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2017

Land Information Memorandum



■ 5 Hugh Greene Lane Te Kauwhata LOT 31 DP 455848

■ www.facebook.com/WaikatoDistrictCouncil ■ 0800 492 452 ■ www.waikatodistrict.govt.nz



Land Information *Memorandum*

In reply please quote: LIM0407/18
If calling, please ask for: Melissa Muir

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 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:	04390/315.04
Legal Description:	LOT 31 DP 455848
Area:	1.15 Hectares more or less
Property Location:	5 Hugh Greene Lane TE KAUWHATA
Owners:	Shaun Paul Swann, Ma Nichelle De Gracia Swann, Cygnet Future Limited

► Property Location:



■ Rates

► Rates & Rating Valuation:

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

Annual rates for 2017/2018	\$ 1,163.37	Balance Owing: \$ 0.00 (Balance of 2nd instalment due 23 January 2018)
Value of Improvements	\$ 1,000.00	
Land Value	\$ 235,000.00	
Capital Value	\$ 236,000.00	
Date of Valuation	1 July 2017	

Valuation

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

There is currently a District wide tri-annual revaluation being undertaken. Values are still currently based on the 2014 valuation.

The updated values will be notified during the month of October 2017 and will be effective for rating purposes from 01 July 2018.

Current Rates

A copy of the current 2017/2018 rates assessment is attached. The 2017/2018 rates are based on the new valuations dated 1 July 2014, which are shown in the table above.

This year we've introduced a new part fee and charge 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. waste water, 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.

<https://www.waikatodistrict.govt.nz/your-council/fees-and-charges>

If you have any queries with regards to the 2017/18 rates, please contact a member of the rating team on 0800 492 452 or e-mail rates@waikdc.govt.nz.

Rates Capital Value

Please note that the rates reflected on 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.

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

Under the Waikato District Plan the property is within the:

- Rural Zone
- Environmental Protection Policy Area
- Flood Limit Policy Area
- Waikato River Catchment Policy Area

Please refer to the Waikato District Plan or speak to a duty planner regarding specific requirements for development on properties within these areas.

Designations

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

- B3 - Whangamarino Wetland, Government Purpose Reserve, Wetland Conservation

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/ Conservation Covenant

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

For any restrictions of the use of the property please refer to the Certificate of Title.

► Resource Consents:

Application No	Description	Decision
	SUBDIVISION CONCENT	GRANTED
SUB0275/06.02	- S127 RMA 1991 – Change/Cancel Condition	12 December 2008
SUB0275/06.03	- To create 14 residential lots	26 November 2001

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.

■ 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
BLD0661/17	Dwelling with Attached Garage	24 November 2016	28 June 2017

Requisitions: No known building requisitions to date.

■ Water Supply

Information regarding –
444(1)

- (ba) any information that has been notified to the territorial authority by a drinking-water supplier under section 692H 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;

The property is located outside an area currently served by a community water supply administered by Waikato District Council.

■ Drinking Water (potable water supply)

The property is not connected to a community water supply. It is the property owner's responsibility to ensure suitable drinking water is supplied on-site.

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.

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

The property is located outside an area currently served by a community system for stormwater or land drainage 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 –
44A(2)

- (a) information identifying each (if any) special feature or characteristic of the land concerned, including but not limited to potential erosion, avulsion, falling debris, subsidence, slippage, alluvion, or inundation, or likely presence of hazardous contaminants, being a feature or characteristic that—
 - (i) is known to the territorial authority; but
 - (ii) is not apparent from the district scheme under the Town and Country Planning Act 1977 or a district plan under the Resource Management Act 1991;

Existing Council records do not contain any information concerning natural hazards affecting the land, it is recommended that a geotechnical engineer is engaged to investigate ground or sub-soil conditions to establish any specific requirements for building development.

Geotechnical Report Available

Attached for your information is a copy of the Site Investigation Report by Mark T Mitchel Ltd, dated 30 October 2015; this was prepared as part of the building application to construct a dwelling & carport.

Under section 71-74 of the Building Act 2004, upon application for a building consent applicants 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 relevant

■ 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 **Friday**

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

The property is on a domestic refuse collection route. For further information please contact the Council's Community Assets Operations Manager.

■ 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.

Yours faithfully



Melissa Muir
Land Information Officer

RATES TAX INVOICE / STATEMENT ASSESSMENT / CREDIT NOTE

GST Reg No. 52-054-982

Issue Date 1 August 2017

Rating Year 1 July 2017 - 30 June 2018

Shaun Paul Swann &
Ma Nichelle De Gracia Swann & 1 other...

Property Number 2014952
Valuation Reference 04390/315.04
Property Location 5 Hugh Greene Lane TE KAUWHATA
Legal Description LOT 31 DP 455848 SUBJ TO & INT IN ESMT
Area (Hectares) 1.1500 ha
Land Value \$235,000
Improvement Value \$1,000
Capital Value \$236,000
Rateable Value* \$236,000
Base Date Valuations 1 July 2014

*The effective date of the rateable value for rating purposes is from 1 July 2015

Amount due by 25 September 2017

\$424.60

Instalment due dates

1 25 September 2017

2 23 January 2018

3 23 May 2018

Help save our resources

Rates notices can be
delivered by email. If you
prefer this method of delivery
email your request to
rates@waikato.govt.nz



Account Summary

Rates balance as at 1 July 2017	\$33.50
Rates previous instalment(s)	\$0.00
Rates penalties	\$3.35
Remission of rates and penalties	\$0.00
Rates adjustments	\$0.00
Rates payments received before 19 July 2017	\$0.00
This rates instalment	\$387.75
Payment now due	\$424.60
GST content of this rates instalment	\$50.58
Amount required to settle rates in full	\$1,200.22

Please note

Any instalment amount not paid by the due date may incur a 10 per cent penalty.

Your General Rate and Uniform Annual General Charge (explained overleaf) for this year are \$1,032.22. This is how they are spent each week:



Area offices and
other properties
\$2.03



Corporate and
council leadership
\$2.13



Grants and
donations
\$0.28



Lifestyle
\$3.40



Parks and
green spaces
\$4.35



Refuse
\$0.23



Transport
\$7.26



Water
management
\$0.18



Payment options



Direct
debit



Credit card
(Website only)



Online
banking



Phone
banking



Over the
counter

Electronic Payments to Bank of New Zealand
02 0316 0246517 00 with particulars RTZ2014952

You can pay by Over-the-counter (OTC), cash, EFTPOS or cheque at any
BNZ branch, or any NZ Post Shop offering 'Pay a bill' services. Council
offices prefer not to receive cash, but accept other OTC payment.
Council's Huntly office is cash free.

To update your details email rates@waikato.govt.nz



RATES 2014952 424.600000

Property Number 2014952
PAYMENT DUE BY 25 September 2017

TOTAL AMOUNT DUE

\$424.60

Amount paid

A penalty of 10 per cent may be added to any unpaid balance.

Please tick if you require a receipt for your payment. ☐



WDACRTZ2014952000042460

Rates assessment

Description of Rate	Differential Categories and Factors for Assessment (1)	Rating Basis	Rating Factor	Factor Applicable	Assessed Amount	Remission Amount	Annual Amount
General Rate		\$0.00	rateable value**	296,000	\$577.73	\$0.00	\$577.73
District Refuse	collection service available	\$131.15	per SUIP*	1	\$131.15	\$0.00	\$131.15
Uniform Annual General Charge (UAGC)		\$454.49	fixed charge	1	\$454.49	\$0.00	\$454.49
(All figures include GST total)				Total	\$1,163.37	\$0.00	\$1,163.37

Notes

1. Differential categories are further defined in the funding impact statement adopted as part of the Long Term Plan.
- * SUIP - Separately used or inhabited part of a property or building.
- ** Rateable Value is based on your Capital Value (which includes land and improvements) less any non-rateable value.
- ^ Water consumption will be invoiced separately on a periodic basis throughout the rating year. Please refer to the Long Term Plan for further details.

Your rates explained

General Rate and Uniform Annual General Charge (UAGC)

All rateable properties are charged a general rate which is calculated on the rateable value of the property. Most properties are charged a UAGC unless there are special legislative reasons for not doing so.

The General Rate and UAGC pays for:

Area offices and other properties – all properties owned by WDC
Corporate and council leadership – ensuring communities have an opportunity to influence the decision-making process
Grants and donations – For community group initiatives, upon application
Lifestyle – animal control, environmental health, community and safety, libraries and resource management
Parks and green spaces – Parks and reserves
Refuse and recycling – refuse and recycling collection, closed landfill management and waste minimisation initiatives
Transport – roads, footpaths, bridges, traffic lights, street lights, signs, pedestrian crossings, street furniture, road safety, landscaping, weeding, street cleaning
Water management – water supply, wastewater, stormwater

Targeted rates

Capital works contributions – for covering the capital cost and interest charges of works not met by lump sum contributions for the projects
Community board – for the purpose of covering the direct costs of operating all the community boards within the district
Community facility – for the maintenance and operation of the halls and community centres within a defined rating area
Land drainage – for the collection and disposal of stormwater within defined rating areas
Refuse – for the collection, recycling and disposal of household refuse within defined rating areas
Wastewater – for the sewage disposal for properties that are connected or able to be connected to the wastewater network
Water – for the supply of water to properties that receive, or are capable of receiving a water supply
Urban stormwater – for the collection and disposal of stormwater within defined rating areas

What else should I know?

Making it easier

Rates can be paid by weekly, fortnightly, monthly or quarterly direct debit. Please complete online at www.waikatodistrict.govt.nz/apply or phone or email Council.

Rates Notices can be delivered by email. If you prefer this method of delivery, email your request to rates@waikdc.govt.nz

Please note all address changes are required to be in writing. Please advise any changes to your details by emailing rates@waikdc.govt.nz or write to our Ngaruawahia Office.

Penalties

A 10 per cent penalty will be added to the remainder of the current charge not paid by the due date.

A 10 per cent penalty will be charged on 1 July to rates that remain unpaid from previous years. A further 10 per cent penalty will be added on 1 January to rates from previous years that remain unpaid at that date. Payments are applied to the oldest debt first.

Rating units in common ownership

Two or more rating units can be treated as one unit for setting a rate if those units are –

- a) Owned by the same person or persons; and
- b) Used jointly as a single unit; and
- c) Contiguous or separated only by a road, railway, drain, water race, river or stream.

Inspection and objection to rating information records

The Rating Information Database (RID) holds all the rates information on your property, including your name and address. The database can be viewed at the Ngaruawahia Office, 15 Galileo Street, Ngaruawahia. Rating information (without owner details) is also available on our website. You can ask the Council to remove your name and address details from the database, or object to any of the information in it.



Postal Address
Waikato District Council
Private Bag 544
Ngaruawahia 3742
New Zealand

0800 492 452

■ If calling from overseas +64 7 824 8633 ■ www.waikatodistrict.govt.nz
■ rates@waikdc.govt.nz ■ www.facebook.com/WaikatoDistrictCouncil

Huntly Office
142 Main Street
Huntly
Opening Hours
Mon to Fri 9am-5pm

Ngaruawahia Office
(Head Office)
15 Galileo Street
Ngaruawahia
Opening Hours
Mon to Thurs 8am-5pm
Fri 9am-5pm

Raglan Office
7 Bow Street
Raglan
Opening Hours
Mon to Fri 9am-5pm

Te Kauhata Office
1 Main Road
Te Kauhata
Opening Hours
Mon to Fri 9am-5pm

Tuakau Office
2 Dominion Road
Tuakau
Opening Hours
Mon to Fri 8.30am-5pm



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952



R.W. Muir
Registrar-General
of Land

Search Copy

Identifier 588292
Land Registration District South Auckland
Date Issued 29 January 2015

Prior References

557918

Estate Fee Simple
Area 1.1500 hectares more or less
Legal Description Lot 31 Deposited Plan 455848

Proprietors

Shaun Paul Swann, Ma Nichelle De Gracia Swann and Cygnet Future Limited

Interests

9882366.1 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 29.1.2015 at 2:42 pm

Subject to a right to drain water (in gross) and a right to drain water (overland flow path) over part marked A and I on DP 455848 in favour of Waikato District Council created by Easement Instrument 9882366.3 - 29.1.2015 at 2:42 pm

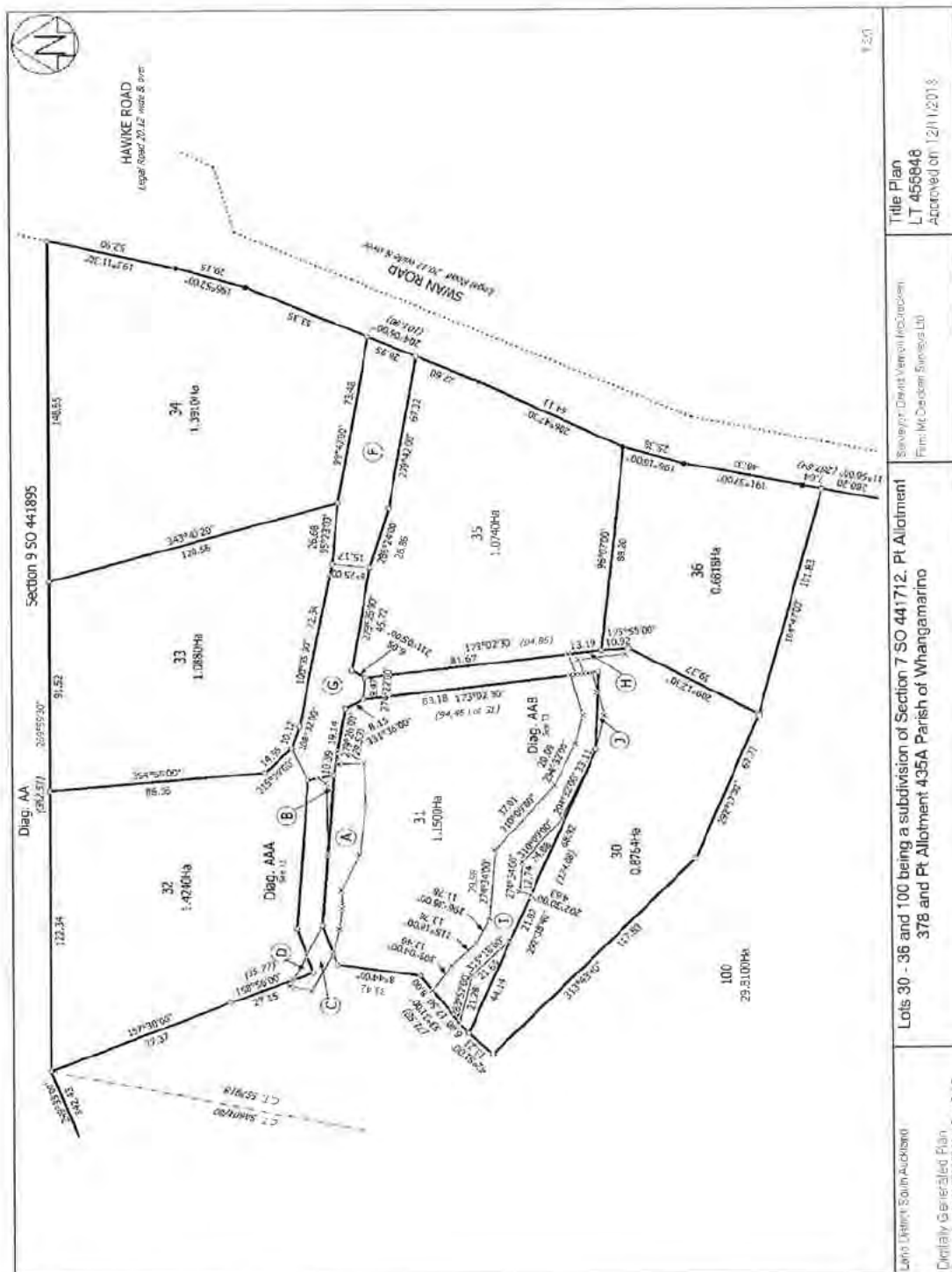
Some of the easements created by Easement Instrument 9882366.3 are subject to Section 243 (a) Resource Management Act 1991 (see DP 455848)

Appurtenant hereto are rights of way, rights to convey water, electricity, telecommunications and computer media and rights to drain water created by Easement Instrument 9882366.5 - 29.1.2015 at 2:42 pm

The easements created by Easement Instrument 9882366.5 are subject to Section 243 (a) Resource Management Act 1991

Land Covenant in Easement Instrument 9882366.5 - 29.1.2015 at 2:42 pm

10493783.3 Mortgage to ASB Bank Limited - 25.7.2016 at 2:23 pm



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



www.waikatodistrict.govt.nz

The Registrar General of Land
South 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 455848, (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 Certificates of Title for Lots 30, 31 and 32 on Deposited Plan 455848

First Schedule

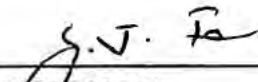
An estate in fee simple in all those parcels of land containing 37.4930 hectares more or less being Section 7 SO Plan 441712 comprised in Certificate of Title 557918 and Part Allotment 378 and Part Allotment 435A Parish of Whangamarino comprised in Certificate of Title SA601/80

Second Schedule

1. The Owners shall preserve and maintain the screen planting in accordance as shown on, and in accordance with, the approved Planting plan prepared by Inform Landscapes Limited, dated 17 October 2012, pages 1 to 3. If any of the planting dies or is removed it shall be replaced with a similar species of plant within a period of three (3) months.
2. The Owners of Lots 30, 31 and 32 shall be advised that an Improved On-Site Domestic Sewage Treatment System (as defined by the Waikato Regional Council) shall be installed on each Lot at the time of building consent. Each system shall be located for maximum performance to protect the Whangamarino Wetland and shall be maintained in accordance with the manufacturer's guidelines.

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

DATED at Ngaruawahia this 6th day of March 2013



GAVIN JOHN ION
Chief Executive

SUB0275/06

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

The Building

Street address of building: 5 Hugh Greene Lane TE KAUWHATA
Legal description of land where building is located: LOT 31 DP 455848
Valuation number: 04390/315.04
Property number: 2014952
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 P Swann, M N D G Swann
Contact person: Shaun Swann
Mailing address: PO Box 13, Mangakino 3445

Street address/registered office: 5 Hugh Greene Lane TE KAUWHATA

Phone numbers:

Landline: N/A Mobile: 021-808144
Daytime: N/A After hours: N/A
Facsimile number: N/A Email address: shaun@covercommunications.co.nz
Website: N/A

First point of contact for communications with the building consent authority

Name: Signature Homes Waikato
Mailing address: PO Box 21268, Rotorua, Hamilton 3256

Phone numbers:

Landline: 079587710 Mobile: 0276993178
Facsimile number: N/A Email address: wesseleshuis@signature.co.nz

Building Work:

Project: Dwelling with Attached Garage
Building consent number: BLD0661/17
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:

APK

Name: Anthony Krippner
Position: Building Inspector
On behalf of: Waikato District Council

Date: 28 June 2017

Your Ref

In reply please quote
SUB0275/06.03

If calling, please ask for
Kelly G. Nicholson

07 December 2010

David McCracken
McCracken Surveys Limited
PO Box 19182
Hamilton 3244

Dear Sir

**APPLICATION FOR CHANGE/CANCEL CONDITIONS - S127 RMA 1991 BY
CHESHUNT FARM LIMITED**

Thank you for your application for Change/Cancel Conditions - S127 RMA 1991 that we received on 2 December 2010.

We have now checked the application and are pleased to advise that it is complete for the purposes of formal acceptance under section 88 of the Resource Management Act 1991, and may now be processed.

Processing

Please note that further information may be requested during the processing of the application, if it is required to better understand the nature of the proposal and its potential effects on the environment.

Council must also complete an assessment of the effects of the proposal and identify whether there are any affected parties. Council will then decide whether notification of your application will be required and will contact you if additional information or notification is required.

Fees and Deposits

We acknowledge receipt of your deposit of \$664.40 for the processing of the application.

Please read the attached information sheet that explains Council's policies regarding the payment of deposits and processing fees.

Contact Us

If you have any questions regarding the processing of your application, please contact Kelly G. Nicholson who is the Consent Planner dealing with your application.

If your query is regarding fees or administration of your application, please contact Joanne Smith, Regulatory Support Manager.

Yours faithfully

cc:
Cheshunt Farm Limited
69 Swan Road
RD 1
Te Kauwhata 3781`

Summer Salmon
Regulatory Support Officer

INFORMATION ON PROCESSING COSTS FOR RESOURCE CONSENTS

Council operates on a User Pays basis. Council Officers' time will be charged on an hourly rate as per the Fees and Charges Policy which are reviewed annually

General Manager Regulatory	\$240.00	Intermediate Planner	\$105.00	Environmental Planning Engineer	\$100.00
Consents Manager	\$150.00	Planner	\$95.00	Regulatory Support Manager	\$95.00
Senior Planner Level 2	\$195.00	Roading Consents Engineer	\$100.00	Regulatory Support Officer	\$65.00
Senior Planner	\$125.00	* All costs incurred when using Consultants will be on charged to the applicant			

WHAT IS INVOLVED IN PROCESSING A RESOURCE CONSENT?

1. A full assessment of the application – by the Planner and Utilities, Roding and Health Officers if applicable
2. Decision (including report and recommendations) as to whether the application can be processed under Delegated Authority or needs to be notified
3. If assessment is required by the Utilities, Roding or Health Officers –writing the assessment report and conditions
4. Site Visits by the appropriate officers i.e.: Planning, Utilities, Roding and Health
5. A detailed planner's report
6. A decision with reasons and conditions
7. Administration Costs
8. Reviewing and signing off under Delegated Authority
9. Notification Costs – Limited or Full if applicable
10. Hearing Costs – if applicable
11. Note: A Monitoring Fee for Landuse or a 223 Certificate will be charged for on all applications at the end of processing.

\$\$ MONEY MATTERS \$\$

During the course of processing your application, Council may charge on-going deposits in relation to costs incurred above deposits already received. The payment of these additional deposits are due the 20th of the following month. If your application needs to be notified and/or a hearing is required, a deposit will be payable prior to the notification and/or hearing process commencing.

If your project is a large or complex one, then Council may elect to bill you on a monthly basis. Such invoices will be required to be paid by the 20th of the following month. A monthly administration fee is chargeable on all monthly accounts.

After making its decision on your application Council will reconcile the costs of processing the application and will advise you if there is a refund due or if there is an additional charge to pay.

Please Note: Under section 36(7) of the RMA, Council can stop processing a Consent if you

Form 5
BUILDING CONSENT NO: BLD0661/17
Section 51, Building Act 2004
ISSUED BY: WAIKATO DISTRICT COUNCIL

The Building

Street address of building:	5 Hugh Greene Lane TE KAUWHATA
Legal description of land where building is located:	LOT 31 DP 455848
Valuation Number: 04390/315.04	Property Number: 2014952
Building name:	N/A
Location of building within site/block number:	N/A
Level/unit number:	N/A

The Owner

Name of owner:	S P Swann, M N D G Swann
Contact person:	Shaun Swann
Mailing Address:	PO Box 97438, Manukau City, Auckland 2241

Street address/registered office: N/A

Phone numbers:

Landline:	N/A	Mobile:	021808144
Daytime:	N/A	After hours:	N/A
Facsimile number:	N/A	Email address:	shaun.swann@simpro.co.nz
Website:	N/A		

First point of contact for communications with the Building Consent Authority

Name:	Signature Homes Waikato
Mailing Address:	PO Box 21268, Rototuna, Hamilton 3256

Phone numbers:

Landline:	N/A	Mobile:	021-02351106 021-836027
Daytime:	07-9587710	Fax number:	N/A
Email address:	deanbaldock@signature.co.nz		

Building Work

The following building work is authorised by this building consent:

Dwelling with Attached Garage

Project type:	Dwelling	\$400,000
Total Value of work:		\$400,000

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: BLD0661/17

This Building Consent is subject to the following condition:

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.

- Excavation, Siting, and Prefloor Plumbing (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-wrap / Structural Framing (pre-wrap)
- Exterior Cladding
- Pre-line
- Post-line
- Drainage
- Final Plumbing / 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.*

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)
- ✓ Wastewater disposal system (PS 3 / PS 4)
- ✓ Stormwater disposal system (PS 3 / PS 4)

Certificates / Memorandums / Statements / Letters:

- ✓ Waterproofing systems (internal)
- ✓ Electrical Compliance Certificate (if applicable)
- ✓ Plumbing pressure test
- ✓ As laid drainage plan
- ✓ gas certificate

Compliance Schedule:

- A compliance schedule is not required for the building.
-

Building Consent Advisory Notes:

- Trusses or rafters shall be fixed at tails to top plate with wire dogs at each end.
- The roof shall be braced to comply with NZS 3604:2011.
- The moisture barrier beneath the floor shall comply with the New Zealand Building Code 1992.
- Provide breather type building paper on outside of frame, to extend to top plate level.
- Insulation shall be a minimum of:- Floor R1.3; Walls R1.9; Roof/Ceiling R2.9; Glazing R0.26 and comply with NZBC H1 Energy Efficiency.
- Footings shall be a minimum of 200mm below cleared ground level.
- Soils may be soft in this area. Foundations shall sit on soils capable of supporting 100kpa. If soft soils are encountered an engineer's design of the foundations will be required.
- All drainage and plumbing shall comply with the New Zealand Building Code 1992.
- At least 48 hours' notice shall be required for plumbing and drainage inspections.
- Plumbing preline inspection shall be required.
- Plumbing inspection shall be required before pouring floor slab.
- An as built drainage plan and an electrical certificate of compliance is required on completion.
- Installer of the wastewater treatment system to provide a Producer Statement Construction / Construction Review.

- Stormwater shall be disposed of in an approved manner.
- All roof trusses shall be designed and fabricated by a certified manufacturer.
- All timber treatment shall comply with NZS 3602:2003.
- Wall and roof framing shall comply with NZS 3604: 2011.
- Domestic smoke alarms must be installed before a final inspection is requested. The number of alarms required and their location in the dwelling is to be in accordance with the New Zealand Building Code.

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.

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.

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 – 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.

Signature:



Name: Trish Simon
Position: Building Administrator
On Behalf of: Waikato District Council
Date: 24 November 2016



Titan Drainage
15 Mexted Pl
P O Box 9262
Hillcrest
HAMILTON

PRODUCER STATEMENT (PS3)

Installation of Wastewater Treatment System

Installer: Titan Drainage Ltd
Allister Shepherd
Registration No. 21608

Date of Installation: 2/6/2017

Installers Address: 15 Mexted Place
PO Box 9262
HAMILTON

I, the installer, certify that construction of the installation described below has been completed in accordance with the wastewater treatment design, and installed to code AS/NZS 1547:2012

As required by Council an As Built drawing of the installation is attached.

Owner: Swann

Consent No: BLD 0661/17

Site Address: 5 Hugh Greene Lane, Te Kauwhata

Specified Work: Supply and install wastewater treatment system in accordance with the engineered design.

NOTES/AMMENDMENTS

.....
.....

SIGNED: 
DATE: 6/6/2017

Allister Shepherd

TITAN DRAINAGE LTD



Titan Drainage
15 Mexted Pl
P O Box 9262
Hillcrest
HAMILTON

As Laid Drainage		Waikato Building Consents	
		Working Together	
Building Consent Number	0661/17	Date	23/6/17
Building Address	5 Hugh Greene Ln, Te Kanihata	No. of pages	
Drain Layer Name	Allister Shepherd	(Please print clearly) Signature:	<i>Allister Shepherd</i>
Registration Number	21608	Business Name	Titan Drainage Ltd.
To Council (tick)			
☐ Hamilton	☐ Hauraki	☐ Matamata-Piako	☐ Otorohanga
☐ Thames-Coromandel	☐ Waipa	☒ Waikato	☐ Waitemata



WBCG INS 26 As Laid

Version 2016-12-14

Page 1 of 1

TITAN DRAINAGE LTD

DART DRAINAGE DESIGN

Producer Statement (PS4)

Wastewater Management System

I, the engineer, certify that construction of the installation described below has been completed in accordance with the design drawings and in accordance with the applicable standards:

- Wastewater - NZS1547:2012

Inspection and supervision of the works was monitored continuously during construction to ensure quality and design standards were adhered to.

Owner: Swann
Project: New Dwelling
Consent No: BLD 0661/17
Site Address: 5 Hugh Greene Lane, Te Kauwhata
Specified Work: Installation of wastewater management system

NOTES/AMMENDMENTS

.....
.....
.....

SIGNED: 

DATE: 12/6/2017

Murray White
Producer Statement Author: 0640

DART DRAINAGE DESIGN



Titan Drainage
15 Mexted Pl
P O Box 9262
Hillcrest
HAMILTON

PRODUCER STATEMENT (PS3)

Installation of Wastewater & Storm Water Drainage

Installer: Titan Drainage Ltd
Allister Shepherd
Registration No. 21608

Date of Installation: 2/6/2017

Installers Address: 15 Mexted Place
PO Box 9262
HAMILTON

I, the Installer, certify that construction of the installation described below has been completed in accordance with the New Zealand Building Code, and any instructions issued by the Engineer, Building Inspector or Designer

As required by Council an As Built drawing of the installation is attached.

Owner: Swann

Consent Number: BLD 0661/17

Site Address: 5 Hugh Greene Lane, Te Kauwhata

Specified Work: Installation of wastewater and storm water drainage

NOTES/AMMENDMENTS

.....

SIGNED: 
DATE: 6/6/2017

Allister Shepherd

TITAN DRAINAGE LTD



Titan Drainage
15 Mexted Pl
P O Box 9262
Hillcrest
HAMILTON

www.titandrainage.co.nz

Waikato Building Consents	
Working Together	
As Laid Drainage	
Building Consent Number: 0661/17	Date: 27/6/17 No. of pages:
Building Address: 5 Hugh Greene Ln, Te Kauhata	
Drain Layer Name: Allister Shepherd	(Please print clearly) Signature: <i>A Shepherd</i>
Registration Number: 21608	Business Name: Titan Drainage Ltd
To Council: (Tick)	
☐ Hamilton ☐ Hauraki ☐ Matamata-Piako ☐ Otorohanga ☐ Thames-Coromandel ☐ Waipa ☒ Waikato ☐ Waitomo	

Pressure test

Plumbing Pressure Test Memorandum

Issued by:
(Plumber)

Brook Owen

Registration
Number:

17256

Company
Name:

Peter Owen plumbing and gasfitting

Company
Address:

101 Columbo st Hamilton

Company
Contact
Details:

Ph: 078479699

Mb: 0274489511

Fx:

To:

- ☐ Hamilton City Council ☐ Hauraki District Council ☐ Matamata-Plako District Council ☐ Otorohanga District Council
☐ Thames-Coromandel District Council ☒ Waikato District Council ☐ Waipa District Council ☐ Wairarapa District Council

Building
Consent
Number:

Building
Owner:

Project
Address:

5 Hugh Green lane

Description
of Building
Work:

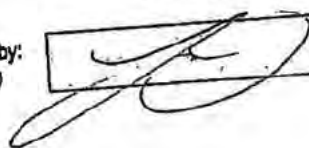
Completion of a pressure test on the plumbing system

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:

15.6.17

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 6699. For information on the Waikato Building Consent Group visit www.buildwaikato.co.nz.

PS-Plumbing Pressure Test Template Version 2016-08-11

Gas.

GASFITTING CERTIFICATE OF COMPLIANCE – GAS SAFETY CERTIFICATE



Certificate of Compliance:

Client Name: Signature homes Waikato

Reference / Job #: J1787 ICP (if known):

Address of work: 5 Hugh Green lane

Suburb: Te Kawhata Town / City: Te Kawhata

Description of gasfitting work: (If different gasfitting work was done by different people, state who did what gasfitting.)

Installation, pipework, appliances, testing and commissioning of-
1 x F and P OR90SDBGFX2 gas hob kitchen
1 x Rheem A871024NFZ/LFZ continuous flow hotwater outside

Gas supply pressure 1 kPa Risk classification (tick one) ☐ Low-Risk ☒ General ☐ High-risk

Gas type (tick one) ☐ Natural gas ☒ LPG ☐ Biogas ☐ Other (specify)

The work has been done in accordance with a certified design: ☐ Yes ☒ No

If yes – Identify the certified design including name, date and version. Also attach a copy of the certified design to this certificate.

(Or provide reference to readily accessible electronic format, eg Internet link.)

Identify:

Link:

The work relies on manufacturer's instructions: ☐ No ☒ Yes:

If yes – Identify the instruction manual including name, date and version. Also attach a copy of manufacturer's instructions to this certificate.

(Or provide reference to readily accessible electronic format, eg Internet link.)

Identify: As stated above

Link:

The work has been done in accordance with means of compliance (specify):

☒ Yes – AS/NZS 5601.1 sections 3 to 6 ☒ Yes – AS/NZS 5601.2 sections 3 to 9 ☐ No

Were any other standards or gas code of practice required for compliance?

☐ Yes (specify) ☒ No

Parts of the gas installation to which this certificate relates that are safe to connect to a gas supply?

☒ All ☐ Parts (specify)

Date(s) on which the work was done:

Name and registration number of anyone who carried out work under supervision:

By signing this document I confirm that I am satisfied that the work described in this certificate of compliance has been done lawfully and safely, and that the information on this certificate is correct.

Certifier name: Brook Owen Registration number: 17256

Certifier Signature:

Date: 15. 6. 17

Gas Safety Certificate:

By signing this document I confirm that the work described in this Gas Safety Certificate, and the installation or part installation, is connected to a gas supply and is safe to use.

Name of person authorised to certify the connection: Brook Owen

Registration number: 17256 Date of completion or connection: 15. 6. 17

Certifier Signature: Date: 15. 6. 17

This Gas Safety Certificate confirms that the gasfitting work complies with the building code for the purposes of Section 19(1)(e) of the Building Act 2004.

Batts.

Installation Producer Statement



Building Details

Builder: Parangon Building Ltd T/A Signature Homes
Lot:
DP:
Address: 5 Hugh Greene Lane
City/Town: Te Kauwhata
Council:
Consent:
Notes:

Carters Install + considers on reasonable grounds that at the time of installation the product(s) listed below were installed into the above building in accordance with Installing Insulation In Residential Buildings NZS 4246 A1:2006 and the plans and specifications provided by the customer. This Installation Producer Statement is issued subject to Carters standards terms and conditions of sale (available at www.carters.co.nz).

Product Details

Product Type: Insulation

Ceiling: R3.2 Ceiling Pink Batts
Wall: R2.2 Wall Pink Batts
Midfloor:
Acoustic:
Other:
Notes:

Completion Details

Merchant: Carters Install +

Installer: Install Solutions

Installer:

Date Installed: 24/02/2017

Date Issued: 24/02/2017

Manager:

Install+ Carters Installed Solutions
www.carters.co.nz



Engineer,



Date: 18 January 2017

Our Ref: 161434

**Construction Review
Producer Statement PS4**

For Inspections Completed At

**5 Hugh Green Lane
Te Kauwhata**

Prepared by:

A handwritten signature in black ink, appearing to read 'Jm Dunning'.

James Dunning
Engineering Technician

Reviewed by:

A handwritten signature in black ink, appearing to read 'Craig Manssen'.

Craig Manssen
Chartered Professional Engineer
CPENG 161576

24 Pengover Avenue
Cambridge 3432

Page 1 of 8

PCE Ref 161434

Ph: 07 560 3555
Mob: 021 614 827
Email: info@pca.net.nz
01/2017



Building Code Clause(s) **B1/VM4, B1/VM4**

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

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

ISSUED BY: **Kirk Roberts Consulting Engineers**
(Construction Review Firm)

TO: **Paragon Building Ltd**
(Owner/Developer)

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

IN RESPECT OF: **Subgrade inspection, Building platform supervision and compaction testing**
(Description of Building Work)

AT: **5 Hugh Green Lane, Te Kauwhata**
(Address) **31** **DP 455848** **SO**
LOT

Kirk Roberts Consulting Engineers has been engaged by **Paragon Building Ltd**
(Construction Review Firm)

To provide ☐ CM1 ☐ CM2 ☒ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with owner/developer
or ☐ other **Engineering supervision** services
(Extent of Engagement)

In respect of clause(s) **B1/VM4, B1/VM4** of the Building Code for the building work described in documents relating to Building Consent No. **0661/17** and those relating to Building Consent Amendment(s) Nos. 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. (copies attached)
or by the attached Schedule ☐ have been issued during the course of the works.

