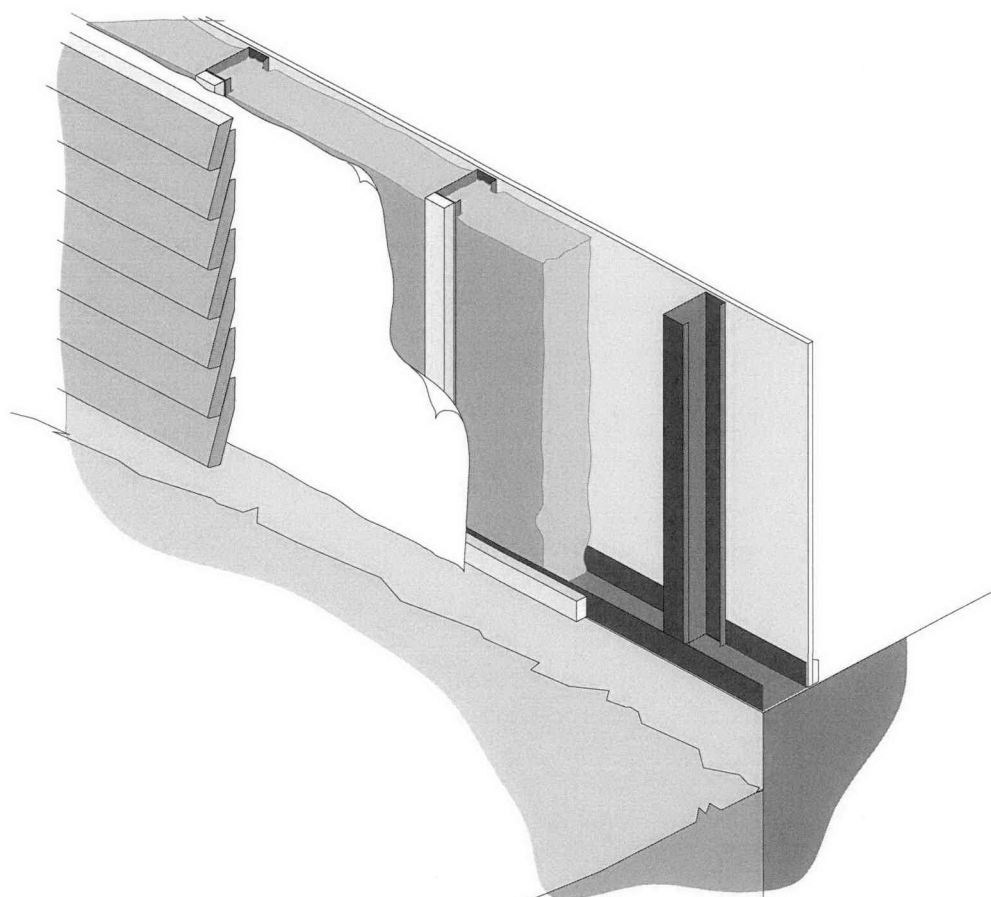
Steel frame - cavity or direct fixed - 90mm framing,  $TCT \leq 0.75$ , 10mm plasterboard



----- Typical framing insulation R-value

### Bevel-back timber weatherboards - Direct-fixed

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard



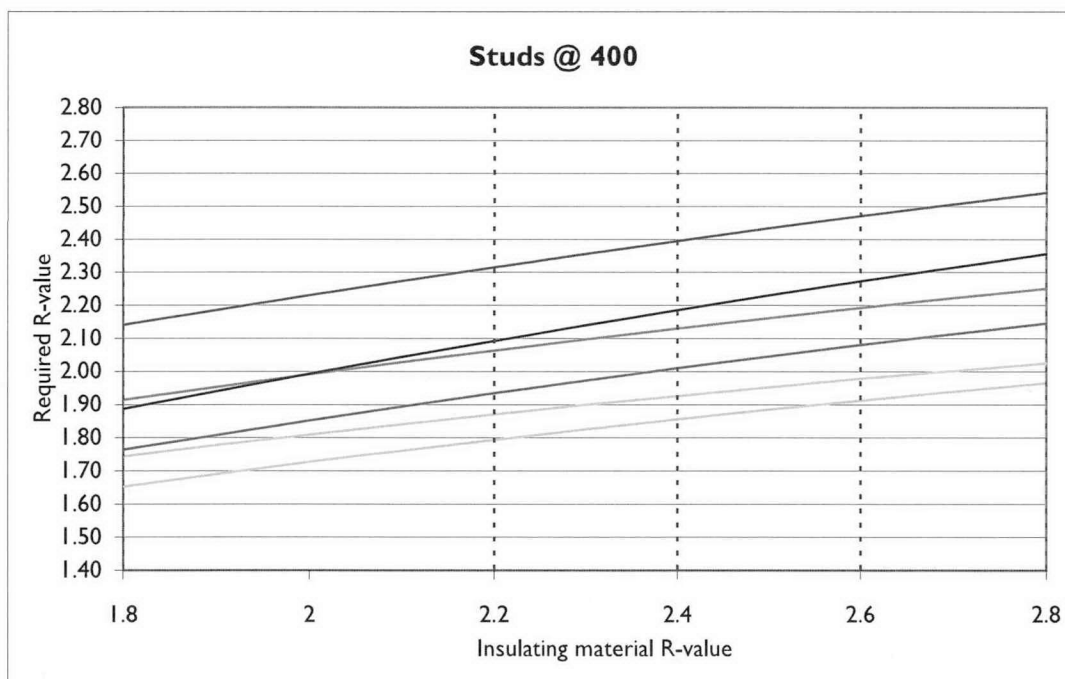
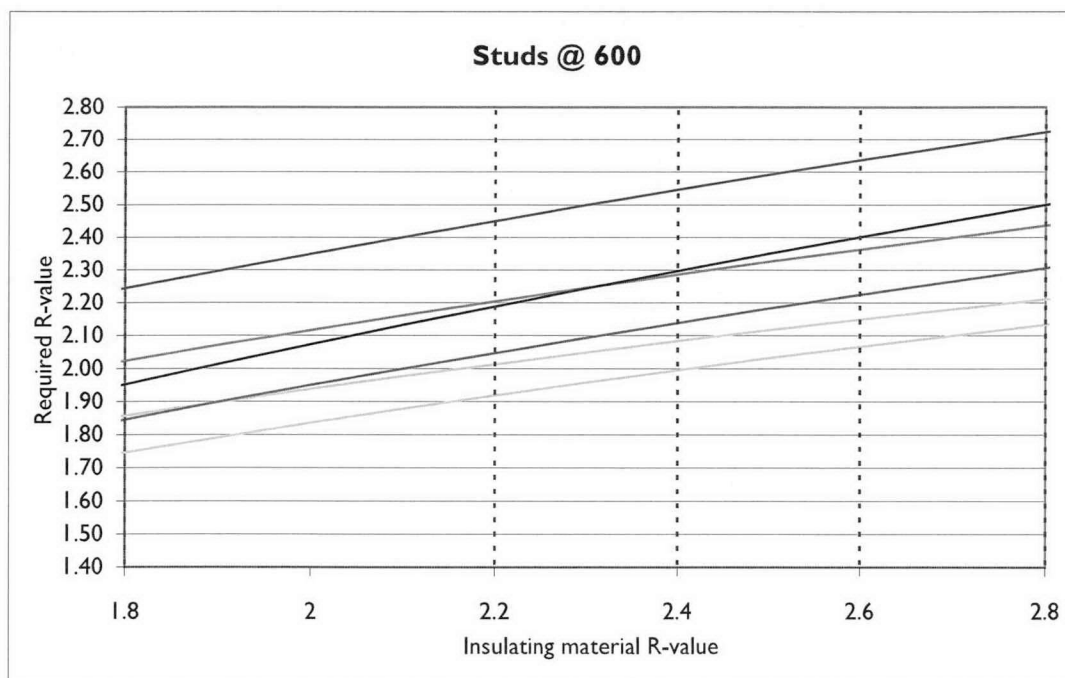
Bevel-back  
Steel framed - Direct fixed with thermal break

- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Bevel-back weatherboard construction can be direct fixed up to a risk factor of 12 (E2/AS1)
- 4 Check manufacturers specifications for suitability of wall wrap



### Bevel-back timber weatherboards - Direct-fixed

Steel frame, 90mm framing, TCT ≤ 0.75, 10mm plasterboard



----- Typical framing insulation R-value

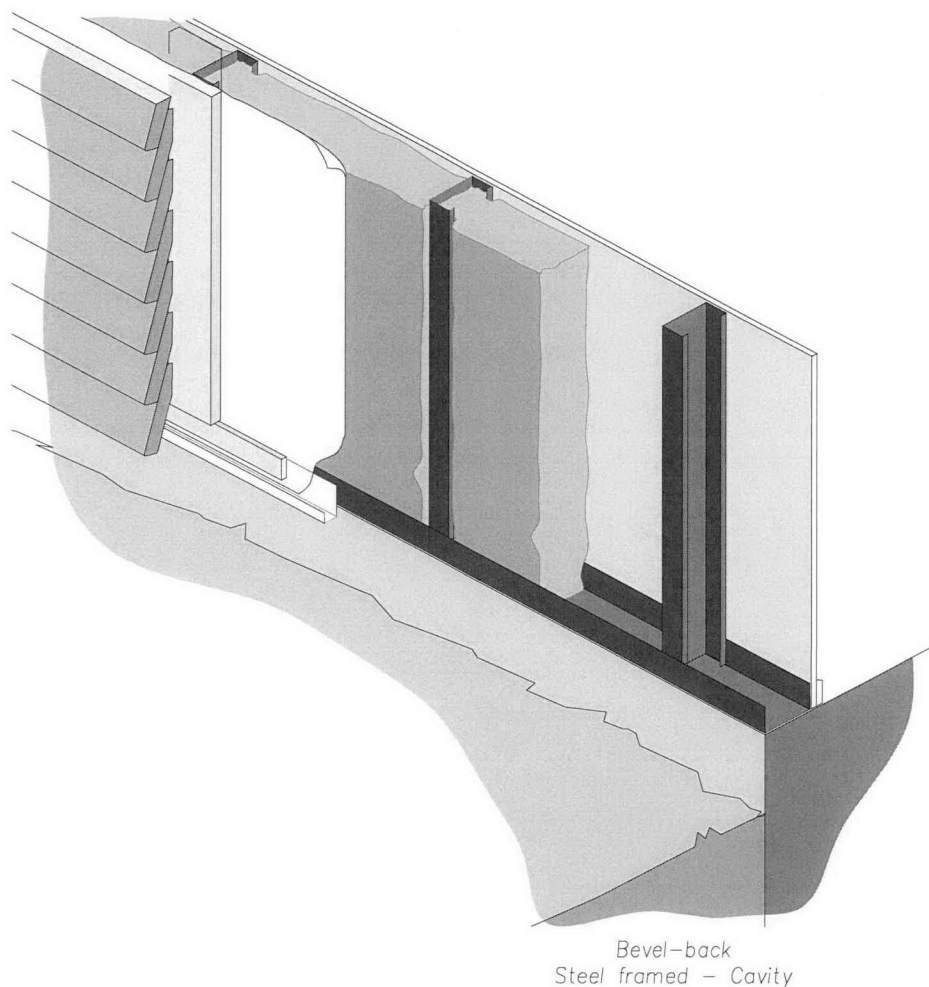
#### Thermal break

	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

	R0.50 sheath (15mm XPS, 20mm EPS)
	R0.35 sheath (10mm XPS, 15mm EPS)
	R0.25 sheath (10mm EPS)

### Bevel-back timber weatherboards - Cavity

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard



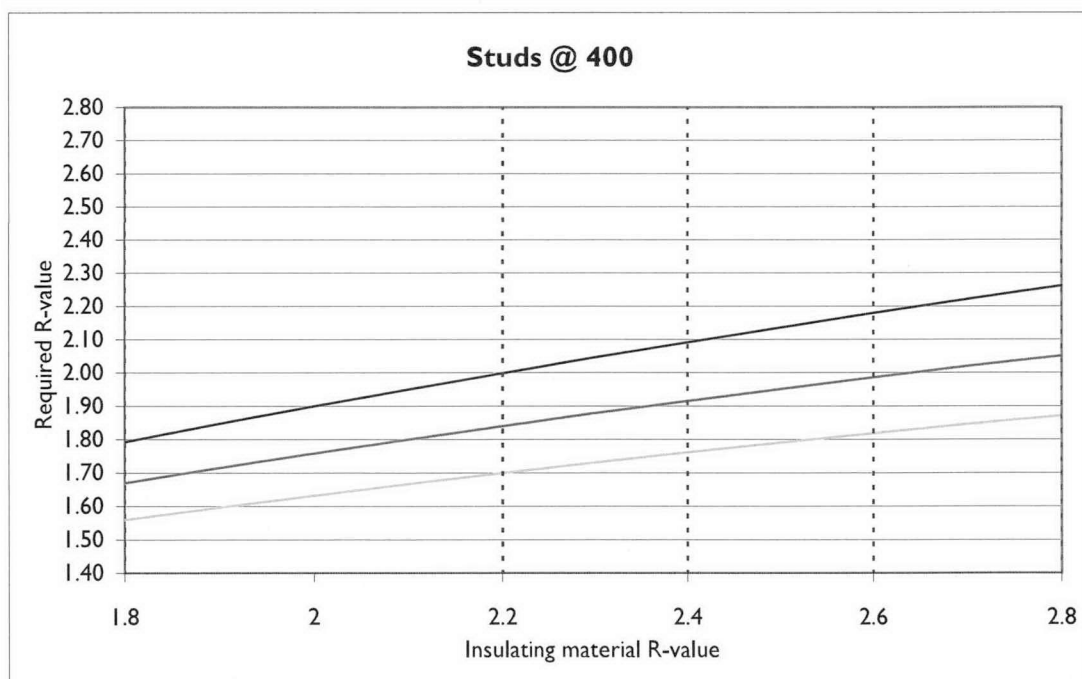
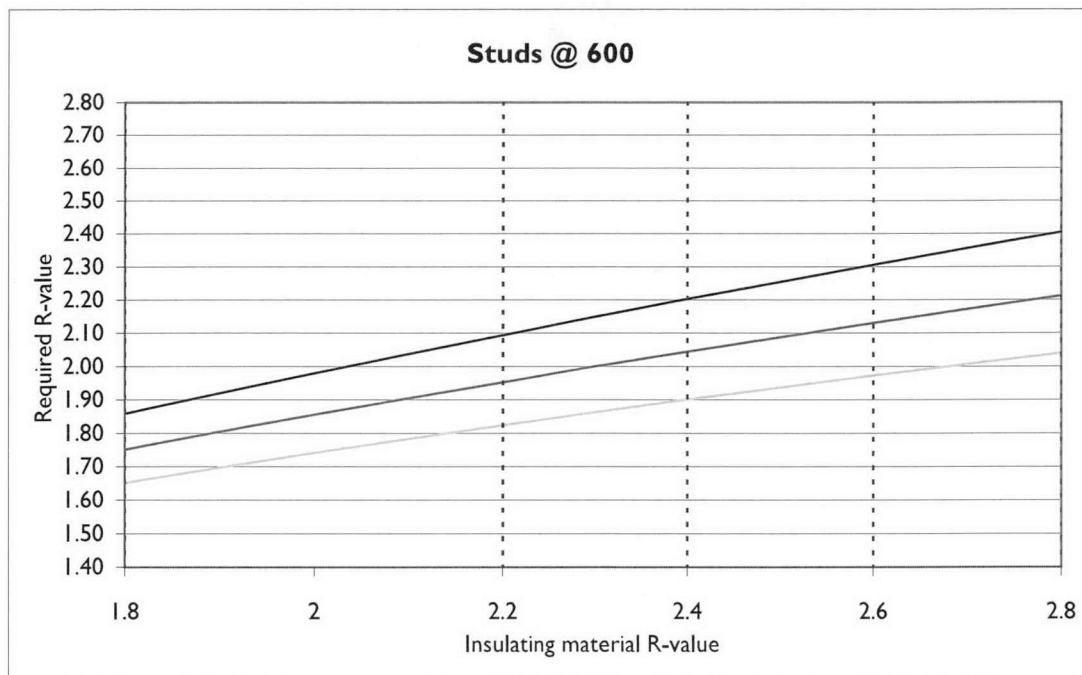
- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Check manufacturers specifications for suitability of wall wrap





### Bevel-back timber weatherboards - Cavity

Steel frame, 90mm framing, TCT ≤ 0.75, 10mm plasterboard



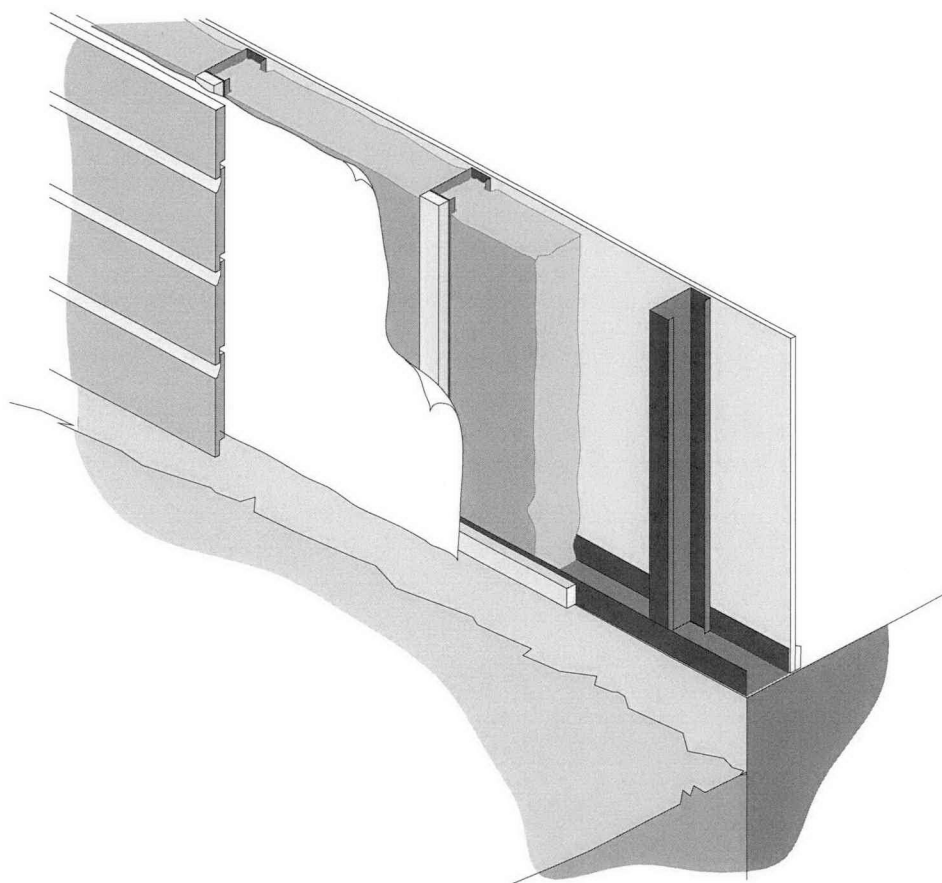
----- Typical framing insulation R-value

#### Thermal break

	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

### **Rusticated timber weatherboards - Direct-fixed**

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard



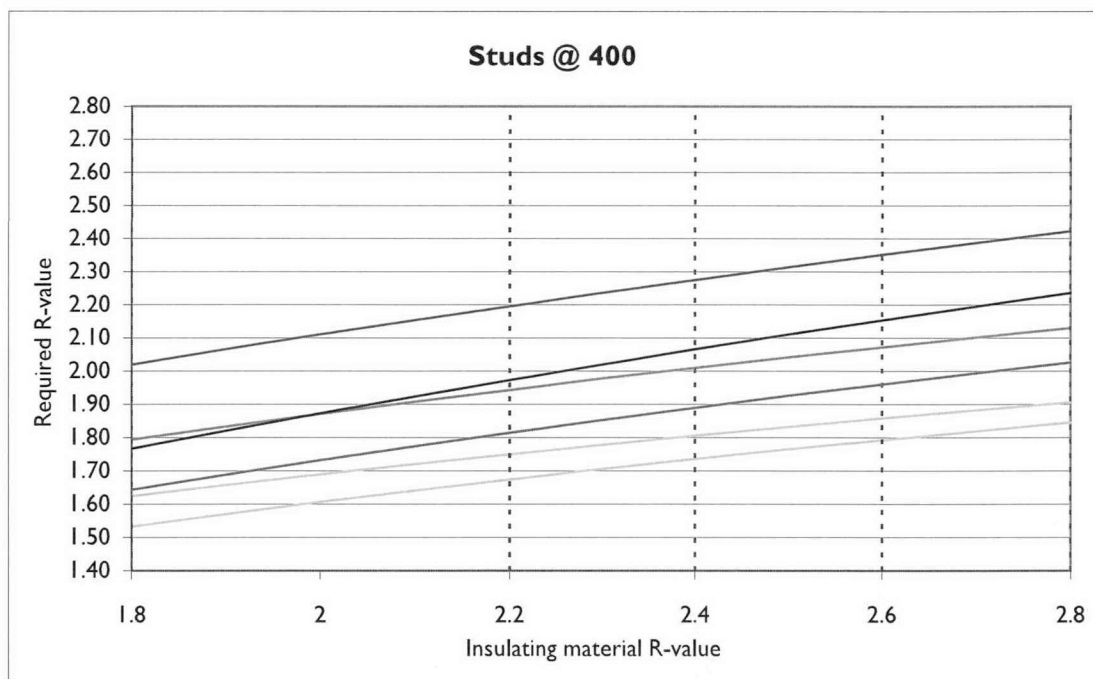
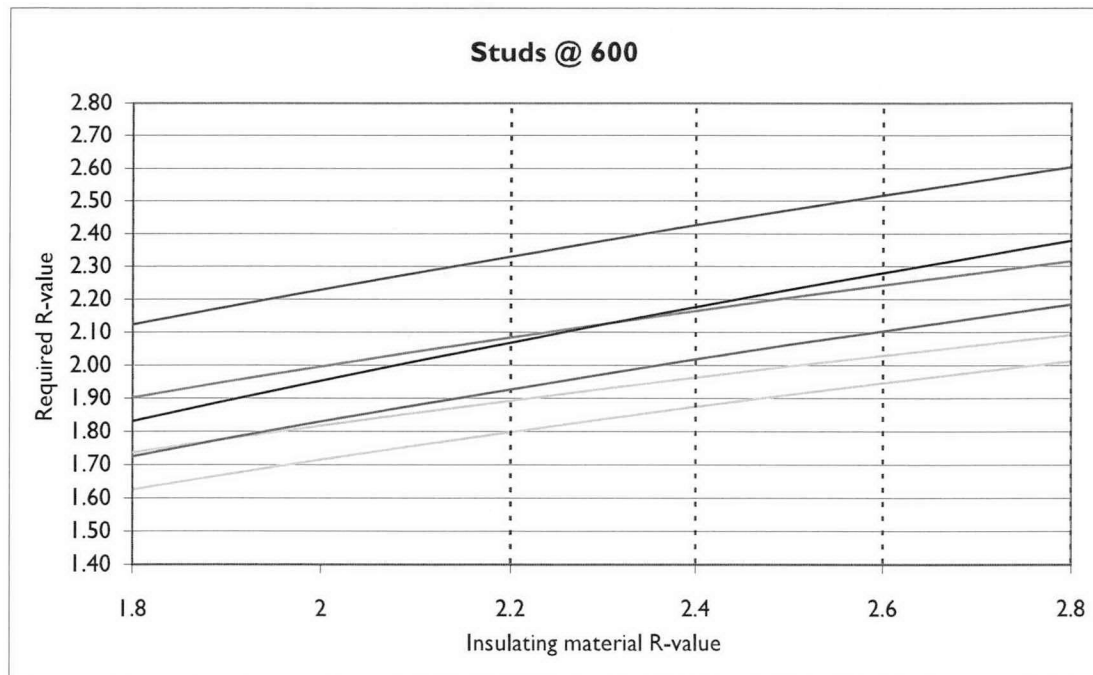
Rusticated  
Steel framed - Direct fixed with thermal break

- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Bevel-back weatherboard construction can be direct fixed up to a risk factor of 6 (E2/AS1)
- 4 Check manufacturers specifications for suitability of wall wrap



### Rusticated timber weatherboards - Direct-fixed

Steel frame, 90mm framing, TCT ≤ 0.75, 10mm plasterboard



----- Typical framing insulation R-value

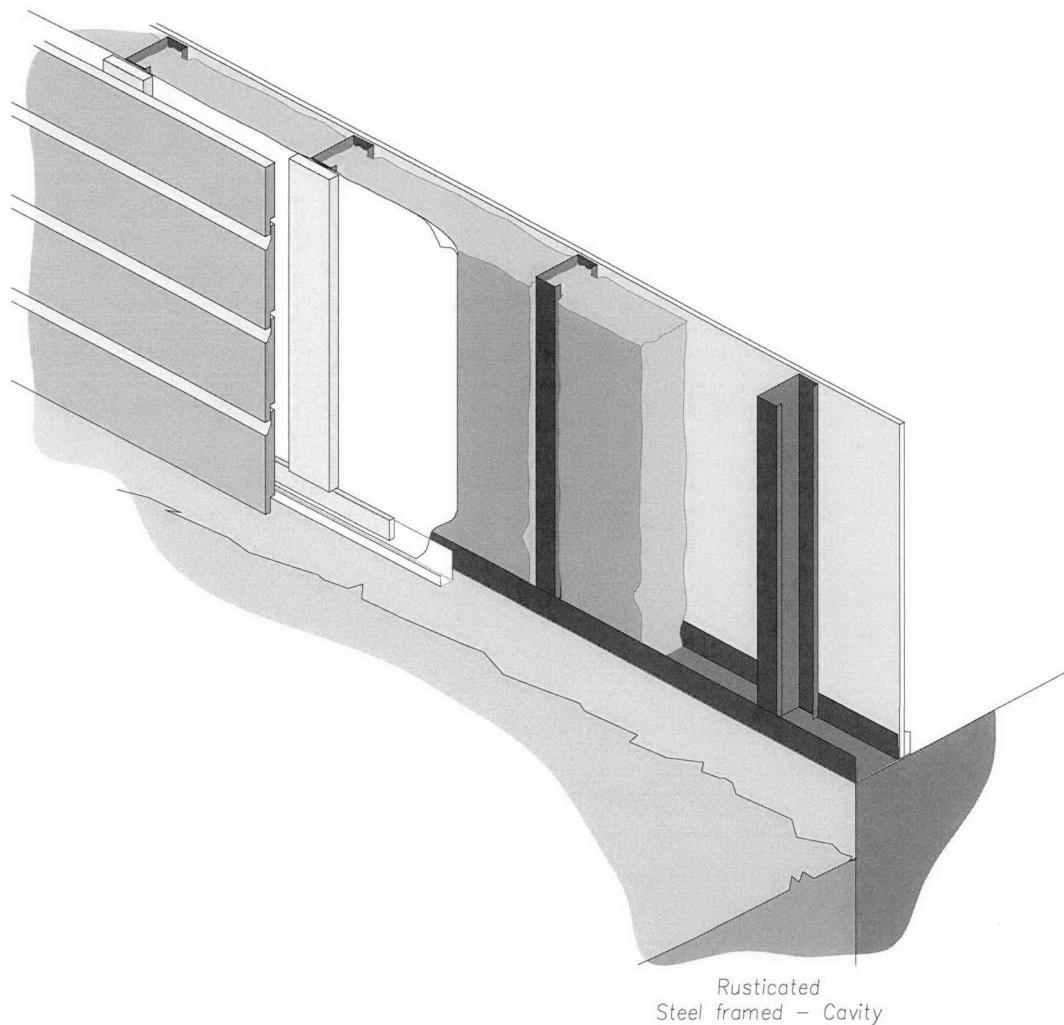
#### Thermal break

	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

	R0.50 sheath (15mm XPS, 20mm EPS)
	R0.35 sheath (10mm XPS, 15mm EPS)
	R0.25 sheath (10mm EPS)

### **Rusticated timber weatherboards - Cavity**

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard

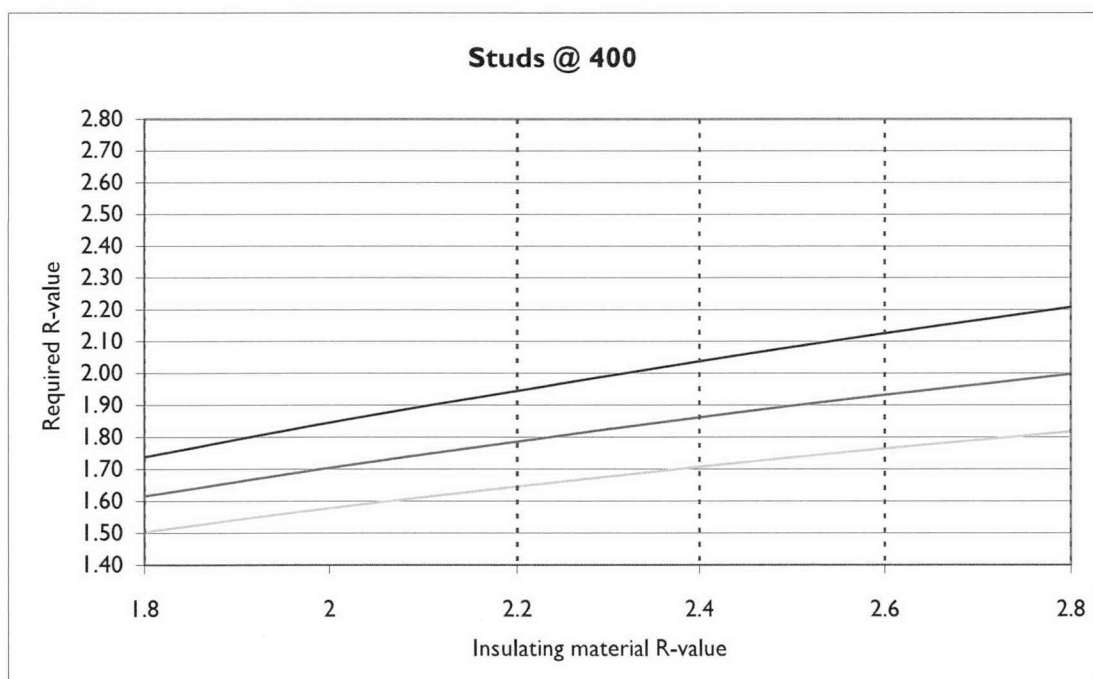
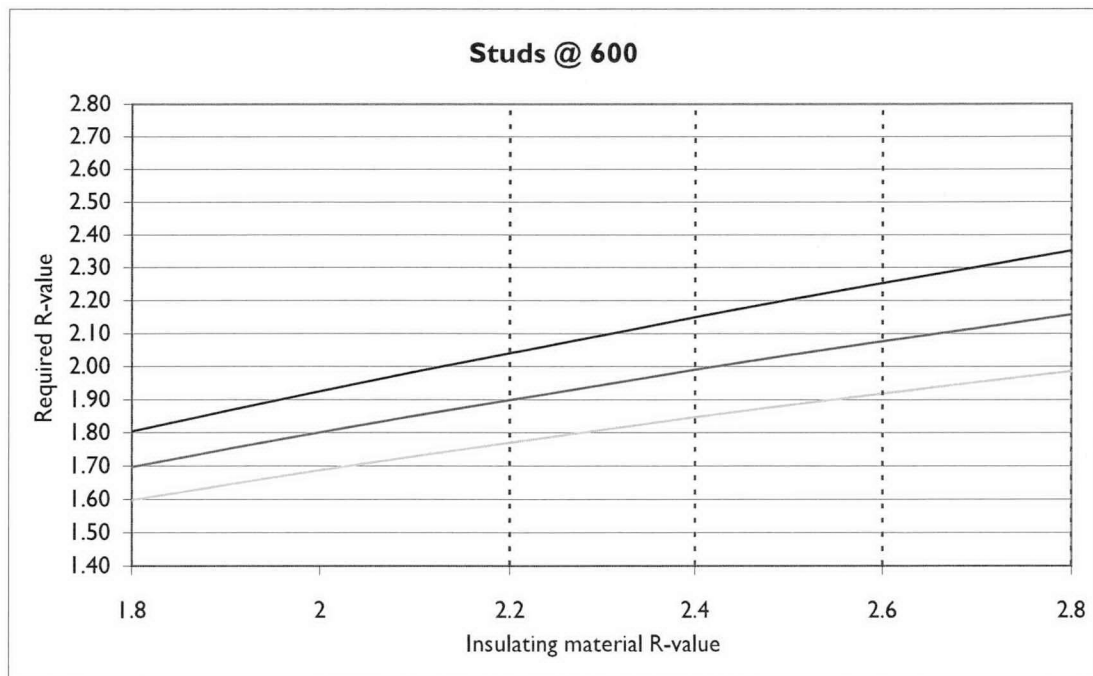


- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Check manufacturers specifications for suitability of wall wrap



### Rusticated timber weatherboards - Cavity

Steel frame, 90mm framing,  $TCT \leq 0.75$ , 10mm plasterboard



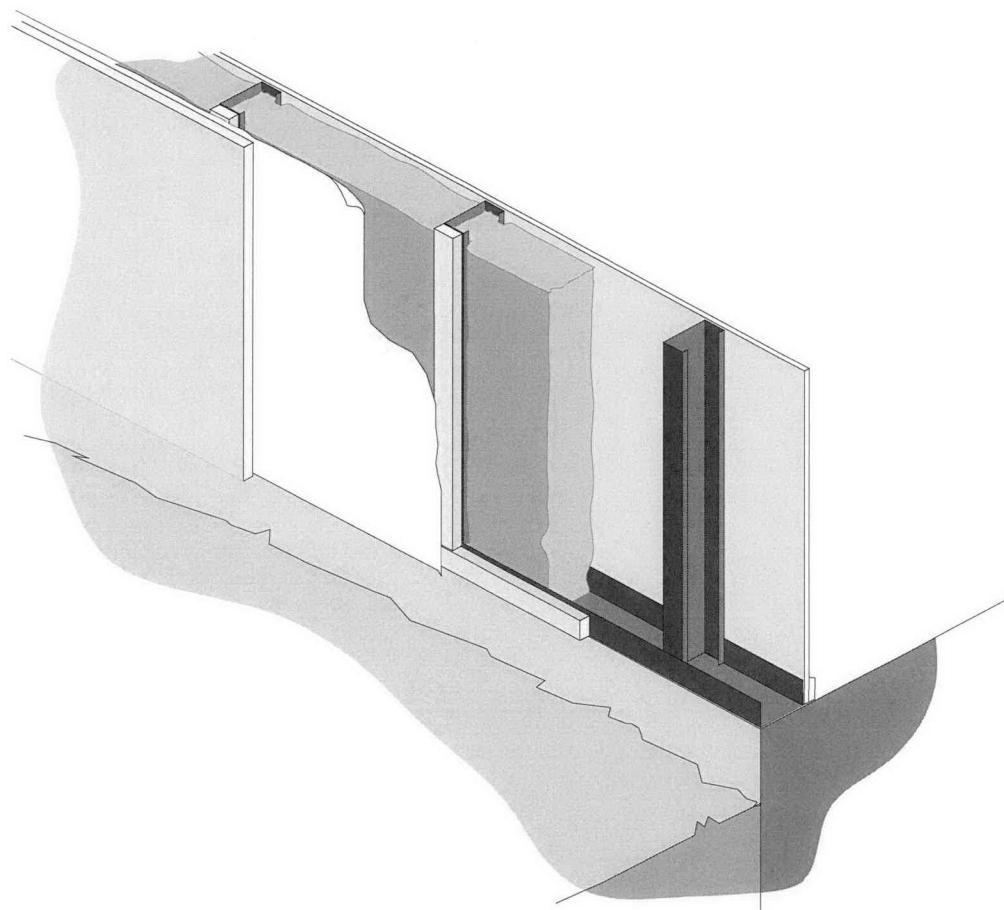
----- Typical framing insulation R-value

#### Thermal break

	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

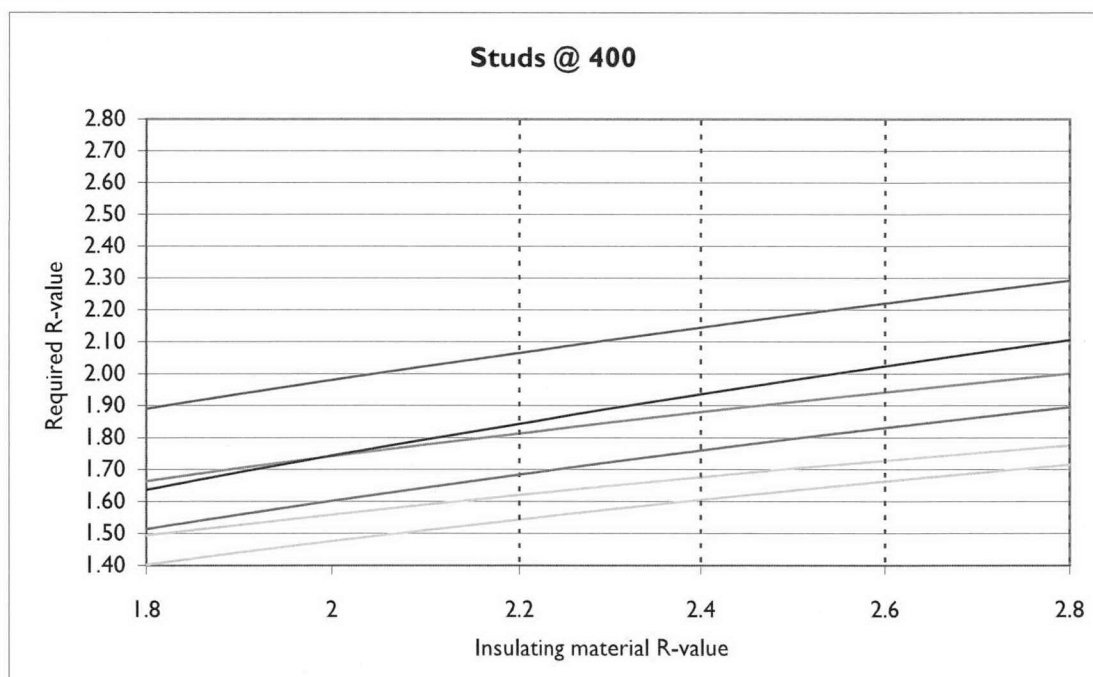
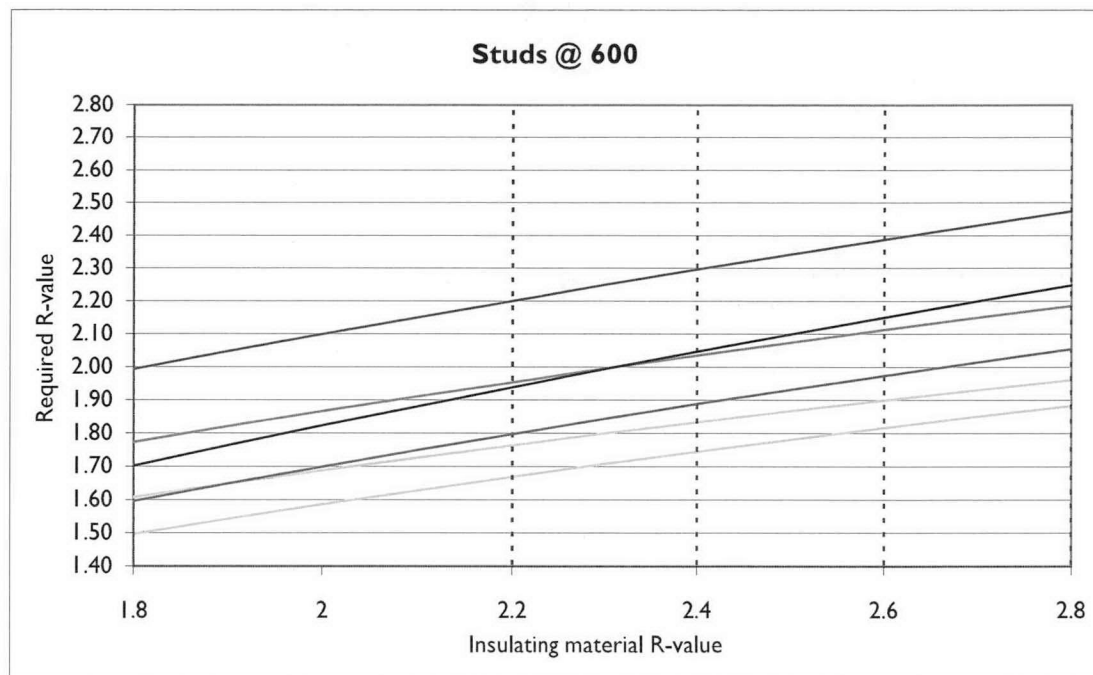
### Sheet cladding - Direct-fixed

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard



Sheet cladding  
Steel framed - Direct fixed with thermal break

- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Flat sheat cladding can be direct fixed up to a risk factor of 6 (E2/AS1)
- 4 Check manufacturers specifications for suitability of wall wrap

**Sheet cladding - Direct-fixed**Steel frame, 90mm framing,  $TCT \leq 0.75$ , 10mm plasterboard

----- Typical framing insulation R-value

**Thermal break**

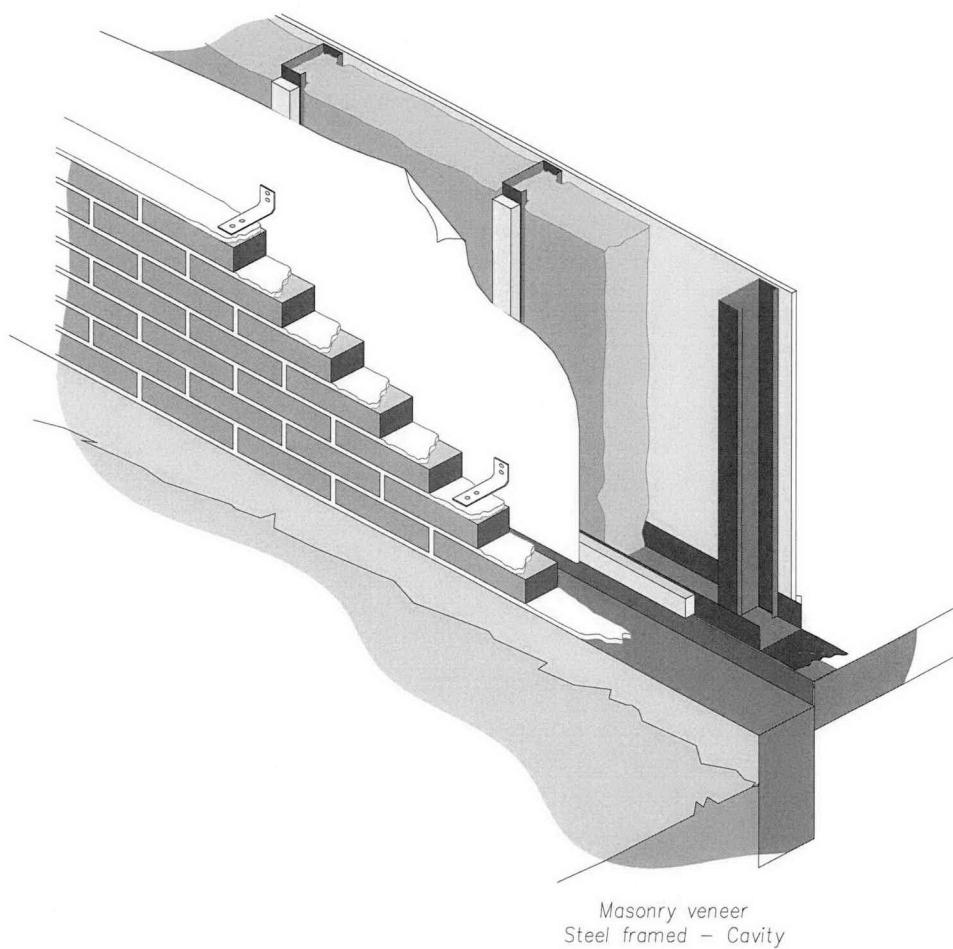
	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

	R0.50 sheath (15mm XPS, 20mm EPS)
	R0.35 sheath (10mm XPS, 15mm EPS)
	R0.25 sheath (10mm EPS)



### Masonry veneer - Cavity

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard

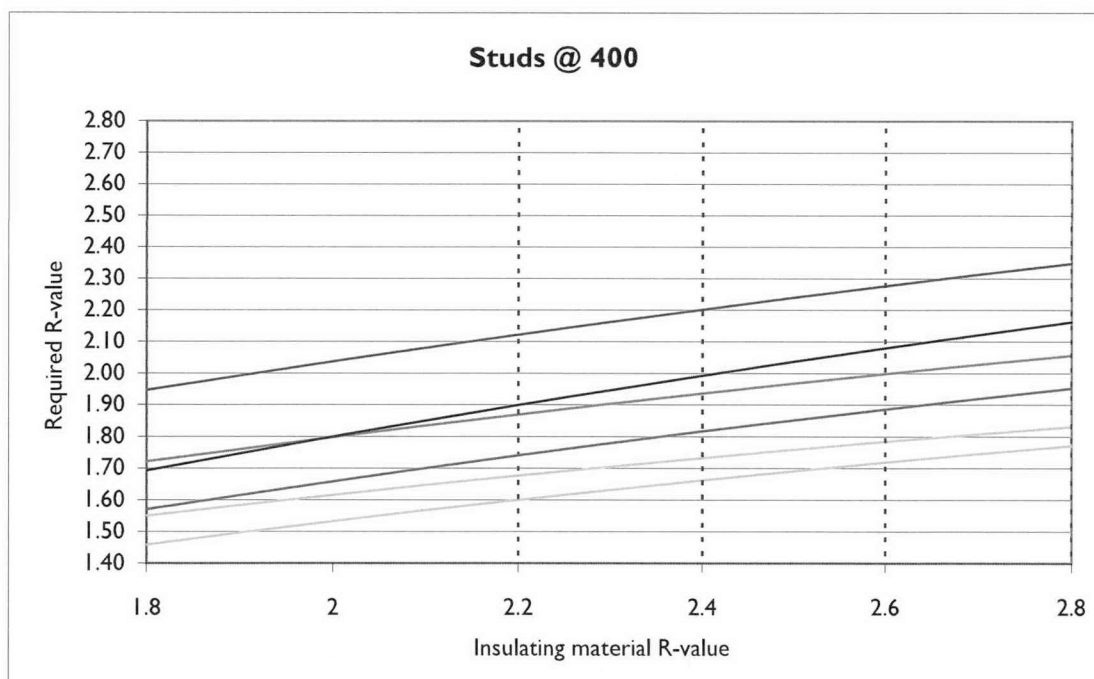
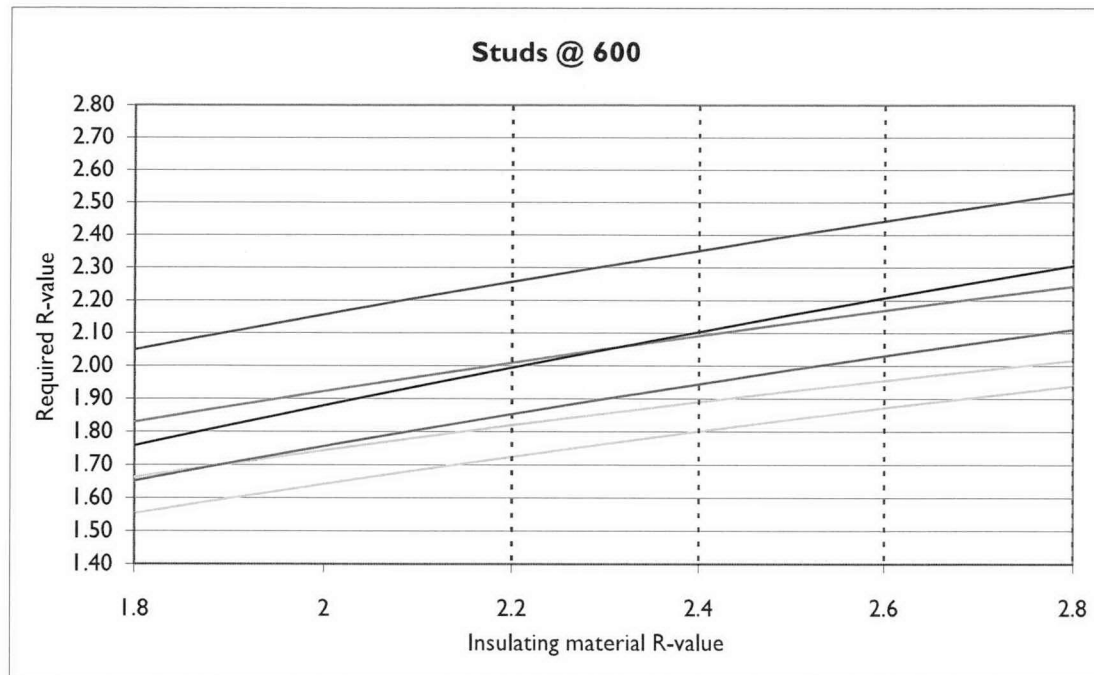


- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Check manufacturers specifications for suitability of wall wrap



### Masonry veneer - Cavity

Steel frame, 90mm framing,  $TCT \leq 0.75$ , 10mm plasterboard



----- Typical framing insulation R-value

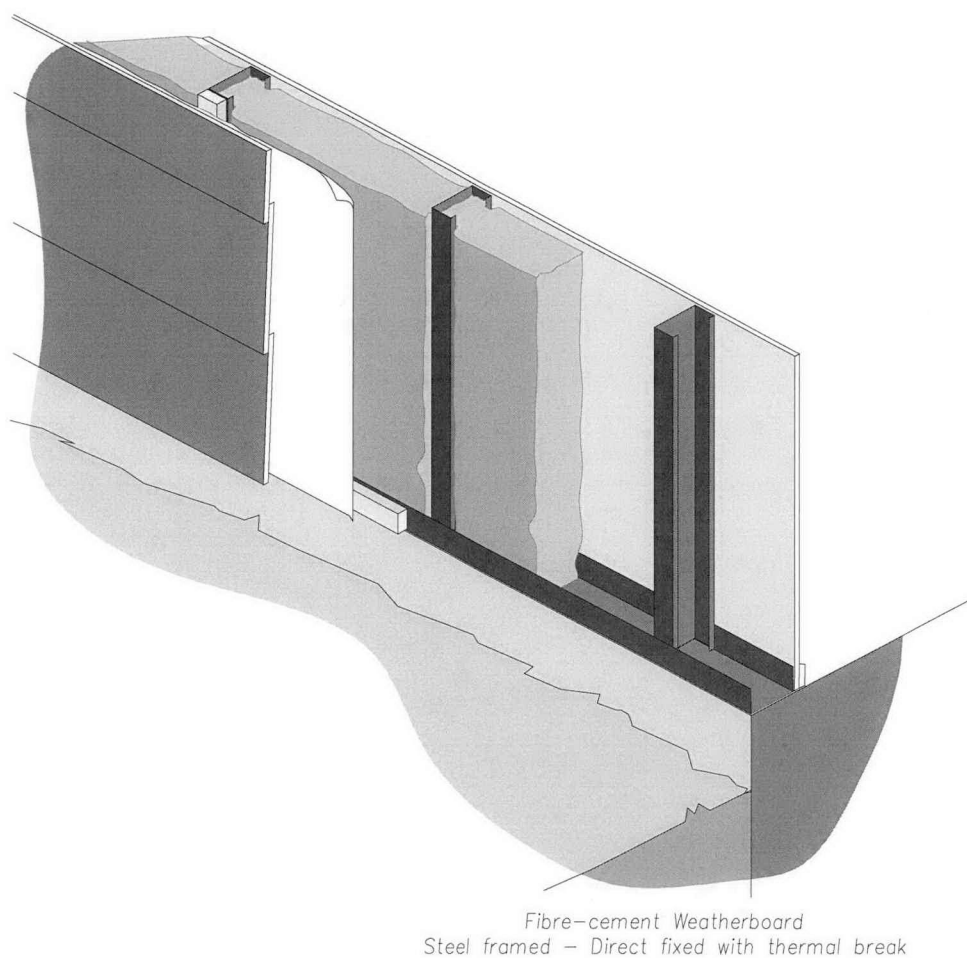
#### Thermal break

	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

	R0.50 sheath (15mm XPS, 20mm EPS)
	R0.35 sheath (10mm XPS, 15mm EPS)
	R0.25 sheath (10mm EPS)

### Fibre-cement weatherboards - Direct-fixed

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard

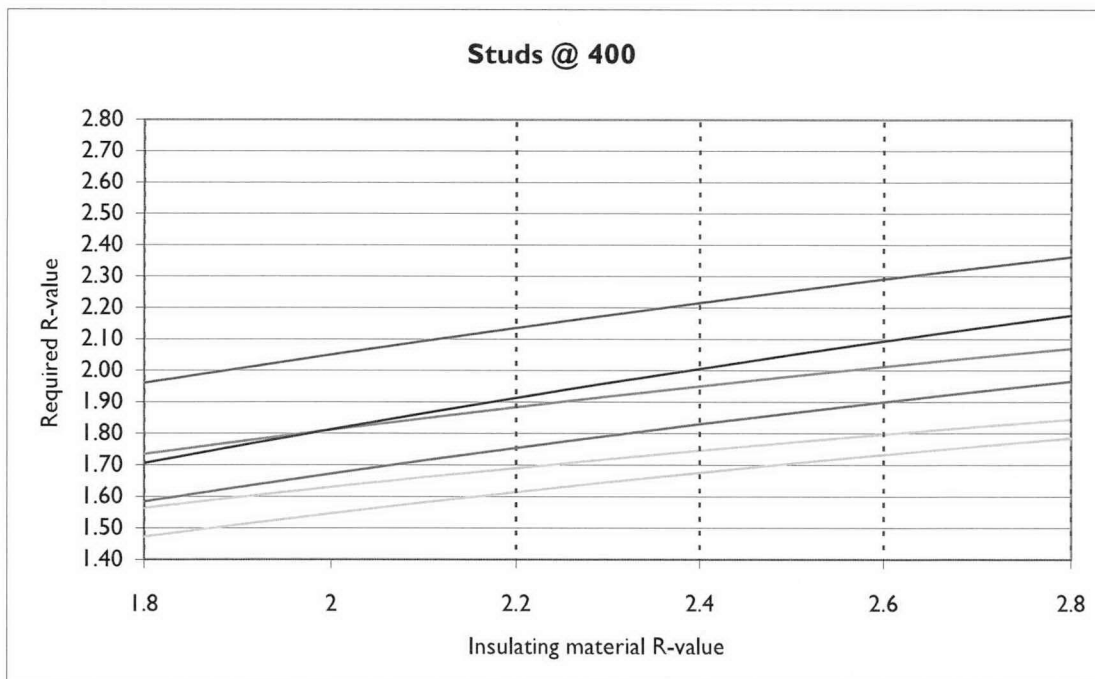
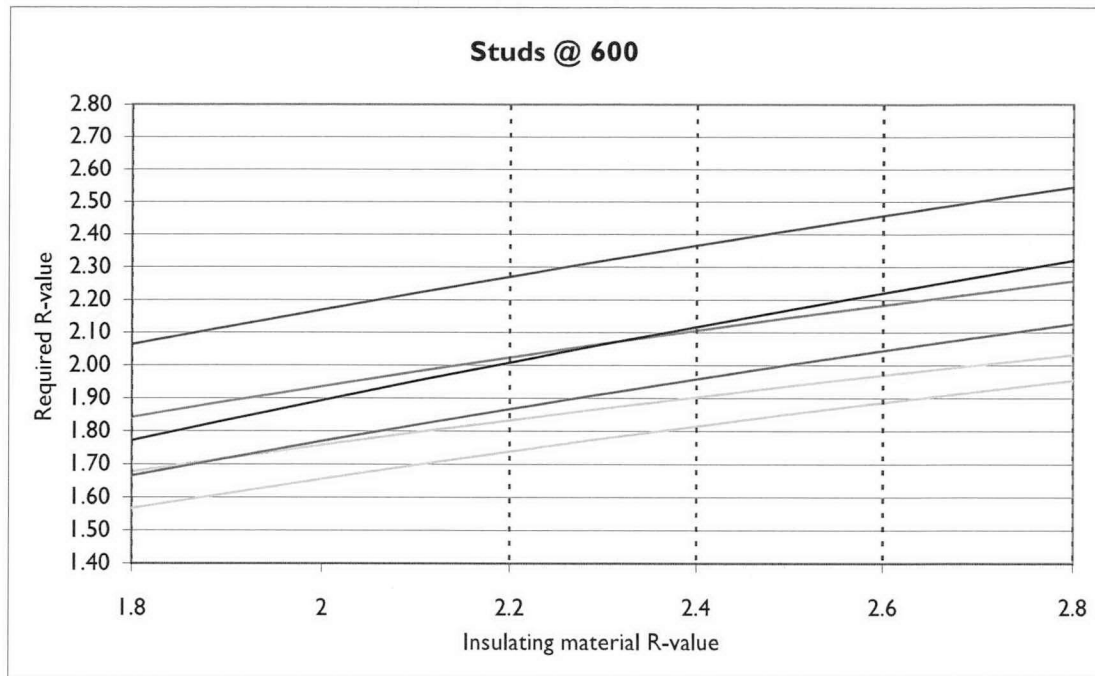


- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Fibre-cement weatherboards can be direct fixed up to a risk factor of 6 (E2/AS1)
- 4 Check manufacturers specifications for suitability of wall wrap



### Fibre-cement weatherboards - Direct-fixed

Steel frame, 90mm framing,  $TCT \leq 0.75$ , 10mm plasterboard



----- Typical framing insulation R-value

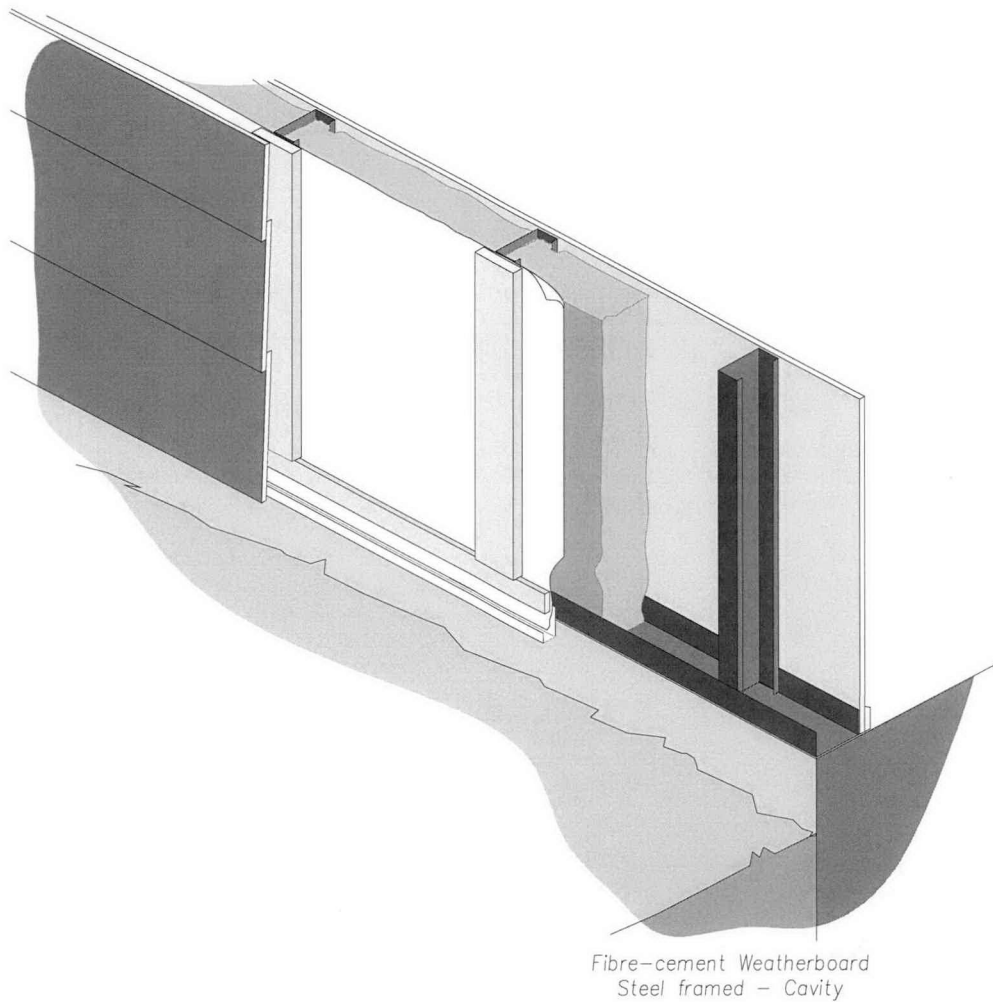
#### Thermal break

	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

	R0.50 sheath (15mm XPS, 20mm EPS)
	R0.35 sheath (10mm XPS, 15mm EPS)
	R0.25 sheath (10mm EPS)

### Fibre-cement weatherboards - Cavity

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard

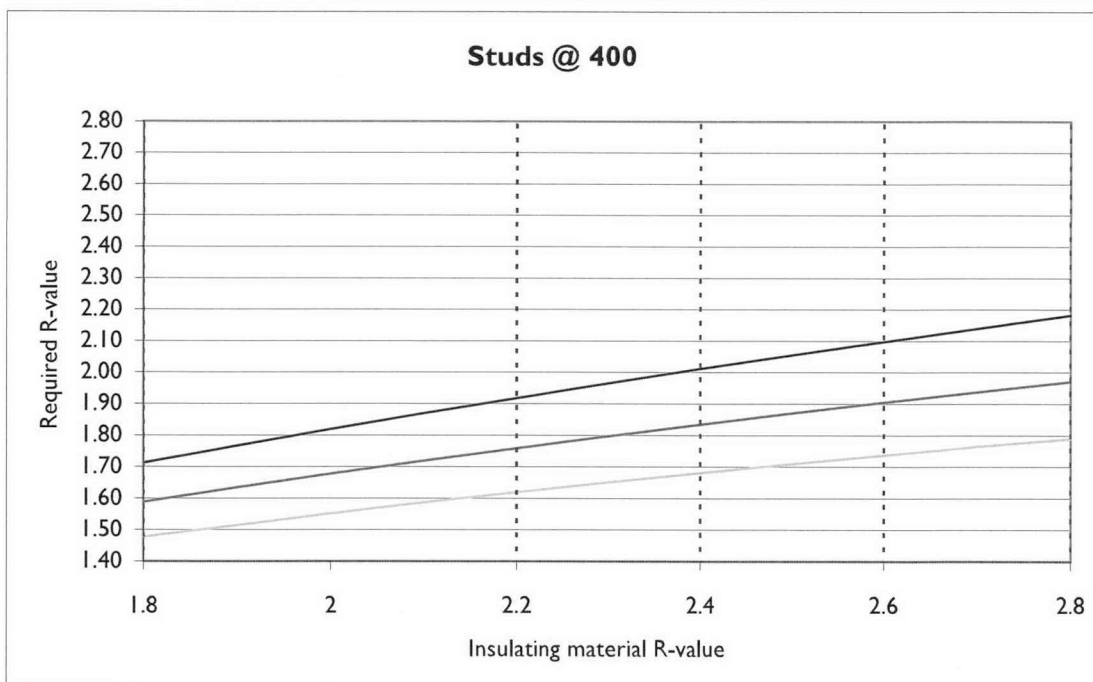
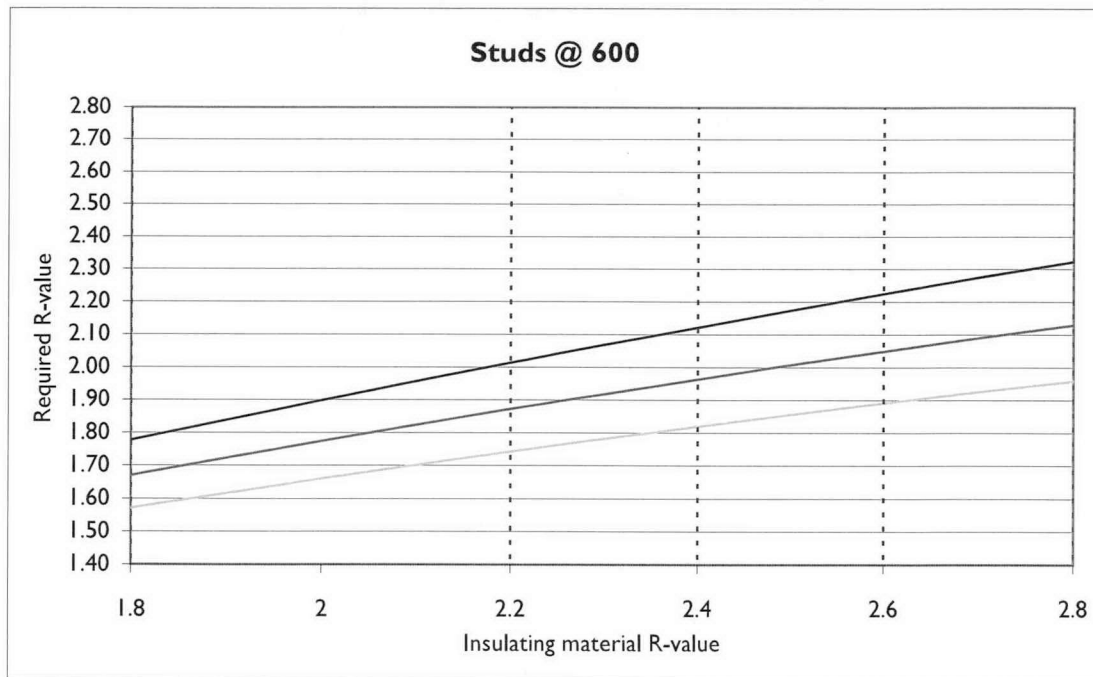


- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Check manufacturers specifications for suitability of wall wrap



### Fibre-cement weatherboards - Cavity

Steel frame, 90mm framing, TCT ≤ 0.75, 10mm plasterboard



----- Typical framing insulation R-value

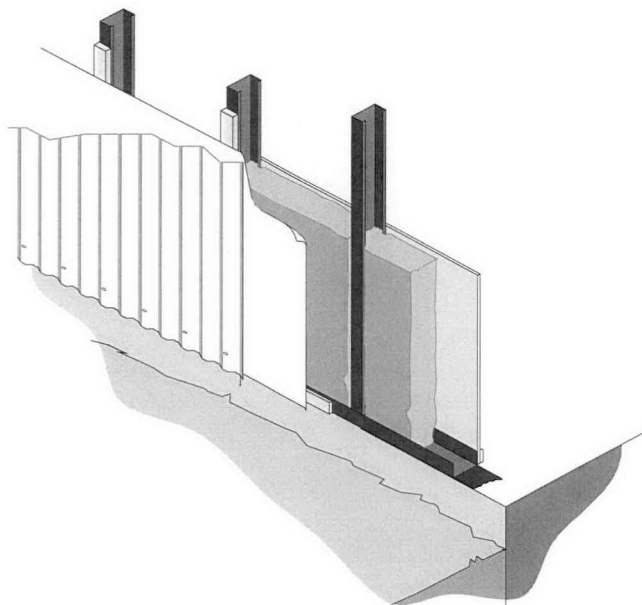
#### Thermal break

	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

### Metal profile - Direct-fixed and Cavity

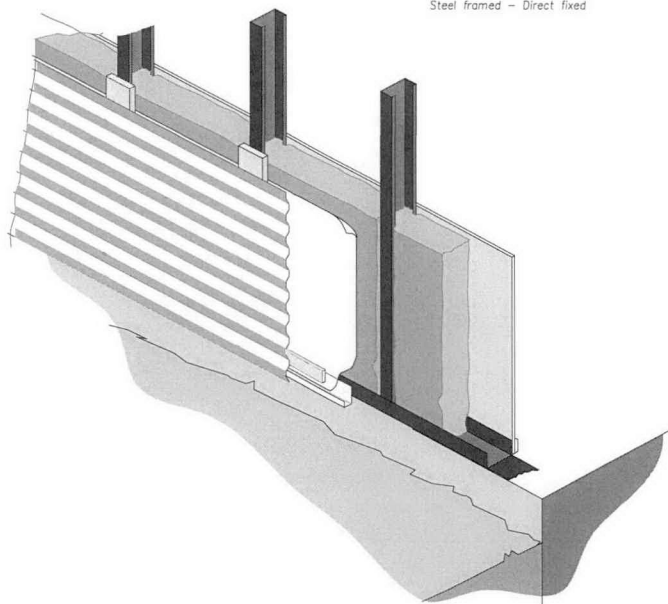
Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard

#### Direct-fixed



Metal vertical profile  
Steel framed - Direct fixed

#### Cavity



Metal horizontal profile  
Steel framed - Cavity

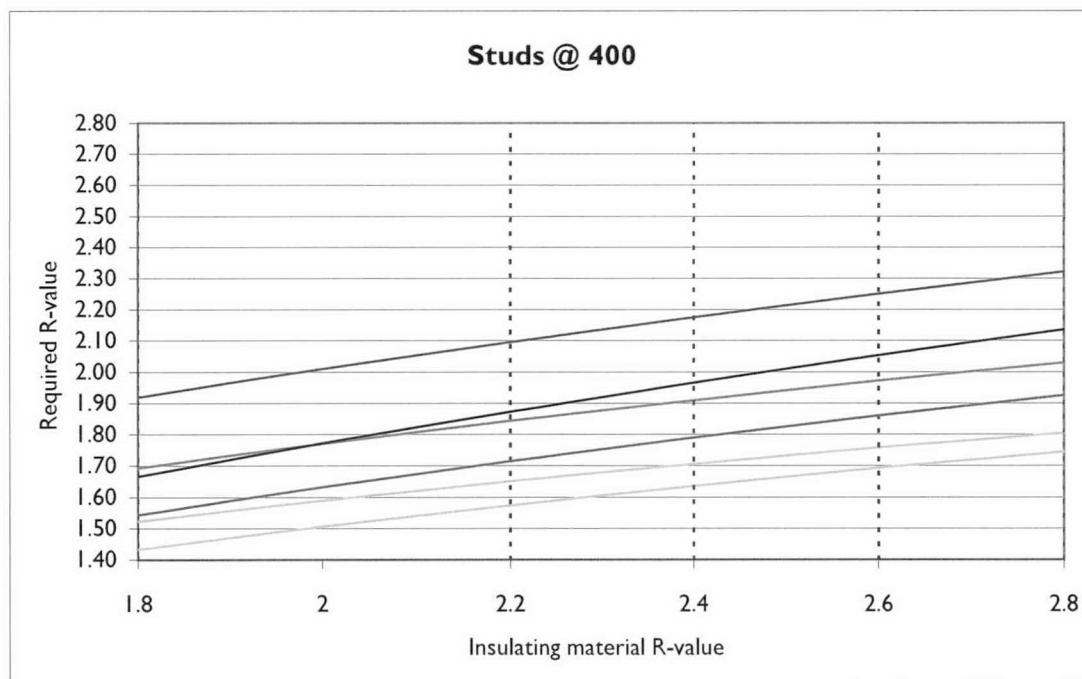
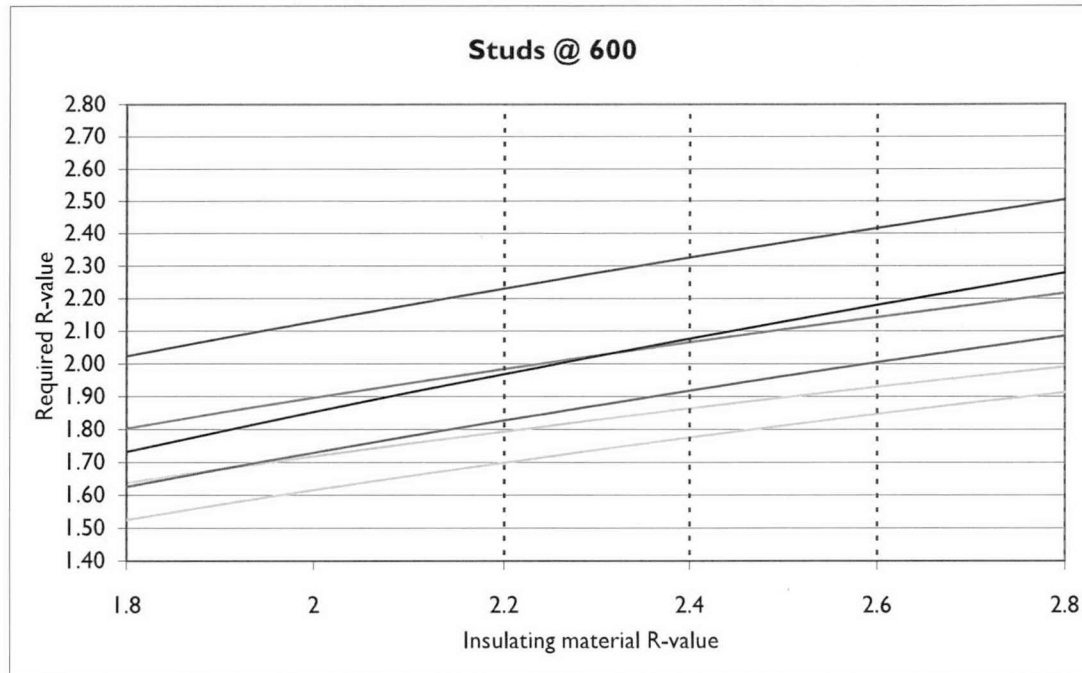
- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Check manufacturers specifications for suitability of wall wrap





### Metal profile - Direct-fixed and Cavity

Steel frame, 90mm framing, TCT ≤ 0.75, 10mm plasterboard



----- Typical framing insulation R-value

#### Thermal break

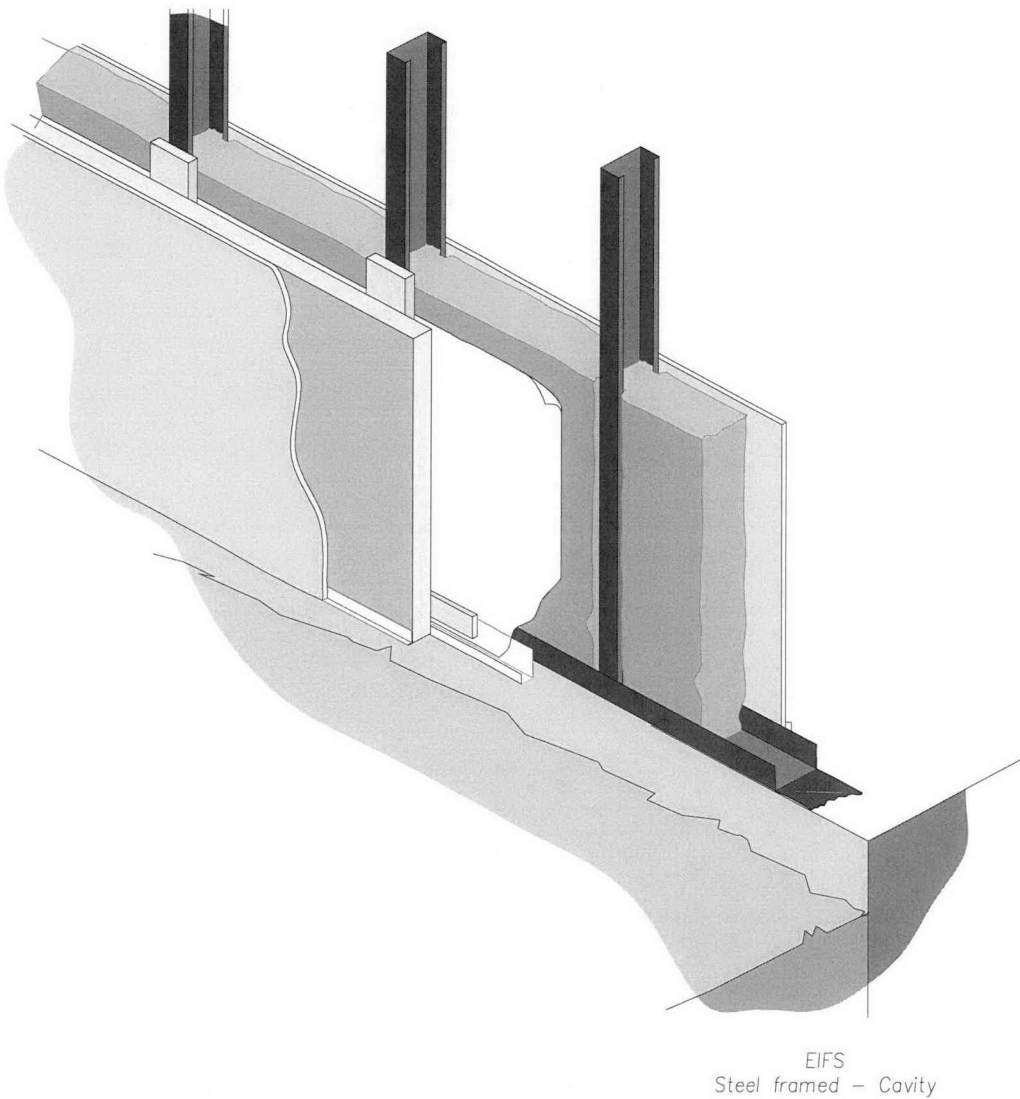
	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)

	R0.50 sheath (15mm XPS, 20mm EPS)
	R0.35 sheath (10mm XPS, 15mm EPS)
	R0.25 sheath (10mm EPS)



### 50mm EIFS - Cavity

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard

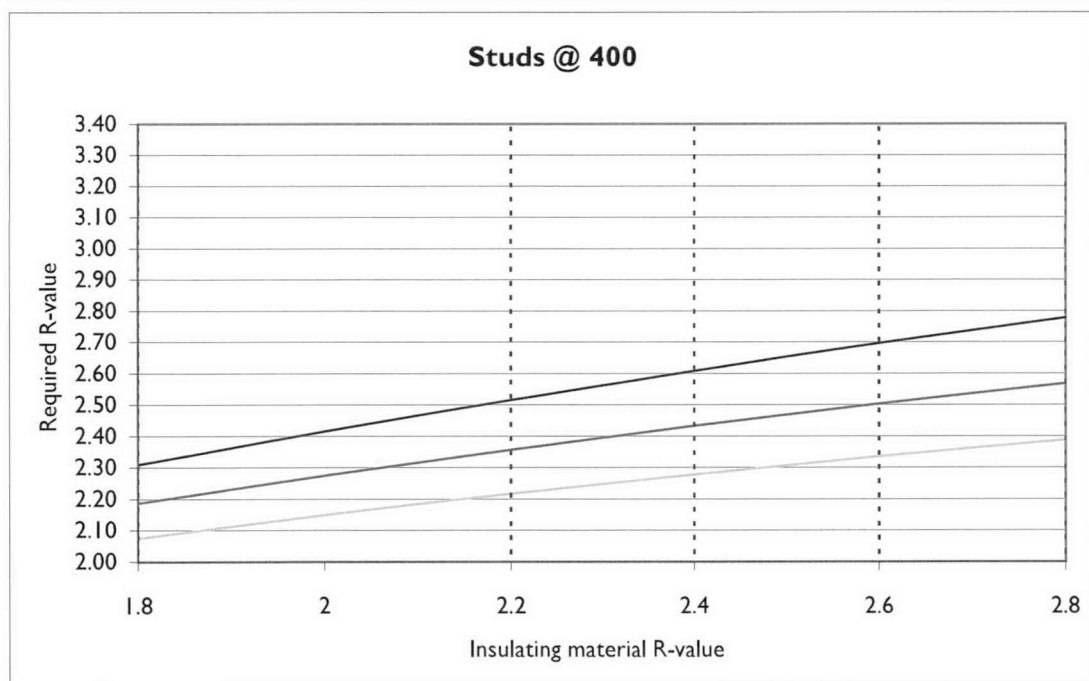
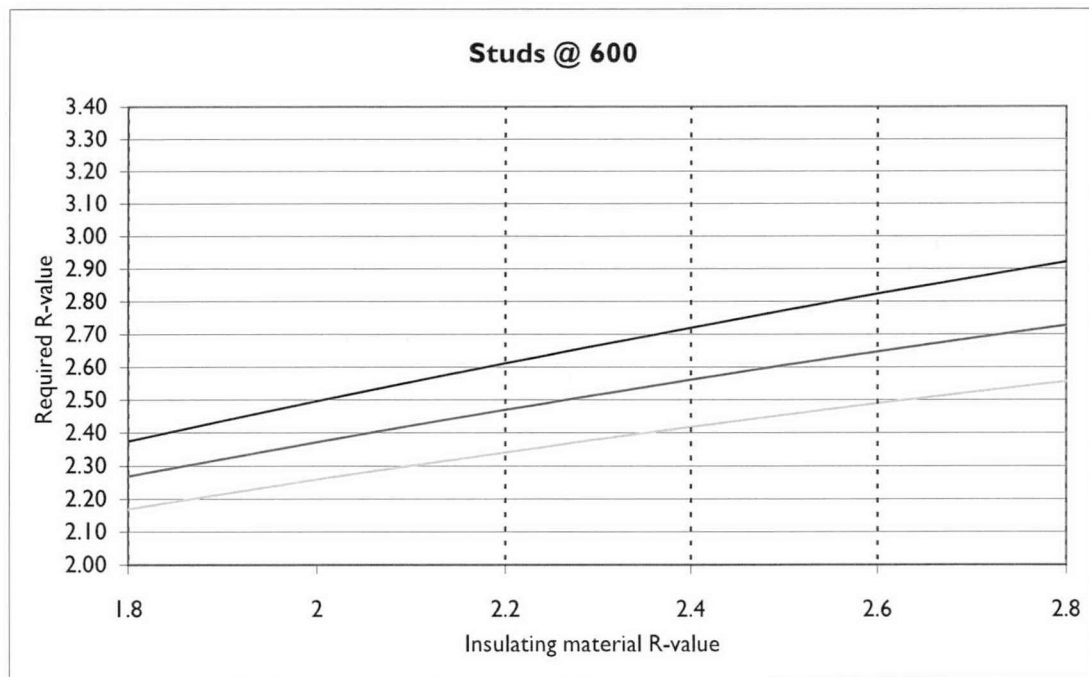


- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Check manufacturers specifications for suitability of wall wrap



### 50mm EIFS - Cavity

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard



----- Typical framing insulation R-value

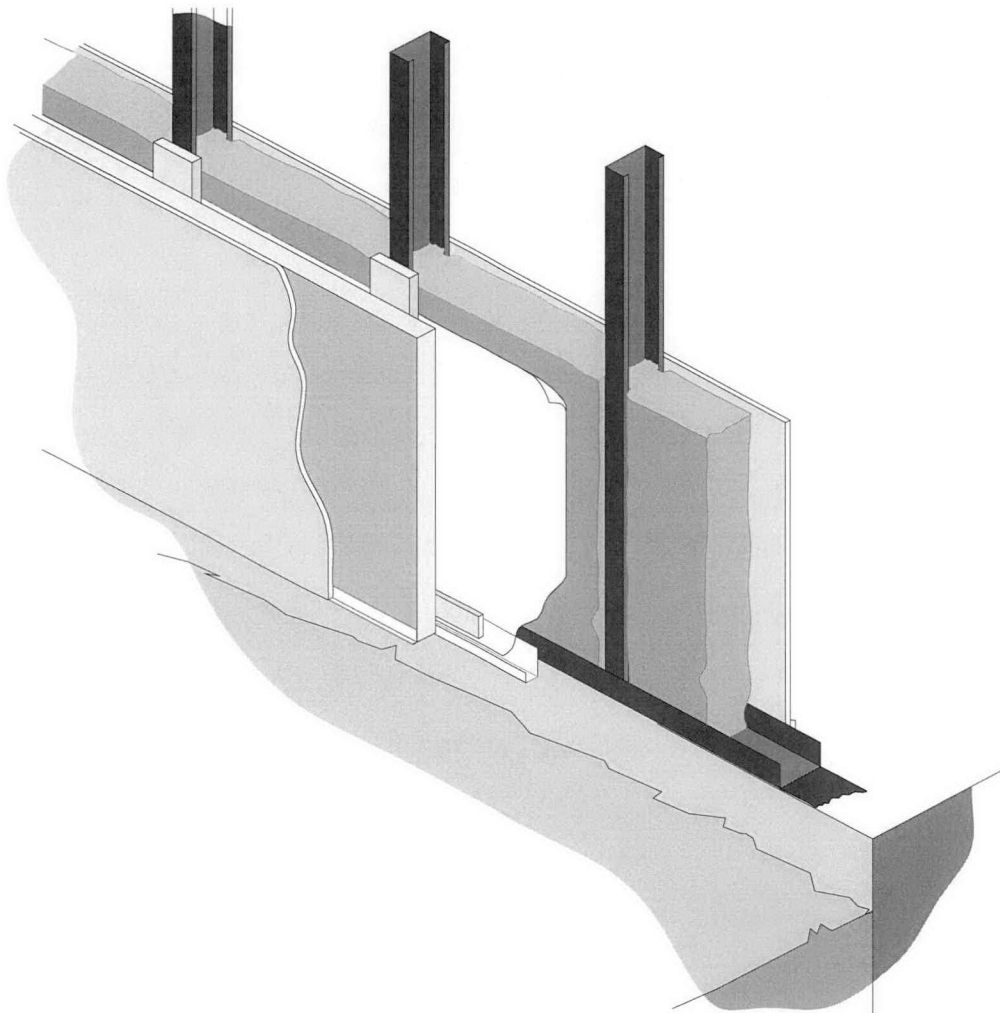
#### Thermal break

	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)



### 50mm AAC - Cavity

Steel frame, 90mm framing, TCT  $\leq 0.75$ , 10mm plasterboard



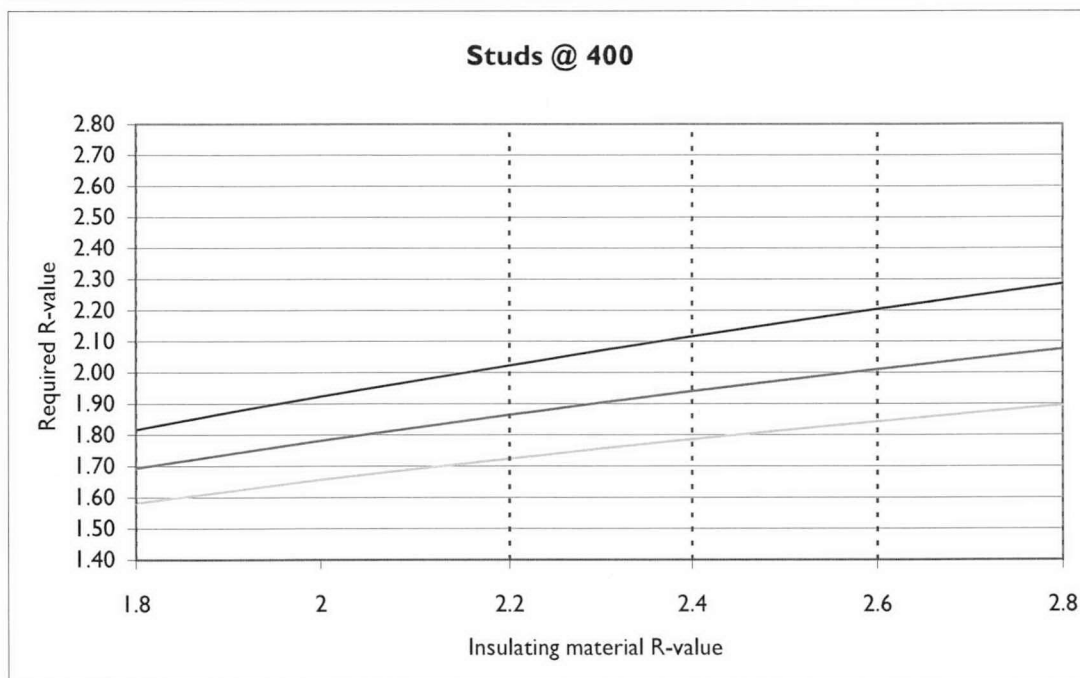
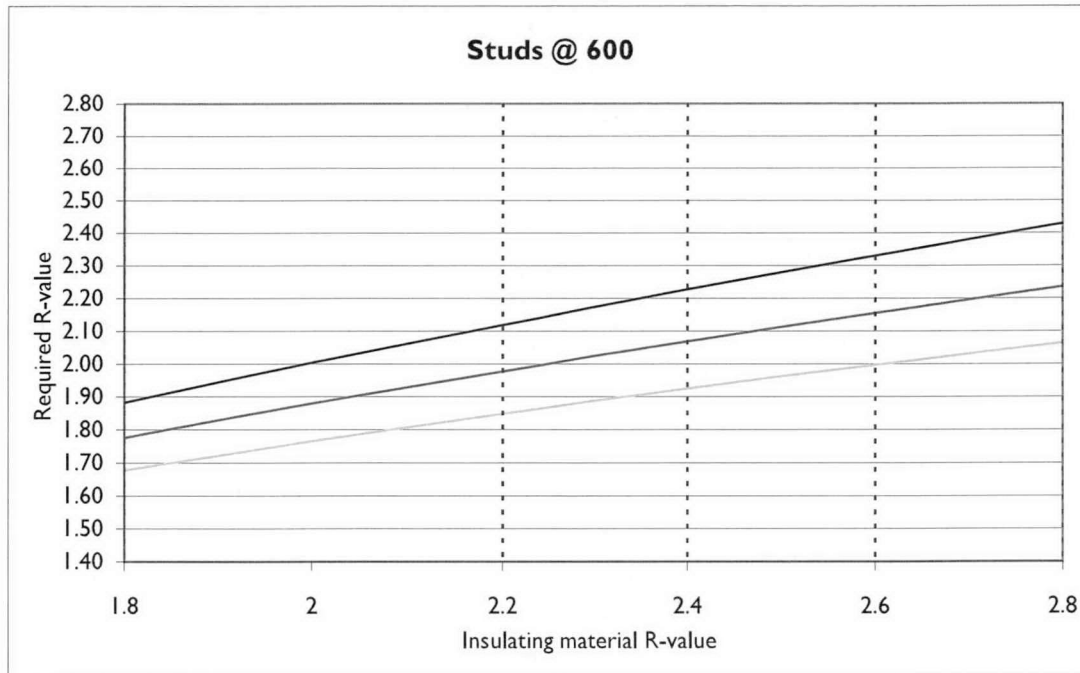
AAC  
Steel framed - Cavity

- 1 All insulants should be placed against wall wrap or sheathing
- 2 When absorbant claddings are used, follow suppliers recommendations on painting
- 3 Check manufacturers specifications for suitability of wall wrap



### 50mm AAC - Cavity

Steel frame, 90mm framing,  $TCT \leq 0.75$ , 10mm plasterboard



----- Typical framing insulation R-value

#### Thermal break

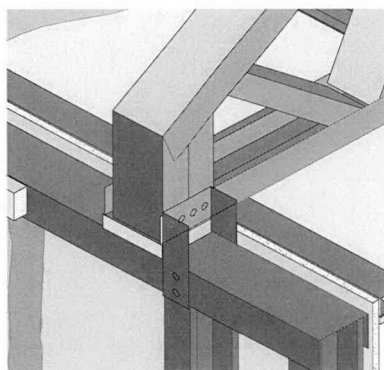
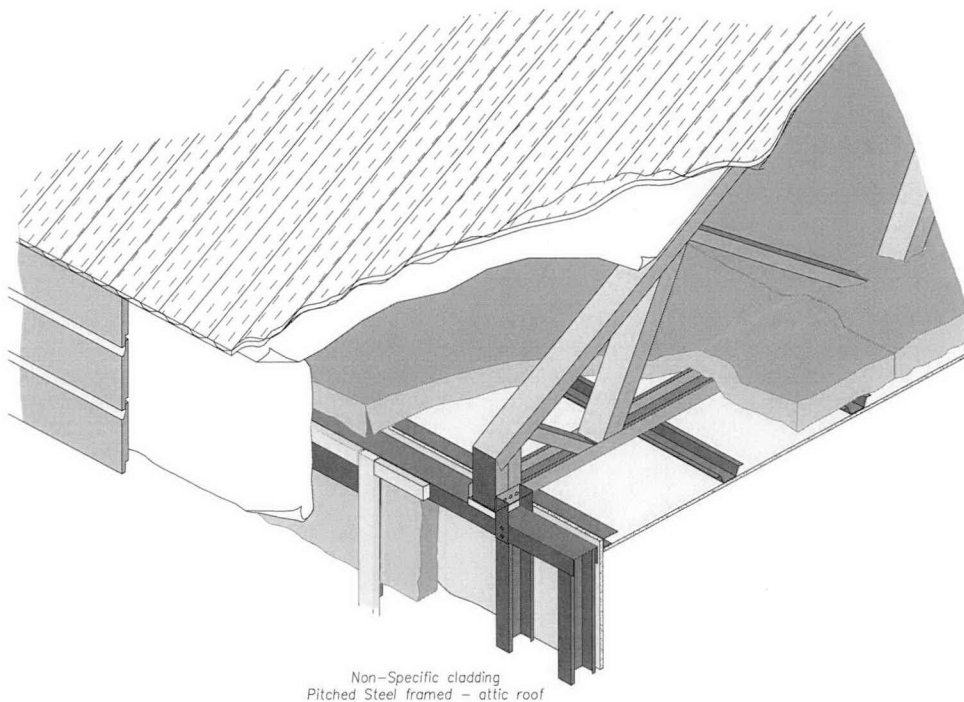
	R0.50 strips (15mm XPS, 20mm EPS)
	R0.35 strips (10mm XPS, 15mm EPS)
	R0.25 strips (10mm EPS)



## 8.0 Appendix B – Roof R-values

### Pitched steel-framed attic roof - Any roofing material

Trusses @ 900crs, TCT  $\leq 0.75$ , 10mm plasterboard ceiling



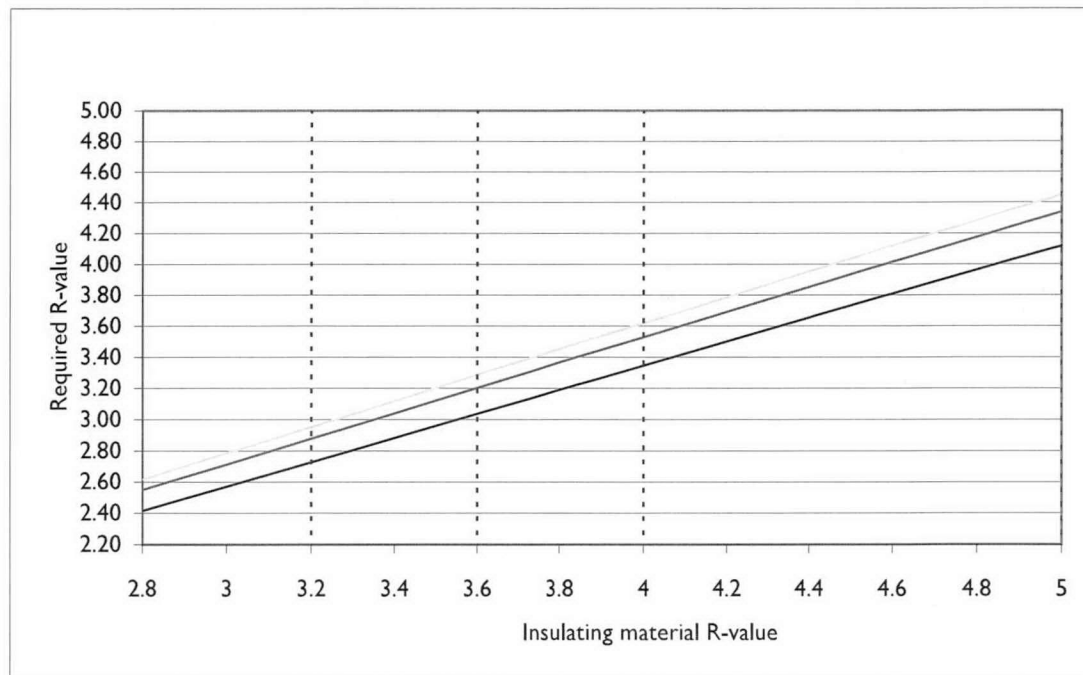
- 1 Note that these results require high quality workmanship. If there are edge gaps larger reduce the construction R-value by 40%.
- 2 Insulation must be placed in all C sections to avoid air gaps
- 3 Add 0.2 if 12mm softboard is used in lieu of 10mm plasterboard





### Pitched steel-framed attic roof - Any roofing material

Trusses @ 900crs, TCT ≤ 0.75, 10mm plasterboard ceiling



----- Typical framing insulation R-value

**Key**

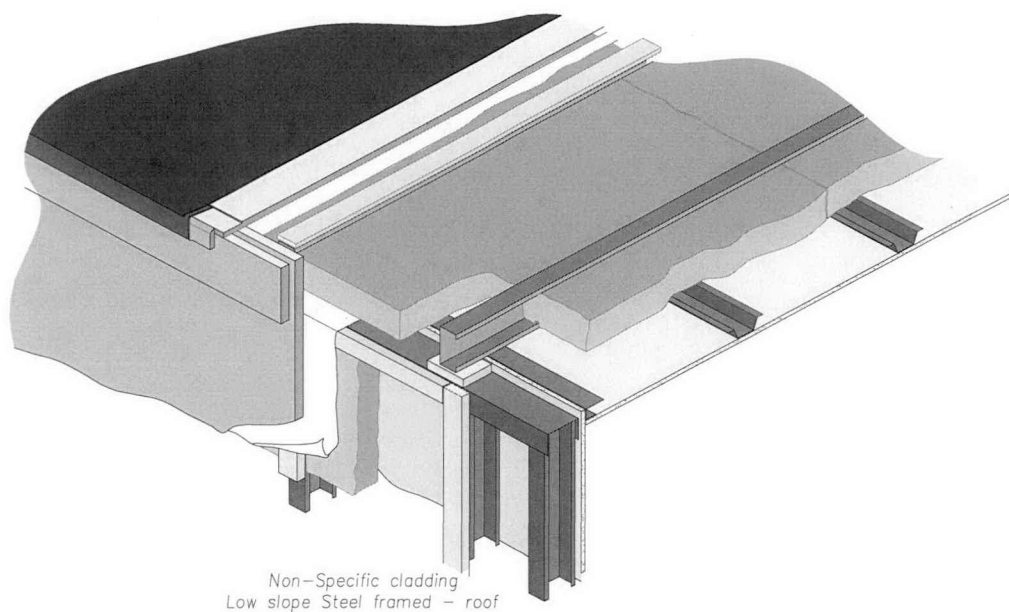
Trusses @ 600crs  
Trusses @ 900crs

Trusses @ 1200crs



### Low slope steel-framed roof - Any roofing material

150mm steel rafters, TCT  $\leq 1.5$ , 10mm plasterboard ceiling

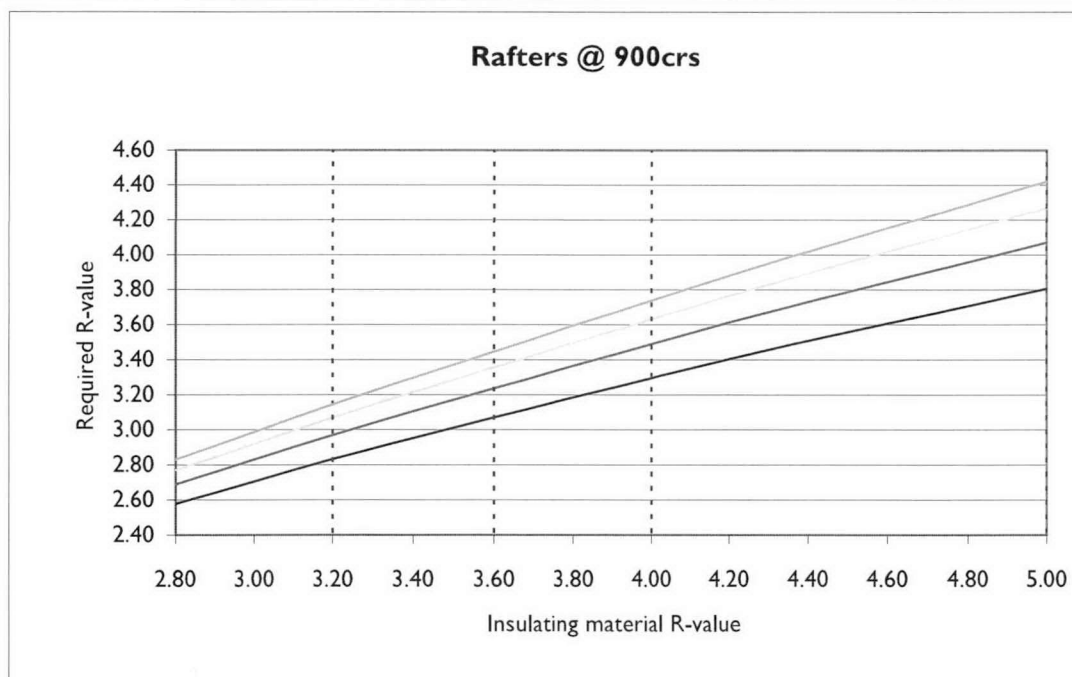
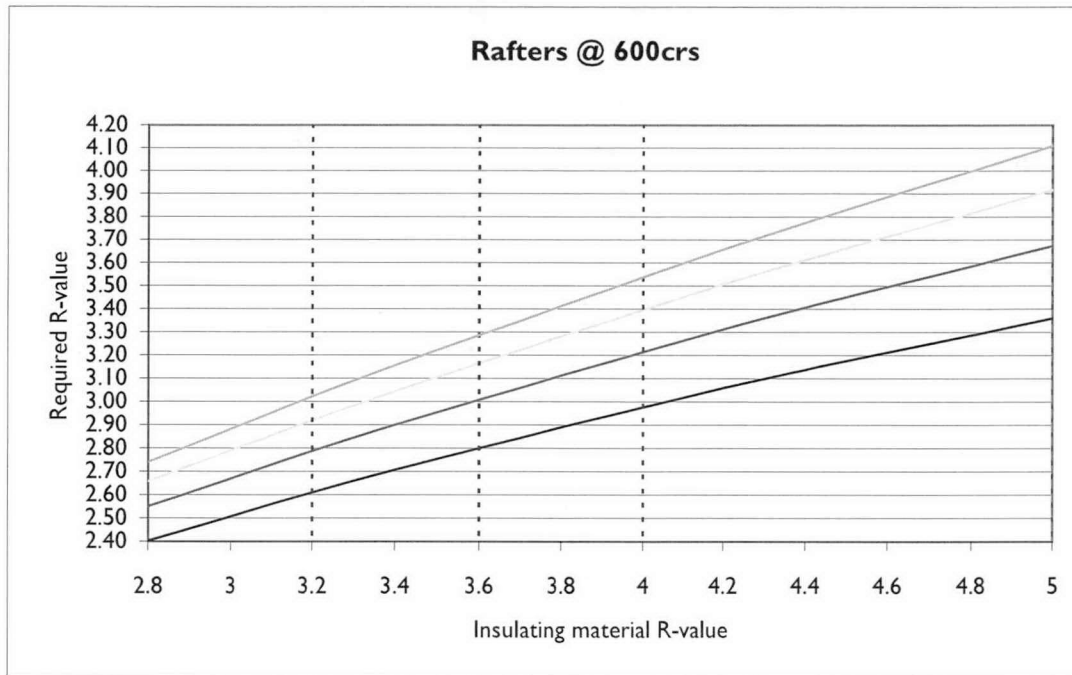


- 1 All rafters require a thermal break with a minimum R-value = 0.2.
- 2 Add 0.2 if 12mm softboard is used in lieu of 10mm plasterboard
- 3 Add 0.1 if there is a 20mm air gap between insulation and lining
- 4 Maintain 25mm clearance between top of insulation and roof underlay



### Low slope steel-framed roof - Any roofing material

150mm steel rafters, TCT ≤ 1.5, 10mm plasterboard ceiling



----- Typical framing insulation R-value

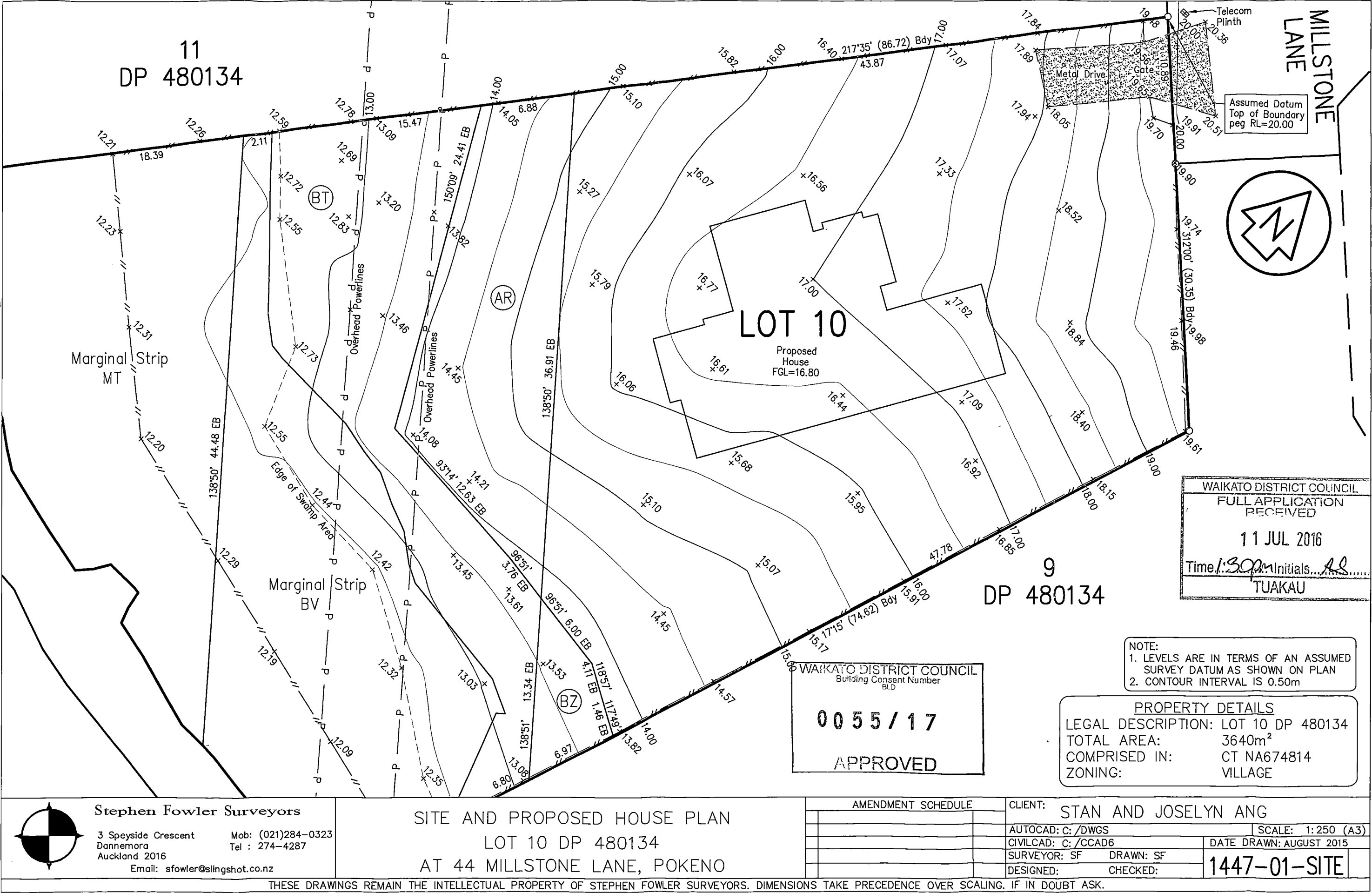
**Key**

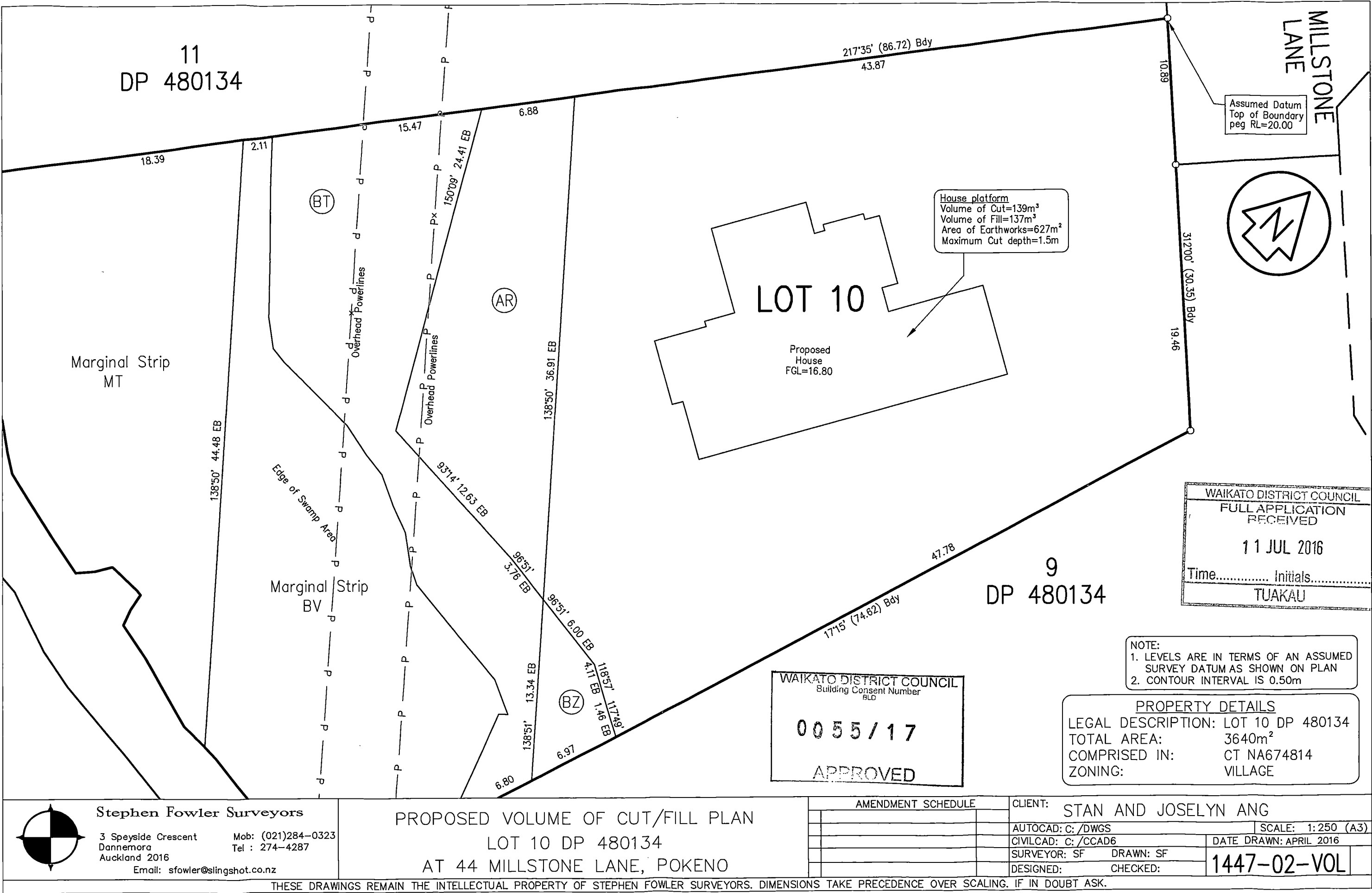
R0.2 strips  
 R0.4 strips

R0.6 strips  
 R0.8 strips

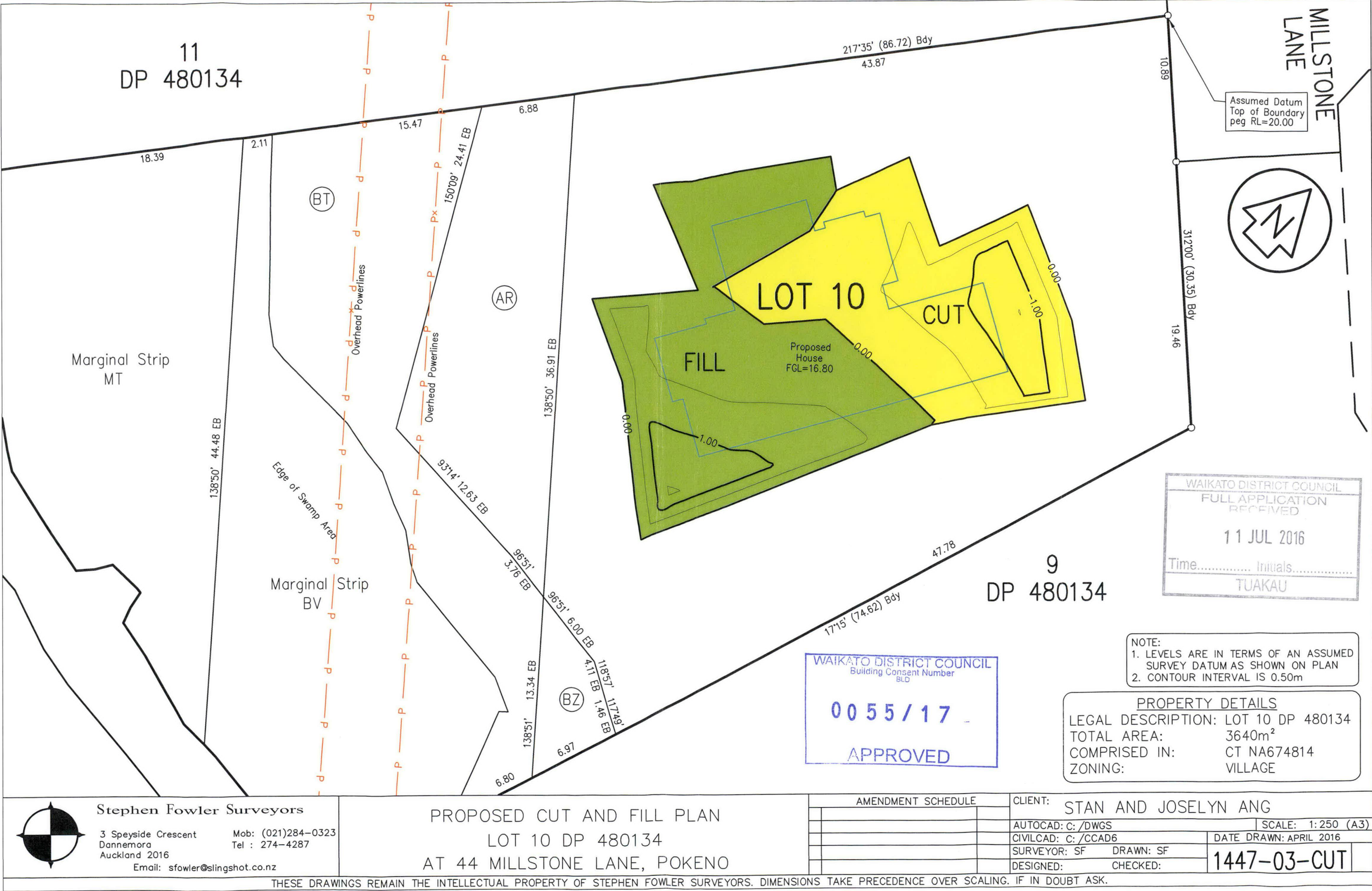
<b>WAIKATO DISTRICT COUNCIL</b> Building Consent Number <small>BLD</small>	
	Page B5
<div style="font-size: 2em; font-weight: bold; margin: 0;">0055/17</div> <div style="font-size: 1.5em; font-weight: bold; margin: 10px 0 0 0;">APPROVED</div>	

# Plans











Note: Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

CONTENTS

SHEET	DRAWING NAME
1	Contents & Design
2	Client Specification
3	Location Plan
4	Existing Site Plan
5	Site Works Plan
6	Site Plan
7	Roof Plane Layout Plan
8	Drainage Plan
9	Drainage Details
10	Elevations .1
11	Elevations .2
12	Floor Plan
13	Foundation Plan
14	Foundation Details
15	Foundation Details
16	Cross Section
17	Bracing Plan
18	Bracing Details - Walls
19	Bracing Details - Ceiling
20	Wall Frame Details - Lintels & Hold Downs
21	Wall Frame Details - Top Plate Connections
22	Ceiling Beam Details - Connections
23	Roof Frame Details - Connection Reference 3D
24	Roof Frame Details - Space Braces
25	Roof Frame Details - On Site Connections
26	Roof Frame Details - On Site Connections
27	Roof Frame Details - Soffit & Roof Battens
28	Roof Flashings
29	Exterior Joinery Details - Installation & Seal
30	Exterior Joinery Details - Installation & Seal
31	HomeRAB TB Fixing Layout
32	Cladding Details - Base & Soffit
33	Cladding Details - Vertical Junction
34	Cladding Details - Joinery
35	Cladding Details - Garage Door
36	Cladding Details - Meter Box
37	Cladding Details - Penetrations
38	Wet Area Details
39	Wet Area Details
40	Water Heating Details
41	Insulation Details
42	Electrical Plan

BUILDING COMPONENT, NOMINATED MEANS OF COMPLIANCE

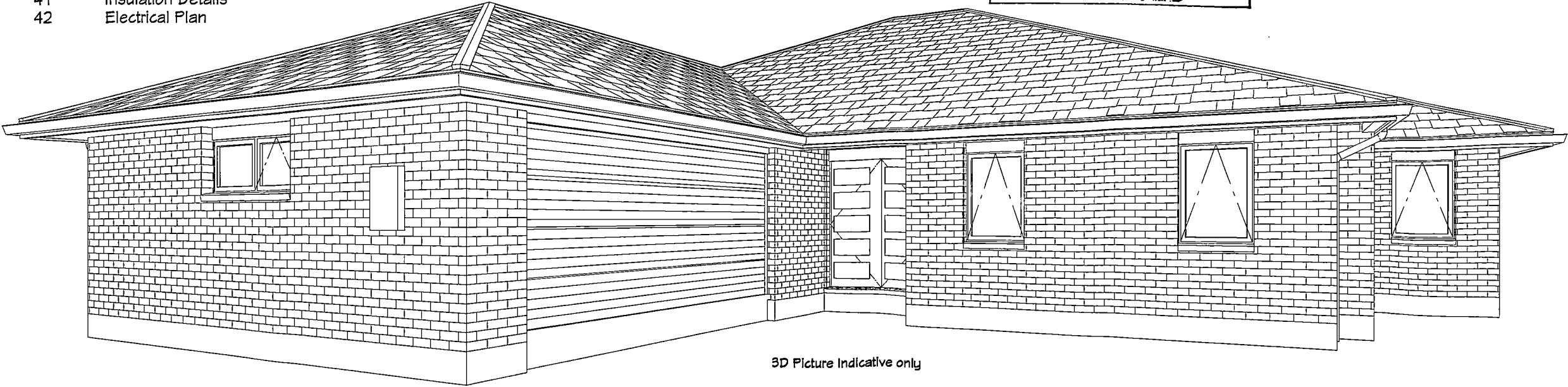
Foundation	AS 2870. Concrete raft slab: Foundation plan, Foundation details
Wall framing	ZOG® 0.75mm G550 Z275 steel framing: Framing details
Roof framing	ZOG® 0.75mm G550 Z275 steel trusses: Roof framing details
Roofing	E2/AS1: Roof flashings
Cladding	E2/AS1: Elevations & risk matrix, Exterior Joinery Details, Cladding Details
Bracing	NZS 3604:2011: Bracing plan, Bracing details
Insulation	NZBC-Clause H1, energy efficiency, 3rd edition: Insulation Calculations
Internal linings	E3/AS1: Cross Sections
Bathrooms	E3/AS1: Wet Area Details
Showers	E3/AS1: Wet Area Details
Water Heating	Refer: Water Heater Details
Water supply	AS/NZ 3500.1, section 14 rainwater supply, section 8 tank design.
Sanitary Plumbing	G13/AS1: Drainage plan
Drainage	G13/AS2: Drainage plan
Laundry	G2/AS1: Floor plan
Kitchen	G3/AS1: Floor plan
Kitchen spaces	G3/VM1: Floor plan (in service history)
Smoke alarms	F7/AS1: Electrical plan
Natural light	G7/AS1, Clause 1.0
Ventilation	G4/AS1: Clause 1.2
Access	D1/AS1: Floor plan



Rex Collins BP101182 - Design 2  
Craig Wearne BP101178 - Design 2

Building Design Summary

- Site data
- Ground bearing: (Coffey Geotechnics (NZ) Ltd)
  - Subsoil Class: (NZS1170, section 5)
  - Wind zone: (NZS3604, section 5)
  - E-quake zone: (NZS3604, figure 5.4)
  - Climate zone: (NZS4218, B1)
  - Exposure zone: (NZS3604, figure 4.2)
  - Rainfall zone: (NZBC:E1, Niwa)
  - Snowload: (NZS3604, figure 15.1)
- Building data
- Building cat: (NZS3604, table 1.1)
  - Floor live loads: (NZS3604, table 1.2)
  - Protect. from fire: (C1/AS1: Risk Group SH)



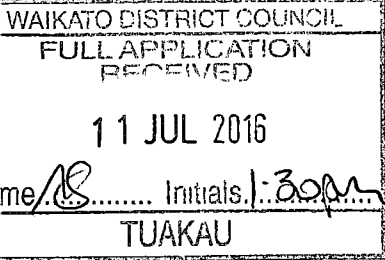
3D Picture Indicative only



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:  
ZOG® frames & trusses  
• ZOG® frames & trusses are designed using ProCAD engineering & detailing software.  
• ZOG® framing is 90x40x0.75mm rollformed from AXXIS® steel provided by NZ Steel Ltd.  
Structure reviewed & PS1 provided by:  
Hamish Pearse-Danker CPEng  
Chartered Prof Engineer No.1011810  
E3 Consultants NZ Ltd  
100 Spring street  
Tauranga  
Ph 07 577 9757



CLIENT:  
  
Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Contents & Design

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	SHEET No. 1 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

<b>Exterior</b>	
Fascia	Bildon 2000 Timber Fascia System 165mm
External gutter	B2 Box Section Spouting G3000
Downpipes	FreeFlow Aluminium 80mm round
Roofing	Metro Tile Shake Satin
Roof underlay	Fastwrap FlameSpec SS
Soffit cladding	5.0mm Hardisoffit™
Garage door jamb	180×19 H3 Rad FJ PP
Garage door architrave	No 19 40×10 H3 Architrave
Garage door head	90×19 H3 Rad FJ PP D4S
External joinery	WeatherTight™
Wall cladding A	Clay brick 70 series
Window heads	James Hadie® Smooth Weatherboard

<b>General Interior</b>	
Ceiling insulation	Pink® Batts® R3.6
Wall insulation	Pink® Batts® R2.2
Ceiling lining	Gib® Standard 10mm
Wall lining	Gib® Standard 10mm
Wall angle trims	Gib® Goldline® tape on trims
Ceiling hatch	The Hatch 650×1370mm with Selwood R28 Ladder Steps
Cornice	Gib-Cove® Alto 50mm
Cornice cpds & closets	Square stopped
Skirting	No20 60×10mm Rad FJ Single Bevel
Architraves	No19 40×10mm Rad FJ Single Bevel
Door jambs	19mm Rad FJ Flat Jamb & Planted Stops
Doors	MDF Premium Paint HC Flush
Door furniture	Schlage Elan
Hot water heater	H J Cooper Mains Pressure - Electric - 250L
Laundry tub	G & A Ultratub 555

<b>Bathroom</b>	
Ceiling lining	Gib® Standard 10mm
Wall lining	Gib® Standard 10mm
Wall finish	Resene Lustacryl paint
Bath	Athena Liquid 1675×750mm
Toilet	VCBC Onda OZ306
Vanity	VCBC Lucia 1200 - China Top - wall hung
Shower cubicle	Clearlite Millennium 1000×1000
Heated towel rail	Heirloom Genesis 1025 Towel Warmer

<b>Ensuite</b>	
Ceiling lining	Gib® Standard 10mm
Wall lining	Gib® Standard 10mm
Wall finish	Resene Lustacryl paint
Toilet	VCBC Onda OZ306
Vanity	VCBC Lucia 1200 - China Top - wall hung
Shower cubicle	Clearlite Millennium 1000×1000
Heated towel rail	Heirloom Genesis 1025 Towel Warmer



<b>WC</b>	
Toilet	VCBC Onda OZ306
Vanity	Michel Cesar Soho wall hung

<b>Kitchen</b>	
Bench top	GFL Smartstone
Sink	Sodium IK73759 Undermount
Splashback	740mm High Glass

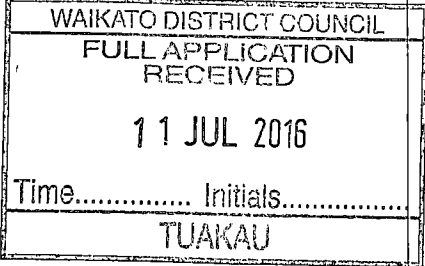
<b>Garage</b>	
Ceiling insulation	Pink® Batts® R3.6
Wall insulation	Pink® Batts® R2.2
Ceiling lining	Gib® Standard 10mm
Wall lining	Gib® Standard 10mm



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

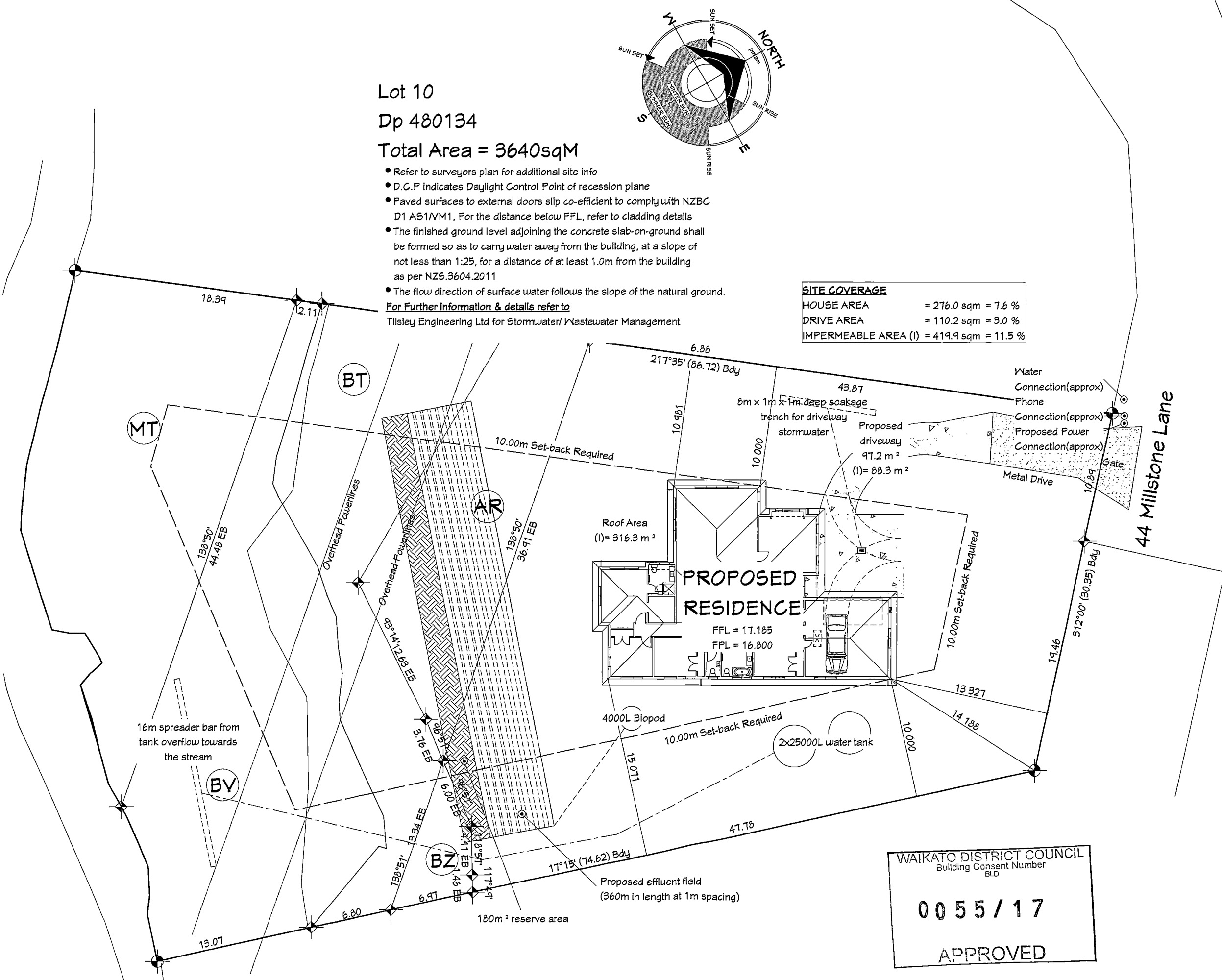
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including	
Ground Bearing:	REF GEOTEC
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

Client Specification

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	SHEET No. 2 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



Lot 10  
Dp 480134  
Total Area = 3640sqM

- Refer to surveyors plan for additional site info
  - D.C.P indicates Daylight Control Point of recession plane
  - Paved surfaces to external doors slip co-efficient to comply with NZBC D1 AS1/VM1, For the distance below FFL, refer to cladding details
  - The finished ground level adjoining the concrete slab-on-ground shall be formed so as to carry water away from the building, at a slope of not less than 1:25, for a distance of at least 1.0m from the building as per NZS.3604.2011
  - The flow direction of surface water follows the slope of the natural ground.
- For Further Information & details refer to  
Tilsley Engineering Ltd for Stormwater/ Wastewater Management

SITE COVERAGE	
HOUSE AREA	= 276.0 sqm = 7.6 %
DRIVE AREA	= 110.2 sqm = 3.0 %
IMPERMEABLE AREA (I)	= 414.9 sqm = 11.5 %

**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

- This location plan is too large to accurately show dimensions and positioning of the structure. It has been provided as general information to give an approximate location.
- Refer to the Existing Site Plan, Site Works Plan, and the Site Plan for more detailed information.