On 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/VM4, B1/VM4** 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, **Craig Manssen** am: ☒ CPEng No. **161576**
(Name of Construction Review Professional) ☐ Reg Arch No.

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

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 **Craig Manssen** ON BEHALF OF **Kirk Roberts Consulting Engineers**

Date: **18 January 2017** Signature: *[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.

CONSTRUCTION REVIEW

We can confirm visiting the property above, and have observed the associated works listed below,

1. Building platform supervision and compaction testing, confirming;
 - a. That all topsoil and unsuitable soils have been removed from the building platform.
 - b. The subgrade has been tested at the time of excavation to a depth of 1 metre confirming the subgrade is satisfactory for the proposed building platform.
 - c. The building platform has been compacted to a minimum 300kPa ultimate bearing pressure.
 - d. Extents of the building platform in relation to building footprint location have not been confirmed as part of this PS4, but testing of the building platform has been completed based on a minimum of 500mm of building platform outside the line of the proposed foundations.
 - e. Underlying soil conditions are covered by a soils assessment not included with this PS4.

Note:

- *This statement applies to the members specified and no other part of the structure.*
- *If any problems arise during the construction of these members, we should be consulted.*
- *This report has been prepared solely for the benefit of our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.*

SITE PHOTOS



Scanning Quality Advice Note

Advice Note from: Power Business Services Scanning Team

Please note that the following 1 page(s) from the original paper document have one or more quality issues identified (see check box below). There may be a loss of original colour where efforts have been made to enhance the original image.

- ☐ Original page has faint printing/writing/graphics
- ☐ Original page has faint ink stamp(s)
- ☐ Original page has partial ink stamp(s)
- ☐ Original page is damaged (torn, missing corner, has a hole)
- ☐ Original page is askew or printing runs over page edge
- ☐ Original page is creased or was previously unfolded (z-fold)
- ☐ Original page or part of page is covering part of another page
- ☐ Pages missing from sequence
- ☒ Other - line down the page.

ELECTRICAL CERTIFICATE OF COMPLIANCE
AND ELECTRICAL SAFETY CERTIFICATE

electrical.



Reference/Certificate ID No:

2417A

This form has been designed to be used by licensed electrical workers to certify that installations or part installations under Part 1 or Part 2 of AS/NZS 3000 are safe to be connected to the specified system of electrical supply.

Location Details:

5 HUGH GREENG LANE

TETAWHATA

Contact Details:
(Name and address)

SHAWN SWANN

021808144

Name of
Electrical worker:

PETER HINTON

Registration/Practising
licence number:

I 3064

Organisation/company:

ALL VOLTAGE GUARANTEE

Phone and email:

027 2802392

photon@orcon.net.nz

Name of person(s)
supervised:

CoC

Type of work:

☐ Additions☐ Alterations☒ New work

The prescribed electrical work is:

☐ Low risk☐ General☒ High risk (Specify):

Reference Standards:

☐ Part 1 of AS/NZS 3000☐ Part 2 of AS/NZS 3000☐ Additional Standards:

Description of Work: (including date/s of work and type of supply system)

NEW MGN / NGN 600 AT NEW HOUSE SITE - 3PH PULLANTO
m box 1x PP ON m box.
Sub circuit to new house

I certify that the completed prescribed electrical work to which this Certificate of Compliance applies has been done lawfully and safely, and the information in the certificate is correct in that the installation, or part of the installation:

Select those that apply:

- ☒ Has been installed in accordance with the specified certified design¹
- ☒ Has an earthing system that is correctly rated (where applicable)
- ☒ Contains fittings that are safe to connect to a power supply
- ☒ Relies on a supplier Declaration of Conformity¹
- ☒ Relies on a manufacturer's instructions¹
- ☒ Has been satisfactorily tested in accordance with the Electricity (Safety) Regulations 2010
- ☒ Is safe to connect

Electronic/Other reference:

jassell.co.nz

Certifier's signature:

Test Results:

Polarity (Independent earth):	✓
Insulation resistance:	750mΩ
Earth Continuity:	0.01Ω
Bonding:	0.01Ω
Fault Loop Impedance	
Other (specify):	

Date:

2-4-17

¹ Attach or reference. If it is impractical to attach a copy of a particular manufacturer's instructions, or of any certified design or supplier declaration of conformity, provide a reference to where the documents can be found, in a readily accessible format, by electronic means.

ESC

I certify that the installation, or part of the installation, to which this Electrical Safety Certificate applies is connected to a power supply and is safe to use.

Certifier's
name:

P. Hinton

Registration/Practising
licence number:

I 3064

Certifier's
signature:Certificate
Issue Date:

2-4-17

Connection
Date:

2-4-17



ELECTRICAL CERTIFICATE OF COMPLIANCE AND ELECTRICAL SAFETY CERTIFICATE



Reference/Certificate ID No: 1444575

This form has been designed to be used by licensed electrical workers to certify that installations or Part Installations under Part 1 or Part 2 of AS/NZS 3000 are safe to be connected to the specified system of electrical supply.

Location Details:

5 HUGH GREENE LANE, TE KAUWHATA

Contact Details:
(Name and address)

SHAWN SWANN

Name of
Electrical worker:

RAM VISAY

Registration/Practising
licence number:

1260531

Organisation/company:

WELLS I & E LTD

Phone and email:

06 7530333

Name of person(s)
supervised:

—

CoC

Type of work:

☐ Additions ☐ Alterations ☐ New work

The prescribed electrical work is:

☒ Low risk ☒ General ☐ High risk (Specify):

Reference Standards:

☐ Part 1 of AS/NZS 3000 ☒ Part 2 of AS/NZS 3000

☐ Additional Standards:

Description of Work: (including date/s of work and type of supply system)

INSTALLED REVENUE METER AT METER BOARD
LIVEN AT MAIN SWITCH.

I certify that the completed prescribed electrical work to which this Certificate of Compliance applies has been done lawfully and safely, and the information in the certificate is correct in that the installation, or part of the installation:

Select those that apply:

- ☒ Has been installed in accordance with the specified certified design¹
- ☒ Has an earthing system that is correctly rated (where applicable)
- ☒ Contains fittings that are safe to connect to a power supply
- ☒ Relies on a supplier Declaration of Conformity¹
- ☒ Relies on a manufacturer's instructions¹
- ☒ Has been satisfactorily tested in accordance with the Electricity (Safety) Regulations 2010
- ☒ Is safe to connect

Electronic/Other reference:

Certifier's signature:

(Signature)

Test Results	
Polarity (Independent earth):	<u>0.K</u>
Insulation resistance:	<u>264/622/637 MΩ</u>
Earth Continuity:	<u>0.08 Ω</u>
Bonding:	<u>0.02 Ω</u>
Fault Loop impedance	<u>0.15/0.18/0.15 Ω</u>
Other (specify):	<u>1.58/1.77/1.58 kA</u>

Date:

17/05/2017.

¹ Attach or reference. If it is impractical to attach a copy of a particular manufacturer's instructions, or of any certified design or supplier declaration of conformity, provide a reference to where the documents can be found, in a readily accessible format, by electronic means.

ESC

I certify that the installation, or part of the installation, to which this Electrical Safety Certificate applies is connected to a power supply and is safe to use.

Certifier's
name:

RAM VISAY

Registration/Practising
licence number:

1260531

Certifier's
signature:

(Signature)

Certificate
Issue Date:

17/05/17

Connection
Date:

17/05/2017.

/06/14 This certificate also confirms that the electrical work complies with the building code for the purposes of Section 19(1)(e) of the Building Act 2004.

CUSTOMER COPY – THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE KEPT FOR A MINIMUM OF 7 YEARS



RECORD OF INSPECTION (ROI) OF HIGH-RISK PRESCRIBED ELECTRICAL WORK

Pursuant to the Electricity (Safety) Regulations 2010



Reference/Record Number:

1665683

Issuer (Inspector) details:

Name of Inspector: RAM VIJAY

Registration #: I260531

Email Address: info@electrasafe.co.nz

Telephone: 021 891 584 / 09 828 1993

Location of Installation:

Location details: 5 HUGH GREENE CANE, TE KAUWHATA

Location Type: ☒ Domestic ☐ Non-Domestic Accommodation ☐ Industrial ☐ Commercial
☐ Educational ☐ Healthcare ☐ Miscellaneous (other)

Certifying Electrical Work and Certificate of Compliance (CoC) details:

Name of Electrical worker(s): PETER HINTON

Registration #: I 3064

CoC details:

2417A

☒ CoC(s) attached

Certifying Electrical Work and CoC details:

What was inspected:

New House → Mains Work + Mew + Earthing

Specify the regulation(s) and companion standard(s), or identify the certified design, followed when carrying out the inspection:

AS/NZS 3000:2007 (A)2

PART 2

SECTION 8

What are the results of the inspection:

VISUAL: 0.12 INSULATION: 264/622/633 MDPSSC: 1.58 / 1.27 / 1.58 kA
EARTHING: 0.08 Ω POLARITY: O.K LOOP: 0.45 / 0.18 / 0.15 Ω
BONDING: 0.02 Ω VOLTAGE: 237 RCD: —

High Risk Category:

- | | | |
|--|--|---|
| ☐ Not to AS/NZS 3000 Part 2 – 6A(2)(a)(i) | ☐ Photovoltaic system – 6A(2)(a)(iv) | ☐ Electrical medical area – 6A(2)(a)(vi) |
| ☐ High voltage installation – 6A(2)(a)(ii) | ☐ Hazardous area – 6A(2)(a)(v) | ☒ Mains work – 6A(2)(b) |
| ☐ Mains parallel generation – 6A(2)(a)(iii) | ☐ Animal stunning or meat conditioning – 6A(2)(c) | |
| ☐ Other – please describe: | | |

Declaration

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 energised, electrically safe.

(Note: Strike out or delete the inapplicable words highlighted in red above.)

Signature:

Date:

17/05/2017

Waterproofing

Producer Statement Construction (PS3) / Memorandum of Completion and Compliance

Issued by: (Construction Reviewer) Robert Le Normand Building Consent number: B100661/17

Company Name: Impact Tiling Ltd

To: ☐ Hamilton City Council ☐ Hauraki District Council ☐ Matamata-Piako District Council ☐ Otorohanga District Council
☐ Thames-Coromandel District Council ☒ Waikato District Council ☐ Waipa District Council ☐ Waitomo District Council

Waikato Building Consent Group Reg. No.: Expiry Date: Other No. (specify):

Owner: Swann

Project Address: 5 Hugh Greene Lane, Te Kauwhata

Lot: DP:

Description of Building Work: Waterproofing Bath

cope of work covered by statement:

System / Product used (if applicable): Ardex Superflex

I (Construction Reviewer's name): Robert Le Normand

have been engaged by (owner/developer/contractor): Signature Homes Paragon Building Ltd

In respect of (tick applicable):
☒ The requirements of the Building Regulations 1992, Clause(s): (Please be specific e.g. E2.3.5) E3

☐ Alternative Solution(s):

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

Waterproofing

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 the *Waikato Building Consent Group Producer Statement Author register (if applicable).
- ✓ I understand that this Statement, if accepted, may be relied upon for the purpose of establishing compliance with the Building Code and the Building Consent.
- ✓ I am satisfied the building work complies with the requirements of the Building Consent and the New Zealand Building Code.

Signed by: R L Normand Robert Le Normand
(Construction Reviewer): (Print clearly): Name of Constructor

Date: 14/6/17 Address: 298R Kahikatea Drive, PO Box 5230, Hamilton 3242

Ph: 07 847 9597 Mb: 021 464 658 Fx: Email: Robbie@impacttiling.co.nz

Qualifications / Experience: BCITO Qualified and Ardex Applicator Number 3973

*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 6699. For information on the Waikato Building Consent Group visit www.buildwalkato.co.nz.

PS 03 Template Version 2016-08-11



Dean Baldeck
Architectural Designer
021 856 027
dean@dbarchitectural.co.nz
PO Box 19154 Hamilton 3244

DB Architectural Ltd

PROJECT SPECIFICATION

Swann Residence

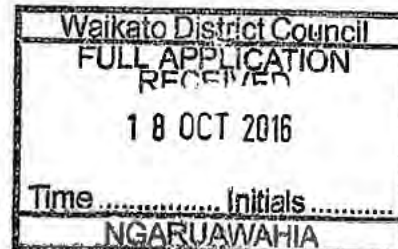
5 Hugh Greene Lane
Te Kauwhata



Issued for Construction

17 Oct 2016

70247



PROJECT OVERVIEW

Scope

New single storey residential dwelling with attached double garage. Concrete slab floor, timber framing with brick veneer cladding and longrun colorsteel roofing.

Address

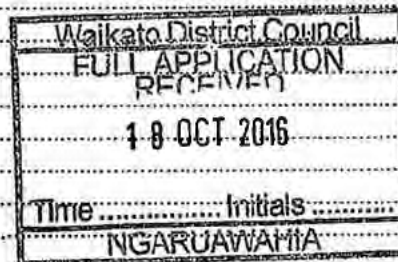
Site Address	5 Hugh Greene Lane
City	Te Kauwhata
Lot #	31
DP #	455848

Site Conditions

Wind Zone	H - High Wind Speed
Earthquake Zone	Zone 1
Exposure Zone	Zone B - Low
Snow Loading Zone	Zone NO

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1 PRELIMINARIES & GENERAL

1.1 Project Quality

1.1.1 Protection

Precautions

Take all appropriate precautions to protect all third party property, services, etc. and indemnify the Principal against any claims arising from the construction operations. Any damage to third party property caused by construction activities or failure to protect shall be rectified as soon as possible by the person causing the damage, or by appropriately qualified tradespersons employed by the person responsible for the damage if necessary.

Adverse Weather

Suspend operations during weather which would affect the quality of work in progress. Secure the works as soon as possible against adverse weather, dust and vandals. Avoid structural damage that is caused by overloading.

Protect Finished Work

Adequately protect all finished work and maintain until the date of Practical Completion. Each trade shall protect the work of all other trades, and each trade is responsible for making good any damage they cause to finished works. Arrange special protection as required for windows and doors, finished timber work, plumbing fittings and hardware, and cabinets and other joinery.

1.1.2 Responsibility

Guarantees

Contractor is responsible to the Principal for the appropriateness and fitness, in relation to a reasonable expectation or requirement, of all of the materials and workmanship incorporated into the works by himself or his subcontractors; for this reason few specific guarantees are required in these contract documents.

The terms and conditions of any warranty or guarantee required or provided shall not in any way negate the minimum remedies available under common law as if no warranty or guarantee had been furnished.

Acceptance

No apparent expression of the Architect/Designer's reasonable satisfaction shall be deemed to be acceptance of defective materials or workmanship within the terms of the Contract or to be an authority for any Variation except where such variation is authorised as provided for in the Contract. Instructions that are given verbally are deemed to be instructions for proper execution of the works and do not involve extra charges.

Good Trade Practice

Workmanship in all trades is required to be equal to or better than recognised good trade practice.

Notification

Should any tradesperson consider that the surface finish or general conditions of previous work are unsatisfactory to ensure a proper finish for their own work thereon, that tradesperson shall give immediate notice to the Contractor or Architect/Designer as appropriate and shall not proceed until necessary improvements have been made. Failing such notice the trade concerned will not be relieved of the responsibility for a poor finish due to such unsatisfactory condition.

Watertightness Detailing

The Contractor and all Subcontractors affected shall be jointly and severally responsible for completion of the whole of the works in a completely watertight condition and shall therefore examine all details to be satisfied that this condition can be achieved. If any detail is considered unsatisfactory the Architect/Designer shall be notified immediately and he will then either interpret the detail to the Contractor's satisfaction, or accept responsibility for watertightness at points in question, always assuming reasonable workmanship.

Systems Installation

For all electronic/ electrical/ mechanical operating systems all work and all necessary materials and items incidental to the primary item specified, that are incorporated into the works, shall be such as to leave a neat, efficient, easily maintained and robust installation, completely in accordance with all recommendations of the primary items manufacturers. Where appropriate source all parts of a system from a single supplier or manufacturer.

Compatibility

Ensure that all parts of a construction or finish are compatible and that their individual use is approved by the manufacturers and/or suppliers of other parts of the system.

1.1.3 Work Shown and Mentioned

The Contract Documents show the extent and nature of the works but there is no warranty expressed or implied that they show each and every minor detail or item required to be included by the Contractor. Should any material, structural member, fixing, or item or work appear to be inadequately described, yet obviously necessary for the neat, strong and satisfactory completion of the work, the Contractor shall include and allow for same in his Tender. Tenderers should draw attention to any significant such item they have allowed for in their Tender.

1.2 Works Management

1.2.1 Setting Out

Basic Site Setout

The Contractor is responsible for accurate setting out of the works. It is recommended that the Contractor engage a Registered Surveyor to establish the basic site setout and the floor levels.

Detailed Site Setout

A Registered Surveyor, engaged by the Contractor, shall check and confirm the accuracy of the Contractors detailed setting out of the works and shall certify this in writing to the Architect/Designer.

Setout Info for Subcontractors

The Contractor shall provide all necessary setting out information and component dimensions for subcontractors and shall check and be responsible for the accuracy of their work.

1.2.2 Co-ordination of the works

Co-ordinate the works of all trades to ensure efficient progress of the works. Ensure that all holes, sleeves, penetrations, supports etc. that are required for services are correctly incorporated as work proceeds. Identify and sufficiently forward notify the appropriate persons of all deadlines for the supply of components, fittings, information, etc.

1.2.3 Authorities and Charges

Building Code

Comply with all relevant provisions of the NZ Building Code, and with all relevant territorial or statutory authority regulations, by-laws, obligations etc. Give all required notices.

Consents

The Principal has obtained a Land Use Consent. The Principal has applied for and paid for the Project Information Memoranda, the Building Consent and other approvals required for the works to start. The PIM and Building Consent will be forwarded to the contractor as quickly as possible after they are issued by the Territorial Authority.

Note: It is an offence under the Building Act to carry out work not in accordance with a building consent.

Building Consent Conditions

Should the building consent be subject to any conditions which modify the contract documents in any way, the Architect/Designer reserves the right to negotiate any or all of these modifying conditions with the Building Consent Authority. If after these negotiations additional work is required, it will be handled as a variation to the contract.

Code Compliance Certificate

The Principal will apply for the Code Compliance Certificate and any other licenses or approvals for the building to be used. However Practical Completion will NOT be certified until the CCC inspection has occurred and any additional works required by the local Building Consent Authority has been completed. To this end it is recommended that the Contractor obtains all required certificates, guarantees, as-built drawings, etc. required for the CCC application as work proceeds, to facilitate application for the CCC as soon as the works are completed. For his part, the Principal hereby undertakes to apply for the CCC within one day of all required material being in hand. Likewise, the Contractor should have the capacity available to attend upon as soon as possible to any items identified by the Building Consent Authority as being required prior to the issue of the CCC.

1.2.4 Standards

New Zealand Standards (NZS), Australian Standards (AS), Joint Standards (AS/NZS), British Standards (BS), Acts of Parliament, Regulations made thereunder, Codes of Practice, and any specific Manufacturer's Instructions or Manufacturer's Recommendations that are referred to in the Contract

Documents shall all be deemed to be the latest published edition thereof at the time of drawings issue and shall be followed by the Contractor and all Subcontractors to the full extent applicable consistent with the intent of this Contract. Documents cited within other cited publications are deemed to form part of this specification.

Where Standards have a number of Divisions, e.g. AS/NZS 3500.1, AS/NZS 3500.2, etc., each of the Divisions relevant to this project is deemed to form part of this specification.

Retain current copies of significant cited documents and manufacturer's technical literature on the site.

1.2.5 Cleaning and Completion

Site Cleaning

Clear construction debris and rubbish from the works at regular intervals, and additionally if so instructed by the Architect/Designer. Clean each space thoroughly before commencing any finishing works.

Practical Completion

In preparation for the Practical Completion inspection carry out the following:

- Clean the works thoroughly, removing all debris, surplus materials, splashes, marks, temporary markings, etc. All cleaning methods and materials shall be as recommended by the manufacturer of the item being cleaned.
- Remove protective wrappings and coverings unless otherwise directed.
- Touch up minor painting faults, carefully matching colour, and brushing out edges. Repaint any badly marked surfaces back to suitable break lines.
- Adjust, ease and/or lubricate as required all doors, drawers, controls and other moving parts to ensure their efficient operation.
- Any other works required to leave all spaces ready for immediate occupation and all electronic / electrical / mechanical systems fully operational.
- Clean out all spoutings, gutters, downpipes, and gullies and flush out all drains.
- Clean all sanitary appliances and check all aspects of the water services.
- Thoroughly re-inspect all aspects of the works (and have any defects fully rectified) to be certain that the works are completely ready for the Practical Completion inspection - If an unreasonable number of items are noted by the Architect/Designer during the inspection it will be terminated and then rescheduled for at least a week forward to allow for proper completion to be achieved.

Certification

Note that a Code Compliance Certificate must be obtained before Practical Completion will be certified. Obtain all required certificates, guarantees, as-built drawings etc. as work proceeds to enable the CCC application to be submitted as soon as construction is completed.

1.3 Works Specifics

1.3.1 Site Safety

Code Compliance

Comply with all of the requirements of the New Zealand Building Code, and in particular with Approved Documents F1 - F5 inclusive. Comply with all relevant OSH Codes of Practice, particularly those for construction, and with the Department of Labour's 'Guidelines for the Provision of Facilities and General Safety in the Construction Industry.' Comply with any other relevant safety legislation and/or regulations.

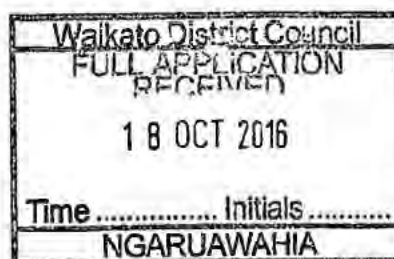
Safe Working Environment

Take all practical steps to make the site and the contract works safe and to provide and maintain a safe working environment. Ensure that all those working on or visiting the site are aware of the site safety rules and are not unnecessarily exposed to hazards.

Scaffolding Standards

Comply with all relevant provisions and recommendations of:

- AS/NZS 1576 : Scaffolding equipment.
- AS/NZS 4576 : Scaffolding installation.
- AS/NZS 4994 : Roof edge scaffolding.
- Labour Department : Scaffolding Code of Practice.



Safety Concerns

Scaffolding shall comply with all Statute and Local Authority Regulations, shall be maintained for the duration, and be removed on completion. The use of ballistic fixings must absolutely comply with all relevant safety recommendations at all times. Portable/personal disc/tape players, radios and iPods must not be used anywhere on site.

No Fires

No rubbish fires are allowed on site.

Egress Routes

Notify the Department of Labour in writing of the Certified Safety Supervisor responsible for safety aspects of the works. Contractor and Subcontractors must familiarise themselves with egress routes from the building, and must ensure that egress routes are NEVER obstructed with construction materials such as to prejudice egress.

1.3.2 Temporary Services

Power, water and Telecoms services are already laid on to the site. Arrange and pay for adequate temporary connections to these services for the duration of the contract.

1.3.3 Specification

This Specification covers contract administration, standards, materials quality, workmanship and the scope of works only: the exact nature of the works and all specialist items, descriptions etc. are contained on the drawings which also take full precedence.

1.3.4 Dimensions

Except where they are clearly to the contrary all dimensions are deemed to be to the bare surface of concrete, masonry, timber framing or other basic construction material. All figured dimensions take precedence over scaled sizes.

Where any detail is included in more than one drawing the larger scale detail takes precedence. Where any ambiguity exists refer to the Architect/Designer for interpretation.

1.3.5 Definitions

Provide and Fix

The word 'provide' and the word 'fix' used separately in the Documents shall be taken to mean 'provide and fix' unless otherwise stated.

1.4 Project Overview

1.4.1 Contract & Tender Documents

Contract Documents

The Contract Documents are complementary and comprise this Specification, the accompanying drawings, the NBC (National Building Contract) together with all Schedules, any Notices to Tenderers issued during tendering, the Tender and the list of accepted Subcontractors, the tender acceptance letter and other relevant correspondence, and any additional details or instructions issued as variations.

The National Building Contract will be emailed upon request.

1.4.2 Site

Residential Site Access

Ensure that the access drive from the road to the house site is not damaged by construction traffic. Reinstate if necessary to equal or better than current condition at the conclusion of this contract.

It is suggested that the contractor take photos at the commencement of the contract for reference re surface etc. on completion.

Site Conditions

Note that the balance of the site not shown for building over or for yards, paths etc. is to remain as close as possible to its current state on completion of the Contract. Plan the excavation carefully to avoid overlaying areas outside of the works area with spoil or other debris.

1.4.3 Adjacent Owners

Avoiding Disruption

Take/carry out whatever actions or precautions are required to avoid or to absolutely minimise noise, dirt, dust, access, etc. inconvenience or disruption of any nature to the adjacent owners or tenants. Indemnify the Principal against any claims arising from this source.

2 SITEWORKS

2.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

2.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

2.3 Site & Scope

2.3.1 Site

Note that no claims will be recognised on the grounds of insufficient description of existing site conditions in the Contract Documents.

2.4 Excavation & Filling

2.4.1 Excavation

Excavation work shall be carried out in accordance with the WorkSafe NZ Excavation Code of Practice. Co-ordinate with other trades as to set-out and timing to ensure that all cut faces are covered or finished etc. as soon as possible after the excavation is complete.

Plan the excavation carefully to ensure that stockpiles will not interfere with concrete construction, to stockpile just sufficient material for the filling, backfilling and reshaping required later, and to avoid overlaying areas outside the works area with material.

Noisy excavation equipment shall be used only during hours which will avoid undue nuisance to the occupants of adjacent properties.

Excavate accurately in position and true to line and minimum sizes and to levels and grades required for all slabs, footings and foundations, and over the rest of the areas shown for levels adjustment.

Below slabs on ground the general intent is to excavate to a stable undisturbed subgrade (of 300 kPa ultimate bearing capacity).

Remove individual boulders from the excavated material and stockpile them where noted for future landscaping use by others.

Keep excavations free of water - remove foundation trench material which becomes water-softened.

Ensure that rainwater runoff from excavated surfaces does not carry material onto adjacent properties.

As soon as excavation and filling is complete foundation material will be inspected by the Architect, and any changes to foundation widths/details will be directed.

2.4.2 Excavation Completion

As soon as excavation and filling is complete and before any concrete is placed or other work proceeded with the foundation material will be inspected by the Engineer, and any necessary changes to foundation widths or details will be directed.

2.4.3 Filling

Filling with salvaged material (of appropriate moisture content) shall be compacted in 150mm layers with mechanical rammers, to 95% relative compaction. All work generally in accordance with the provisions of NZS 4431.

On completion clean up the stockpile areas and the site.

Waikato District Council	
FULL APPLICATION	
Issued for Construction	
18 OCT 2016	
Time	Initials
NGARUAWAHIA	

3 CONCRETE

3.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

3.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3101.1&2:2006(NZS)	Concrete Structures Standard
3104:2003(NZS)	Specification for concrete production
3109:1997(NZS)	Concrete construction
3112.1:1986(NZS)	Methods of test for concrete - Tests relating to fresh concrete
3114:1987(NZS)	Specification for concrete surface finishes
3121:1986(NZS)	Specification for water and aggregate for concrete
3122:2009(NZS)	Specification for Portland and blended cements (General and special purpose)
3124:1987(NZS)	Specification for concrete construction for minor works
3604:2011(NZS)	Timber-framed buildings
4671:2001(AS/NZS)	Steel reinforcing materials

3.3 Workmanship

3.3.1 Qualifications

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All work shall be carried out to the latest and best trade practise standards by experienced and competent tradesmen, familiar with the materials specified and installation techniques.

3.3.2 Formwork

Provide all necessary formwork to produce finished concrete to the required dimensions, surface finishes and structural tolerances (NZS 3109 table 4, note that slab surfaces shall not vary by more than 3mm from a 3m straightedge placed anywhere on the surface, and that this maximum variation shall extend over a minimum distance of 1m).

Coordinate with all trades to build in all necessary starters, fixings, anchorages, chases, sleeves, bolts, conduits, electrical / plumbing devices etc., and check their exact positioning before pouring. Coordinate with all trades to form all necessary holes, openings etc. with their positions and sizes exactly as required.

Strike formwork without shock or vibration, and without disturbing, damaging or overloading the structure. Fill all bolt holes as soon as practicable.

3.4 Ribraft Concrete Floors

3.4.1 Scope

Supply the required/selected Firth RibRaft components and construct the concrete on-ground floor slab as shown on the drawings. All aspects of this work shall be in accordance with the Firth RibRaft Technical Manual Manual (check www.firth.co.nz or call 0800 800576 for the latest edition), a copy of which must be held on site (and referenced for any aspect where there is the slightest uncertainty), the RibRaft Floor System CodeMark Certificate of Conformity - Certificate No: CMA-CM40015(Rev1), and as shown on the drawings.

No Substitutions are permitted for Firth RibRaft Floor System.

3.4.2 Selections

Pods thickness: 220mm

DPM: as per NZS 3604:2011

Slab thickness above pods: 85mm

Slab finish: U3

3.4.3 Installation

All RibRaft installation work shall be carried out by experienced and competent tradesmen, familiar with the techniques and materials specified, in accordance with Firth RibRaft Technical Manual and as shown on the drawings. All handling, preparatory blinding DPM, formwork and reinforcing, and concreting and finishing techniques shall be exactly as recommended by Firth Industries Ltd.

Notify the BCA for inspection of the excavation and of the Ribraft slab ready for pouring, and keep whatever records or test results they may require.

Check that all topsoil etc. has been removed from the RibRaft slab location and that the excavated (or hardfill made-up where necessary) platform is level and approximately 330mm below the required finished floor level. Co-ordinate with other trades to ensure that any wastewater drains or other piped or wired service lines are correctly incorporated (and fully operationally tested as appropriate) as work proceeds.

Place and compact any hardfill or basecourse required by the Engineer for specific design. Blind the surface with up to 50mm of sand, and compact (and adjust if necessary) to accurately level, carrying the sand blinding to at least 500mm beyond the RibRaft perimeter. (Install shear key piles if required or specified).

Lay the specified DPM over the entire platform and extending at least 200mm beyond the RibRaft perimeter, with strips lapped 150mm and 50mm PVC adhesive tape sealed, and any services penetrations tape sealed. Tape repair any damage to the DPM as soon as it occurs, and re-inspect/repair just before pouring. Construct the slab perimeter formwork as specified above and as detailed, including edge rebates and any slab cut-outs required.

Unload and handle components carefully to avoid any damage, and keep them clean until installed. Place the RibRaft pods in the grid pattern as shown on the layout plan, with Firth 300mm spacers to the perimeter and under loadbearing walls, and Firth 100mm spacers between all other pods. Neatly cut pods as required to infill where the shape or size of the slab does not match the 1.2m pods module.

Reinforce as specified and as noted on the drawings, ensuring the bars are positioned in the spacer lugs, install plumbing waste pipes etc. as required, and then install the reinforcing mesh over the top of the pods, seated on mesh chairs, and install the re-entrant corner steel (Grade 500E) across internal corners as noted. Install starters as detailed for any subsequent masonry walls, ensuring accurate positioning (as bending to masonry core positions is not acceptable).

Pour Firth RaftMix (or pump Firth RaftMix Pump), and vibrate and screed and finish as specified, and cure and install shrinkage control joints as specified or noted.

Remove trade debris from the area progressively; on completion leave the works area completely clean.

4 BRICKWORK

4.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

4.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2699.1:2000(AS/NZS)	Built-in components for masonry construction – Wall ties
3103:1991(NZS)	Specification for sands for mortars and plasters
3604:2011(NZS)	Timber-framed buildings
4210:2001(NZS)	Masonry construction: Materials and workmanship
4236:2002(SNZHB)	Masonry veneer wall cladding
NZBC B2	Durability
NZBC E2/AS1	External Moisture

4.3 Brickwork

4.3.1 Scope

Supply and lay the selected bricks to form the brick elements as shown on the drawings. All aspects of this work shall be in accordance with the related compliance documents and as shown on the drawings.

4.3.2 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All work shall be by or under the direct supervision of a Registered Mason certified by NZ Masonry Trades Registration Board, and conform to the requirements of NZS 4210.

Co-operate with the concreter and carpenter in the setting out of the works.

Co-operate with other trades to ensure that all preliminary and preparatory works, including all framing, membranes, wraps, rigid air barriers, and flashings, all relevant clearances, and any other related works, are completed to specification and as shown on the drawings.

Co-ordinate with trades the locations of pipes, outlets, cables, meter boards and other fittings installed by others.

All brick veneer walls shall be true to line, level and plumb, and within the tolerances tabled in NZS 4210 and SNZ HB4236. All brickwork laid to stretcher bond pattern, with joints width 10mm +/- 3mm.

4.3.3 Installation

Install all brickwork related damp proof courses in accordance with the requirements of NZBC E2/AS1 and to the details shown on the drawings.

Mortar shall have a minimum compressive strength of 12.5 MPa, and be manufactured from cement, sand, lime, and admixtures, and be accurately measured and mixed in accordance with NZS 4210.

Mineral oxide pigment dosages shall be to NZS 4210.

Form all necessary openings, reveals, sills, weepholes, separation and control joints, and cavities to the locations and details shown on the drawings, and in accordance with the requirements of NZBC E2/AS1 and NZS 4210. Install necessary vermin stops. Weatherproof all separation joints to the details shown on the drawings.

Wall tie type, durability, spacing, fixing and installation shall be as defined in NZBC E2/AS1 Tables 18A, 18B, 18C, and NZS 4210.

Install all necessary flashings to openings, and other locations as required, to the details shown on the drawings and in accordance with NZBC E2/AS1 requirements.

During the progress of work every care must be taken to prevent moisture penetration of the bricks. No bricklaying shall proceed during wet weather. Upon completion of each days work, exposed tops of brick veneers shall be protected from inclement weather.

Comply with NZS 4210 Cold Weather Construction and Hot Weather Construction requirements.

On completion or the works leave brickwork clean and free of marks and staining. All brickwork cleaning shall be done to the brick manufacturer's recommendations.

Thoroughly clean all other surfaces affected by the brickworks.

4.3.4 Mortar Pointing

Mortar joints shall be concave, tooled to a depth not exceeding 6mm and burnished after the initial stiffening has occurred.

5 CARPENTRY

5.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

5.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1491:1996(AS/NZS)	Finger jointed structural timber
1562.2:1999(AS/NZS)	Design and installation of sheet roof and wall cladding - Corrugated fibre-reinforced cement
1859.1:2004(AS/NZS)	Reconstituted wood-based panels - Specifications - Particleboard
1859.2:2004(AS/NZS)	Reconstituted wood-based panels - Specifications - Dry-processed fibreboard
2270:2006(AS/NZS)	Plywood and blockboard for interior use
2271:2004(AS/NZS)	Plywood and blockboard for exterior use
2295:2006(NZS)	Pliable, permeable building underlays
2588:1998(AS/NZS)	Gypsum plasterboard
2589:2007(AS/NZS)	Gypsum linings - Application and finishing
2904:1995(AS/NZS)	Damp-proof courses and flashings
2908.2:2000(AS/NZS)	Cellulose-cement products - Flat sheets
3602:2003(NZS)	Timber and wood-based products for use in building
3603:1993(NZS)	Timber Structures Standard
3604:2011(NZS)	Timber-framed buildings
3617:1979(NZS)	Specification for profiles of weatherboards, fascia boards, and flooring
3618:1984(NZS)	Mechanical stress grading of timber
3622:2004(NZS)	Verification of timber properties
3631:1988(NZS)	New Zealand timber grading rules
3640:2003(NZS)	Chemical preservation of round and sawn timber
AS/NZS 2269.0:2012	Plywood - Structural - Part 0: Specifications
NZBC E2	External moisture

5.3 General

This section includes the receiving, stacking and storage of all Carpenter's materials and the fabrication, erection and fixing of all framing, sheathings and finishing timbers, including all work incidental to neatly finishing in other trades and all temporary work and temporary bracing.

The Carpenter shall attend upon all trades, and shall supply and fix all obviously necessary but not specifically mentioned fixings and materials.

5.4 Materials

5.4.1 Timber

Timber standards

All timber shall be true to NZS 3631, SG 8 or better for all framing, and dressing A for all finishings. Timber which is below standard, in the opinion of the Architect/Designer, shall be removed from the site.

Timber seasoning

All timber shall be seasoned or kiln dried to the stable moisture content suitable for its location in the finished construction, and if the use of inadequately seasoned timber results in damage or opening joints in the finished building the timber shall be replaced. Fixing of linings delayed after closing in until the framing has dried back below 20% and to allow for the maximum settling of substrates.

Timber treatment

All non-durable timber, including components in manufactured items, shall be appropriately treated against moisture and/or insect decay by a member of the NZ Timber Industry Federation Inc. Treatment shall be to the requirements of NZS 3602 as an absolute minimum, and all treated timber shall be identified and marked as required.

Ensure that similar timbers with different treatment levels are carefully managed to avoid accidental use of an H1 item where H3 treatment is required by the Standard.

Timber storage

All kiln dried, dressed or finishing timbers shall be stacked under cover on delivery to the site, and all timber shall be full to the nominal sizes shown or specified, subject only to normal cutting and dressing tolerances.

Timber priming

Ensure that enclosed surfaces and ends of paint finished exterior finishing timbers are fully primed before fixing. If this trade carries out the priming it shall be to the standards required of the Painter.

Timber re-treatment

Ensure that all cut or drilled surfaces of H4 and H5 treated timbers are flood coat re-treated, with the product recommended by the original treatment plant, before installation.

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Exposed framing timbers

All exposed framing timbers will be unfinished to the exterior, and shall be fine bandsawn milled, treated with a minimum of discolouration, handled carefully at all times to avoid surface damage, and delivered free of crayon or pencil or other markings.

Required treatment markings shall be on the ends, NOT on the faces.

5.4.2 Other Materials

Shall be delivered with the packaging and labeling intact, shall be of the same type, finish or colour to maintain continuity, shall be handled, stored, and conditioned if required all in accordance with manufacturers recommendations, and shall be protected from rain or dampness where appropriate. The use of items damaged in any way is subject to approval.

5.4.3 Fixings

Nails

Comply with the Nailing Schedules in NZS 3604. All nails fixing exterior timbers shall be stainless steel, (OR hd galv. and nails in cedar shall be st.st), and nails that will be covered with plaster or any similar material shall be hot dip galvanized, unless otherwise specified.

Finishing brads to all finishing timbers shall be set out neatly and punched to the diameter of the nail below the surface. Bore slightly undersize holes for nailing that will possibly cause splitting.

Machine staples are completely unacceptable in finishing timbers.

Screws

Shall be of suitable gauge, thread design and length to provide secure fastening, stainless steel/hot dip galvanised to the exterior, hot dip galvanised or similar corrosion resistant for damp situations.

Screws fixing hardware or similar shall be of the same material and finish as the hardware.

Bolts

Unless noted or specified otherwise, holding down bolts shall be M12 galvanised at maximum 900mm centres, and in all cases maximum 300mm from each end of the timber, cast in 120mm minimum unless noted otherwise.

Timber/timber and timber/steel - Hexagonal head mild steel with metric thread and with 50mm x 50mm x 3mm washers, all hot dip galv, M16 unless noted otherwise.

Timber/concrete (dry situations) - Ramset Trubolts, T12140 at 0.6m centres unless noted otherwise (for damp or exterior situations use stainless steel Trubolts).

All bolt holes 1mm larger than the bolt. Bolts tightened until the washer just indents the timber surface, and re-tightened just prior to Practical Completion to remove any slack consequent on timber shrinkage. Secure all nuts by punching thread.

Adhesives

Aliphatic PVA for dry timber applications.

All other adhesives are subject to specific approval.

Check surfaces are in appropriate condition to receive adhesive, and all adhesives use strictly in accordance with the manufacturers instructions. Check alignment of adhesive fixed items pre final set.

5.4.4 Sealants

Sealant for Critical Joints

For critical joints, i.e. primary water/weatherproofing seals, precast panels primary seals, structural floor slab control joints, structural glazing, immersion or hydrostatic pressure seals, etc. etc., either use the sealant noted on the drawings or obtain a reputable sealant manufacturers recommendation for the precise situation, and submit the manufacturers specifications covering all relevant criteria and characteristics of the proposed sealant, primers, joint surfaces preparation, etc. to the Architect/Designer for review and confirmation to proceed. If so requested additionally submit a sample of the proposed sealant made up into a demonstration joint, incorporating the same materials, preparation, finish tooling, etc. After confirmation to proceed with the proposed sealant install a sample joint to approval, length approx. 2% of the overall length of the joints required, with a minimum length of two metres; when accepted this joint becomes the quality control for all subsequent similar joints.

Sealant for Less Critical Joints

For less critical joints (generally in covered or protected situations) and bathroom and kitchen ceramics and sanitaryware etc., select the sealant from a reputable manufacturers range for the substrate materials involved, with due regard for the flexibility required, acid or neutral curing, mould resistance, paintability (or clear or standard colours), slumping characteristics, temperature extremes expected, etc. (silicone, polymer or polyurethane sealants are anticipated). For all simple gap-filling and draught sealing situations select a paintable acrylic sealant with good adhesion characteristics for the substrates involved. (Be particularly careful in sealant selection with bare metal, polycarbonate, polystyrene or similar substrates or where bituminous based membranes are adjacent or where exposure to solvents is possible).

Qualifications

All joint surfaces preparation and all sealant installation work shall be exactly in accordance with the sealant manufacturers recommendations, and carried out by competent and experienced operatives.

Application

Ensure that the sealant is being used within the manufacturer's stated design parameters, particularly with regard joint design and anticipated cyclic movement. Check that the joint faces are sound, completely clean and free of dirt rust oil grease laitance etc., dry (and frost-free), and they are primed to suit the surface porosity (particularly for critical locations). Insert a polyethylene tape slip layer at the back of the joint or a closed cell polyethylene backer rod where required, and to the sealant manufacturers recommendations. Mask joint edges where a clean straight finish line is required.

Completion

Check the toxicity of the selected sealant and handle it appropriately. Check that the temperature during sealant installation is within the manufacturers guidelines. Install the sealant and then tool the filled joints surfaces smooth and even, utilizing a lubricant as necessary and strictly within the manufacturers guidelines. Remove any masking immediately after tooling, clean up all adjacent surfaces using the recommended cleaning agents as required, and protect the finished joints until they have properly cured.

5.5 Workmanship

5.5.1 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All non-restricted building work to be carried out by or under the direct supervision of competent tradesmen.

All work to be carried out in accordance with the best and latest trade practice.

Timberwork joints shall be accurately fitted to ensure close contact over the full surface of the joint. Carefully punch exposed nailing to the diameter of the nail head below the surface. Bruises and tool marks completely removed. Split timbers and hammer marked finishing timbers replaced.

Distribute any acceptable defects in timber so as not to impair the strength or the appearance of the finished work. Do not cut studs across the grain to straighten them.

The checking and cutting away of timbers shall be avoided where possible and shall be limited to such dimensions as will not prejudice the purpose for which the timber is used. Observe NZS 3604 restrictions on holing and checking of joists and beams. Concealed services pipes and wiring shall not project beyond the framing face and where possible shall be beyond the linings fixings reach.

Fit a 3 ply bituminous DPC at all timber to concrete junctions to provide complete separation.

Ensure that the DPC material is compatible with the timber treatment.

Install heavyweight building paper or breathable/absorbent building wrap behind all exterior claddings, fixed horizontally with 150mm laps, finished at edges as detailed, staple fixed at 300cns to all studs and with staples through nylon straps in exposed locations, all in exact accordance with the manufacturers recommendations. Any damage shall be made good by lapping in a new section.

Line under roofing with heavyweight building paper weatherlapped and fully supported on nylon straps where necessary.

Clean out framing voids before fixing sheathings. Ensure framing voids are fully vermin proofed. Build in as necessary all required flashings (supplied by others) to windows, doors, roof edges, etc.

Just prior to closing-in clear all timber offcuts and other rubbish, and rake loose material to even. Lay 0.25mm thick black polythene sheeting over the full ground surface. Cut to neatly butt or lay up against foundations. Lap joins 100mm and tape seal. Hold in place with pegs, block knockouts or similar.

5.5.2 Windows Installation

Prepare window and external door framing openings for joinery installation by neatly cutting the building wrap at 45° into corners, turning the wrap through the frame depth and fixing to inside face, flashing the bottom corners with moulded plastic corner flashings and overflashing the full sill and 200mm up the jambs with flexible flashing tape, stapled to hold the stretched external corner. At the head corners install flashing tape 200mm each way from the corners, and install the specified metal head flashing fixed over the wall wrap, in turn over-flashed with an additional piece of wrap extended up under the wrap above or sill flashing or up under the eaves soffit.

Take delivery of aluminium windows (and doors). Check substrates for correct profile and alignment. Set shims or pack as necessary to install exactly true and square. Use appropriate separators between aluminium and other materials, and fix securely with due regard for any anticipated movements and for linings, trim etc.

Install frames with aluminium flashings as noted and/or as required to completely weatherproof all frame to cladding junctions. Head flashings carried 75mm minimum up behind claddings, extended at 15° out over the head facing and covering the facing 25mm before finishing with a 5mm 45° 'kick out'. Neatly dress down the head flashings at the ends of the facings. Sill soaker where required shall have a minimum 5° slope and be carried down 40mm over lower cladding and finished with a 5mm 45° 'kick out'.

Install neat sealant beads as shown or required.

After frames installation install closed cell backing rods as required and expanding foam air-seal the gap between framing and liners.

5.5.3 Joinery Fixing

Take delivery of all scheduled joinery items (doors, cabinets, shelves, etc.) and install in the positions shown, accurately aligned, true to level, plumb and square, and securely fastened as noted and in accordance with best trade practice and with due regard for adjacent linings, finishes and trim, and anticipated movements.

Cabinets scribed and/or recessed packers scribed to adjacent surfaces as detailed or directed.

Protect all installed joinery from damage including surface marking and contamination, dirt and dust, and moisture until completion. Do not use joinery items for working supports or platforms or for storage of materials or tools and equipments.

5.5.4 Adjustments

On completion ensure that doors, sashes, and fittings doors and drawers all neatly fit the openings with regular tolerances to all edges, and that all hardware is correctly adjusted and is operating smoothly.

5.6 Timber Framing

5.6.1 Scope

Supply and install timber framing to the floors, walls, roofs, and other timber framed elements, as identified and detailed on the drawings. All aspects of this work shall be in accordance with NZS 3604, product manufacturers' recommendations, and as shown on the drawings and the specification.

5.6.2 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All work shall be carried out to current best trade practise by experienced and competent tradesmen, familiar with the materials and installation techniques, in accordance with NZS 3604 and as shown on the drawings.

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings prior to installing timber framing.

Co-ordinate with other trades to install timber framing as required.

5.6.3 Timber Framing

Timber Grade and Quality

Unless otherwise noted or specified on the drawings or specification, all framing timber shall be minimum structural grade SG 8 Radiata pine in accordance with NZS 3622.

Framing timber shall be seasoned or kiln dried, and be straight and true and free from wind, warp and distortion, and in lengths suitable for the members required, and shall have a moisture content of between 12% and 18% before installation.

Do not use damaged, faulty or defective materials.

Timber Treatment

All non-durable timber framing shall be appropriately treated against moisture and/or insect decay by treatment plants with recognised quality assurance systems that are administered by the Timber Preservation Council (NZTPC). Treatment of timber and wood-based building products shall be to the requirements of NZS 3602 as an absolute minimum, and all treated timber shall be identified and marked as required.

Carefully manage treated framing during installation to avoid accidental use of timber with a lower performance or durability treatment than that required or specified.

Storage & Handling

Check timber framing upon delivery and reject sub-standard or damaged material.

Store timber framing dry under cover, fillet stacked and well clear of the ground, and protect from damage, moisture, and contamination.

Ensure all appropriate personal protection equipment is worn at all times when handling and cutting treated framing.

Framing Installation

All timber framing members, including all dawning, strutting, blocking, bracing etc, shall be sized, setout, fitted and fixed to the requirements of NZS 3604 and as shown on the drawings to accommodate structural loadings, cladding and lining setout and support, and the installation of other building components, fixtures and fittings.

All framing shall be erected without deviation, true to line, level, angle and plumb, and evenly aligned and square, and within the tolerances allowed in NZS 3604 Table 2.1. Framing members accurately cut, lapped, housed, joined, and seated so as to provide full contact over the bearing surfaces.

Temporarily prop, brace, tie, and secure framing members and elements as required until the framing is complete and self supporting. Leave in place for safety purposes as long as required.

Protect timber framing as required during installation against damage and moisture, and against significant variation of moisture content until ready for lining. Avoid ponding of water around floor plates.

Concrete Separation

Separate timber framing with an approved continuous damp proof course when in direct contact with concrete or masonry. Ensure that the DPC material is compatible with the timber treatment.

Free draining separations to external vertical faces shall be 12mm minimum and as noted on the drawings.

Timber Re-treatment

All cut or drilled surfaces of H4 and H5 treated timber framing shall be flood coat re-treated, with a suitable product recommended by the original treatment plant, before installation.

Edge Notching and Centre Holes

The notching, checking, and boring of framing members shall be in strict accordance with the requirements of NZS 3604.

Avoided checking and cutting where possible and keep to such dimensions so as not to prejudice the purpose for which the member is used. Keep edge notching to a minimum and where possible use centrally bored holes instead.

Concealed services pipes and wiring shall not project beyond the framing face and where possible shall be beyond the lining's fixing reach.

Framing Protection

Protect timber framing as required during installation against damage and moisture, and against significant variation of moisture content until ready for lining. Avoid ponding of water around floor plates.

Built-up Framing Members

Except for jack studs, bottom plates and top plates, framing members may be substituted with built-up members in accordance with the limitations of NZS 3604 2.4.4.7 with the prior approval of the Architect/Designer only.

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5.6.4 Steel Fixings

Fastenings and Connectors

Unless otherwise noted or specified, timber framing fastenings and connectors shall be as specified in the relevant fixing schedules of NZS 3604 or have an equivalent capacity as specified therein. Timber framing connectors and fixings shall comply with the product information as required in NZS 3604 2.4.6, and shall be used and installed in accordance with the manufacturer's recommendations. Pre-drill nail holes in split-prone framing as necessary.

Durability of Fixings & Fastenings

Unless otherwise noted or specified, the minimum durability of timber framing fixings and fastenings, excluding nails and screws, shall comply with the durability requirements of NZS 3604 Table 4.1. Galvanised steel fixing components, excluding nails and screws, shall have galvanised coating masses in accordance with NZS 3604 Table 4.2.

Unless noted or specified otherwise, the materials for nails and screws shall be as given in NZS 3604 Table 4.3.

Steel fixings and fastenings in contact with timber treated with copper based timber preservatives (H3.2 or higher) shall be in accordance with NZS 3604 4.4.4.

Stainless steel nails shall be minimum Grade 304 unless otherwise specified or noted.

Bolts and Coachscrews

Unless specified or shown otherwise, all bolted and coach screwed connections shall be M12 or M16 in accordance with the relevant fixing requirements given in NZS 3604.

Bolted and coach screwed connections shall have either a 50mm x 3mm square, or a 55mm x 3mm round, washer to each head and nut for M12 and M16 fixings. Washers shall be of the same material and durability as the bolt or coach screw.

5.6.5 Wall Framing

Plates

Top and bottom plates shall be to the dimensions and layout shown on the drawings. Unless specified or shown otherwise, top and bottom plates shall be fixed in accordance with NZS 3604 7.5.12 and Tables 8.18 and 8.19, true to line and level or angle.

Joints in top plates shall be made over a stud or over blocking between studs, and all top plate connections shall be in accordance with NZS 3604 8.7.3. Form all holes and edge notches in top and bottom plates in accordance with NZS 3604 8.7.5.

Studs

Studs shall be to the dimensions and spacings shown on the drawings, and installed true to line and plumb in both directions between top and bottom plates.

Unless noted otherwise, non-load bearing wall studs shall be to the spacings given in NZS 3604 Table 8.4, stud width as shown on the drawings.

Form all holes and edge notches in studs in accordance with NZS 3604 8.5.1.5. Do not notch, check, cut, or bore holes in the middle third of any trimming stud.

Should the need arise, studs shall be straightened in accordance with NZS 3604 8.5.3 with prior approval from the Architect/Designer only.

Unless noted otherwise, studs in loadbearing walls for 3 kPa floor loads shall be in accordance with NZS 3604 Table 14.10.

Lintels

Lintels shall be to the dimensions and locations shown on the drawings, and installed true to line and level, and shall be supported by a 45mm thick doubling stud or jack stud fixed to a trimming stud, and secured against uplift in accordance with NZS 3604 8.6.1.8 as required.

The thickness of a lintel may be made from two or more members, where each member is the length of the lintel, in accordance with NZS 3604 2.4.4.7.

Sill & Head Trimmers

Unless specified or shown otherwise, sill and head trimmers to openings shall be the same width as the wall stud and to the thickness given in NZS 3604 Table 8.15, and installed at the required opening height true to line and level, and supported by a 45mm thick doubling stud or jack stud fixed to a trimming stud.

Dwangs

Dwangs shall be the same width and thickness as the wall stud, and installed at the centres noted on the drawings, and accurately cut and fixed in place true to line and level and flush with stud edges. Dwangs fixed in accordance with NZS 3604 Table 8.19.

Ribbon Boards

Ribbon boards shall be as dimensioned and located on the drawings, and installed on edge and checked 25mm into studs at the required height, true to line and level, and fixed in place in accordance with NZS 3604 Table 8.19.

5.6.6 Posts

Timber posts shall be to the sizes and locations shown on the drawings, and installed true to line and plumb each way, and supported at the base by steel post brackets as detailed.

Base bracket brand name & type:

5.6.7 Roof Framing

Rafters

All rafters (including hip, valley and jack rafters) shall be to the dimensions, spacings, pitch, and layout shown on the drawings.

Rafters shall be aligned and paired at the required spacings to ridge boards, ridge beams, hip rafters and valley rafters, and as shown on the drawings, and installed parallel, true to line, pitch and plane, and fixed in accordance with NZS 3604 Table 10.1.

Any required jointing of rafters shall be made over supports shown on the drawings only.

Unless shown otherwise, rafter seating to top plates, beams, and lintels shall have a minimum bearing of 32mm without reducing the rafter depth to less than 65mm, or 80%, at the birds mouth.

Extend rafter ends to form eaves as detailed on the drawings and in accordance with NZS 3604 10.2.1.14.

Fly rafters and outriggers installed to form gable verges as detailed on the drawings and in accordance with NZS 10.2.1.15.3

Ridge Beams

Ridge beams shall be to the dimensions and locations shown on the drawings, and installed true to line and level.

Unless specified or shown otherwise, ridge beam ends shall be secured by and fixed to wall framing in accordance with NZS 3604 Table 10.2.

Rafters Housed into a Ridge Beam

Unless shown otherwise, rafters set into a ridge beam shall fully housed 15mm into the ridge beam. The rafter shall be cut to the housing angle for full end bearing.

Verandah Beams

Verandah beams shall be to the dimensions and locations shown on the drawing and installed true to line and level. Unless shown otherwise, all verandah beam jointing and connections to timber posts shall be in accordance with NZS 3604 Table 9.2.

Tie bracket brand name & type:

Valley Boards

Valley boards shall be sized to the dimensions and installed to the supporting framing as detailed on the drawings.

Purlins

Purlins shall be to the dimensions and spacings shown on the drawings and as required by the cladding material, and fixed to rafters and/or trusses in accordance with NZS 3604 Table 10.10 (purlins on their flat) and/or Table 10.11 (purlins on their edge).

Purlins on their flat shall be continuous over a minimum of two spans.

Provide all necessary blocking and lateral support to purlins laid on edge in accordance with NZS 3604 10.2.1.16.6, and as detailed.

Extend purlins to form gable verges as detailed and in accordance with NZS 3604 10.2.1.15.

Roof Trusses

Roof trusses shall be Specific Engineering Design (SED) in accordance with NZBC B1/VM1 and manufactured by an accredited fabricator, and shall comply with all aspects of NZS 3604 10.2.2. Roof trusses shall be fabricated to meet the specific design requirements of the roof including, but not limited to; roof layout, pitch, and details, in accordance with the drawings and specification.

Roof trusses shall be supported and fixed to the truss fabricator's specifications but shall be no less than that required by NZS 3604 Tables 10.14 and 10.15. Roof trusses shall be braced as shown on the drawings and in accordance with NZS 3604 10.3.

Roof Bracing

Roof bracing shall be as shown on the drawings and in accordance with NZS 3604 10.3 and 10.4 as necessary.

5.6.8 Ceiling Framing

Ceiling framing shall be to the dimensions, layout, spacings, and details shown on the drawings, and shall be installed true to line, level and plane, and securely fixed in accordance with NZS 3604 Table 13.3.

5.7 James Hardie Eaves & Soffits

5.7.1 Scope

Supply and install the specified James Hardie products as a fibre-cement sheet lining material to the eaves and soffits identified on the drawings, complete with all accessories. All aspects of this work shall be in complete accordance with James Hardie Eaves And Soffits Installation Manual (check www.jameshardie.co.nz, or call 0800 808 868 for the latest edition) and other relevant product manufacturers' recommendations.

5.7.2 Eaves & Soffit Lining

HardieFlex Eaves Lining - 4.5mm. 4.5mm thick fibre-cement sheet lining with an un-sanded surface finish. The sheets are to be finished with a paint system. Installed in accordance with the James Hardie Eaves And Soffits Installation Manual to the locations shown on the drawings.

5.7.3 Co-operation

Co-ordinate with other trades to ensure that the panels correctly allow for fascia and wall cladding installation and associated flashings etc., and that services penetrations are correctly handled to maintain full weathertightness and sheet integrity.

Ensure that other trades are aware of the James Hardie Safe Working Practices.

5.7.4 Preparation

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and in accordance with James Hardie requirements. The fascia and framing shall be in true alignment, complete and suitable for the sheets, and maximum moisture content as per NZS 3602. Ensure that the framing is true in line with no projections due to structural and bracing bracketry etc. Ensure that any hold-downs from the roof framing to the wall framing are correctly installed.

Check that the building underlay or rigid air barrier to the wall framing has been installed in full accordance with the manufacturer's requirements and the drawings. Check junctions to all other building elements and ensure that all necessary works have been completed eg. flashings etc that will enable the sheets and all accessories to be installed.

5.7.5 Flexible Sealant

Flexible silicone sealant to be Sika Silaflex MS. Use to seal the sheets and accessories in accordance with the sealant manufacturer's recommendations and to James Hardie requirements. Ensure sealant compatibility with selected finish.

5.7.6 Workmanship

All installation work shall be carried out by an LBP, or supervised by an LBP, in accordance with James Hardie Eaves And Soffits Installation Manual and other relevant product manufacturers' recommendations.

5.7.7 Delivery & Handling

Carry all sheets on edge. Stack sheets flat on a level platform off the ground ie. use the supplied delivery pallet on level ground (if no pallet then evenly spaced bearers on level ground at 600mm c/s maximum). Keep sheets and accessories dry at all times. Avoid damage to sheet edges, ends, and surfaces. Keep uPVC flashings etc. out of direct sunlight, and store all accessories on flat and avoid damage. All installers to be familiar with and comply with the James Hardie Safe Working Practices in the Installation Manual, to use appropriate safety gear, and in particular to be aware to avoid breathing silica dust. Do not use any damaged or blemished sheets or accessories.

5.7.8 Installation

Install the sheets to the framing in accordance with the Installation Manual, complete with all accessories eg. mouldings, sealant, underflashings, etc.

Ensure that all cut edges of panels are primed prior to installation with Dulux Primacryl, Resene Quick Dry, or similar. Ensure that the bottom edge of the fascia forms a drip edge of 15mm minimum to the sheet. Seal around services penetrations to maintain weathertightness and air pressure resistance.

HardieFlex Eaves Lining joints to be formed with uPVC jointers.

HardieFlex Eaves Lining joints to be formed with Two-way uPVC jointers.

HardieFlex Eaves Lining joints to be formed as butt joints with backing strip.

5.7.9 Fixings

Fix HardieFlex Sheet 4.5mm sheets with galvanised nails in accordance with James Hardie requirements.

5.7.10 Completion

Ensure that the sheets have been fixed correctly, that all joints and accessories have been completed correctly, and that all penetrations have been taped correctly. Check that no damage has occurred to any installed sheet element or associated component, replace as necessary. Ensure that the sheets are painted within 90 days of the sheet installation, complete with all accessories and flashings. Hand over a copy of the latest edition of the James Hardie HardieFlex Eaves Lining Product Warranty to the client. Hand over a copy of the latest James Hardie Eaves And Soffits Installation Manual to the client for their maintenance information.

5.8 GIB® Plasterboard Sheets

5.8.1 Scope

Supply and install the selected GIB® Plasterboard sheets, complete with all accessories, as sheet lining material to the walls, ceilings and other elements identified on the drawings. All aspects of this work shall be in complete accordance with Winstone Wallboards Ltd technical literature and installation guidelines (call Winstone Helpline on 0800 100 442 or check www.gib.co.nz for the latest editions) and other relevant product manufacturers' recommendations.

Substitution of any specified GIB® system, GIB® System component or GIB® plasterboard is not permitted.

5.8.2 Components

To the areas noted on the drawings as 'general plasterboard wall or ceiling lining', shall additionally comply with all relevant aspects of the GIB® Site Guide January 2010 literature, complete with all recommended components and accessories and other relevant manufacturers recommendations.

To the areas noted as 'Wet Area' on the drawings, additionally comply with all relevant aspects of the GIB Aqualine® Wet Area Systems March 2007, complete with all system accessories, BRANZ Appraisal No.427 (2007) and other relevant product manufacturers' recommendations.

To the timber framed areas noted as 'Bracing' on the drawings, shall additionally comply with all relevant aspects of the GIB EzyBrace® Systems 2011 literature and GIB Ezybrace® software 2011 to the specified bracing unit rating, complete with all system accessories, BRANZ Appraisal No.294 (2011) and other relevant product manufacturers' recommendations.

5.8.3 GIB Plasterboard

GIB® Standard plasterboard, 10mm thick.

Location: Walls in all non wet areas.

GIB® Standard plasterboard, 13mm thick.

Location: Ceilings in all non wet areas.

GIB Aqualine® plasterboard, 10mm thick.

Location: Walls in all wet areas.

GIB Aqualine® plasterboard, 13mm thick.

Location: Ceilings in all wet areas.

GIB Braceline® / GIB Noiseline® plasterboard, 10mm thick.

Location: As per bracing layout.



5.8.4 Fixings

Fix sheets with adhesive and GIB® Grabber® drywall screws in accordance with Winstone Wallboards Ltd requirements.

GIBFix® All-Bond adhesive. Use to adhere the sheets and accessories to the framing in accordance with Winstone Wallboards Ltd requirements.

5.8.5 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Co-ordinate with other trades to ensure that appropriate clearances are allowed from adjacent internal linings, fixtures, products, and associated services, etc, that the sheets correctly allow for door and window installation, and that services penetrations are correctly handled to maintain sheet integrity.

5.8.6 Workmanship

All installation work shall be carried out by experienced tradesmen familiar with the techniques and materials specified and in accordance with the current requirements of Winstone Wallboards Ltd.

5.8.7 Delivery & Handling

Store GIB® plasterboard sheets undercover inside a watertight building and keep sheets dry at all times. Stack sheets flat on a dry level surface in accordance with Winstone Wallboards Ltd recommendations. Avoid damage to sheet edges, ends, and surfaces. Carry all sheets on edge. Do not use damaged or faulty sheets.

5.8.8 Preparation

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and otherwise in accordance with the specified Level of Finish and Winstone Wallboards Ltd requirements. Framing shall be plumb and in true alignment, complete and suitable for the sheets, and maximum moisture content 18% or as recommended by Winstone Wallboards Ltd. Ensure that the framing is true to line and plane and with no projections due to structural and bracing bracketry etc. Ensure that all framing brackets, plates, braces and hold-downs etc. are correctly installed.

Check that the building has been completely finished to all penetrations including doors, windows, services, etc so that the sheets can be installed without being affected by any weather conditions. Check junctions to all other building elements and ensure that all necessary works have been completed eg. flooring, setout of services, etc. that will enable the sheets and accessories to be installed. Clear building debris and rubbish from framing voids and keep clean until GIB sheet linings are installed.

5.8.9 Installation

Install the sheets, complete with all accessories, to the framing in accordance with the relevant Winstone Wallboards Ltd recommendations and literature, and as noted and detailed on the drawings.

5.8.10 Completion

Ensure that the sheets have been cut, fitted and joined, and fixed correctly. Check for damage and replace as necessary.

Clean up thoroughly on completion and remove all waste and rubbish from site.

Provide a copy of the Winstone Wallboards Ltd maintenance requirements to the owner.

6 ROOFING

6.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

6.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1562.2:1999(AS/NZS)	Design and installation of sheet roof and wall cladding - Corrugated fibre-reinforced cement
2295:2006(NZS)	Pliable, permeable building underlays
2728:2007(AS/NZS)	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
3500.3:2003(AS/NZS)A2	Plumbing and drainage - Stormwater drainage: Amendment 2
3604:2011(NZS)	Timber-framed buildings
4200.1:1994(AS/NZS)	Pliable building membranes and underlays - Materials
4200.1:1994(AS/NZS)A1	Pliable building membranes and underlays - Materials: Amendment 1
4389:1996(AS/NZS)	Safety mesh
4534:2006(AS/NZS)	Zinc and zinc/aluminium-alloy coatings on steel wire
NZBC E2	External moisture
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 2.2
NZS 3441	Zinc coated steel coil

6.3 Workmanship

6.3.1 Guarantees

The whole of the roof covering work shall be complete in all respects and absolutely watertight. Commencement of roofing works by any Subcontractor indicates their full agreement to and acceptance of an unwritten guarantee to maintain the whole of their work in a satisfactory and watertight condition, and to arrange and pay for any damage consequential upon the failure of their materials or workmanship, for the periods stated below, irrespective of the 90 day general maintenance period.

- Aluminium roofer - ten years after completion.

6.3.2 Co-operation

Co-operate with other trades to ensure that framed roofing substrates have appropriate spacings, alignments and fixings, and to ensure that sheet roofing substrates have the correct edge and central fixings, appropriate alignments and gradients, edge priming if necessary, and are completely clean.

Ensure that each section is waterproofed as soon as possible after preparatory work is complete; allow to carry out the works in several operations if necessary to comply with this condition.

6.3.3 Alternatives

Alternatives or substitutions are not permitted to any specified product or system in the Roofer section.

6.4 Metalcraft Roofing - Longrun Roofing

6.4.1 Scope

Supply and install the selected Metalcraft Roofing as a Roof Cladding to the roofs identified on the drawings complete with all accessories. All aspects of this work shall be in complete accordance with Metalcraft Roofing guides and technical manuals, (check 0800 766 369 for the latest editions), and other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Metalcraft Roofing Roof Cladding.

6.4.2 Co-operation

Co-operate with other trades to ensure that roof framing has appropriate spacings, alignments and fixings, and is in accordance with the drawings and NZS3604, and coordinate to ensure that all timber members required for ridges, hips, valleys, barges, penetrations, junctions with vertical faces, etc. are correctly in place.

Note and co-ordinate with the installer of the rainwater system specified.

Ensure that each section of roof is waterproofed as soon as possible after preparatory work is complete; allow to carry out the works in several operations if necessary to comply with this condition.

6.4.3 Material

Steel, 0.4mm BMT.

6.4.4 Product

Colorsteel Endura.

6.4.5 Profile

Metalcraft Roofing profile 'Corrugate'.

6.4.6 Installation

All installation work shall be carried out by experienced and competent tradesmen who are familiar with the techniques and materials specified. All handling and fixing techniques, and all jointing and sealing materials and techniques, shall be exactly as recommended by Metalcraft Roofing. Handle

roofing without scratching, distortion or other damage, store on even bearers, and keep dry until installed.

Set-out the roofing sheets exactly square to building axis and maintain this accurate setout throughout the works, and set-out to lap sheets away from the prevailing wind. Install the underlay running up and down the slope with minimum 300mm side laps. Do NOT install any fixings to the underlay (to avoid dissimilar metals/electrolysis) - install the underlay length by length as the roofing proceeds and ensure it is taut and evenly lapped when the roofing screws are installed.

Ensure all roofing accessories are installed as the sheets are laid.

Protect the coated surface from damage at all times; replace the whole sheet where a significant depth of the coating has been damaged. Completely clean off all drill and power saw swarf and pop-rivet shanks as the work proceeds (at least daily, and keep them and other rubbish out of the spoutings). Remove trade debris from the roof and from the site progressively, and on completion leave the roof and rainwater system completely clean.

Do not use black lead pencils for marking prefinished roof cladding - permanent marking may result. Observe cladding manufacturer's recommendations where flues discharge above roofs, and for the installation of solar heating panels. Do NOT weld Colorsteel products. NO abrasive disc cutters, no soldering, no lead head nails or lead edged flashings, no touch-up paints, and do not slide tools down the roof.

Screw fix, screws to comply with AS3566 (Self-drilling construction screws) Class 4 and in accordance with Metalcraft Roofing recommendations. (Do NOT use stainless steel screws to fix prepainted cladding). Use only low carbon (

Use fixing systems that will accommodate thermal expansion for long lengths and/or dark colours. Fastening clips and brackets fixed in accordance with Metalcraft recommendations.

All jointing techniques, fixings and sealants to be in accordance with Metalcraft recommendations, as noted on the drawings, and shall be compatible with the roofing material and finish.

Ridges, hips, and barge flashings etc. shall all be matching Colorsteel or other, and as noted and detailed on the drawings. Soft zinc flashing edges neatly dressed down where required, plumbing penetrations custom flexible rubber flashed (fully sealed), and instruct the Plumber that no copper (or brass) pipes are to discharge on to the roof.

6.4.7 Completion

Sweep down completed roof and clean out spouting, gutters and rainwater pipes. Remove debris and unused material from site.

Issue to the Main Contractor a copy of the Metalcraft Roofing maintenance requirements together with the relevant Metalcraft Roofing Warranty for the completed works.

6.5 Metalcraft Roofing - Rainwater & Fascia Systems

6.5.1 Scope

Supply and install the selected Metalcraft Rainwater & Fascia Systems to the roofs identified on the drawings complete with all accessories. All aspects of this work shall be in complete accordance with Metalcraft Rainwater & Fascia Systems guides and technical manuals, (check 0800 766 369 for the latest editions), and other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Metalcraft Rainwater & Fascia Systems products.

6.5.2 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works, including membranes, wraps, framing, claddings and trims, and any other related works, are completed to specification and as shown on the drawings.

Coordinate with trades the locations of pipes, outlets, cables, meter boards and other fittings installed by others.

6.5.3 Material

Steel - 0.55mm BMT.

6.5.4 Product

Colorsteel Endura.

6.5.5 Spouting Profile

Quarter Round Gutter.

6.5.6 Fascia Profile

Metalline Fascia 185.

6.5.7 Downpipe Profile

Round

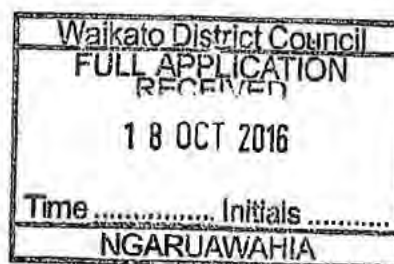
Round Downpipe. Round downpipe diameters shall be to the Metalcraft range as noted on the drawings, and manufactured from the material specified.

6.5.8 Preparation

Check all aspects of preparatory works, including but not limited to:-

Check that the timber framing complies with NZS 3604, is in true alignment and includes all blocking required for joints, corners and soffits etc., and has a maximum moisture content of 24% at the time of Metalcraft Rainwater & Fascia Systems installation.

Check that all preparatory materials are lapped such that any water will run down to the exterior.



6.5.9 Installation

Workmanship

All installation work shall be carried out by experienced and competent tradesmen who are familiar with the techniques and materials specified. All handling and fixing techniques, and all jointing and sealing materials and techniques, shall be exactly as recommended by Metalcraft Roofing. Handle spouting and fascia without scratching, distorting or damaging.

Protect the coated surface from damage at all times; replace the whole section where a significant depth of the coating has been damaged. Completely clean off all drill and power saw swarf as the work proceeds.

Screw fixings shall be in accordance with Metalcraft Roofing requirements and as noted on the drawings, and of a compatible material and finish with the fascia, spouting, and spouting brackets. Exposed screws should be factory prepainted for an accurate colour match. Support brackets fixed in accordance with Metalcraft Roofing recommendations.