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
11 JUL 2016  
Time..... Hrs..... Mins.....  
TAKAU

ELEVATION GUIDE

CLIENT:  
**Ang Residence**  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Location Plan**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S	SHEET No. 3 OF 42

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD  
**0055/17**  
APPROVED

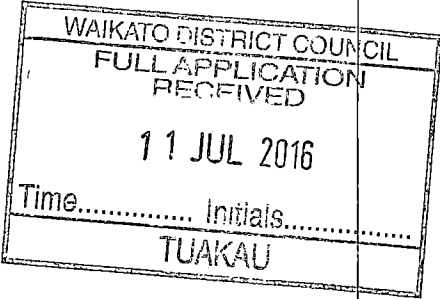
**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



ANG

© GOLDEN HOMES HOLDINGS LTD  
NOTES:

This page shows pre-construction site information of the current status of the existing lot, prior to clearing of the site, earth works and/ or any demolition if required.

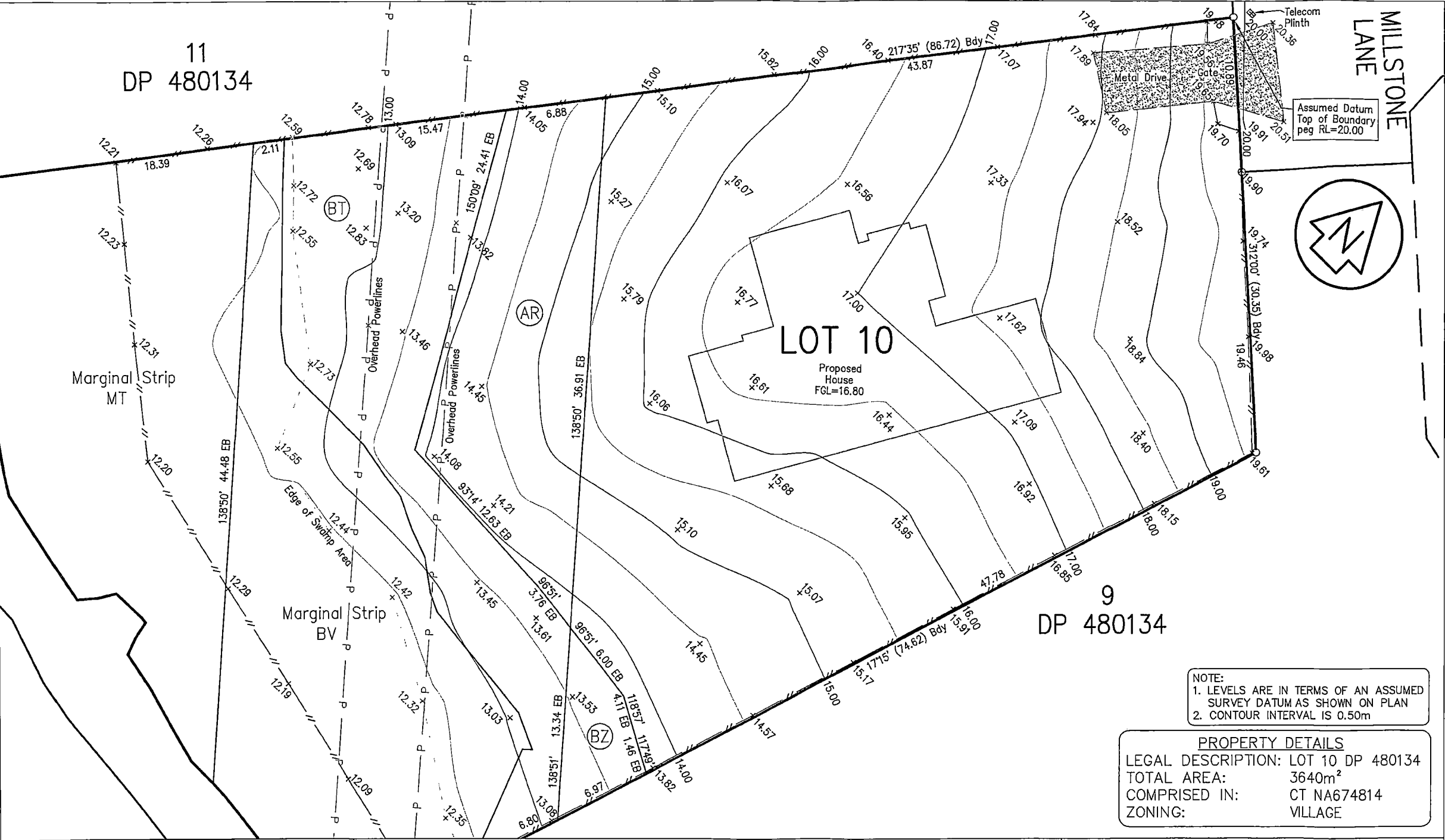


CLIENT:  
  
Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B


SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Existing Site Plan	
JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S	SHEET No. 4 OF 42



NOTE:  
1. LEVELS ARE IN TERMS OF AN ASSUMED SURVEY DATUM AS SHOWN ON PLAN  
2. CONTOUR INTERVAL IS 0.50m

**PROPERTY DETAILS**  
LEGAL DESCRIPTION: LOT 10 DP 480134  
TOTAL AREA: 3640m<sup>2</sup>  
COMPRISED IN: CT NA674814  
ZONING: VILLAGE

 <b>Stephen Fowler Surveyors</b>  3 Speyside Crescent Dannemora Auckland 2016  Mob: (021)284-0323 Tel : 274-4287  Email: sfowler@slingshot.co.nz	SITE AND PROPOSED HOUSE PLAN  LOT 10 DP 480134  AT 44 MILLSTONE LANE, POKENO	AMENDMENT SCHEDULE		CLIENT: STAN AND JOSELYN ANG	
				AUTOCAD: C:/DWGS	
				CIVILCAD: C:/CCAD6	
				SURVEYOR: SF	
				DRAWN: SF	
				DESIGNED: CHECKED:	
				1447-01-SITE	
THESE DRAWINGS REMAIN THE INTELLECTUAL PROPERTY OF STEPHEN FOWLER SURVEYORS. DIMENSIONS TAKE PRECEDENCE OVER SCALING. IF IN DOUBT ASK.					

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD

0055/17

APPROVED



**GOLDEN  
HOMES™**

© GOLDEN HOMES HOLDINGS LTD

- Located & identify boundary pegs on site prior to commencing earthworks.
- Located & identify all service connection points on site prior to commencement of earthworks.
- The building platform is to be flat with a Ground Bearing Capacity of no less than that shown in the SITE DATA below. If during site works soft soils, expansive clay, presence of peat or organic vegetation matter, or previous earth disturbances are discovered, then an engineer must be engaged to review suitability of the ground in relation to the current foundation design.
- Refer to the Site Plan for the required FPL (finished platform level)
- Public protection from onsite hazards
- Site safety fencing (When required by T.A), 2.0m(min) to prevent site hazards from harming traffic or passers-by, to restrict unauthorized entry by children - ensure fencing is difficult to be climbed, gates and doors do not project beyond site when open, and encloses the whole site.
- All building sites to have O.S.H compliant warning signs erected.
- Any hazardous equipment or materials will be stored onsite only if secured, by portable building lock up or in the house being built (after lock-up stage)
- Sites to be assessed on an individual basis by construction managers for compliance with NZBC clause F5 and if specific hazards exist then a work-site barrier must be erected.

Time initials  
CLIENT: TUAKAU  
Area Residence

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: <i>for zones upto &amp; including</i>	
Ground Bearing:	REF GEOTEC
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: 1:200	SHEET No. 5 OF 42

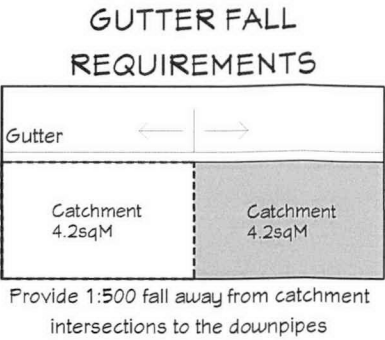
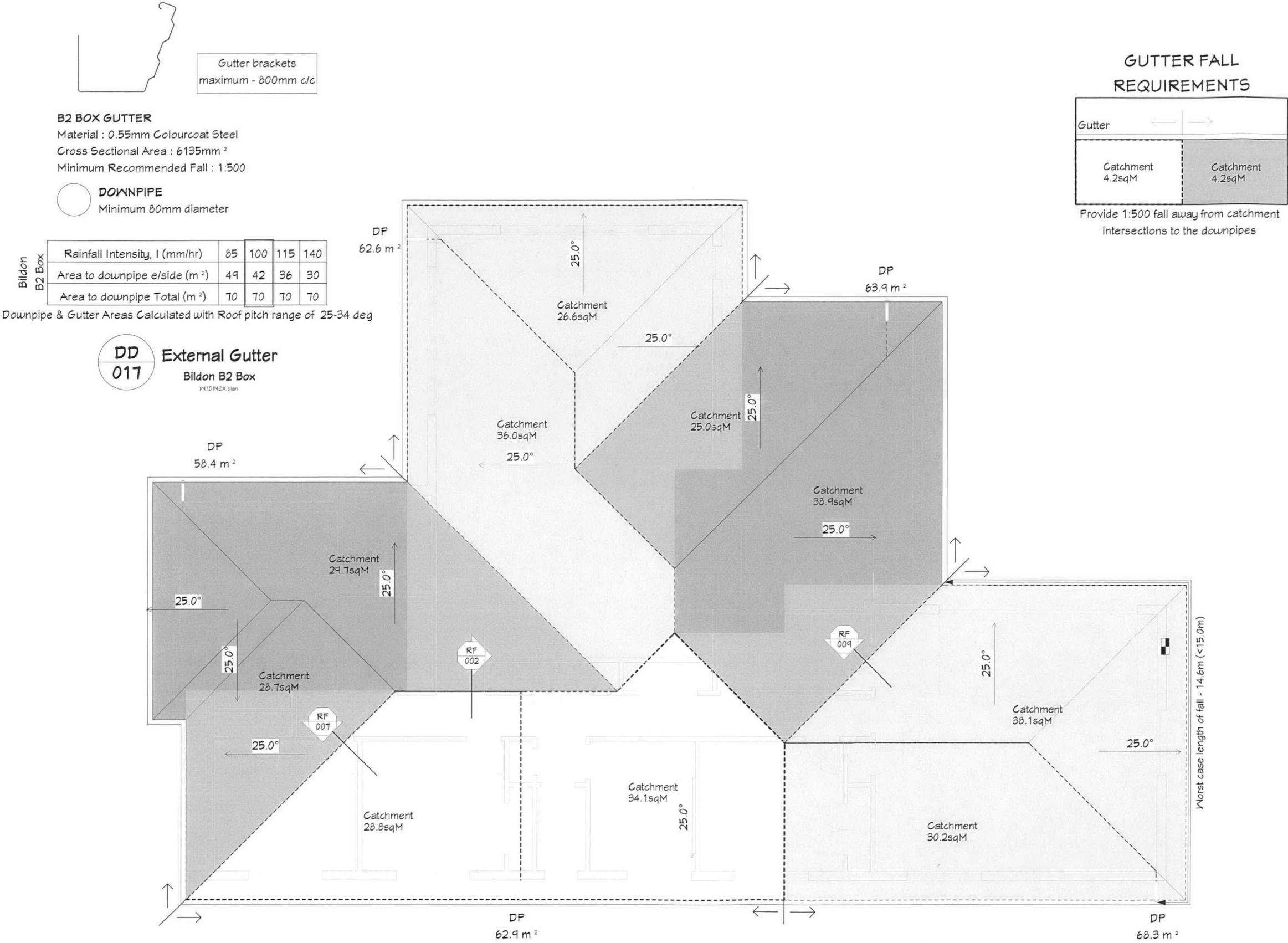


ELEVATION  
GUIDE





**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

**Detail Callouts**

RF 002 = Roof Flashing Detail  
002 = Detail Number  
Refer to Roof Flashing Sheets

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including

Ground Bearing:	REF GEOTEC
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

**Roof Plane Layout Plan**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: 1:100	SHEET No. 7 OF 42



**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

- Legend**
- 100mm PVC STORMWATER DRAIN
  - 100mm PVC SOIL DRAIN
  - WASTE PIPES
  - TV TERMINAL VENT
  - IP INSPECTION POINT
  - RE RODDING EYE
  - GT GULLY TRAP
  - ODP DOWNPIPES

ALL DRAINAGE TO NZBC Clause G13/A52

NZBC G13 A5/1 Table C2

Fixture Type	Discharge Units	Minimum Discharge pipe size (mm)	Gradient
Basin	1	40	1:40
Bath	4	40	1:40
Shower	2	40	1:40
Laundry	5	50	1:40
Kitchen sink	6	50	1:40
WC	4	100	1:60

Discharge Pipe Table

For Further Information & details for stormwater/ wastewater management refer to Tilsley Engineering Ltd for Stormwater/ Wastewater Management

**INTERNAL PLUMBING WASTE KEY**

S indicates a sink and has +700mm for developed length  
T indicates a shower tray or bath and has +300mm for developed length  
H indicates a H.W.C and has +700mm for developed length  
(#.#) in all cases indicates the plan length

**EXTERNAL DRAINAGE**

NZBC - G13, Pipe sizes  
MCI - Minimum connection invert (bellow FFL)  
Sewer drain - 100mm P.V.C pipe, 1:120 Gradient(min)  
Stormwater drain - 100mm P.V.C pipe, 1:120 Gradient(min)  
\*All Inverts allow 650mm below FFL at the head of the drain to allow for gully and pipe cover

**POINTS OF ACCESS GENERAL**

Rodding points are preferred to inspection points in landscaped or sealed areas and within buildings.

**Spaced at no further than:**

- 50m where rodding points are used.
- 100m where inspection points, inspection chambers or access chambers are used.

**Positioned at:**

- Changes in direction of greater than 45°
- Changes in gradient of greater than 45°

**Stormwater Specific**

- Plumber to ensure there is an inspection point within 2.0m of building where a stormwater pipe runs under the slab
- At junctions of drains, other than a drain serving a single downpipe less than 2.0m.

**Sewer Specific**

- Plumber to ensure there is an inspection point within 2.5m of building where a sewer pipe runs under the slab
- Immediately prior to drain outfalls,
- Immediately inside the boundary of the property served
- At the junction of every drain with another drain, other than a drain serving a single gully trap less than 2.0m.

**VENT REQUIREMENTS**

- Vent at head of the drain to be within 6.0m(developed length) of last Gully trap/W.C
- W.C needs vent within 1.5m due to main drain fall less than 1:60
- Max branch drain without venting is 10m
- Max developed length to a gully 3.5m, if exceeds add venting
- Developed length is from water seal to discharge (allow +200mm foundation to gully)

Please refer the recommendations (Page 88/ Sheet 9 of the PDF) and plan (Sheet 42 of the PDF)

and draw in & note the recommendations as noted and shown on the plan. Please also incorporate the following designs into our drainage details:

Water Tank design as noted on Page 25/ Sheet 26 of the PDF and  
Spreader Bar design as noted on Page 27/ Sheet 28 of the PDF.

**Amended**  
**17-08-16**



**ANG**

© GOLDEN HOMES HOLDINGS LTD

**NOTES:**

**Bracing Element Lines**

- Prior to making penetrations for pipe work or other, the contractor must review the plans to ensure the work will not effect the ZOG® structural framing or bracing elements.
- Vanity Wastes - All vanity wastes to be put into wall frame to allow for wall hung vanities.
- Check & confirm on site position of all utility connections.
- Check & confirm on site that all invert levels are as shown on the plans and that the minimum gradients noted can be achieved.

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD

**0055/17**

**APPROVED**

**CLIENT:**

**Ang Residence**  
**Lot 10, Dp 480134**  
**44 Millstone Lane**  
**Waterfall Park, Pokeno**

**TERRITORIAL AUTHORITY:**

Waikato District Council  
Village Growth Area B

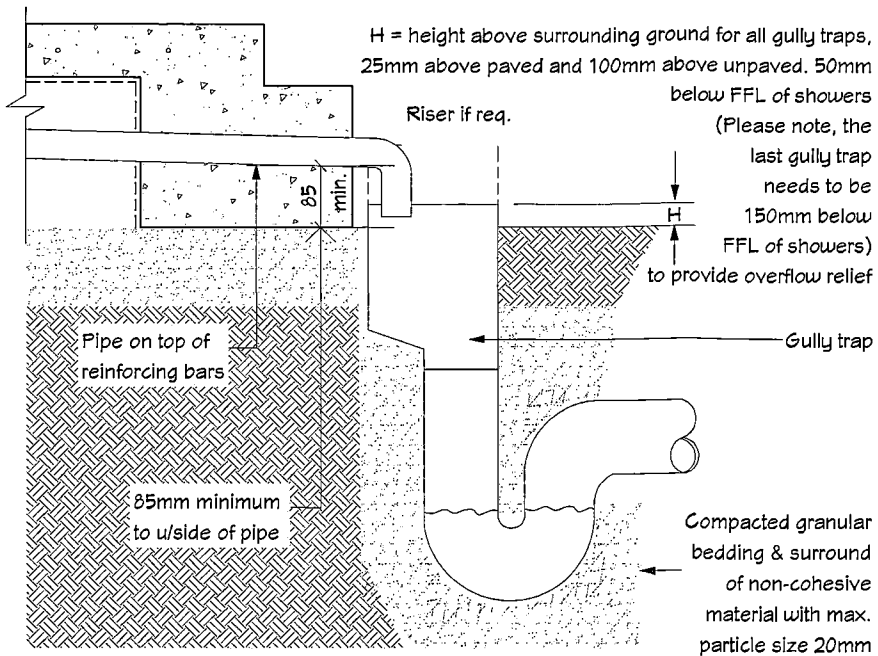
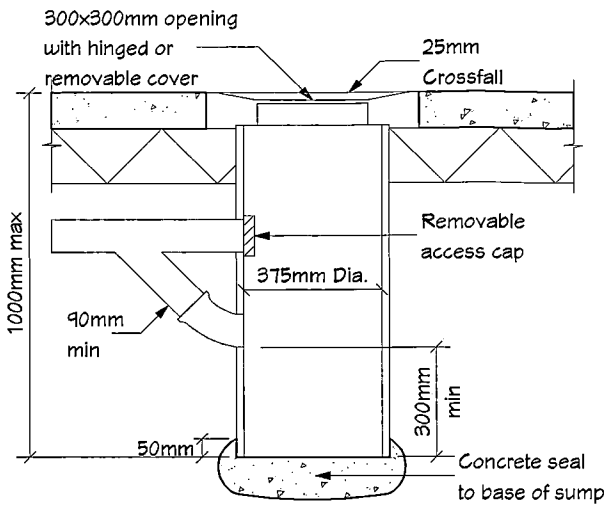
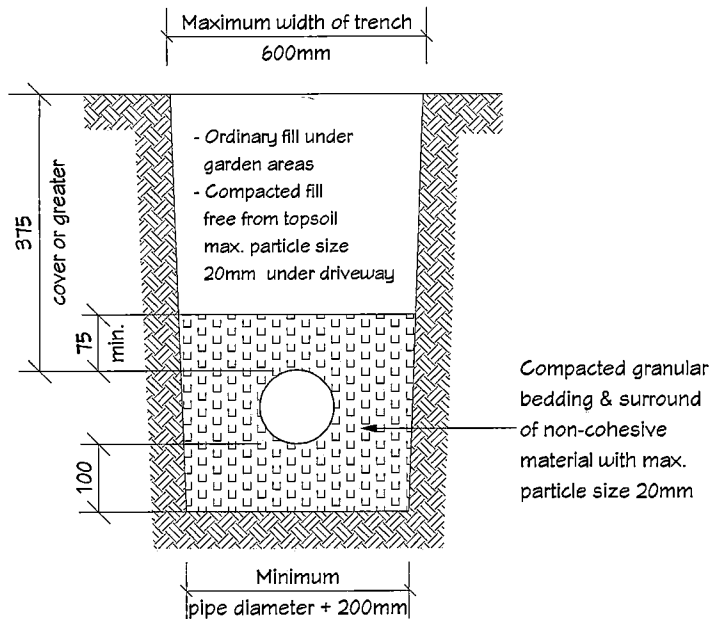
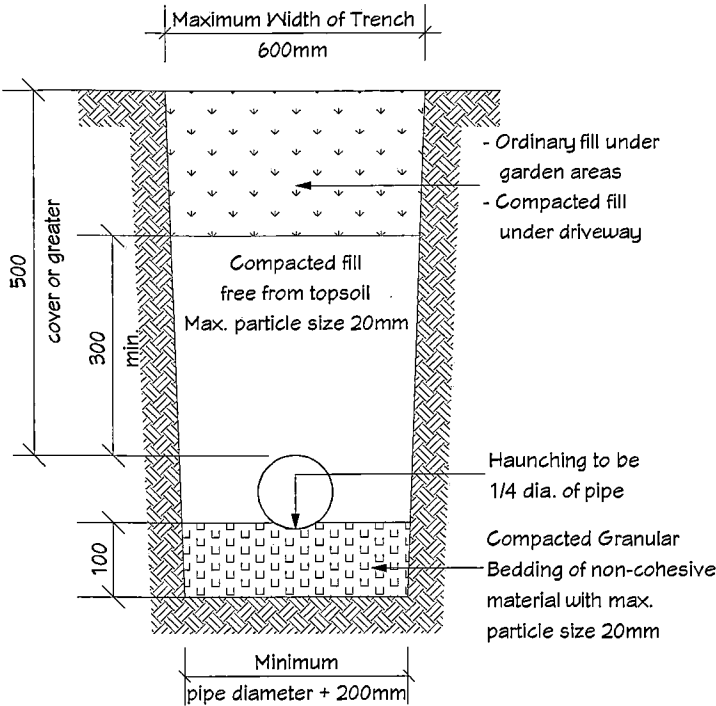
**SITE DATA: for zones upto & including**

Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Drainage Plan**

JOB No: 5534 SALES: Grant Edwards  
ZOG No: DRAWN: Matt  
PLAN DATE: 20/04/2016  
SCALE: 1:100 SHEET No. 8 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

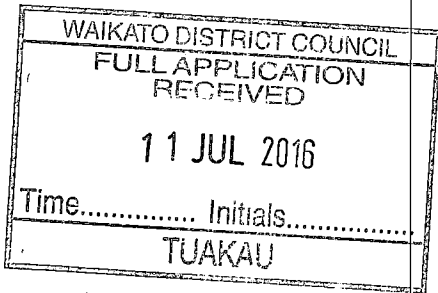


ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- **Vanity wastes** - All vanity wastes to be put into wall frame to allow for wall hung vanities



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including

Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

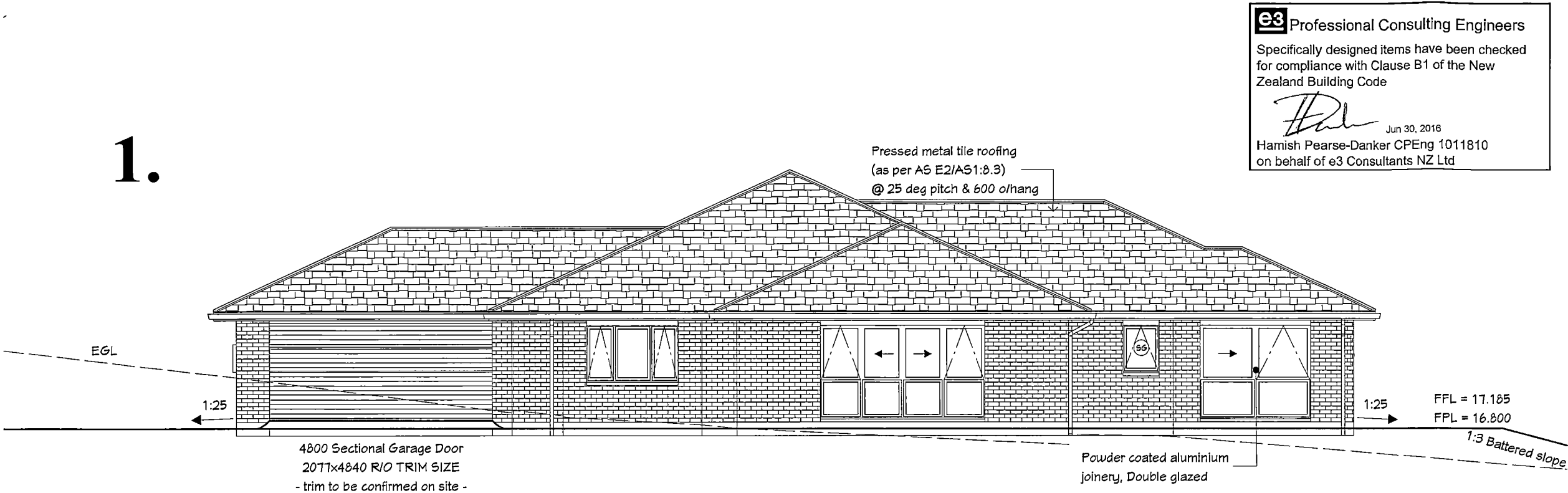
Drainage Details

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S	SHEET No. 9 OF 42



V = Pipe trenches open less than 48 hours  
3V = Pipe trenches open more than 48 hours (except rock)

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



**e3** Professional Consulting Engineers

Specifically designed items have been checked  
for compliance with Clause B1 of the New  
Zealand Building Code

*Hamish Pearce-Danker*  
Jun 30, 2016  
Hamish Pearce-Danker CPEng 1011810  
on behalf of e3 Consultants NZ Ltd



**ANG**

© GOLDEN HOMES HOLDINGS LTD

**NOTES:**

- If windows & doors are shown upto soffit,  
window and door sizes are to be measured  
on site prior to the manufacture of those  
units.

FFL = Finished Floor Level  
FGL = Finished Ground Level  
FPL = Finished Platform Level  
EGL = Existing Ground Level

**SG** Indicates safety glass

Safety Glazing

- All glazing is to be in accordance with the NZ  
Building Code Handbook and NZS.4223,  
Parts 1, 2, & 3 Code of Practice for Glazing  
in Buildings.
- All glazing panels to bathrooms and toilets to  
have safety glazing to the interior panel only
- All glazing to be confirmed by the  
manufacturer prior to construction

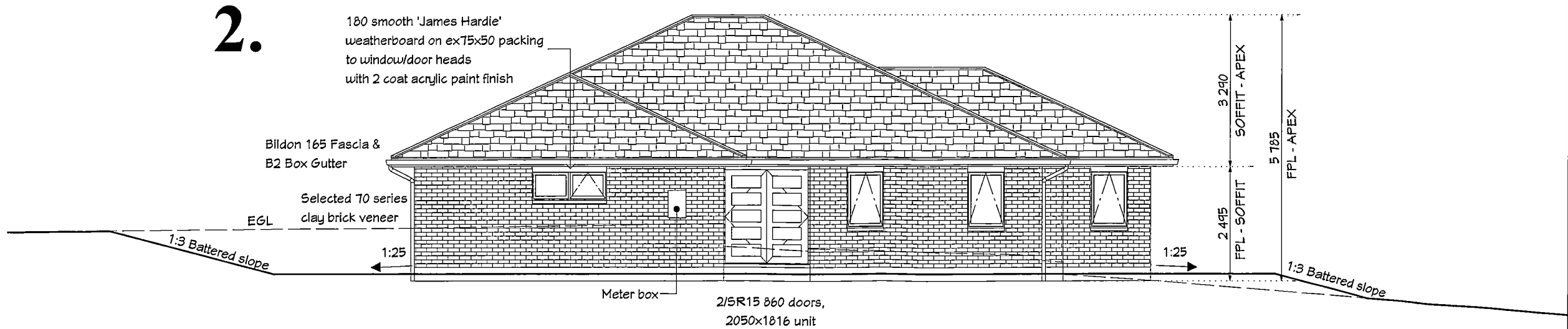


Table 2 Building envelope risk matrix Paragraph 3.1.2, Figure 1					
Risk factor	Risk Severity				Subtotals for each risk factor
	Low	Med	High	Ven High	
Wind zone (per NZS 3604)	0	0	1	2	1
Number of storeys	0	1	2	4	0
Roof/wall intersection design	0	1	3	5	0
Eaves width	0	1	2	5	1
Envelope complexity	0	1	3	6	0
Deck Design	0	2	4	6	0
Total Risk Score					2

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD

**0055/17**

**APPROVED**

**CLIENT:**

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

**TERRITORIAL AUTHORITY:**

Waikato District Council  
Village Growth Area B

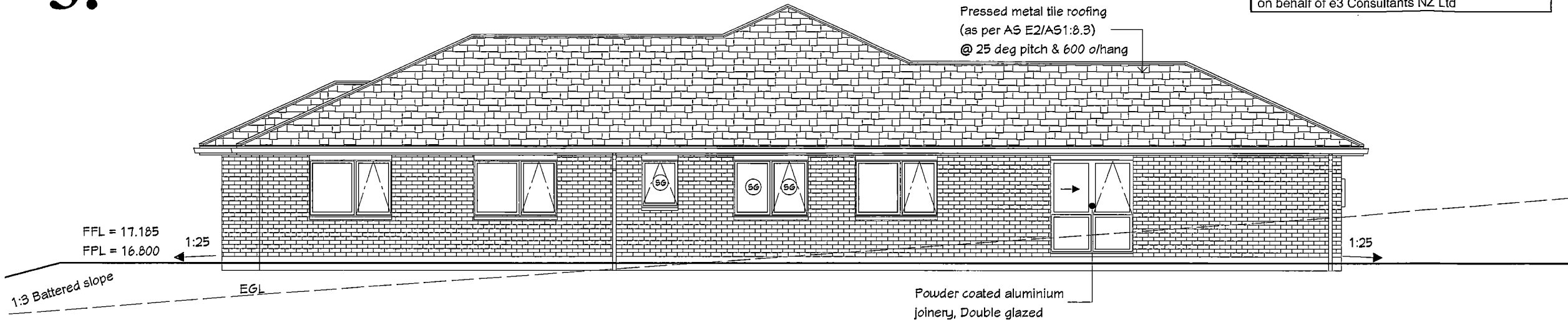
**SITE DATA: for zones upto & including**  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Elevations .1**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: 1:100	SHEET No. 10 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

3.



e3

Professional Consulting Engineers

Specifically designed items have been checked for compliance with Clause B1 of the New Zealand Building Code

Jun 30, 2016

Hamish Pearse-Danker CPEng 1011810  
on behalf of e3 Consultants NZ Ltd



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- If windows & doors are shown upto soffit, window and door sizes are to be measured on site prior to the manufacture of those units.

FFL = Finished Floor Level  
FGL = Finished Ground Level  
FPL = Finished Platform Level  
EGL = Existing Ground Level

SG Indicates safety glass

Safety Glazing

- All glazing is to be in accordance with the NZ Building Code Handbook and NZS.4223, Parts 1, 2, & 3 Code of Practice for Glazing in Buildings.
- All glazing panels to bathrooms and toilets to have safety glazing to the interior panel only
- All glazing to be confirmed by the manufacturer prior to construction

4.

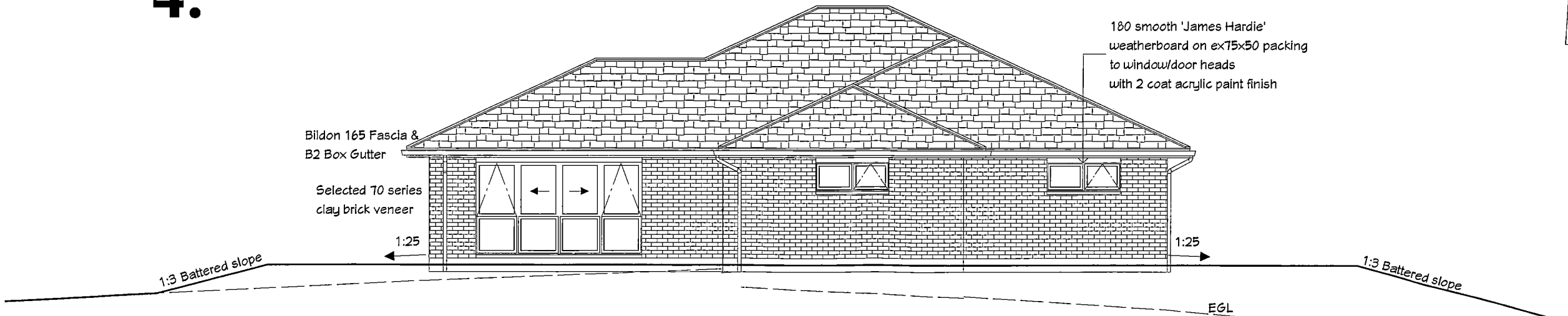


Table 2 Building envelope risk matrix Paragraph 3.1.2, Figure 1					
Risk factor	Risk Severity				Subtotals for each risk factor
	Low	Med	High	Very High	
Wind zone (per NZS 3604)	0	0	1	2	1
Number of storeys	0	1	2	4	0
Roof/wall intersection design	0	1	3	5	0
Eaves width	0	1	2	5	1
Envelope complexity	0	1	3	6	0
Deck Design	0	2	4	6	0
Total Risk Score					2

WAIKATO DISTRICT COUNCIL

Building Consent Number

BLD

0055/17

APPROVED

WAIKATO DISTRICT COUNCIL

FULL APPLICATION RECEIVED

11 JUL 2016

Time..... mins

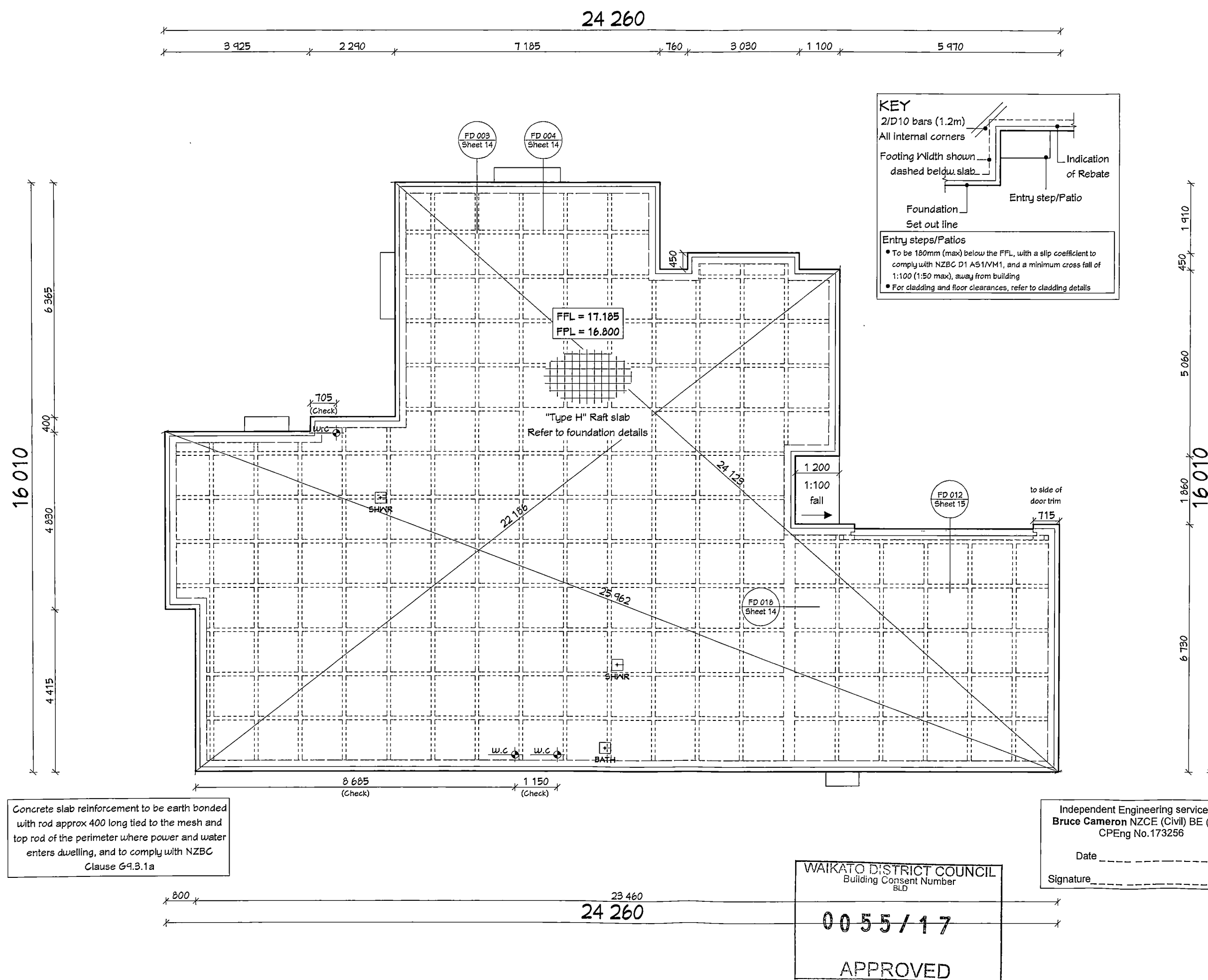
CLIENT: TUKAU

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTECH  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Elevations .2	
JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: 1:100	SHEET No. 11 OF 42



ANG

© GOLDEN HOMES HOLDINGS LTD

## NOTES:

- This foundation plan must be read in conjunction with the full consented drawing set.
- Refer to cladding details for cladding rebates.
- Concrete pour must not start until the earth bonding has been completed.
- No slab shrinkage saw cuts are to be made in this raft slab under any circumstances unless specifically asked for by the consulting engineer.
- Concrete strength shall be 20MPa (or 25MPa TC2, TC3 & exposure zone D) at 28 days.
- Excavation and hardfill to a depth as required to reach good ground bearing
- Granular fill material shall be placed and compacted in layers of 150 mm maximum thickness, over the area beneath the proposed ground slab, so that the total thickness of granular base is not less than 75 mm nor more than 600 mm.
- If the finished platform could cause intrusions to DPM layer, it must be protected by blinding the hardfill with sand 5-25mm thick.

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including	
Ground Bearing:	REF GEOTECH
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

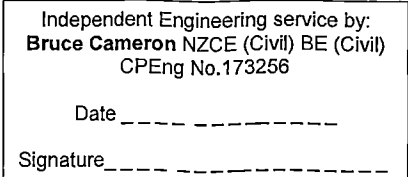
## Foundation Plan

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: 1:100	SHEET No. 13 OF 42

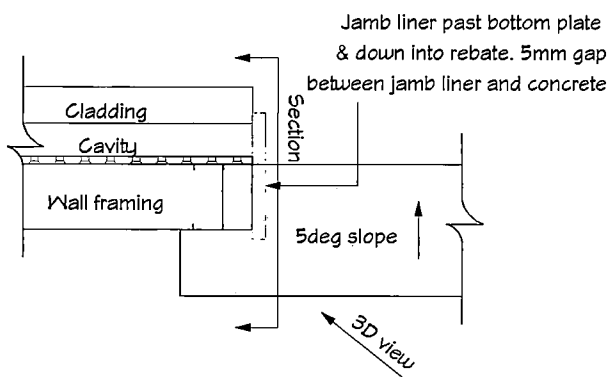
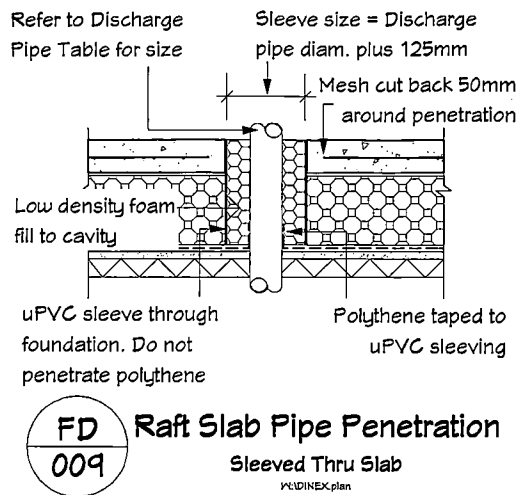


**NOTE:**

- All reinforcing is to be in accordance with NZS 4671.
- Void formers to be 200mm(min) thickness
- For cladding and floor clearances, refer to cladding details
- The finished ground level adjoining the raft slab shall be formed so as to carry water away from the building, at a slope not less than 1:25 for a minimum distance of 1.0m. As per NZS:3604
- Minimum clearance for reinforcement unless shown otherwise:  
Exposed during construction = 25mm, Slab mesh = 30mm from top of slab,  
Raft foundation = 50mm from bottom of raft & 75mm to external faces

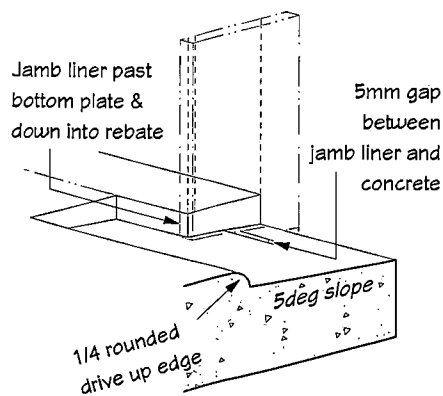


JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: NTS	SHEET No. 14 OF 42

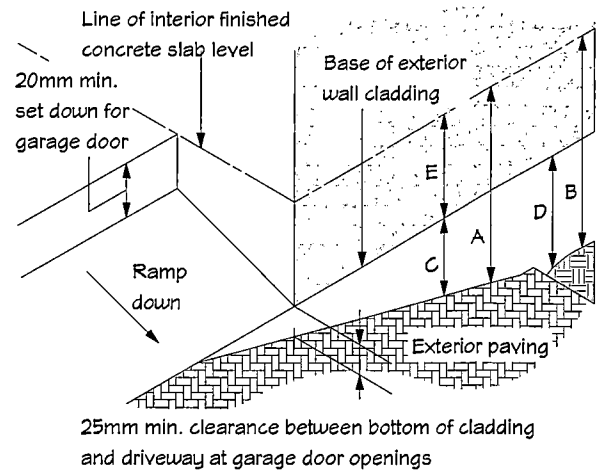


FD  
012

Garage Door Rebate  
Plan View  
K&L INEX plan

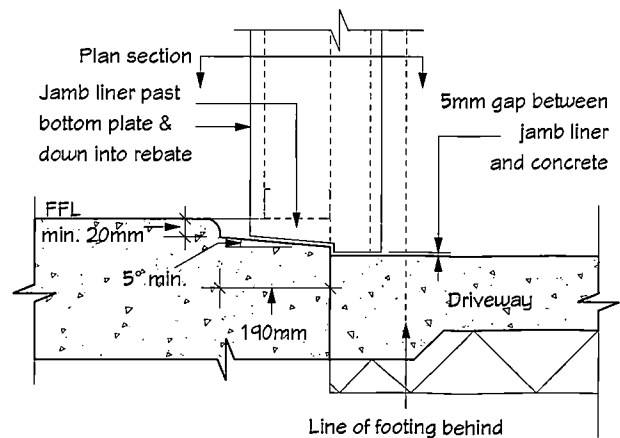


FD 012 Garage Door Rebate  
Interior 3D View  
WADINEX.pln



Minimum clearances (mm)	Masonry veneer		Other claddings				
	A	B	A	B	C	D	E
Concrete slab	100	150	150	225	100	175	50

**FD** **Garage Door Rebate**  
**012** Exterior 3D View  
WINDIX plan



**FD** **Garage Door Rebate**  
**012** **Section**  
 W-DINEX plan

Independent Engineering service by:  
**Bruce Cameron** NZCE (Civil) BE (Civil)  
 CPEng No.173256

Date \_\_\_\_\_

Signature \_\_\_\_\_



GOLDEN  
HOMES™

ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED

11 JUL 2016

Time..... Initials

TUAKAU

CLIENT:

## Ang Residence

Lot 10, Dp 480134

44 Millstone Lane

## Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including	
Ground Bearing:	REF GEOTECH
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

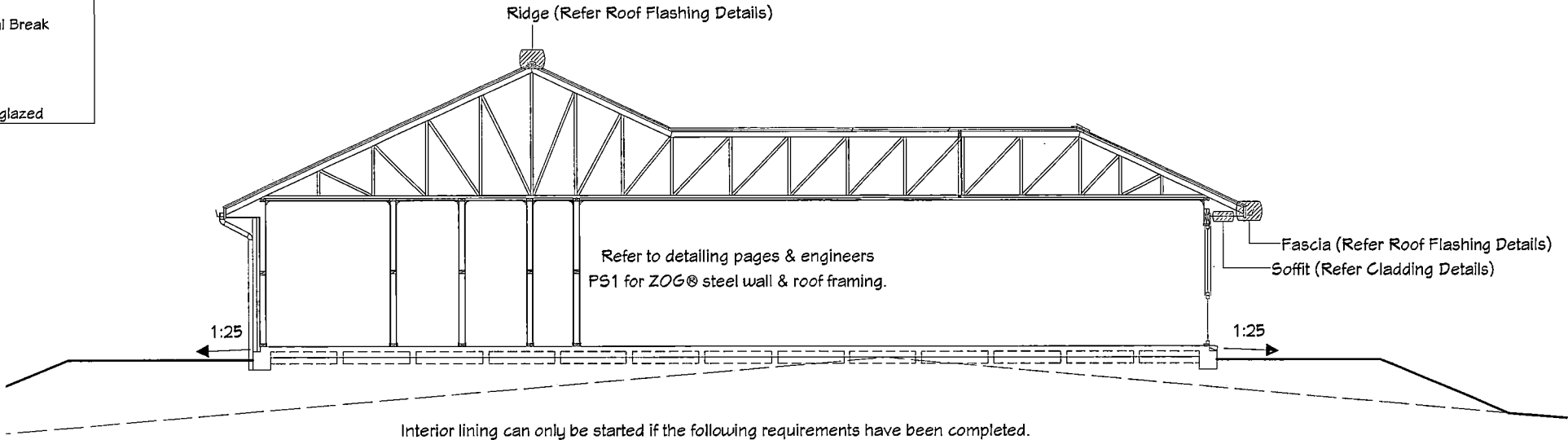
## Foundation Details

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: NTS	SHEET No. 15 OF 42



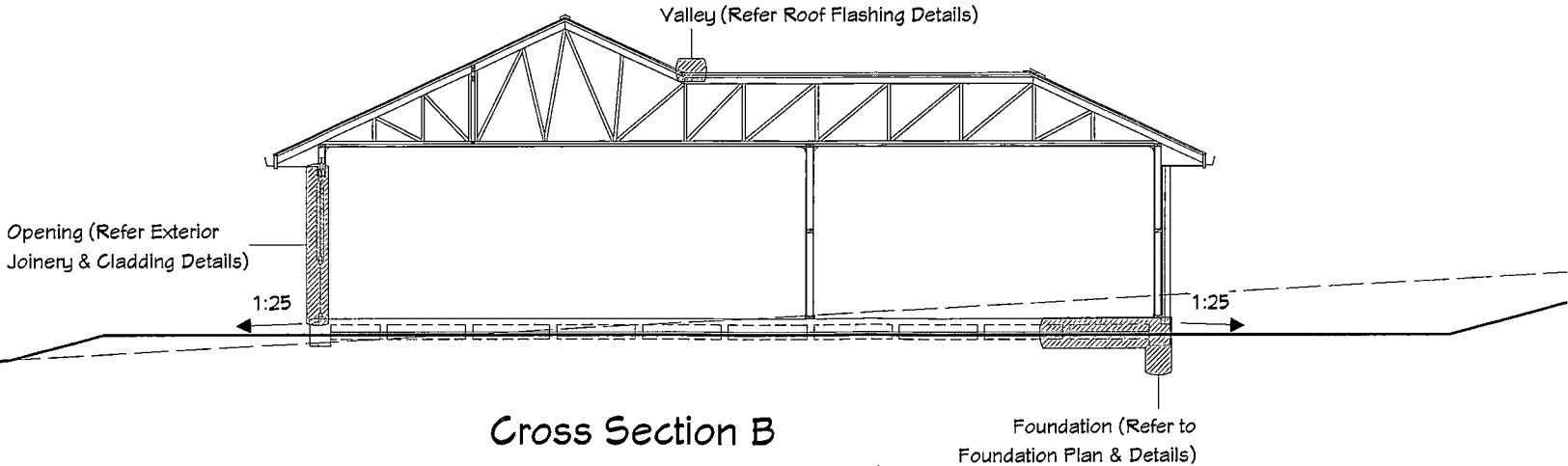
**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

Structure:	<i>PS1 provided by engineer</i> ZOG® steel frame trusses ZOG® steel frame walls 2420mm stud height Metal battens@370mm c/c ZOG® ceiling battens @ 450c/c
Overhang:	Refer elevations/Floor plan
Fascia system:	Refer elevations
Roof Underlay:	Fire retardant underlay
Soffit:	4.5mm Hardisoffit® lining
Thermal break	
Wall Underlay:	HomeRAB Thermal Break
Cladding:	Refer elevations
Ceiling Lining:	Plasterboard
Wall lining:	Plasterboard
Joinery Frames:	Aluminium double glazed



- Interior lining can only be started if the following requirements have been completed.
- Roofing, fascia and soffit linings.
  - XPS & Fasturap to the exterior of the building.
  - Exterior openings have been installed & sealed as per Opening Details page.

Cross Section A



Cross Section B

**ADDITIONAL EXTERNAL WALL  
FRAME REQUIREMENTS:**  
Brick cladding  
(upto & incl. V.high wind)  
Studs @ 600c/c, Nogs @ 1200c/c



ANG

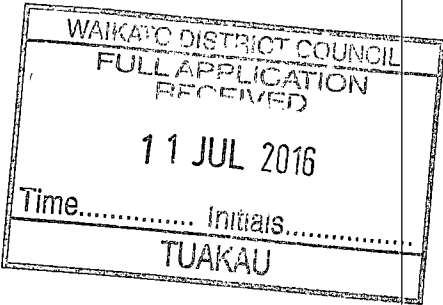
© GOLDEN HOMES HOLDINGS LTD

NOTES:

- Any timber used in the construction of the building must have a DPC layer separating it from any ZOG® steel framing.
- Roof underlay must be installed horizontally in all cases.

Fixings

- All fixings to be as per the latest ZOG® steel frame manual and comply with Section 4, Durability, NZS:3604:2011



INSULATION

External Walls = R-2.2 batts  
Internal Garage Walls = R-2.2 batts  
Ceiling = R-3.6 batts

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

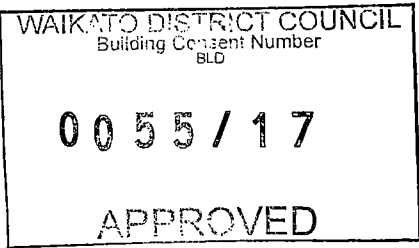
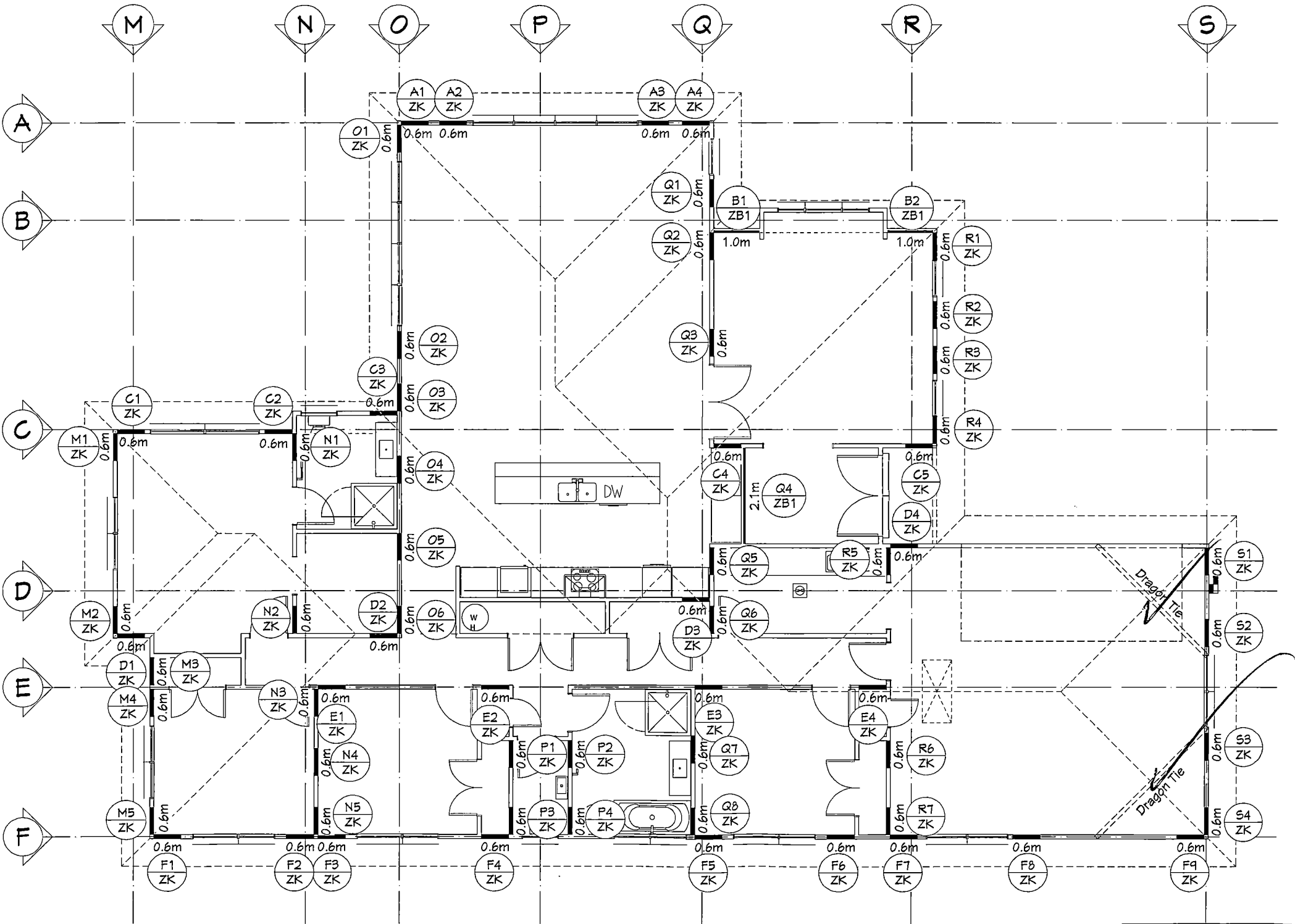
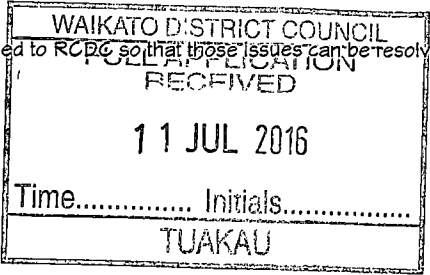
SITE DATA: for zones upto & including

Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Cross Section

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: 1:100	SHEET No. 16 OF 42

Note: Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



e3

Professional Consulting Engineers

Specifically designed items have been checked for compliance with Clause B1 of the New Zealand Building Code

Hamish Pearse-Danker

CPEng 1011810

on behalf of e3 Consultants NZ Ltd

Jun 30, 2016

1011810

GOLDEN HOMES™

ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

Bracing Element

A1 0.5

ZK

Label & Length

Type

Bracing Element Lines

- Holes or intrusions into the ZOG® frame bracing elements may require engineers specific design for remedial work.
- ZOG® must be contacted for an alternative solution prior to any intrusions and/or modifications being made to bracing elements.
- Bracing plan to be read in conjunction with bracing details located on the following sheet.
- Hold down bolts for bracing are not to be any closer than 100mm from any other hold down bolt. If there is another hold down bolt closer than 100mm to the end of the brace element and it is of the equivalent capacity or higher than that required for the brace, then no further bracing hold down is required. 'The designer' must be contacted for a solution if there is conflicting bolts with a lesser capacity than that required for the brace.
- If a sheets are used as part of the bracing element, penetrations within those sheets must not be greater in size than 90mmx90mm and must not be closer than 90mm to any edge of any of those sheets.
- All braces must be located within 600mm of the location shown on this plan.

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including

Ground Bearing:

REF GEOTEC

Sub-soil Classification:

E

Soil Classification

Expansive Soil

Wind Zone:

High

Earthquake Zone:

2

Exposure Zone:

C

Climate Zone:

3

Rainfall Intensity:

94.8mm/hr

Snowload:

0.0kPa

Bracing Plan

JOB No: 5534

SALES: Grant Edwards

ZOG No:

DRAWN: Matt

PLAN DATE:

20/04/2016

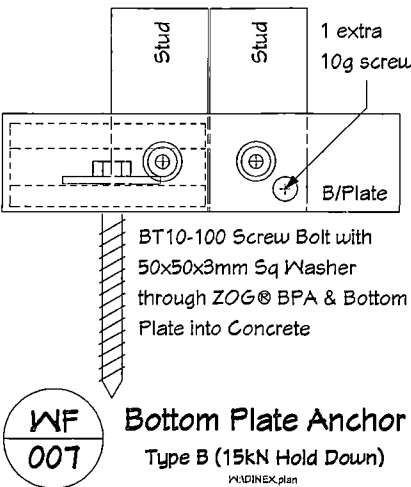
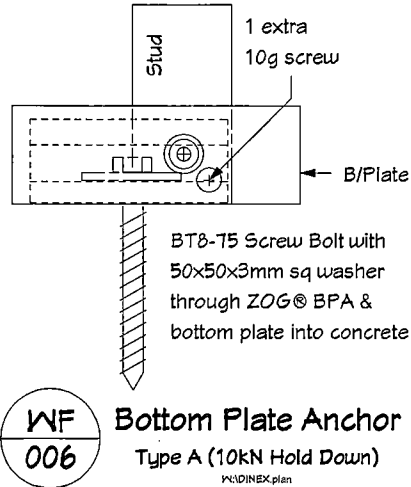
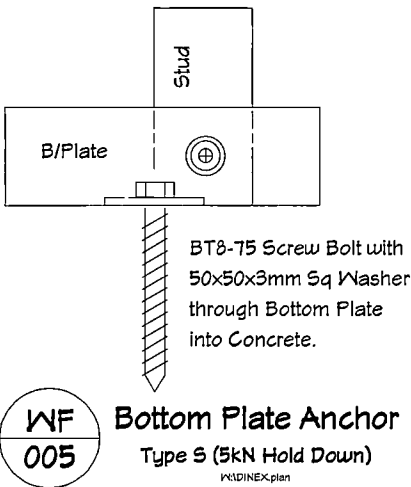
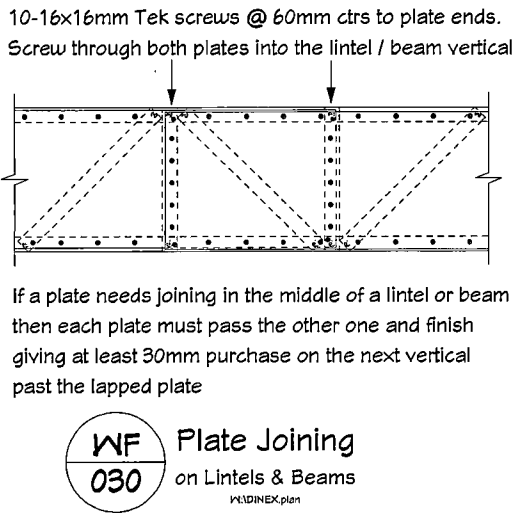
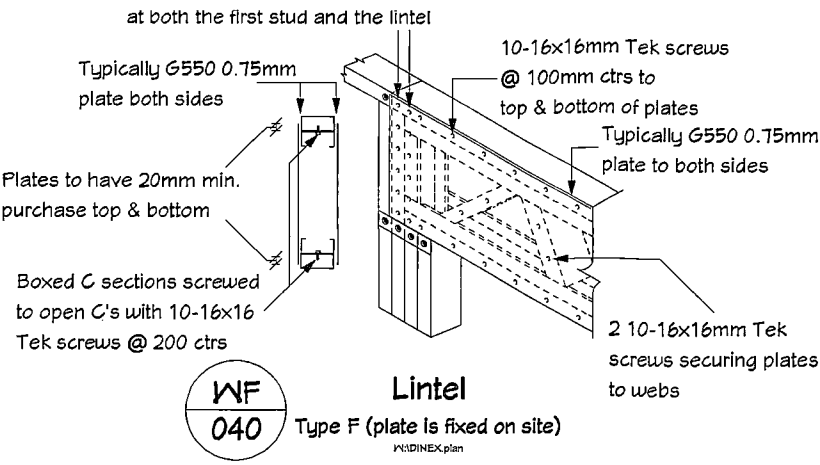
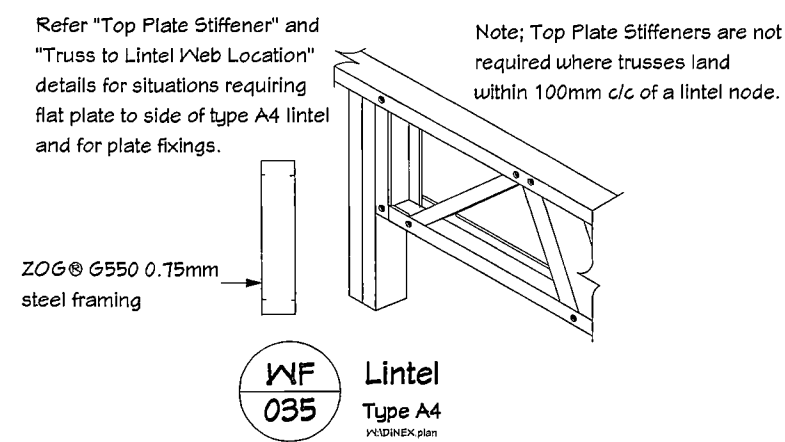
SCALE: 1:100

SHEET No. 17 OF 42



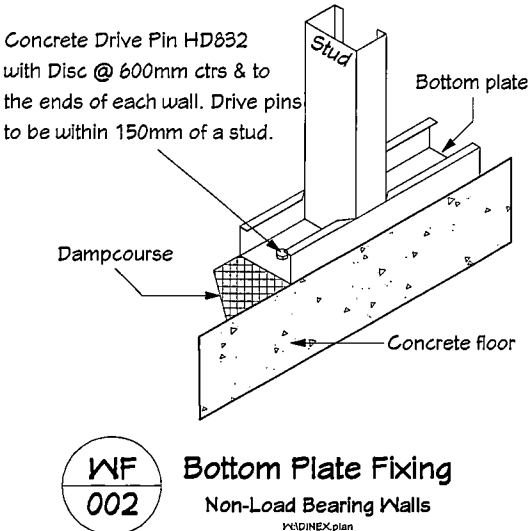
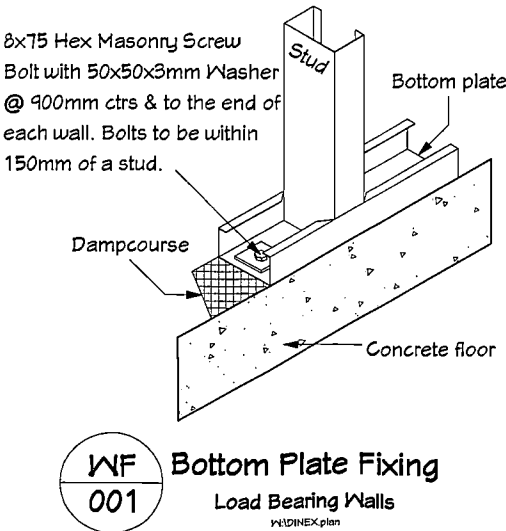


**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



**Bottom Plate Hold Down Table** WF010

Type	Uplift (kN)	Description
Standard	7.50	BT8-T5 with 50x50x3 washer
A	9.67	BT8-T5 with ZOG BPA & 50x50x3 washer
B	14.83	BT10-100 with ZOG BPA & 50x50x3 washer
C	20.00	BT16-150 with ZOG BPA & 50x50x3 washer



**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

Hold Down Labels **A** **B**

- Hold downs for lints are shown on the Floor Framing Layout page of the detailing plans. Any opening not showing a hold down label are type S. All other types are labeled.
- Hold downs for trusses are shown on the Hold Down Plan. All trusses must have a minimum of type S at the stud below the truss on all load bearing walls.
- Refer to Top Plate Details for transfer of loads to studs where trusses are not within 100mm ctrs to the nearest stud.
- Refer to Floor Framing Layout plan for opening lintel types. Where lintel plates are required, they are to be fixed on site as shown in these lintel details.