Fascia

Install Metalline Fascia 185 panels, complete with joints and corners, in accordance with Metalcraft recommendations and as noted and detailed on the drawings.

Spouting

Screw fix spouting brackets, true to line, at maximum 900mm centres and to falls as shown on the drawings. Form spouting joints and downpipe droppers in strict accordance with Metalcraft recommendations. Locate downpipe droppers to the set-out shown on the drawings.

Downpipes

Downpipes and spreaders setout and installed complete with bends as shown on the drawings. All joints lapped and sealed to Metalcraft recommendations. Screw fix down pipes plumb to walls with matching support brackets. Direct downpipes into stormwater system as noted on the drawings.

Completion

Clean up thoroughly and remove debris and unused material from site.

Issue to the Main Contractor a copy of the Metalcraft Roofing Rainwater Systems maintenance requirements together with the Metalcraft Roofing Rainwater Systems Warranty for the completed works.

Data Received By

21 NOV 2016

CUSTOMER SUPPORT

7 ALUMINIUM JOINERY

7.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

7.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1734:1997(AS/NZS)	Aluminium and aluminium alloys - Flat sheets, coiled sheet and plate
1866:1997(AS/NZS)	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
2208:1996(AS/NZS)	Safety glazing materials in buildings
4211:2008(NZS)	Specification for performance of windows
4223.1:2008(NZS)	Code of practice for glazing in buildings - Glass selection and glazing
4223.2:2016(NZS)	Glazing in buildings - Part 2: Insulating glass units
4223.3:2016(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4223.4:2008(NZS)	Glazing in buildings - Part 4: Wind, dead, snow, and live actions
4666:2012(AS/NZS)	Insulating glass units
4667:2000(AS/NZS)	Quality requirements for cut-to-size and processed glass
4668:2000 (AS/NZS)	Glossary of terms used in the glass and glazing industry

7.3 Aluminium Windows & Doors

7.3.1 Alternatives

The materials and elements specified indicate the required standards for these works. Alternatives which are equal to or superior to these materials and elements may be tendered for approval.

Thermal performance (NZBC H1/AS1) must be as required to meet the Designer's Thermal Evaluation.

7.3.2 Installation Type

Timber Frame Installation - Cavity Construction

All windows (and aluminium frame external doors) installation work shall be exactly in accordance with NZBC E2/AS1, the Windows Association's Windows Installation System (WANZ:WIS), and details on the drawings or supplied by the windows manufacturer.

Check framing alignment, and that window openings are square and the correct size for fitting tolerances.

Prepare framing openings by neatly cutting the building wrap at 45° into the corners, turning wrap through the frame depth and fixing to the inside face, flashing the bottom corners with moulded

plastic and over-flashing the full sill and 200mm up the jambs with the specified flexible flashing tape, stapled to hold the stretched external corners. At head corners install flashing tape 200mm each way from the corners.

Install the WANZ extruded aluminium support bar with built in drainage and ventilation to NZBC E2, to provide continuous support to the window unit. Install the head cavity closer, positioned to provide a 15mm drip edge to the cladding.

Set shims or pack as necessary and install the frames exactly true and square, blocked-up off the support bar as required. Use appropriate separators between aluminium and other materials, and fix securely with due regard for any anticipated movements and for linings, trim etc.

Install the head flashing, extending 35mm up behind the cladding (and in turn over-flashed with an additional piece of wrap cover extended up under the wrap or flashing or eaves above), sloping at 15° down to the exterior, and turning down to cover the top of the aluminium frame by at least 10mm, before finishing with a 5mm 45° 'kick out'. Upstand the head flashing ends as detailed. Install jamb flashings/ sealant or scribes as detailed.

After frames installation install closed cell backing rods as required and expanding foam air-seal the gap between framing and liners.

7.3.3 Glass Platform

Double Glazed.

7.3.4 Workmanship

These windows will be manufactured in workshops containing all mechanical equipment appropriate for the work, and by experienced and competent tradesmen who are familiar with the techniques and materials specified.

The manufacturer will co-ordinate with other trades to establish the exact sizes for all frames before fabrication. Frames and sashes will be fabricated true, square, rigid, and 'out of wind', with all joints strongly mechanically fixed, and with mitres tight and fully sealed. Potential thermal, wind and seismic movements will be accommodated within the construction. All cavities will drain to the exterior, and all drilling swarf etc. will be removed during fabrication.

Stays, hinges, running gear and glazing will be installed as scheduled (the Designer will be notified if any scheduled hardware of fixing position appears to be inappropriate for this project).

Hardware will be fixed true to line and position, and adjusted and oiled as required for correct operation.

Glass will be cut true and square, sized to provide correct edge clearances, blocked into place as required, and all units will be delivered either pressure fit, pocket glaze, or beaded/wedged, unless site glazing is required. Glazing gaskets will be compatible with all adjacent materials, and cut 1%

over-length to absolutely avoid stretching during installation. Frames will be braced etc. as necessary for transportation to the site.

Flashings as detailed will be supplied. Flashing materials will be compatible with the windows.

7.3.5 Delivery and Installation

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and the construction principles that are embodied in the Acceptable Solutions.

Arrange for delivery of windows to the site only when a suitable storage situation is available for them, handle the windows in accordance with the manufacturers requirements, avoid any frame distortion, avoid rubbing damage, avoid contact with concrete, plaster, mud etc. and keep them dry. Retain protective coverings for as long as possible, and remove them at completion.

Experienced and competent tradesmen who are familiar with the techniques and materials specified shall carry out all installation work. Fix in accordance with the manufacturer's instructions. Take utmost care to avoid damage to anodized or powder coated surfaces - correction of any such disfigurement requires written authority - replace any badly damaged items.

Use fixings compatible with the materials involved, as recommended by the windows manufacturer and to comply with the DWP requirements, basically aluminium or Type 316 stainless steel where exposed externally; galvanized to AS/NZS 4680, 610g/m², may be used where not exposed.

Thoroughly check all preparatory work to openings prior to installation, including underlay, corner seal tapes, adjacent cladding, pre-installed flashings, waterproofing systems etc. as appropriate. Use inert barriers or coatings to prevent contact between dissimilar metals or between aluminium and concrete.

Install flashings as detailed and supplied by the windows manufacturer, installed tightly and neatly with absolute minimum tolerances, with head weathering jamb, jamb weathering sill, and sill open (draining) to exterior. Except where the window is recessed all head flashings shall extend 30mm minimum beyond the frame.

Air-seal all frame perimeters to adjacent structure to a depth of 15 - 20mm with expanding foam or appropriate sealant including a PEF rod at head, sill and jambs to retard the spread of sealant.

Weather-seal frame jambs etc. to adjacent surfaces (or to each other) as detailed or as required by the windows manufacturer, to achieve a fully watertight installation. In preparation for sealant the joints shall be clean, dry, and primed if necessary. Insert closed cell polyethylene backer rods or a polyethylene tape slip layer if required. Mask adjacent surfaces if appropriate, install the sealant fully in accordance with the sealant manufacturer's recommendations, and finish to even smooth surfaces.

Remove trade debris progressively, appropriately clean any affected adjacent surfaces, thoroughly clean the windows, check that all hardware is in full working order, and provide safety indication of the glass for the balance of adjacent works.

8 INSULATION

8.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

8.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3604:2011(NZS)	Timber-framed buildings
4220:1982(NZS)	Code of practice for energy conservation in non-residential buildings
4243.1:2007(NZS)	Energy efficiency - Large buildings - Building thermal envelope
4246:2006(NZS)	Energy efficiency - Installing insulation in residential buildings
4859.1:2002(AS/NZS)	Materials for the thermal insulation of buildings - General criteria and technical provisions

8.3 Thermal Insulation

8.3.1 Scope

Supply and install the selected products as thermal insulation to the specified R-values, complete with all accessories, to the floors, walls, ceilings, roofs, and other thermally insulated building elements, as noted and shown on the drawings. All aspects of this work shall be in accordance with the product manufacturer's technical literature and installation requirements, other relevant product manufacturers' recommendations, and as shown on the drawings.

8.3.2 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Co-ordinate with other trades to install all thermal insulation as required.

8.3.3 Workmanship

All installation work shall be carried out by experienced and competent tradesmen, familiar with the specified products and installation techniques, in accordance with the manufacturer's installation requirements, and as noted and detailed on the drawings.

Store and handle products in accordance with the manufacturer's recommendations, keep dry and protect from damage. Do not compress fibre insulation bales. Do not use damaged or defective insulation products and accessories.

The building must be completely enclosed and water tight before installation commences with the exception of roof insulation when installed with roofing. Ensure the moisture content of timber framing is no greater than 18% prior to installing insulation to timber framed elements. Always

maintain the full insulation thickness to ensure the required thermal values are achieved. Do not install insulation pads or blankets into closed cavities that are less than the stated insulation nominal thickness.

8.3.4 Product

Mineral Wool Blanket

Mineral wool thermal insulating blanket.

Manufacturer, brand name & type: Pink Batts

R-Value & Location: R2.2 (walls), R3.2 (ceilings)

8.3.5 Installation

Ceiling Insulation, Framed/Truss Roof - Mineral Wool Blanket

Install mineral wool insulation blanket, complete with accessories, over the ceiling lining, at right angles to the joists, and allow to drape into the joist cavity in accordance with the manufacturer's installation recommendations. Leave no gaps along the insulation blanket edges and joints, and at the ceiling perimeter/wall junction. Separate ceiling insulation 200mm from recessed light fittings and other recessed electrical fittings; refer to the drawings for containment requirements around recessed electrical fittings.

8.3.6 Completion

Check that all insulation has been installed correctly and is correctly supported and that all edges, joins and ends are fully closed without gaps. Check for damage and faults and repair or replace as necessary. Collect and remove from site all rubbish and waste material.

Issue to the Owner a copy of any product maintenance requirements and a copy of the Thermal Insulation Product and Installation Warranties for the completed works.

9 TILING

9.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

9.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3103:1991(NZS)	Specification for sands for mortars and plasters
3122:2009(NZS)	Specification for Portland and blended cements (General and special purpose)
4858:2004(AS/NZS)	Wet area membranes

9.3 Workmanship

9.3.1 Co-operation

Co-operate with the Contractor and other Subcontractors to ensure that substrates are completely appropriate for the tiling required, particularly with regard to concrete surface finish, the use of retarders, release agents or curing compounds, and with regard fixing and finishing of sheet substrates and their support.

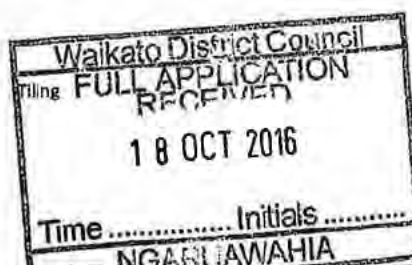
9.3.2 Workmanship

Delay tiling to allow maximum curing and settling and initial creep of the substrates, particularly to load bearing structural elements.

All work by competent and experienced tilers. Co-ordinate with other trades and instruct them as necessary to ensure appropriate substrate conditions to assure first class tiling results.

Protect all adjacent surfaces from damage or staining during tiling: arrange any making good or cleaning required as instructed by the Architect/Designer. Wash down and remove form work release agents, slab curing compounds, and surface retarders. Clean down with mould killer, etching agents, or wire brush as required. Grind off high spots if required. Ensure that the moisture content of substrates is appropriate.

Set out tiles as detailed or for even margins with patterns to register in all directions. The finished surfaces shall be true and even and with lines accurate, level and plumb, or to even falls as noted, and finished flush with adjoining work as appropriate. Cut edges to the manufacturers instructions, and stone arris where the cut edges are not concealed under adjoining work.



No retempering of partially set or dried mortar, adhesive or grout. Prior to grouting rake out any excess bedding material. Grout shall be coloured as directed, placed full depth, and finish tooled to a dense, uniform surface. Clean excess grout off tiles and adjacent surfaces.

Form control joints at tiling edges abutting concrete or masonry, within the tiled surface to give a maximum panel dimension of 2m, and over any control joints in the substrate. Rake control joints full depth to the substrate as work proceeds, mask edges and clean out just prior to placing filler, and fill full depth and flush. Clean excess filler off the tiles or other surfaces.

On completion thoroughly clean the full tiled surfaces, and lightly buff where appropriate. Protect finished work from subsequent damage.

10 PAINTING & DECORATING

10.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

10.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2310:2002(AS/NZS)	Glossary of paint and painting terms
2311:2009(AS/NZS)	Guide to the painting of buildings
3750.0:2008(AS/NZS)	Paints for steel structures - Introduction and list of Standards
AS 1580	Methods of test for paints
BRANZ IB 257	Wood primers
NZS 7702	Colours for specific purposes

10.3 General

10.3.1 Alternatives

The materials specified in this section or on the drawings indicate the required standards for these works. Alternatives which are considered equal to or superior to these may be tendered for approval (in writing, and they must NOT be used unless they are approved in writing).

10.3.2 Co-operation

Co-operate with all trades and attend upon Concretor, Joiner, Carpenter, etc. to ensure that the surfaces provided by these trades are completely suitable for the Painter works that are required.

10.3.3 Preparation

No painting or varnishing or other surface coating work shall be undertaken unless the surfaces to be coated are in a correct and proper condition to ensure first class results.

Inspect the works of other trades on which Painter work is scheduled and report to the Main Contractor and the Architect/Designer any defects or irregularities that would affect the permanency or finish of the painting work, and do not proceed until the defects or irregularities have been completely rectified. Failure to examine and report will be construed as an acceptance that all preparatory works are completely satisfactory.

This clause does not relieve the Painter of any of the usual preparatory work to surfaces customarily performed by this trade.

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Clean down all surfaces with sugar soap, strippers, mould killers, etching agents, etc. as required. Sand or rub all sharp edges off exterior timbers and other materials as appropriate before painting. Finish rub down ALL surfaces. Ensure that the moisture content of all substrates is appropriate. Remove locks, fastenings, and similar hardware before painting and refix on completion. Remove all electrical switch and power plates before painting and refix them on completion. Mask adjacent surfaces as required to a true line and remove the masking on completion. Dust and wipe down all surfaces for Painter work and completely remove all dust, rubbish, dirt etc. from areas involved immediately prior to commencement. To each area of the works complete all surface preparation before applying paint to any surface.

10.3.4 Protection

Take adequate precautions to prevent paint spots falling on prefinished or similar surfaces, and extreme care to keep absorbent materials (e.g. cedar, sawn framing, decking, paving) completely clean during all adjacent painting work. Correction of any such disfigurement shall be to the Architect/Designer's approval.

10.3.5 Qualifications

All work by the Painting Subcontractor shall be of the highest reasonable standard, and executed by experienced and competent tradesmen to the Architect/Designer's approval.

10.3.6 Workmanship

Strictly adhere to all Manufacturers' instructions.

Strictly observe Manufacturers' requirements with regard to surface and air temperatures for painting. No work shall be carried out on surfaces that are not completely dry, and no external work shall be carried out during damp or wet conditions.

In all finishes any irregularities or brushmarks or dust etc. in each preceding coat shall be rubbed down to provide a smooth clean surface for the following coat. Each coat shall be finished over all surfaces before a further coat is applied, and each coat shall be completely dry before subsequent coats. Finish broad areas before painting trim, paint ceilings before walls and walls before joinery, trim and other items.

Each coat and the full completed system shall be of uniform finish, colour, texture and sheen, shall have proper covering of thin edges, corners, end grain etc. and shall be free of blemishes such as runs, sags, fat edges, entrained hairs, brush marks, starved patches etc.

10.3.7 General

The schedules indicate the general extent of the works to be carried out but are in no way exhaustive in their description of the actual items for painter work. Complete all work necessary for the proper and entire completion of the works. All items and portions of items reasonably inferable but not specifically mentioned are deemed included, i.e. cupboard interiors, the top and bottom of doors, unseen cabinetry tops, etc. All doors shall have equal painter work on ALL surfaces.

Where timber work is specified for priming before fixing the priming shall be thoroughly brushed in to all surfaces, and all exterior timber work for paint finishing shall be fully primed within one week of fixing. Should more than one month elapse between priming and undercoating the timber shall be fully reprimed.

Stopping up work shall be carried out immediately the priming or sealing coat is dry, and shall be solidly placed to finish clean and dry. Stopping tinted to match the timber for clear finished work.

Paint putties within one month of glazing timber frames; paint to impinge on glass to assist sealing.

10.3.8 Materials

All Painter materials shall be ready mixed and delivered in unopened containers. Materials shall be used only for the purpose and in the manner intended by the manufacturer; any apparent scheduled discrepancy in this respect shall be referred to the Architect/Designer immediately for clarification.

Where surfaces are specified to be finished in a particular manner or material, all preparatory work, priming, or undercoating, that is necessary to ensure a proper finish shall be provided, irrespective of any apparent omission herein.

Thinning shall only be to manufacturer's specification. Thoroughly stir as required to lift any settled pigment and ensure the paint is homogeneous. Paints shall be factory or shop tinted to the colour required. Undercoats shall be fully tinted to match the final colour scheduled. All paints shall have the finished film thickness that is specified by the manufacturer (checked by monitoring the coverage per litre).

10.3.9 Completion

Allow to touch up to approval any Painter work which is damaged during the finishing works of other trades. Replace all hardware, remove all masking, covers, containers etc., thoroughly clean all affected surfaces, and leave all spaces ready for immediate occupation. Avoid scratching or abrading glass or hardware during any cleaning.

11 PLUMBING

11.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

11.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1221:1997(AS/NZS)	Fire hose reels
1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2009(AS/NZS)	PVC-U pipes and fittings for drain, waste and vent application
1477:2006(AS/NZS)	PVC pipes and fittings for pressure applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
2032:2006(AS/NZS)	Installation of PVC pipe systems
2033:2008(AS/NZS)	Installation of polyethylene pipe systems
2492:2007(AS/NZS)	Cross-linked polyethylene (PE-X) pipes for pressure applications
2537.1:2011(AS/NZS)	Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) for pressure applications - Part 1: Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - General
2642.2:2008(AS/NZS)	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
2712:2007(AS/NZS)	Solar and heat pump water heaters - Design and construction
3500.1:2003(AS/NZS)	Plumbing and drainage - Water services
3500.2:2003(AS/NZS)	Plumbing and drainage - Sanitary plumbing and drainage
3500.3:2003(AS/NZS)	Plumbing and drainage - Stormwater drainage
3500.4:2003(AS/NZS)	Plumbing and drainage - Part 4: Heated water services
3501:1976(NZS)	Specification for copper tubes for water, gas, and sanitation
4121:2001(NZS)	Design for access and mobility: Buildings and associated facilities
4517:2010(NZS)	Fire sprinkler systems for houses
4541:2013(NZS)	Automatic fire sprinkler systems
4602:1988(NZS)	Low pressure copper thermal storage electric water heaters
4603:1985(NZS)	Installation of low pressure thermal storage electric water heaters with copper cylinders (open-vented systems)
4606.1:1989(NZS)	Storage water heaters - General requirements
4607:1989(NZS)	Installation of thermal storage electric water heaters: valve-vented systems

11 PLUMBING

11.1 Preliminary

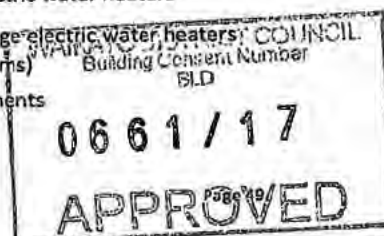
Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

11.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1221:1997(AS/NZS)	Fire hose reels
1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2009(AS/NZS)	PVC-U pipes and fittings for drain, waste and vent application
1477:2006(AS/NZS)	PVC pipes and fittings for pressure applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
1596:2014(AS/NZS)	The storage and handling of LP Gas
2032:2006(AS/NZS)	Installation of PVC pipe systems
2033:2008(AS/NZS)	Installation of polyethylene pipe systems
2492:2007(AS/NZS)	Cross-linked polyethylene (PE-X) pipes for pressure applications
2537.1:2011(AS/NZS)	Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) for pressure applications - Part 1: Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - General
2642.2:2008(AS/NZS)	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
2712:2007(AS/NZS)	Solar and heat pump water heaters - Design and construction
3500.1:2015(AS/NZS)	Plumbing and drainage - Part 1: Water services
3500.2:2015(AS/NZS)	Plumbing and drainage - Part 2: Sanitary plumbing and drainage
3500.3:2015(AS/NZS)	Plumbing and drainage - Part 3: Stormwater drainage
3500.4:2003(AS/NZS)	Plumbing and drainage - Part 4: Heated water services
3500.5:2012(AS/NZS)	Plumbing and drainage - Part 5: Housing installations
3501:1976(NZS)	Specification for copper tubes for water, gas, and sanitation
4121:2001(NZS)	Design for access and mobility: Buildings and associated facilities
4517:2010(NZS)	Fire sprinkler systems for houses
4602:1988(NZS)	Low pressure copper thermal storage electric water heaters
4603:1985(NZS)	Installation of low pressure thermal storage electric water heaters with copper cylinders (open-vented systems)
4606.1:1989(NZS)	Storage water heaters - General requirements



4607:1989(NZS)	Installation of thermal storage electric water heaters: valve-vented systems
4613:1986(NZS)	Domestic solar water heaters
4614:1986(NZS)	Installation of domestic solar water heating systems
4617:1989(NZS)	Tempering (3-port mixing) valves
4692.1:2005(AS/NZS)	Electric water heaters – Energy consumption, performance and general requirements
4766:2006(AS/NZS)	Polyethylene storage tanks for water and chemicals
5601.1:2013(AS/NZS)	Gas Installations - Part 1: General installations
7602:1977(NZS)	Specification for polyethylene pipe (Type 5) for cold water services
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
7646:1978(NZS)	Specification for polyethylene pipes and fittings for gas reticulation
AS/NZS 3500.5:2012	Plumbing and drainage - Part 5: Housing installations
NZBC G11	Gas as an Energy Source
NZBC G12	Water Supplies
NZBC G13	Foul Water

11.3 General

Carry out all works necessary to leave the water, waste, vent and soil systems serving the sanitary fittings and the plumbing hardware shown on the drawings or specified below in correct working order complete with all ancillary systems (safetrays, floor drains, overflows, relief valves, etc.) required, and with all normal incidentals customarily installed by this trade.

Comply with the Building Code, Territorial Authority By-laws and statutory authority Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange for all tests and pay all fees and customary charges in connection with the required works.

11.4 Workmanship

11.4.1 Co-operation

Co-operate with all other trades. Attend upon Concretor, Drainlayer and Carpenter to set out the exact positions of pipe runs before adjacent work is put in hand, and to ensure that all pipes, sleeves, fixings, flashings etc. are correctly incorporated into the structure as construction proceeds.

11.4.2 Workmanship

All plumbing work shall be carried out by, or under the direct control of, properly qualified tradesmen, and shall be to recognised high standards.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials only to approval. Install seismic restraints to storage tanks and HWCs.

Weatherseal wherever pipes, screws, bolts or other fastenings penetrate an external surface, and particularly roofing; seal with gaskets, flashings (and overflashings if necessary) or mastic as appropriate - any damage that results from failure of such seals will be made good at the Plumber's expense.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Plumber's expense.

11.4.3 Pipework

Joints between pipes of different materials shall always be to the approval of the TA Plumbing Inspector.

Pipework set-out neatly with a minimum number of bends, and more or less parallel to and at right angles to structural elements - avoid diagonal piping.

All internal pipework shall be concealed except where otherwise is either shown or approved. Exposed pipework shall be accurately and neatly run. Arrange all pipework (and particularly traps) in a manner which will allow maximum future accessibility for repairs or maintenance. Arrange for access panels to any primary maintenance positions, and install conveniently located isolating valves for each group of fittings. Wingbacks securely and squarely fixed. Crox unions usually acceptable only at the final connection to fittings. Install white plastic flanges where pipes penetrate linings in visible locations.

Where pipes are covered with nail fixed linings and trim ensure that their positions are marked on the linings to minimise the risk of subsequent nailings penetrating the pipe. Any such damage shall be rectified immediately, with all consequential damage made good.

Set pipework out in straight runs to even gradients. Fix all pipes to the structure sufficiently to fully support and to prevent sagging or vibration. Clips and saddles shall be the same material as the pipe. Exterior pipes on stand-off brackets. Fixings to the exterior or damp locations shall all be hot dip galvanized unless otherwise noted. Sleeves for pipes or drains penetrating concrete or masonry shall be uPVC, 20mm minimum larger internal diameter than the external diameter of the pipe, finished flush with concrete or masonry, and packed and mastic sealed.

Close open ends of the systems during construction to prevent the entry of foreign matter.

11.4.4 Temperature Movement

All work shall respect in full all probable thermal movements - layouts, fixings and jointings shall be arranged to allow thermal movement without risk of prejudice to watertight conditions, or risk of damage from straining of the pipes which will generate failures.

In particular, observe best local trade practice to avoid problems arising from freezing conditions.

11.4.5 Excavation

Allow to carry out all excavation that is required to suit the services installed by this trade. Check for other services before excavation. Trenches true to line and level, base of trenches clear of loose

material, and shore trenches as required to suit the ground conditions. Backfilling shall be carried out by this trade, and be to the requirements specified in Siteworks.

11.4.6 Testing

All plumbing services shall be completed in stages which will allow for proper testing under normal working pressures prior to the application of insulation, concealment or other enclosure. Testing of piped water services shall be by hydrostatic testing in accordance with AS/NZS 3500.1 and shall not show any leakage when subjected to a hydrostatic pressure of 1500kPa for a period of not less than 30 minutes. All leaks remedied and retested. On completion the whole of the plumbing services to be subjected to full operational tests in the presence of the plumbing inspector, with any defects revealed in these tests properly remedied.

11.4.7 Warranties

Warranty cards and manufacturer's guarantees for all items supplied and installed by this trade shall be correctly filled in and handed over at Practical Completion.

11.5 Materials

11.5.1 Materials

Materials shall be delivered with packaging and labeling intact. Incidentals (jointing compounds, PTFE tape, seals, washers, silfos, solvent cements, etc.) shall be completely appropriate for the application involved. The use of imperfect items or items damaged in any way is always subject to approval.

11.5.2 Alternatives

The materials and elements specified indicate the required standards for these works. Alternatives which are equal to or superior to these materials and elements may be tendered for approval.

11.5.3 Materials Separation

Separate dissimilar metals in any circumstances which could produce contact or electrolytic action by a water film, with thick plastic tape, bituminous felt or other inert material. Pipes in contact with or built into concrete or masonry shall be fully spiral wrapped in Denso tape or equal.

11.6 Systems

11.6.1 Wastes & Vents

All traps sized to AS 3500.2. Wastes and vents all uPVC. Wastes shall be to AS 3500.2 falls as a minimum. Vents shall be generally as indicated, but avoid where permissible in compliance with AS 3500.2, or shall be combined above the flood level of the fittings.

Fit bird proof domes to all vents.

11.6.2 Cold Water System

Supply Pumped From Storage Tank

All cold water supply pipework shall be polybutylene, arranged and fixed so that all joints are in a fully 'relaxed' condition, without any stress or tension.

Storage tank supply, installation and feed specified below. Supply an approved self-priming multi-stage constant pressure pump of appropriate capacity and install it where noted, on a small slab and with a weatherproof enclosure to suit (specified under Carpenter, but the Plumber shall co-ordinate re size, access etc.) (The pump electrical feed/connection is specified under Electrician).

Lay on a 20mm main from the pump along the route shown on the Site Plan to the connection position noted on the Floor Plan (pipe depth, backfilling, signal strip etc. to good trade practice and BCA approval). At the connection position take a branch feed off for the hosecocks (and reticulate to the positions shown and install angle hosecocks) and toilet cisterns and then take the main feed through an accessible and cleanable in-line sediment and dirt filter, and then through an approved UV disinfection unit (complying with AS 3497, and tested to NZ/AS 4348). Exact position and pipework layout for filter and disinfection unit to approval.

Primary distribution from the disinfection unit shall be in 20mm piping, reducing to 12mm for the final feed to individual items. Install conveniently located isolating valves to turn off each group of fittings, and install a small isolating valve alongside each toilet cistern not integrally fitted with one. (Note that these isolating valves and the hosecocks are not covered by the Plumbing Hardware Prime Cost Sum).

11.6.3 Hot Water System

Electric Storage, High Pressure Hot Water Cylinder

Supply the electric storage high pressure hot water cylinder noted on the drawings and install it where shown. Where appropriate install the cylinder on a safetray, with its drain discharging in a visible location.

Install temperature and pressure relief valves, cold water expansion valves, flow control valves, line strainers, pressure limit valves, and non-return/isolating valves as required to leave the hot water system in full design operational order. Install a tempering valve for each cylinder to control the hot water temperature at any sanitary fixture used for personal hygiene at not more than 55°C.

Check that the water pressure is suitable for the cylinders operation, and install PRV's if excessive. Pressure relief discharges shall be copper and to the exterior in approved positions.

Flush all pipework before making the final connections. Lag the main distribution pipes full length with wall pipe insulation.

Showers shall have priority feeds, without 'tees', and the pipework layout shall ensure that the showers temperature and pressure remain as even as possible.

Irrespective of whether a mixing device is installed, the storage water heater control thermostat shall be set at a temperature of not less than 60°C to prevent the growth of Legionella bacteria.

11.7 Elements

11.7.1 Sanitary Fittings

Supply and fix all of the sanitary fittings as scheduled on the drawings. All fittings checked on delivery for 'perfect' condition, and all fittings plain white. Supply and fix all normal accessories that are not

usually supplied with the fitting.

The Plumber is responsible for fittings from delivery until Practical Completion of the contract.

11.7.2 Appliances

All appliances are exactly identified on the drawings notes. Main Contractor will establish, in consultation with the Plumber and Electrician, which of them will be supplied by each of these trades.

12 DRAINLAYING

12.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions In this Specification as appropriate. Read this section in conjunction with all other trade sections.

12.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2009(AS/NZS)	PVC-U pipes and fittings for drain, waste and vent application
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
2032:2006(AS/NZS)	Installation of PVC pipe systems
3500.2:2015(AS/NZS)	Plumbing and drainage - Part 2: Sanitary plumbing and drainage
3500.3:2015(AS/NZS)	Plumbing and drainage - Part 3: Stormwater drainage
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
AS/NZS 1547:2012	On-site domestic wastewater management
BS 5572	Code of practice for sanitary pipework
NZBC G13	Foul Water

12.3 General

Carry out all required works to leave the sewer and stormwater systems shown on the drawings in correct working order complete with all normal incidentals.

Comply with Local Authority By-laws and Health Department Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the works.

12.4 Workmanship

12.4.1 General

Carry out all required works to leave the sewer and stormwater systems shown on the drawings in correct working order complete with all normal incidentals. Comply with Local Authority By-laws and Health Department Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the works.

12.4.2 Co-operation

Cooperate with all trades and attend upon the Concretor and Plumber to set out exact pipe runs before any adjacent work is put in hand and ensure that all sleeves etc. are correctly incorporated as work proceeds.

12.4.3 Materials

All pipes and other materials shall comply with the appropriate Standards, and shall be protected from damage of any kind until installation is complete. All incidentals appropriate for the applications involved. Concrete shall be 17.5MPa and as specified under Concretor, Mortar shall be as specified in Blocklayer.

12.4.4 Workmanship

All drainlaying shall be carried out by, or under direct control of, properly qualified tradesmen, and shall be to recognised high standards. Ensure cast-in items are installed when required so that no delay is caused by this trade. Adequately protect all adjacent surfaces - clean down to remove dirt etc., and any damage shall be made good by the appropriate trade at the Drainlayer's expense.

On completion of drainlaying clean up full area affected by this trade to the condition it was in before drainlaying commenced.

Site is to be returned as close as possible to its present condition on completion of the contract.

12.4.5 Excavation

As required for sewer and stormwater. Check for other service lines before excavation - the Drainlayer is responsible for making good any damage. Trenches true to line and with even gradients between gullies, soil stack terminations or downpipes, etc.

Keep the bottom of trenches clear of loose material. All pipes shall be laid in appropriate bedding material, compacted as required. Shore trenches if required to suit ground conditions. Backfilling shall be by this trade, to the standards required in Siteworks.

12.5 Elements

12.5.1 Drainlaying

Commence drainlaying at the low end of even fall sections of drains and proceed in a continuous sequence to the fittings connections.

Sumps, gullies, etc. solidly bedded. Lay 110mm uPVC drains to connect gullies, sumps, stacks, and downpipes through to the street edge connections.

Every junction and bend shall be an inspection position. Temporarily seal the open ends of incomplete drains to prevent entry of foreign matter. Make appropriate provision for any anticipated differential settlement. Place signal strip above all drains.

13 ELECTRICAL

13.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

13.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2201.1:2007(AS/NZS)	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
2293.2:1995(AS/NZS)	Emergency evacuation lighting for buildings - Inspection and maintenance
3000:2007(AS/NZS)	Electrical installations (known as the Australia/New Zealand Wiring Rules)
3350.2.35:1999(AS/NZS)	Safety of household and similar electrical appliances - Particular requirements - Instantaneous water heaters
5000.1:2005(AS/NZS)	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
60335.2.30:2009(AS/NZS)	Household and similar electrical appliances - Safety - Particular requirements for room heaters
6104:1981(NZS)	Specification for emergency electricity supply in buildings
AS/NZS 1125	Conductors in insulated electric cables and flexible cords
AS/NZS 2053	Specification for unplasticized PVC conduit and fittings for electrical wiring
AS/NZS 3012	Electrical installations - Construction and demolition sites
AS/NZS 3018	Domestic electrical installations
AS/NZS 3085	Telecommunications installations
AS/NZS 3100	Requirements for electrical apparatus
AS/NZS 3191	PVC insulated flexible cords
AS/NZS 3439	Electrical switchgear and controlgear
AS/NZS 3947	Low-voltage switchgear
AS/NZS 60227	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Flexible cables (cords)
AS/NZS 60598	Luminaires - Particular requirements - Recessed luminaires
AS/NZS 60898	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Circuit-breakers for a.c. and d.c. operation
AS/NZS 61009	Residual current operated circuitbreakers with integral overcurrent protection for household and similar uses (RCBOs)
NZECF 54	Recessed luminaires

NZS 1989	Plugs and socket outlets
NZS 6206	Electric meter boxes

13.3 Workmanship

13.3.1 General

Supply and install all materials, including all necessary minor and incidental items, for proper completion of all of the electrical services specified or shown on the drawings. The contract will not be deemed to be complete until the Electrician has provided an Electrical Certificate of Compliance in accordance with NZECP 11 (made available to the Contractor in time for the Code Compliance Certificate application).

Obtain all necessary permits and consents, serve all notices and pay all fees in and customary charges connection with the works.

The position of switches, light and power outlets and other fittings, although shown specifically in some instances, are in general only shown diagrammatically. The exact location of each of these items will be as directed on site by the Architect/Designer; the Electrician shall give reasonable notice of when this information is required. Items positioned in contravention of this shall be repositioned if directed, including rewiring if necessary, all at the Electrician's expense.

Unless drawn (on 1:20 wall elevations) or specified otherwise the mounting height to the centreline of the following items above the floor shall be:

- 1000mm for lighting switches;
- 2000mm for wall mounted lights;
- 2100mm for the bayonet of pendant lights;
- 300mm for power points, except at benches.

(Notify the Architect/Designer if either the actual fitting or mounting position seem to make the mounting height noted above inappropriate).

Warranty cards and manufacturers guarantees for items supplied and installed by this trade shall be filled in correctly and handed over at Practical Completion. Arrange all circuits to obtain an optimum balance of the system, and check and reconnect where necessary to achieve this on completion. Leave the works clean and tidy and in full operational order.

13.3.2 Co-operation

Co-operate with all other trades and attend upon the Concretor and Carpenter to set out all required penetrations and to ensure that all wiring and fittings are correctly incorporated as work proceeds. The Carpenter will provide and fix all necessary dwangs and timber supports in locations determined by the Electrician.

13.3.3 Workmanship

All electrical work shall be carried out by, or under the direct control of, registered tradesmen, and shall be to recognized high standards. All work shall be such as to leave a neat, efficient and robust installation. Neatly label switchboards to identify each circuit.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604: 2011 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials shall be only to approval.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Electrician's expense.