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

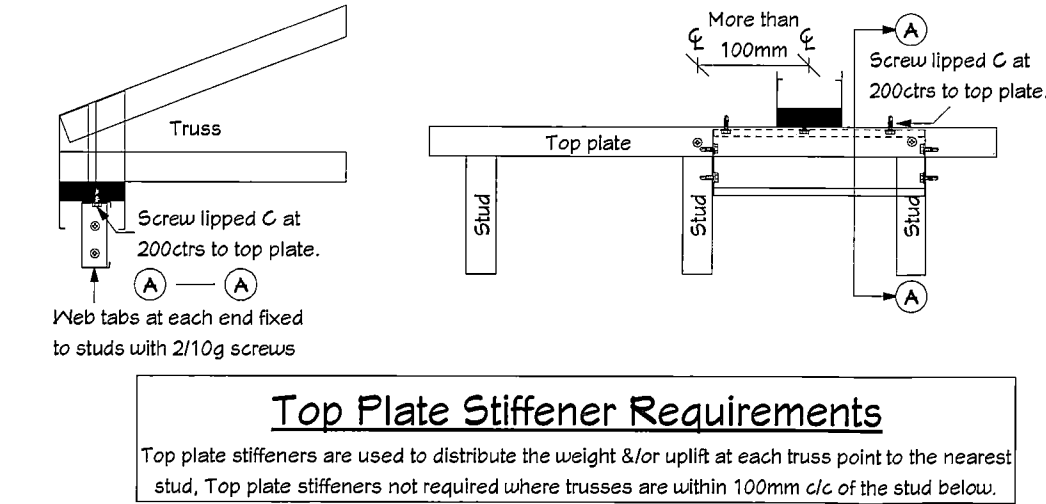
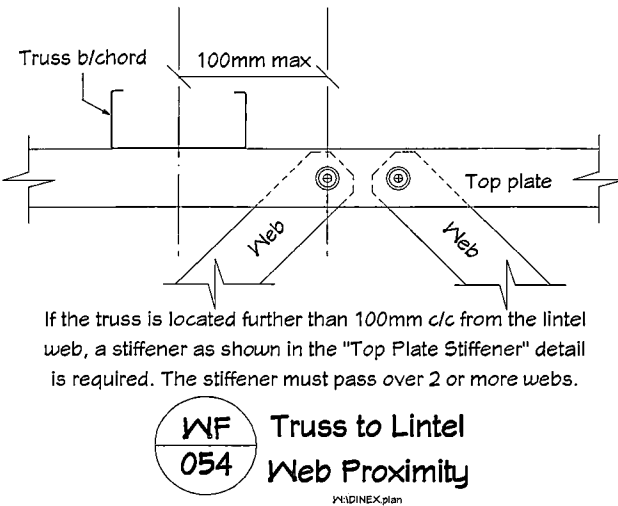
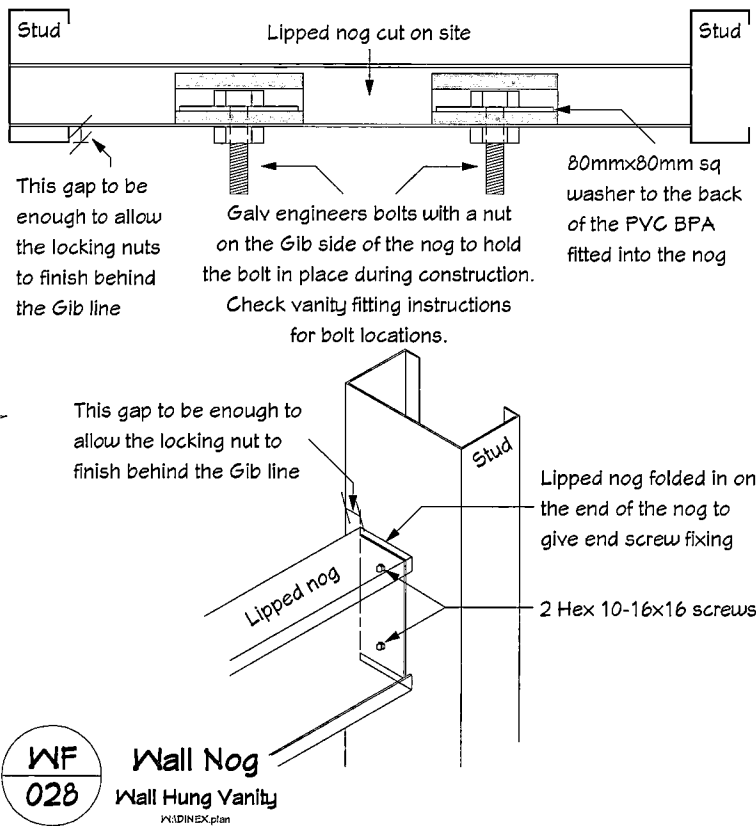
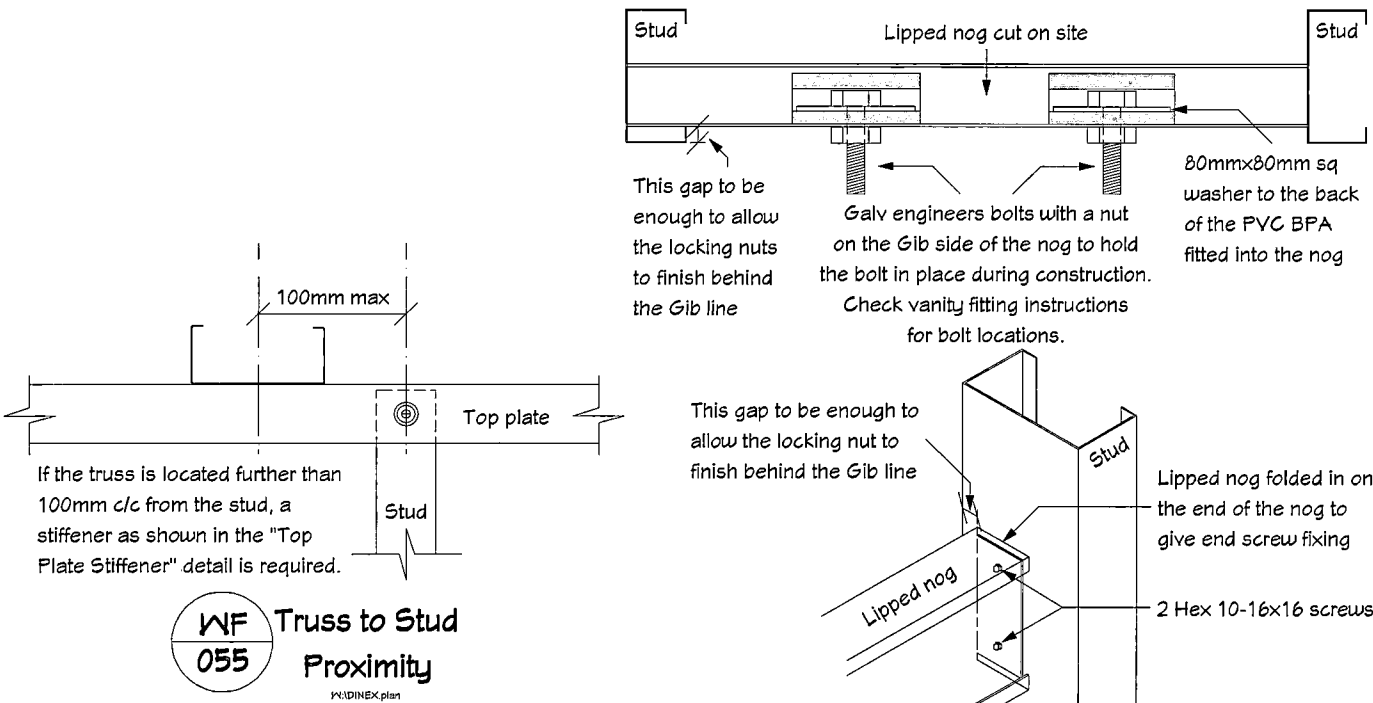
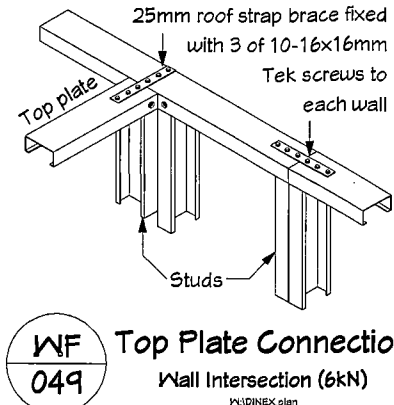
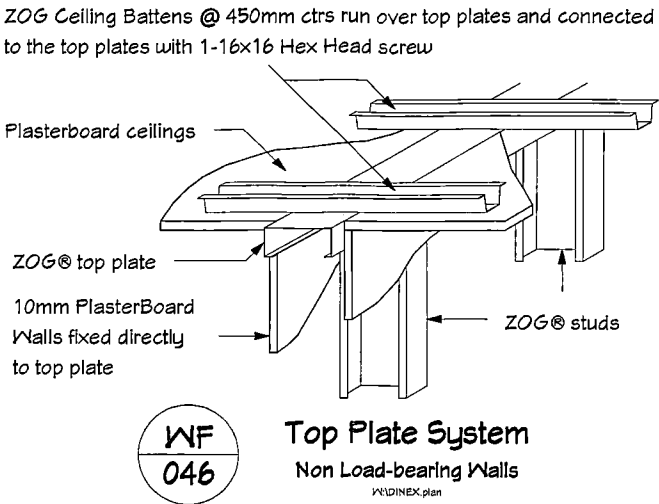
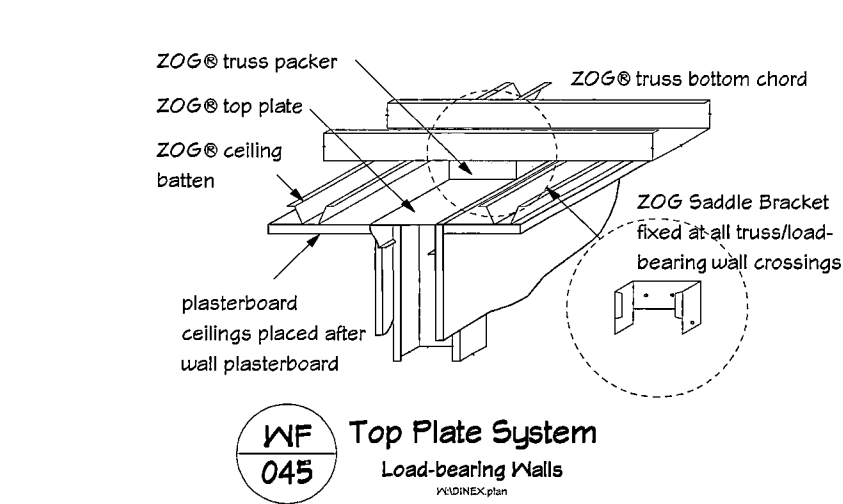
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Wall Frame Details - Lintels & Hold Downs**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	N.T.S SHEET No. 20 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- All trusses must be placed to land within 100mm C/C of a stud on load bearing walls where possible. If a truss can not, then these top plate stiffener details must be followed for that truss.
- Trusses do not have to be specifically positioned in relation to studs over non-load bearing walls.

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED

11 JUL 2016

Time..... initials.....  
TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa


Wall Frame Details - Top  
Plate Connections

JOB No: 5534 SALES: Grant Edwards  
ZOG No: DRAWN: Matt  
PLAN DATE: 20/04/2016  
SCALE: N.T.S SHEET No. 21 OF 42

Option A

Option B

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL

FULL APPLICATION RECEIVED

11 JUL 2016

Time..... Initials.....

TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including

Ground Bearing: REF GEOTEC

Sub-soil Classification: E

Soil Classification: Expansive Soil

Wind Zone: High

Earthquake Zone: 2

Exposure Zone: C

Climate Zone: 3

Rainfall Intensity: 94.8mm/hr

Snowload: 0.0kPa

Ceiling Beam Details - Connections

JOB No: 5534

SALES: Grant Edwards

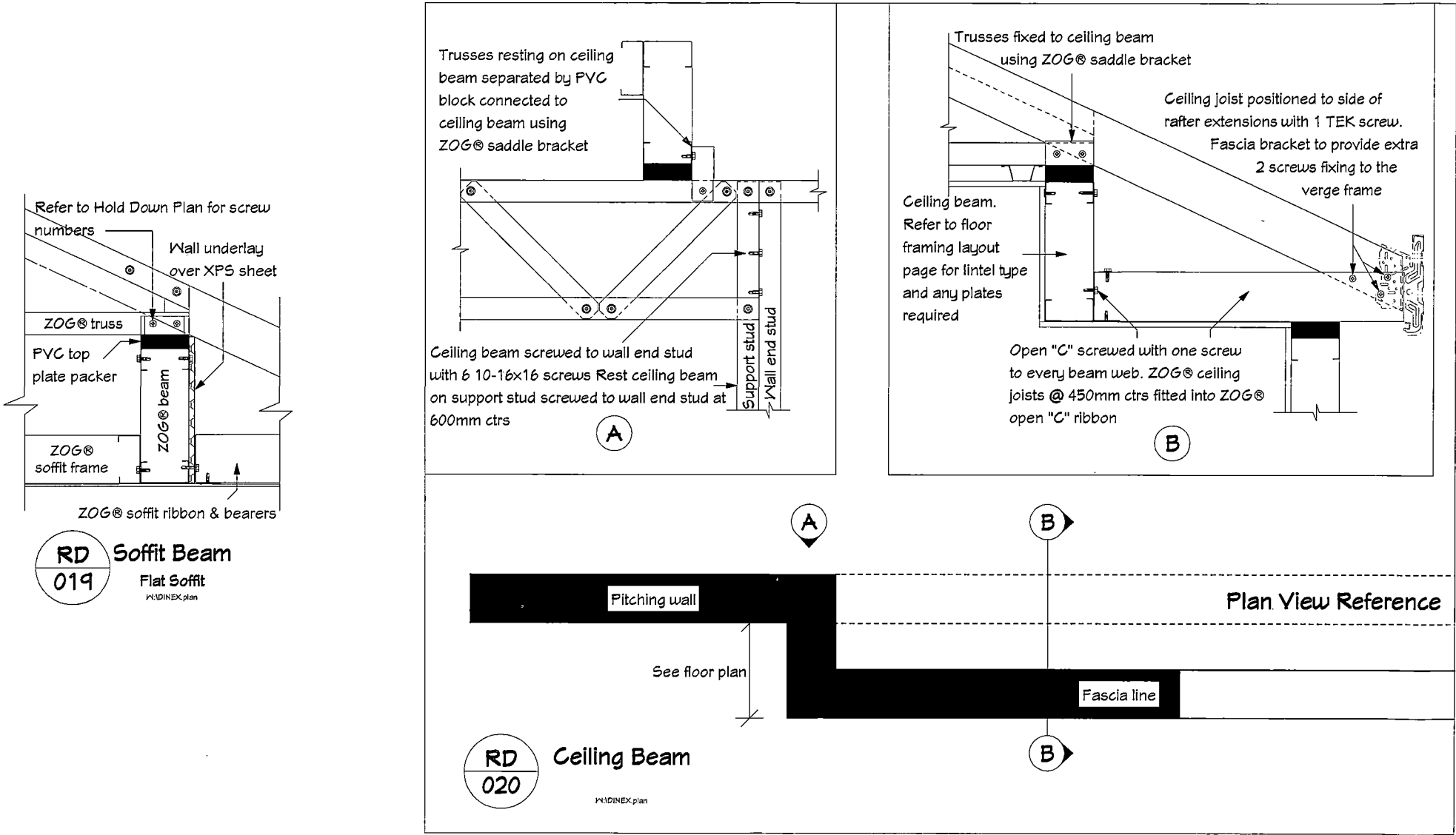
ZOG No:

DRAWN: Matt

PLAN DATE: 20/04/2016

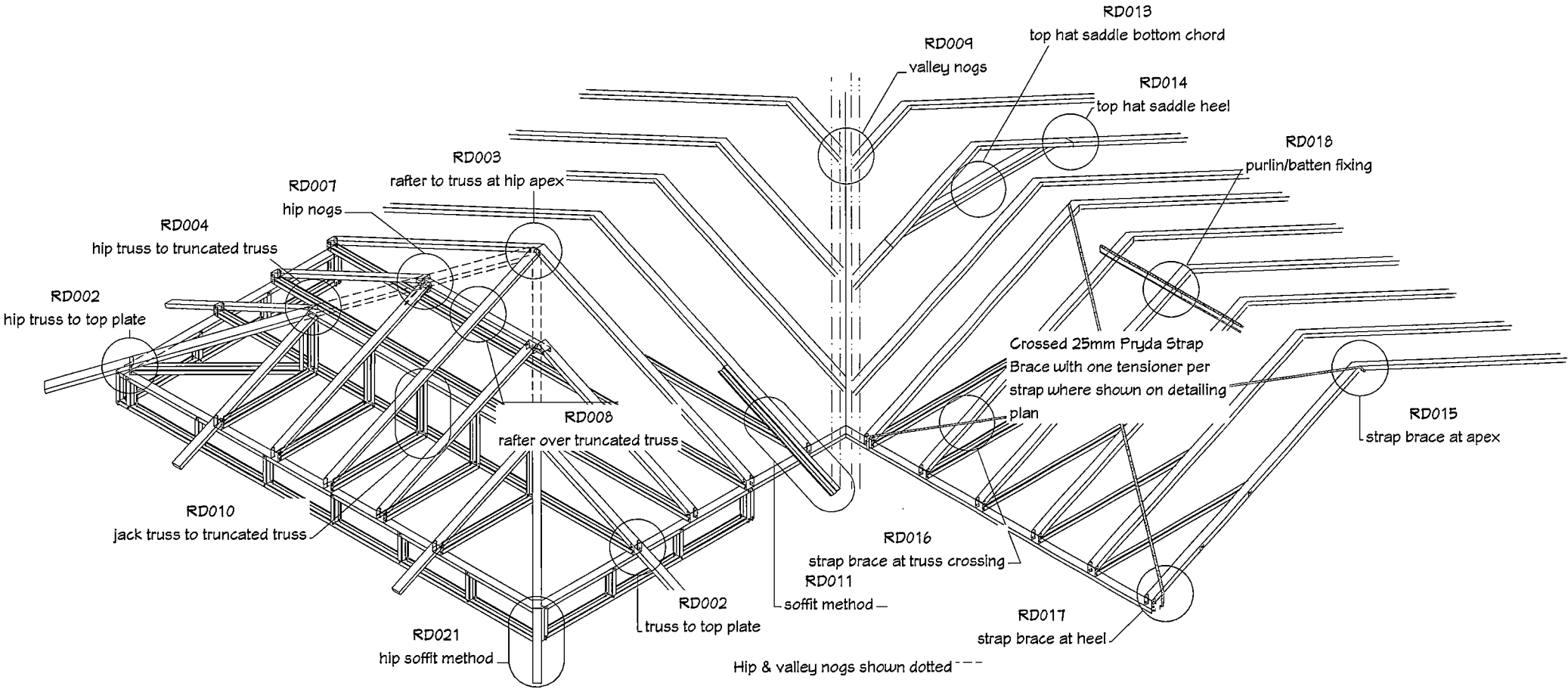
SCALE: N.T.S

SHEET No. 22 OF 42






**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



**RD 001** **Roof Frame Reference**  
Hip Roof  
V:\DINEX\plan

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
**0055/17**  
**APPROVED**



**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKAU

CLIENT:  
**Ang Residence**  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

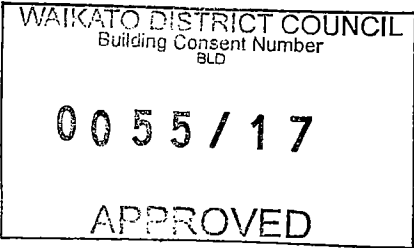
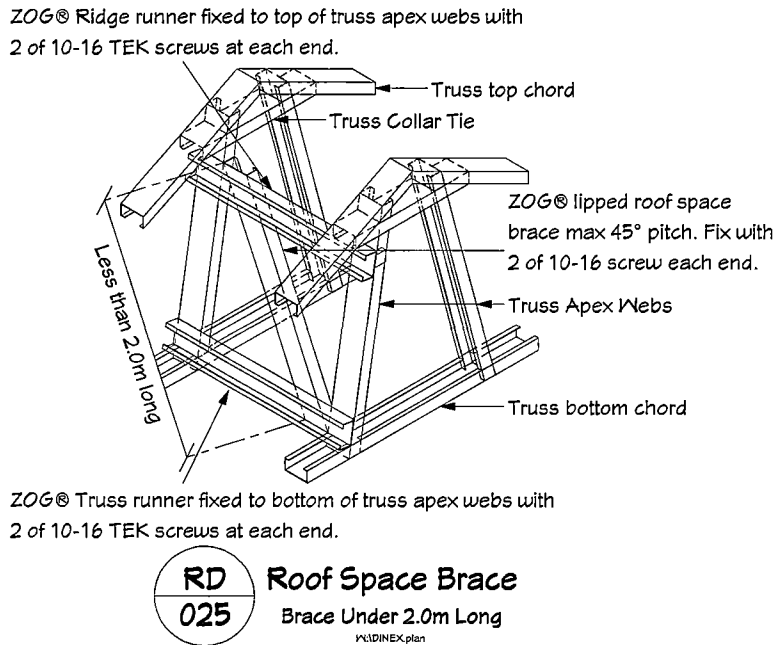
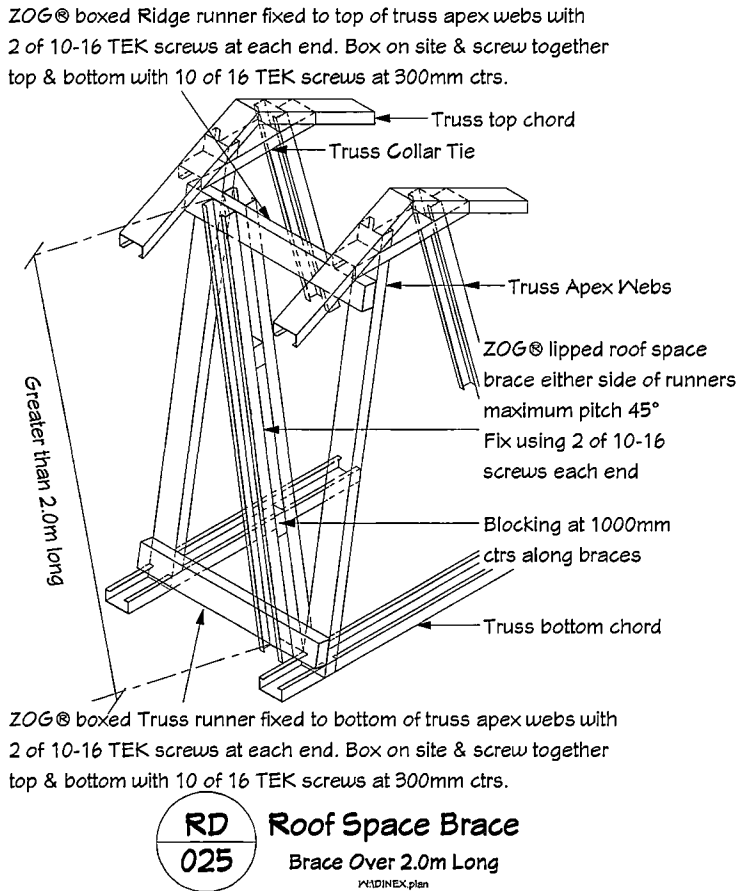
TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Roof Frame Details -  
Connection Reference 3D**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S	SHEET No. 23 OF 42

Note: Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED

11 JUL 2016

Time..... 10:04:15.....

TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Roof Frame Details - Space Braces

JOB No: 5534

SALES: Grant Edwards

ZOG No:

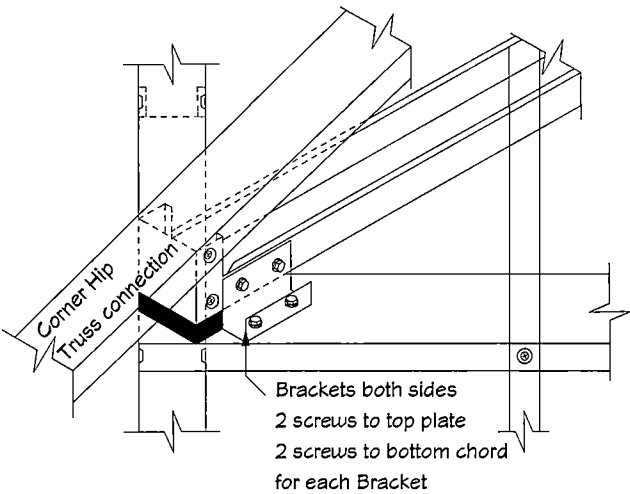
DRAWN: Matt

PLAN DATE: 20/04/2016

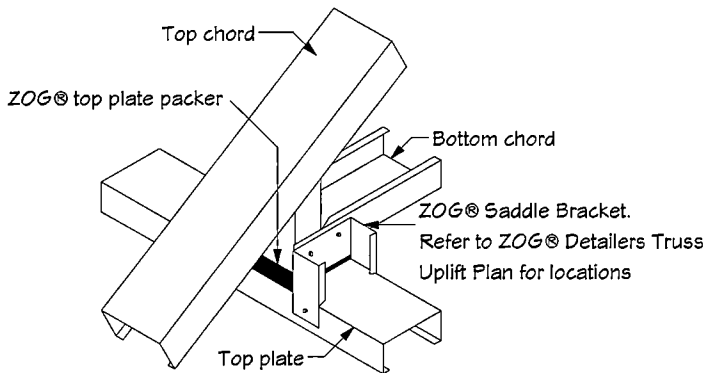
SCALE: N.T.S

SHEET No. 24 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



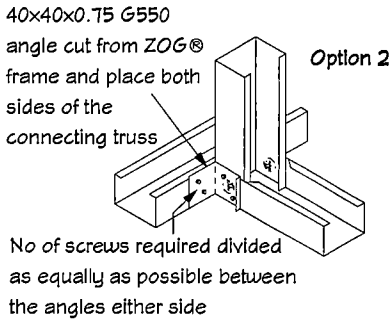
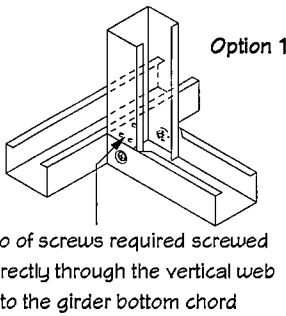
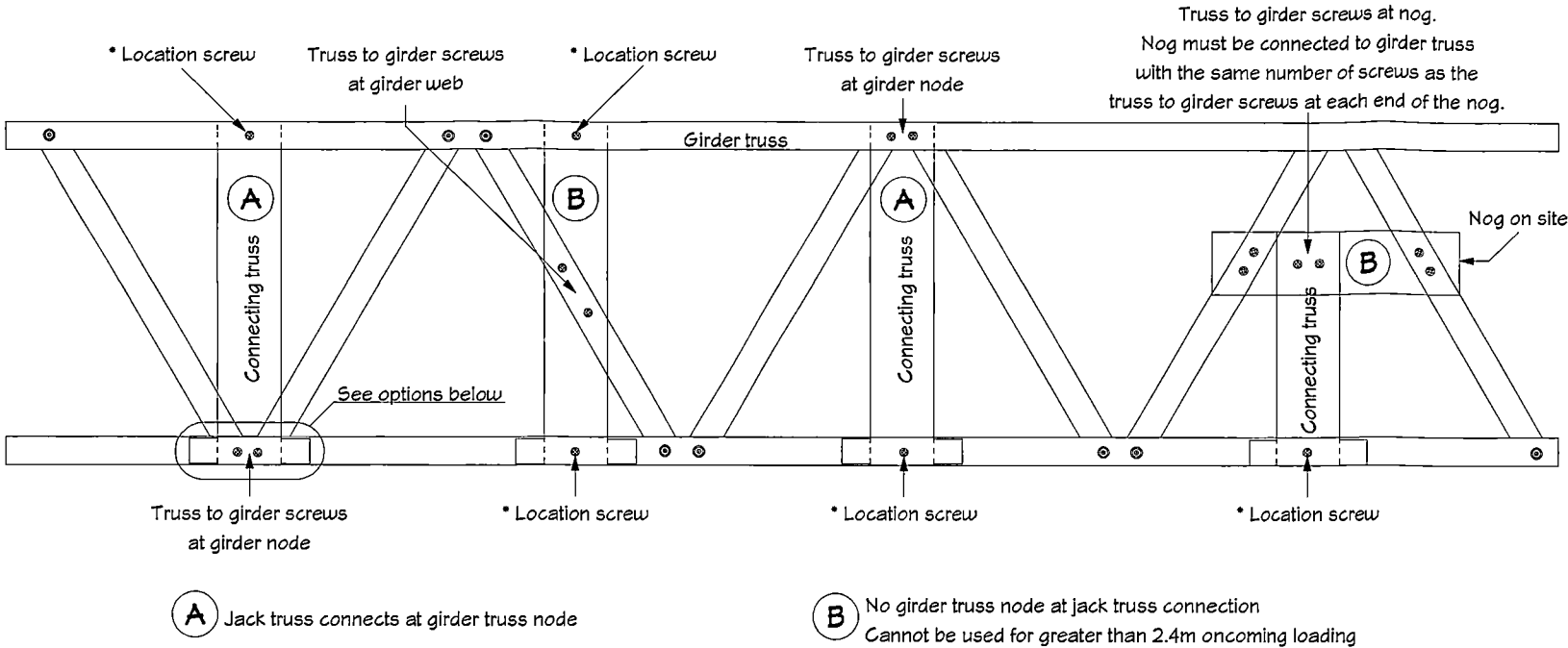
**RD 002** Truss to Top Plate  
Hip Truss  
W/DINEX plan



\* Refer to alternative methods available for Truss to Top Plate connections where this method is not possible. Bottom plate fixings shown in table are suitable for use with any alternative top plate fixing used

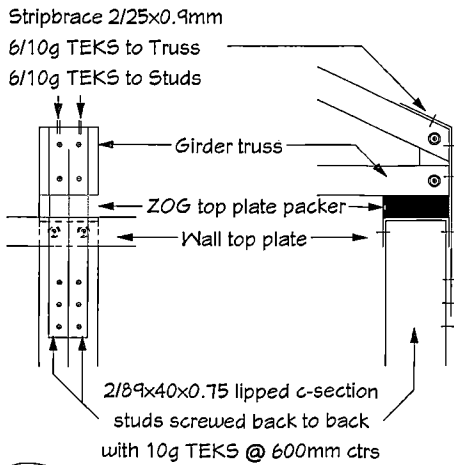
	Sgl Bracket			Dbl Bracket	
Type	S	A	B	C	D
Rating	5kN	10kN	15kN	20kN	30kN
Screws to Truss	2	4	6	8	12
Screws to Top Plate (half each side)	2	4	6	8	12
Bottom Plate Hold Down Type	S	A	B	C	D

**RD 002** Truss to Top Plate Connection  
STD \*  
W/DINEX plan



\* Location screws are not structural and are not a requirement. They have been shown as options only and can be placed in any portion of the truss if needed for stabilizing while under construction.

**RD 010** Jack Truss to Girder Truss  
W/DINEX plan



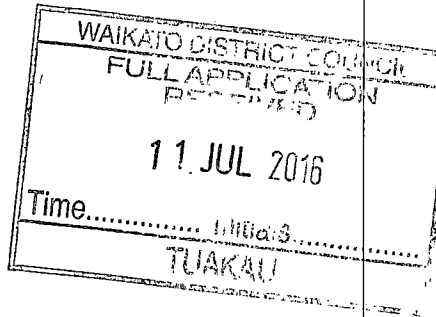
**RD 002** Truss to Top Plate Connection  
Alternative Method Type B (15kN)  
W/DINEX plan



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

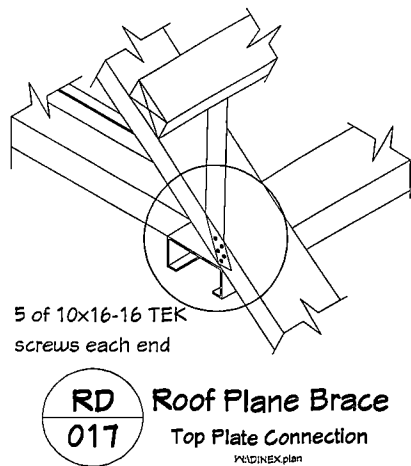
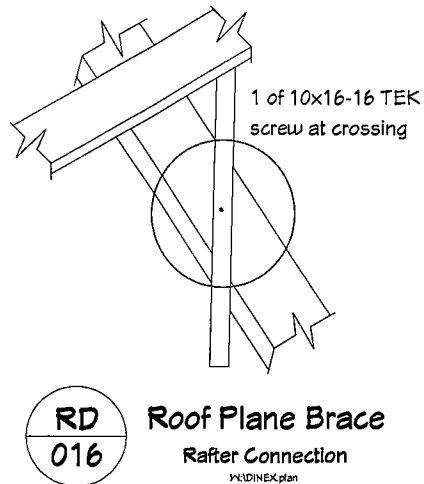
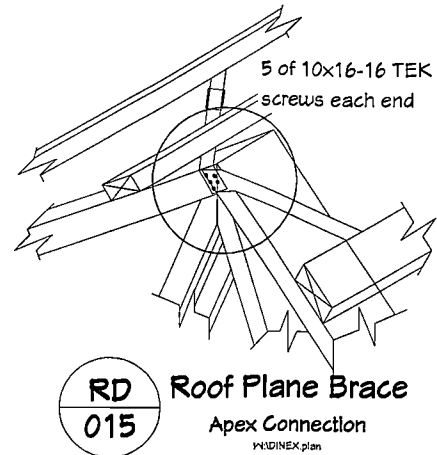
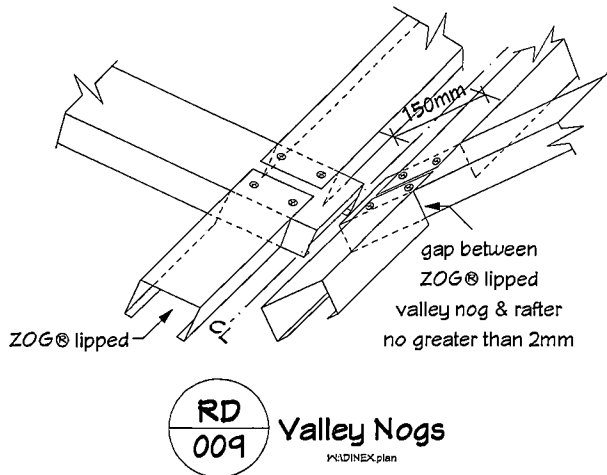
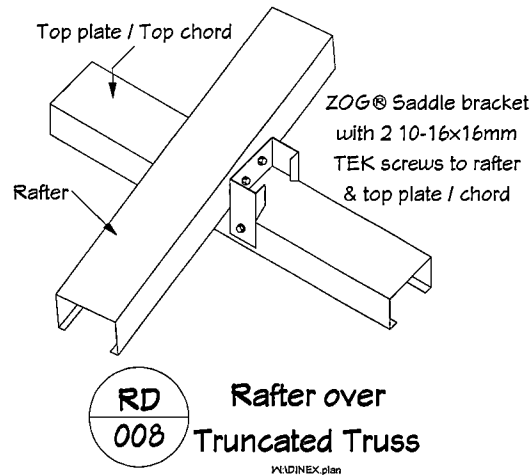
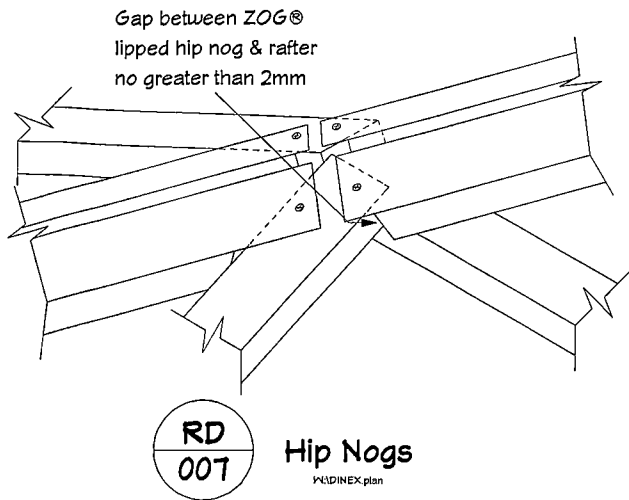
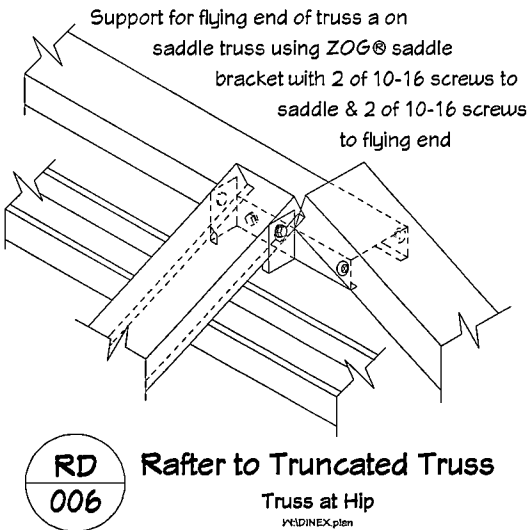
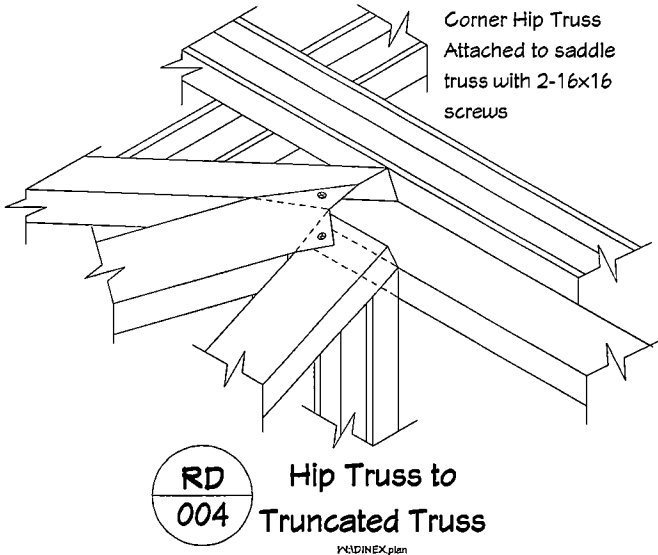
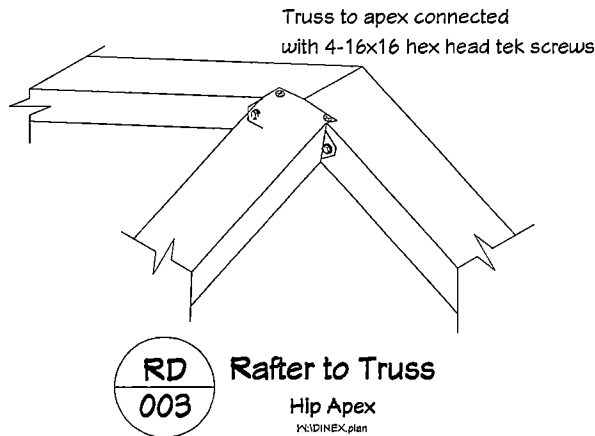
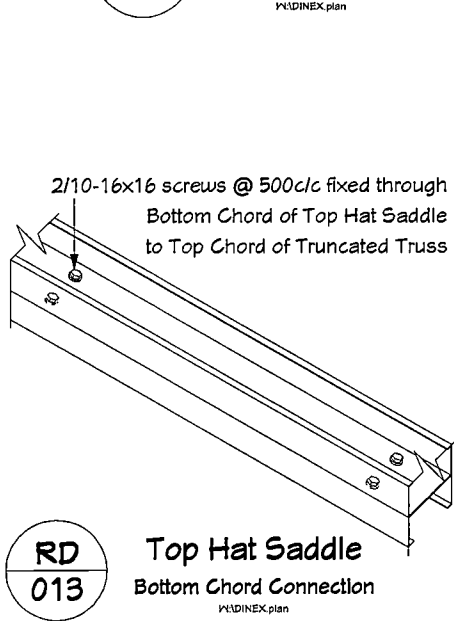
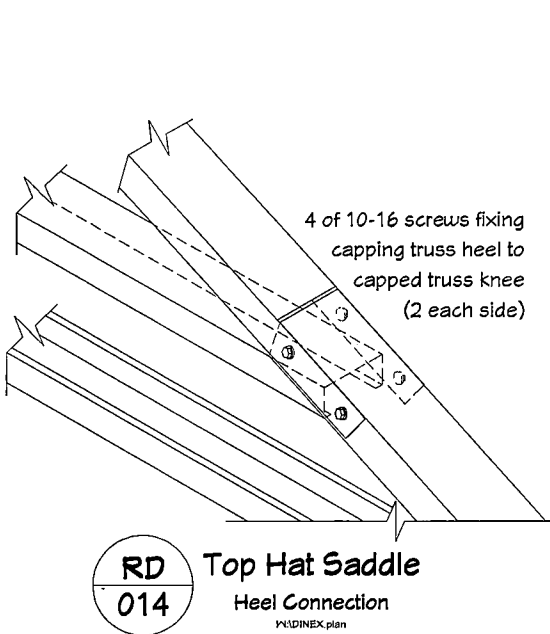
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Roof Frame Details - On Site  
Connections

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S	SHEET No. 25 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

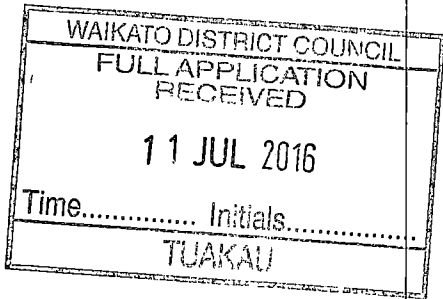


**ANG**

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- All gables must have a gable brace. These are to be constructed and placed on site by the contractor.
- Refer to Roof Truss Layout page for roof plane bracing positions.



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Roof Frame Details - On Site Connections**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	NTS SHEET No. 26 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKAU

CLIENT:  
  
Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

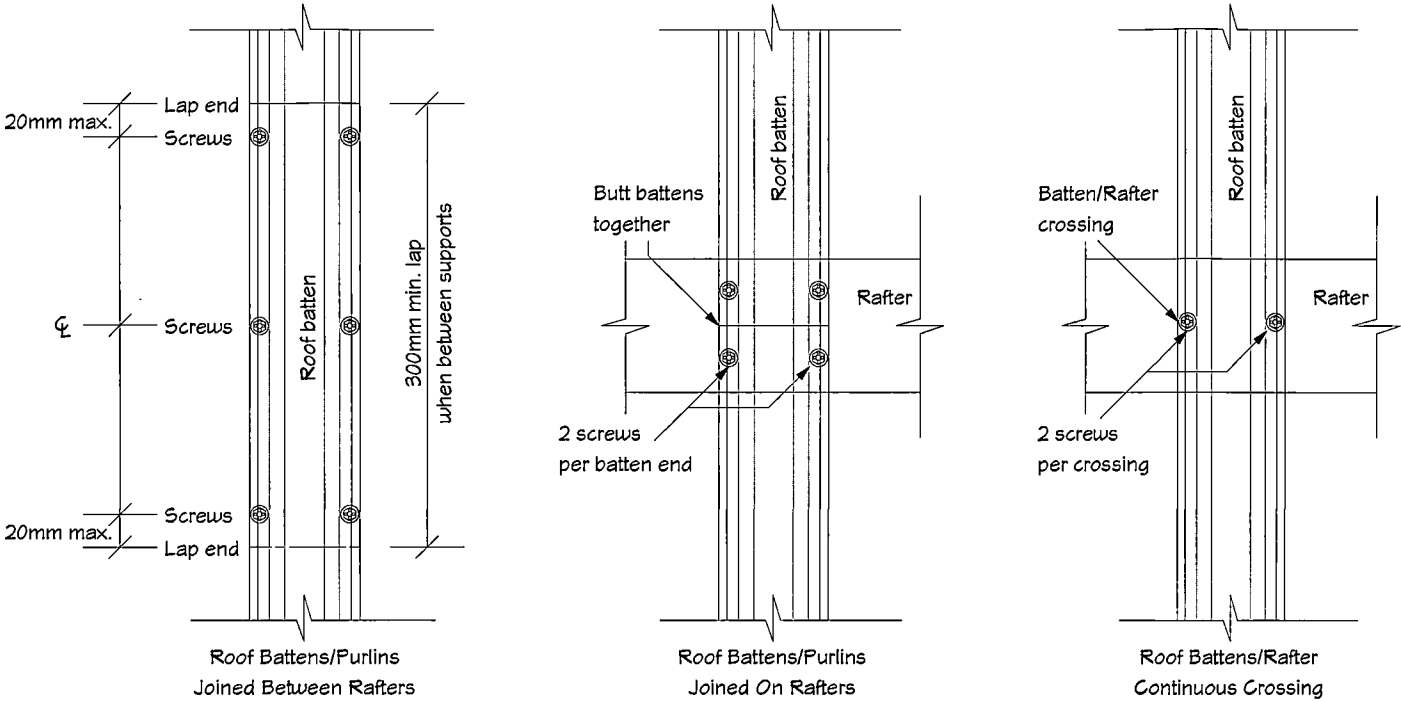
SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Roof Frame Details - Soffit & Roof Battens**  
JOB No: 5534 SALES: Grant Edwards  
ZOG No: DRAWN: Matt  
PLAN DATE: 20/04/2016  
SCALE: N.T.S SHEET No. 27 OF 42

Fixing loads calculated in accordance with  
NZS3604 - Table 10.12 Tile battens for all wind zones

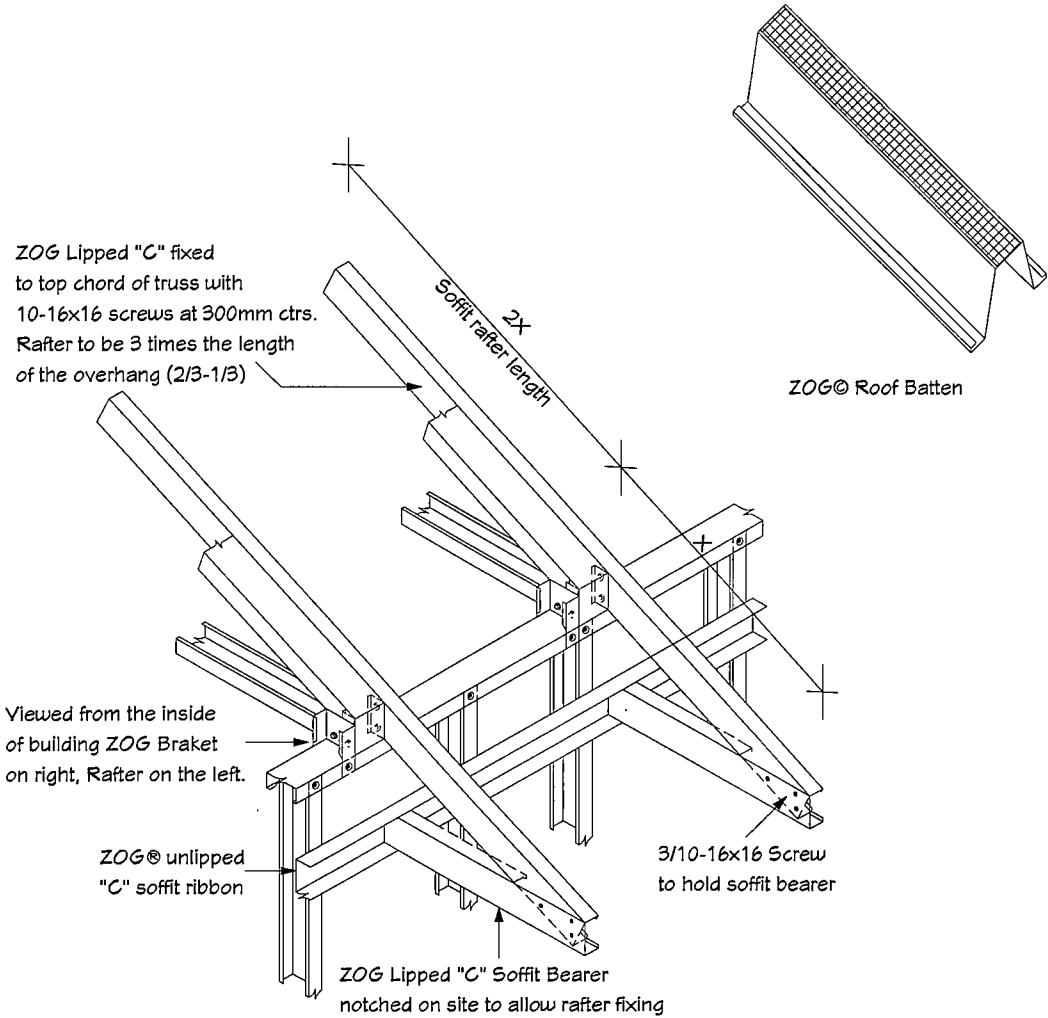
- Wind Zone upto & including Extra High
- Rafters Centres = 1200mm
- Fixing required (T) = 2.4kN
- Screw capacity (12-10x25) = 2.0kN
- Screws per crossing = 2 (4.0kN)

Fixing capacities based on testing carried  
out by AHI Roofing in accordance using  
BRANZ EMI method.



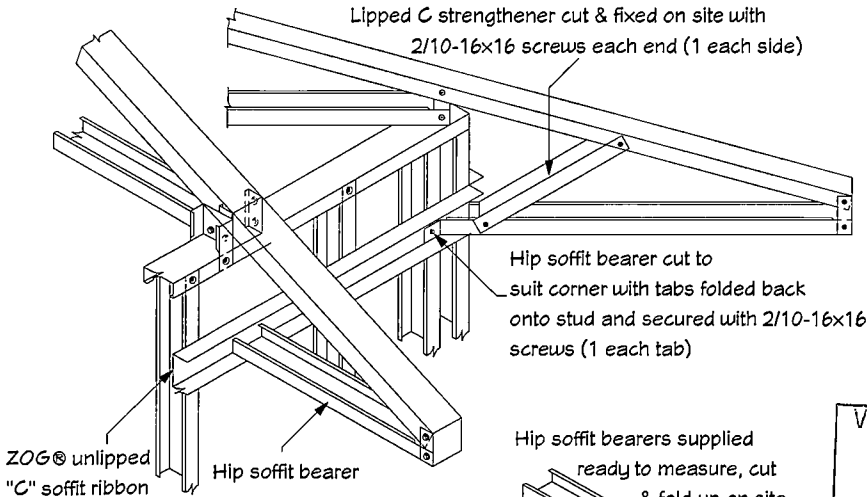
**RD 018** Roof Batten/Purlin  
Connection to Rafter  
KMDINEX plan

ZOG Lipped "C" fixed  
to top chord of truss with  
10-16x16 screws at 300mm ctrs.  
Rafter to be 3 times the length  
of the overhang (2/3-1/3)



**RD 011** Soffit Method  
Flat Soffit  
KMDINEX plan

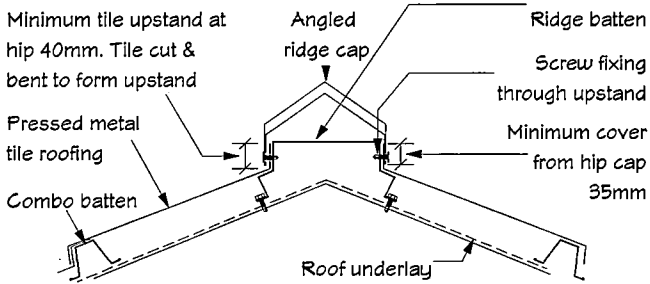
Lipped C strengthener cut & fixed on site with  
2/10-16x16 screws each end (1 each side)



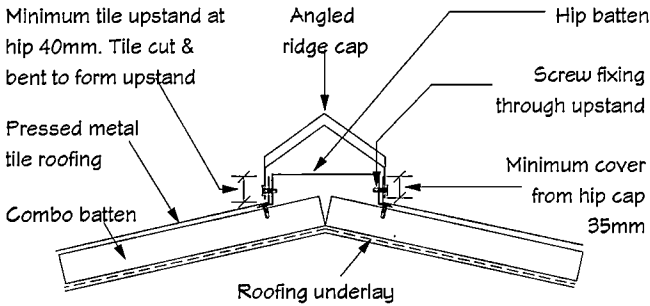
**RD 021** Soffit Method  
Soffit at Hip  
KMDINEX plan

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD  
**0055/17**  
APPROVED

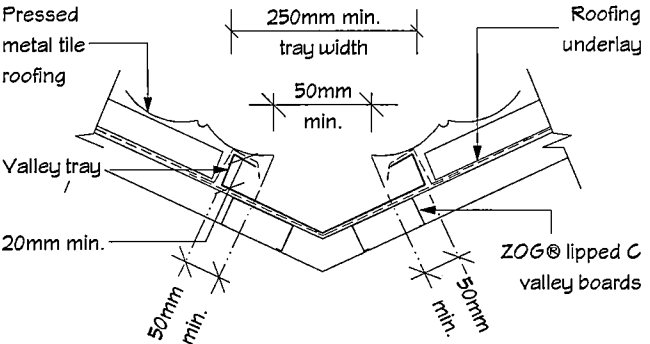
**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



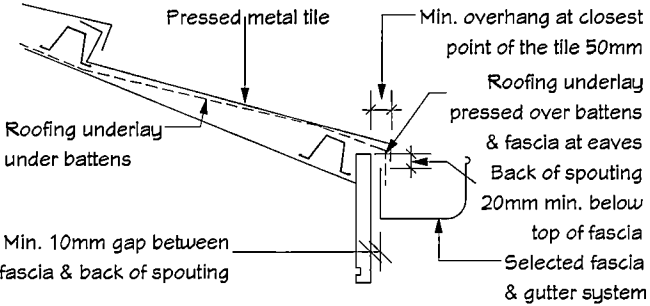
**RF 002**  
**Ridge Flashing**  
Metal Tile  
WCDINEX plan



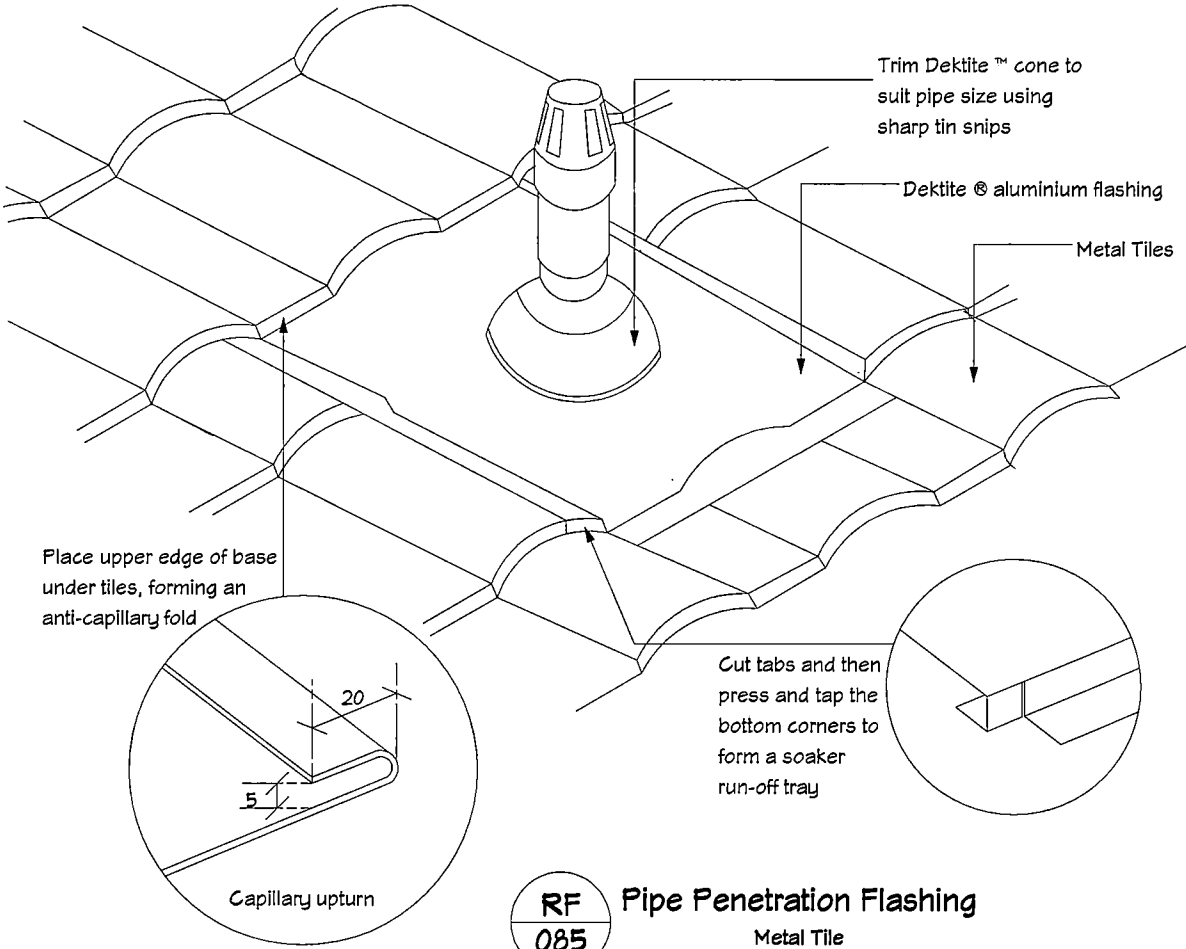
**RF 007**  
**Hip Flashing**  
Metal Tile  
WCDINEX plan



**RF 009**  
**Valley Tray**  
Metal Tile  
WCDINEX plan



**RF 011**  
**External Gutter**  
Metal Tile  
WCDINEX plan



**RF 085**  
**Pipe Penetration Flashing**  
Metal Tile  
WCDINEX plan



**ANG**

© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL

FULL APPLICATION  
RECEIVED

11 JUL 2016

Time..... Initials.....

TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

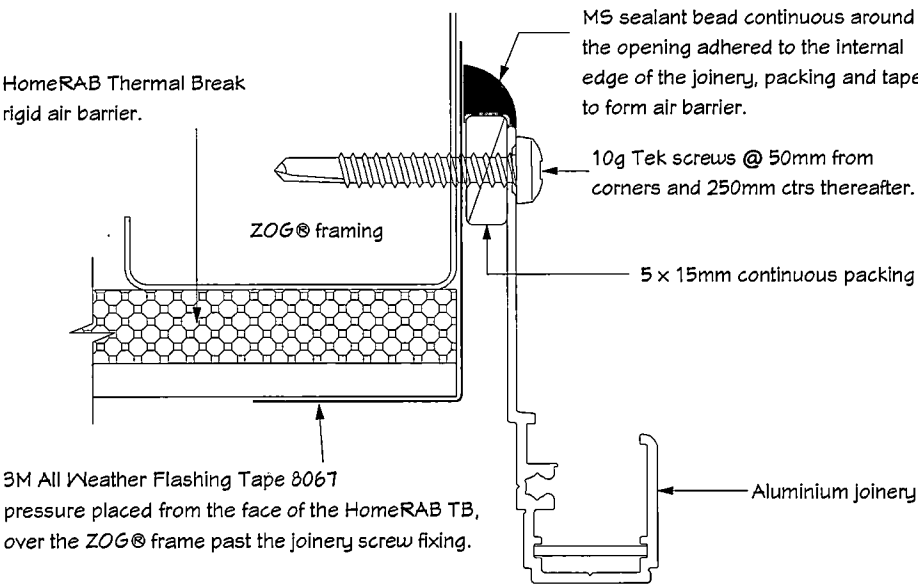
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

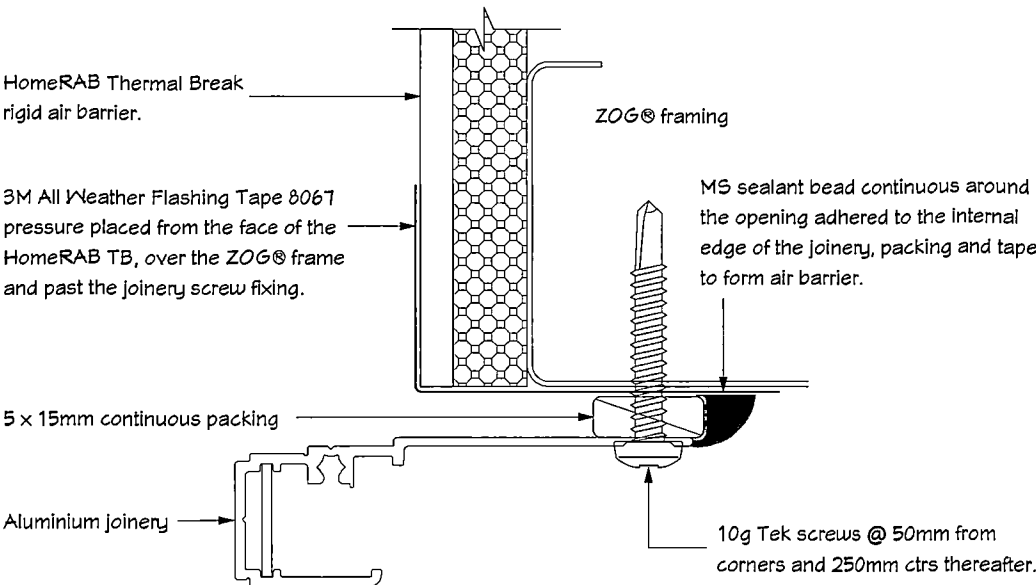
**Roof Flashings**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S.	SHEET No. 28 OF 42

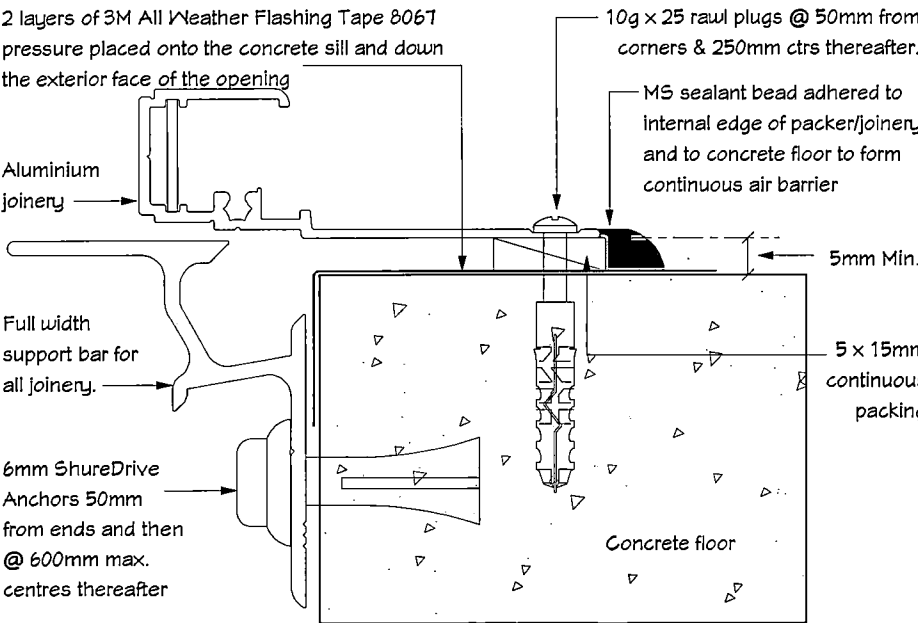
**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



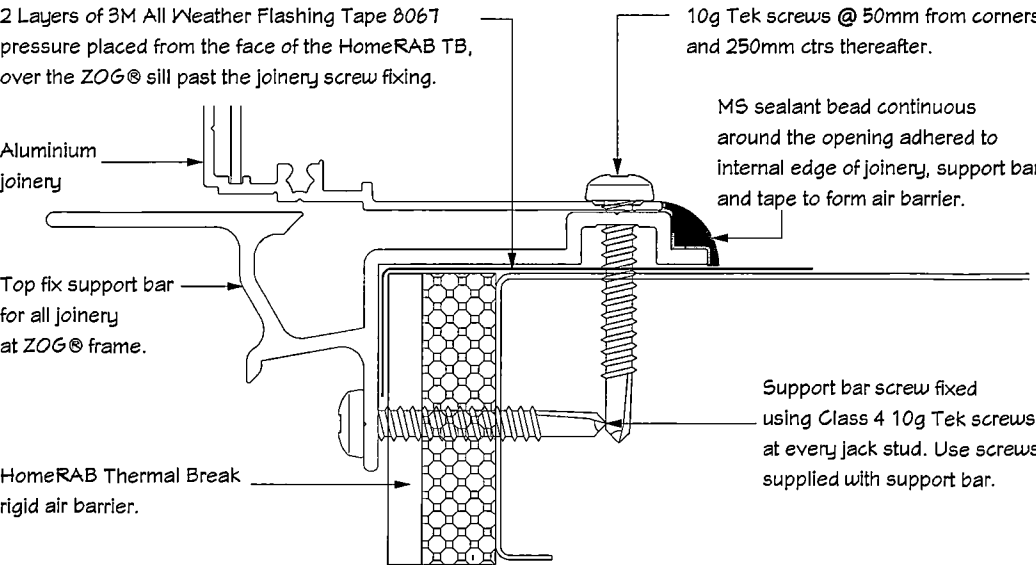
**EJ**  
**006** Aluminium Joinery Connection  
Jamb at ZOG Frame  
KIDINEX plan



**EJ**  
**007** Aluminium Joinery Connection  
Head at ZOG Frame  
KIDINEX plan



**EJ**  
**004** Aluminium Joinery Connection  
Sill at Conc Floor  
KIDINEX plan



**EJ**  
**005** Aluminium Joinery Connection  
Sill at ZOG Frame  
KIDINEX plan

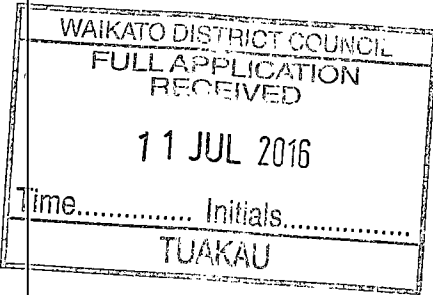


**ANG**

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- Refer to the NALCO Golden Homes Window & Exterior Door Installation Procedure manual for installation method.



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including

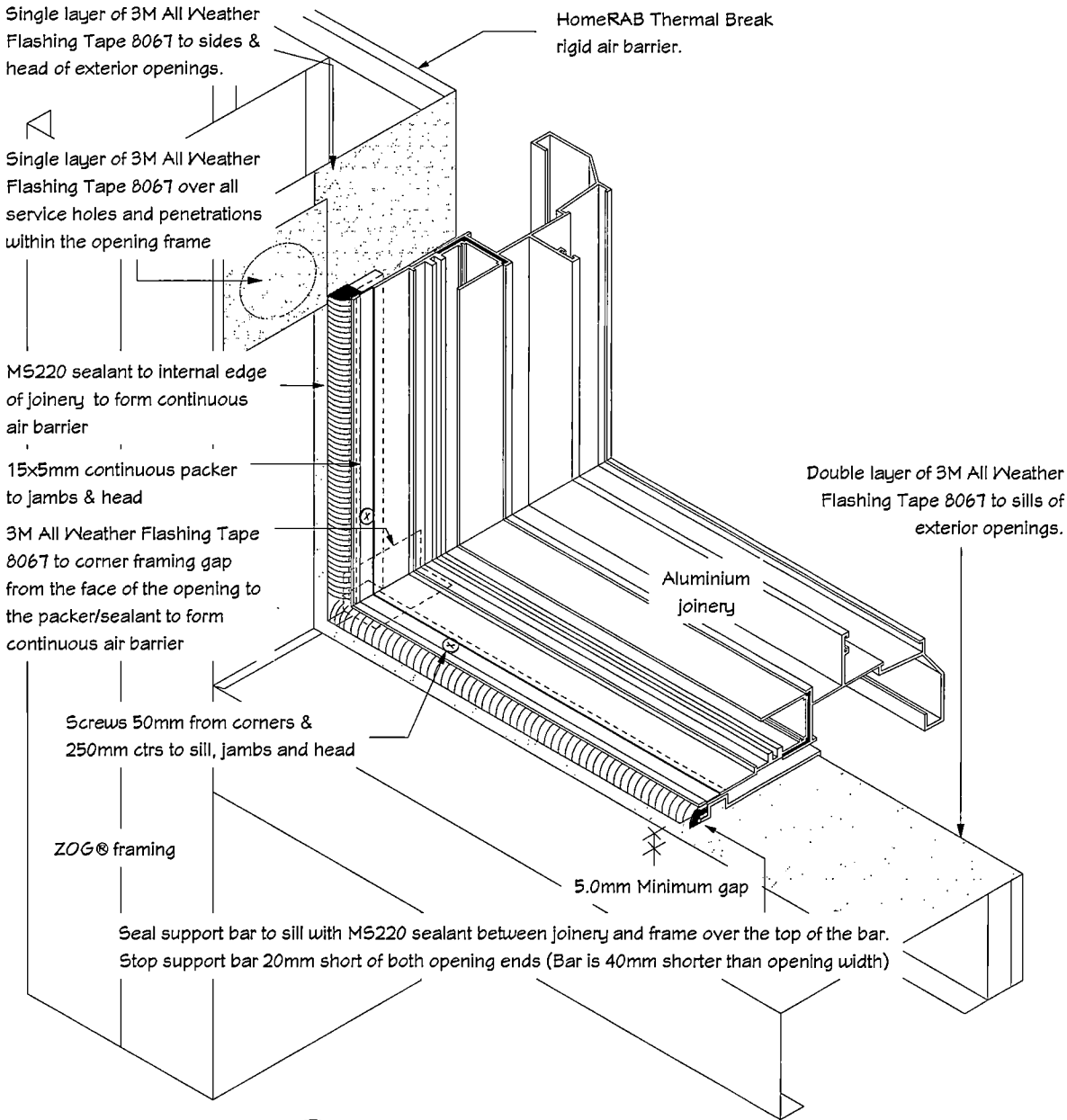
Ground Bearing:	REF GEOTEC
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

**Exterior Joinery Details -  
Installation & Seal**

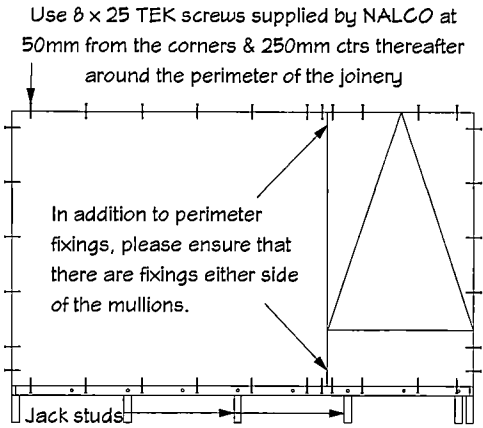
JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	N.T.S. SHEET No. 29 OF 42



**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

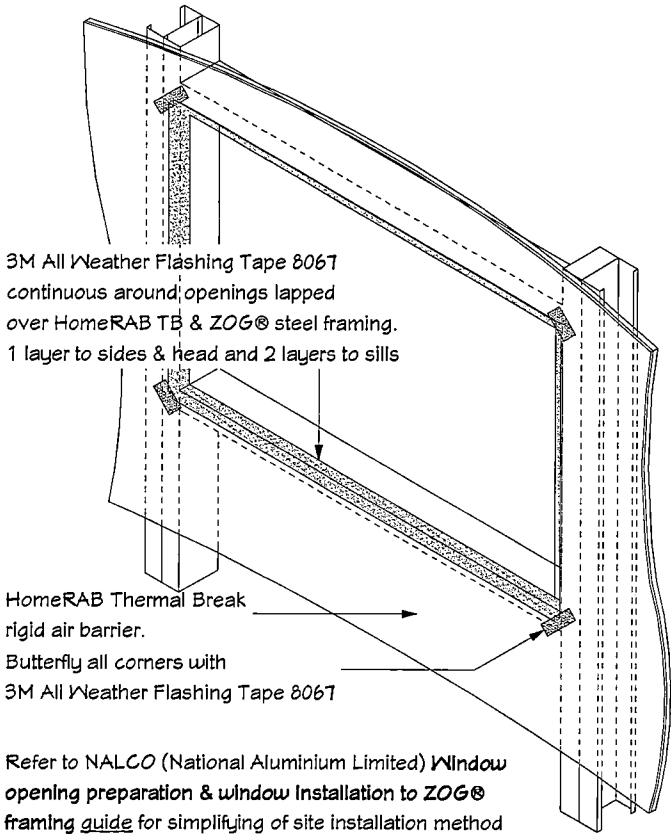


**EJ 014** Aluminium Joinery Opening  
3D of Corner Fixing & Sealant  
W:\DINEX-plan



Support bar on all windows and doors.  
Support bar supports are to be fixed at 300mm ctrs using 10 x 25mm 24TPI Class 4 screws supplied by NALCO. Ensure one screw is fixed through support bar into every jack studs.  
Stop support Bar 20mm short of each opening jamb (40mm shorter than opening width)

**EJ 016** Aluminium Joinery  
Fixing to ZOG Frame  
W:\DINEX-plan



**EJ 013** Aluminium Joinery Opening  
3D of Flashing Tape  
W:\DINEX-plan

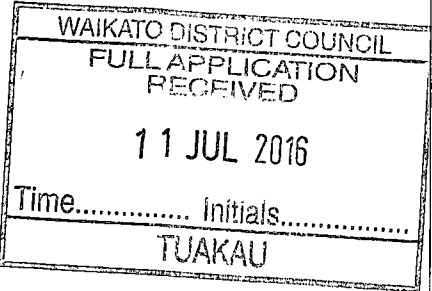


**ANG**

© GOLDEN HOMES HOLDINGS LTD

NOTES:

- Joinery must be installed in accordance with NZS4211 and as shown in the NALCO Golden Homes Window & Exterior Door Installation Procedure manual.



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

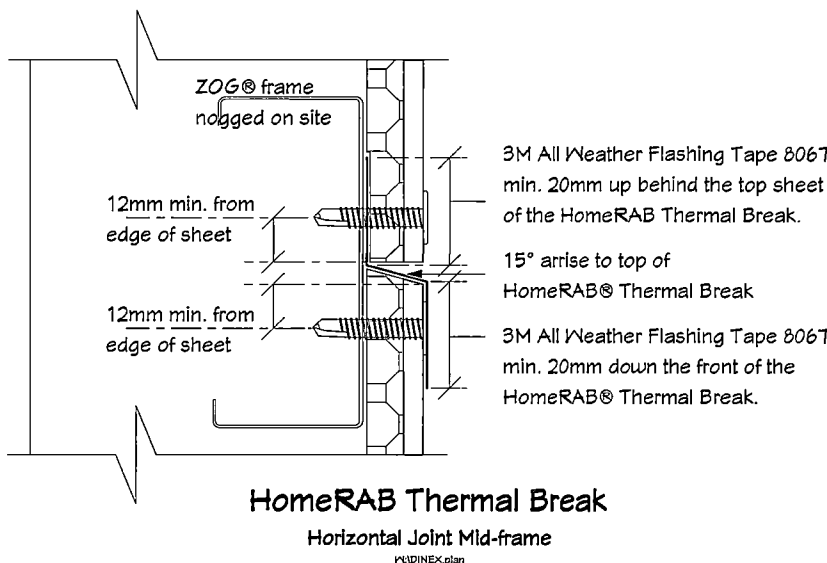
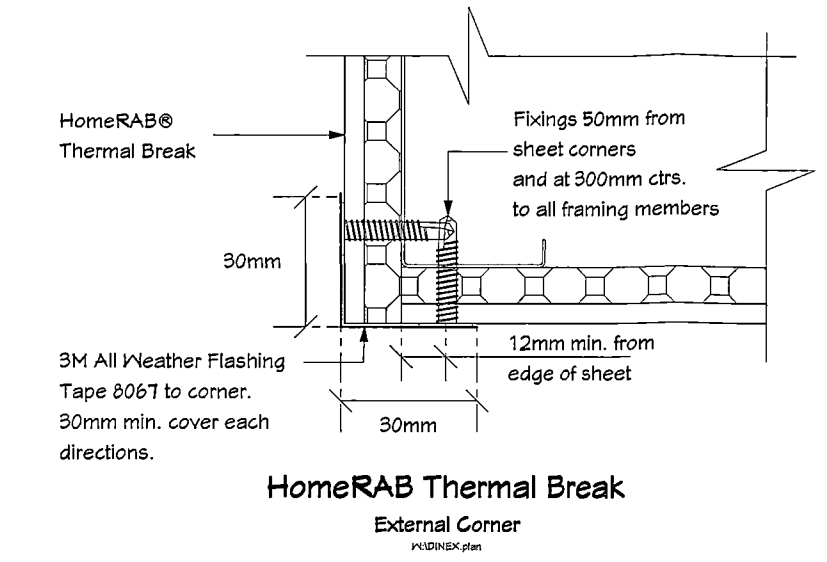
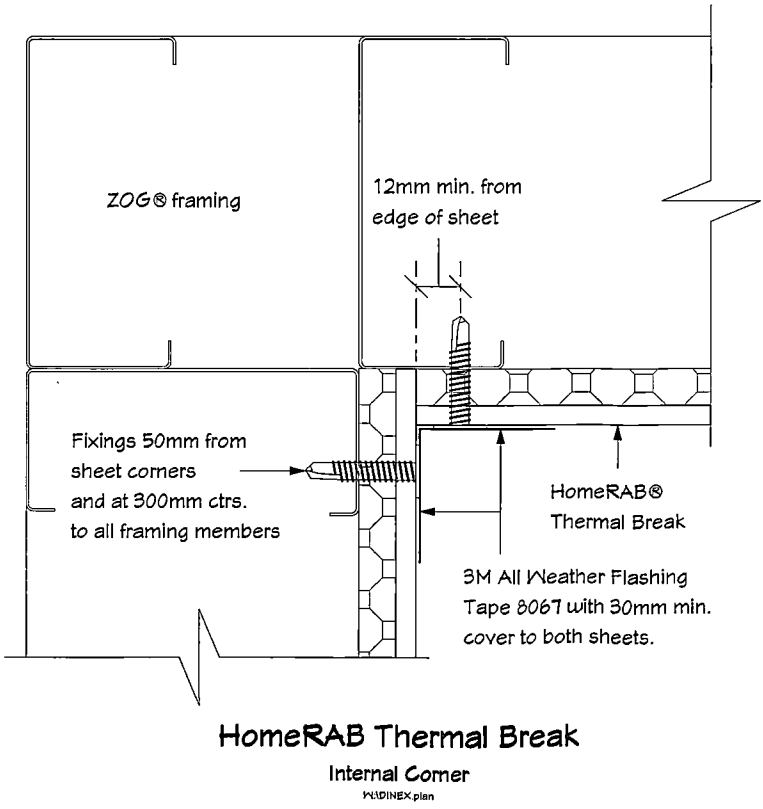
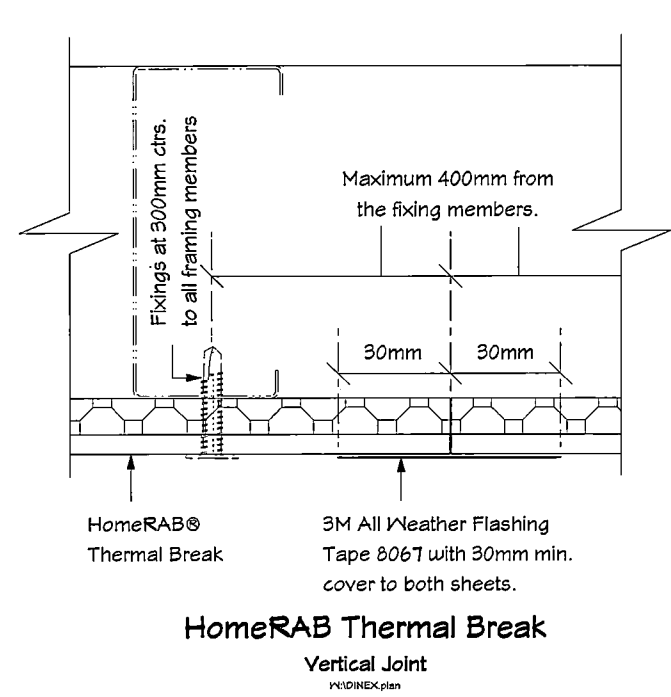
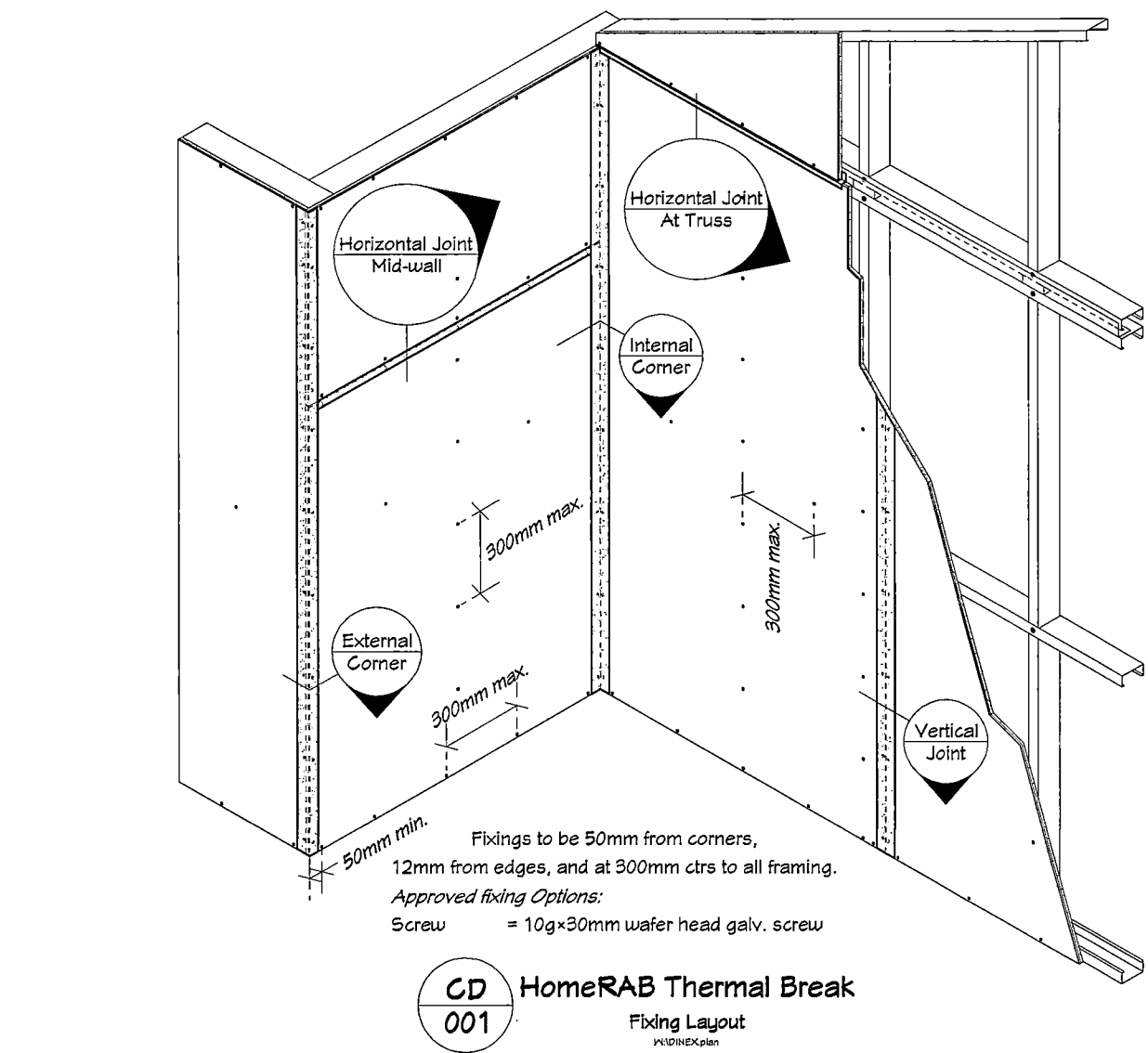
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including	
Ground Bearing:	REF GEOTEC
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

**Exterior Joinery Details - Installation & Seal**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	N.T.S. SHEET No. 30 OF 42

Note: Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

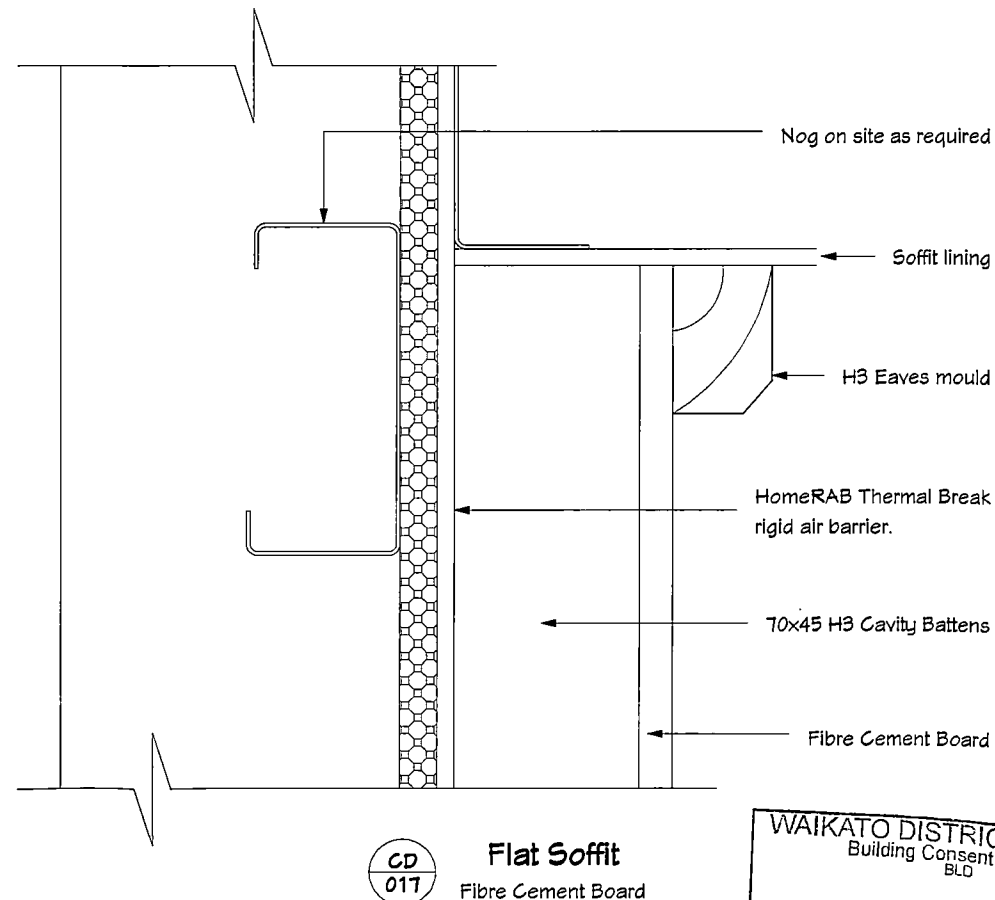
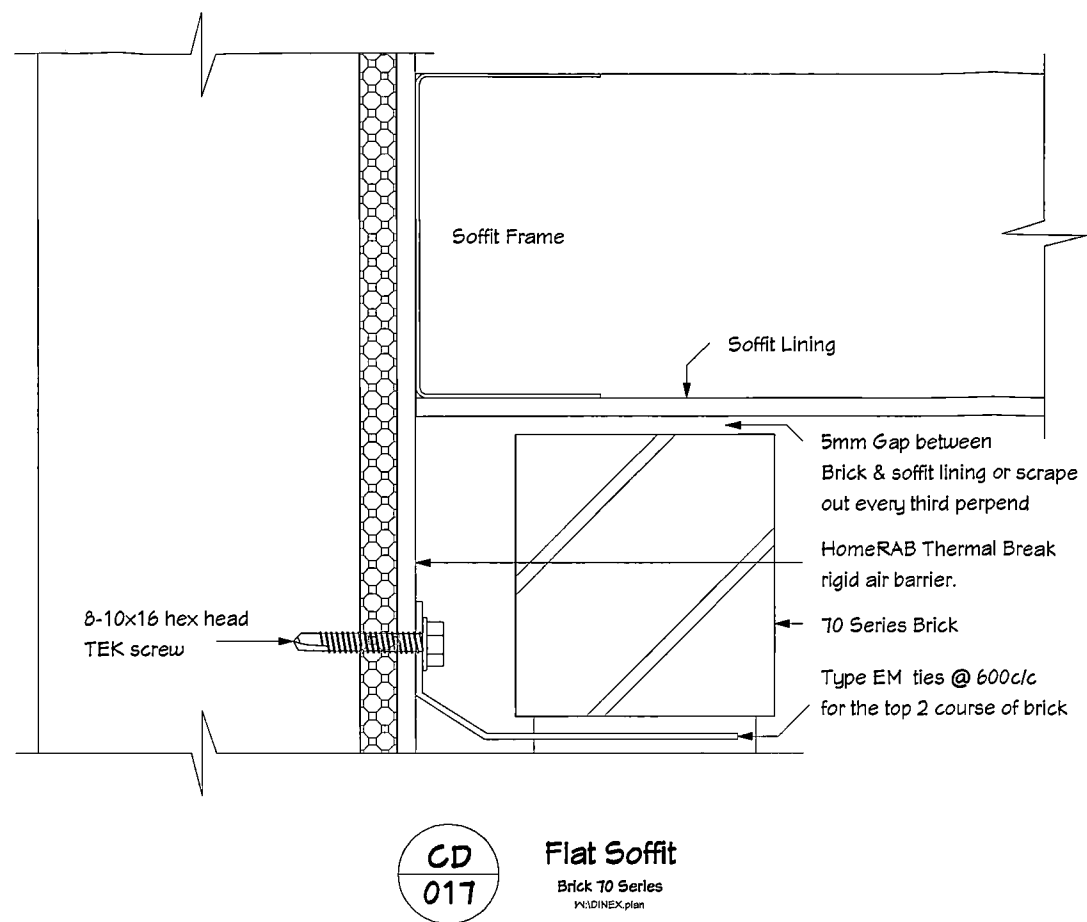
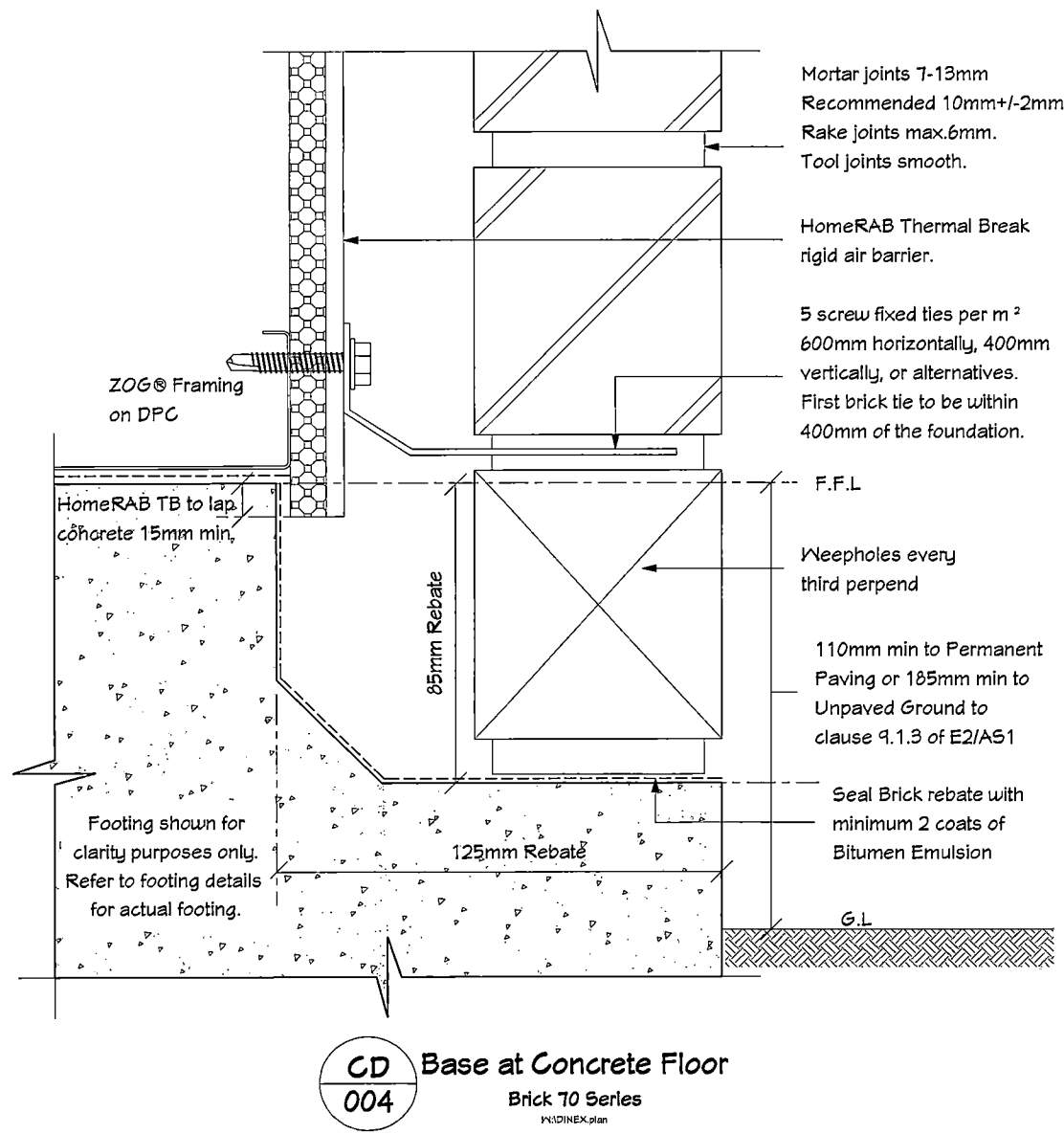
SITE DATA: for zones upto & including

Ground Bearing:	REF GEOTEC
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

**HomeRAB TB Fixing Layout**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	SHEET No. 31 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKAU

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

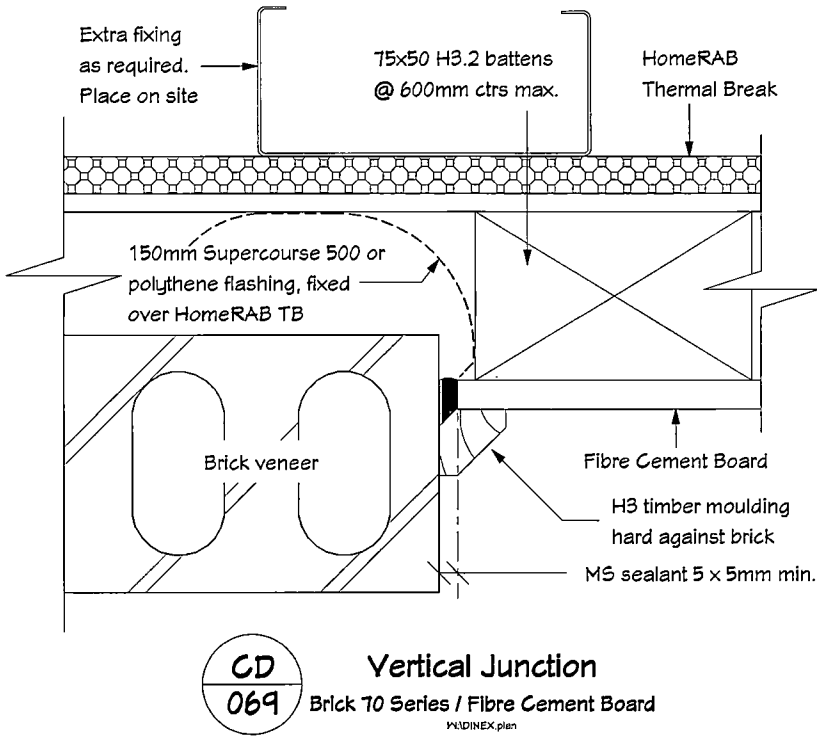
Waikato District Council  
Village Growth Area B


SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Cladding Details - Base & Soffit

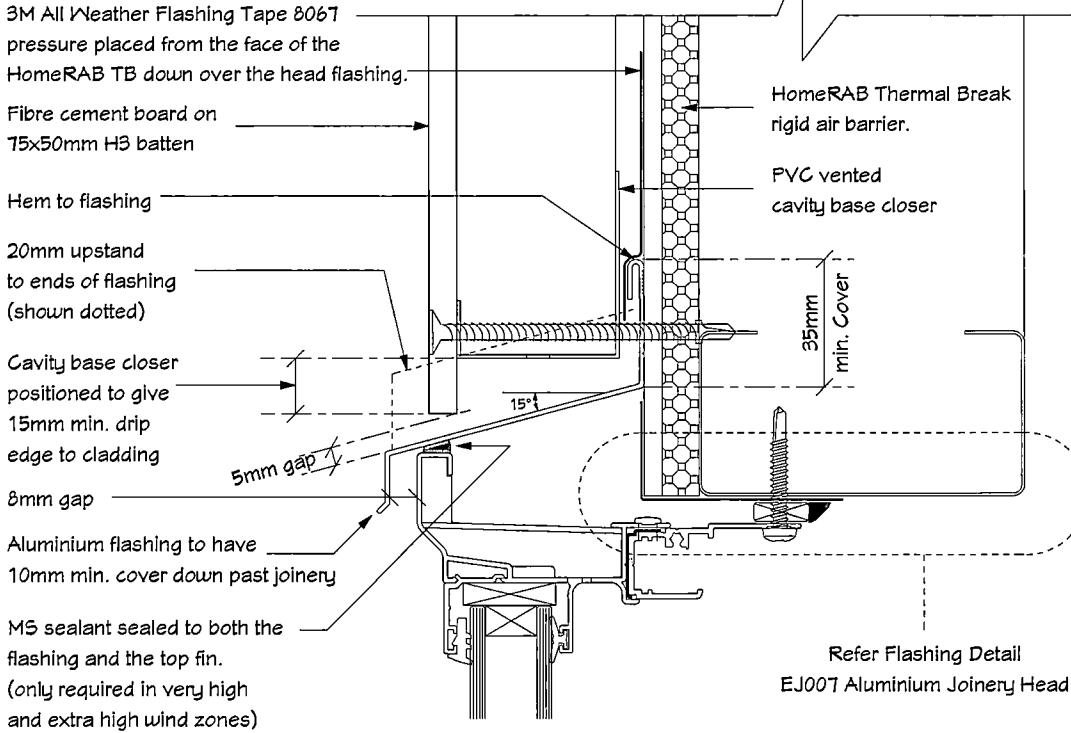
JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S	SHEET No. 32 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

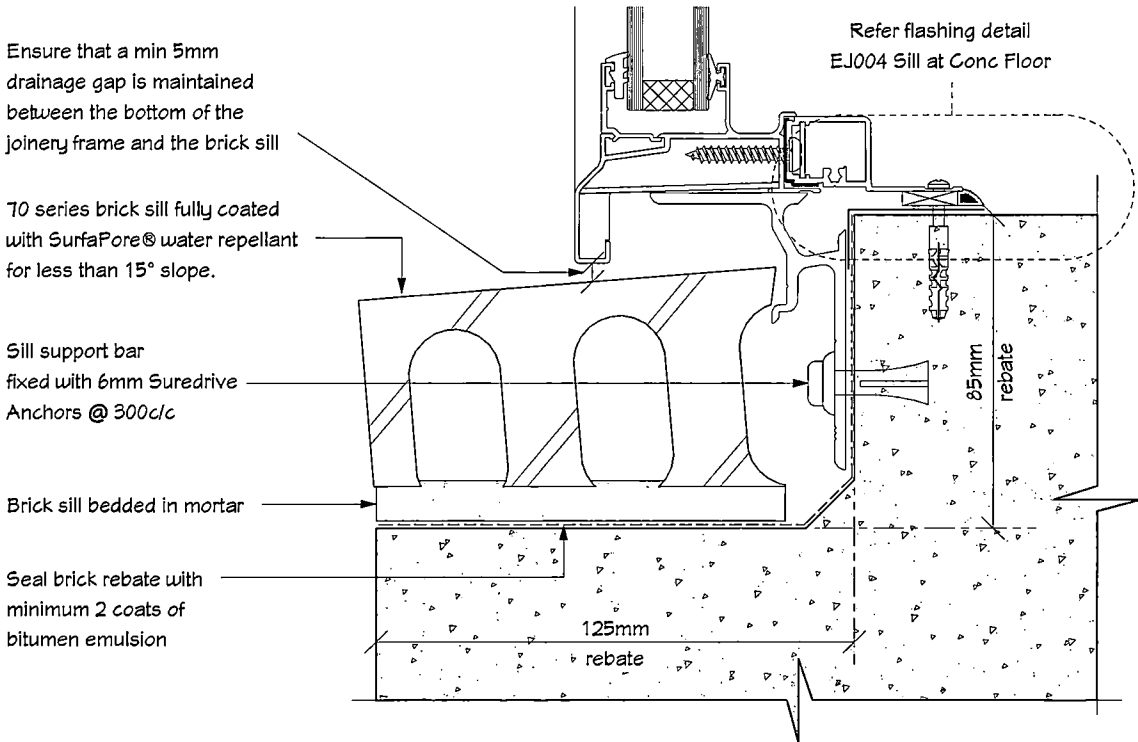


	
<b>ANG</b>	
© GOLDEN HOMES HOLDINGS LTD	
NOTES:	
<div>WAIKATO DISTRICT COUNCIL FULL APPLICATION 11 JUL 2016 Time..... .....</div>	
CLIENT:  Ang Residence Lot 10, Dp 480134 44 Millstone Lane Waterfall Park, Pokeno	
TERRITORIAL AUTHORITY: Waikato District Council Village Growth Area B	
SITE DATA: for zones upto & including Ground Bearing: REF GEOTEC Sub-soil Classification: E Soil Classification: Expansive Soil Wind Zone: High Earthquake Zone: 2 Exposure Zone: C Climate Zone: 3 Rainfall Intensity: 94.8mm/hr Snowload: 0.0kPa	
<b>Cladding Details - Vertical Junction</b>	
JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S.	SHEET No. 33 OF 42

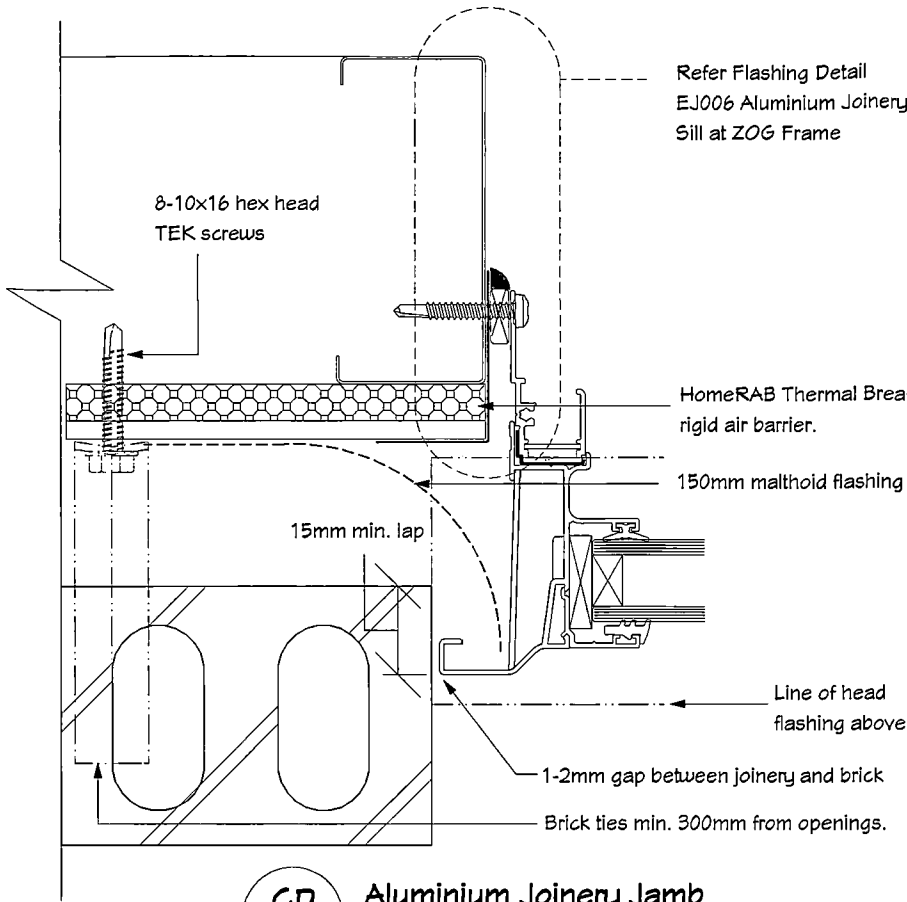
**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



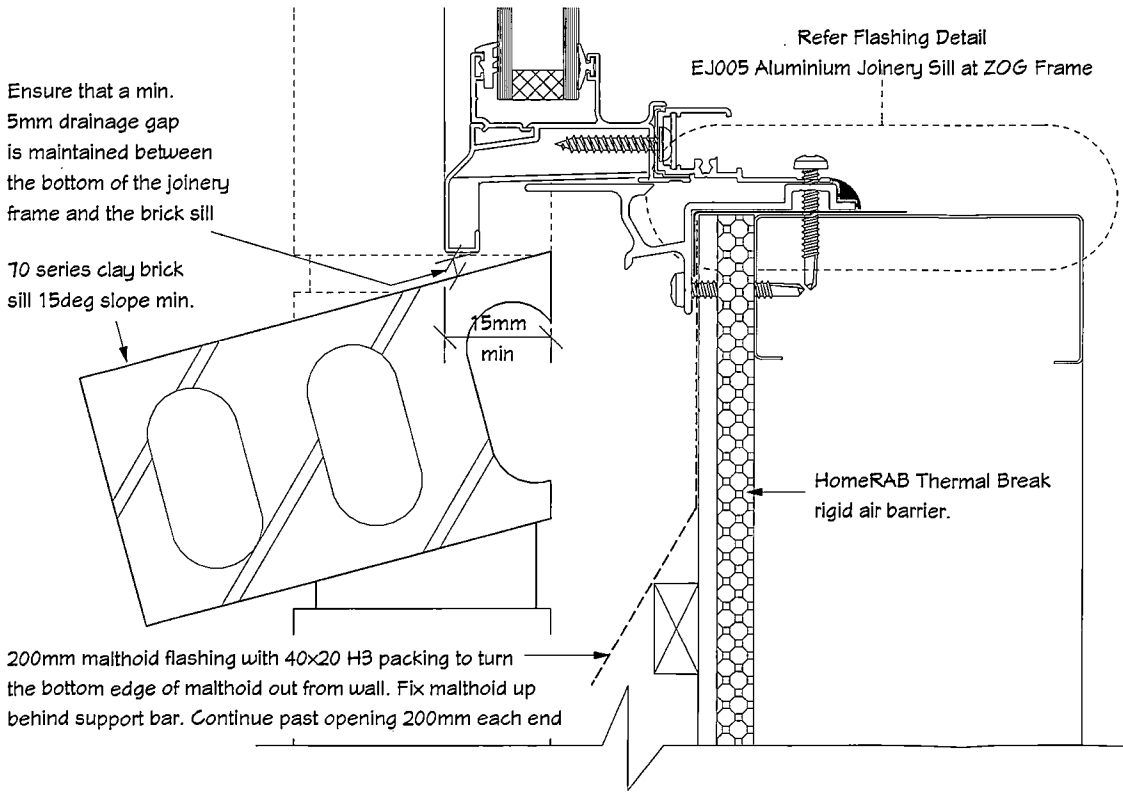
**CD 110** Aluminium Joinery Head  
Fibre Cement Board



**CD 107** Aluminium Joinery Sill at Floor  
Brick 70 Series  
W/DINEX plan



**CD 109** Aluminium Joinery Jamb  
Brick 70 Series  
W/DINEX plan



**CD 108** Aluminium Joinery Sill at Frame  
Brick 70 Series  
W/DINEX plan



**ANG**

© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD

**0055/17**

**APPROVED**

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED

**11 JUL 2016**

Time..... Initials.....  
**TUAKAU**

CLIENT:

**Ang Residence**  
**Lot 10, Dp 480134**  
**44 Millstone Lane**  
**Waterfall Park, Pokeno**

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Cladding Details - Joinery**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S.	SHEET No. 34 OF 42



# ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED

11 JUL 2016

Time..... Initials.....  
TUAKAU

**CLIENT:**

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

**TERRITORIAL AUTHORITY:**

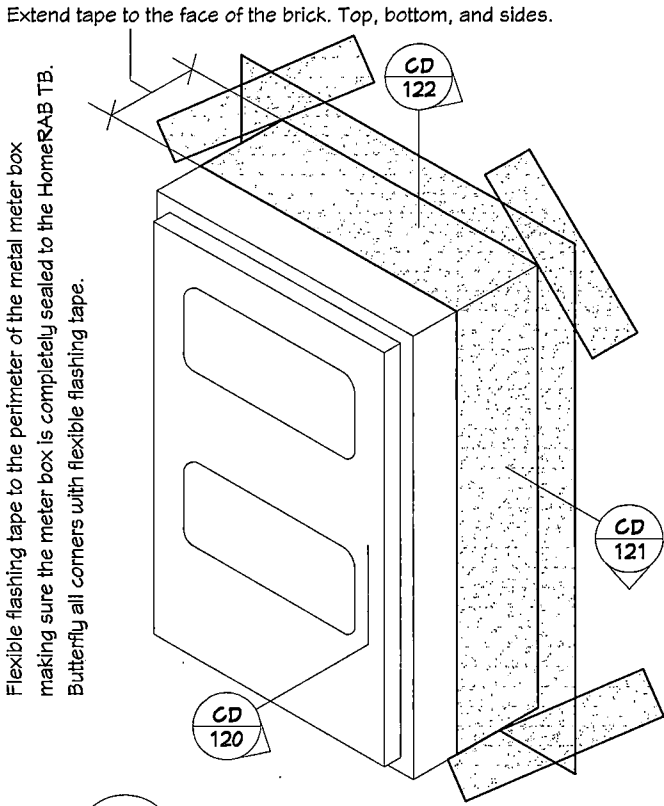
Waikato District Council  
Village Growth Area B

SITE DATA: <i>for zones upto &amp; including</i>	
Ground Bearing:	REF GEOTEC
Sub-soil Classification:	E
Soil Classification	Expansive Soil
Wind Zone:	High
Earthquake Zone:	2
Exposure Zone:	C
Climate Zone:	3
Rainfall Intensity:	94.8mm/hr
Snowload:	0.0kPa

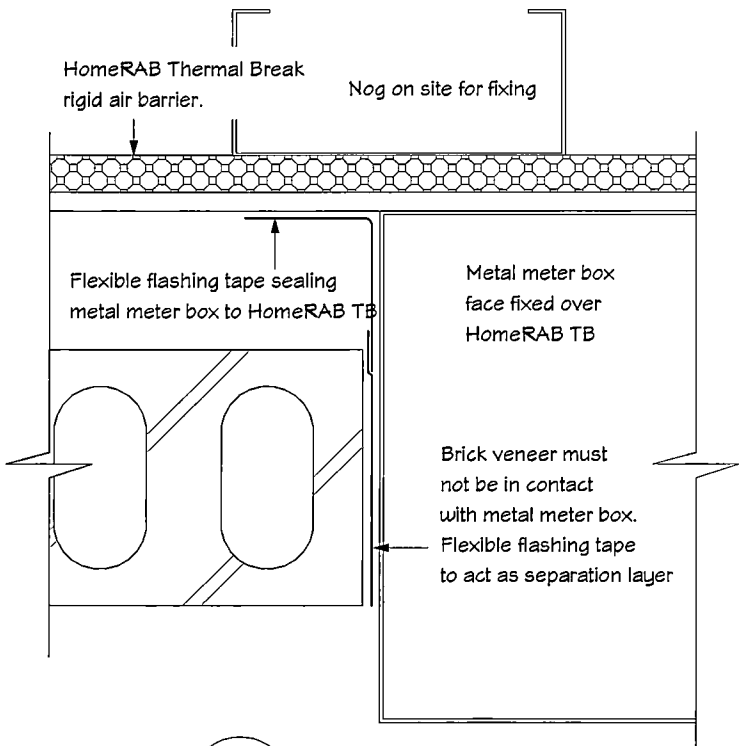
### Cladding Details - Garage Door

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S.	SHEET No. 35 OF 42

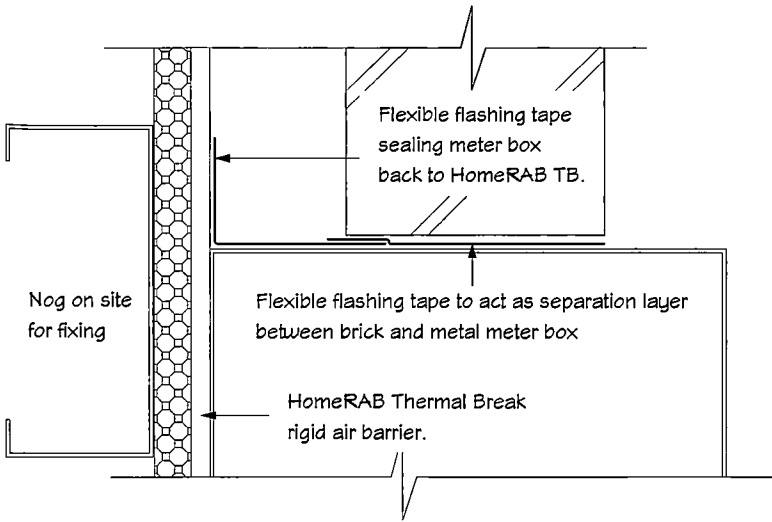
**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



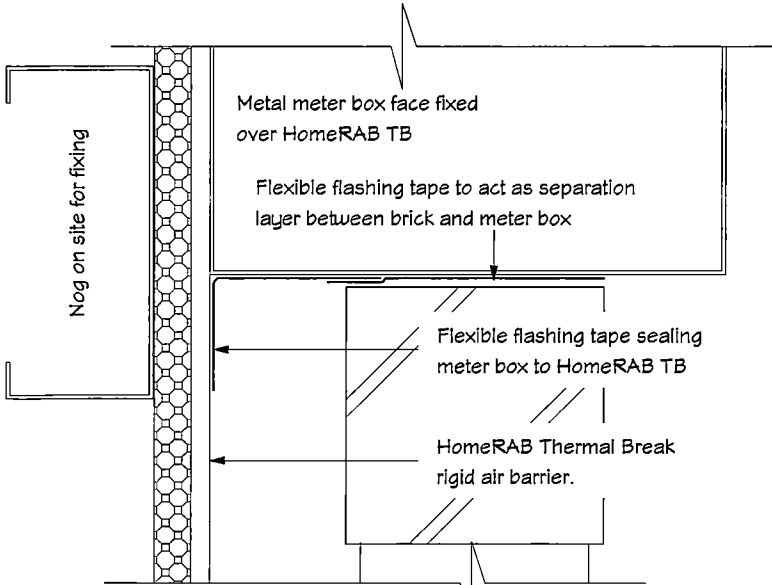
**CD 119** Meter Box Flashing 3D  
Brick 70 Series  
MIDINEX plan



**CD 121** Meter Box Jamb  
Brick 70 Series  
MIDINEX plan



**CD 122** Meter Box Head <500mm wide  
Brick 70 Series  
MIDINEX plan



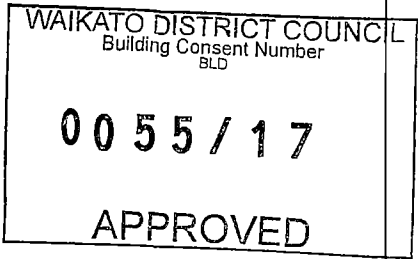
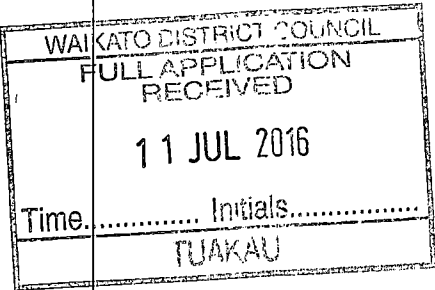
**CD 120** Meter Box Sill  
Brick 70 Series  
MIDINEX plan



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

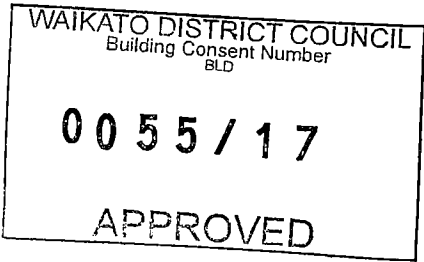
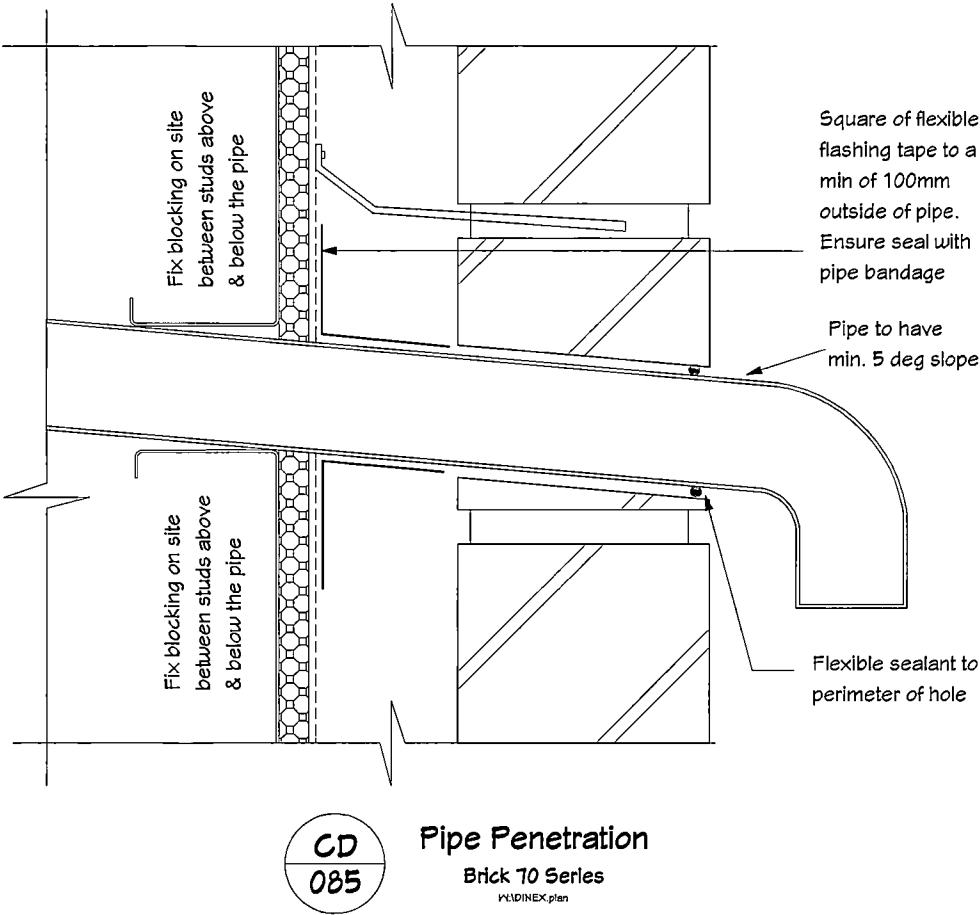
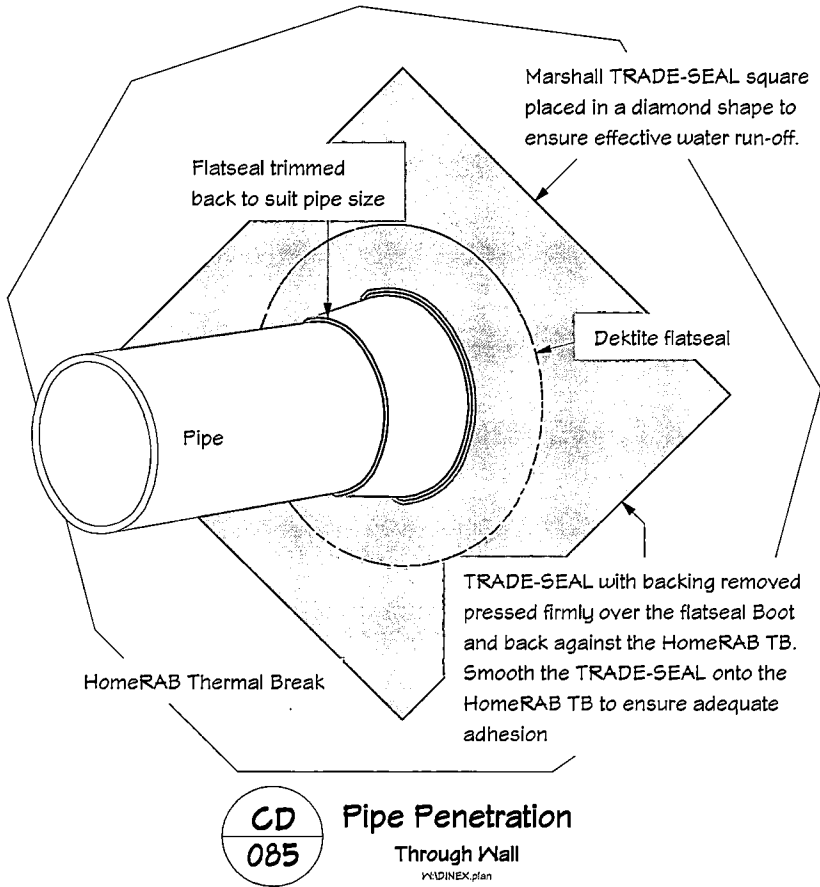
SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Cladding Details - Meter Box**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	N.T.S. SHEET No. 36 OF 42



**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKAU

CLIENT:  
  
Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

Cladding Details - Penetrations

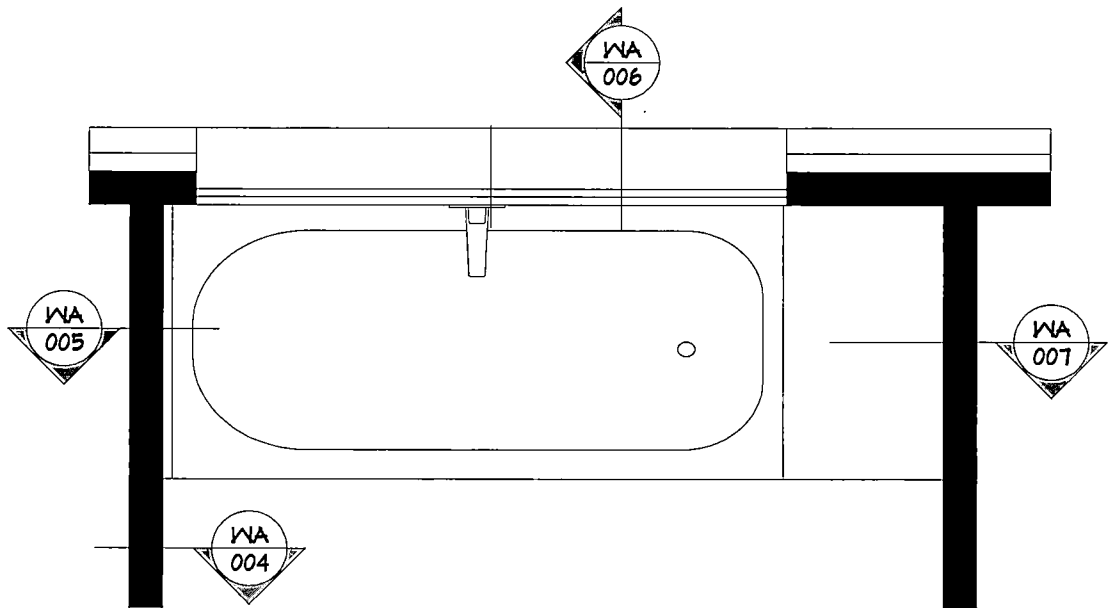
JOB No: 5534SALES: Grant Edwards

ZOG No:DRAWN: Matt

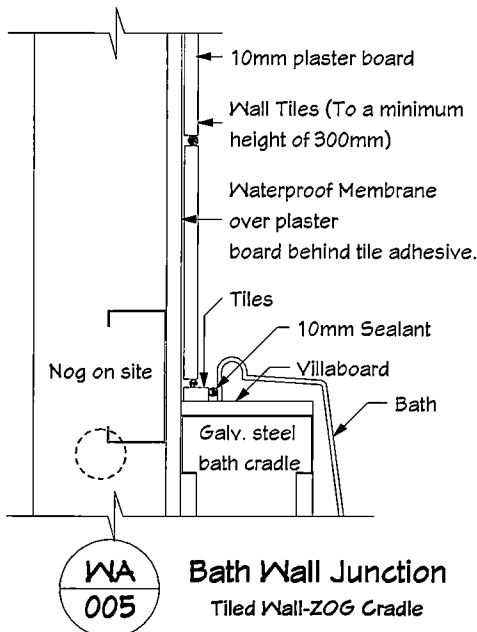
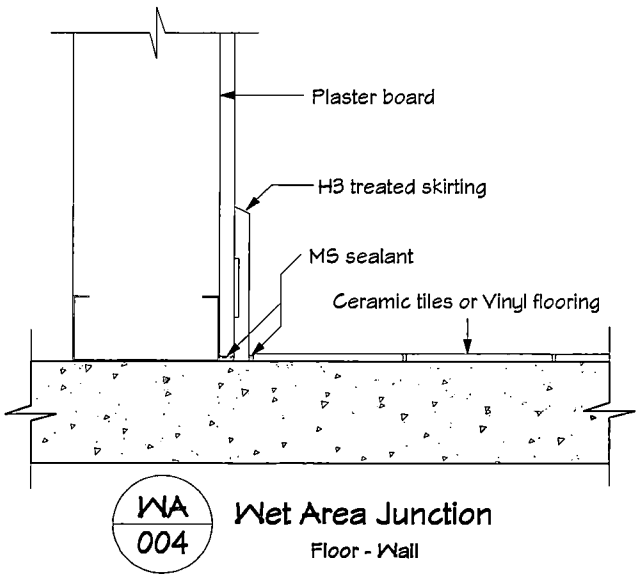
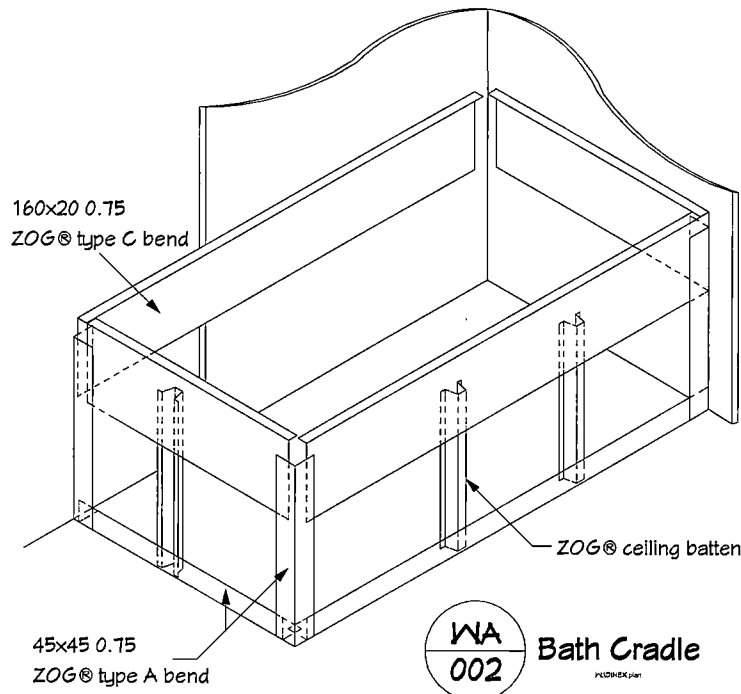
PLAN DATE:20/04/2016

SCALE: N.T.S.SHEET No. 37 OF 42


**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



WA001 Bathroom Detail Reference



WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD  
**0055/17**  
APPROVED



**ANG**  
© GOLDEN HOMES HOLDINGS LTD

NOTES:

Wet area / water splash floor & wall options  
Due to the finish variations required by the owner from time to time, the list below is provided as suitable options for floor and wall coverings in watersplash areas.