13.3.4 Wiring

Joints within cable runs will not normally be accepted. TPS cable shall be adequately supported, and clipped at regular intervals. At terminations all strands of conductors shall be fully secured in a terminal block or clamped under a screw head washer; do not cut away any strands. Wiring which terminates in enclosed fittings and/or where subject to heat liable to cause deterioration, shall be high temperature type, with the tails made off with heat resisting sleeves, to protect the permanent wiring.

Wire lights in 1.5mm 3 core - 7.5 amps loading max per circuit (allow for 100w to all light fittings unless identified otherwise).

Wire power outlets in 2.5mm 3 core - 7 maximum GPO singles or doubles per circuit. Assess power outlets for specific equipment and allow accordingly.

Conceal all wiring except as noted on drawings or below. All wiring cast into concrete shall be run in conduit pipes. All cables shall be stranded (single core is unacceptable).

Wire more or less parallel to and at right angles to the structural elements - avoid any diagonal wiring. Layout of the principal distribution wiring shall be to approval. Position all wires to minimise the risk of damage from subsequent nailing of linings etc.

Generally, do not run TPS horizontally within timber walls except in the area up to 300mm above floor. Wire in the ceiling framing and drop vertically to outlets and switches.

Wire exterior lighting in screened cable.

14 APPENDIX

1. Engineers Soil Report
2. Stormwater Report
3. Wastewater Report
4. Engineered Foundation Design
5. Truss & Lintel Layouts & Producer Statement
6. Bracing Calculations
7. H1 Compliance Report
8. Building Wrap Specifications
9. Batten Man
10. Premier Brick Specifications
11. Hot Water

Mark T Mitchell Ltd

Consulting Geotechnical Engineers

1150 Victoria Street
P O Box 9123
Hamilton 3240
New Zealand
Telephone 07 838 3119
Facsimile 07 839 3125
email: mtm@geocon.co.nz

Ref: W - 14541.7
30 October, 2015

Cheshunt Farm Ltd
No. 69 Swan Road
Te Kauwhata 3871

Attention: Frank Greene

Dear Sir,

Re: Site Investigation, Geotechnical Assessment, Foundation Recommendations and Preliminary Assessment for Disposal of Stormwater and Wastewater Proposed Subdivision - No. 69 (Lot 30-37) Swan Road, Te Kauwhata

In accordance with your request, we have carried out a Site Investigation and Geotechnical Assessment of the above referenced property. The purpose of our investigation and assessment was to determine and evaluate the subsurface conditions within the property and provide appropriate recommendations for proposed subdivision.

Our associate company, Geocon Geotechnical Ltd. has carried out the soil testing with the results presented in the attached report dated 6 October, 2015.

Stage 1 of the Subdivision included the development of a Right of Way (Hugh Greene Lane) to provide access to five of the lots, with Lots 36 and 37 accessed directly off Swan Road. The 30 metre diameter Planning Circles for each lot have been re-positioned from the Scheme Plan locations so as to be more central in the lots and thus provide more suitable building areas. The Geocon test hole locations have been positioned so as to be central within these circles.

The results of our geotechnical assessment of the property, together with our recommendations are as follows:

1. Soil Conditions

The results of the soil testing indicate that the silty Clay or clayey Silts soils that occur below the Topsoil exhibit moderate to high soil strengths in their undisturbed state and are therefore suitable for the support of building foundations.

However, the soils within the less elevated lots within the subdivision (Lots 30, 31 and 32) have only low to moderate strengths. Engineer-design of foundations will be required for buildings located within these lots.

Director: Mark T Mitchell BE MS (Purdue) MIPENZ MASCE CPEng InPE(NZ) Member ACENZ

2. Foundation Recommendations – Concrete Floor Construction

2.1 Lots 33, 34, 36 and 37 (Standard Foundations)

Within these lots, the bore hole tests indicate that soil strengths are relatively so as to enable conventional concrete floor construction to the requirements of NZS 3604:2011, the NZ Standard for timber framed buildings to be carried out. However at the time of building construction, further soil testing should be carried out within the proposed building site areas to indicate the extent of site over-excavation which may be required.

For a concrete floor dwelling, it will be necessary to remove the Topsoil and any soft Silt or Clay, which the test holes indicate will be to an approximate depth of around 0.2 to 0.6 metres below existing ground level.

The Clay and Silt soils are subject to swelling and shrinkage during times when soil moisture contents fluctuate between winter and summer levels. It is therefore recommended that all pad and strip footings are to be located a minimum depth of 400mm below adjacent ground levels so as to minimise the effect of ground swelling and shrinkage.

Provided these soils are not softened through water ponding, they will provide an allowable bearing pressure of 100 kPa, which is one of the requirements for the non-specific design building codes.

2.2 Lots 30 – 32 and 35 (Concrete Raft Foundations)

The test holes drilled within these lots indicate that compressible soils are present from 1.5 to 3.0 metres below the current ground surface. For building construction on these lots, the floor slab and footing design will need to be carried out as a Specific Design by a Chartered Professional Engineer, with engineer-inspections at the time of construction also required.

Site preparation work will also be required so as to provide a suitable bearing surface for the foundation slab.

Two design options for the concrete slab foundation are available, as follows. Each option will require an engineer design and construction inspections, all of which are able to be carried out by our office:

a. Waffle Concrete Floor Slab

A "Ribraft" or "Conqra" waffle-type concrete slab of uniform thickness would be suitable for this project, following site preparation work as described below. This type of concrete slab is well reinforced and is able to accommodate a limited amount of poor ground conditions below the slab. Thus, the risk of post-construction cracking of the floor slab as a result of poor ground conditions is considerably reduced.

This type of floor slab will require supplementary steel reinforcement, to an engineer design so as to accommodate the presence of the soft soils at depth.



b. Engineer-designed Concrete Raft Floor Slab

This alternative will also require the site preparation work as described below.

In place of the Ribraft-type raft of uniform thickness however, the raft comprises a series of inter-connected concrete foundation beams, forming a multiple cell layout, with a conventional mesh-reinforced, 100mm thick concrete floor slab poured either over the top of, or in conjunction with, the foundation beams.

The deepened perimeter foundation beams and also the interior beams are well-reinforced with the ability to span over loose soils areas that may settle, or consolidate over the design life of the building.

2.3 Site Preparation

Concrete Slab-on-Grade Construction for the building sites will require a level building platform to be formed, with imported rockfill used where the building platform is to be raised. The use of locally excavated silt or clay soils to provide filling for below the concrete slab is not recommended.

It is also important that soil from the building site excavations is not deposited in the area of the effluent drainage field as the filling will not be suitable for the effluent drainage fields.

3. Foundation Preparation

The recommended procedure for preparing the building site areas is as follows:

1. Set out the proposed building and excavate all Topsoil and any soft Silt or Clay. This is expected to be at a depth of 0.2 to 0.6 metres below existing ground level. The excavation should extend to a minimum of 0.5 metres outside the perimeter of the building lines. These soils can either be removed from the site or stockpiled for future landscaping or yard area filling.
2. Under Mitchell staff direction, compact the exposed soil surface with a self-propelled vibratory compactor of minimum 2 tonnes static weight, with the vibratory action turned off. The surface should be compacted (i.e. proof rolled) with at least six passes with this roller. Where the exposed soil is noted to weave excessively, that area should be over-excavated and replaced with pit sand. Our staff member will advise on any over-excavation that may be required.
3. Any local soft areas which show up during this proof-rolling/base compaction process will need to be excavated and removed from the building area.
4. Imported pit sand should then be used to bring the building area up to the desired grade and placed in layers not exceeding 200mm thick with each layer compacted with the roller mentioned above. The pit sand should be compacted with at least six passes with this roller.
5. Satisfactory compaction of the filling would be achieved when testing with a Scala Penetrometer indicates a blow count of 5 blows per 100mm penetration.



4. Foundation Recommendations – Timber Floor

Timber floor dwellings, founded on bored piles may be constructed in accordance with NZS 3604:2011, the NZ Standard for Timber Framed Buildings, provided that deepened foundations as described below are utilised. The bored piles will need to be drilled through the Topsoil to a depth at which the Scala-values exceed 5 blows per 100mm and then founded to depths as specified in NZS 3604:2011.

Where the Scala tests at these depths do not achieve the required 5 blows per 100mm, the diameter of the footings will need to be increased by about 100mm greater than the minimum values set out in Table 6.1 of NZS 3604:2011. Alternatively insitu shear vanes must exceed minimum shear strength of 80 kPa.

When the pile holes are drilled, one of our staff members, or other competent person, will need to carry out testing at several locations across the site to verify this recommendation and certify the adequacy of foundation soil bearing.

5. On-Site Wastewater (Effluent) Drainage – Preliminary Assessment

A preliminary assessment of on-site wastewater management has been carried out. When final house sizes and locations are determined, we will need to carry out more comprehensive assessments, with an updated report to be completed and forwarded to Council as part of the Building Consent application.

5.1 Topography and Drainage

The subject site is situated over rolling hill topography. The soil conditions within the lots consist of silty Clay and clayey Silts. (Weathered Volcanic Ash)

5.2 Soil Conditions and Groundwater

The bore holes drilled for the foundation recommendations showed layers of silty Clay and clayey Silt through to the base of the 4.0 metres deep bore hole. The clay is assessed as a Category 5 soil in accordance with AS/NZS 1547:2000, with a recommended design loading rate of 8mm per day.

Groundwater was generally not encountered in the bore holes at the time of our early spring investigation and is unlikely to rise in the elevated portions of the Subdivision. Bore holes drilled in Lots 30 and 31 encountered groundwater levels of 3.2 and 2.5 metres respectively, with these lots are located in the less elevated area.

Due to the fine grained nature of the soils the site will require a higher level of effluent treatment (dual chamber septic tank) and densely vegetated evapo-transpiration beds that recognise the low permeability of the site soils.



5.3. Primary Treated Effluent - Septic Tank with Outlet Filter

This type of system will be suitable for small to moderate dwellings where design flows can be managed below 1.3 cubic metres per day. This typically equates to a 4-bedroom dwelling with reticulated or bore water supply, or 5-bedroom dwellings with roof tank water supply. It can also apply to 5-bedroom dwellings with reticulated or bore water supply if measures are taken to reduce wastewater flows.

5.4. Improved (Secondary) Effluent Treatment

This will be required for larger dwellings where the design flow exceeds 1.3 cubic metres or can be optionally adopted on smaller dwellings. This will require a proprietary wastewater treatment system that meets the criteria of the Waikato Regional Plan.

Secondary treated effluent is commonly discharged through dripper lines although the area used can be minimised if evapo-transpiration beds are adopted.

5.5 General - Applying to both Primary and Improved Systems

At the time of the Building Consent Application a specific design for the effluent treatment and land application system is to be submitted to the Waikato District Council.

The design is to be prepared in accordance with the design guidelines contained in AS/NZS 1547:2000, TP58:2004 and the Waikato Regional Plan. As a minimum the design will need to include:

- An assessment of the receiving soils and soil loading rates in the area of the drainage field.
- Calculations of daily wastewater flows and land application area required.
- A plan showing test locations and drainage field location.
- A PS-1 (design) certificate from a Chartered Engineer or other suitably qualified wastewater design professional.

We would be pleased to provide this design, which would be based on the intended floor plan of a proposed house.

6. Stormwater Disposal Preliminary Recommendations

The depth of impermeable Clay and Silt soils identified at the site indicate that conventional in-ground soakage, by means of soakholes or soakage trenches will not be appropriate for this Subdivision.

Any proposed dwelling in the rural areas will be serviced by either trickle feed and/or roof tank water supply. Therefore, the most economical option for stormwater disposal will be to oversize the roof-water tank so that it is sufficiently large as to be able to contain and temporarily store stormwater from short duration and high intensity rainfall events. This is so as to prevent a nuisance to the neighbouring properties from water flowing off the site.



For the roof water tank detention, a small diameter outlet pipe, typically 25mm diameter is used to discharge the collected stormwater at Greenfields rate (runoff rate from an undeveloped site). This allows the roof water to be detained thus countering the impact of concentrated roof stormwater flows.

A second, higher-level overflow pipe also needs to be installed at the top of the tank, so that in the event of the design storm being exceeded, the detention tank has a means of discharging excess stormwater within the property without creating any nuisance to the neighbouring property.

Both the high level overflow pipe and the slow release outlet pipe can then be discharged into a shallow aggregate-filled swale drain within the property.

6.1 Stormwater Detention Tank Recommendations

The attached Table 1 shows that for a typical roof area of 300 square metres a detention tank of at least 7,992 litre capacity be required to cater for the stormwater generated from a 10 year ARI (Average Recurrence Interval), 60 minute storm.

All roof water downpipes are to be connected to these tanks. Note that this volume is in addition to the volume of water required for household use, if any. The 25mm diameter outlet is to be positioned so the 7,992 litre volume requirement lies above this outlet.

6.2 General Recommendations

It should be noted that the actual water tank or alternative soakage trench requirements will need to be determined by a Chartered Engineer based on the proposed house roof and driveway areas. This information will need to be undertaken prior to the Building Consent Application, as these details will need to be submitted with that application.

Attention is also drawn to the 2009 Waikato District Council Water Supply Bylaw which requires all new residences located within rural areas which are connected to a Council water supply, to have a water tank capacity of minimum 22,000 litres. This 22,000 litre requirement is in addition to the detention volume referred to in Section 6.1 above.

7. Construction Inspections

In order to satisfy Waikato District Council building requirements, site testing of the building sites will need to be carried out at the time of house foundation preparation work. Inspections of the stormwater and wastewater installations will also be required.

This work is required to be tested and inspected under the direction of a Chartered Engineer, with engineer-certification provided. Mark T Mitchell Ltd, together with Geocon Geotechnical Ltd, our associated testing company working under our direction, is able to provide this service.

Yours faithfully

Mark T Mitchell Ltd



Mark T Mitchell
Director



Mark T Mitchell Ltd - Consulting Geotechnical Engineers

Mark T Mitchell Ltd		Consulting Geotechnical Engineers		Ph 07 938 3110	
PROJECT: CHESHUNT FARM LTD Stormwater Assessment for No. 69 (Lot 30 to 37) Swan Road, Te Kaitiaki		Ref: W-14541		Date: October 2015	
<p>TABLE 1 - ON SITE DETENTION TANK REQUIREMENTS TO CAPTURE STORMWATER RUNOFF FROM A TYPICAL ROOF AREA OF 300/sqm</p>					
(10 Year Storm Event)					
<p>A. CATCHMENT CHARACTERISTICS</p>					
Pre-development		Post-development			
Grass		Grass			
500		200			
0.3		0.3			
<p>Detachment Area (square metres): 500</p>					
<p>Runoff coefficient: 0.3</p>					
<p>Design Rainfall (mm): 10.930 gmm. Area to be developed for residential use is assumed to be 500 sqm. (Note: Average area min = 6,872 sqm and Max = 15,925 sqm)</p>					
<p>Note: Average Total area of sections is 10,930 gmm. Area to be developed for residential use is assumed to be 500 sqm. (Note: Average area min = 6,872 sqm and Max = 15,925 sqm)</p>					
<p>B. PRE-DEVELOPMENT RUNOFF (10 YEAR STORM EVENT) (Unaffected Roadfall Rainfall Data)</p>					
STORM DURATION	RAINFALL INTENSITY 10 yr (mm/hr)	RAINFALL VOLUME (m³/sqm in area)	TOTAL VOLUME (m³)	VOLUME - grass (m³)	Runoff Rate -pre-dev. grass (mm/hr)
10 min	91	151	7,250	2,255	3.8
20 min	62	206	10,400	3,120	2.6
30 min	50	251	12,550	3,785	2.1
60 min	35	345	17,280	5,175	1.4
2 hours	21	429	21,450	6,435	0.9
<p>C. POST-DEVELOPMENT RUNOFF (10 YEAR STORM EVENT) (Adjusted Roadfall Rainfall Data)</p>					
STORM DURATION	RAINFALL INTENSITY 10 yr (mm/hr)	RAINFALL VOLUME (m³/sqm in area)	TOTAL VOLUME (m³)	VOLUME - Roof (m³)	Runoff Volume -Post Develop Grass (m³)
10 min	106	175	8,200	4,752	1,958
20 min	73	242	12,100	6,534	1,452
30 min	59	291	14,550	7,857	1,120
60 min	40	39.9	19,950	10,373	2,394
2 hours	25	49.4	24,700	13,338	2,954
<p>Note: Required tank volume = Proposed Roof Volume less the Allowable Discharge Volume</p>					
<p>Allowable Discharge Rate = pre-development grass runoff rate less the post-development grass runoff rate</p>					
<p>1</p>					
<p>RECOMMENDATIONS: PROVIDE A DETENTION VOLUME OF MINIMUM 7,932 LITRES.</p>					
<p>*NOTE: HIRDS RAINFALL DATA (VERSION 3) FOR TE KAITIAKI IS ADJUSTED FOR CLIMATE CHANGE IN ACCORDANCE WITH LIFE GUIDELINES</p>					
<p>Checked by: <i>MM</i></p>					

Geocon Geotechnical Ltd

Geotechnical Engineers

1150 Victoria Street
PO Box 9123
Hamilton, New Zealand
Facsimile 07 839 3125
Telephone 07 838 3119
email: kevin@geocon.co.nz

Ref: G-14541.1
6 October, 2015

Cheshunt Farm Ltd
c/- Mark T Mitchell Ltd
Consulting Geotechnical Engineers
PO Box 9138
Hamilton 3240

Dear Sir,

**Re: Site Investigation for Foundations and Preliminary On-Site Stormwater and Wastewater Disposal
Proposed New Subdivision at No. 69 (Lot 30-37) Swan Road, Te Kauwhata**

In accordance with your request, we have carried out a Site Investigation including a Preliminary Stormwater and Wastewater disposal assessment at the above referenced site.

The following report is based on site conditions as observed during a site investigation carried out by our staff on 22 & 23 September, 2015.

The proposed subdivision area is located off the southern side of Swan Road with some of the Lots accessed from the newly formed Hugh Greene Lane. The topography within the lots consists of rolling hill farmland sloping downward to the west towards the northern end of the Whangamarino Swamp. The subdivision layout with the bore hole locations are shown on the attached Site Plan, Drawing No. 14541-01.

The results of our investigations are as follows:

1. Geomorphology and Geology

The natural soils encountered at the test locations consist primarily of fine grained Silt and Clay soils, which have developed by the progressive weathering of volcanic tephra (ash). The ash layers are a few to several metres in thickness and are representative of a sequence of volcanic ash deposits that have been progressively weathered to silty Clay and clayey Silt soils. These layers are a part of the Hamilton Ash Formation.

Below the Volcanic soils, ancient alluvial deposits known as the *Walton Subgroup* are present. The Walton Subgroup consist of two geological units referred to as the *Karapiro* and *Puketoka Formations*. These soils are older and are distinguished from the volcanic ash soils as pumiceous in nature.

The Walton Subgroup soils understood to have been deposited as primary or re-worked alluvial deposits or as non-welded distal ignimbrites (volcanic deposit). These soils typically consist of pumiceous silts, clays and consolidated fine grained sands with weathered pumice inclusions.

Soil Testing • Geotechnical Investigations • Civil Engineering Laboratory • Test Drilling

2. Field Investigation

The subsurface soil conditions within the proposed subdivision were investigated by drilling four machine and four hand auger borings together with associated Scala Penetrometer probes and insitu shear vane tests at the locations shown on the Site Plan.

The Bore Holes are designated Nos. 1 to 8 with the Bore Hole logs and associated test data are presented on Figs. A-1 to A-8.

The purpose of the borings and associated testing was to provide guidance as to the general subsurface soil profile together with the variability and relative density of soils within and below the proposed subdivision. Actual conditions may vary across the development site however, and in some locations may differ slightly from those as described in the following section of this report.

3. Subsurface Conditions

The soil conditions at the site, as revealed by the bore holes consist of 200 to 300mm of TOPSOIL generally overlying stiff to very stiff, silty CLAY and clayey SILT to depths of 1.3 to greater than 4.0 metres below existing ground level.

The stiff, Clays and Silts are part of the Hamilton Ash deposit and are underlain by weaker (soft to firm) clayey SILT in the less elevated parts of the subdivision, namely Lots 30 to 32 and Lot 35.

Groundwater was encountered at 3.2 and 2.5 metres in Bore Hole Nos. 1 and 2 respectively at the time of the site investigation. These two bore holes are at the lowest elevations of all the lots.

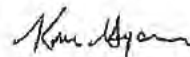
Yours faithfully

Geocon Geotechnical Ltd



Bishnu Basnet
Civil Engineer

Report Approved by

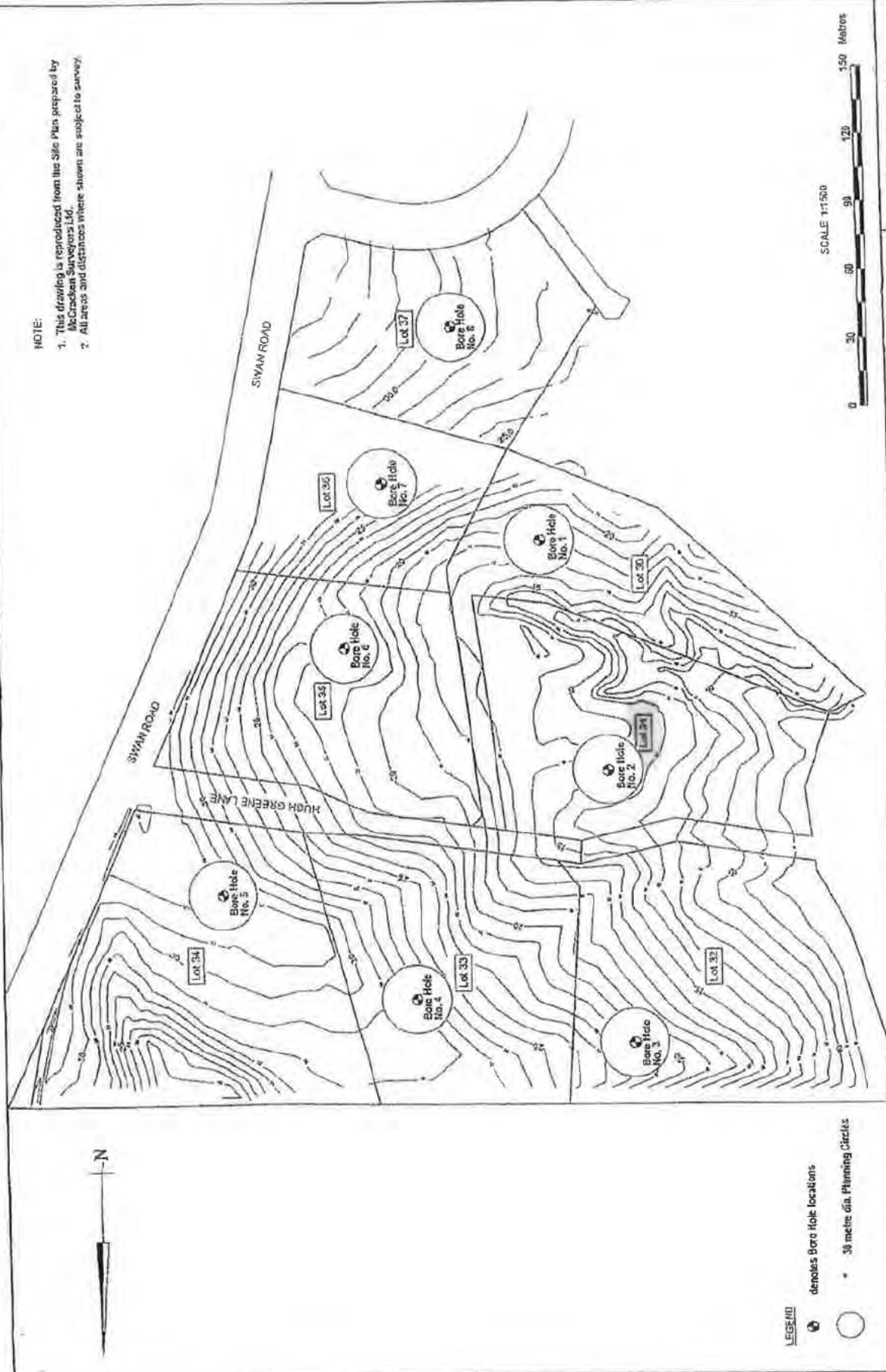


Kevin Hyde
Manager



NOTE:

1. This drawing is reproduced from the Site Plan prepared by McCracken Surveyors Ltd.
2. All areas and distances where shown are subject to survey.



SITE PLAN

DRAWING No. 14541-01
DATE September 2015
ISSUE One

CHESHUNT FARM LTD

Site Investigation for Proposed Subdivision
No. 69 (Lot 30 - 37) Swan Road, Te Kauwhata

Geocon Geotechnical Ltd

Consulting Geotechnical Engineers

1158 Victoria Street, P.O. Box 9123, Hamilton

GRAPHIC LOG	BORE HOLE LOG No. 1 (Lot 30)	DEPTH (metres)	GEOLOGICAL FORMATION	VANE SHEAR STRENGTH - kPa (in-situ Remoulded)	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL
					1	2	3	4	5	6	7	8	9	10	
	TOPSOIL.		T/S												
	clayey SILT. Stiff, moist, moderately plastic, dark yellowish brown.		Hamilton Ash	80/16											
		70/12													
		80/16													
		82/18													
	silty CLAY. Stiff, moist, moderately plastic, manganese nodules, brown. Becoming light brown @ 1.3 metres. " mottled orange @ 1.5 metres.	1		80/32											
			80/30												
			70/26												
	SILT with some clay. Firm, moist to wet, slightly plastic, manganese nodules, light orangey brown, mottled white. Becoming light yellowish brown @ 2.7 metres. " wet from 3.2 metres.	2	Walton Subgroup	46/8											
				40/12											
	Bottom of Bore Hole completed 1/09/15	3													End of Day
		4													
		5													
		6													
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - Vane shear values shown are as recorded in the field, to which a calibration factor from Geotechnics Vane 1432 of 1.558 should be applied to obtain Undrained Shear Strength (kPa). - Scala test was carried out in 1.0 metre depth increments.															
JOB NAME: CHESHUNT FARM LTD JOB LOCATION: NO. 69 (Lot 30-37) Swan Road, Te Kauwhata JOB NUMBER: W-14541				DRILL METHOD: Hand Auger RIG: DRILLER: JZ				LOGGED: JZ PLOTTED: BB DATE LOGGED: 23/09/15 CHECKED: KA							
Geocon Geotechnical Ltd Geotechnical Engineers 1160 Victoria Street, P.O. Box 9123, Hamilton		BORE HOLE LOG		BORE HOLE No. 1 LOCATION: Refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-1											

GRAPHIC LOG	BORE HOLE LOG No. 2 (Lot 31)	DEPTH (metres)	GEOLOGICAL FORMATION	VANE SHEAR STRENGTH - kPa (10-saturated)	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL
					1	2	3	4	5	6	7	8	9	10	
	TOPSOIL.		T/S												
	silty CLAY. Stiff to very stiff, moist, highly plastic, brown. Containing manganese nodules @ 0.4 metres.		Hamilton Ash	130/50											
				122/55											
				76/48											
	silty CLAY. Stiff to very stiff, moist, highly plastic, light brown.	1	Walton Subgroup	100/50											
				90/38											
				136/54											
		SILT with some clay, trace fine sand. Firm to stiff, moist, moderately plastic, slightly iron stained, light grey.	2		74/28										
				40/18											
		SILT with some clay, trace fine sand. Soft to firm, wet, dilatant, light yellowish grey. Becoming stiff @ 3.5 metres.	3												
		Bottom of Bore Hole completed 22/09/15	4												
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - Vane shear values shown are as-recorded in the field, to which a calibration factor from Geotechnics Vane 1432 of 1.659 should be applied to attain Undrained Shear Strength (kPa). - Scale test was carried out in 1.0 metre depth increments.															
JOB NAME: <u>CHESHUNT FARM LTD</u> JOB LOCATION: <u>No. 69 (Lot 30 - 37) Swan Road, Te Kauwhata</u> JOB NUMBER: <u>W-14541</u>				DRILL METHOD: <u>Hand Auger</u> RIG: _____ DRILLER: <u>JZ</u>				LOGGED: <u>BB</u> PLOTTED: <u>BB</u> DATE LOGGED: <u>22/09/15</u> CHECKED: <u>AKH</u>							
 Gecocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton				BORE HOLE LOG BORE HOLE No. 2 (Lot 31) LOCATION: refer Site Plan RL (m): _____ SHEET: 1 OF 1 Fig. No. A-2											

GRAPHIC LOG	BORE HOLE LOG No. 3 (Lot 32)	DEPTH (metres)	GEOLOGICAL FORMATION	VANE SHEAR STRENGTH - kPa (in-situ/consolidated)	SCALA PENETROMETER (blows/100mm)										PEZOMETER / WATER LEVEL
					1	2	3	4	5	6	7	8	9	10	
	SOIL DESCRIPTION														
	TOPSOIL.		T/S												
	silty CLAY. Stiff to very stiff, moist, moderately plastic, brown.		Hamilton Ash	120/42											
				100/36											
				72/20											
	clayey SILT. Stiff, moist, moderately plastic, light brown, mottled orange.	1	Walton Subgroup	100/40											
				86/20											
	SILT with some clay. Firm, moist to wet, low plasticity, manganese nodules, light orangey brown, mottled white.	2													
				50/12											
	SILT with minor clay. Firm, wet, low plasticity, manganese nodules, light pinkish brown, mottled white.	3													
		4													
	Bottom of Bore Hole completed 23/09/15														
NOTES <ul style="list-style-type: none"> The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Vane shear values shown are as recorded in the field, to which a calibration factor from Geotechnics Vane 1432 of 1.558 should be applied to attain Undrained Shear Strength (kPa). Scale test was carried out in 1.0 metre depth increments. 															
JOB NAME: CHESHUNT FARM LTD JOB LOCATION: No. 69 (Lot 30 - 37) Swan Road, Te Kauwhata JOB NUMBER: W-14541				DRILL METHOD: Hand Auger RIG: DRILLER: JZ				LOGGED: BB PLOTTED: BB DATE LOGGED: 23/09/15 CHECKED: KJ							
Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton				BORE HOLE LOG				BORE HOLE No. 3 (Lot 32) LOCATION: refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-3							

GRAPHIC LOG	BORE HOLE LOG No. 4 (Lot 33)	DEPTH (metres)	GEOLOGICAL FORMATION	VANE SHEAR STRENGTH - σ_{vs} (kPa) (un-saturated)	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL		
					1	2	3	4	5	6	7	8	9	10			
	TOPSOIL.		T/S														
	silty CLAY. Stiff, moist, highly plastic, brown. Becoming light brown @ 0.7 metres. " very stiff @ 1.5 metres. " light yellowish brown @ 2.2 metres.	1	Hamilton Ash	82/34													
				74/36													
				98/30													
				90/30													
		120/54															
	2	120/60															
		140+															
	3	140+															
		135/100															
	128/80																
	CLAY with some silt. Very stiff, moist, highly plastic, micaceous, light yellowish brown, mottled light grey. " Becoming mottled brown @ 3.5 metres. " yellowish brown @ 3.5 metres.	4															
Bottom of Bore Hole completed 22/09/15																	
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - Vane shear values shown are as-recorded in the field, to which a calibration factor from Geotechnics Vane 1432 of 1.558 should be applied to obtain Undrained Shear Strength (kPa). - Scale test was carried out in 1.0 metre depth increments.																	
JOB NAME: CHESHUNT FARM LTD JOB LOCATION: No. 69 (Lot 30 - 37) Swan Road, Te Kauwhata JOB NUMBER: W-14541		DRILL METHOD: Machine Auger RIG: HILUX DRILLER: JZ		LOGGED: BB PLOTTED: BB DATE LOGGED: 22/09/15 CHECKED: <i>[Signature]</i>													
 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton		BORE HOLE LOG		BORE HOLE No. 4 (Lot 33) LOCATION: refer Site Plan RI (m): SHEET: 1 OF 1 Fig. No. A-4													

GRAPHIC LOG	BORE HOLE LOG No. 5 (Lot 34)	DEPTH (metres)	GEOLOGICAL FORMATION	VANE SHEAR STRENGTH - kPa (in-situ/unconsolidated)	SCALA PENETROMETER (blows/100mm)										PEZOMETER / WATER LEVEL
					1	2	3	4	5	6	7	8	9	10	
	SOIL DESCRIPTION														
	TOPSOIL.		T/S	50/12											
	clayey SILT. Stiff, moist, moderately plastic, manganese nodules, dark yellowish brown.			54/20											
				74/32											
				84/28											
				84/42											
				140+											
				110/40											
				109/40											
				110/30											
			140+												
			140+												
silty CLAY. Stiff to very stiff, moist, moderately plastic, manganese nodules, brown. Becoming orangey brown @ 0.8 metres. " light brown @ 1.3 metres.		1	Hamilton Ash												
		2													
		3													
		4													
silty CLAY. Very stiff, moist, highly plastic, light orangey brown. Becoming mottled orange @ 3.3 metres.															
Bottom of Bore Hole completed 23/09/15															
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - Vane shear values shown are as-recorded in the field, to which a calibration factor from Geotechnics Vane 1432 of 1.558 should be applied to attain Undrained Shear Strength (kPa). - Scale test was carried out in 1.0 metre depth increments.															

JOB NAME: <u>CHESHUNT FARM LTD</u> JOB LOCATION: <u>No. 69 (Lot 30 - 37) Swan Road, Te Kauwhata</u> JOB NUMBER: <u>W-14541</u>	DRILL METHOD: <u>Hand Auger</u> RIG: _____ DRILLER: <u>JZ</u>	LOGGED: <u>BB</u> PLOTTED: <u>BB</u> DATE LOGGED: <u>23/09/15</u> CHECKED: <u>KH</u>
--	---	--

 Geocon Geotechnical Ltd Geotechnical Engineers 1159 Victoria Street, P.O. Box 9123, Hamilton	BORE HOLE LOG BORE HOLE No. 5 (Lot 34) LOCATION: <u>refer Site Plan</u> RL (m): _____ SHEET: 1 OF 1 Fig. No. A-5
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GRAPHIC LOG	BORE HOLE LOG No. 6 (Lot 35)	DEPTH (metres)	GEOLOGICAL FORMATION	VANE SHEAR STRENGTH - kPa (in situ remoulded)	SCALA PENETROMETER (blows/100mm)										PEZOMETER / WATER LEVEL	
					1	2	3	4	5	6	7	8	9	10		
	TOPSOIL.		T/S													
	silty CLAY. Stiff to very stiff, moist, highly plastic, light yellowish brown. Becoming mottled red and white @ 0.5 metres. " orangey brown, mottled light yellow & white @ 0.7 metres.	1	Hamilton Ash	132/38												
				112/68												
				84/50												
				92/48												
				100/48												
	SILT with some clay. Stiff, moist, moderately plastic, light orangey white, mottled yellow, red & white. Becoming light brownish yellow @ 1.8 metres. " light yellowish white with manganese nodules @ 2.8 metres. " very soft to soft @ 2.9 metres. " wet @ 3.2 metres.	2	Walton Subgroup	114/22												
					90/28											
					88/18											
		3		90/20												
		4														
Bottom of Bore Hole completed 22/09/15																
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - Vane shear values shown are as-recorded in the field, to which a calibration factor from Geotechnics Vane 1432 of 1.658 should be applied to obtain Undrained Shear Strength (kPa). - Scale test was carried out in 1.0 metre depth increments.																
JOB NAME: <u>CHESHUNT FARM LTD</u> JOB LOCATION: <u>No. 69 (Lot 30 - 37) Swan Road, Te Kauwhata</u> JOB NUMBER: <u>W-14541</u>		DRILL METHOD: <u>Machine Auger</u> RIG: <u>HILUX</u> DRILLER: <u>JZ</u>		LOGGED: <u>BB</u> PLOTTED: <u>BB</u> DATE LOGGED: <u>22/09/15</u> CHECKED: <u>KH</u>												
 Geocon Geotechnical Ltd Geotechnical Engineers 1150 Victoria Street, P.O. Box 9123, Hamilton		BORE HOLE LOG		BORE HOLE No. 6 (Lot 35) LOCATION: refer B1 to Plan RL (m) SHEET: 1 OF 1 Fig. No. A-5												

Print Date: 27 October 2017, 1:28 p.m.

GRAPHIC LOG	BORE HOLE LOG No. 8 (Lot 37)	DEPTH (metres)	GEOLOGICAL FORMATION	VANE SHEAR STRENGTH - kPa (In-situ/Remoulded)	SCALA PENETROMETER (blows/100mm)										PIEZOMETER / WATER LEVEL		
					1	2	3	4	5	6	7	8	9	10			
	SOIL DESCRIPTION																
	TOPSOIL.		T/S	114/44													
	silty CLAY. Stiff to very stiff, moist, highly plastic, light yellowish brown, mottled orange. Becoming mottled yellow & reddish brown @ 0.9 metres. " light brown @ 1.6 metres. " mottled light red & white @ 2.5 metres.		Hamilton Ash	112/46													
				112/50													
				100/42													
				140+													
				140+													
				98/48													
				140+													
				132/68													
			116/72														
			112/70														
	CLAY with some silt. Very stiff, moist, highly plastic, light orangey brown, mottled white.		Walton Subgroup														
	Bottom of Bore Hole completed 22/09/15																
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - Vane shear values shown are as-recorded in the field, to which a calibration factor from Geotechnics Vane 1432 of 1.558 should be applied to attain Undrained Shear Strength (kPa). - Scale test was carried out in 1.0 metre depth increments.																	
JOB NAME: <u>CHESHUNT FARM LTD</u> JOB LOCATION: <u>No. 69 (Lot 30 - 37) Swan Road, Te Kauwhata</u> JOB NUMBER: <u>W-14541</u>				DRILL METHOD: <u>Machine Auger</u> RIG: <u>HILUX</u> DRILLER: <u>JZ</u>				LOGGED: <u>BB</u> PLOTTED: <u>BB</u> DATE LOGGED: <u>22/09/15</u> CHECKED: <u>Kel</u>									
Gecon Geotechnical Ltd Geotechnical Engineers 1160 Victoria Street, P.O. Box 9123, Hamilton				BORE HOLE LOG BORE HOLE No. 8 (Lot 37) LOCATION: refer Site Plan RL (m): SHEET: 1 OF 1 Fig. No. A-8													

Mark T Mitchell Ltd

Consulting Geotechnical Engineers

1150 Victoria Street
P O Box 9123
Hamilton 3240
New Zealand
Telephone 07 838 3119
Facsimile 07 839 3125
email: mtm@geocon.co.nz

Ref: W – 14935.6
8 August, 2016

Shaun Swann
PO Box 97438
Manukau City
Auckland 2241

Dear Sir,

**Re: Stormwater Disposal Recommendations and Design
Proposed New Dwelling - Lot 31 Hugh Greene Lane, Te Kauwhata**

In accordance with your request we have carried out a Stormwater Disposal Assessment of the above referenced property. The purpose of our assessment was to evaluate the subsurface conditions within the property and provide appropriate stormwater disposal recommendations for the proposed new dwelling.

The grassed, site is located on the south—western side of Hugh Green Lane and Swan Road, Te Kauwhata and is located approx. 2.4 kilometres to the north-east of the Te Kauwhata township. The proposed dwelling is to be located on a west facing hill slope which falls to swampy ground at the base of the hill on the western boundary of the property.

Our recommendations for disposal of stormwater generated by the proposed new dwelling are as follows:

1. Soil Conditions

A site investigation of the site has been carried out by Geocon Geotechnical Ltd, with the report dated 6 October, 2015, Ref: G-14541. The report has identified that fine grained silt and clay soils underlie the property. The fine grained nature of these soils mean that that conventional in-ground soakage, by means of soakholes or soakage trenches will be not be appropriate for this site.

It is understood that the property is to be serviced by roof tank water supply with the potential to connect to the trickle feed water main located in Hugh Greene Lane. As the property can connect to the water supply it must comply with the Waikato District Council 2009 water supply bylaw. To comply with the bylaw a water storage tank of at least 22,000 litre capacity will need to be installed.

2. Stormwater Disposal Recommendations

The most practical means to dispose of stormwater will be to provide an above-ground water storage tank with a restricted overflow to provide temporary detention for high intensity rainfall events at this property.

The detention tank requires all the downpipes from the proposed dwelling to be collected into a conventional rain water collection tank, but with excess capacity so as to temporarily store (ie. detain) water from high intensity storm events. The upper portion of the tank could be used to comply with the detention tank and excess water disposal requirements. The purpose of the detention tank system is for stormwater from high intensity rainfall events to be held back in the tank and then slowly discharge to the gully located along the southern boundary.

The water tank will need to be provided with a restricted, low-level outlet which can discharge the collected stormwater at 'Greenfield's rate' (i.e. runoff rate from an undeveloped site), the details of which are set out in the following section of this report. The overflow stormwater needs to be disposed of via the gully.

3. Detention Tank Requirements

From plans supplied, the area of the property is approximately 11,500 square metres. For our calculations we have assumed that 1,000 square metres is the area that will be developed for residential use, i.e. building development and associated infrastructure requirements.

The attached Table 1 shows that a roof water tank of at least 7,844 litre capacity will be required to cater for the stormwater generated from a 10-year ARI, 60-minute storm for a roof area of 260 square metres. Note that this volume is in addition to the volume of water required for household use. Therefore a smaller diameter slow release outlet pipe is to be positioned so the 7,844 litres lies above this outlet.

Therefore, a water tank with a capacity of 29,844 litres will be required, alternatively two tanks may be provided with the detention volume shared between the two tanks.

3.1 Sizing of Outlet Pipes from Proposed Detention Tank

The attached Table 2 sets out calculations for the sizing of the slow release outlet pipe from the proposed detention tank system, which conclude that a 25mm diameter PVC pipe will be required so as to ensure that the stormwater runoff rate from the developed site does not exceed the present Greenfield's (undeveloped) runoff rate.

A high level 90 or 110mm overflow pipe is to be installed to cater for extreme rainfall events, the details of which are shown on the attached Stormwater Tank Design Detail, Drawing No. 14935-31. It is a requirement that both the main overflow pipes and the smaller diameter pipe discharge into a gravel lined pit, as shown on the attached Stormwater Drainage Plan Drawing No. 14935-30.

3.2. Outlet pipe Recommendations

In accordance with your request the outlet for the high level overflow from the stormwater tank(s) is to be located in the gully system that runs parallel with the southern boundary. The outlet of this pipe is to be located on a bed of drainage metal to prevent scouring and erosion at the point of discharge. The bed of 60/40 drainage metal should be about 50mm deep and extend for 500mm beyond the end of the pipe and 250mm from either side of the pipe.



4. Disposal of Driveway Stormwater

Based on information supplied by the owner it is understood that the driveway to the dwelling to have a gravel surface and therefore there is no paved surface to take into account for the stormwater disposal assessment. It should be noted that if the driveway is to be sealed or concreted in the future, appropriate on-site stormwater retention systems will need to be installed.

5. Assumed Building Construction and Site Conditions

The roof water tank was designed based on the plans provided of the proposed development areas that indicated approximately 260 square metres of roof area. It is assumed that 1,000 square metres of the total property area of 11,500 square metres will be developed for residential use.

Please note that a separation distance of at least 8.0 metres is required between the proposed stormwater discharge point and any wastewater systems.

6. Limitations and Installation

For all roof surfaces, a spouting leafguard product (Marley Leafslide Series 3 or similar) is to be adopted to prevent litter from entering the spoutings and downpipes prior to entering the roof tank.

A Producer Statement – PS 1 – Design to cover the stormwater detention system is attached. It should be noted that one of the requirements of this Producer Statement is that staff from our office will need to inspect the detention system at the time of its installation.

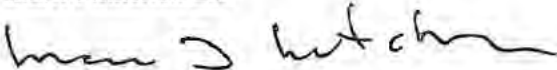
7. Construction Inspections

In order to satisfy Waikato District Council building requirements, inspection of the stormwater disposal construction installations will need to be carried out. This work is required to be carried out under the direction of a Chartered Engineer, with certification provided to indicate that the installations as specified in this report are to an acceptable standard and to the design requirements of the project.

Mark T Mitchell Ltd, together with Geocon Geotechnical Ltd, our associated testing company working under our direction, is able to provide this service at additional cost. Where possible, please provide at least 48 hours notice prior to the commencement of these site works.

Yours faithfully

Mark T Mitchell Ltd



Mark T Mitchell
Director





NEW ZEALAND INSTITUTE OF
ARCHITECTS
INCORPORATED



P.I.M. No.
Building Regulation Clause(s)

PRODUCER STATEMENT - PS1 - DESIGN

ISSUED BY: Mark T Mitchell Ltd Job No W-14935
(Design Firm)
TO: Shaun Swann
(Owner/Developer)
TO BE SUPPLIED TO: Waikato District Council
(Building Consent Authority)
IN RESPECT OF: Stormwater Disposal System Installation
(Description of Building Work)
AT Lot 31 Hugh Greene Lane, Te Kauwhata DP SO
(Address)

We have been engaged by the Owner in respect of the above referenced project to provide design and construction inspection services in respect of the requirements of Clause E1 (Surface Water) of the Building Regulations 2004 for Part only (as specified below and on the Drawings attached to this statement), of the proposed work.

-Stormwater Disposal System Design

The design has been prepared in accordance with acceptable solutions of the approved document Verification Method E1/VM1 & AS1 issued by the Department of Building & Housing and described on the Drawings which are listed below

- Mark T Mitchell Ltd Stormwater Disposal Recommendation and Design Report dated 8 August, 2016.
- Mark T Mitchell Ltd Drawing Nos. 14935-30 and -31.

The following specific design elements have not been reviewed:
- All other aspects of project

On behalf of the Design Firm, which holds a current policy of Professional Indemnity Insurance to a minimum value of \$200,000 and is a member of ACENZ, I believe on reasonable grounds subject to site verification of the following design assumptions:

- (i) Soil Conditions as per Geocon Geotechnical Ltd Report Reference: G-14541.1/1, dated 22 January, 2016.
- (ii) Site layout as proposed and shown on the Drawings prepared by Signature Homes Ltd.
- (iii) All proprietary products meeting the performance specification requirements, the drawings, specifications and other documents according to which the building is proposed to be constructed, comply with the relevant provisions of the Building Code.
- (iv) For this Producer Statement to remain valid, construction inspection and certification of the installations are to be carried out by a staff member from Mark T Mitchell Ltd.

I believe on reasonable grounds the building work, if constructed in accordance with the drawings, specifications, and other documents provided, will comply with the relevant provisions of the Building Code.

I, Mark T Mitchell am registered as CPEng 15278 #
(Name of Design Professional)

I am a Member of: IPENZ and hold the following qualifications: . BE (Civil), MSCE, MIPENZ, CPEng, Int PE (NZ)

SIGNED BY Mark T Mitchell ON BEHALF OF Mark T Mitchell Ltd, Consulting Engineers
(Design Firm)

Date. 8 August, 2016

(signature)

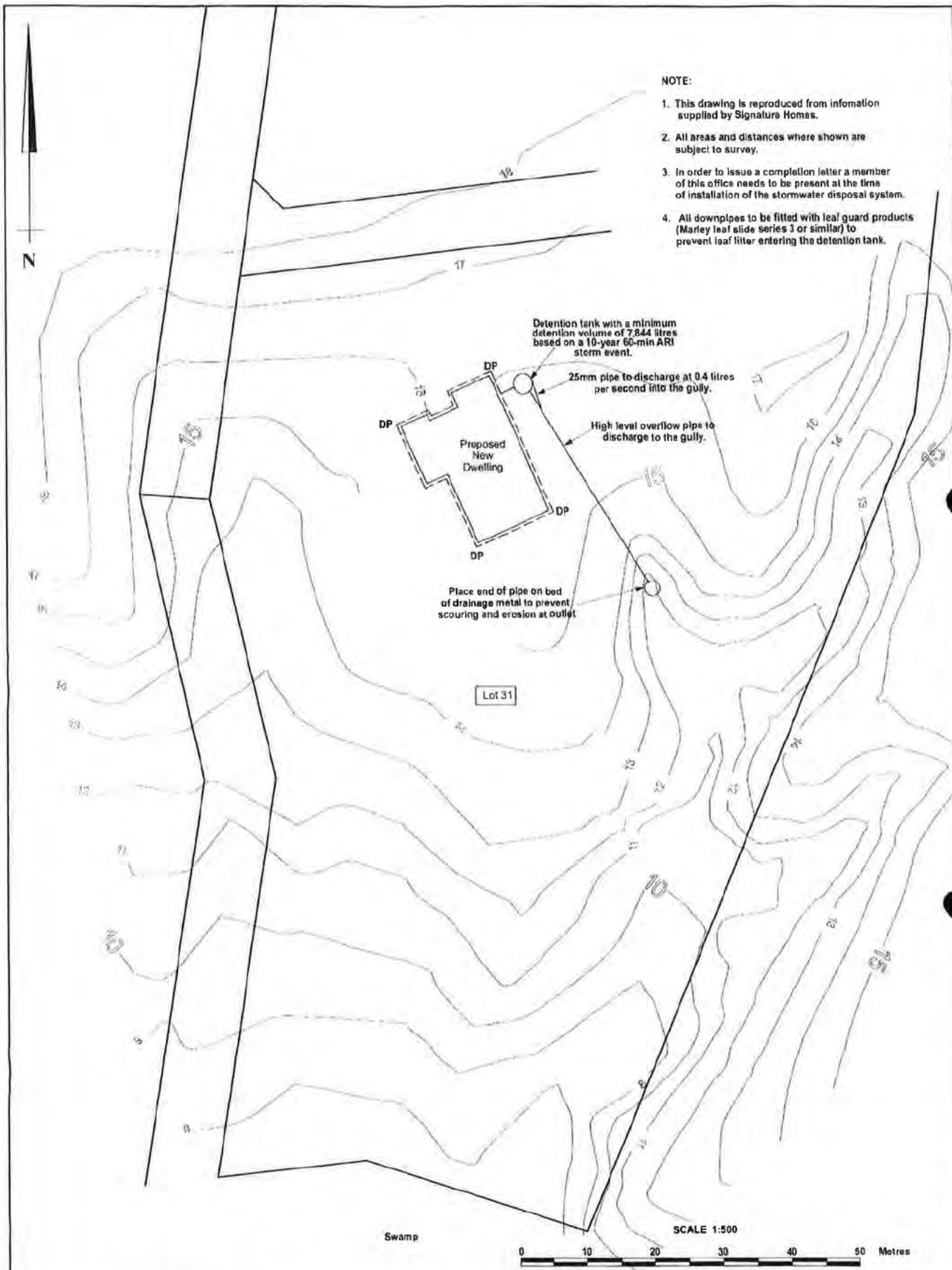
Mark T Mitchell

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.

PRODUCER STATEMENT PS1

May 2007



NOTE:

1. This drawing is reproduced from information supplied by Signature Homes.
2. All areas and distances where shown are subject to survey.
3. In order to issue a completion letter a member of this office needs to be present at the time of installation of the stormwater disposal system.
4. All downpipes to be fitted with leaf guard products (Marley leaf slide series 3 or similar) to prevent leaf litter entering the detention tank.



Mark T Mitchell Ltd
Consulting Geotechnical Engineers
1150 Victoria Street, P.O. Box 9123, Hamilton

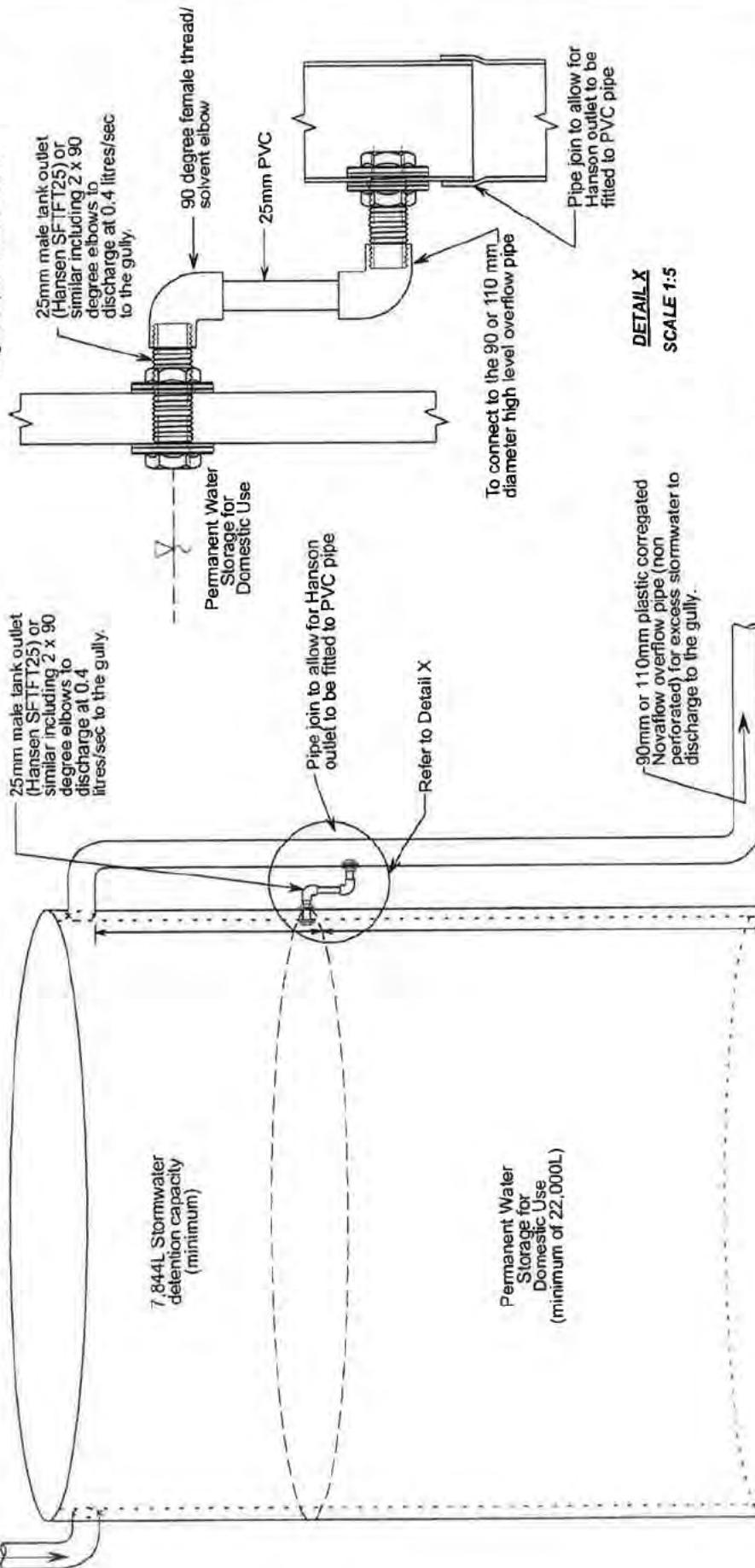
SHAUN SWANN

Stormwater Assessment and Design Studies
Lot 31 Hugh Green Lane, Te Kauwhata

**STORMWATER
DRAINAGE PLAN**

DRAWING No. 14935-30
DATE July 2016
ISSUE One

Note: Diameter of outlet pipe is shown as 25mm, but is dependent on the diameter of the tank. Plumber / Drainlayer to confirm pipe size with Engineer prior to installation.



DETAIL X
SCALE 1:5

NOTE:

This Drawing is intellectual property and has copyright © to the designer, Mark T Mitchell Ltd. No form of unauthorised reproduction, in full or part, is permitted.

SCALE 1:25



Mark T Mitchell Ltd
Consulting Geotechnical Engineers
1150 Victoria Street, P.O. Box 9123, Hamilton

SHAUN SWANN
Stormwater Assessment & Design Studies
Lot 31 Hugh Green Lane, Te Kauwhata

STORMWATER TANK DESIGN DETAILS

DRAWING No. 14935-31
DATE July 2016
ISSUE One

TABLE 1 - ON SITE DETENTION TANK REQUIREMENTS TO CAPTURE STORMWATER RUNOFF FROM A DWELLING ROOF AREA OF 280sqm

(10 Year Storm Event)									
A. CATCHMENT CHARACTERISTICS									
		Pre-development		Post-development					
		Grass		Grass					
Catchment Area (square metres):		1,000		Roof		740			
Runoff co-efficient:		0.3		0.9		0.3			
(ex DBH NZ Building Code C1 E1 VM E1/VM1)									
Note: Total area of section is 11,500 sqm. Area to be developed for residential use is assumed to be 1,000 sqm.									
B. PRE-DEVELOPMENT RUNOFF (10 YEAR STORM EVENT) (Unadjusted Rainfall Data)									
STORM DURATION	RAINFALL INTENSITY 10 yr ARI (mm/hr) Computed	RAINFALL VOLUME (litres/sq m area) Entered from HIRDS	TOTAL VOLUME (litres) Determined from HIRDS	VOLUME - grass (litres)	Runoff Rate -pre-devpmnt grass (litres/sec)	Runoff Rate -post devpmnt grass (litres/sec)	Allowable Discharge Rate (litres/sec) (Refer to note)	Allowable Discharge volume (litres)	REQUIRED TANK VOLUME (litres) (Refer to note)
10 min	91	15	15,100	4,530	7.6		1.0	623	3,496
20 min	62	21	20,800	6,240	5.2		0.7	868	4,795
30 min	50	25	25,100	7,530	4.2		0.6	1,070	5,740
60 min	35	35	34,500	10,350	2.9	Greenfield runoff rate = Runoff rate from the existing grassed area	0.4	1,492	7,844
2 hours	21	43	42,900	12,870	1.8		0.3	1,903	9,656
C. POST-DEVELOPMENT RUNOFF (10 YEAR STORM EVENT) (Adjusted Rainfall Data)									
STORM DURATION	RAINFALL INTENSITY 10 yr ARI (mm/hr) Computed	RAINFALL VOLUME (litres/sq m area) Entered from HIRDS	TOTAL VOLUME (litres) Determined from HIRDS	VOLUME - Roof (litres)	Runoff Volume -Post Devpmnt Grass (litres)	Runoff Rate -post devpmnt grass (litres/sec)	Allowable Discharge Rate (litres/sec) (Refer to note)	Allowable Discharge volume (litres)	REQUIRED TANK VOLUME (litres) (Refer to note)
10 min	106	18	17,600	4,118	3,907	6.5	1.0	623	3,496
20 min	73	24	24,200	5,663	5,372	4.5	0.7	868	4,795
30 min	58	29	29,100	6,809	6,460	3.6	0.6	1,070	5,740
60 min	40	40	39,900	9,337	8,858	2.5	0.4	1,492	7,844
2 hours	25	49	49,400	11,560	10,957	1.5	0.3	1,903	9,656
Note: Required tank volume = Proposed Roof Volume less the Allowable Discharge Volume									
Allowable Discharge Rate = pre-development grass runoff rate less the post-development grass runoff rate									
RECOMMENDATIONS: PROVIDE A DETENTION VOLUME OF MINIMUM 7,844 LITRES.									
*NOTE: HIRDS RAINFALL DATA (VERSION 3) FOR TE KAUWHATA ADJUSTED FOR CLIMATE CHANGE IN ACCORDANCE WITH MFE GUIDELINES									
									Checked by: 

TABLE 2 - Detention Tank Low Level Outlet Pipe-Flow Calculations

Job Number: W-14935

Date: July 2016

Pipe Flow Assessment for: SHAUN SWANN

Location: Lot 31 Hugh Greene Lane, Te Kauwhata

Pipe Flow Rate and Discharge: HAZEN-WILLIAMS PIPE FLOW FORMULA for Conventional Water Tank with Surplus Capacity

1. General Pipe Flow calculations - Given required discharge and pipe diameter - determine required gradient For PVC pipe C = 130

GIVEN: COEFF C= 130

PIPE DIAM D= 25 mm

DISCHARGE Q= 0.4 l/s

(D)0.63= 7.60

(D)2.63= 4.75E+03

CALCULATE:

REQD GRADIENT= 0.0

CALC VELOCITY= 0.8 m/s

(I)0.54= 0.18

2. General Pipe Flow calculations - Head loss at Orifices and at Bends - Given velocity determine head loss

3. Head loss - Orifice at discharge point from water tank and at 90 degree bend

Orifice Head loss coeff = 0.5

Bend head loss coeff = 2.0

Total head loss coeff = 2.5

(sharp bend)

Two 90 degree bends, coeff = 4.5

Double 90 deg bends

Pipe Diameter = 20

Pipe Area = 314

Velocity m/sec = 0.2

Discharge l/sec = 0.1

v squared/2g = 0.0

total coeff = 4.5

Height of tank above the low level outlet pipe = 0.01

Pipe Diameter = 25

Pipe Area = 491

Velocity m/sec = 0.2

Discharge l/sec = 0.2

v squared/2g = 0.0

total coeff = 4.5

Height of tank above the low level outlet pipe = 0.01

0.01

0.04

0.08

0.15

0.33

0.45

0.45

0.45

0.45

0.45

Checked by:

[Signature]

DART DRAINAGE DESIGN

Wastewater Management Design – 5 Hugh Greene Ln, Te Kauwhata

The above address is the ideal situation for the Biocycle AWTS 8200.

The Biocycle AWTS is an economical and efficient secondary treatment wastewater disposal system designed for treating raw effluent. It is an environmentally friendly operation, with low running costs.

The Biocycle AWTS is perfect for treating wastewater where less than ideal soil conditions exist, high water table is present, or where site restrictions put limitations on the location of the disposal field.

The Biocycle AWTS 8200 is capable of treating 1600L of effluent per day.

Design Information

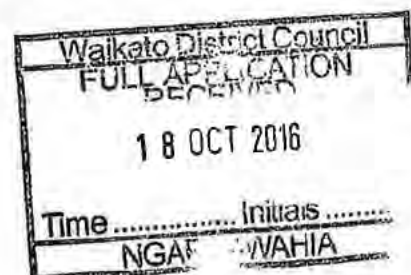
- The soil at the above site is moderately structured slow draining clay.
- The dwelling will be on rain/roof water supply with the availability of trickle feed.
- Water table was not located at time of site investigation, test depth was 1.2m.
- 4 bedroom home plus study = 7 people.
180L/day/person = 1260L per day.
- Soil Category: 5 – 2.9mm/day absorption rate.
- 1260L/day divided by 2.9mm/day = 440m of dripline required.

Uniram 17 pressure compensating dripline with 2.3L/hour emitters at 0.5m spacing, laid 1m apart on ground surface amongst densely planted native bush, giving in excess of 600mm separation between treated effluent and the water table, 1.5m from all boundaries.

All Biocycle Systems are installed by NZ Registered drainlayers.

The installation design for this Biocycle System has been completed in accordance with Waikato Regional Council Permitted Activity Rule 3.5.7.6 section d).

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Specialists In Wastewater and Stormwater Design



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As Built Drawings

Installer shall submit to the local authority as-built plans of the installation drawn to scale.

System Maintenance

- The Biocycle AWTS must be serviced every 6 months minimum by a suitably qualified service technician.
- The property owner should inspect and clean effluent filters on regular occasions to help ensure the efficiency of the treatment system. These inspections should be done at once every two months.
- Maintenance of the effluent disposal field must be completed as part of the annual service by the technician.
- As part of the monitoring and reporting requirements a copy of the service report is to be kept by the property owner and the service agency.

If any further information is required please contact me on the above numbers.

Regards,



Murray White

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DESIGN PRODUCER STATEMENT (PS1)

Owner: Swann

Address: 5 Hugh Greene Lane, Te Kauwhata
Lot 31, DP 455848

Design Works: On Site Wastewater Management

Drawings & Design Prepared By: Murray White

Designers Address: 15 Mexted Place
PO Box 9262
HAMILTON

I, the designer, certify that the above mentioned works have been completed in accordance with NZS 1547:2012, and meets ARC TP58.

All site supervision and inspection of the work completed under the scope of this design are covered by this certificate

I, the designer and our company hold current Professional Indemnity insurance to the value of \$2,000,000.

NOTES/AMMENDMENTS

.....

.....

SIGNED: 

DATE: 28/9/2016

Murray White

Producer Statement Author: 0640

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SEPTIC TANK DOS & DON'TS

All wastewater (toilets, shower, sinks, laundry) produced on the site is discharged to an onsite wastewater treatment and land disposal system. The wastewater treatment system is a fragile biological process and therefore requires care by all residents.

You can help maintain an effective wastewater treatment system on your site, by ensuring no toxic chemicals are put down the sinks or toilets and use only environmentally friendly cleaning products. Toxic chemicals, drugs (e.g. antibiotics) kill the bacteria in the treatment system. These organisms are required to treat wastewater and if healthy populations are not maintained, the system will fail resulting in poorly treated wastewater discharging into the soil, odours, increased maintenance requirements and eventually the expense of upgrading the system. You should also minimise your water use as much as possible to protect the system from overloading.

DO

- Minimise your water use
- Minimise the length of showers
- Use showers in preference to baths
- Use bio-degradable soaps and cleaners
- Check all your cleaning products to see if they are suitable for septic tanks
- Minimise use of strong toilet cleaners
- Scrape all plates and dishes to remove as much fat and grease as possible
- Report/fix all leaking taps as soon as possible
- Use phosphate free/low phosphorus based laundry detergents

DO NOT

- Don't pour any toxic/strong chemicals (paint, oil, grease, thinners, pesticides down any drains)
- Don't flush any products down the toilet, other than standard toilet paper
- Don't discard any drugs down the toilet or sink
- Don't use strong cleaners
- Don't tip chlorine cleaners or disinfectant based products into the system
- Don't use chemical drain cleaning products
- Don't do all your laundry in one day
- Don't install sink garbage grinders. If a grinder exists, don't discharge high volumes of scraps, especially carbohydrates or fats/oils down it.
- Don't put coffee grinds down the sink

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BioCycle Systems Ltd

15 Mexted Place
P.O. Box 9262
HAMILTON
0274 998 799
0800 246 292

Design Specifications for BioCycle Treatment Plants

The BioCycle Aerobic Wastewater Treatment System can be used to treat domestic effluent from residential or light commercial properties to a level where it can be safely dispersed on site without any negative effect on the environment.

The modular construction of the BioCycle plant makes it possible to manufacture a system for any flow rate that may be required. It is a cost effective alternative for areas where ground porosity is at varying ends of the spectrum. On undulating sites where the land at lower levels is consumed by buildings or other facilities the BioCycle System allows the effluent to be distributed on a level above the tanks location.

The BioCycle System complies with all specifications for aerobic treatment units from New Zealand and Australia, providing effective and reliable wastewater treatment over a long period of time. The design parameters have been derived from proven technology in the field of wastewater treatment. This is achieved by application of the specified parameters with excellent design and construction principals, including thorough testing of the system and final effluent.

The BioCycle System has an anaerobic chamber of primary treatment enabling a minimum 20% reduction of BOD5 through sedimentation.

The primary chamber receives the return activated sludge from the clarification chamber, providing a stimulant for further breakdown of the influent load.

Following primary treatment, aeration is provided in a chamber which contains submerged media. This plastic cusped media is attached to the walls of the tank allowing even distribution of air through the chamber and media.

Diffused air at a minimum rate of 80 litres/min at a head of 1.5m is required. This is disposed at the bottom of the tank by way of purposed built air diffusers.

The aeration system is designed to maintain a minimum dissolved oxygen concentration of 2mg/L in the aerobic chamber within the maximum two hourly flow.

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A second sedimentary chamber is provided to remove settling and floatable solids passing through from the aerobic chamber.

Provision is made for constant automatic return of settled solids to the anaerobic chamber by means of a subsurface sludge mechanism operated by venture suction off the air supply manifold.

Tank Construction

In New Zealand, the BioCycle System standard concrete tank is constructed of steel reinforced concrete to a strength of 40Mpa. Tank walls are monolithic. The lid is constructed separately and sealed to the tanks walls to prevent leakage.

Manhole lids are formed in HDPE and internal components are PVC pressure pipe.

All electrical box housings, aerators and electrical control units are made of HDPE and are fastened to the tank lid.

Each system is fitted out prior to leaving the factory. Prerequisite drainage, irrigation and electrical connections are completed on site.

Operating Plant Specifications

Aeration

1 LP80 HN Air Pump located inside the HDPE enclosure on top of the tank

- 85 watt power rating is single phase
- Exhaust capacity is 80 litres per minute per pump
- Noise level at 1.0m is 30dBA (less inside enclosure)

Irrigation Pump

A Davey D42AB submersible pump with a maximum head of at least 29m is fitted.

Power consumption varies with total flow during any day and type of irrigation system installed.

The estimate cost of power consumption used by the blower and the irrigation pump is approximately \$120 per annum

Monitoring System

All BioCycle units are installed with two alarms as warning devices. An alarm plate (audio/visual) is supplied to be installed in a convenient position inside the house. The alarm plate is commercial grade,

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similar to a light switch with two coloured lights. A switch plate provides for the alarm to sound and to be switched to 'mute' when heard.

The alarm panel is incorporated into an electrical circuit breaker unit located at the system or fuse box as an extra safeguard in the event of an electrical fault.

The two lights indicate:

1. The high water level designed to sound if the water level in the irrigation chamber reaches a certain level. This indicates that the submersible pump is malfunctioning, or the filter is blocked, or the switch is off.
2. The air pressure is designed to sound if the blower ceases to operate.

The user is responsible for keeping the filter clean and ensuring that the irrigation line and drippers are not obstructed.

Final Effluent Quality

A properly maintained system produces treated water of a very high quality.

The following standards apply:

- B.O.D under 20g per cubic meter
- Suspended solids under 30g per cubic meter

BioCycle Guarantee

BioCycle Systems guarantees to repair or replace any part of the system requiring repair or replacement due to defective manufacture, provided BioCycle is given notice of the problem within 24 hours of the customer being aware of the problem.

The BioCycle System is guaranteed for ten years from the date of the agreement, except for defects in the mechanical/electrical components and irrigation points. These parts are guaranteed for two years or the earlier of either commissioning date or 3 months from the date of installation.

For all enquiries please call BioCycle toll free on 0800 246 292

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Waikato District Council	
FULL APPLICATION RECEIVED	
18 OCT 2016	
Time	Initials
NGARUAWAHIA	

RECOMMENDED PLANTS FOR ON SITE WASTEWATER DISPOSAL SYSTEMS

GENERAL MATTERS TO CONSIDER WHEN PLANTING A LAND DISPOSAL AREA:

Plants that are suitable for planting in moist conditions, such as those associated with wastewater land disposal fields need to be selected on the basis of both their tolerance for such moist conditions and for their potential for high level of growth/high transpiration of moisture in such conditions. Standard lawn grass is a proven effective high transpiration plant species in such conditions, as are a large number of other plant species seen in typical domestic gardens.

Consideration needs to be given to effects of roots from plants and from trees in particular on wastewater distribution pipe networks/emitter lines in land application systems. Potential for root intrusion/disruption to the pipe system must be considered prior to selection and planting of a plant or tree species.

Advice on such matters for particular plant species can be obtained from garden centre specialists and landscaping consultants.

NATIVE PLANTS SUITABLE FOR MOIST CONDITIONS IN THE AUCKLAND REGION:

The following list covers native plant species are considered to be suitable for planting in moist conditions, such as those associated with wastewater disposal fields in Auckland situations. They are all tolerant or fond of moist conditions and all are native to the Auckland region. Much of this information has been adapted from one of the ARC Botanic Gardens advisory leaflets; "14 – New Zealand plants for wet places" and the list edited and reviewed by Dr. Rhys Gardner Consulting Botanist, Auckland War Memorial Museum (August 2004).

Grasses, ground covers, and other plants

Astelia grandis (swamp astelia)

Large clump forming plant with bright green, flax-like foliage. Female plants produce upright panicles of orange berries in the centre of the plant. This endemic species will not tolerate eutrophic conditions and prefers peat soils.

Blechnum novaezealandiae (kloklo)

Large, robust fern growing to 1 or even 2m, Hardy species that tolerates most conditions, but does best in well drained, shady areas.

Carex

There are many members of this genus which grow naturally in damp to wet areas. They all have quite fine drooping foliage and are vigorous in moist conditions. Most prefer very light shade.

The following species have been identified for their suitability:

Carex dissita

Endemic species with dull green to reddish tufts often 0.5m tall (although this can vary). Tolerates a range of swampy habitats, but is also noted to grow on drier soils under forest cover.

Carex fl agellifera

Endemic species with dense spreading reddish-brown tufts to 0.5m tall. Prefers damp soil and full sun, but is noted to thrive in a variety of habitats including boggy pasture.

Carex geminata

Robust and vigorous endemic species that grows to 1.5m tall. Thrives in a range of wet habitats. Suitable for a larger area.