- Tiled - Ceramic or stone tiles having 6% maximum water absorption, waterproof grouted joints, and bedded with an adhesive specified by the tile manufacturer as being suitable for the tiles, substrate material and the environment use.
- Cement based solid plaster or concrete having a steel trowel or polished finish, "semi-gloss" or "gloss" paint must be used if paint finish required.
- Timber or timber based products such as particleboard/plywood sealed with waterproof applied coatings.
- Sheet linings finished with vinyl coated wall paper, semi-gloss or gloss coating. (wall only)
- Integrally waterproof sheet material (e.g. polyvinylchloride "vinyl") with sealed joints. (wall only)
- Any other material that complies with NZBC E3 clauses 3.1.1, 3.1.2 & D1 A51/M1

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKA  
CLIENT:

**Ang Residence**  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

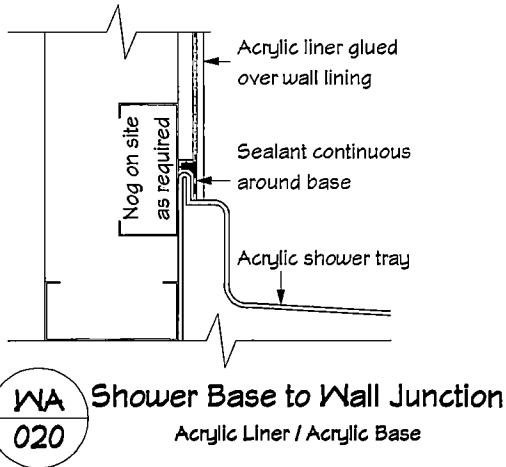
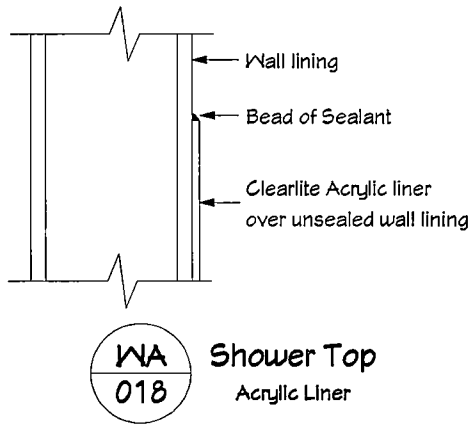
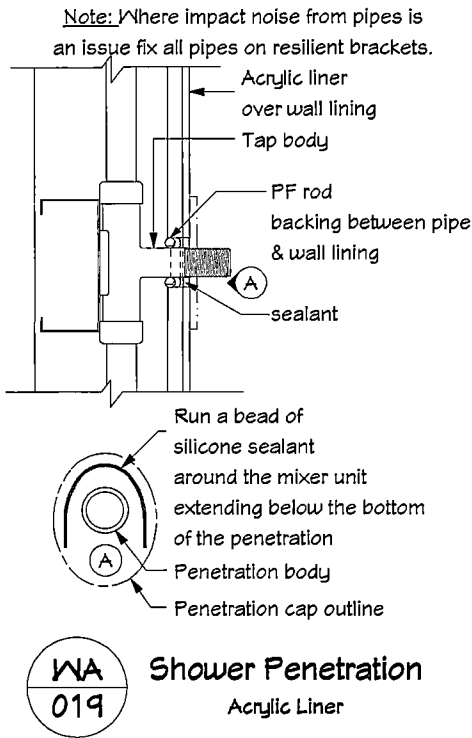
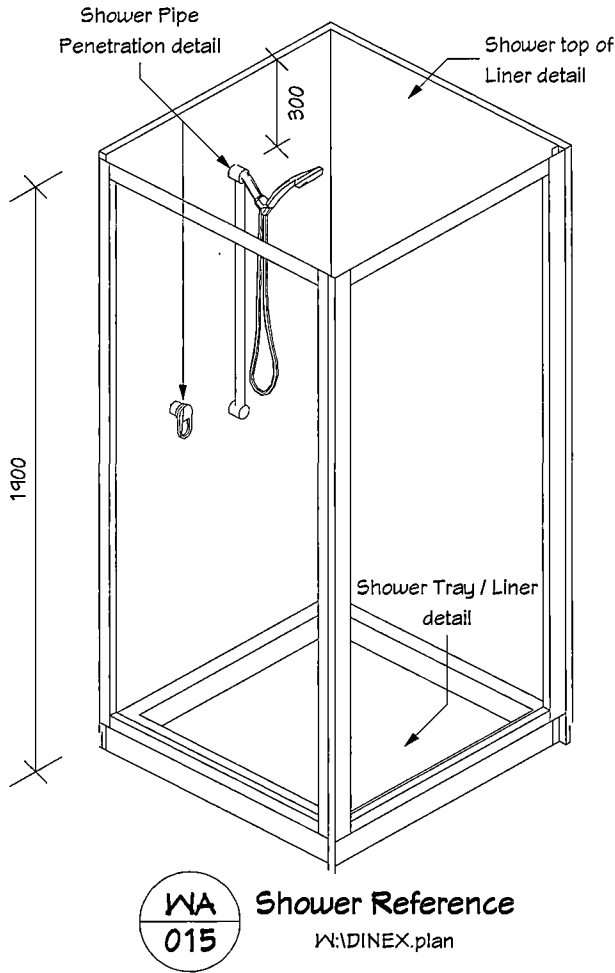
TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Wet Area Details**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S	SHEET No. 38 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

Wet area / water splash floor & wall options

Due to the finish variations required by the owner from time to time, the list below is provided as suitable options for floor and wall coverings in watersplash areas.

• Tiled - Ceramic or stone tiles having 6% maximum water absorption, waterproof grouted joints, and bedded with an adhesive specified by the tile manufacturer as being suitable for the tiles, substrate material and the environment use.

• Cement based solid plaster or concrete having a steel trowel or polished finish, "semi-gloss" or "gloss" paint must be used if paint finish required.

• Timber or timber based products such as particleboard/plywood sealed with waterproof applied coatings.

• Sheet linings finished with vinyl coated wall paper, semi-gloss or gloss coating. (wall only)

• Integrally waterproof sheet material (e.g. polyvinylchloride "vinyl") with sealed joints. (wall only)

• Any other material that complies with NZBC E3 clauses 3.1.1, 3.1.2 & D1 AS1/NM1

WAIKATO DISTRICT COUNCIL

FULL APPLICATION RECEIVED

11 JUL 2016

Time..... Initials.....

TUAKAU

CLIENT:

Ang Residence

Lot 10, Dp 480134

44 Millstone Lane

Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council

Village Growth Area B

SITE DATA: for zones upto & including

Ground Bearing: REF GEOTEC

Sub-soil Classification: E

Soil Classification: Expansive Soil

Wind Zone: High

Earthquake Zone: 2

Exposure Zone: C

Climate Zone: 3

Rainfall Intensity: 94.8mm/hr

Snowload: 0.0kPa

Wet Area Details

JOB No: 5534

SALES: Grant Edwards

ZOG No:

DRAWN: Matt

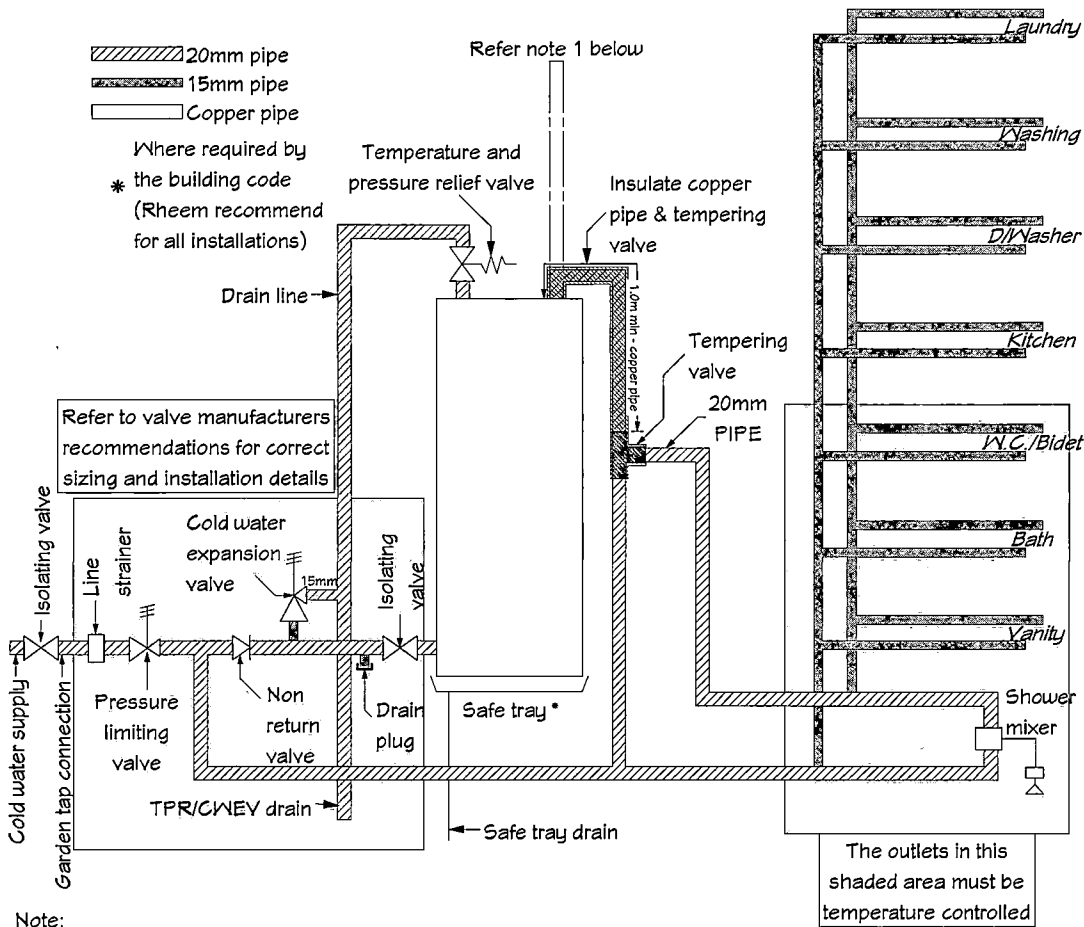
PLAN DATE:

20/04/2016

SCALE: N.T.S.

SHEET No. 39 OF 42

Note: Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



Note:

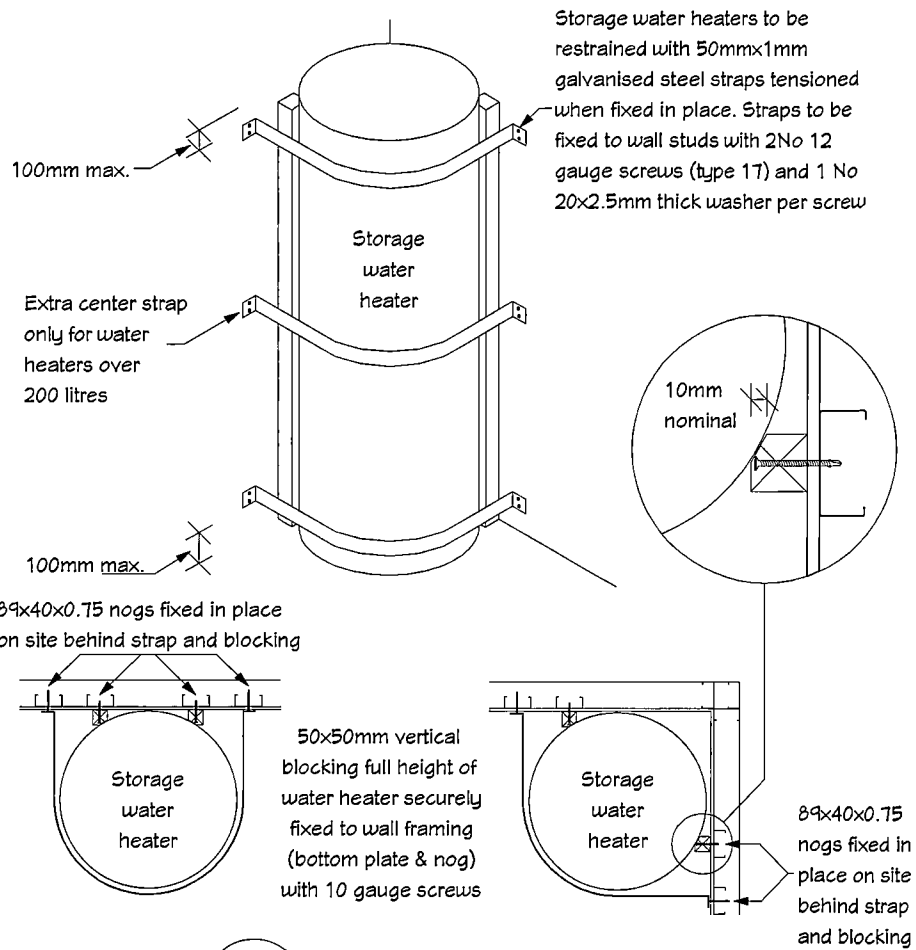
- 1) A mains pressure water heater can also be installed as an open vent or valve vented low pressure system
- 2) Combination valves (e.g. units incorporating isolating valve, strainer and pressure limiting valve) can be used to reduce the number of valves and simplify the installation

**WH 001** Mains Pressure HWC Installation  
Electrical  
W:\DINEX.plan

Max developed pipe length

To comply with both H1 and G12, a 15mm pipe at 12m max developed pipe length from the HWC to the kitchen sink meets the requirements of the acceptable solutions. As an alternative solution, an increase of up to 50% (Total 18m) can be approved, provided the pipe is insulated over its full length from the HWC with preformed closed cell foam with 13mm wall thickness.

This generic alternative solution is considered to meet the requirements of both G12 and H1"



**WH 010** Internal Water Heater  
Seismic Constraint 90-360L  
W:\DINEX.plan

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD  
**0055/17**  
APPROVED



**ANG**

© GOLDEN HOMES HOLDINGS LTD

NOTES:

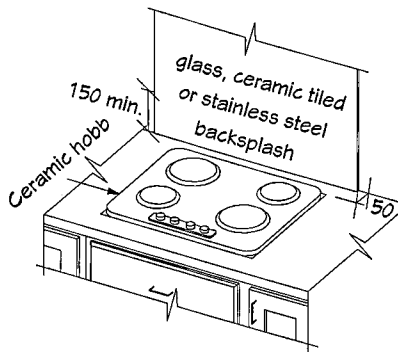
- Water storage heater control thermostat shall be set at a temperature of not less than 60°C to prevent the growth of Legionella bacteria.
- Tempering Valve to be installed as per NZBC

G12, to allow for a maximum of 55°C water to be delivered to sanitary fixtures

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED

11 JUL 2016

Time..... Initials.....  
**TUAKAU**



**WH 021** Hobb Clearances  
Ceramic  
W:\DINEX.plan

CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification: Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

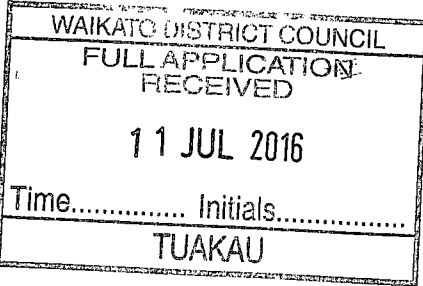
**Water Heating Details**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE:	N.T.S. SHEET No. 40 OF 42

TYPE	S	A	B	C	D
TOTAL SCREWS	2	4	6	8	12
FIXING RATING	5.00KN	10.00KN	15.00KN	20.00KN	30.00KN

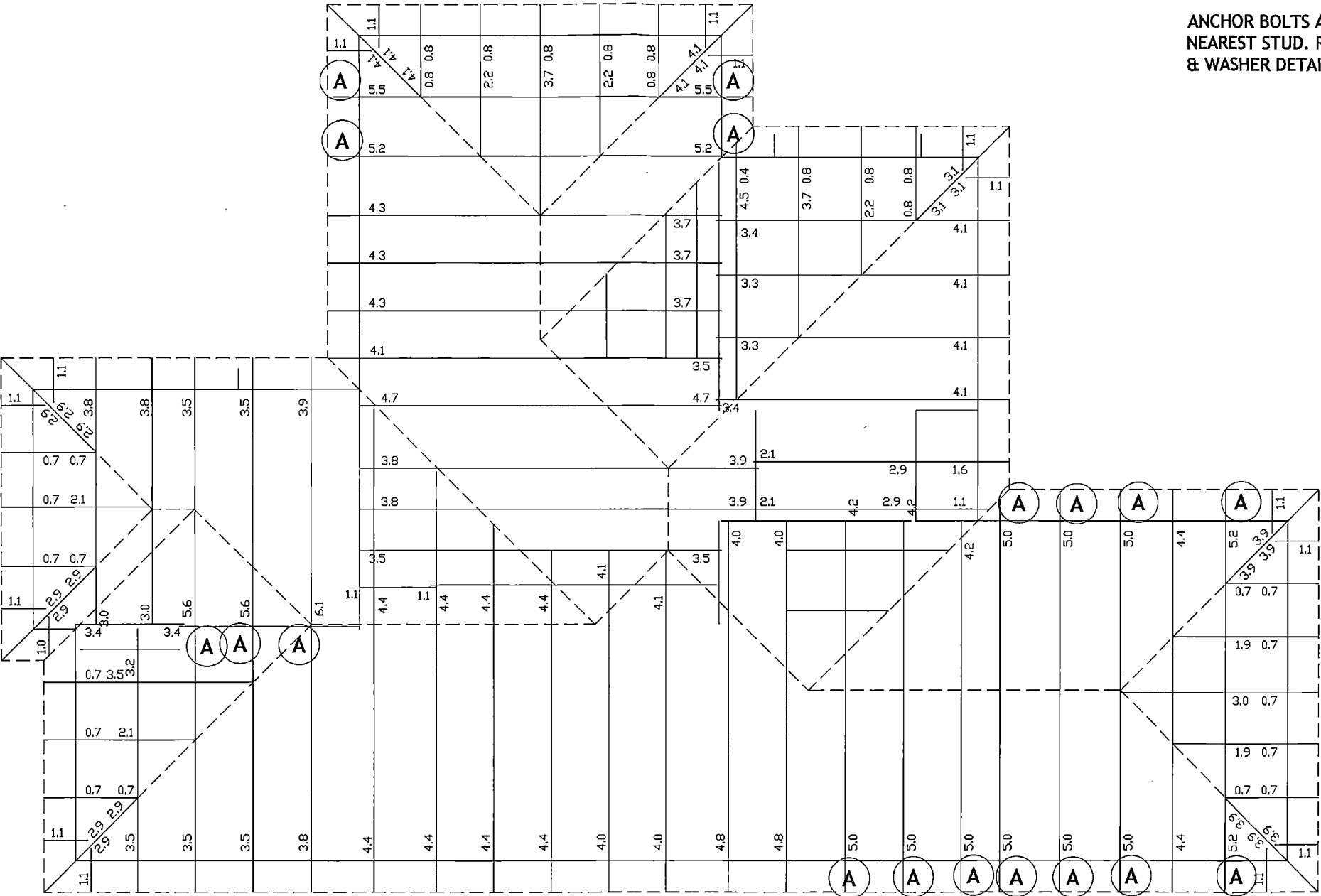
FOR ALL FIXINGS ABOVE TYPE "S" PLEASE ADD 10 GAUGE TEK SCREWS TO THE NEAREST STUD, 1 EXTRA TO BOTH SIDES OF THE STUD AT TOP AND TO BOTTOM PLATE CONNECTIONS

ANCHOR BOLTS ARE REQUIRED WITHIN 100mm CENTRES TO THE NEAREST STUD. REFER TO THE LATEST ZOG MANUAL FOR BOLT & WASHER DETAILS



NOTES  
SCREWS MUST BE FIXED IN SHEAR FOR CORRECT KN  
INTERNAL POINT LOADING PADS (OR EQUIVALENT) ARE REQUIRED IF MORE THAN 35.0m2 OF LOAD IS TRANSFERRED DOWN TO A SINGLE POINT OF A FOUNDATION SLAB

JOB REFERENCE  
5534



HOLD DOWN TYPES:

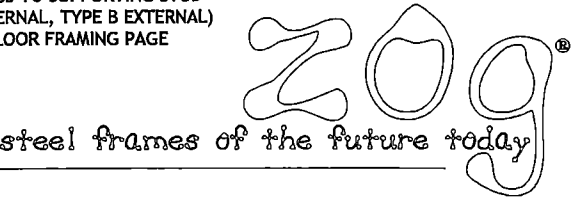
TRUSS HOLD DOWNS:  
ALL FIXINGS ARE TYPE S UNLESS NOTED ON THIS PAGE

WALL BOTTOM PLATE HOLD DOWNS TO BE THE GREATER OF:  
- STANDARD TYPE S HOLD DOWN  
- TYPE TRANSFERRED DOWN FROM TRUSS TO SUPPORTING STUD  
- BRACE WHERE REQUIRED (TYPE A INTERNAL, TYPE B EXTERNAL)  
- IF DISPLAYED USE TYPES NOTED ON FLOOR FRAMING PAGE

HOLD DOWN PLAN

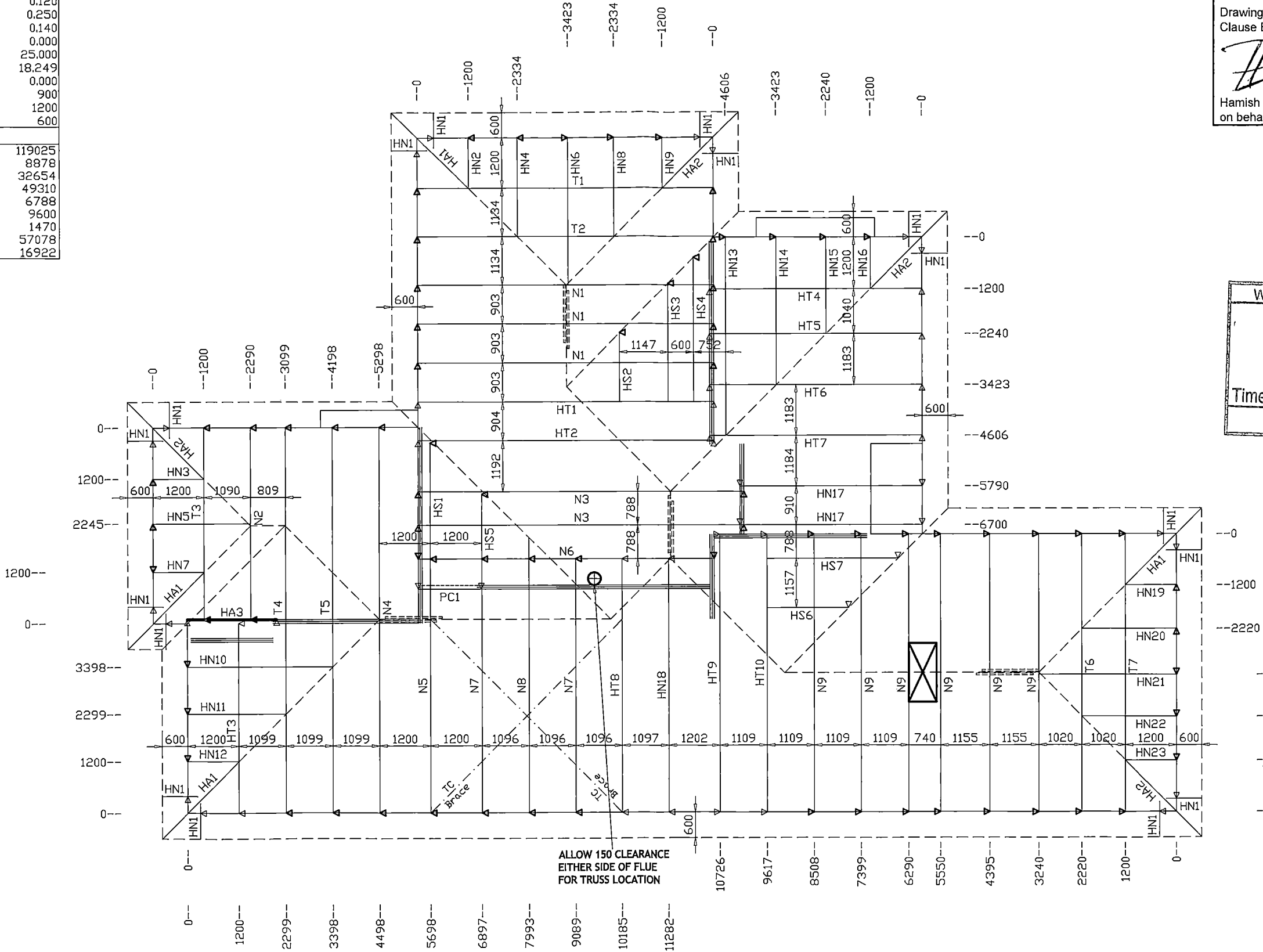
DATE DRAWN 22-06-2016	DRAWN JOSH	VIEW NAME 4 of 6	JOB DETAILS ANG RESIDENCE 44 MILLSTONE LANE WATERFALL PARK, POKENO
DWG FILE Drawing3	SCALE 1:100		

NO MODIFICATIONS TO WALL FRAMES OR ROOF TRUSSES ARE TO BE UNDERTAKEN WITHOUT OBTAINING WRITTEN INSTRUCTION FROM "ZOG" MANUFACTURING



REFER TO THE LATEST ZOG MANUAL FOR ALL HOLD DOWN AND TRUSS CONNECTION DETAILS

Truss Design Summary		
System	SFS-P90-GH	
Wind Load (m/s)	W44	
Roof Load (kPa)	SHEET	
TC Dead Load	0.120	
TC Live Load	0.250	
BC Dead Load	0.140	
BC Live Load	0.000	
Truss Pitch	25.000	
Truss Pitch	18.249	
Truss Pitch	0.000	
End Batten Spacing	900	
Int Batten Spacing	1200	
Bottom Chord Restraints	600	
Truss Summary		
Standard Truss	18	119025
Half Girder Truss	5	8878
Half Truss	31	32654
Truncated Truss	7	49310
RH Half Girder Truss	4	6788
RH Half Truss	8	9600
Parallel Chord Truss	1	1470
Half Truncated Truss	10	57078
Half Saddle Truss	7	16922



e3

Professional Consulting Engineers

Drawings have been checked for compliance with Clause B1 of the New Zealand Building Code

Jun 30, 2016

Hamish Pearse-Danker CPEng 1011810  
on behalf of e3 Consultants NZ Ltd

WAIKATO DISTRICT COUNCIL

FULL APPLICATION RECEIVED

11 JUL 2016

Time..... Initials.....

TUAKAU

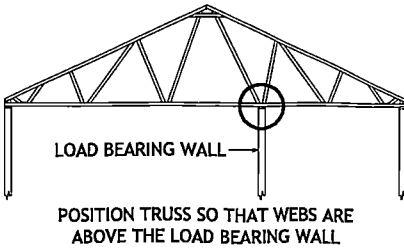
WAIKATO DISTRICT COUNCIL

Building Consent Number

BLD

0055/17

APPROVED



NOTES

THE DETAIL TO THE LEFT INDICATES LOCATION OF LUMBERLOK STRIP BRACE WITH TENSIONERS (IN ACCORDANCE WITH NASH 3405:2006 Section 10.4)

THE DETAIL TO THE LEFT INDICATES LOCATION OF ADDITIONAL ROOF SPACE BRACES. REFER TO CONSENT PLANS FOR BRACE DETAILS AND FIXINGS

FACTORY CHECK:

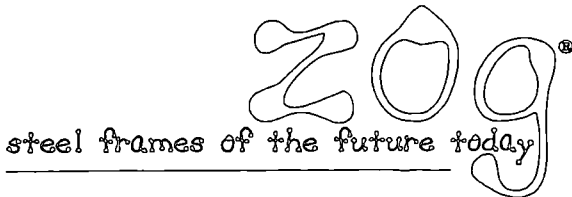
LOADED: \_\_\_\_\_

MADE BY: \_\_\_\_\_

CHECKED: \_\_\_\_\_

DRIVER CHECK: \_\_\_\_\_

NO MODIFICATIONS TO WALL FRAMES OR ROOF TRUSSES ARE TO BE UNDERTAKEN WITHOUT OBTAINING WRITTEN INSTRUCTION FROM "ZOG" MANUFACTURING



ROOF TRUSS LAYOUT


DATE DRAWN	DRAWN	VIEW NAME	JOB DETAILS	JOB REFERENCE
22-06-2016	JOSH	3 of 6	ANG RESIDENCE 44 MILLSTONE LANE WATERFALL PARK, POKENO	5534
DWG FILE		SCALE		
Drawing3		1:100		

Wall Design Summary		
System Types Found SFS-Master-ZIG		
Wind Load Found (m/s)		W44
Load Types Found		Sheet
Floor Types Found		Concrete
Wall Summary		
Load Bearing Walls	41	103995
Non Load Bearing Walls	27	67590
Support Beams	3	7450

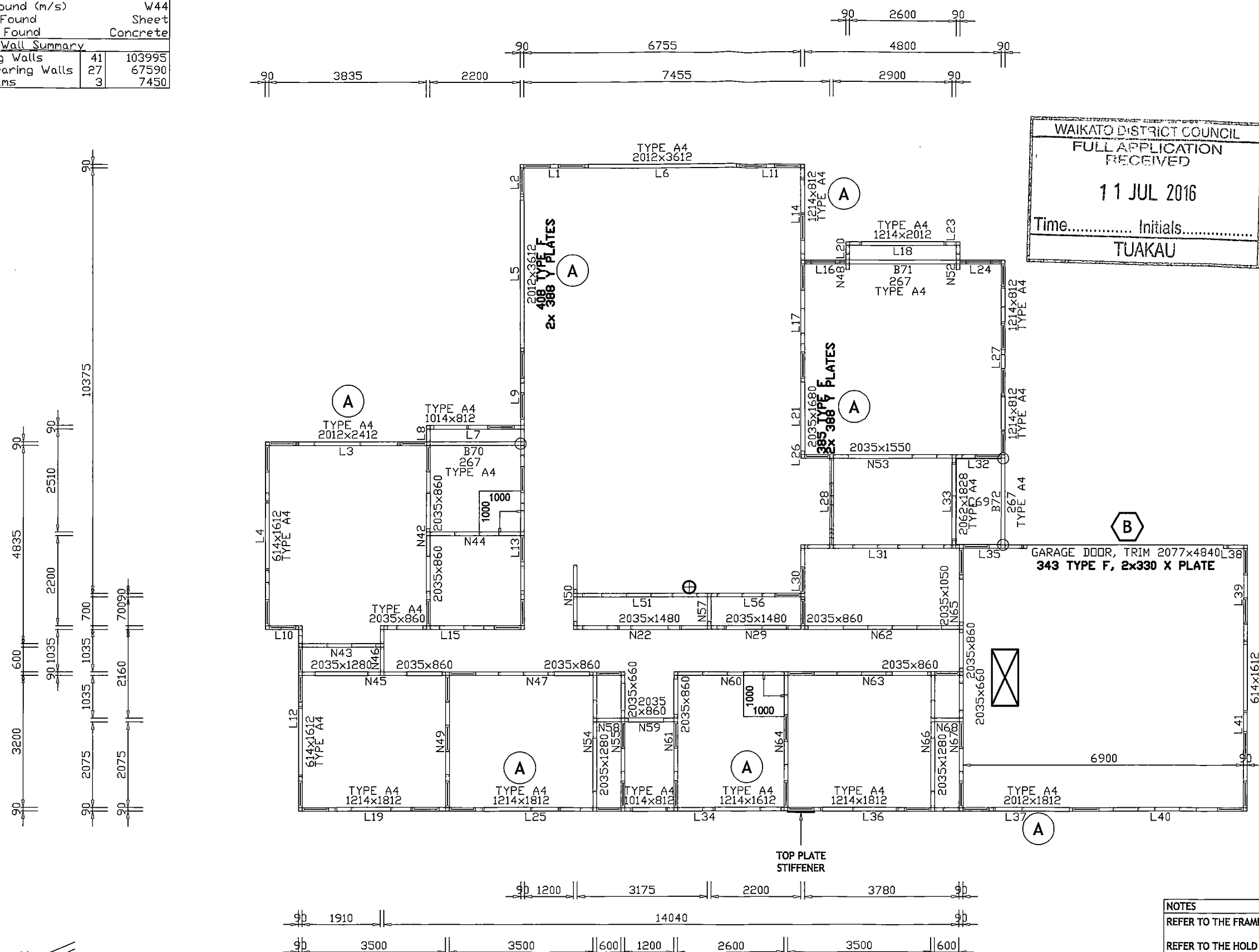
**INTERNAL LINERS: 19mm TIMBER LINERS WITH ARCHITRAVES**

**e3** Professional Consulting Engineers


Drawings have been checked for compliance with  
Clause B1 of the New Zealand Building Code

 Jun 30, 2016  
Hamish Pearse-Danker CPEng 1011810  
on behalf of e3 Consultants NZ Ltd

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
11 JUL 2016  
Time..... Initials.....  
TUAKAU



NO MODIFICATIONS TO WALL FRAMES OR ROOF TRUSSES ARE TO BE UNDERTAKEN WITHOUT OBTAINING WRITTEN INSTRUCTION FROM "ZOG" MANUFACTURING



## FLOOR FRAMING LAYOUT

DATE DRAWN <b>22-06-2016</b>	DRAWN <b>JOSH</b>	VIEW NAME <b>2 of 6</b>	JOB DETAILS <b>ANG RESIDENCE 44 MILLSTONE LANE WATERFALL PARK, POKENO</b>	ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO ZUG MANUFACTURING	JOB REFERENCE <b>5534</b>
DWG FILE <b>Drawing3</b>		SCALE <b>1:100</b>			

NOTES

REFER TO THE FRAME PLACEMENT PAGE FOR STANDING FRAMES

REFER TO THE HOLD DOWN PAGE FOR HOLD DOWN TYPES  
ADDITIONAL LINTEL HOLD DOWN TYPES NOTED LIKE SHOWN: TYPE

FOR **TYPE E/F** PLATE DETAILS REFER TO THE CONSENT PLANS. THE E/F PLATES MUST  
EXTEND PAST THE BEAM/LINTEL ENDS AND BE FIXED TO THE FRAMING EITHER SIDE

LOAD BEARING WALLS ARE LABELED WITH AN "L"  
NON LOAD BEARING WALLS ARE LABELED WITH AN "N"  
THIS LAYOUT IS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL PLANS  
ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO ZOG MANUFACTURING



**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.

INSULATION CALCULATION (Steel frame)

Climate zone : upto and including climate zone 3  
as per NZBC - Clause H1, Energy Efficiency - third edition  
and NZS:4218 2009, Energy Efficiency – small building envelope

BUILDING DESCRIPTION

All measurements are as per NZS 4218:2009 Appendix A

Building Thermal Envelope					
FLOORS	Total Area	Total Perimeter	Ratio	Total Thermal Floor Area	Actual R-value
Concrete floor	276.00	83.80	3.29	205.30	1.30
Suspended	0.00	0.00	0.00	0.00	0.00
WALLS	Perimeter	Stud height	Area (ex. voids) (incl. glazing)	Glazed area	
Wall # 1 - Interior wall (garage)	13.95	2.42	33.76	0.00	1.60
Wall # 2 - AAC Panels	0.00	0.00	0.00	0.00	2.19
Wall #2 - Intersections, 90mm voids (No. of)	0	0.00	0.00	N/A	0.44
Wall # 3 - 70 Series brick	61.49	2.42	145.97	35.44	2.07
Wall #3 - Intersections, 90mm voids (No. of)	13	2.42	2.83	N/A	0.44
Wall # 4 - W/board(16mm Fibre-cement)	0.00	0.00	0.00	0.00	2.12
Wall #4 - Intersections, 90mm voids (No. of)	0	0.00	0.00	N/A	0.44
Wall # 5 - W/board(7.5mm Fibre-cement)	0.00	0.00	0.00	0.00	2.08
Wall #5 - Intersections, 90mm voids (No. of)	0	0.00	0.00	N/A	0.44
Wall # 6 - #####	0.00	0.00	0.00	0.00	2.08
Wall #6 - Intersections, 90mm voids (No. of)	0	0.00	0.00	N/A	0.44
ROOFS	Area				
Trussed (excl. skylight area)	205.30				4.80
Raftered (excl. skylight area)	0.00				0.00
GLAZING	Actual glazing	Max glazing @ 30%	Glazing over 30%		
Glazing	35.44	54.77	0.00		0.26
Sky Lights	0.00				0.26

CALCULATION FOR - Average roof insulation R-value

	Total Area	Area %	Actual system R-value (Ar) =	Actual R-value
(a) Full height batts (hatched)	194.70	94.8%	Actual system R-value (Ar) =	4.9
(b) Chamfered batts (grey)	10.60	5.2%	Actual system R-value (Br) =	3.52
Total thermal roof area	205.30	100.0%	Average system R-value =	4.80

Example calculation: Average R-value = 1/((a%/(Ar))+(b%/Br))

REFERENCE BUILDING HEAT LOSS

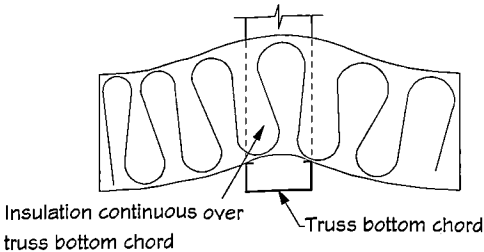
R-values as per NZS:4218 2009

Building Thermal Envelope	Area(sqM)	R-Value(min)	Heat loss(area/r-value)
Roof	205.30	3.30	62.2
Wall (set at 70%)	127.80	2.00	63.9
Floor	205.30	1.30	157.9
Glazing ≤ 30% (set at 30%)	54.77	0.26	210.7
Glazing > 30%	0.00	0.40	0.0
Sky Lights	0.00	3.30	0.0
Total Heat Loss of the Reference Building			494.7

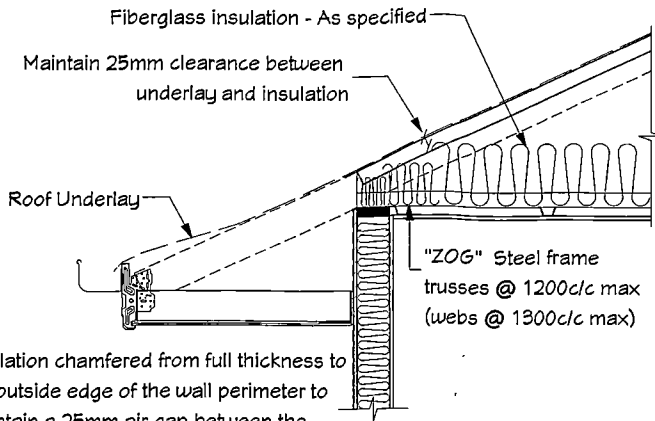
PROPOSED BUILDING HEAT LOSS

R-values as per BRANZ INSULATION GUIDE - fourth edition & REDCO calculations

Building Thermal Envelope	Area (sqM)	R-Value	Heat loss (area/r-value)
Trussed (excl. skylight area)	205.30	4.80	42.7
Raftered (excl. skylight area)	0.00	0.00	0.0
Wall # 1 - Interior wall (garage)	33.76	1.60	21.1
Wall # 2 - AAC Panels	0.00	2.19	0.0
Wall # 3 - 70 Series brick	110.53	2.07	53.4
Wall # 4 - W/board(16mm Fibre-cement)	0.00	2.12	0.0
Wall # 5 - W/board(7.5mm Fibre-cement)	0.00	2.08	0.0
Wall # 6 - #####	0.00	2.08	0.0
Wall voids (total)	2.83	0.44	6.4
Concrete floor	205.30	1.30	157.9
Suspended	0.00	0.00	0.0
Glazing ≤ 30% (double)	35.44	0.26	136.3
Glazing > 30% (double)	0.00	0.26	0.0
Sky Lights	0.00	0.26	0.0
Total Heat Loss of the Proposed Building (Must be less than or equal to the Reference Building)			417.9



ID 002  
Insulation Detail  
Lapping over Truss Bottom Chord  
W:\DINEX\plan

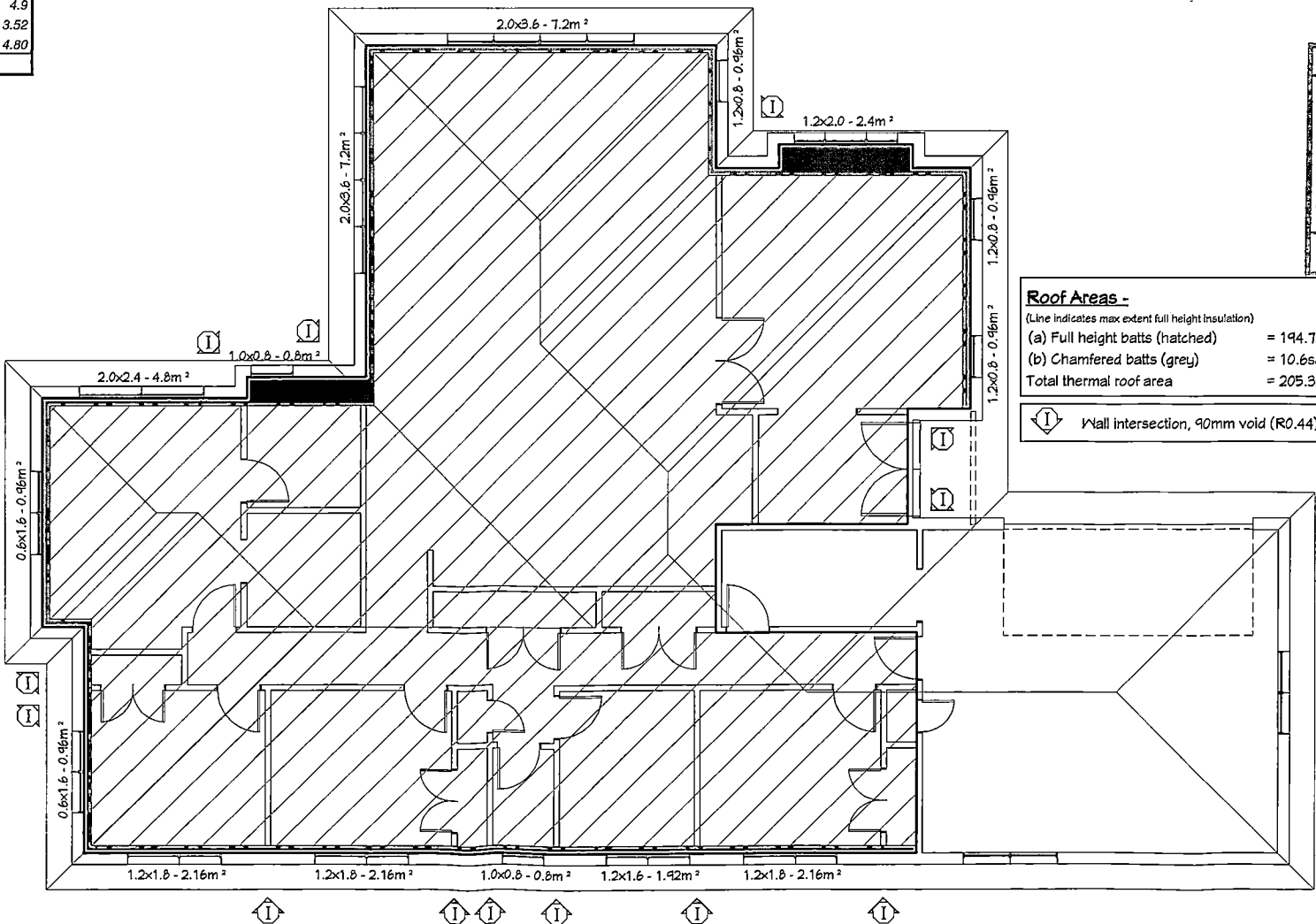


Notes

- Insulation chamfered from full thickness to the outside edge of the wall perimeter to maintain a 25mm air gap between the insulation and the roofing underlay.
- Insulation is to cover bottom chord of trusses.
- Insulation is to be installed in and around truss webs.

Insulated area  
refer to plan  
Chamfered area

ID 001  
Insulation Detail  
Chamfered Edge at Truss Heel  
W:\DINEX\plan



Roof Areas -

(Line indicates max extent full height insulation)

- (a) Full height batts (hatched) = 194.7sqM
- (b) Chamfered batts (grey) = 10.6sqM
- Total thermal roof area = 205.3sqM

Wall intersection, 90mm void (R0.44)



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

INSULATION

- External Walls = R-2.2 batts
- Internal Garage Walls = R-2.2 batts
- Ceiling = R-3.6 batts
- Edge of thermal roof area
- Start of chamfered edge

THERMAL BREAKS:

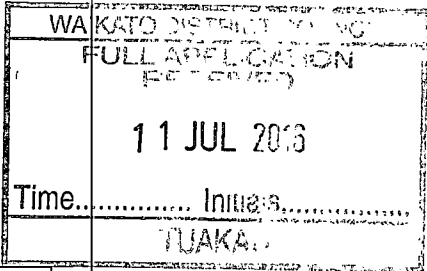
Thermal breaks increase the performance of the steel & reduce the risk of internal condensation.

External walls:

Thermal break is achieved by first installing a 30mm HD EPS block under all connections between truss & wall top plates (ref NASH N-10 V1.2 pg14) and secondly by sheathing the external perimeter with 10mm XPS polystyrene under the building wrap.

Roof:

Thermal break is achieved by installing the insulation as a blanket type, over the bottom chords and in & around the truss webs. (ref NASH N-10 V1.2 Appendix B pg50)



CLIENT:

Ang Residence  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council  
Village Growth Area B

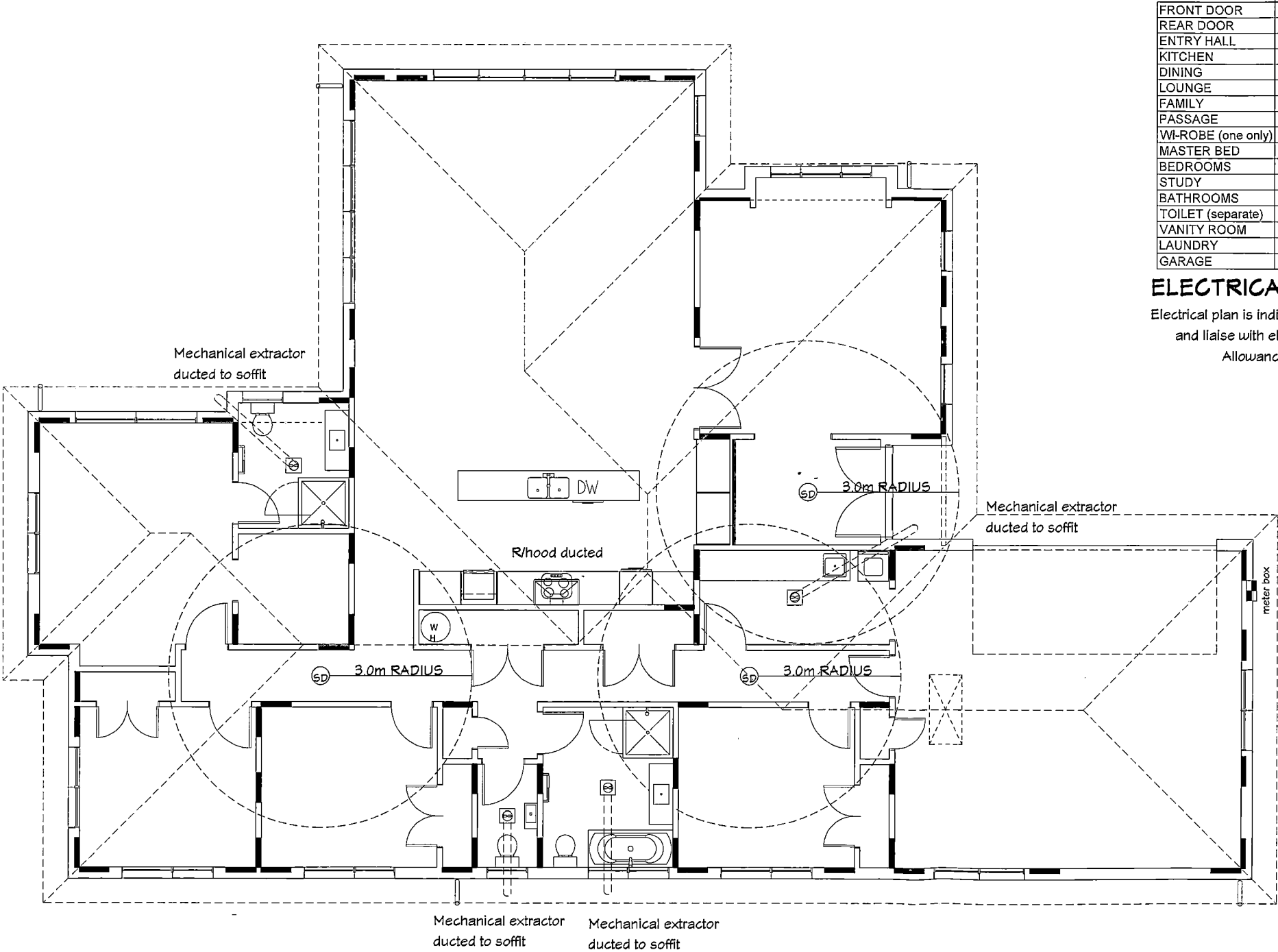
SITE DATA: for zones upto & including

- Ground Bearing: REF GEOTEC
- Sub-soil Classification: E
- Soil Classification: Expansive Soil
- Wind Zone: High
- Earthquake Zone: 2
- Exposure Zone: C
- Climate Zone: 3
- Rainfall Intensity: 94.8mm/hr
- Snowload: 0.0kPa

Insulation Details

JOB No: 5534	SALES: Grant Edwards
ZOG No:	DRAWN: Matt
PLAN DATE:	20/04/2016
SCALE: N.T.S.	SHEET No. 41 OF 42

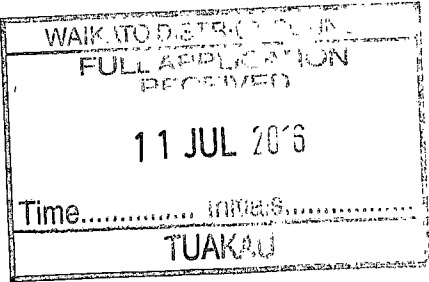
Note: Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



	RECESSED LIGHTS	2-WAY LIGHT CIRCUIT	DOUBLE P/POINT	SINGLE P/POINT	TV OUTLET	TELEPHONE JACK	WALL HEATER	RCD POINT	HEATED TOWEL RAIL	EXTRACTOR FAN & DUCTING	RANGEHOOD DUCTING	POWER TO OVEN/COOKTOP	SMOKE DETECTORS	AUTO GARAGE DOOR point/unit
FRONT DOOR	1													
REAR DOOR	1													
ENTRY HALL	1												1	
KITCHEN	2		2	3		1					1	1		
DINING	1		1											
LOUNGE	2		2		2									
FAMILY	2		2											
PASSAGE	3	1	1										2	
WI-ROBE (one only)	1													
MASTER BED	1		2			1								
BEDROOMS	1		1											
STUDY	1		1											
BATHROOMS	1						1	1	1	1				
TOILET (separate)	1													
VANITY ROOM	1									1				
LAUNDRY	1		1											
GARAGE	1													1

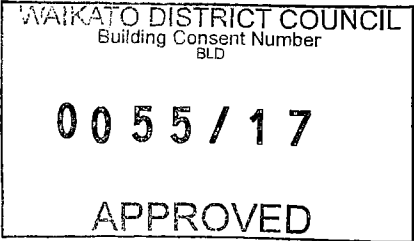
ELECTRICAL ALLOWANCES BY ROOM

Electrical plan is indicative only refer to specifications for quantities and liaise with electrician to confirm layout on walk through.  
Allowances to be made for NZBC regulations



ELECTRICAL KEY	
○	RECESSED LIGHTS
⊗	EXTRACTOR FAN
⊕	SINGLE P/POINT
⊕⊕	DOUBLE P/POINT
⊕ <sub>RCD</sub>	RCD POINT
⊕ <sub>TV</sub>	TV OUTLET
⊕ <sub>PH</sub>	TELEPHONE JACK
2W	2 WAY LIGHT CIRCUIT
⊕ <sub>RH</sub>	RANGEHOOD DUCTING
⊗	SMOKE DETECTORS

• Installation of all artificial lighting to comply with NZBC clause G8



ANG

© GOLDEN HOMES HOLDINGS LTD

NOTES:

Bracing Element Lines

•

Holes or intrusions into the ZOG® frame bracing elements may require engineers specific design for remedial work. 'The designer' must be contacted for an alternative solution prior to any intrusions and/or modifications being made to bracing elements.

•

Any switch mounted into plasterboard used as a component in the bracing element must be a minimum of 150mm from the element edge.

•

Meter box to be 500mm max width.

•

Positions of ventilation ducting is approximate only and to be confirmed by the installer.

•

•

CLIENT:

Ang Residence

Lot 10, Dp 480134

44 Millstone Lane

Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:

Waikato District Council

Village Growth Area B

SITE DATA: for zones upto &amp; including

Ground Bearing: REF GEOTEC

Sub-soil Classification: E

Soil Classification: Expansive Soil

Wind Zone: High

Earthquake Zone: 2

Exposure Zone: C

Climate Zone: 3

Rainfall Intensity: 94.8mm/hr

Snowload: 0.0kPa

Electrical Plan

JOB No: 5534

SALES: Grant Edwards

ZOG No:

DRAWN: Matt

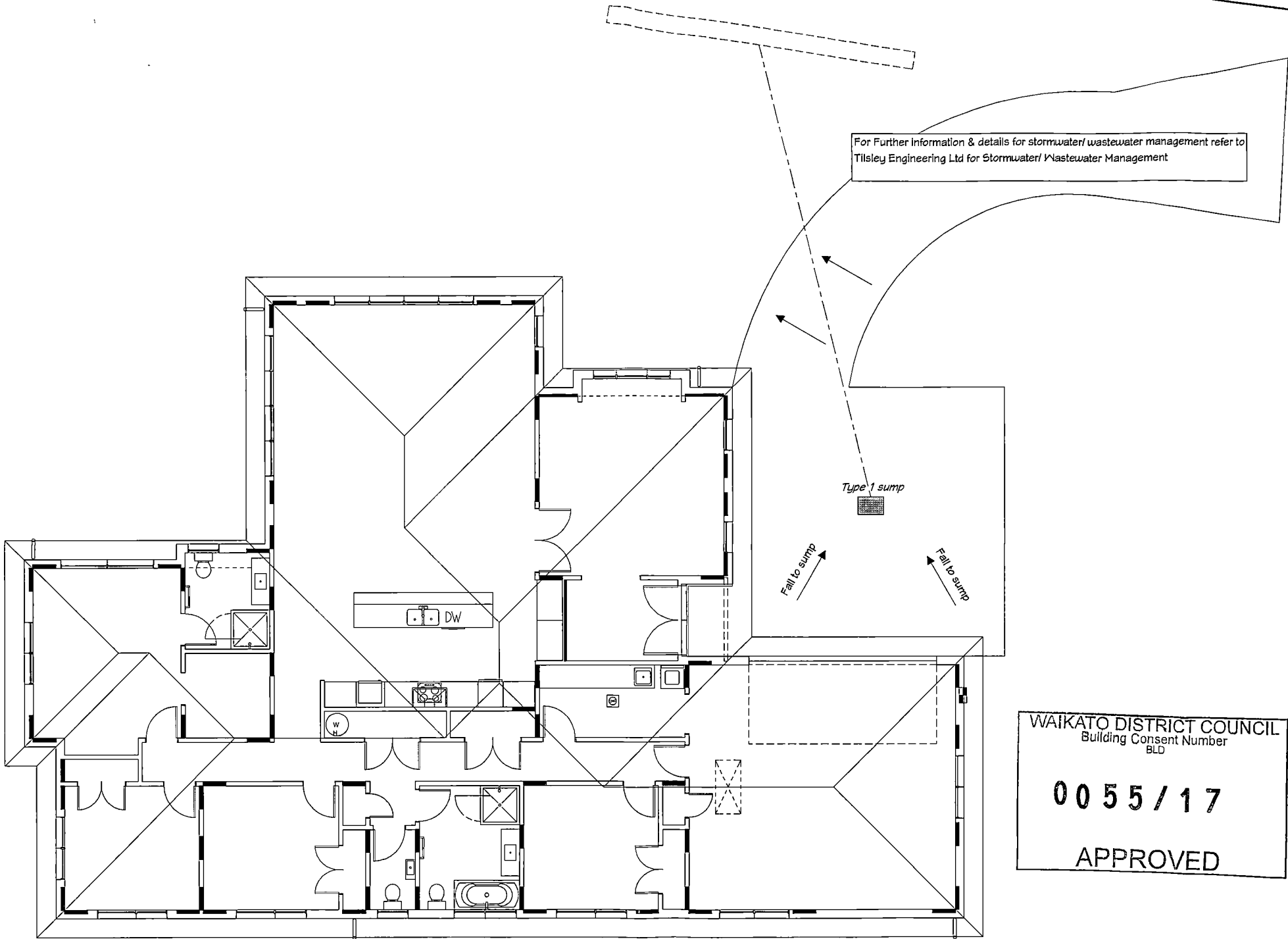
PLAN DATE:

20/04/2016

SCALE: N.T.S.

SHEET No. 42 OF 42

**Note:** Prior to any construction starting plans must be reviewed by all contractors and any issues involving information or workability for their own trade and for following trades must be notified to RCDC so that those issues can be resolved before construction starts.



WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD  
**0055/17**  
APPROVED

Please refer the recommendations (Page 88/  
Sheet 9 of the PDF) and plan (Sheet 42 of  
the PDF)  
and draw in & note the recommendations as  
noted and shown on the plan. Please also  
incorporate the following designs into our  
drainage details:  
Water Tank design as noted on Page 25/  
Sheet 26 of the PDF and  
Spreader Bar design as noted on Page 27/  
Sheet 28 of the PDF.

Septic Tank

Stormwater Tank

Stormwater Tank

NOTES:  
This Drainage As-Built page is for the  
drainlayer to complete and supply for code of  
compliance if the method/layout of the drainage  
work has been finalised in a different manner to  
that shown on the Drainage Plan provided. In  
all cases, any variation to the original drawings  
must comply with the relevant building code  
and reference to that code stated by the  
drainlayer.