Carex lessoniana

Robust and vigorous endemic species that grows to 1.5m tall. Similar to *C.geminata* in that the species is spreading and suitable for a larger wet area.



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Carex secta (purei, makura)

Endemic species that exhibits tall spreading tussocks. Has been noted to grow to 3m tall, widespread in swampy areas. Useful in the creation of bird habitat.

Carex virgata

Endemic species that forms dense, light green tussocks up to 1m tall. Thrives in a variety of habitats including swamps, drain margins, seepages and wet pastures. Useful in the creation of bird habitat.

Cortaderia fulvida (toetoe)

Branching from the base and forming a clump to 4m high. Long strap-shaped leaves with redorange coloured veins, fl over heads cream yellow. New shoots exhibit pale waxy cover on lower parts (unlike pampas grass) Prefers good drainage and semi-shade. Will struggle to compete if dried out in summer.

Cyperus ustulatus (toetoe upoko-tangata, giant umbrella sedge)

Vigorous leafy sedge growing to 1m in open damp places. Tolerates immersion in standing water within a range of habitats from seepages to wetlands.

Dicksonia squarrosa (wheki, tree fern)

Tree fern up to 7m tall that exhibits tolerance of wet open ground, and fl oods. Found to shelter and accumulate with other native plants. The base of the fern attracts biodiversity. Useful application to streambank and seepage habitats.

Elatostema rugosum (parataniwha)

Herbaceous plant up to 0.5m tall that spreads by rhizomes. Bronze coloured foliage with serrated edge. Grows on moist sites in light to heavy shade. Intolerant of dry habitats.

Hypolepis dicksonioides

Large fern that prefers fertile moist, but well-drained ground, grows vigorously and spores into planted areas with abundance. Does however, die back during winter.

Phormium tenax (harakeke, fl ax)

Fast growing clump-forming fl ax with large stiff leaves, to 3m. Full exposure and sun. Moist to wet conditions. Does not have deep or wide roots. Easily propagated from split fans or grown from seed. Attracts birds, especially Tui.

Trees and shrubs

Consideration needs to be given to the effects of roots land application on wastewater distribution pipe networks. This problem can be more signifi cant for large tree species.

Carpodetus serratus (putaputaweta, marbleleaf)

Lowland forest tree up to 7m tall. Large bunches of cream coloured fl owers appear in spring followed by black berries.

Coprosma areolata

Species that grows to 4m tall. Low tolerance to drought, with medium to high fertility.

Coprosma robusta (karamu, shining karamu)

Shrubs or small trees growing to 3m+, with glossy green leaves. Masses of orange-red fruit in autumn are attractive to birds. Hardy plant.

Coprosma tenuicaulis (swamp coprosma)

Endemic species that grows to 3m tall. Leaves pale green with slender branches. Will tolerate a range of swampy to boggy habitats including standing water.

Cordyline australis (ti kouka, cabbage tree)

Palm-like in appearance with large heads of linear leaves and panicles of scented fl owers. Sun to semi-shade. Prefers damp to moist soil. Grows eventually to 12m+ height.

Dacrycarpus dacrydioides (kahikatea, white pine)

Tree that grows to 40m. Moderately growing species, which prefers wetland and boggy environments. Application of this species must consider the possible impact of its root systems on the wastewater disposal fl eld.

DART DRAINAGE DESIGN

Specialists in Wastewater and Stormwater Design

DART

DRAINAGE DESIGN

Geniostoma rupestre (hangehange)

Common forest shrub with pale green glossy foliage, growing to 2-3m. Tiny flowers give off strong scent in spring. Looks best in sunny position where it retains a bushy habit, and prefers well-drained soil.

Hebe stricta (koromiko)

Shrub or small tree growing to 2-5m in height. Natural forms have white to bluish flowers. Plant in full sun. Tolerates exposure. (NB Many cultivars and hybrids are available commercially, but these are all unsuitable for use near existing natural vegetation.)

Laurelia novae-zelandiae (pukatea)

Large upright tree (to 30m) with attractive bright green foliage and distinctive whitish bark. Fast growing and able to handle a wide variety of soils. It will tolerate periodic flooding, breathing roots develop in water logged soils. Can be grown from seed. Tolerant of some sun and frost. Not tolerant of wind.

G4

Leptospermum scoparium (manuka)

Shrub or small tree growing to 4m+ in height. Ubiquitous shrub varying in form throughout New Zealand. Ideal to provide shelter for other plants as it is quick growing and hardy. Requires full sun and. Hardy and tolerant of difficult conditions, including waterlogging and drought.

Meliccytus ramiflorus (mahoe)

A fast growing yet long lived tree to 7m height. Prefers well drained fertile soils. Tolerates some frost, wind and sun. Birds are attracted to the blue berries.

Pennantia corymbosa (kalkomako)

Slow growing species that will reach 12m in moist, fertile sites. Useful species application in bank stabilisation or wetland habitats.

Plagianthus betulinus (ribbonwood)

Fast growing species to 15m. Similar application to that of Pennantia corymbosa.

Rhopalostylis sapida (nikau)

New Zealand's only native palm, with red berries attractive to birds. Requires light shade, plenty of moisture and protection from wind when young. Grows well in areas of permanent dampness.

Syzygium maire (maire tawake)

Attractive and moderately growing wetland tree to 15m with bronze foliage, large bunches of reddish fruit and distinctive whitish bark. Requires a sheltered sunny position. Tolerates some frost.

Vitex lucens (puriri)

Fast growing to 20m in fertile, open but sheltered conditions. Will struggle with poor drainage during adolescence.



Producer Statement PS1
Engineering Design
M Class Ribraft Foundation
5 Hugh Greene Lane, Te Kauwhata

Job Ref. 162063

Date: 17 October 2016

Prepared by:


Michael Richardson
Chartered Professional Engineer (1005467)

Client: Parangon Building Ltd

10 October 2016

STRUCTURAL SPECIFICATION

1. Durability is certified to the extent required as part of the specific design of the structural elements.
2. The attached details provide a foundation detail for M class foundations soils i.e. moderately expansive clay soils.
3. The MTM soils geotechnical assessment (Ref: W-14541.7 – 30 Oct 2015) requires and engineered "Ribraft Waffle-type concrete slab with supplementary steel reinforcement. Recommendations on adjacent sites are for 400mm embedment on shallow soils, which is comparable to recommendations for a moderately expansive soil type.
4. The void form foundation design proposed based on standard Ribraft guidelines for timber framed brick clad residential dwelling but modified to AS2870 requirements for a moderately expansive soil i.e. extra perimeter steel and SE72 equivalent mesh (664).
5. The foundation subgrade has not been tested with multiple soil tests. Once all topsoil has been removed, the subgrade will require testing to confirm stiff cohesive soils form the founding surface. That is, a minimum undrains shear strength (S_u) of 70kPa. Once the subgrade has been certified, the site will then be appropriate for a raft type foundation (i.e. M Class Ribraft).
6. The final founding level is not to be raised above the existing ground level without further review from an engineer.

5.0 Ribraft Foundation

5.1 Foundations to be formed on minimum 20MPa grade concrete.

5.2 All reinforcement to have minimum cover as follows:

Concrete cast against ground: 75mm
Concrete cast against form work: 50mm
Concrete cast against DPM: 50mm
Concrete Top Cover: 30mm
Rib edges formed against polystyrene infill panels: 40mm

5.3 Reinforcement bars noted in drawings are as follows:

R = Grade 300E round bars.
D = Grade 300E deformed bars.
HR = Grade 500E round bars.
HD = Grade 500E deformed bars.

5.4 2-HD12 diagonal trimmer bars 1200mm long shall be installed at the corners of slab penetrations and at slab re-entrant corners.

5.5 Foundation details are to follow the requirements of the Firth Ribraft manual for a standard Firth Ribraft design but with an extra HD12 bar in the perimeter footing, and SE72 (or 664) mesh used in the topping slab. The slab mesh is to lap into the edge beam, with a lateral mesh bar overlapping the perimeter top steel bar. If the mesh cannot overlap, then 600mm long HD12 L-bar starters at 1200mm centres should be used.

Note:

*This statement applies to the members specified and no other part of the structure.
If any problems arise during the construction of these members, we should be consulted.
This report has been prepared solely for the benefit of our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.*

IMPORTANT NOTES:

- ENSURE MINIMUM 3.02M² GRADE 500C REINFORCING MESH FABRIC COMPLYING WITH AS/NZS 4671 IS USED IN THE CONCRETE FLOOR SLAB
- ALL SERVICES TO BE PLACED CENTRALLY WITHIN AN OPENING 50mm GREATER IN DIAMETER THAN THE SERVICE DUCT/PIPE WHERE THEY PASS THROUGH THE RIB RAFT SYSTEM TO ALLOW SEISMIC TOLERANCES
- C.D.S. CHECK ON SITE
- PLAN IS TO BE READ IN CONJUNCTION WITH THE RIB RAFT TECHNICAL MANUAL

ENGINEERING SITE ASSESSMENT AND SOIL TESTING SUMMARY:
(SEE ENGINEERS REPORT IN SPECIFICATIONS)

A "Subsult" or "Control" type concrete slab on pile foundation would be suitable for this project, following site preparation work as described below.

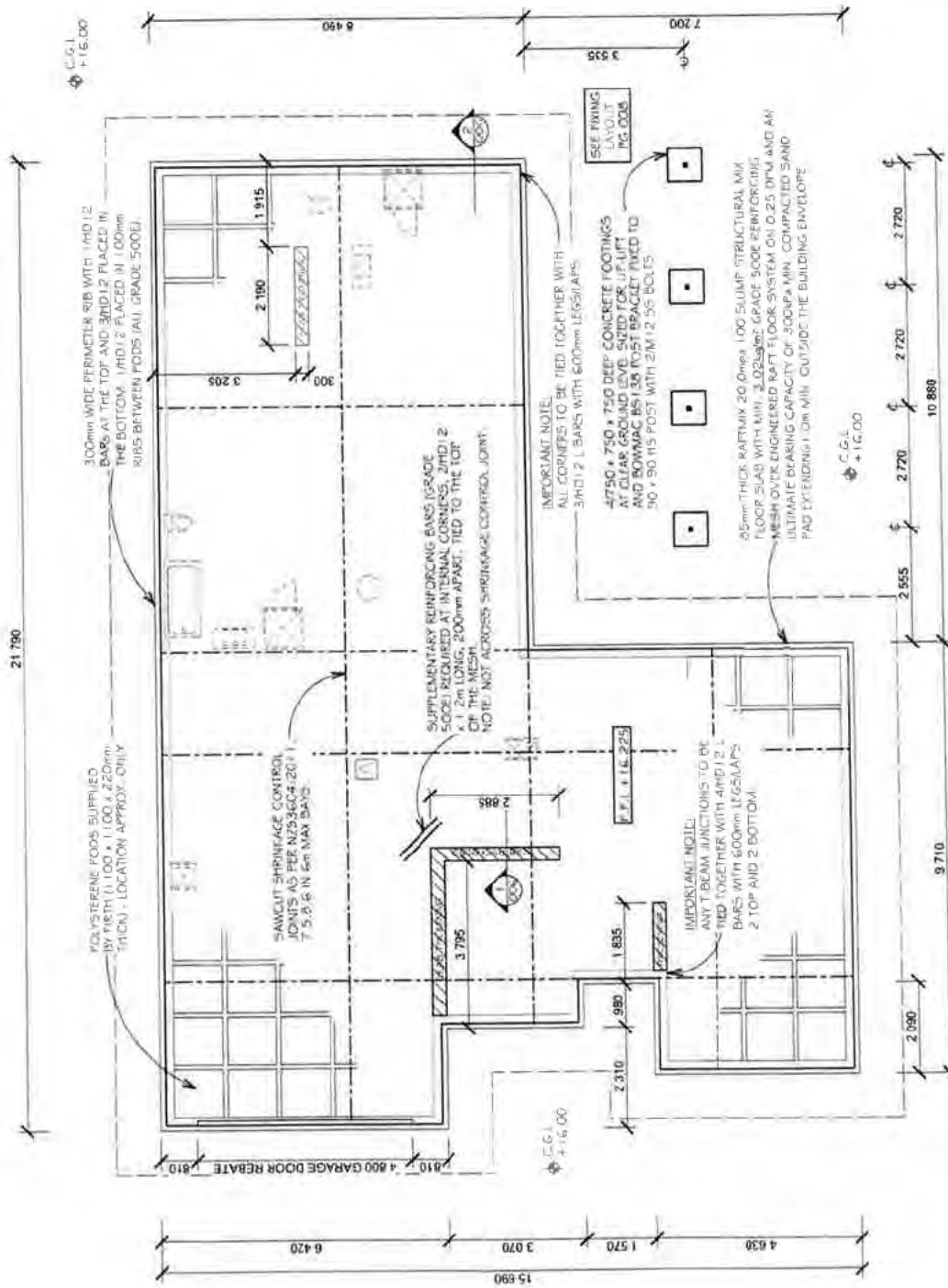
This type of house slab will require supplementary steel reinforcement, to an engineer design, as to accommodate the settlement of the soil with at depth. See engineering foundation design in specs.

The recommended procedure for preparing the building site area is as follows:

1. Set out the proposed building and excavate all Topsoil and any soft Silt or Clay. This is expected to be at a depth of 0.2 to 0.6 metres below existing ground level. The excavation should extend to a minimum of 0.5 metres outside the perimeter of the building area. These soils can either be removed from the site or stockpiled for future landscaping or yard area filling.
2. Under Mitchell staff direction, compact the exposed soil surface with a self propelled vibratory compactor of minimum 2 tonnes static weight, with the vibratory action turned off. The surface should be compacted to a good roller with a label size pattern with this roller. Where the exposed soil is noted to be excessively soft, area should be over-excavated and replaced with pit sand. Our staff member will advise on any minor excavation that may be required.
3. Any local split areas which show up during this project, regardless of compaction process, will need to be excavated and replaced with pit sand.
4. The pit sand should be compacted with a roller mentioned above. The pit sand should be compacted with at least six passes with this roller.
5. Satisfactory compaction of the filling would be achieved when tested with a Scale Penetration Indicator, a new count of 5 blows per 100mm penetration.

In order to satisfy Waikato District Council building requirements, site testing of the building area will need to be carried out at the time of house foundation preparation work. Inspections of the stormwater and wastewater installation will also be required.

This work is required to be tested and inspected under the direction of a Chartered Engineer, with engineer certification provided by Mark J. Mitchell Ltd, together with Geotechnical Ltd, our associated testing company, working under our direction, is able to provide this service.



FOUNDATION LAYOUT PLAN

SCALE: 1:100
AREA: 245.7m²

REV	DATE	AMENDMENT	TSW NO	70247
REV			DWG NO.	005
			Drawn	TH
			Date	17/10/2017

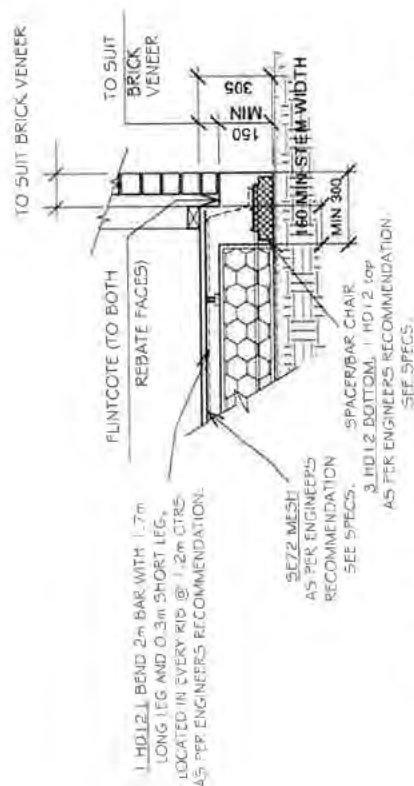
SWANN RESIDENCE
5 HUGH GREENE LANE
TE KAUWHATA

FOUNDATION PLAN

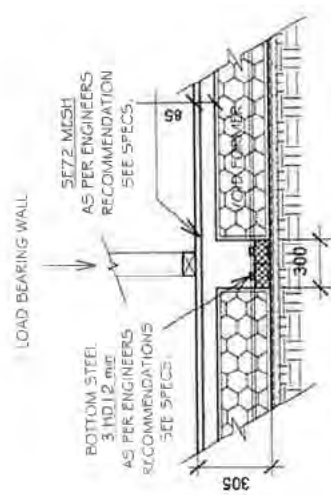
These drawings and designs remain the property of SIGNATURE HOMES LTD

NOTE: CONTRACTOR & SUB-CONTRACTORS TO CHECK DIMENSIONS TO BEING PROVIDED TO THEM BY THE ARCHITECTURAL DESIGNER. DIMENSIONS ARE TO BE CHECKED ON SITE. DIMENSIONS ARE TO BE CHECKED ON SITE. DIMENSIONS ARE TO BE CHECKED ON SITE.

Signature HOMES
YOUR HOME YOUR WAY



BRICK VENEER CONSTRUCTION DETAIL
SCALE: 1/20



SECTION UNDER INTERNAL LOAD BEARING WALLS

Waikato District Council
FULL APPLICATION
RECEIVED
18 OCT 2016
Time..... Initials.....
NGARUWAHIA

[illegible]



Building Code Clause(s).....B1/VM4 B2.....

PRODUCER STATEMENT – PS1 – DESIGN

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

ISSUED BY:..... Derek Booth Consultancy Limited t/a DBCON 0800 23 22 66
(Design Firm)

TO:..... Paragon Building Ltd.....
(Owner/Developer)

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

IN RESPECT OF:..... Ribraft Foundation with modification for more steel.....
(Description of Building Work)

AT:..... 5 Hugh Greene Lane, Te Kauwhata.....
(Address)

..... LOT.....31..... DP 455848... SO

We have been engaged by the owner/developer referred to above to provide ... Foundation Design.....
..... services in respect of the requirements of
(Extent of Engagement)

Clause(s) B1/VM4 B2..... 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 the Ministry of Business, Innovation & Employment..... or
(verification method / acceptable solution)
- ☒ Alternative solution as per the attached schedule..... AS2870.....

The proposed building work covered by this producer statement is described on the drawings titled

..... as per attached Ribraft Layout and Details..... and numbered
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 70kPa subgrade with no topsoil, and no raising of the ground levels.
(ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) 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 and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐ CM1 ☒ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) Or ☐ as per agreement with owner/developer (Architectural)

I, ... Michael Richardson..... am:
(Name of Design Professional)

☒ CPEng 1005467

☐ Reg Arch #

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

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

The Design Firm is a member of ACENZ: ☐

SIGNED BY ... Michael Richardson..... ON BEHALF OF DRCon Ltd.....
(Design Firm)

Date.. 17 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 Form 2 of the Building (Forms) Regulations 2004 for the application of a Building Consent.

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



Form 2A

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and Section 30C, Building Act 2004

Please fill in the form as fully and correctly as possible.

JOB NO. 162063

If there is insufficient room on the form for requested details, please continue on another sheet and attach the additional sheet(s) to this form.

THE BUILDING

Street address: 5 Hugh Greene Lane

Suburb:

Town/City: Te Kauwhata

Postcode:

THE OWNER

Name(s): Parangon Building Ltd

Mailing address:

Suburb:

PO Box/Private Bag:

Town/City:

Postcode:

Phone number:

Email address:

BASIS FOR PROVIDING THIS MEMORANDUM

I am providing this memorandum in my role as the: Please tick the option that applies (✓)	
☐	sole designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design myself – no other person will be providing any additional memoranda for the project
☐	lead designer who carried out some of the RBW design myself but also supervised other designers – this memorandum covers their RBW design work as well as mine, and no other person will be providing any additional memoranda for the project
☒	lead designer for all but specific elements of RBW – this memorandum only covers the RBW design work that I carried out or supervised and the other designers will provide their own memoranda relating to their specific RBW design
☐	specialist designer who carried out specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work

IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)

I Michael Richardson supervised the following design work that is restricted building work

PRIMARY STRUCTURE: B1

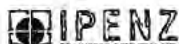
Design work that is restricted building work	Description	Carried out/ supervised	Reference to plans and specifications
Tick (✓) if included Cross (X) if excluded	[If appropriate, provide details of the restricted building work]	[Specify whether you carried out this design work or supervised someone else carrying out this design work]	[If appropriate, specify references]

Primary structure

All RBW Design work relating to B1	()		() Carried out () Supervised	
Foundations and subfloor framing	(✓)	<i>M Class Ribrafit</i>	() Carried out (✓) Supervised	
Walls	()	<i>n/a</i>	() Carried out () Supervised	
Roof	()	<i>n/a</i>	() Carried out () Supervised	
Columns and beams	()	<i>n/a</i>	() Carried out () Supervised	
Bracing	()	<i>n/a</i>	() Carried out () Supervised	
Other	()	<i>n/a</i>	() Carried out () Supervised	

EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2

All RBW design work relating to E2	()	<i>n/a</i>	() Carried out () Supervised	
Damp proofing	()	<i>n/a</i>	() Carried out () Supervised	
Roof cladding or roof cladding system	()	<i>n/a</i>	() Carried out () Supervised	
Ventilation system (for example, subfloor or cavity)	()	<i>n/a</i>	() Carried out () Supervised	
Wall cladding or wall cladding system	()	<i>n/a</i>	() Carried out () Supervised	
Waterproofing	()	<i>n/a</i>	() Carried out () Supervised	
Other	()	<i>n/a</i>	() Carried out () Supervised	
	()	<i>n/a</i>	() Carried out () Supervised	



WAIVERS AND MODIFICATIONS

Waivers or modifications of the building code are required () Yes (•) No

If Yes, provide details of the waivers or modifications below:

Clause	Waiver/modification required
<i>[List relevant clause numbers of building code]</i>	<i>[Specify nature of waiver or modification of building code]</i>

Note: continue on another page if necessary.

ISSUED BY

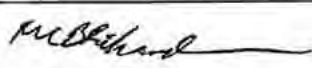
Name: Michael Richardson	LBP or Registration number: 1005467
The practitioner is a: () Design LBP () Registered architect (•) Chartered professional engineer	
Design Entity or Company (optional): Derek Booth Consultancy Limited	
Mailing address (if different from below): PO Box 1123, Taupo 3351	
Street address / Registered office: 70 Rotokawa Street,	
Suburb:	Town/City: Taupo
PO Box/Private Bag:	Postcode: 3330
Phone number: 07 378 5067	Mobile: 0274 947 016
After Hours:	Fax: 07 378 2800
Email address: info@dbcon.co.nz	Website: www.dbcon.co.nz

DECLARATION

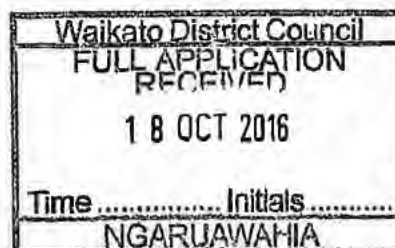
I Michael Richardson [name of practitioner], LBP,

state that I have applied the skill and care reasonably required of a competent design professional in carrying out or supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- Complies with the building code; or
- Complies with the building code subject to any waiver or modification of the building code recorded on this form.

Signature: 

Date: 17 October 2016



GRAPHIC LOG	BORE HOLE LOG No. 2 (Lot 31)	DEPTH (metres)	GEOLOGICAL FORMATION	VANE SHEAR STRENGTH - kPa ($\approx$ shear vane test)	SCALA PENETROMETER (blows/100mm)										PREZOMETER / WATER LEVEL
					1	2	3	4	5	6	7	8	9	10	
	TOPSOIL.		T/S												
	silty CLAY. Stiff to very stiff, moist, highly plastic, brown. Containing manganese nodules @ 0.4 metres.		Hamilton Ash	130/50											
				122/55											
				78/48											
	silty CLAY. Stiff to very stiff, moist, highly plastic, light brown.	1		100/50											
			90/38												
	SILT with some clay, trace fine sand. Firm to stiff, moist, moderately plastic, slightly iron stained, light grey.	2		74/28											
				40/18											
	SILT with some clay, trace fine sand. Soft to firm, wet, dilatant, light yellowish grey. Becoming stiff @ 3.5 metres.	3													
	Bottom of Bore Hole completed 22/09/15	4													
NOTES - The stratification lines represent the approximate boundary between soil types and the transition may be gradual. - Vane shear values shown are as recorded in the field, to which a calibration factor from Geotechnics Vane 1482 of 1.658 should be applied to obtain Undrained Shear Strength (kPa). - Scale test was carried out in 1.0 metre depth increments.															
JOB NAME: <u>CHESHUNT FARM LTD</u> JOB LOCATION: <u>No. 69 (Lot 30 - 37) Swan Road, Te Kauwhata</u> JOB NUMBER: <u>W-14541</u>		DRILL METHOD: <u>Hand Auger</u> RIG: _____ DRILLER: <u>JZ</u>		LOGGED: <u>BB</u> PLOTTED: <u>BB</u> DATE LOGGED: <u>22/09/15</u> CHECKED: <u>ACB</u>											
Geocon Geotechnical Ltd Geotechnical Engineers 1158 Victoria Street, P.O. Box 9123, Hamilton		BORE HOLE LOG		BORE HOLE No. 2 (Lot 31) LOCATION: <u>refer Site Plan</u> RL(m): _____ SHEET: 1 OF 1 Fig. No. A-2											

MiTek New Zealand Limited



Correspondence from : **AUCKLAND**
40 Neales Road, East Tamaki 2013
PO Box 58-014, Botany 2163
Phone: 09 274 7109
Fax: 09 274 7100

CHRISTCHURCH
14 Pilkington Way, Wigram 8042
PO Box 8387, Riccarton 8440
Phone: 03 348 8691
Fax: 03 348 0314

www.mitek.nz.co.nz

MiTek 20/20 Engineering 4.6.6.324

Printed: 07:19:26 29 Sep 2016

PRODUCER STATEMENT for MiTek 20/20® TRUSS DESIGN - Version 4.6

ISSUED BY: MiTek New Zealand Limited

TO: Cambridge Manufacturing

IN RESPECT OF: MiTek® Truss Designs

This producer statement covers the MiTek 20/20® truss design and the structural performance of the GANG-NAIL® connector plate for the job reference **FC17957C** and may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

The MiTek 20/20® truss design program has been developed by MiTek New Zealand Limited for the design of MiTek® timber roof, floor and attic trusses in New Zealand. The truss designs computed by MiTek 20/20® are prepared using sound and widely accepted engineering principles, and in accordance with compliance documents of the New Zealand Building Code and Verification Method B1/VM1; and Internationally accepted standard ANSI/TPI 1 - 2002 as an alternative solution, to satisfy the requirements of Clauses B1 and B2 of the New Zealand Building Code.

On behalf of **MiTek New Zealand Limited**, and subject to:

- i) All proprietary products meeting their performance specification requirements
- ii) The provision of adequate roof bracing and overall building stability
- iii) Correct selection and placement of GANG-NAIL connector plates
- iv) Correct input of Truss Design Data as shown in the Fabricator Design Statement for this job
- v) The design being undertaken by the accredited fabricator under the terms of the software licence
- vi) Timber is graded to the requirements of NZS 3603:1993
- vii) Minimum timber treatment for these MiTek® trusses shall be in accordance with B2/AS1 Table 1A and the relevant sections of NZS 3602:2003

I believe on reasonable grounds that the trusses, if constructed in accordance with the MiTek 20/20® truss design and shop drawings, will comply with the relevant provisions of the New Zealand Building Code.

MiTek New Zealand Limited holds a current policy of Professional Indemnity Insurance no less than \$500,000.

On behalf of **MiTek New Zealand Limited**,

Date: Thursday, 29 September 2016

In Ling Ng, BE (Hons), CPEng, IntPE, MIPENZ (ID: 146585)
TECHNICAL SERVICES MANAGER, MiTek New Zealand Limited

Cambridge Manufacturing

Fabricator Design Statement : Page 1

Job: FC17957C

Client: Parangon Building Ltd
Phone:Site: Swann
Lot 31 Hugh Green lane
Te KowhaiDescription:
Building Consent No.:
MITek 20/20 Statement 4.6.3.21

MITek New Zealand Limited

Phone:
Printed: 07/09/2016 10:50:20

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MITek accredited fabricator Cambridge Manufacturing, being licensed to use the MITek 20/20® software, to the client listed above and may be used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

MITek 20/20® TRUSS DESIGN DATA

The MITek 20/20® computer design for this job is based on the following design parameters entered into the program. The Fabricator shall ensure that these job details are current and relevant to the project for the design of the MITek® trusses.

Job Details		Importance Level :	2	Design Working Life :	50 years
Roof Truss		Pitch:	22.500 deg	Nominal Overhang:	600 mm
Timber Group:	MSG8 DDP H1.2	Ceiling		Wind	
Material:	Galv Iron .5mm	Material:	Gib 13mm/Rondo Screwed	Area:	High (44.0 m/s)
Dead Load:	0.210 kPa	Dead Load:	0.200 kPa	Pressure Coeff:	C _{pe} = varies; C _{pi} = -0.30, 0.20
Restraints:	900 mm centres	Restraints:	600 mm centres		
Live Load:	Q _{ur} = 0.250 kPa	Live Load:	Q _c = 1.400 kN		
	Q _c = 1.100 kN				

The minimum timber treatment for these MITek® trusses shall be in accordance with B2/AS1 Table 1A and the relevant sections of NZS 3602:2003. The timber for these MITek® trusses shall be graded to the requirements of NZS 3603:1993. Proprietary fixings and timber connectors shall be selected in accordance with NZS3604:2011 Section 4 - Durability.

MITek® Truss List

Legend: * = detail only, ? = input only, Txx = failed design, Ø = non certified, Unmarked trusses = designed successfully, LB = lateral bracing required
GB = gable brace required

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
HT1	1	6853	22.500	900	TR2	1	11950	22.500	900	J7D	1	3257	22.500	900
J1B	2	3252	22.500	900	HT2	1	6180	22.500	900	J8	1	2357	22.500	900
J1E	1	3252	22.500	900	HT3	1	3257	22.500	900	J8A	1	2357	22.500	900
J4	1	5052	22.500	900	J1	2	3252	22.500	900	J9	1	1457	22.500	900
T1	1	11950	22.500	900	J1A	2	3252	22.500	900	J9A	1	1457	22.500	900
T2	1	8251	22.500	900	J1C	1	3252	22.500	900	J10	1	2172	22.500	900
T4	1	6806	22.500	900	J1D	1	3252	22.500	900	J10A	1	2172	22.500	900
T5	1	8360	22.500	900	J2	1	2352	22.500	900	J10B	1	2172	22.500	900
T6	1	5052	22.500	900	J2A	1	2352	22.500	900	J11	1	1272	22.500	900
T7	1	4390	22.500	900	J2B	2	2352	22.500	900	J11A	1	1272	22.500	900
T8	1	4390	22.500	648	J3	2	1452	22.500	900	J11B	1	1272	22.500	900
T9	1	8360	22.500	900	J3A	2	1452	22.500	900	J11C	1	1272	22.500	900
T10	2	8360	22.500	699	J5	2	2167	22.500	900	T3	3	6180	22.500	900
T11	2	8251	22.500	810	J5A	1	2167	22.500	900	V1	1	1522	22.500	900
T12	5	11950	22.500	810	J5B	1	2167	22.500	900	V2	1	3925	22.500	900
T12A	1	11950	22.500	810	J5C	1	2167	22.500	900	V3	1	3025	22.500	900
TG1	1	11950	22.500	900	J6	2	1267	22.500	900	V4	1	2125	22.500	900
TG2	1	8251	22.500	900	J6A	2	1267	22.500	900	V5	1	980	22.500	900
TG3	1	6180	22.500	900	J7	1	3257	22.500	900	V6	1	1292	22.500	900
TG4	1	6806	22.500	900	J7A	1	3257	22.500	900	V7	1	2102	22.500	900
TR1	1	11950	22.500	900	J7B	1	3257	22.500	900	V8	1	2912	22.500	900

Total quantity : 60

The computer design input has been carried out by:

MITek 20/20 Software Operator: Rick Glover

MITek Candidate Number and Qualifications: 10692 - MITek 101, 201, 301, COC

Accredited Fabricator:

CARTERS

Carters, a division of Carter Holt Harvey Limited

Thursday, 29 September 2016

Design Certificate – Technical basis for structural design methodology contained in designIT for houses - New Zealand.

designIT for houses, New Zealand has been developed by experienced timber engineers to assist designers in selecting appropriate sizes of structural laminated veneer lumber products manufactured by Carter Holt Harvey (including hySPAN, hy90, hyONE and hyJOIST) and other generic stress grades of timber, to be used as structural elements for the construction of buildings that fall within the scope of NZS 3604.

The design methodology used for the software complies with the loading and general design requirements contained within AS/NZS 1170 and with timber structural design in accordance with NZS 3603:1993 including Amendment 4 (Verification method B1/VM1, 6.1).

designIT relies on the accurate input of span and loading information by the user. Where accurate inputs are submitted the product and/or stress grade and the size given will comply with the structural requirements of the New Zealand Building Code, provided the installation is in accordance with the installation requirements provided by designIT and/or in product literature and/or NZS 3604, or specific engineering design, as appropriate.

References:

NZS 3603:1993 Timber Structures Standard.	AS/NZS 1170:2002 Structural design actions, Parts 0 and 1.
NZS 3604:2011 Timber-framed buildings.	AS/NZS 1170:2011 Structural design actions, Part 2: Wind actions.
AS 1720.1 – 2010 Timber structures. Part 1: Design methods.	AS/NZS 1170:2003 Structural design actions, Part 3: Snow and ice actions.
AS 1684.1 – 1999 Residential timber framed construction. Part 1: Design criteria.	

This Design Certificate, and any associated warranty/certification, is void where there has been substitution of alternate products not detailed within the Member Specification.