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED  
**11 JUL 2016**  
Time..... Initials.....  
TUAKAU

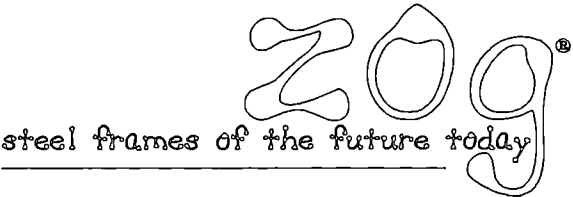
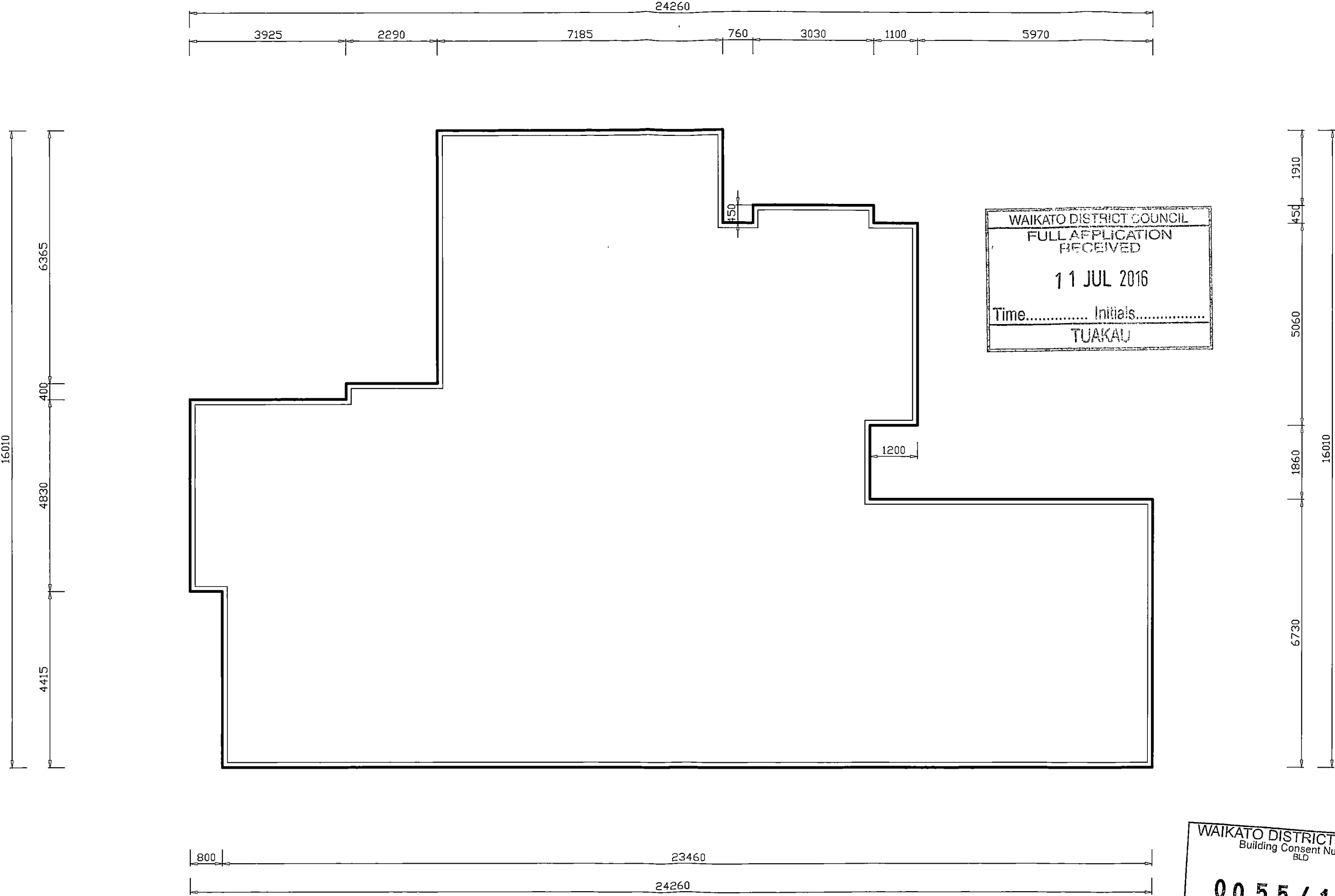
CLIENT:  
**Ang Residence**  
Lot 10, Dp 480134  
44 Millstone Lane  
Waterfall Park, Pokeno

TERRITORIAL AUTHORITY:  
Waikato District Council  
Village Growth Area B

SITE DATA: for zones upto & including  
Ground Bearing: REF GEOTEC  
Sub-soil Classification: E  
Soil Classification Expansive Soil  
Wind Zone: High  
Earthquake Zone: 2  
Exposure Zone: C  
Climate Zone: 3  
Rainfall Intensity: 94.8mm/hr  
Snowload: 0.0kPa

**Drainage Plan As-Built**

JOB No: 5534	SALES: Grant Edwards
ZOG No:	
PLAN DATE:	
SCALE:	

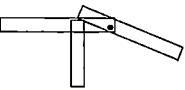


BUILDING OUTLINE

DATE DRAWN	DRAWN	VIEW NAME	JOB DETAILS	JOB REFERENCE
22-06-2016	JOSH	1 of 6		
DWG FILE		SCALE	ANG RESIDENCE 44 MILLSTONE LANE WATERFALL PARK, POKENO	5534
Drawing3		1:100		

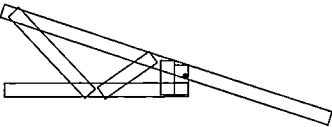
NOTES  
THIS PAGE IS FOR DETAILING USE ONLY

NO MODIFICATIONS TO WALL FRAMES OR ROOF TRUSSES ARE TO BE UNDERTAKEN WITHOUT OBTAINING WRITTEN INSTRUCTION FROM "ZOG" MANUFACTURING



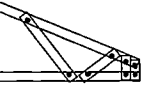
ADDITIONAL 2 of 10g TEKS TO  
TOP CHORD INTERSECTION

TO ALL TRUNCATED TRUSSES



ADDITIONAL 2 of 10g TEKS TO  
TO STRENGTHEN EXTENSIONS

TO ALL TRUSS EXTENSIONS



ADDITIONAL 4 of 10g TEKS  
TO FIRST 4 WEB MEMBERS

TRUSSES:  
N1, N3, N9, T1, T2, T6, T7 & HT10

4 OF 10g  
TEK SCREWS

STACKING EXTRAS: L5, L21, C69, B70, B71, & B72

PUSHOUT WALLS

L18	L7	L20	L23	L8
-----	----	-----	-----	----

2.4 WALLS

L16	L24	L2	N57	N58	N68	L38
L29		L9				N56
L3			N64			
L4					L37	
N42					N60	
N53			N45			
L41				N61		
L35	L11		N50		L32	N59
N62			L31			
L36				N54		
N63				N55		

L12			N65		
N66		N67		N46	
L25			L22		
L39	N44		L28	L10	
L6		L19			
L40			N51		
N47			N49		
L33	L30	N43	L1		
L27			L14	L26	N48
L34		L15			
L13		L17			N52

FACTORY CHECK:

LOADED: \_\_\_\_\_

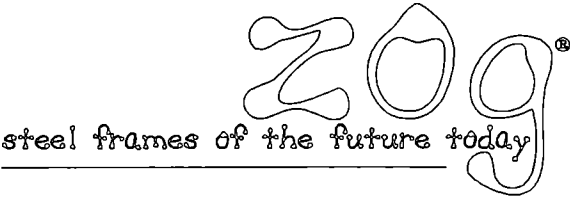
MADE BY: \_\_\_\_\_

\_\_\_\_\_

CHECKED: \_\_\_\_\_

DRIVER CHECK: \_\_\_\_\_

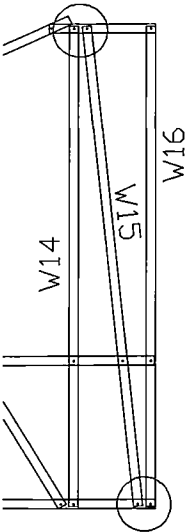
NO MODIFICATIONS TO WALL FRAMES OR ROOF TRUSSES ARE TO BE UNDERTAKEN WITHOUT OBTAINING WRITTEN INSTRUCTION FROM "ZOG" MANUFACTURING



PANEL STACKING

DATE DRAWN	DRAWN	VIEW NAME	JOB DETAILS
22-06-2016	JOSH	5 of 6	ANG RESIDENCE
DWG FILE	SCALE		44 MILLSTONE LANE
Drawing3	1:100		WATERFALL PARK, POKENO

NOTES	JOB REFERENCE
THIS PAGE IS FOR FACTORY USE ONLY	5534



HT7

WAIKATO DISTRICT COUNCIL  
FULL APPLICATION  
RECEIVED

11 JUL 2016

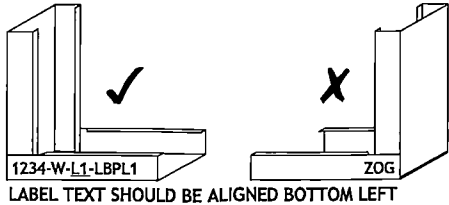
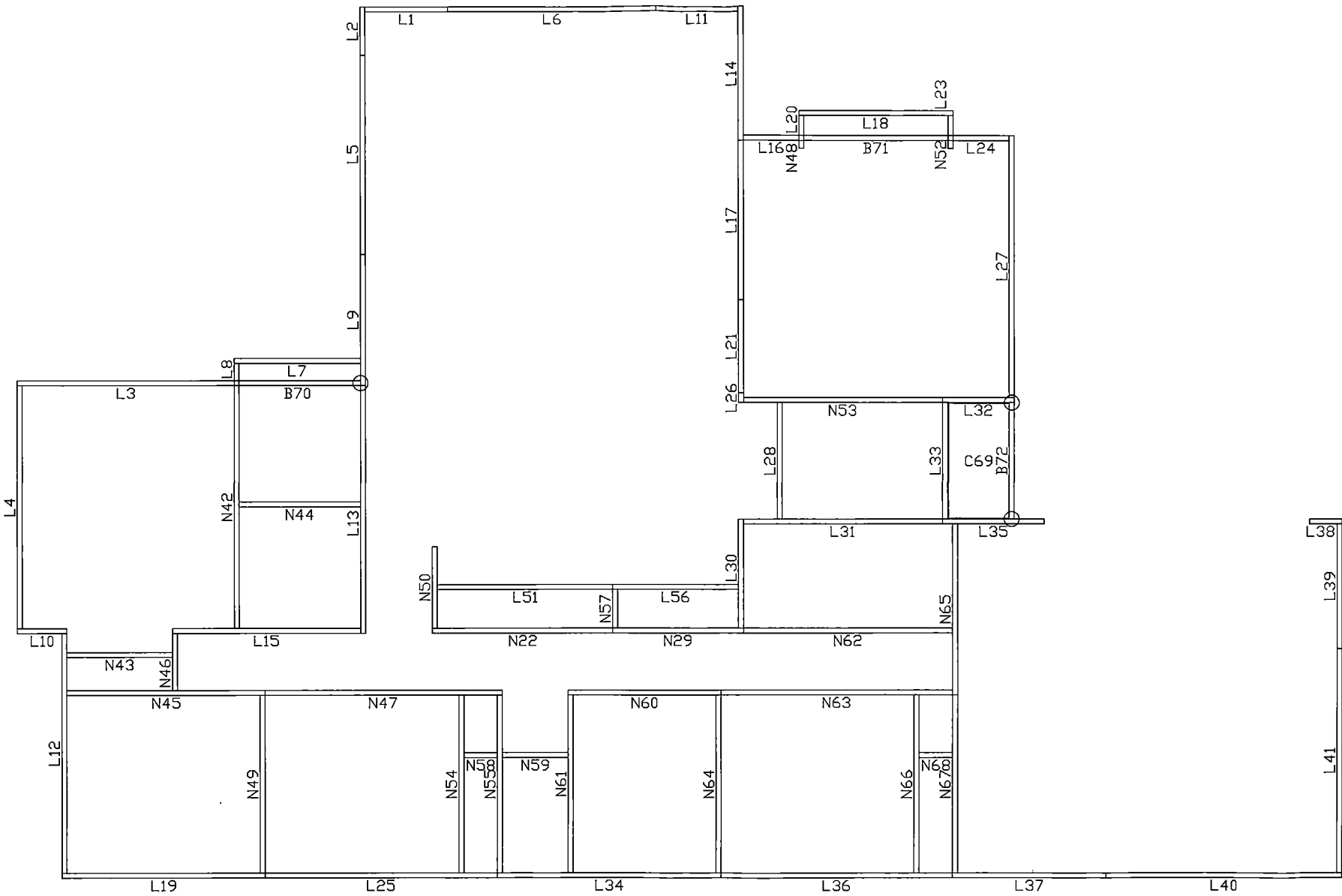
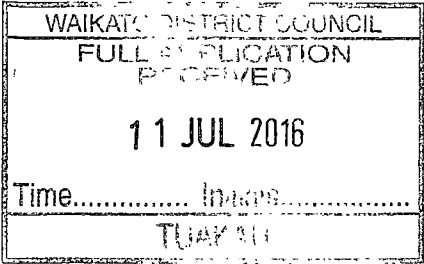
Time..... Initials.....

TUAKAU

WAIKATO DISTRICT COUNCIL  
Building Consent Number  
BLD

0055/17

APPROVED

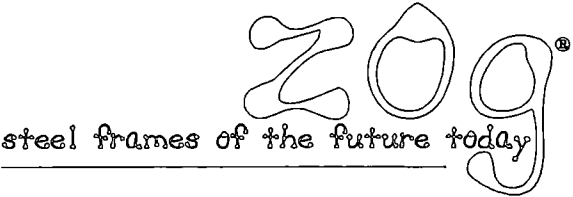


THIS PAGE MUST ONLY BE USED FOR FRAME PLACEMENT  
WALL TYPES: LOAD BEARING MARKED "L", NON-LOAD BEARING MARKED "N"  
ORIENTATION OF FRAMES CAN BE DETERMINED USING BOTTOM PLATE LABELS  
LABELS ON THIS PAGE SHOW DIRECTION THAT BOTTOM PLATE LABEL MUST FACE  
IF BOTTOM PLATE "ZOG" MARK IS FACING PLAN LABEL THEN ORIENTATION IS WRONG

JOB REFERENCE  
5534

# FRAME PLACEMENT

DATE DRAWN 22-06-2016	DRAWN JOSH	VIEW NAME 6 of 6	JOB DETAILS ANG RESIDENCE 44 MILLSTONE LANE WATERFALL PARK, POKENO
DWG FILE Drawing3	SCALE 1:100		

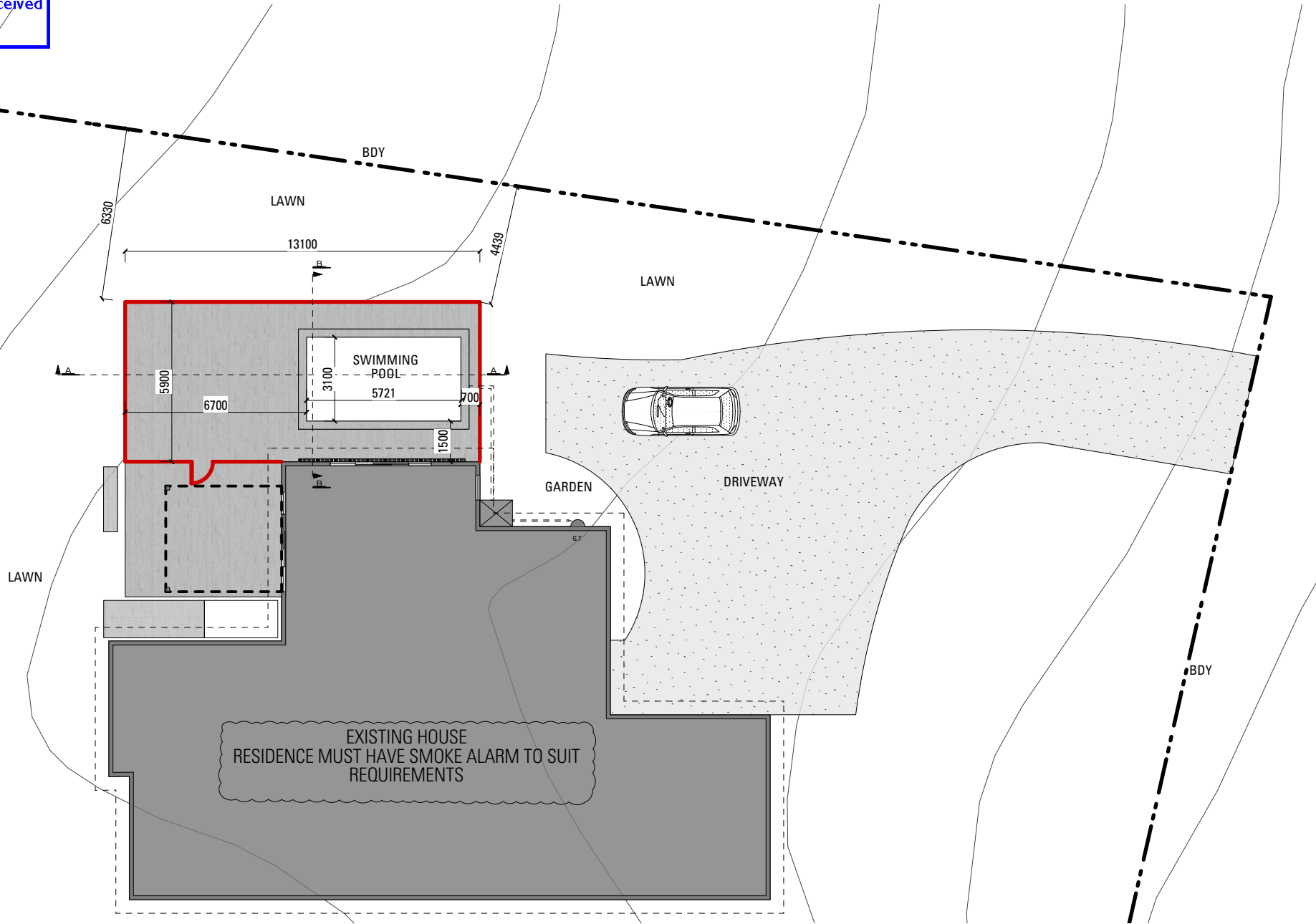


NO MODIFICATIONS TO WALL FRAMES OR ROOF TRUSSES ARE TO BE UNDERTAKEN WITHOUT OBTAINING WRITTEN INSTRUCTION FROM "ZOG" MANUFACTURING



## Certificate of Acceptance (Building Checklist)

Applicant's Name: Stephen John, Kelly and Murray Noel Thompson, Thompson and McWatt		COA No: COA1000/24
Property Address: 44 Millstone Lane POKENO		
<b>Key:</b> <input checked="" type="checkbox"/> or <input type="checkbox"/> P = Pass <input type="checkbox"/> X or <input type="checkbox"/> F = Fail, further inspection required <input type="checkbox"/> I or <input type="checkbox"/> — or <input type="checkbox"/> NA = Not Applicable		
Project Complete <input type="checkbox"/> Yes  Date of Construction: _____ <p style="text-align: center;"><b>OR</b></p> List of work to be finished: pool barrier in place with opening gate , restrictor stays to windows , alarms and locks to doors , work complete , PASS	<b>List of work that was inspected and complies with the Building Code and what clauses (i.e. B1, B2, C1 etc.)</b> B1/ b2/ f4/	
<b>Certificate of Acceptance does not cover:</b>	<b>List building work that could not be inspected:</b>	
<b>Notes for Work Completed</b>  Number of Inspections that would have been required: one		
<b>OUTCOME OF DECISIONS</b>		
<b>Work Completed:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No Further inspection required  Building Inspector: David Wales  Signature: Date:8/09/2023 8:30:00 am	<b>Further Inspection:</b> <input type="checkbox"/> Yes Work completed  Building Inspector: David Wales  Signature: Date:8/09/2023 8:30:00 am	<b>Inspectors Approval of COA:</b> <input type="text" value="Approved"/>  Building Inspector: David Wales  Signature: Date:8/09/2023 8:30:00 am



ADDRESS:  
44 MILLSTONE LANE, POKENO 2471

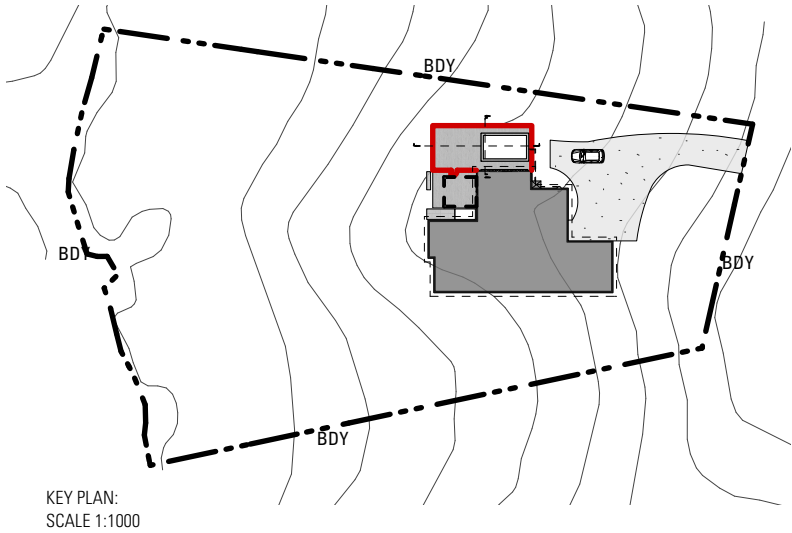
Property No  
2015001

LEGAL DISCRIPTION:  
LOT 10 DP 480134

LANDUSE CODE:  
LIFESSTYLE SINGLE UNIT

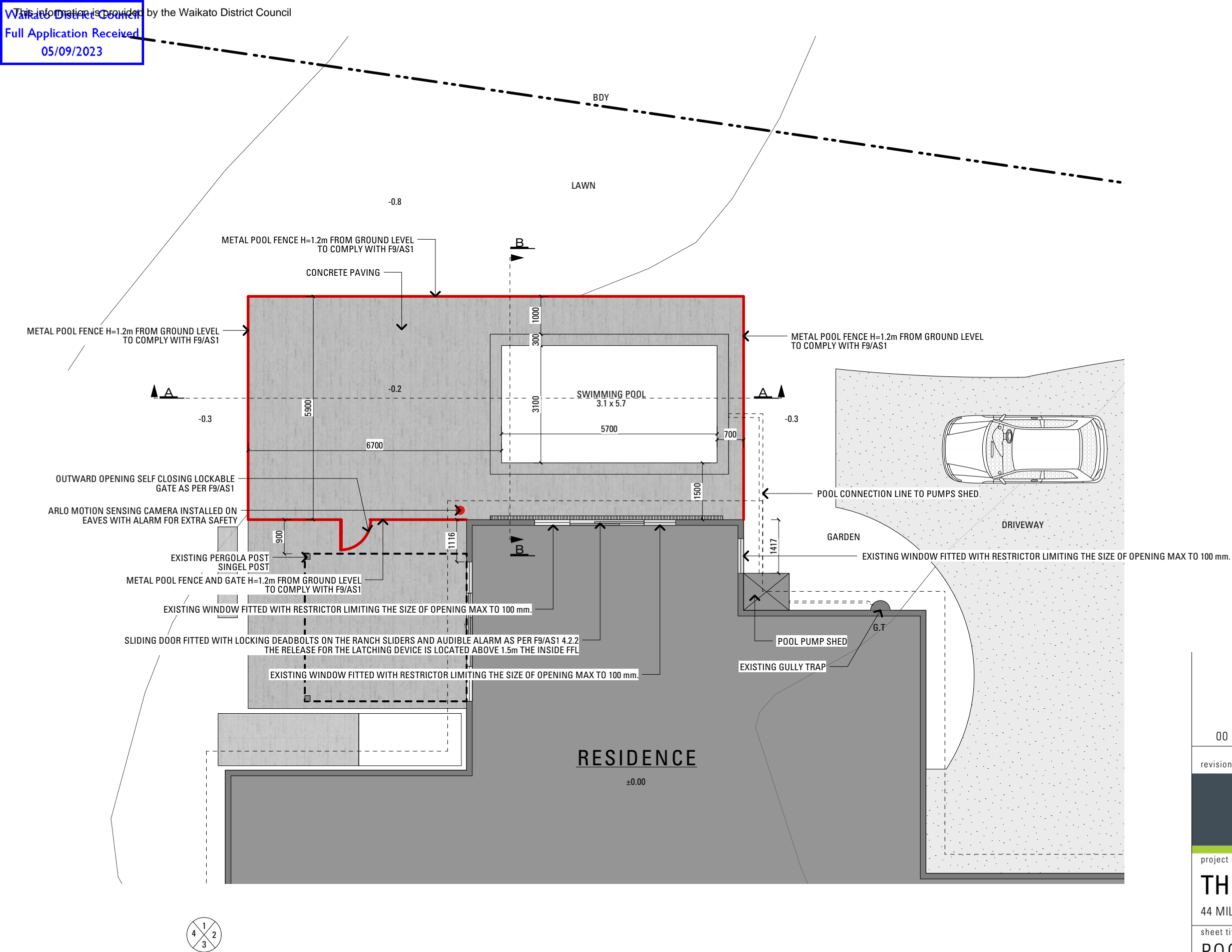
LANDUSE ZONE CODE:  
9A RESIDENTIAL

ZONE:  
LLRZ - Large lot residential zone



00	2023/07/18	
revisions	date	revision details
<div><div></div><div>275 Fitzgerald Rd, Drury 2577 +64 (9) 294 6620 design@luijten.co.nz www.luijten.co.nz</div></div>		
project name and address		
THOMPSON RESIDENCE		
44 MILLSTONE LANE, POKENO		
sheet title		
GENERAL PLAN		
designed	-	
drawn	ZA	
checked	ZA	
scale	1:200 @ A3	
		<div><div></div><div>BUILDING CONSENT C4601 01</div></div>





#### NOTES

- ALL METAL FENCES BY BOUNDARYLINE AS PER PS1 DOCUMENTS
- PROPOSED INGROUND SWIMMING POOL NOT PART OF CONSENT
- BUILDING WALL FORMING PART OF POOL BARRIER, SLIDING DOOR THAT PROVIDE ACCESS INTO THE IMMEDIATE POOL IS FITTED WITH LOCK SYSTEM AND ALARM SYSTEM
- WINDOWS FITTED WITH RESTRICTOR LIMITING THE SIZE OF OPENING MAX TO 100mm

00 2023/07/18

revisions . date revision details



275 Fitzgerald Rd, Drury 2577  
+64 (9) 294 6620  
design@luijten.co.nz  
www.luijten.co.nz

project name and address .

**THOMPSON RESIDENCE**  
44 MILLSTONE LANE, POKENO

sheet title .

**POOL PLAN AND DETAILS**

designed .-  
drawn . ZA  
checked . ZA  
scale .  
1:100 @ A3



BUILDING CONSENT

C4601

02





VIEW FROM THE POOL TOWARD THE HOUSE WALL



ARLO MOTION SENSING CAMERA WITH ALARM SYSTEM

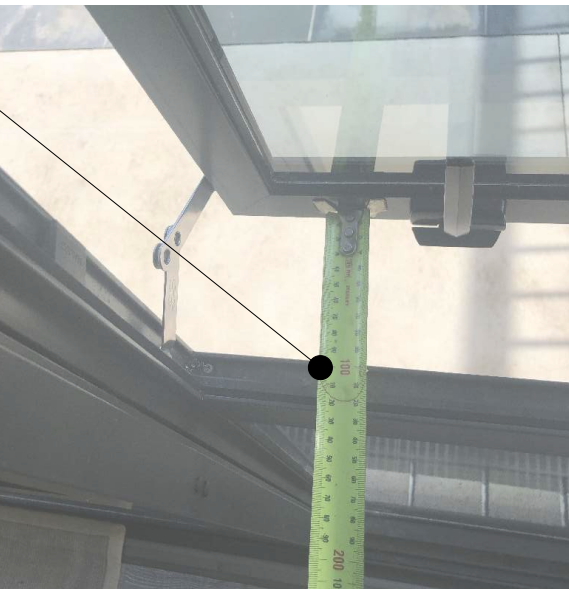
METAL FENCE LINE H=1.2m

SLIDING DOOR FITTED WITH LOCKING DEADBOLTS ON THE RANCH SLIDERS AND AUDIBLE ALARM AS PER F9/AS1 4.2.2  
THE RELEASE FOR THE LATCHING DEVICE IS LOCATED ABOVE 1.5m INSIDE FFL



VIEW FROM INSIDE THE HOUSE

WINDOW FITTED WITH RESTRICTOR LIMITING THE  
SIZE OF OPENING MAX TO 100 mm.



DETAIL OF WINDOW MAX OPENING

**BUILDING WALL FORMING THE POOL BARRIER :**

ALL WORKS TO COMPLY WITH THE BUILDING ACT 2004 NZBC F9

WINDOWS SHALL HAVE A RESTRICTOR LIMITING THE SIZE OF OPENING SUCH THAT A 100MM DIAMETER SPHERE CANNOT PASS THROUGH.

DOORS IN A BUILDING WALL THAT PROVIDE ACCESS INTO THE IMMEDIATE POOL AREA SHALL BE SINGLE LEAF DOORS THAT ARE NOT MORE THAN 1000MM IN WIDTH.

DOORS IN A BUILDIGN WALL PROVIDING ACCESS INTO THE IMMEDIATE POOL AREA SHALL HAVE, SELF CLOSING DEVICE OR AN AUDIBLE ALARM, AND A SELF LATCHING DEVICE THAT AUTOMATICALLY OPERATES ON CLOSING THE DOOR AND THAT MUST BE RELEASED MANUALLY, THAT IS LOCATED NOT LESS THAN 1500MM ABOVE THE INSIDE FLOOR, AND

00 2023/07/18

revisions . date revision details



275 Fitzgerald Rd, Drury 2577  
+64 (9) 294 6620  
design@luijten.co.nz  
www.luijten.co.nz

project name and address .

**THOMPSON RESIDENCE**  
44 MILLSTONE LANE, POKENO

sheet title .

**SITE PHOTOS**

designed .-  
drawn . ZA  
checked . ZA  
scale .  
1:100 @ A3

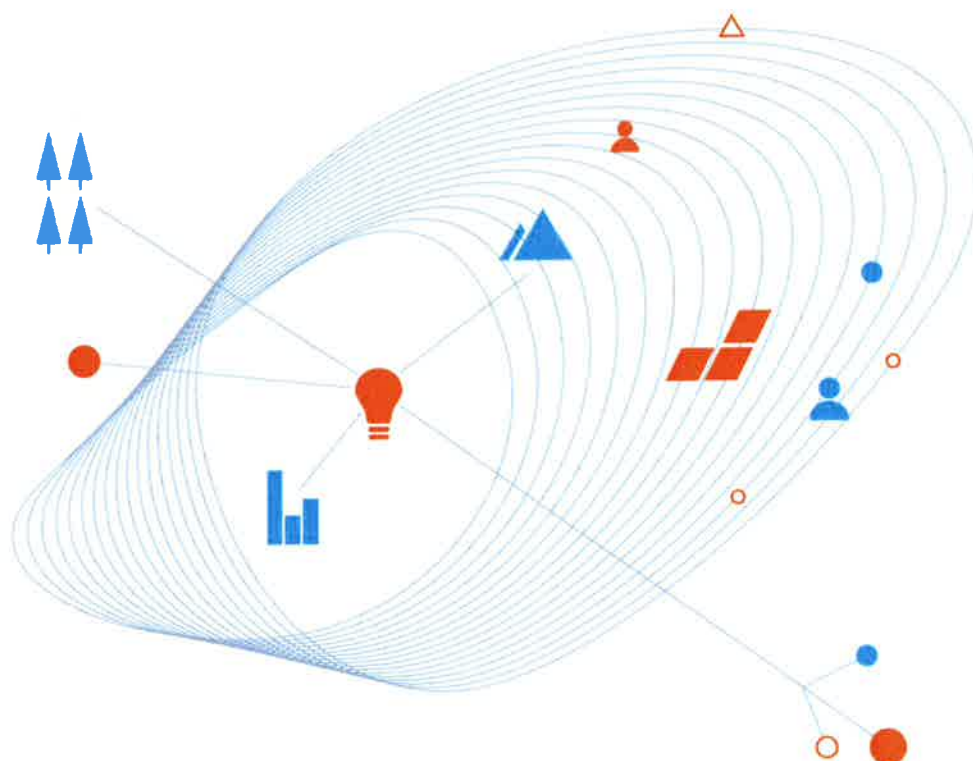
BUILDING CONSENT

C4601

04



Innovation is  
finding answers  
to questions  
no one has  
asked



Pokeno Farms Limited  
Geotechnical Completion Report  
on Waterfall Park, Stage 2A at Market Road, Pokeno  
GENZAUCK14972AD  
7 November 2014



Level 11, 7 City Road  
Grafton Auckland 1010  
PO Box 8261 Symonds Street  
Auckland 1150 New Zealand  
t: +64 9 379 9463  
f: +64 9 307 2654  
coffey.com

7 November 2014

Garry Robertson  
Pokeno Farms Limited  
P.O. Box 101  
Silverdale  
Auckland 0944

**Attention: Mr G Robertson**

Dear Gary

**RE: Geotechnical Completion Report for Pokeno Farms Limited at Waterfall Park, Stage 2A,  
Pokeno**

This report presents all supporting geotechnical data and our Suitability Statement in relation to land development works undertaken at the above location.

It has been prepared in accordance with instructions received from Pokeno Farms Limited and forms part of the documentation required by Waikato District Council to achieve certification under Section 224(c) of the Resource Management Act.

If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact the undersigned.

For and on behalf of Coffey

A handwritten signature in blue ink, appearing to read "S.G. Lander".

**S.G. Lander**

Principal Geotechnical Engineer

Distribution:	AR Civil Consulting Limited	1 Copy
	Pokeno Farms Limited	1 Copy
	Waikato District Council	3 Copies
	Original held by Coffey Geotechnics (NZ) Limited	

**Coffey Geotechnics (NZ) Limited**  
GENZAUCK14972AD  
7 November 2014

## CONTENTS

<b>1</b>	<b>INTRODUCTION AND DESCRIPTION OF SUBDIVISION</b>	<b>1</b>
<b>2</b>	<b>RELATED REPORTS</b>	<b>1</b>
<b>3</b>	<b>EARTHWORKS OPERATIONS</b>	<b>1</b>
<b>3.1</b>	<b>Plant</b>	<b>1</b>
<b>3.2</b>	<b>Construction Programme</b>	<b>2</b>
<b>4</b>	<b>QUALITY ASSURANCE AND CONTROLS</b>	<b>2</b>
<b>4.1</b>	<b>Inspections</b>	<b>2</b>
<b>4.2</b>	<b>Quality Control Criteria</b>	<b>2</b>
<b>4.3</b>	<b>Quality Assurance Testing</b>	<b>3</b>
<b>4.3.1</b>	<b>Compaction</b>	<b>3</b>
<b>5</b>	<b>PROJECT EVALUATION</b>	<b>3</b>
<b>5.1</b>	<b>Bearing Capacity and Settlement of Building Foundations</b>	<b>3</b>
<b>5.2</b>	<b>Expansive Soils</b>	<b>3</b>
<b>5.3</b>	<b>Lot Gradients</b>	<b>4</b>
<b>5.4</b>	<b>Fill Induced Settlement</b>	<b>4</b>
<b>5.5</b>	<b>Vegetation Cover</b>	<b>4</b>
<b>5.6</b>	<b>Stormwater Controls</b>	<b>4</b>
<b>5.7</b>	<b>Service Trenches</b>	<b>4</b>
<b>5.8</b>	<b>Topsoil</b>	<b>5</b>
<b>5.9</b>	<b>Contractor's Work</b>	<b>5</b>
<b>6</b>	<b>OPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT</b>	<b>5</b>

### Important Information About Your Coffey Report

#### Tables

Table 1: AR Civil Consulting Limited As-Built Plans

Table 2: Suitability Statement Summary

#### Appendices

Appendix 1: AR Civil Consulting Limited As-Built Plans

Appendix 2: Classification Test Data

Appendix 3: Field Density Test Summary Sheets

Appendix 4: CSIRO Guide to Home Owners on Foundation Maintenance and Footing Performance  
(Sheet No. 10-91)



Geotechnical Completion Report  
(This report must be read and / or reproduced in its entirety)

## 1 INTRODUCTION AND DESCRIPTION OF SUBDIVISION

This Geotechnical Completion Report (GCR) has been prepared for Pokeno Farms Limited as part of the documentation required to be submitted to Waikato District Council for subdivisional development.

It contains our Suitability Statement, relevant test data and the AR Civil Consulting Limited (HGCL) as-built plan set relating to Stage 2A of the Waterfall Park Residential Subdivision as follows:

**Table 1: AR Civil Consulting Limited As-Built Plans**

Title	Reference No.	Date
Earthworks As-Built (sheet 1)	AR-35-07-01-901 (Rev A)	October 2014
Earthworks As-Built (sheet 2)	AR-35-07-01-902 (Rev A)	October 2014
Water Supply & Stormwater As-Built Plan (sheet 1)	AR-35-07-01-911 (Rev A)	October 2014
Water Supply & Stormwater As-Built (sheet 2)	AR-35-07-01-912 (Rev A)	October 2014
Stormwater As-Built Plan (sheet 1)	AR-35-07-01-921 (Rev A)	October 2014
Stormwater As-Built Plan (sheet 2)	AR-35-07-01-922 (Rev A)	October 2014
As-Built Cut & Fill Plan (sheet 1)	AR-35-07-01-931 (Rev A)	October 2014
As-Built Cut & Fill Plan (sheet 2)	AR-35-07-01-932 (Rev A)	October 2014

This report covers the construction period February 2011 to October 2014. It is intended to be used for certification purposes for:

- 5 residential lots numbered 6, 7 and 9 to 11,
- 1 new road.

This stage of the subdivision is located at Market Road, Pokeno and as can be seen on the fill as-built plan, three of the lots have been partly affected by minor filling, to a maximum depth of approximately 1 metre. It should be noted that proposed Lot 8 will contain existing dwelling, and as such this GCR does not extend to lot 8.

## 2 RELATED REPORTS

A Geotechnical Investigation Report (GIR) on the subject land was prepared by this Consultancy reference GENZNEWP14972, dated 14 October 2011. The conclusions and recommendations of that report have been reviewed during the preparation of this document.

## 3 EARTHWORKS OPERATIONS

### 3.1 Plant

The main items of plant used by the Contractor, Twomey Construction Limited were:

- 2 x Caterpillar Excavator;
- 1 x Steel Drum Vibrating Roller;
- 1 x Caterpillar Grader;



#### Geotechnical Completion Report

(This report must be read and / or reproduced in its entirety)

- 1 x Caterpillar Bulldozer;
- 1 x Caterpillar Pad Foot Vibrating Compactor

### 3.2 Construction Programme

Construction commenced in early August 2014 with the formation of a silt pond near the entrance to the site. Shortly after the silt pond became functional topsoil was stripped from within the footprint of the proposed Private Accessway (road). During this time the watercourse below the silt pond was mucked out so a new culvert/road crossing could be formed. Dynamic cone penetrometer testing was conducted by the contractor within the invert of the watercourse and based on the test results a 600mm undercut (with hardfill replacement) was performed prior to the installation of the culvert pipes.

Earthworks operations commenced shortly after the installation of the culvert /road crossing. The earthworks primarily involved minor cuts and fills to form the road for Lots 6 to 11. By mid-September 2014 earthworks operations to form the accessway was complete and basecourse hardfill was placed over the road subgrade.

At this time site service installation such as power, telecoms and water commenced. Lot entrances, an edge beam and kerb were also formed during the service installations. In conjunction with these works the existing (old) culvert road crossing was uplifted and the surrounding watercourse was stripped of soft alluvial deposits so that a new outlet structure could be formed.

By mid-October 2014 accessway formation and site service installations were complete and the accessways were sealed.

## 4 QUALITY ASSURANCE AND CONTROLS

### 4.1 Inspections

During the earthworks engineering inspections were undertaken on a regular basis to assess compliance with NZS 4431 and project specific recommendations and specifications. Project specific inspections were required on this stage of the development for:

- Removal of topsoil, prior to cutting and filling

### 4.2 Quality Control Criteria

Due to the variable nature of the soils types being used as filling, the compaction control criteria of minimum allowable shear strengths and maximum allowable air voids were used for quality assurance purposes.

Geotechnical Completion Report  
(This report must be read and / or reproduced in its entirety)

Specification details for Stage 2A are as follows:

Minimum Shear Strength and Maximum Air Voids Method

(a) Air Voids Percentage

(As defined in NZS 4402)

General Fill

Average value less than 10%

Maximum single value 12%

(b) Undrained Shear Strength

(Measured by Pilcon shear vane - calibrated using NZGS 2001 method)

General fill

Average value not less than 140 kPa

Minimum single value 110 kPa

Note: The average value shall be determined over any ten consecutive tests

## 4.3 Quality Assurance Testing

### 4.3.1 Compaction

Regular insitu density, strength and water content tests were carried out on all areas of the filling at or in excess of the frequency recommended by NZS 4431. A series of hand auger boreholes were also drilled at selected locations as an added check on quality control.

## 5 PROJECT EVALUATION

### 5.1 Bearing Capacity and Settlement of Building Foundations

Following the completion of earthworks operations, we returned to the site on 13 October 2014 and drilled a series of hand auger boreholes at appropriate natural ground locations in order to determine representative ground conditions over the site. The results of our borehole investigation, compaction control testing and site observations have been used in our evaluation of likely foundation options for future building development.

At current subgrade levels all filled and undisturbed natural ground has a geotechnical ultimate bearing capacity of 300 kPa within the influence of conventional shallow residential building foundation loads.

It should be noted that NZS 3604 only allows a maximum backfill depth of 600mm over the building platform of a dwelling unless an Engineering design solution is proposed, on account of the risk of induced consolidation of the subsoils caused by the weight of the backfill.

### 5.2 Expansive Soils

Two sets of expansive soil tests were carried out on samples selected from around the proposed development area and within the zone of likely influence of shallow building foundations.

#### Geotechnical Completion Report

(This report must be read and / or reproduced in its entirety)

The expansive soil tests were carried out in accordance with NZS 4402, "Methods of Testing Soils for Civil Engineering Purposes" test section 2 and the shrink-swell index tests were carried out in accordance with AS1289, "Methods of Testing Soils for Engineering Purposes" test method 7.1.1 and were primarily intended to assess the Expansive Classes of the site materials as defined in AS 2870:2011, "Residential Slabs and Footings – Construction".

The AS 2870:2011 Site Class for this subdivision is H1.

Specific design alternatives for this Site Class are presented in the Suitability Statement, and the CSIRO "Guide to Home Owners on Foundation Maintenance and Footing Performance" Sheet No. 10-91 is appended for further information.

### 5.3 Lot Gradients

The appended As Built Finished Contour Plan shows some areas within the development having gradients steeper than 1 in 4. The extent of these areas has been determined by as-built site gradients. Slope gradients steeper 1 in 4 are generally located on the western boundaries of Lots 6 and 11, we are satisfied that these areas are subject not to the hazard described in Section 71(3) of the Building Act. Details of resulting building and earthworks restrictions in the vicinity of these areas are presented in the suitability statement.

### 5.4 Fill Induced Settlement

As a result of our pre-fill inspections and quality control testing and relatively minor depths of fill placed, we are of the opinion that induced differential settlements beneath or within the certified filling due to its imposed weight should be insignificant with respect to conventional NZS 3604 residential building development that incorporates specific foundation and associated structural design on account of the expansive site soil class.

### 5.5 Vegetation Cover

Wherever practical on sloping land beyond building platform areas all grass cover should be maintained and even supplemented with new plantings.

The contribution of appropriate vegetation cover to overall site stability and erosion control should not be underestimated.

### 5.6 Stormwater Controls

It is important on all sloping lots that due care is paid to the design and construction of appropriate stormwater disposal systems. These systems should serve to collect all runoff from roofs, decks and paved areas, together with discharges from retaining wall drains and other subsoil drains and should connect directly into the public stormwater drainage network.

Uncontrolled stormwater discharges onto the ground surface or into soakage pits can cause erosion, scour and/or instability on sloping land and should not be permitted under any circumstances.

### 5.7 Service Trenches

As is normal on all subdivisions, building developments involving foundations within a 45 degree zone of influence from pipe inverts will require Engineering input.

Geotechnical Completion Report  
(This report must be read and / or reproduced in its entirety)

## 5.8 Topsoil

Topsoil depths in likely building platform areas were checked by the drilling of a borehole in the approximate centre of each of the lots. Our findings, which are indicative only and subject to variation at other locations, show that likely topsoil depths are between 200 mm and 250mm.

Site specific findings are presented in the Suitability Statement Summary.

## 5.9 Contractor's Work

We have relied on the Contractor's work practices and assume that the works have been carried out in accordance with:

- (i) The approved Contract drawings and design details,
- (ii) The approved Contract specifications,
- (iii) Authorised Variations to (i) and (ii) during the execution of the works,
- (iv) The conditions of Resource, Earthworks and Building Consents where applicable,
- (v) The relevant Coffey Geotechnics reports, recommendations and site instructions,

and that all as-built information and other details provided to the Client and/or Coffey Geotechnics are accurate and correct in all respects.

## 6 OPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT

I, S.G. Lander, of Coffey Geotechnics (NZ) Limited, Auckland, hereby confirm that:

1. I am a Chartered Professional Engineer experienced in the field of geotechnical engineering as defined in section 1.2.3 of NZS 4404 and was retained by the Developer as the Geotechnical Engineer on Stage 2A of the Waterfall Park residential subdivision, Pokeno.
2. The extent of preliminary investigations carried out to date are described in GIR number GENZNEWP14972, dated 14 October 2011, and the conclusions and recommendations of that document have been re-evaluated in the preparation of this report. Details of the results of all tests carried out are appended.
3. In my professional opinion, not to be construed as a guarantee, I consider that:
  - (a) The earth fills shown on the appended Cut-Fill as-built plan have been placed in compliance with NZS 4431 and related documents.
  - (b) The completed earthworks give due regard to land slope and foundation stability considerations within the residential lots, but as shown on the appended contour as-built plan localised areas within Lots 6 and 11 either have gradients steeper than 1 in 4 or are adjacent to land having such gradients.

No building construction and no earthworks which increases the slope angle or surcharge loading should take place anywhere within the areas demarcated as steeper than 1 in 4 on these lots or elsewhere if similar gradients exist unless endorsed by a Chartered Professional Engineer experienced in geomechanics, as such operations may, in certain circumstances, have

Geotechnical Completion Report

(This report must be read and / or reproduced in its entirety)

detrimental effects on overall site stability. Depending on the building design proposals this may require geotechnical investigations. As a minimum lateral loads from soil creep should be addressed.

- (c) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for foundation design on all lots.

Where a geotechnical bearing capacity greater than 300 kPa is required, (ie. outside the limits of NZS 3604, such as when piling is undertaken), further specific site investigation and design of foundations should be carried out prior to building consent application.

- (d) The backfilling and compaction of the stormwater and sanitary sewer trenches on this subdivision has where possible been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

Nevertheless, no building development should take place within the 45 degree zone of influence of drain inverts unless endorsed by specific site investigations, foundation designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that lateral stability and differential settlement issues are addressed and that building loads are transferred beyond the influence of the pipe and beyond the extent of the trench backfill.

- (e) The assessed AS 2870:2011 expansive site Class for all lots is H1 (high).

Subject to the geotechnical recommendations and expansive soil assessment associated with 3(b), 3(c), 3(d) and 3(e) above:

- (ii) The filled and original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 (that incorporates specific foundation and associated structural design on account of the expansive soils site class) and related documents.
- (iii) On all lots foundation design may be carried out in accordance with AS 2870:2011 (Class H1) or alternatively, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 900mm for NZS3604 type strip and pad foundations.

For buildings having brittle exterior cladding appropriate control joints should also be specifically designed, unless mitigated by Architectural specifications and / or the structural design.

- (iii) The subject lots are suitable for on-site effluent disposal. Until such time as public sanitary sewer reticulation is made available (if ever), a proprietary on-site effluent treatment system must be installed and maintained on each lot and should incorporate sufficient primary and secondary pre-treatments discharging via dripper line irrigation. Due regard should be given to slopes having gradients steeper than 1(v) in 4(h) and to any overland flow paths.

Minimum system requirements must comply with Waikato District Council, Waikato Regional Plan (2007), Section 3 – Water Module, subsection 3.5.7.5 Permitted Activity Rule – Discharge of Domestic Sewage From new On-Site Systems.

Geotechnical Completion Report

(This report must be read and / or reproduced in its entirety)

Each system will require specific design commensurate with each building proposal at building consent stage. Maintenance of the proprietary systems must be undertaken as specified by the suppliers.

Based on local knowledge, we have classified the soils on this stage of the subdivision as being category 5 to 6 as defined in Table 5.1 of TP58.

- (f) Road subgrades and lot accessway subgrades have been formed having due regard for slope stability and settlement, although CBR values do vary between natural and filled ground as is to be expected.

The as-built plans and the Professional Opinion contained in this report are furnished to the Council and Pokeno Farms Limited for their purposes alone, with respect to the particular brief given to us. It may not be relied upon in any other context or for any other purpose without our prior review and agreement. It does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any dwelling.

The appended table summarises the status of each residential lot covered by this suitability statement.

For and on behalf of Coffey

Prepared By:



**R. Berry**

Senior Engineering Geologist

Authorised By:



**S.G. Lander**

Principal Geotechnical Engineer  
MIPENZ, CPEng

## Geotechnical Completion Report

(This report must be read and / or reproduced in its entirety)

**TABLE 2: SUITABILITY STATEMENT SUMMARY**

<b>Lot No.</b>	<b>Comments</b>	<b>Topsoil Depth (mm)</b>	<b>Ultimate Bearing (kPa)</b>	<b>AS2870 Class</b>
<b>6</b>	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h).  Elsewhere, AS 2870 foundation design or alternatively, a specific foundation and structural design by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 900mm for NZS3604 type strip and pad foundations.	200	300	H1
<b>7</b>	AS 2870 foundation design or alternatively, a specific foundation and structural design by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 900mm for NZS3604 type strip and pad foundations.	250	300	H1
<b>9</b>	AS 2870 foundation design or alternatively, a specific foundation and structural design by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 900mm for NZS3604 type strip and pad foundations.	250	300	H1
<b>10</b>	AS 2870 foundation design or alternatively, a specific foundation and structural design by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 900mm for NZS3604 type strip and pad foundations.	200	300	H1
<b>11</b>	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h).  Elsewhere, AS 2870 foundation design or alternatively, a specific foundation and structural design by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 900mm for NZS3604 type strip and pad foundations.	250	300	H1



## Important information about your Coffey Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

### **Your report is based on project specific criteria**

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

### **Subsurface conditions can change**

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

### **Interpretation of factual data**

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time.

The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

### **Your report will only give preliminary recommendations**

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

### **Your report is prepared for specific purposes and persons**

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

**Coffey Geotechnics (NZ) Limited**





## Important information about your Coffey Report

### **Interpretation by other design professionals**

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

### **Data should not be separated from the report**

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

### **Geoenvironmental concerns are not at issue**

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks.

If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

### **Rely on Coffey for additional assistance**

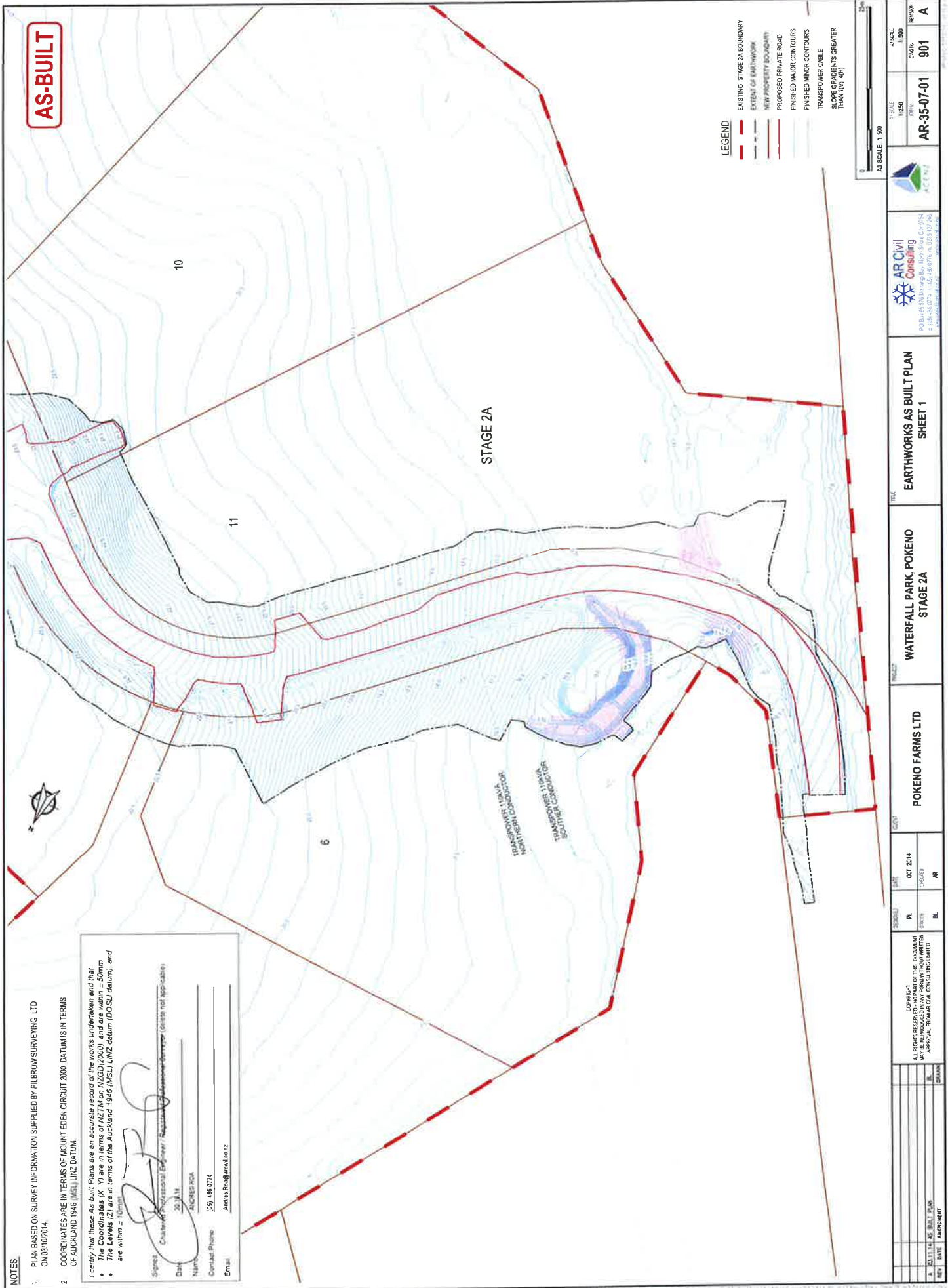
Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

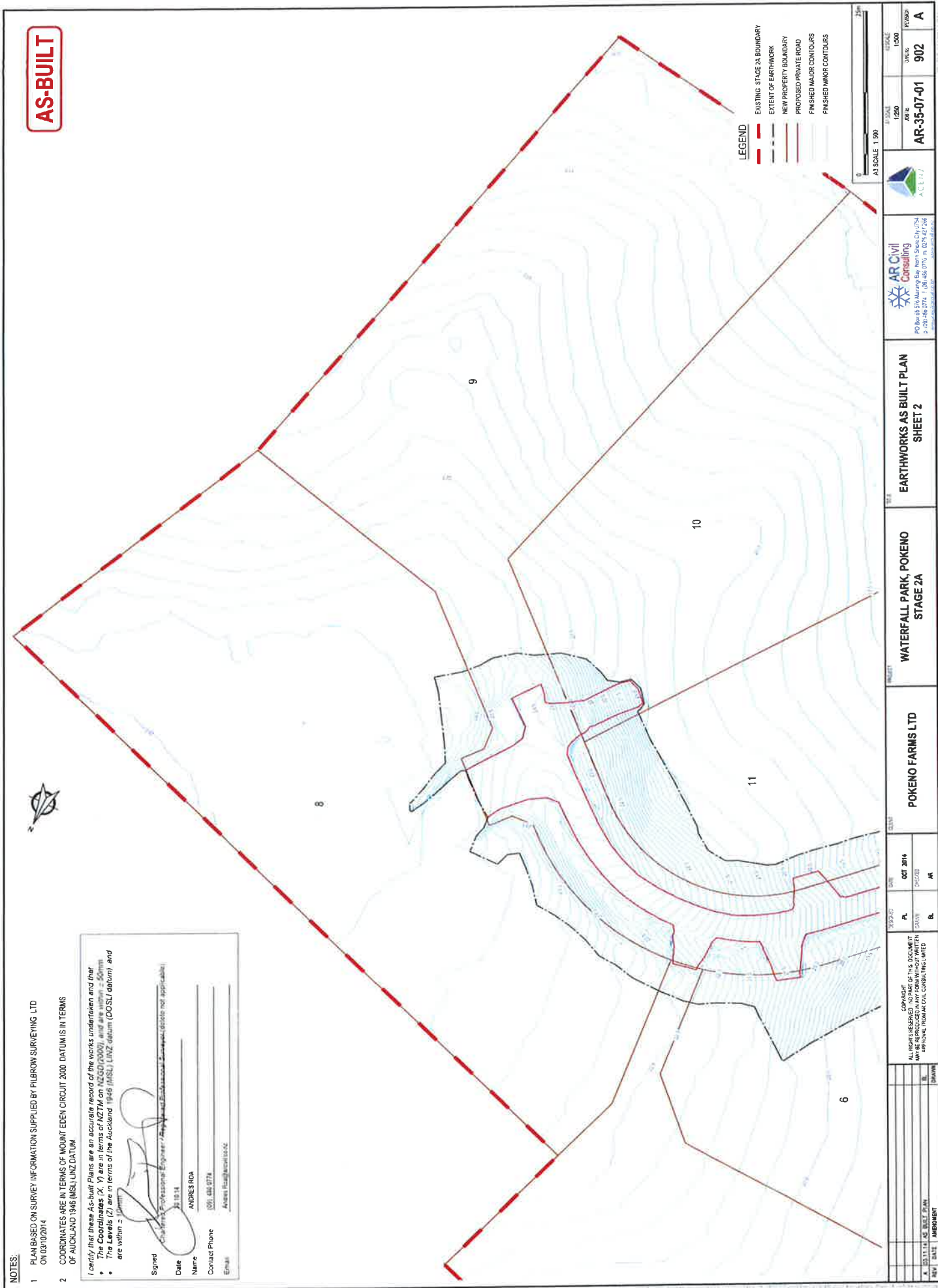
### **Responsibility**

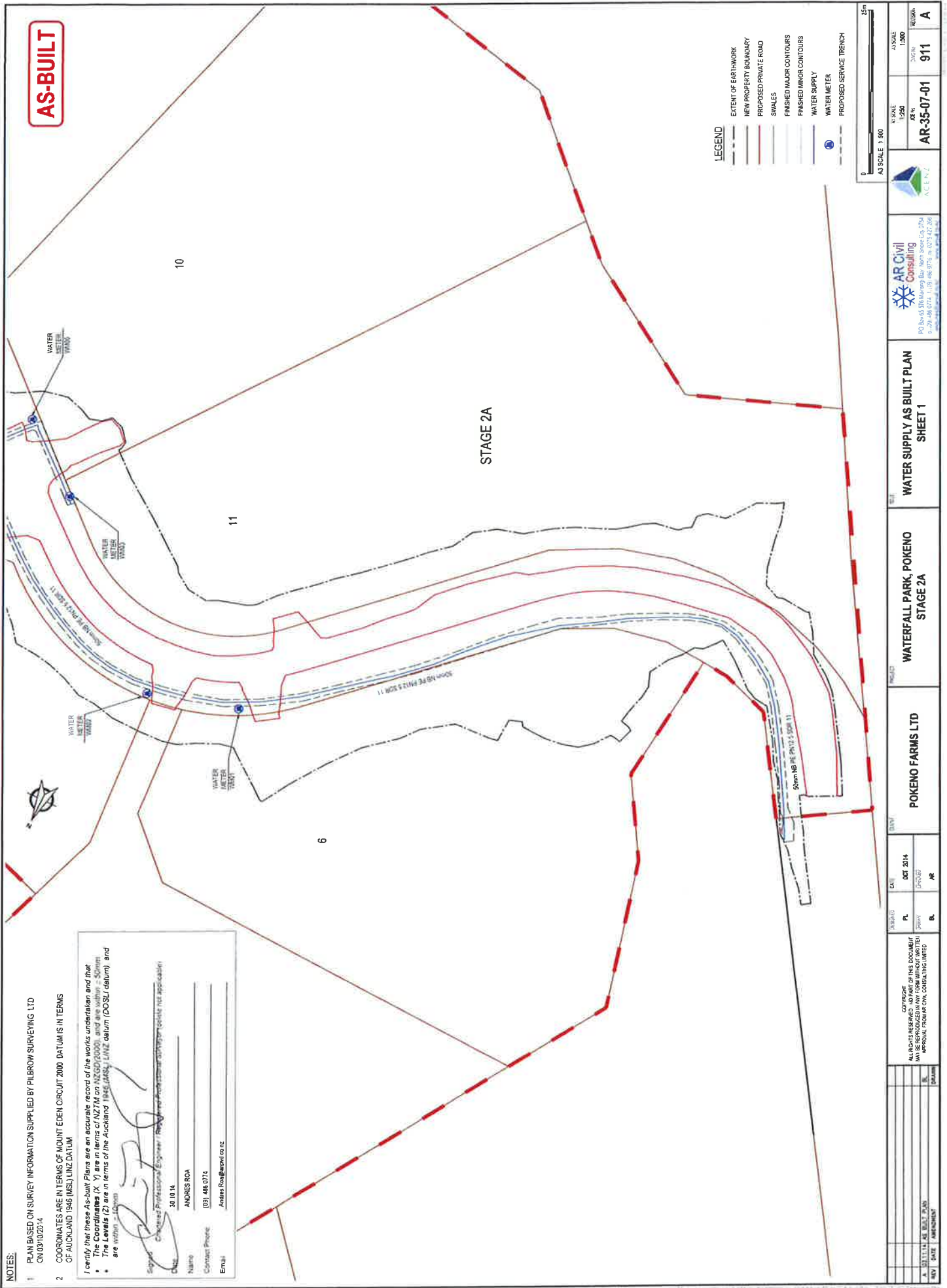
Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

# Appendix 1

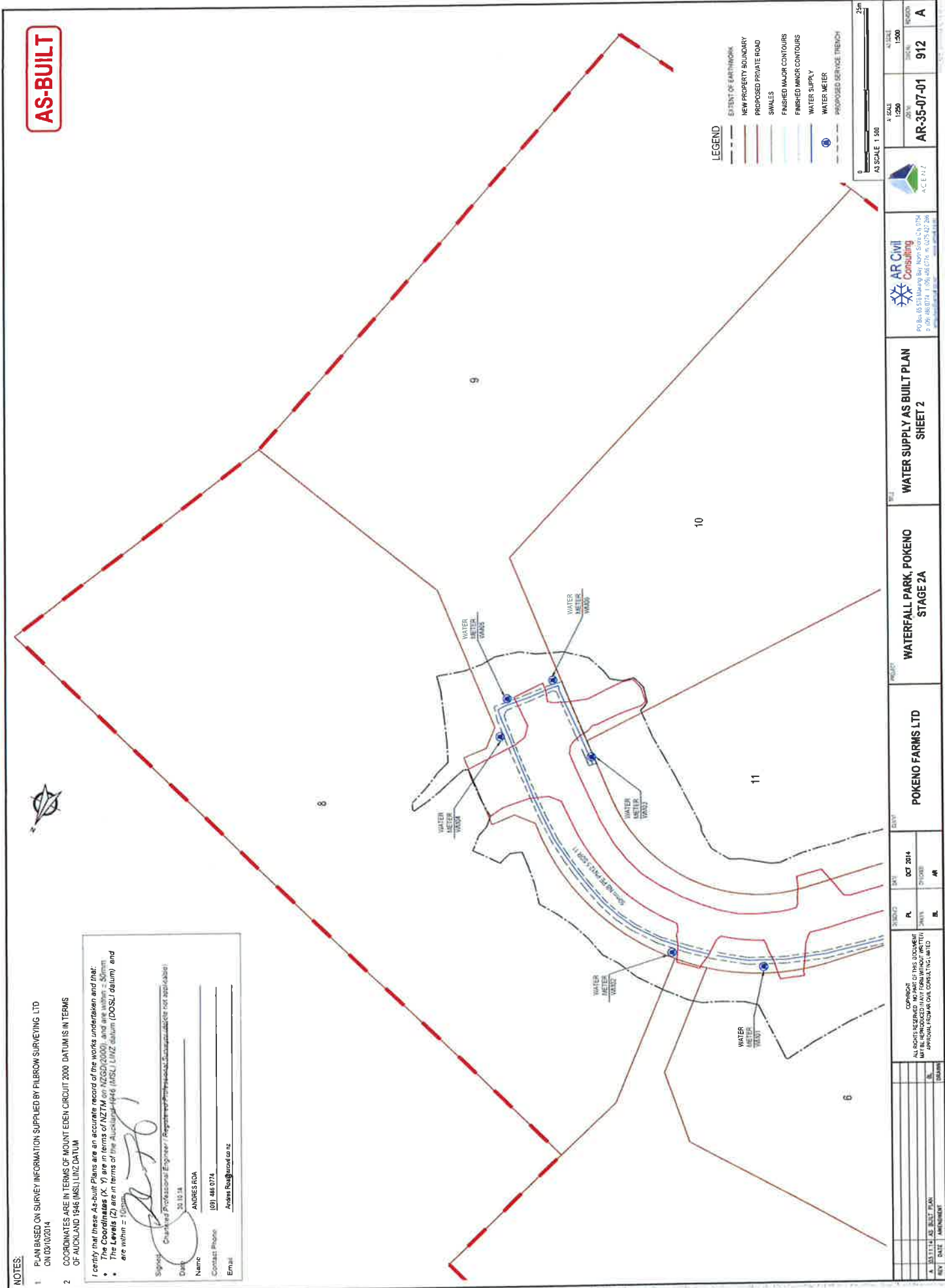
**AR Civil Consulting Limited  
As-Built Plans**

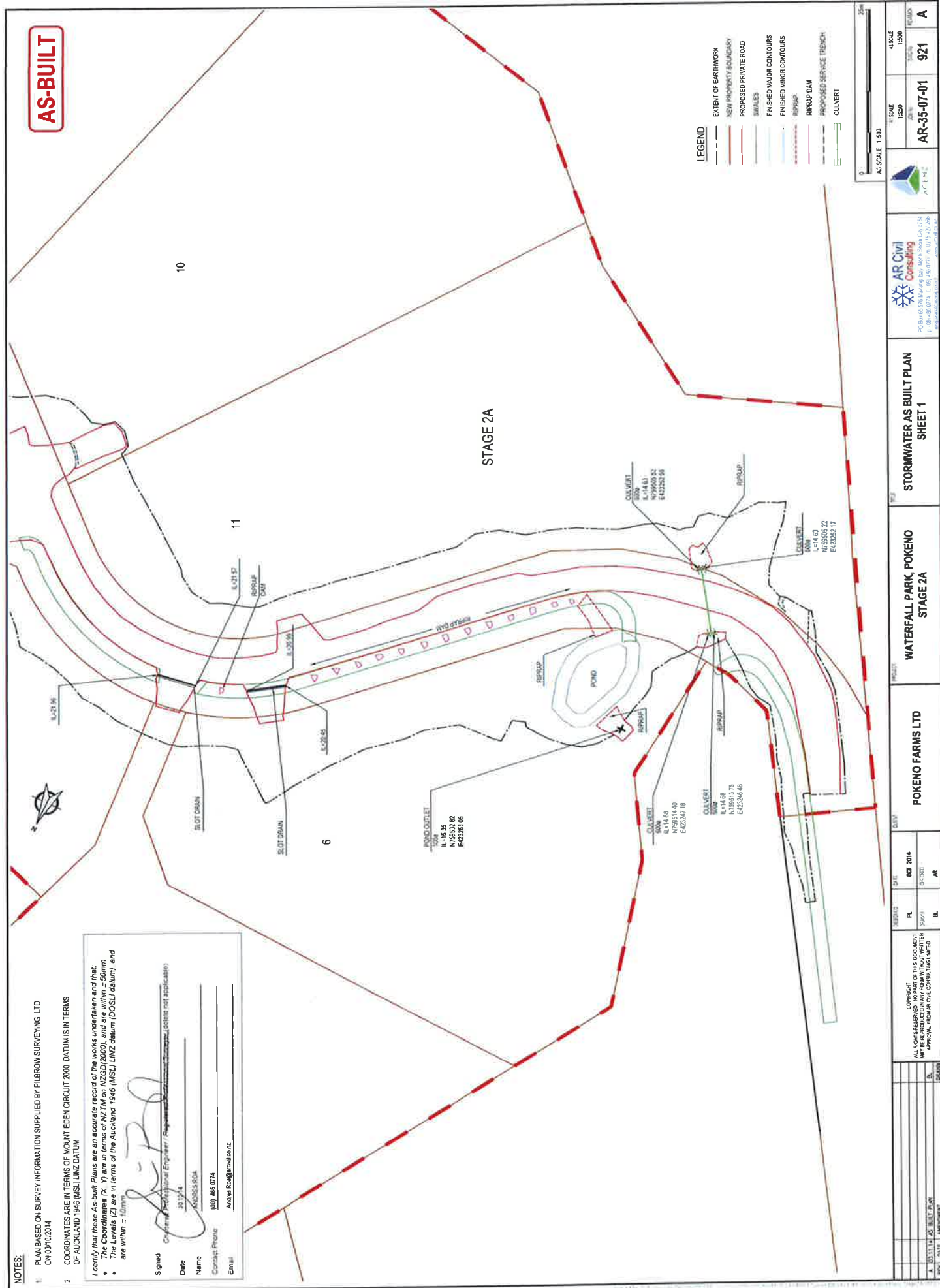


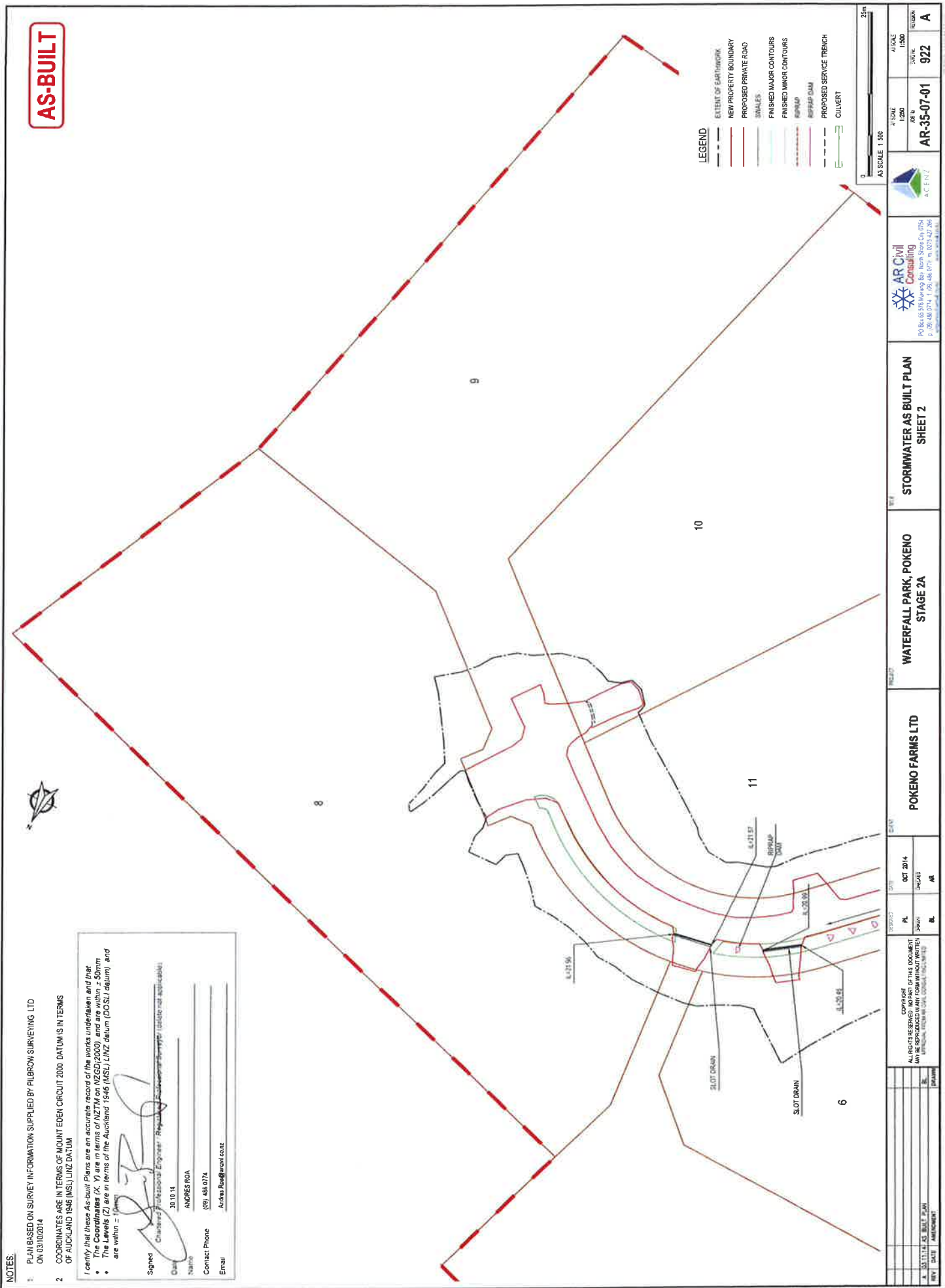






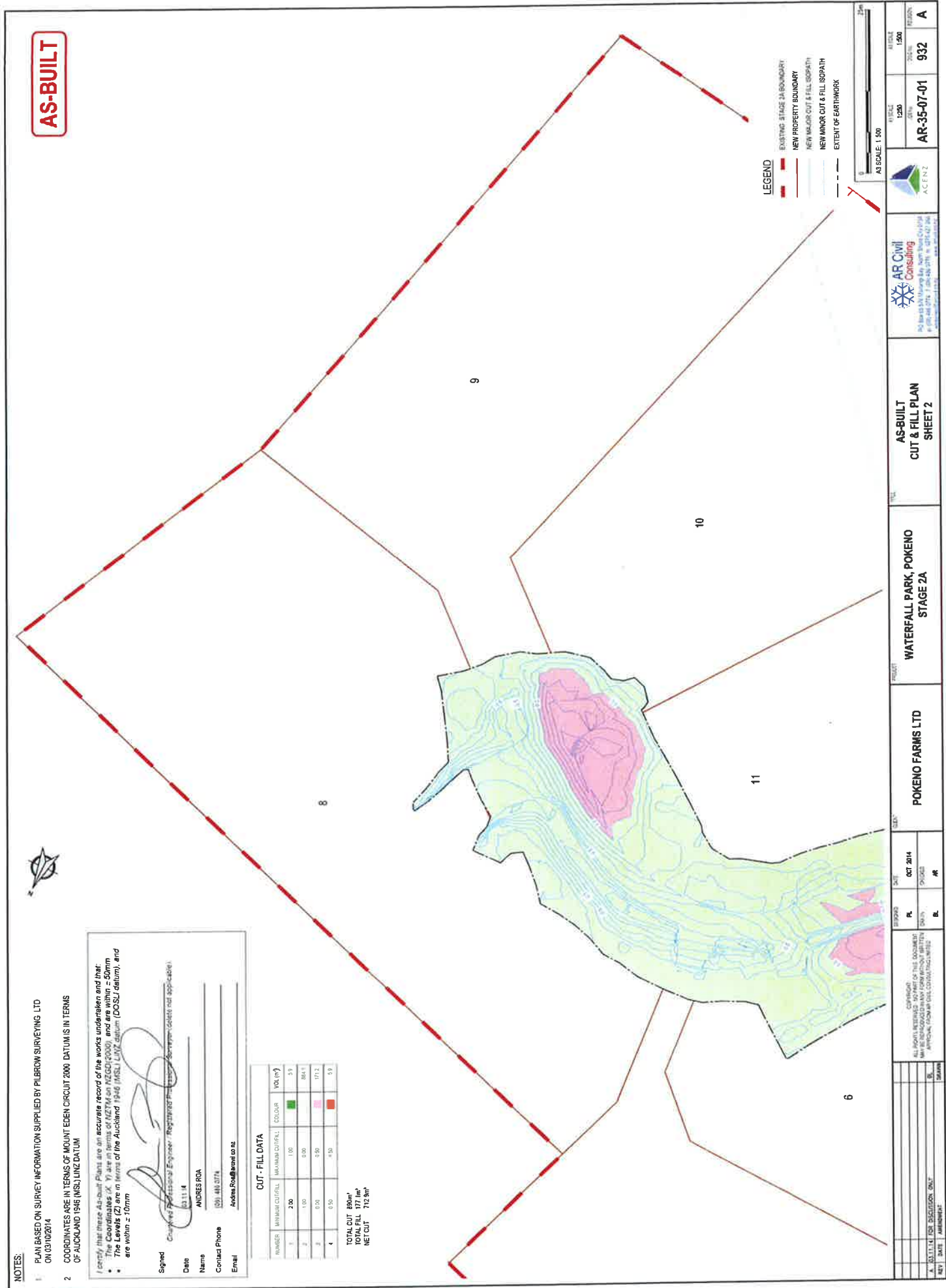












# Appendix 2

## **Classification Test Data**

This report may only be reproduced in full

Work Order ETAM14W03116

Page 1 of 1

**CLASSIFICATION TEST RESULTS**

Test Methods: NZS 4402:1986 Tests 2.1, 2.2, 2.3, 2.4, 2.6



Tests / comments  
indicated \* are  
outside the scope of  
the laboratory's  
accreditation

J. McKelvey Approved Signatory

JOB NO

GENZETAM00857AA

PROJECT

Waterfall Park Stage 2A

McGills Road, Pokeno

CLIENT

Coffey Geotechnics NZ Ltd, Auckland

CLIENT REF

GENZAUCK14972AD

BOREHOLE NO

Lot 7, HA2, 0.3 - 0.7m

LAB SAMPLE ID

ETAM14S-05832

Prepared from 'As Received' Natural Water Content of 47.1 %

Tests on fraction passing 0.425mm sieve

Liquid Limit 110

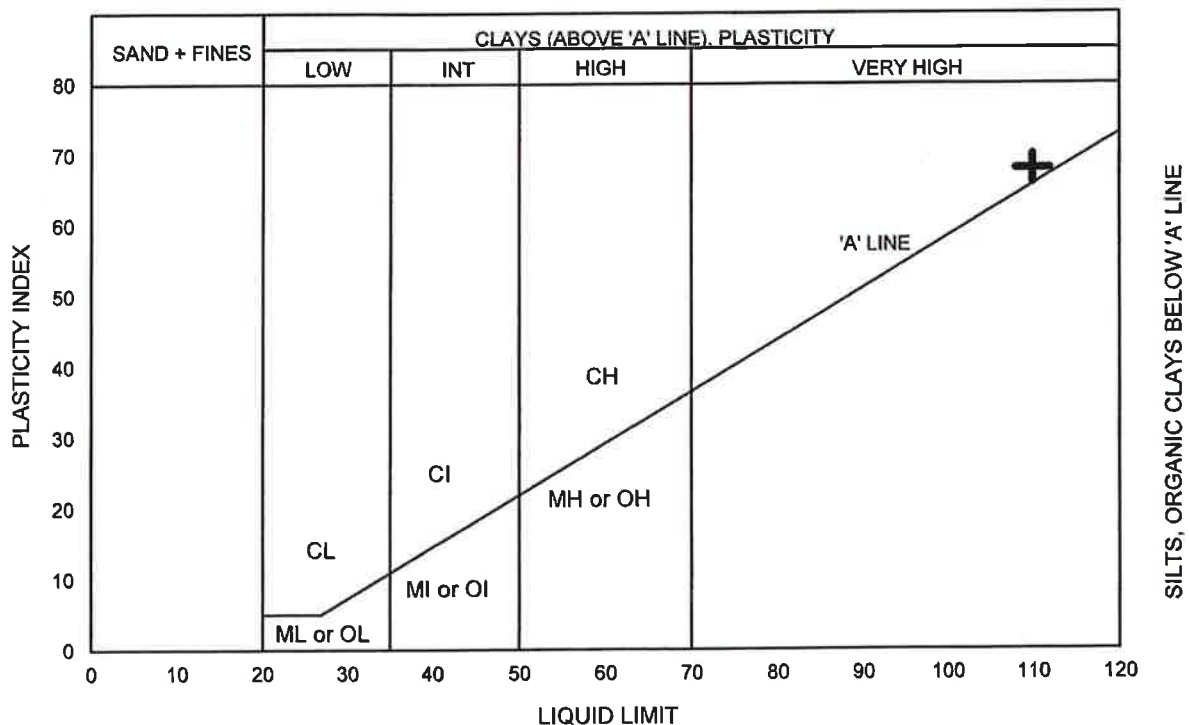
Plastic Limit 42

Plasticity Index 68

\*Liquidity Index (w-PL)/PI 0.1

Linear Shrinkage 24

CASAGRANDE PLASTICITY CHART



East Tamaki Laboratory  
Coffey Geotechnics NZ Limited  
144A Cryers Road, East Tamaki, Auckland NZ 2013  
PO Box 58877, Botany, Auckland NZ 2163  
Phone: +64 9 272 3375, Fax: +64 9 272 3378  
www.coffey.com

DATE

17.10.14

CHECKED

Jm

Limits.L1190312

## CLASSIFICATION TEST RESULTS

Test Methods: NZS 4402:1986 Tests 2.1, 2.2, 2.3, 2.4, 2.6



Tests / comments  
indicated \* are  
outside the scope of  
the laboratory's  
accreditation

J. McKelvey Approved Signatory

JOB NO  
PROJECT

GENZETAM00857AA  
Waterfall Park Stage 2A  
McGills Road, Pokeno

CLIENT  
CLIENT REF

Coffey Geotechnics NZ Ltd, Auckland  
GENZAUCK14972AD

BOREHOLE NO

Lot 9, HA3, 0.3 - 0.7m

LAB SAMPLE ID

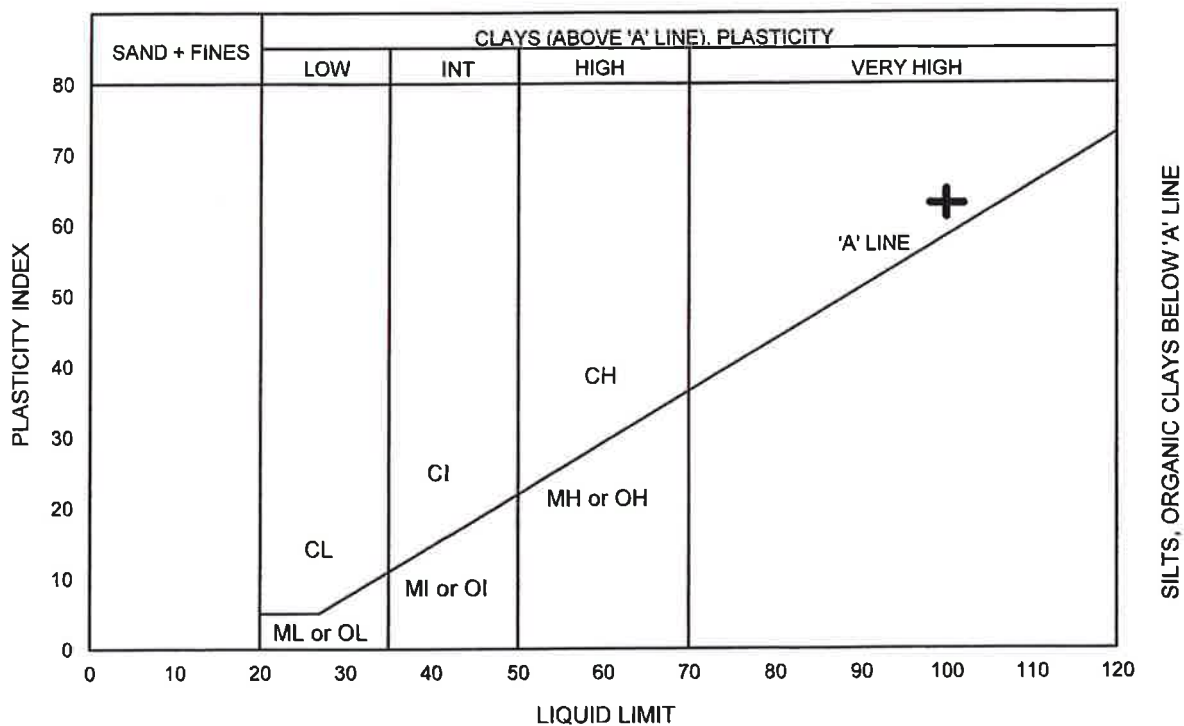
ETAM14S-05833

Prepared from 'As Received' Natural Water Content of 40.4 %

Tests on fraction passing 0.425mm sieve

Liquid Limit	100
Plastic Limit	37
Plasticity Index	63
*Liquidity Index (w-PL)/PI	0.1
Linear Shrinkage	22

CASAGRANDE PLASTICITY CHART



East Tamaki Laboratory  
Coffey Geotechnics NZ Limited  
144A Cryers Road, East Tamaki, Auckland NZ 2013  
PO Box 58877, Botany, Auckland NZ 2163  
Phone: +64 9 272 3375, Fax: +64 9 272 3378  
www.coffey.com

DATE 17.10.14

CHECKED JM

Limit14190312

# Appendix 3

## Field Density Test Summary Sheets



PROJECT NAME: GENZAUCK14972AD- Waterfall Park Stage 2  
ATTENTION : Ray Berry  
CLIENT: Coffey Geotechnics NZ Ltd

PROJECT CODE: GENZETAMD0857AA-00  
CLIENT ADDRESS: PO Box 8261 Symonds Street Auckland 1150

Coffey Geotechnics NZ Ltd  
144A Cypres Road, Baul Tamariki, Auckland 2103, New Zealand  
PO Box 58 877, Botany, Manukau 2163, New Zealand  
1 +64 9 272 3375 f +64 9 272 3378 www.coffey.com

FILL SUMMARY SHEET

Test Standards : Shear Strength (using field Shear vane in accordance with NZGS 2001); Nuclear Densometer Testing (in accordance with NZS 4402:1984 Test 4.2.1); Water Content Testing (in accordance with NZS 4402:1986 Test 4.1.1.5(b))

Date	Work Order :	Tested By	Test No.	Wet Density (t/m <sup>3</sup> )	Oven Water Content (%)	Dry Density (t/m <sup>3</sup> )	Solid Density (t/m <sup>3</sup> )	Air Voids %	Field Shear Strength				Location (See plan)	Easting	Northing	RL (m)	Comments
									In kPa								
28.08.14	ETAM14W02623	AB	1	1.68	51.5	1.11	2.7	2.0	UTP	UTP	UTP	UTP	Refer to plan	2690112	6437781	-	F.L. Clay Fill
28.08.14	ETAM14W02623	AB	2	1.66	50.1	1.10	2.7	3.9	UTP	UTP	UTP	UTP	Refer to plan	2690167	6437774	-	F.L. Clay Fill
28.08.14	ETAM14W02623	AB	3	1.69	49.7	1.13	2.7	2.1	UTP	UTP	UTP	UTP	Refer to plan	2690171	6437773	-	F.L. Clay Fill

Checked By:   
Date: 14/9/14  
Approved Signatory Signature:   
Approved Signatory: Eric Carter



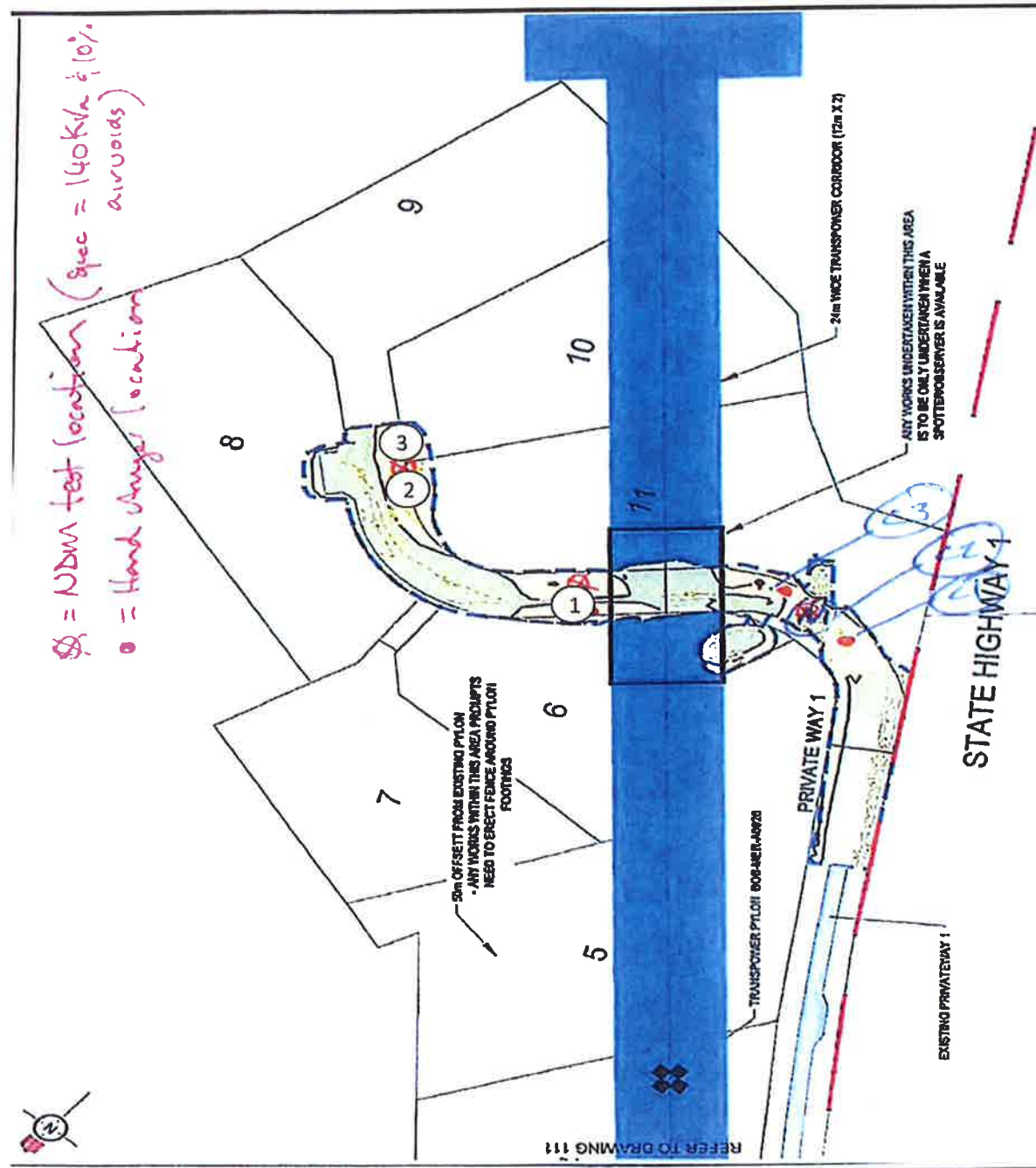




Project Code: GENZETAM00857AA  
Work Order No: ETAM14W02623  
Page : 2 of 2

Job Name: GENZAUCK14972AD -Waterfall Park Stage 2  
Location: Refer to plan below

### Site Plan - Not to scale



Tested By :	AB	Date :	28.08.14
Checked By :	EP	Date :	01.09.14





Coffey Geotechnics NZ Ltd  
144A Cryers Road, East Tamaki, Auckland 2103, New Zealand  
PO Box 58 877, Bolany, Manukau 2163, New Zealand  
t +64 9 272 3375 f +64 9 272 3378 www.coffey.com

Page 1 of 1

# DETERMINATION OF FIELD WATER CONTENT AND FIELD DRY DENSITY - NUCLEAR SURFACE MOISTURE - DENSITY GAUGE

JOB NAME: GENZAUCK14972AD - Waterfall Park Stage 2  
SAMPLE NO: ETAM14S-04131  
GAUGE No: SL 662  
SG = 2.7 (t/m<sup>3</sup>) assumed / measured / supplied  
MDD = N/A (t/m<sup>3</sup>) assumed / measured / supplied  
LAYER TESTED: SPR  
LOCATION: Refer to plan

PROJECT CODE: GENZETAM00857AA  
WORK ORDER NO: ETAM14W02624  
ATTENTION: Ray Berry  
CLIENT: Coffey Geotechnics NZ Ltd  
ADDRESS: PO Box 8261 Symonds Street  
Auckland 1150

Test No	Location Chainage (m)	Test Depth (mm)	Nuclear Densometer			% of Maximum Dry Density (MDD)	Total Voids (%)	Location & Comments
			$\rho$ (t/m <sup>3</sup> )	$w$ (%)	$\rho_s$ (t/m <sup>3</sup> )			
1	N1	Backscatter	2.29	6.0	2.16	-	20	

Test Standard: NZS 4407:1991 Test 4.2.2 (Backscatter) , Water Content: NZS 4407:1991;Test 4.2

Notes : Total Void and Percentage of Maximum Dry Density calculations are not IANZ endorsed as part of this report.

1.  $\rho$  = Bulk density      2.  $\rho_s$  = Dry density      3.  $w$  = Water content

Comments:

Tested By: AB      Date: 28.08.14

Checked By: EP      Date: 02.09.14

Approved Signatory: Eric Paton

Approved Signatory signature: *E. Paton*      Date: 02.09.14

Tests Indicated as not accredited are outside the scope of the laboratory's accreditation





Project Code: GENZETAM00857AA

Work Order No: ETAM14W02623

Sample No: ETAM14S-04130

Page: 1 of 2

## RECORD OF BOREHOLE

JOB NAME: Waterfall Park Stage 2 (GENZAUCK14972AD)

CLIENT: Coffey Geotechnics (NZ) Limited Date of Order : 27/08/2014

LOCATION: Private Way 1 (refer to plan) Borehole No. : HA1

SHEAR STRENGTH (kPa)	REMOULDED STRENGTH (kPa)	SENSITIVITY	OTHER TESTS	DEPTH (m)	GRAPHIC LOG	SAMPLE DESCRIPTION	GROUNDWATER
UTP UTP >223				0.0		FILL: Silty CLAY; high plasticity, yellow brown with minor brown patches	Nil
						0.20m - Silty CLAY; high plasticity, yellow brown (NATURAL SOIL)	
156	104			0.5		End of hand auger at 0.40m	
				1.0			
				1.5			
				2.0			
				2.5			
				3.0			
				3.5			
				4.0			
				4.5			
				5.0			
				5.5			

DRILLED BY: KB	SAMPLE TYPES	CHECKED BY: EP
DATE: 28-Aug-2014	SS Small Sample	DATE: 12-Sep-14
LOGGED BY: KB	LS Large Sample	
DATE: 28-Aug-2014	SH Undisturbed Shelby Tube Sample	



Project Code: GENZETAM00857AA

Work Order No: ETAM14W02623

Sample No: ETAM14S-04130

Page: 2 of 2

## RECORD OF BOREHOLE

JOB NAME: Waterfall Park Stage 2 (GENZAUCK14972AD)

CLIENT: Coffey Geotechnics (NZ) Limited Date of Order : 27/08/2014

LOCATION: Private Way 1 (refer to plan) Borehole No. : HA2

SHEAR STRENGTH (kPa)	REMOULDED STRENGTH (kPa)	SENSITIVITY	OTHER TESTS	DEPTH (m)	GRAPHIC LOG	SAMPLE DESCRIPTION	GROUNDWATER
UTP UTP 223 >223	94			0.0		FILL: Silty CLAY; high plasticity, yellow brown with minor dark orange brown patches and trace of fine rootlets to 0.4m	Nil
180	57			0.5			
137	35						
>223				1.0		Silty CLAY; high plasticity, yellow brown (NATURAL SOIL)	
>223							
				1.5		End of hand auger at 1.10m	
				2.0			
				2.5			
				3.0			
				3.5			
				4.0			
				4.5			
				5.0			
				5.5			

DRILLED BY: KB	SAMPLE TYPES	CHECKED BY: EP
DATE: 28-Aug-2014	SS Small Sample	DATE: 12-Sep-14
LOGGED BY: KB	LS Large Sample	
DATE: 28-Aug-2014	SH Undisturbed Shelby Tube Sample	

## Appendix 4

### **CSIRO Guide to Home Owners on Foundation Maintenance and Footing Performance (Sheet No. 10-91)**



Sheet No. 10-91

Revised August 1996

## Guide to home owners on foundation maintenance and footing performance (updated for AS 2870-1996)

### Introduction

This guide was prepared by Dr P.F. Walsh, formerly of CSIRO and now with the University of Newcastle, with advice from the Standards Australia Committee on Residential Slabs and Footings, to provide guidance to home owners on their responsibilities for the care of clay foundations, and to discuss the performance that can be expected from a footing system. (The ground that supports a house is called a foundation, and the concrete structure that transfers the load to this foundation is the footing system.)

The best information about the design and construction of footing systems is contained in the Australian Standard AS 2870 'Residential Slabs and Footings'. The Standard gives a system of site classification, prescribed footing and slab designs, and construction methods that provide an excellent footing system for Australian houses. However, a warning is given that the chance of a footing failure is higher if extreme site conditions are permitted to occur, viz.:

- growth of trees too close to a footing;
- excessive or irregular watering of gardens adjacent to the house;
- lack of maintenance of site drainage; and
- failure to repair plumbing leaks.

The Standard further states that compliance with this guide is a way to avoid extreme site conditions.

Clay foundations are the cause of major problems for houses. Clays are very fine-grained soils that are plastic and sticky when wet, and hard and strong when dry. All clays swell or shrink to some degree as they become wet or dry out. 'Reactive' clays swell or shrink to such an extent that foundation movements can damage houses.

All house sites are classified. Reactive-clay sites are classified as S, M, H or E, in order of increasing reactivity. Proper maintenance of such clay sites requires that the moisture content of the clay should be kept reasonably constant.

Some minor cracking of masonry walls on reactive clay sites is almost inevitable despite proper design, construction and maintenance. Very slight cracks (up to 1 mm wide) could be expected in most houses. Larger cracks (up to 5 mm) may occur in some houses with properly designed and constructed footings if reactive clay sites have been subject

to large changes of moisture. Cracks larger than 5 mm are regarded as significant damage.

Non-reactive sites – sands, silts and certain clays of class A or S – need only be protected from becoming extremely wet. This requires adequate attention to site drainage and prompt repair of plumbing leaks.

Further information on these topics is given in the following sections. The guide has been updated to be consistent with the revised edition of AS 2870 (1996).

### Site classification

AS 2870 requires all sites to be classified. The emphasis has been placed on reactive clays that swell and shrink with changes of moisture content, because these are the most common cause of problems. The classification system is fairly complicated but, as a general guide, the following may be helpful in understanding the system for clay sites.

- S Clays that have not given trouble in the past.
- M Moderately reactive clays that may cause minor damage to brick houses on old-style light strip footings. Moderately reactive clays are common.
- H Highly reactive clays that often damage houses, paths and fences.
- E Extremely reactive clays that frequently damage houses even with strong footings. Generally rare in major cities except Adelaide. Other occurrences include outback NSW, Darling Downs, Geelong and Horsham.

Since the precautions necessary depend on the reactivity of the site, the owner should check the classification that is shown on the house plans.

The maintenance of the building and the site is the responsibility of the owner, and so the owner should be familiar with the requirements of this guide.

### Care of clay foundations

All clays move with changes of moisture content, so the aim is to minimise such changes in the clay by:

- draining the site;
- keeping gardens and trees away from the house;
- adequate but moderate garden watering; and
- repairing plumbing leaks.

This sheet is available from **CSIRO PUBLISHING** • Freecall **1800 - 645051**  
CSIRO PUBLISHING, PO Box 1139, Collingwood, Vic 3066, Australia

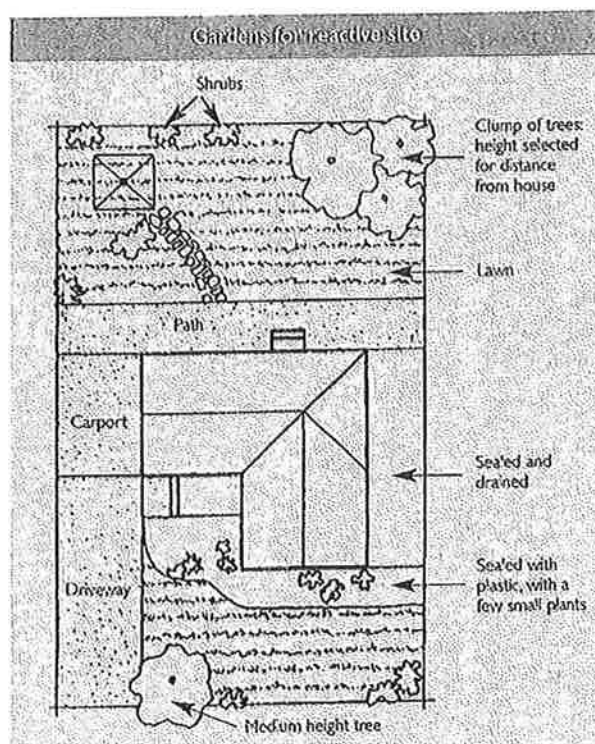
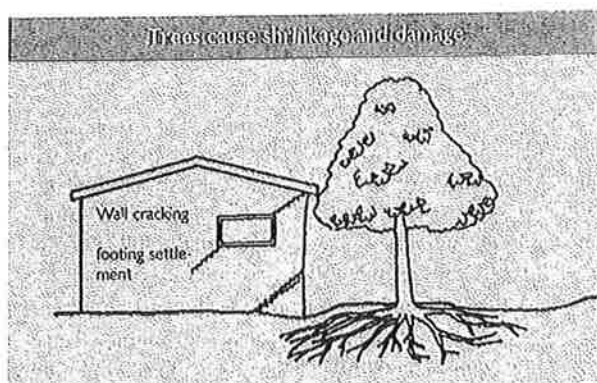
© 1996 CSIRO Australia    Unauthorised copying of this Information Sheet is prohibited    ISSN 0314-5956



On a reactive-clay site there are some restrictions on the way the owner can safely develop the garden around the house. These restrictions apply mainly to brick houses. In most cases, only minimal precautions are justified for framed houses clad with timber or sheeting.

The site must be well drained. Under no circumstances should water be allowed to lie against the house or even near the house. The ground immediately next to the house should be graded away with a slope of about 50 mm over the first metre. Suitable surface drains should be provided to take the surface water away from the house. Where topsoil is brought in, it should not interfere with the site drainage, nor should it raise the ground level enough to block the weepholes in the brick walls or any subfloor vents. Even the subfloor of houses with timber floors should be drained so that water does not collect under the house.

Large garden beds are best not located near the house. This will avoid the possibility of introducing too much moisture to the foundation clay by overwatering. The zone near the house should be planned for paths or covered with gravel.



and plastic sheeting. Small shrubs may be planted at reasonable spacings.

Gardens and lawns should be watered adequately but not excessively. Uniform, consistent watering can be important to prevent damage to the foundation during dry spells such as droughts or dry summers.

Trees and large shrubs require substantial amounts of water, and if the soil near the tree dries out, the roots will extend in search of soil moisture. Tree watering is important in late summer and in drought. The use of slow-drip watering systems may be appropriate. It has also been found useful to drill holes near trees and fill them with gravel to allow water better access to the tree roots. Otherwise, clays will shrink as they dry, and a house may settle as shown below.

Removal of large trees creates the opposite problem. As soil moisture is gradually restored, clays swell and may lift shallow footings.

Many factors determine the extent of clay drying by trees. The more important include soil type, and the size, number and species of trees. Trees obtain moisture from roots that spread sideways, and the drying zone is influenced by the extent of these roots. For single trees, the drying zone is usually half to twice the tree height, but the zone may be larger for groups or rows of trees. Although it is known that the species can influence the extent and severity of the drying zone, little definite information is available. Some Australian trees are particularly efficient in extracting water from very dry soils and can be more dangerous than non-Australian species that use large amounts of water in normal conditions. The effect of tree drying on the amount of movement is also related to the reactivity of the clay. To minimise the risk of damage, trees (especially groups of trees) should not be planted near the house on a reactive clay site, and the following limits are recommended:

- $d = 1.5 h$  for Class E sites
- $d = 1 h$  for Class H sites
- $d = 0.75 h$  for Class M sites

where  $d$  is the distance of the tree from the house, and  $h$  is the eventual mature height of the tree. These values should be increased by 50% if the trees are in a dense group. These rules mean that on the average suburban block, trees that grow higher than 8–9 m are often impractical unless the owner accepts the risk of some damage to the house. If large trees are desired, it may be practical to adopt a specially designed footing system, e.g. a piled footing system.

A leak in the plumbing can cause the footings of a house on a reactive clay to move. The water seeps into the clay causing it to swell and push the footing system upwards. Any obvious leaks in stormwater, drainage or sewerage pipes should be investigated. Leaking water pipes can be detected by turning off all the taps and checking if the water meter records any flow.

The above restrictions may seem onerous for new home owners, but lack of site maintenance on a reactive clay can cause damage to the house. The whole issue should be kept in some perspective. The damage to houses caused by reactive clays is mostly unsightly cracks in the brickwork. In the typical Australian brick-veneer house, the brickwork does not support the structure. It is the timber frame that

carries the walls and roof loads, so brick cracks do not affect the structural safety of the house.

If owners choose to disregard some of the above restrictions and, say, plant large trees all around the house, they should not blame the builder, the engineer or the Council if the house suffers some cracking.

### Performance of footing systems

All building materials move. Concrete and timber shrink, bricks grow, and so on. Many building practices have been evolved to reduce the damage that such movements cause, and the minor difficulties that arise are usually repaired without significant problems.

Where footings are designed by an engineer, the basis of the design is the limitation of any vertical movement that might occur between the centre of the wall and a line joining the ends of the wall. This is termed the differential movement and limits are given in AS 2870 for various forms of house construction. For example, a masonry veneer house with articulation joints is designed for a movement limit of 30 mm. The amount of this movement at a house can be checked using a level or even a string line along a brick course in the wall. If the vertical differential movement is less than the prescribed limit then the footing system has performed up to standard.

Masonry wall cracking can have many causes other than footing movement, including bricks growing as they absorb moisture, the structural or shrinkage movements of the frame within the veneer skin or even accidental damage during construction. If the cracking is less than a few millimetres it is virtually impossible to determine the cause. Certainly if there is no evidence of excessive differential movement then footings should not be regarded as the cause of the cracking.

However, it must be accepted that on reactive clay sites, particularly Class H and E, some movement is likely and for some sensitive houses cracking may occur even for footings performing within expectations. In order to set realistic expectations, AS 2870 contains Appendix C which is included in this report.

The performance requirement of AS 2870 suggests that Category 0 to 1 damage may be expected for houses on a reactive-clay site, but that the damage is of little consequence. Category 2 damage (isolated cracks up to 5 mm wide) is clearly not satisfactory, but it still does not constitute significant failure and could be expected to occur under adverse environmental conditions.

For these categories of damage, it is the intention of AS 2870 that consequent repairs are part of the normal house maintenance, although during the warranty period this may be the responsibility of the builder.

Nonetheless, to ensure that the damage does not proceed to a more serious state, the owner should take some action.

- Check that the recommendations on site treatment, drainage, garden arrangement, trees etc., have been observed.
- Keep a record of the crack width against the time of the year. If the damage is as high as Category 2 and seems to be increasing, the owner should consult the builder who

may be able to offer more specific advice. If this does not prove satisfactory, the owner should engage a consulting engineer who specialises in house footings.

- Engage a plumber to check for leaks if this is suspected to be the cause.
- Replace soil moisture in dry spells by watering. Such watering can be more effective if holes or trenches are dug into the clay. The holes or trenches should be filled with compacted crushed rock or gravel and moderately watered. Some trees may need to be removed or kept pruned.

Complete stability is difficult to achieve, so repairs to damaged walls should include methods that will disguise further movements. Extra joints should be included in external masonry walls and further cracking in internal walls can be concealed by flexible paints, wall paper or panelling. Repairing of cracks with brittle fillers should be avoided unless the cracks have stabilised.

For the more serious categories of damage, the steps to be taken are similar, but there should be little delay in seeking advice. Remedial action for significant failure may still only include attention to stabilising moisture conditions as described above, but could also involve constructing a concrete path or a wall in the ground to stop drying of the foundation clay. Walls may even be designed to span over sagging footings or to cantilever beyond sagging footings. Underpinning is usually not satisfactory in reactive clays.

Experience indicates that lack of maintenance is responsible for many failures. Even with proper design and site maintenance the occasional failure may still occur because footing behaviour is so complex.

### Shrinkage of concrete floors

Concrete needs water. Firstly to allow the fresh concrete to flow, and secondly to develop strength during its first few weeks. As a slab starts to dry, it shrinks and tries to contract. Some of this movement is restrained or resisted by friction on the bottom of the slab and by the beams in the ground. This restraint causes tension or stretching forces in the slab and these forces are often large enough to crack the slab.

Shrinkage cracking is almost inevitable and does not represent failure. Most owners never notice the cracks because they often do not occur until after the carpets are laid. Cracks under brittle or sensitive floor coverings are of concern, but the risk of damage can be reduced by using flexible mortars and glues for fixing slate and tiles etc. Also it helps to delay installing the floor covering until after the shrinkage has occurred. The length of delay should be at least three months after the slab has started to dry (i.e. from the time the slab is last wet from rain or during construction).

### Adhesive-fixed floor coverings

A concrete slab takes a long time to dry. For example, under temperate conditions a slab will take about three months to dry. Moisture in the concrete can interfere with the bond or break down the adhesive used to attach floor coverings. However, a range of adhesives is available for various floor coverings and these should perform quite well on slabs that have been allowed to dry sufficiently. If there is any doubt, the moisture condition of the slab should be assessed before coverings are placed.



## Conclusion

This guide has been prepared to advise owners on how to care for the foundation of their houses and what to expect from a well-designed footing system. The main concern with foundation maintenance is to prevent the foundation soil becoming too wet or too dry, and a variety of recommendations are given to achieve this.

## Further Information

Cameron, D. A. & Earl, I. 1982, *Trees and Houses: A Question of Function*, Cement & Concrete Association, Melbourne.  
Cameron, D. A. & Walsh, P. F. 1984, *Damage to Buildings on Clay Soils*, Technical Bulletin 5.1, Australian Council of National Trusts.

CSIRO 1995, *House Cracking in Drought Periods*, Information Sheet No. 10-88, CSIRO Australia, Division of Building, Construction and Engineering, Melbourne.

Martin, K. G., Lewis, R. K., Palmer, R. E. & Walsh, P. F. 1983, *Floor Coverings on Concrete Slab-on-ground*, CSIRO Australia, Division of Building Research Report, Melbourne.

## Disclaimer

The information in this and other Information Sheets is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject. Further professional advice needs to be obtained before taking any action based on the information provided.

## Appendix C of As 2870

**Table C1 Classification of damage with reference to walls**

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired	5-15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted	15-25 mm but also depends on number of cracks	4

**Table C2 Classification of damage with reference to concrete floors**

Description of typical damage	Approximate crack width limit in floor	Change in offset from a 3 m straight edge centred over defect (see Note 5)	Damage category
Hairline cracks, insignificant movement of slab from level	<0.3 mm	<8 mm	0
Fine but noticeable cracks. Slab reasonably level	<1.0 mm	<10 mm	1
Distinct cracks. Slab noticeably curved or changed in level	<2.0 mm	<15 mm	2
Wide cracks. Obvious curvature or change in level	2-4 mm	15-25 mm	3
Gaps in slab. Disturbing curvature or change in level	4-10 mm	>25 mm	4

### Notes:

- 1 Crack width is the main factor by which damage to walls is categorised. The width may be supplemented by other factors, including serviceability, in assessing category of damage.
- 2 In assessing the degree of damage, account shall be taken of the location in the building or structure where it occurs, and also of the function of the building or structure.
- 3 Where the cracking occurs in easily repaired plasterboard or similar clad-framed partitions, the crack width limits may be increased by 50% for each damage category.
- 4 Local deviation of slope, from the horizontal or vertical, of more than 1/100 will normally be clearly visible. Overall deviations in excess of 1/150 are undesirable.
- 5 Account should be taken of the past history of damage in order to assess whether it is stable or likely to increase.
- 6 The straight edge is centred over the defect, usually, and supported at its ends by equal height spacers. The change in offset is then measured relative to this straight edge.

Nov 97



Part 1: Introduction and general provisions / How the plan works / Relationships between spatial layers

## Relationships between spatial layers [000047, 000055, 000078]

The District Plan uses a range of spatial layers that are shown on planning maps including zones, overlays, site-specific controls, development areas and designations. The function of each spatial layer is set out in the National Planning Standards, November 2019, as follows:

### *Zones*

A zone spatially identifies and manages an area with common environmental characteristics or where environmental outcomes are sought, by bundling compatible activities or effects together, and controlling those that are incompatible. The spatial area of each zone is shown on the planning maps. Every part of the district (except for roads) is in one zone and the zones do not overlap.

### *Overlays*

As well as zones, there are various overlays (such as Outstanding Natural Landscapes and Significant Natural Areas) and sites/features (such as Historic Heritage buildings). An overlay spatially identifies distinctive values, risks or other factors which require management in a different manner from underlying zone provisions.

### *Site-specific controls*

Site-specific control spatially identifies where a site or area has provisions that are different from other spatial layers or district-wide provisions that apply to that site or area.

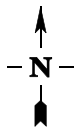
### *Precincts*

A precinct spatially identifies and manages an area where additional place-based provisions apply to modify or refine aspects of the outcomes anticipated in the underlying zone(s).

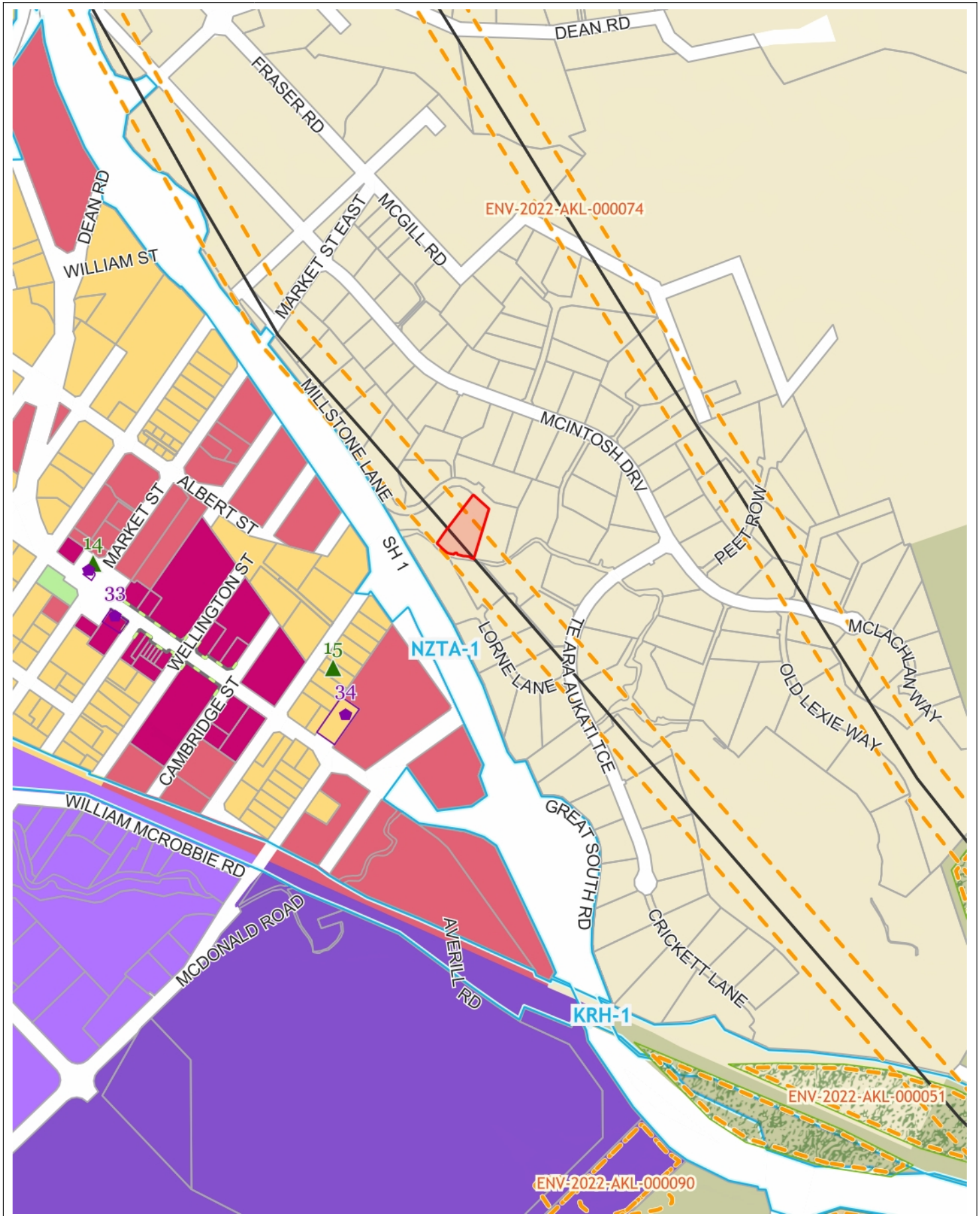
### *Designations*

A designation is a provision in a district plan for a public work or project. Only a requiring authority can give notice of a requirement for a designation.





# Proposed Waikato District Plan (Appeals Version)



SCALE 1:9028

Cadastre sourced from Land Information  
New Zealand under CC-BY.  
Copyright © Waikato District Council

Projection: New Zealand Transverse Mercator  
Datum: New Zealand Geodetic Datum 2000

Print Date: 21/09/2023

A4



# Proposed Waikato District Plan Appeals Version

## Map Legend

### APPEALS



Appeals

### DISTRICT-WIDE MATTERS

#### Energy, infrastructure and transport

----- Indicative road

———— National grid \*

—●— Gas transmission line

#### Hazards and risk overlays



Coastal sensitivity area (erosion)



Coastal sensitivity area (inundation)



Defended area



Flood plain management area



Flood ponding area



High risk coastal erosion area



High risk coastal inundation area



High risk flood area



Mine subsidence risk area

#### Historical and cultural values overlays



Historic heritage item \*



Sites and areas of significance to Maaori

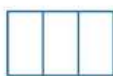


Extent of setting



Notable tree \*

#### Natural environment values overlays



Coastal environment \*



Outstanding Natural Landscape



Natural character



Significant Natural Area



Outstanding Natural Feature

#### General district-wide matters overlays



Acoustic area - Horotiu



Airport subdivision control boundary



Airport air noise boundaries



Noise control boundary -  
Waikato gun club \*



Airport noise SEL95 boundary



Airport obstacle limitation surface



## Proposed Waikato District Plan Appeals Version

### Map Legend

#### PRECINCTS

	Commercial		Open space
	Education		Operational
	Industrial		Residential
	Medium density residential		Rural
	Mixed use		

#### DEVELOPMENT AREAS

##### Concept plan - Havelock

	Havelock industry buffer		Havelock rural lifestyle cluster
	Havelock 40 dB LAeq noise contour		Havelock walkway cycleway bridleway
	Havelock slope residential area		
	Havelock hilltop park		

##### Concept plan - Rangitahi

	Lots		Balance lot - farm management
	Comprehensive residential development		Existing native vegetation
	Potential mixed use		Reserve - recreational
	Potential commercial		Reserve - pedestrian way
	Potential tourism		Reserve - drainage
	Walking-cycle path		Landscape restoration policy area
	Local road		
	Edge lane		



## Proposed Waikato District Plan Appeals Version

### Map Legend

#### DESIGNATIONS



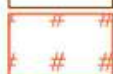
Designation \*

#### SPECIFIC CONTROLS

##### Residential zones



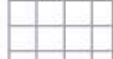
Te Kauwhata ecological residential area



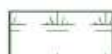
Business overlay area



Amenity setback



Huntly heritage area



Huntly north wetland area



Matangi heritage area

##### Open space and recreation zone



Tamahere Park



Tamahere Village Green

##### Industrial zones



Horotiu earth bund

##### Rural zones



Aggregate extraction area



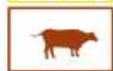
Aggregate resource area



Te Uku wind farm setback



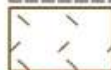
Meremere dragway



Agricultural research centre



Huntly power station  
- coal and ash management area



Whaanga Coast development area



Whaanga Coast property area





## Proposed Waikato District Plan Appeals Version Map Legend

### Commercial and mixed use zones

Verandah

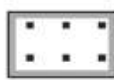


Motorway service centre

### Special purpose zones



Indicative borrow pits and Maaori-made soils



TaTa Valley hotel area



Airsides overlay

### Multi-zone

Battlefield view shaft



Raglan navigation beacon



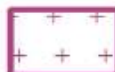
Coal mining area



Segregation strip



Environmental protection area



Tamahere commercial area



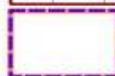
Lakeside Te Kauwhata high density area



Urban expansion area



Lakeside Te Kauwhata medium density area

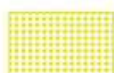


Waikato River catchment



Lakeside Te Kauwhata rural area

### INFORMATION ONLY



Mystery Creek noise boundary



Fonterra noise control boundary



## Proposed Waikato District Plan Appeals Version Map Legend

### ZONES \*

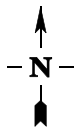
	COMZ – Commercial zone
	TCZ – Town centre zone
	LCZ – Local centre zone
	GRUZ – General rural zone
	RLZ – Rural lifestyle zone
	LLRZ – Large lot residential zone
	GRZ – General residential zone
	MRZ – Medium density residential zone
	SETZ - Settlement zone
	OSZ – Open space zone
	HIZ – Heavy industrial zone
	GIZ – General industrial zone

SPZ - Special purpose zones

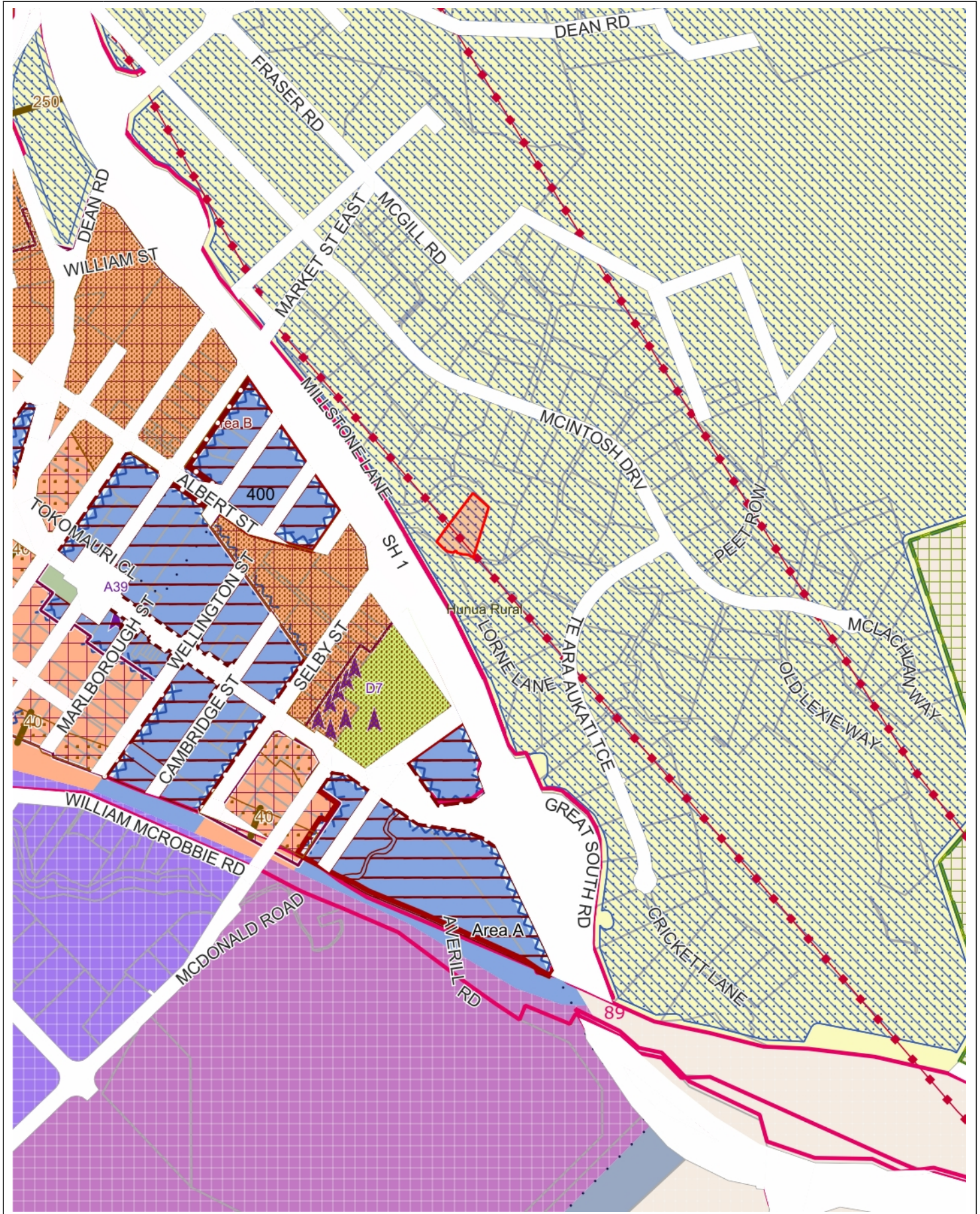
#### List of Special purpose zones:

BTZ - Business Tamahere zone  
 CORZ - Corrections zone  
 FUZ - Future urban zone  
 HOPZ - Hopuhopu zone  
 KLZ - Kimihia lakes zone  
 MAZ - Mercer airport zone  
 MSRZ - Motorsport and recreation zone  
 MTZ - Matangi zone  
 OHI - Ohinewai zone  
 RPZ - Rangitahi Peninsula zone  
 TKAZ - Te Kowhai airpark zone  
 TTZ - TaTa Valley zone





# Waikato District Plan



SCALE 1:9028

Cadastre sourced from Land Information  
New Zealand under CC-BY.  
Copyright @ Waikato District Council

Projection: New Zealand Transverse Mercator  
Datum: New Zealand Geodetic Datum 2000

Print Date: 21/09/2023

A4



# Legend

## Waikato District Plan

Context		Plan Section Divide
		State Highway
		Rail
		Land Parcel
Building / Construction		Water Body
		Reserve
		Airport Inner Noise Control Boundary
Commercial		Airport Outer Noise Control Boundary
		Airport SEL 95 Noise Control Boundary
		Background Noise Area
		High Background Noise Area
		Noise Control Boundary
		Noise Boundary Distance (m)
		Airport Obstacle Limitation Surface
		Area A and B (Pokeno)
		Area of Interest / Scheduled Area
		Business Centre Classification
Hazard Policies		Housing Restriction Area
		Front Yard Control Line
		Main Frontage Control Line
		Mixed Use Policy Area
		Tamahere Commercial Area
		Town Centre
		Town Centre Overlay Area
		Verandah
		Catchment Management Plan Area
		1% Design Flood Level
Culture & Heritage		Flood Limit
		Flood Risk
		Huntly East Mine Subsidence
		Huntly South Assessment I
		Land Stability Policy Area
		Remediation Policy Area
		River Stability Policy Area
		Battlefield View Shaft
		Heritage Area
		Heritage Item
Infrastructure		Notable Tree
		Schedule 8A
		Site of Significance
		Urupa
		Waikato River Catchment
		Designation
		Gas Line
		Transmission Line
		Indicative Road Intent Important Local A
		Indicative Road Intent Important Local B
Natural Environment		Indicative Road Location Important Collector
		Indicative Road Location Important Service Lane
		National Walkway
		Raglan Navigation Beacon
		Segregation Strip
		Walkway Cycleway Bridleway
		Coastal Marine Area
		Conservation Policy Area
		Ecological Corridor
		Environmental Enhancement Overlay Area
Urban Environment		Environmental Protection Policy Area
		Gully Area
		Hauraki Gulf Catchment Area
		Identified Significant Natural Feature
		Landscape Policy Area
		Management Area
		Proposed Esplanade Reserve
		Ridgeline Policy Area
		Schedule 5A Site of Special Wildlife Interest
		Threatened Species Serious Decline
Minerals / Mining		Threatened Species Gradual Decline
		Whaanga Coast Policy Area
		Amenity Planting Requirement
		Anticipated Dwelling Number
		Concept Plan
		Papakainga Policy Area
		Residential Large Lot Overlay Area
		Residential Medium Lot Overlay Area
		Structure Plan Boundary
		Urban Expansion Policy Area
Zones		Village Growth Area
		Aggregate Extraction Policy Area
		Aggregate Resource Policy Area
		Coal Mine Policy Area
		Village Business (Franklin)
		Business (Waikato)
		Business (Franklin)
		Forest Conservation (Franklin)
		Queen's Redoubt Heritage (Franklin)
		Recreation (Franklin)
Map Information		Wetland Conservation (Franklin)
		Recreation (Waikato)
		Heavy Industrial (Waikato)
		Industrial 2 (Franklin)
		Industrial Services (Franklin)
		Light Industrial (Franklin)
		Industrial Park (Waikato)
		Light Industrial (Waikato)
		Industrial (Franklin)
		Maio Mining (Franklin)
Zones		Aggregate Extraction (Franklin)
		Timber Processing (Franklin)
		Pa (Waikato)
		Residential (Franklin)
		Living (Waikato)
		Residential 2 (Franklin)
		New Residential (Waikato)
		Living Zone Te Kauwhata Ecological (Waikato)
		Living Zone Te Kauwhata West (Waikato)
		Village (Franklin)
Zones		Rural-Residential (Franklin)
		Country Living (Waikato)
		Coastal (Franklin)
		Coastal (Waikato)
		Rural (Franklin)
		Rural (Waikato)
		Commercial
		Open Space
		Industrial
		Cultural
Zones		High Density
		Residential
		Low Density
		Agriculture Production
		Copyright & Disclaimer - Cadastre boundaries sourced from Land Information New Zealand under CC-BY. Graphical representations of the District Plan rules have been derived from various sources; the representations are to the best of knowledge. Exact boundaries may require further investigation, please direct enquiries to the Planning and Strategy Team, districtplan@waikato.govt.nz
		Map Coordinates - the grid coordinates, provided as easting and northing values, measured in metres, use the New Zealand Transverse Mercator 2000 projection grid coordinates. Eastings are labelled on the top and bottom margins, their values increase towards the east. Northings are labelled on the lateral margin. Their values increase towards the north. For example, the value 5884321 is read as 5884 km and 321 m. 1:50 000 maps are marked at 4 km intervals, the area of a grid is 16 square km or 1600 hectares.
		On the overview map the following town abbreviations have been used: Pokeno as Pok, Te Kauwhata as TeK, Huntly as Hun, Ngaruawahia as Nga and Raglan as Rag