Version date: 17 February 2016

For further information or advice please contact: Carter Holt Harvey Woodproducts New Zealand
173 Captain Springs Road, Onehunga, Auckland
Telephone 0800 808 131
Facsimile 0800 808 132
Email: designit@chhwoodproducts.co.nz

Specifier details:

Specifier details:		
Specifier:	Ricky Glover	
Business name:	Carter Holt Harvey	
Address:	77 Hautapu road Cambridge	
Email:	ricky.glover@catrers.co.nz	
Phone: (07)8237298	Mobile:	Facsimile:

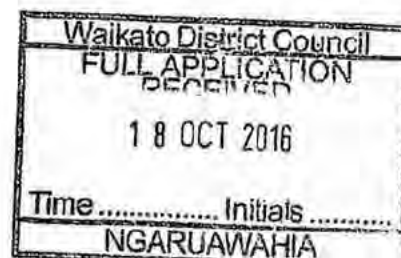
Project & Site details:

Project:	Parangon Building	Ref. no.: FC17957C
At (address):	Lot 31 Hugh Green lane Te Kauwhata	
For (owner/s):	Swann	
Wind zone:	High	
Snow loading	Snow region: N0, snow loading not applicable	

MEMBER DESIGN DETAILS

Member 1

- | | |
|--------------------------------|---|
| 1) Member code and description | Entry Door - Lintels - In single or upper storey load bearing walls |
| 2) Date prepared | 28/09/2016 |
| 3) Serviceability criteria | AS 1720.1-2010 and AS 1684.1-1999 |
| 4) Design Inputs | |
| Span | 0.9 m |
| Roof load width 'RLW' | 4.5 m |
| Roof type and mass | Light roof & ceiling - 40 kg/m ² |
| 5) Member specification | |
| Size, stress grade/product | Use 150 x 90 hy90 |
| Material type | Structural Laminated Veneer Lumber to AS/NZS 4357 |



6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	3.0 mm	0.3 mm (long term)	$\frac{3.0}{0.3} = 10.73$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-2.2
1.2G + 1.5Q	0.80	-4.7
1.2G + $W_U + \psi_C Q$	1.00	-4.6
0.9G + W_U	1.00	3.7

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports

Member 2

1) Member code and description Entry Beam - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 1.8 m
Roof load width 'RLW' 1.2 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$	6.0 mm	0.7 mm (long term)	$\frac{6.0}{0.7} = 8.89$
Live load - $\psi_S Q$ *	7.2 mm	1.0 mm	$\frac{7.2}{1.0} = 7.20$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-0.9
1.2G + 1.5Q	0.80	-2.6
1.2G + $W_U + \psi_C Q$	1.00	-1.8

0.9G + W_U | 1.00 | 1.4

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports

Member 3

1) Member code and description Living W1 - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 1.6 m
Roof load width 'RLW' 1.8 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + ψ_L Q *	5.3 mm	0.7 mm (long term)	$\frac{5.3}{0.7} = 7.94$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k ₁ ¹	End ⁴ kN
1.35G	0.60	-1.2
1.2G + 1.5Q	0.80	-2.8
1.2G + W _U + ψ_C Q	1.00	-2.4
0.9G + W _U	1.00	1.9

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports

Member 4

1) Member code and description Living W2 - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 0.9 m
Roof load width 'RLW' 1.4 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product
Material type
Assumed design density

Use 2/90 x 45 SG8 Laserframe
Dry softwood, machine stress graded and verified (NZS 3622)
< 480 kg/m³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$	3.0 mm	0.6 mm (long term)	$\frac{3.0}{0.6} = 4.83$
Live load - $\psi_S Q^*$	3.6 mm	0.9 mm	$\frac{3.6}{0.9} = 4.02$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1^1	End ⁴ kN
1.35G	0.60	-0.8
1.2G + 1.5Q	0.80	-3.3
1.2G + W_{DJ} + $\psi_C Q$	1.00	-1.6
0.9G + W_{DJ}	1.00	1.3

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Member 5

1) Member code and description

Living W3 - Lintels - in single or upper storey load bearing walls

2) Date prepared

28/09/2016

3) Serviceability criteria

AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 0.9 m
Roof load width 'RLW' 2.4 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product
Material type
Assumed design density

Use 2/90 x 45 SG8 Laserframe
Dry softwood, machine stress graded and verified (NZS 3622)
< 480 kg/m³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q^*$	3.0 mm	1.0 mm (long term)	$\frac{3.0}{1.0} = 2.86$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-1.3
1.2G + 1.5Q	0.80	-3.9
1.2G + W_U + $\psi_C Q$	1.00	-2.8
0.9G + W_U	1.00	2.2

See 'Notes for interpretation of reaction data' at the end of this report

- 8) Installation requirements Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Member 6

- 1) Member code and description Family W1 - Lintels - In single or upper storey load bearing walls
- 2) Date prepared 28/09/2016
- 3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999
- 4) Design inputs
- Span 1.6 m
- Roof load width 'RLW' 2.4 m
- Roof type and mass Light roof & ceiling - 40 kg/m²

6) Member specification

- Size, stress grade/product Use 150 x 90 hy90
- Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	5.3 mm	0.9 mm (long term)	$\frac{5.3}{0.9} = 6.08$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

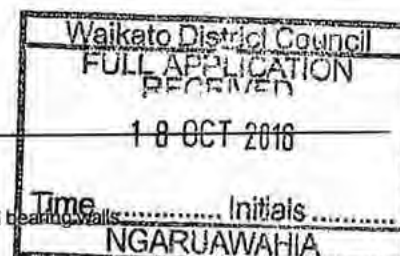
Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-1.6
1.2G + 1.5Q	0.80	-3.2
1.2G + W_U + $\psi_C Q$	1.00	-3.2
0.9G + W_U	1.00	2.5

See 'Notes for interpretation of reaction data' at the end of this report

- 8) Installation requirements Provide at least 30 mm bearing at end supports

Member 7

- 1) Member code and description Family W2 - Lintels - In single or upper storey load bearing walls
- 2) Date prepared 28/09/2016



3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 1.6 m
Roof load width 'RLW' 2.0 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	5.3 mm	0.7 mm (long term)	$\frac{5.3}{0.7} = 7.20$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1 ¹	Limit states design reaction ^{2,3}
		End ⁴ kN
1.35G	0.60	-1.3
1.2G + 1.5Q	0.60	-2.9
1.2G + $W_U + \psi_C Q$	1.00	-2.7
0.9G + W_U	1.00	2.1

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports

Member 8

1) Member code and description Dining Slider - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 3.2 m
Roof load width 'RLW' 5.2 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 2/300 x 45 hySPAN
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	10.0 mm	2.4 mm (long term)	$\frac{10.0}{2.4} = 4.20$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1 ¹	Limit states design reaction ^{2,3}
		End ⁴ kN
1.35G	0.60	-5.3
1.2G + 1.5Q	0.80	-8.1
1.2G + W_U + $\Psi_C Q$	1.00	-10.6
0.9G + W_U	1.00	8.1

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Nail lamination in accordance with Detail H1.

Member 9

1) Member code and description Bed 4 & Master Bed Sliders - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 1.8 m
Roof load width 'RLW' 6.5 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 200 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \Psi_L Q$ *	6.0 mm	1.4 mm (long term)	$\frac{6.0}{1.4} = 4.28$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1 ¹	Limit states design reaction ^{2,3}
		End ⁴ kN
1.35G	0.60	-4.3
1.2G + 1.5Q	0.80	-6.8
1.2G + W_U + $\Psi_C Q$	1.00	-8.9
0.9G + W_U	1.00	7.1

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports

Member 10

- 1) Member code and description Covered Patio End beam - Lintels - In single or upper storey load bearing walls
- 2) Date prepared 28/09/2016
- 3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999
- 4) Design Inputs
- | | |
|-----------------------|---|
| Span | 3.6 m |
| Roof load width 'RLW' | 2.4 m |
| Roof type and mass | Light roof & ceiling - 40 kg/m ² |

5) Member specification

Size, stress grade/product Use 2/240 x 45 hySPAN
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	10.0 mm	3.6 mm (long term)	$\frac{10.0}{3.6} = 2.76$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-3.0
1.2G + 1.5Q	0.80	-5.1
1.2G + W_u + $\psi_c Q$	1.00	-5.8
0.9G + W_u	1.00	4.3

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Nail lamination in accordance with Detail H1.

Member 11

- 1) Member code and description Covered Patio Side beams x 4 - Lintels - In single or upper storey load bearing walls
- 2) Date prepared 28/09/2016
- 3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999
- 4) Design Inputs
- | | |
|-----------------------|---|
| Span | 2.7 m |
| Roof load width 'RLW' | 2.7 m |
| Roof type and mass | Light roof & ceiling - 40 kg/m ² |
- 5) Member specification
- Size, stress grade/product Use 240 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357
- 6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	9.0 mm	1.6 mm (long term)	$\frac{9.0}{1.6} = 5.47$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-2.5
1.2G + 1.5Q	0.80	-4.7
1.2G + W_U + $\psi_C Q$	1.00	-4.9
0.9G + W_U	1.00	3.7

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports

Member 12

1) Member code and description Ensite - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 0.9 m
Roof load width 'RLW' 2.4 m
Roof type and mass Light roof & ceiling - 40 kg/m²

Waikato District Council	
FULL APPLICATION RECEIVED	
18 OCT 2016	
Time	Initials
NGARUAWAHIA	

5) Member specification

Size, stress grade/product Use 2/90 x 45 SG8 Laserframe
Material type Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density < 480 kg/m³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	3.0 mm	1.0 mm (long term)	$\frac{3.0}{1.0} = 2.86$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-1.3
1.2G + 1.5Q	0.80	-3.9
1.2G + W_U + $\psi_C Q$	1.00	-2.8
0.9G + W_U	1.00	2.2

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Member 13

1) Member code and description Bed 2 W1 & W2 - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design Inputs

Span 1.6 m
Roof load width 'RLW' 2.4 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	5.3 mm	0.9 mm (long term)	$\frac{5.3}{0.9} = 6.08$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.80	-1.6
1.2G + 1.5Q	0.80	-3.2
1.2G + W_U + $\psi_C Q$	1.00	-3.2
0.9G + W_U	1.00	2.5

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports

Member 14

1) Member code and description Bed 3 - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design Inputs

Span 1.6 m
Roof load width 'RLW' 5.1 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 150 x 90 hy90

Material type

Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q^*$	5.3 mm	1.8 mm (long term)	$\frac{5.3}{1.8} = 2.96$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-3.3
1.2G + 1.5Q	0.80	-5.3
1.2G + $W_U + \psi_C Q$	1.00	-6.8
0.9G + W_U	1.00	5.4

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports

Member 15

1) Member code and description W/C - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 0.6 m
Roof load width 'RLW' 5.1 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 2/90 x 45 SG8 Laserframe
Material type Dry softwood, machine stress graded and verified (NZS 3622)
Assumed design density < 480 kg/m³

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q^*$	2.0 mm	0.7 mm (long term)	$\frac{2.0}{0.7} = 3.08$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-2.6
1.2G + 1.5Q	0.80	-6.2
1.2G + $W_U + \psi_C Q$	1.00	-5.4

0.9G + W_U | 1.00 | 4.3

See 'Notes for interpretation of reaction data' at the end of this report

- 8) Installation requirements Provide at least 30 mm bearing at end supports
Nail lamination required - refer AS 1684

Member 16

- 1) Member code and description Bathroom - Lintels - In single or upper storey load bearing walls
- 2) Date prepared 28/09/2016
- 3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999
- 4) Design inputs
- | | |
|-----------------------|---|
| Span | 0.9 m |
| Roof load width 'RLW' | 5.1 m |
| Roof type and mass | Light roof & ceiling - 40 kg/m ² |

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q^*$	3.0 mm	0.3 mm (long term)	$\frac{3.0}{0.3} = 9.49$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1^1	End ⁴ kN
1.35G	0.60	-2.5
1.2G + 1.5Q	0.80	-5.1
1.2G + W _U + $\psi_C Q$	1.00	-6.2
0.9G + W _U	1.00	4.2

See 'Notes for interpretation of reaction data' at the end of this report

- 8) Installation requirements Provide at least 30 mm bearing at end supports

Member 17

- 1) Member code and description Media - Lintels - In single or upper storey load bearing walls
- 2) Date prepared 28/09/2016
- 3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999
- 4) Design inputs
- | | |
|-----------------------|-------|
| Span | 1.6 m |
| Roof load width 'RLW' | 5.1 m |

Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	5.3 mm	1.8 mm (long term)	$\frac{5.3}{1.8} = 2.96$
*Critical serviceability load case			
See 'Notes for interpretation of serviceability data' at the end of this report			

7) Reactions

Load case	k_1 ¹	Limit states design reaction ^{2,3}
		End ⁴ kN
1.35G	0.60	-3.3
1.2G + 1.5Q	0.80	-5.3
1.2G + W_U + $\psi_C Q$	1.00	-8.8
0.9G + W_U	1.00	5.4

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports

Member 18

1) Member code and description

Garage PA Door - Lintels - In single or upper storey load bearing walls

2) Date prepared

28/09/2016

3) Serviceability criteria

AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 0.9 m
Roof load width 'RLW' 4.0 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	3.0 mm	0.2 mm (long term)	$\frac{3.0}{0.2} = 12.04$
*Critical serviceability load case			
See 'Notes for interpretation of serviceability data' at the end of this report			

7) Reactions

Load case	k_1 ¹	Limit states design reaction ^{2,3}
		End ⁴ kN



1.35G	0.60	-2.0
1.2G + 1.5Q	0.80	-4.4
1.2G + W _U + $\psi_c Q$	1.00	-4.1
0.9G + W _U	1.00	3.3

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports

Member 19

1) Member code and description Garage W1 - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span	1.6 m
Roof load width 'RLW'	4.0 m
Roof type and mass	Light roof & ceiling - 40 kg/m ²

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	5.3 mm	1.4 mm (long term)	$\frac{5.3}{1.4} = 3.74$

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-2.6
1.2G + 1.5Q	0.80	-4.5
1.2G + W _U + $\psi_c Q$	1.00	-5.3
0.9G + W _U	1.00	4.2

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements Provide at least 30 mm bearing at end supports

Member 20

1) Member code and description Garage Door - Lintels - In single or upper storey load bearing walls

2) Date prepared 28/09/2016

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 4.8 m
Roof load width 'RLW' 1.8 m
Roof type and mass Light roof & ceiling - 40 kg/m²

5) Member specification

Size, stress grade/product Use 2/300 x 45 hySPAN
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	10.0 mm	4.4 mm (long term)	$\frac{10.0}{4.4} = 2.27$
*Critical serviceability load case			
See 'Notes for interpretation of serviceability data' at the end of this report			

7) Reactions

Load case	k_1 ¹	Limit states design reaction ^{2,3} End ⁴ kN
1.35G	0.60	-3.0
1.2G + 1.5Q	0.80	-4.9
1.2G + $W_U + \psi_C Q$	1.00	-5.7
0.9G + W_U	1.00	3.9

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports
Nail lamination in accordance with Detail H1.

Member 21

1) Member code and description

Office - Lintels - In single or upper storey load bearing walls

2) Date prepared

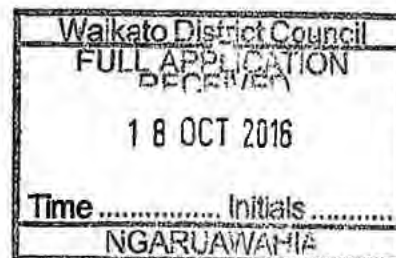
28/09/2016

3) Serviceability criteria

AS 1720.1-2010 and AS 1684.1-1999

4) Design inputs

Span 1.6 m
Roof load width 'RLW' 2.7 m
Roof type and mass Light roof & ceiling - 40 kg/m²



5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \psi_L Q$ *	5.3 mm	1.0 mm (long term)	$\frac{5.3}{1.0} = 5.44$
*Critical serviceability load case			
See 'Notes for interpretation of serviceability data' at the end of this report			

7) Reactions

Load case	Limit states design reaction ^{2,3}	
	k_1 ¹	End ⁴ kN
1.35G	0.60	-1.8
1.2G + 1.5Q	0.80	-3.5
1.2G + W _U + Ψ_c Q	1.00	-3.6
0.9G + W _U	1.00	2.8

See 'Notes for interpretation of reaction data' at the end of this report

8) Installation requirements

Provide at least 30 mm bearing at end supports

Notes for interpretation of serviceability data

- "average deflection" is an engineering concept based upon a notional estimated load, notional member rigidity and, in some cases, an approximate model of material response to environmental conditions. These parameters are, 'standardised' in AS/NZS 1170, AS 1684.1 and AS 1720. Deflections calculated using this methodology cannot therefore be usefully compared with deflections calculated using other methods, eg GLTAA design methodology.
- Deflection is the flexural response to load – 'out-of-level' measurements of installations are not necessarily deflections and can incorporate 'initial out-of-straightness', whether intended or not. Furthermore, loads can be higher/lower than the notional estimate and in any comparison with measured levels, material variability needs to also be considered. AS 1720 gives the following basis for estimation of upper bound deflections for various materials.

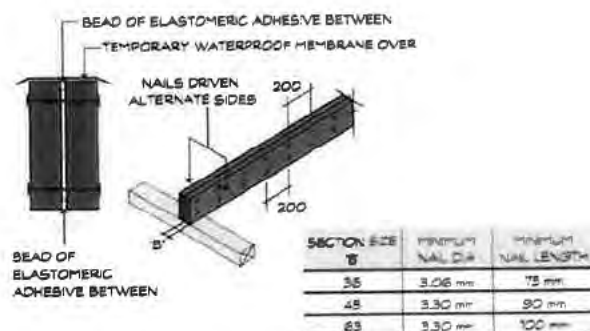
No 1 Framing – visually graded to NZS 3631	Average + 100%
SG grades – mechanically graded to AS/NZS 1748	Average + 43%
GL grades for glulam to AS/NZS 1328	Average + 33%
LVL to AS/NZS 4357 (Includes hySPAN and hyJOIST)	Average +18%

As can be seen, comparison of the 'average deflection' for different materials, even if calculated on the same basis, does not give the whole picture!
- The limits referred are those specified in AS 1684.1 for the stated load case.
- 'Rigidity ratio' expresses the rigidity of the specified beam relative to the rigidity of a notional beam just meeting the serviceability requirements of AS 1684.1

Notes for interpretation of reaction data

- Duration of load factor ' k_1 ' for strength as per NZ 3603:1993
- Negative (-) reactions relate to the 'gravity' or 'downwards' force on the support
- Positive reactions relate to the 'upwards' forces or 'tie-down' requirement on the support
- End reaction includes allowance for overhang/cantilever where one has been designed

Vertical nail lamination - two pieces



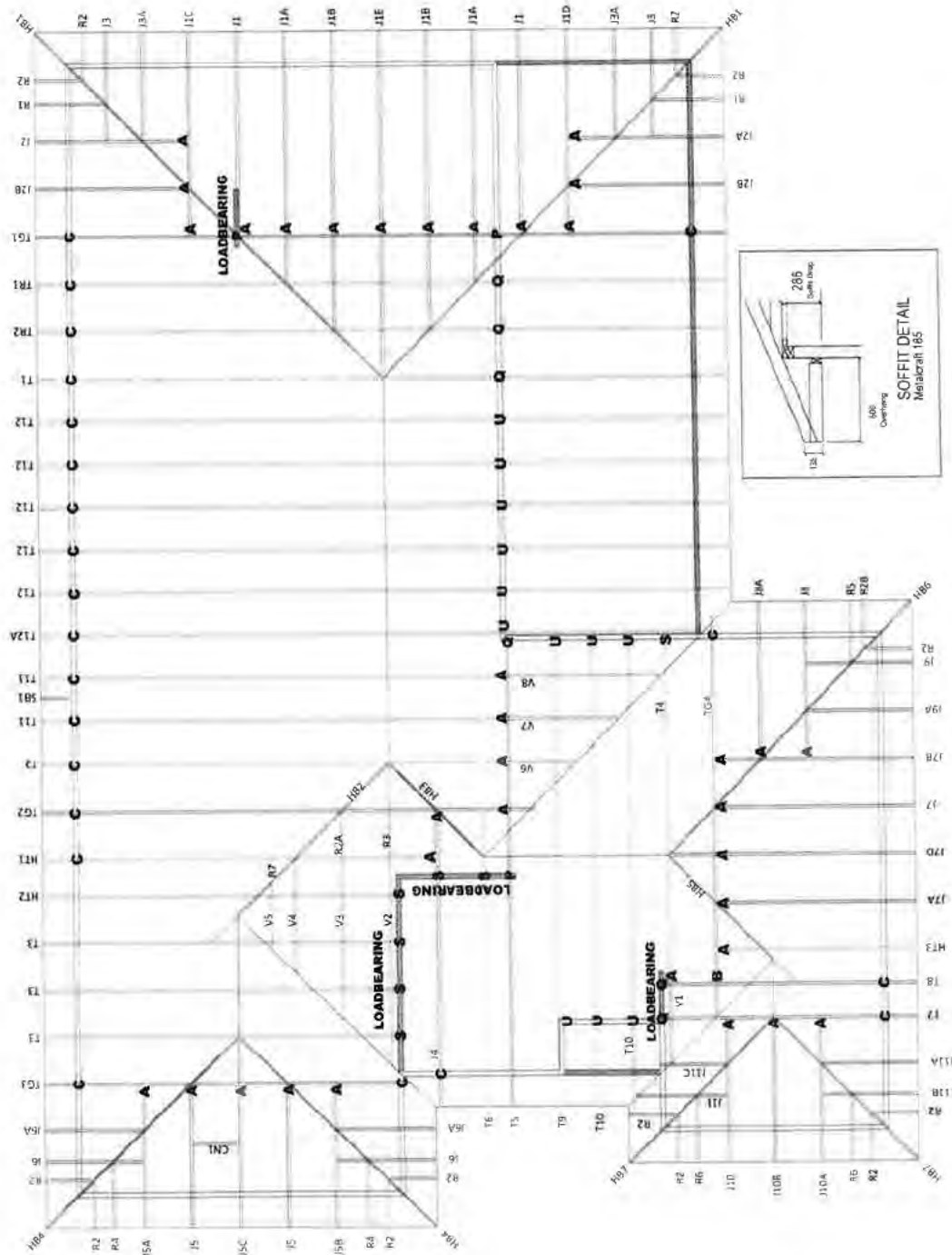
DETAIL H1

The details shown are intended to both limit the entry of moisture between the laminates and to provide adequate shear transfer.

BUILDABLE CONSENT LAYOUT

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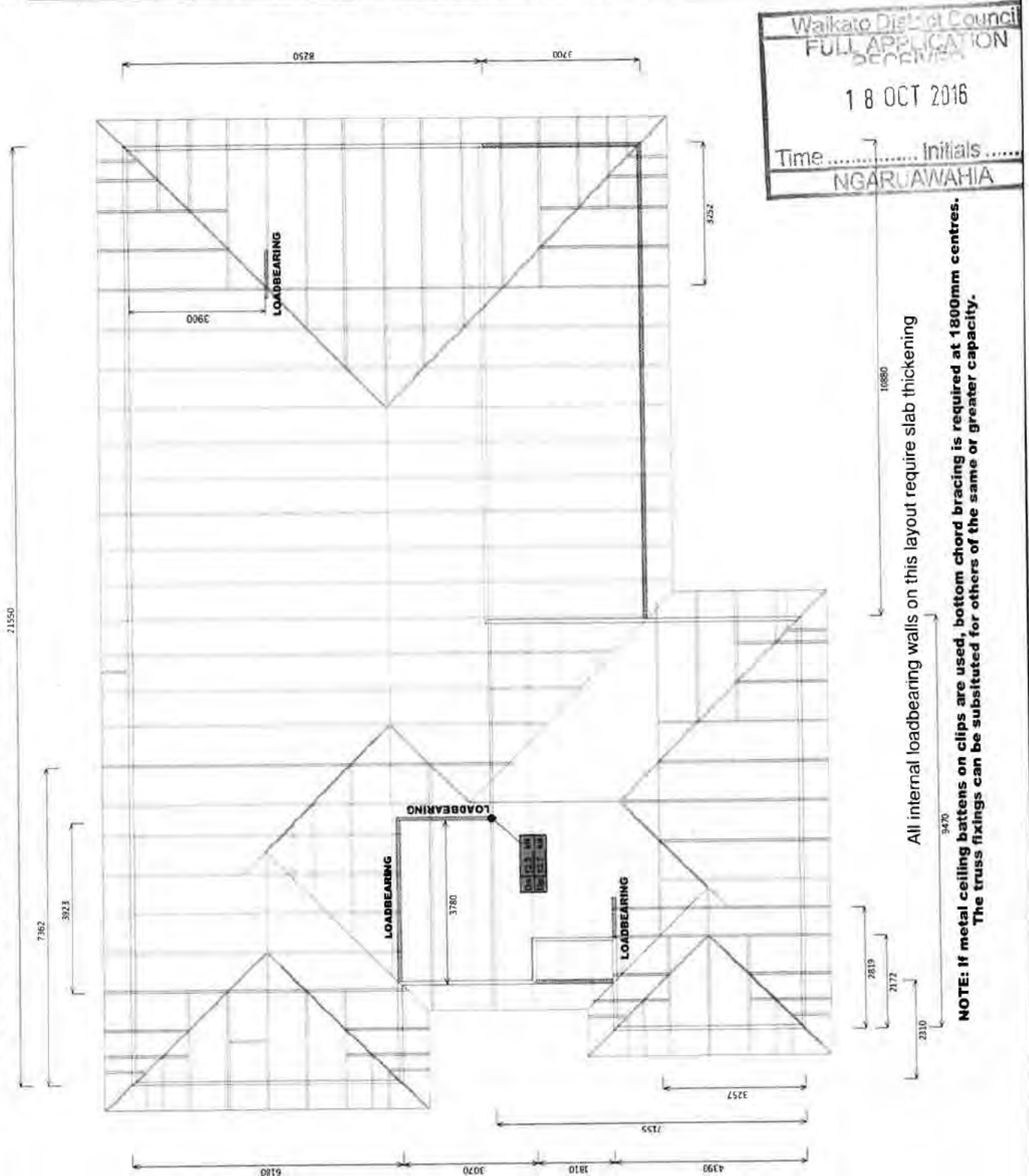
Cambridge Manufacturing 77 Hautapu Rd. Cambridge (07) 823 7312	
JOB No FC17957C	
Client: Paragon Building Ltd Job Name: Swann Address: Lot 31 Hugh Green lane Te Kauwhata	
Pitch: 22.5deg Roof Type: Galv Iron .5mm Overhang: 600mm Wind Area: High Roof Snow: 0.000kPa	
Trusses and rafter at 900mm max centres unless stated otherwise. This layout is to be read in conjunction with the Architectural plans.	
DRAWN: Rick Glover	28 Sep 2016
FIXINGS A = 47x90 Joist Hanger B = 47x120 Joist Hanger C = C7200 (pair) D = 47x190 Joist Hanger E = 95x165 Joist Hanger G = SH-140 Split Hanger H = SH-180 Split Hanger K = SH-220 Split Hanger L = 6kN Strap M = Multigrips (pair) N = Nailon Plate S = CPC 40 Single Cleat T = CPC 40 Short (pair) U = CPC 80 Single Cleat Q = 9kN Pack P = 16kN Pack X = 25kN Uplift Y = 35kN Uplift Z = 45kN Uplift All truss fixings not indicated as above must have two wire dogs.	
Please contact your local CARTERS Manufacturing Branch for any queries regarding this layout.	
See Back Page for Dimensions, Lintel Statement & Point Load Notification.	
	



BUILDABLE CONSENT LAYOUT

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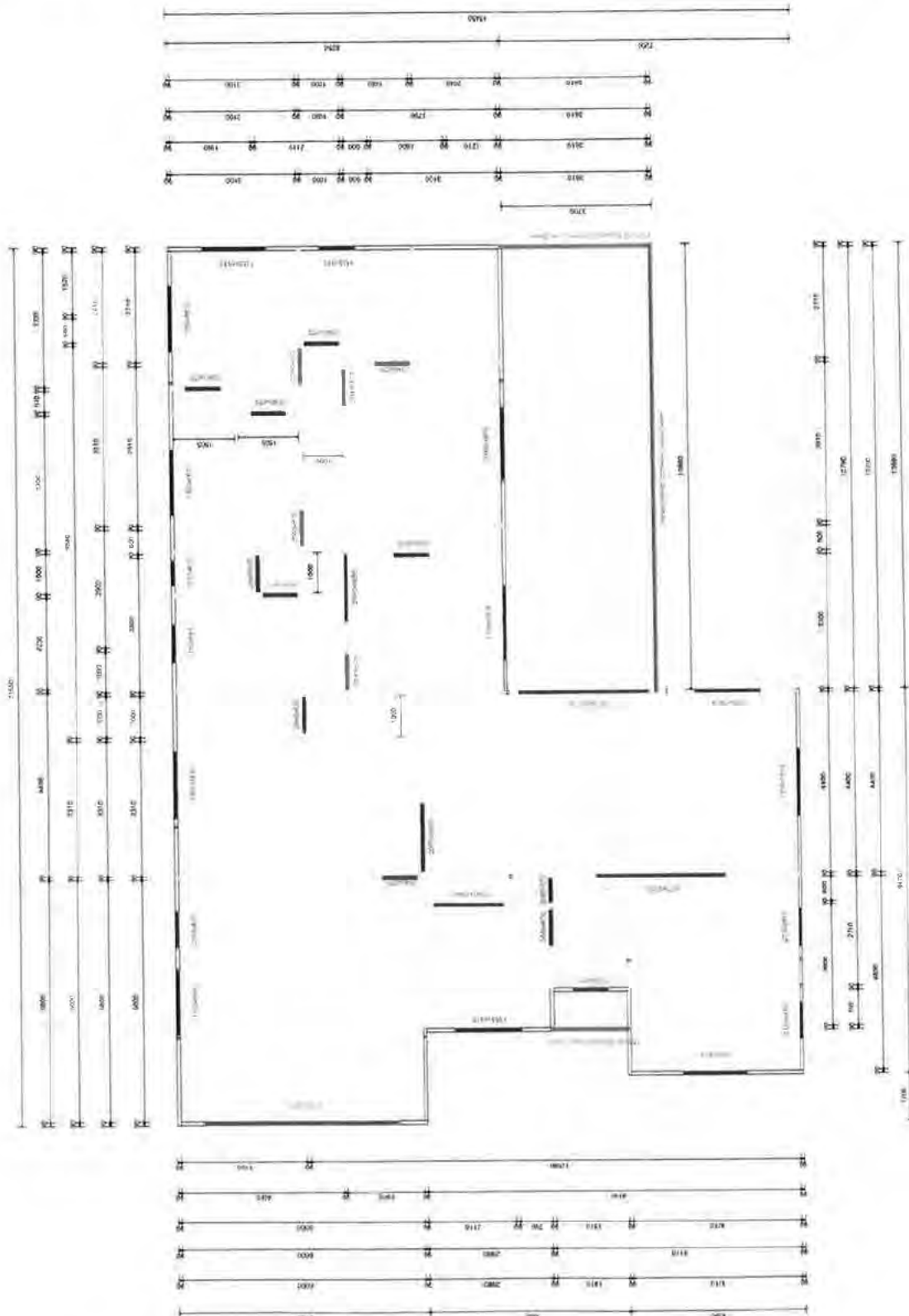
Cambridge Manufacturing 77 Hautapu Rd, Cambridge (07) 823 7312	JOB No FC17957C	Pitch: 22.5deg Roof Type: Galv Iron 5mm Overhang: 600mm Wind Area: High Roof Snow: 0.000kPa	Trusses and rafters at 900mm max centres unless stated otherwise. This layout is to be read in conjunction with the Architectural plans.	DRAWN Rick Glover 28 Sep.2016	The lintels have been sized using one of the following: hy90, hyONE and hySPAN lintels have been sized using the designIT for houses - New Zealand series 5 software. GANGLAM and FLITCH BEAMS have been sized using the MITek Beam Program V1.10 June 2011. Any treated LVL product is H3.1 which satisfies the minimum treatment requirement of H1.2 as per NZS3602. Unless otherwise stated the timber grade for all lintels is SGG. Lintels not shown are to be selected as per NZS3604: 2011. All walls shown on this layout are considered to be load bearing.	Notification of point loaded lintels or point loads on internal walls where the downward load is higher than 10kN or the upward load is greater than 12kN.	See Front Page for Truss Layout and Fixings	FTMA NEW ZEALAND
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BUILDABLE CONSENT LAYOUT

CARTERS
YourBuildingPartner

Cambridge Manufacturing 77 Hautapu Rd, Cambridge (07) 823 7312	
JOB No	FC17957C
Client: Parangon Building Ltd Job Name: Swann Address: Lot 31 Hugh Green Lane Te Kauwhata	
Pitch: 22.5deg Roof Material: Galv Iron .5mm Soffit Overhang: 600mm Wind Area: High Snow Load (factored): 0.000kPa	
Trusses and rafters at 900mm max centres unless stated otherwise. This layout is to be read in conjunction with the Architectural plans.	
DRAWN	Rick Glover 28 Sep.2016
The lintels have been sized using one of the following: hy90, hyONE and hySPAN lintels have been sized using the designIT for houses - New Zealand series 5 software. GANGLAM and FLITCH BEAMS have been sized using the MITek Beam Program V1.10 June 2011. Any treated LVL product is H3.1, which satisfies the minimum treatment requirement of H1.2 as per NZS3602. Unless otherwise stated the timber grade for all lintels is SGB. Lintels not shown are to be selected as per NZS3604: 2011.	
NOTE Please contact your local CARTERS Manufacturing Branch for any queries regarding this layout or if any on site remedial work is required. No modifications to Roof Trusses or Wall Frames are to be undertaken without first obtaining written authority from CARTERS Manufacturing.	
Level 1 Frames	
	

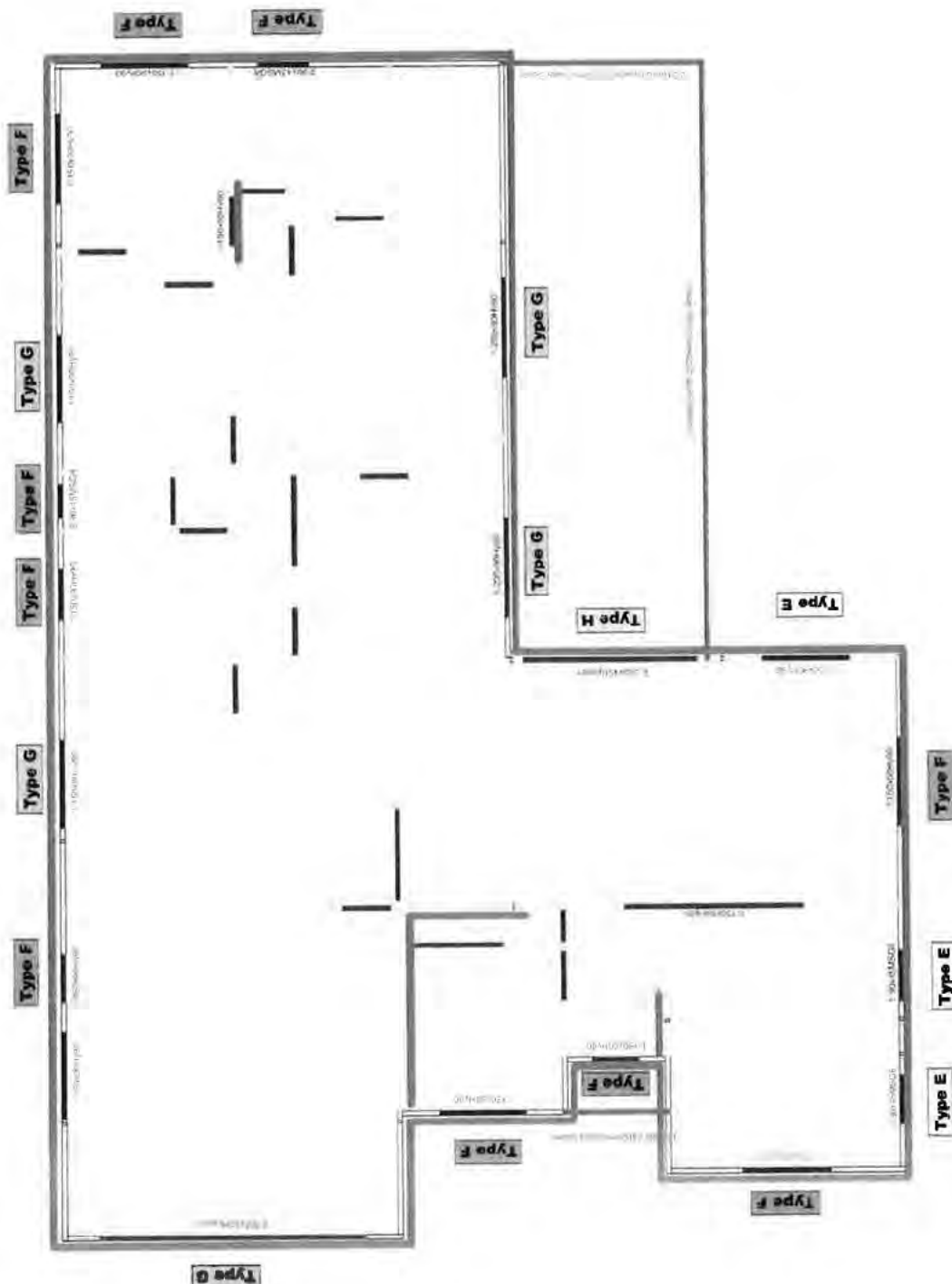


BUILDABLE CONSENT LAYOUT

Refer to the Details Page
for the lintel and stud to top
plate fixing guide

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Your Building Partner

Cambridge Manufacturing 77 Hautapu Rd, Cambridge (07) 823 7312	JOB No FC17957C	DRAWN Rick Glover 28 Sep.2016
Client: Paragon Building Ltd Job Name: Swann Address: Lot 31 Hugh Green lane Te Kauwhata		
The lintels have been sized using one of the following: hy80, hyONE and hySPAN lintels have been sized using the designIT for houses - New Zealand series 5 software. GANGLAM and FLITCH BEAMS have been sized using the MITek Beam Program V1.10 June 2011. Any treated LVL product is H3.1, which satisfies the minimum treatment requirement of H1.2 as per NZS3602. Unless otherwise stated the timber grade for all lintels is SG8. Lintels not shown are to be selected as per NZS3604: 2011.		
Lintel Fixings <div>Type E - 1.4 kN</div> <div>Type F - 4.0 kN</div> <div>Type G - 7.5 kN</div> <div>Type H - 13.5 kN</div>		
Stud to Top Plate Fixings Fixing Type B		
Level 1 Fixings 		



Lintel Fixings

Stud to Top Plate Fixings

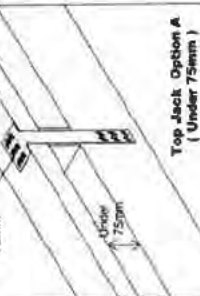
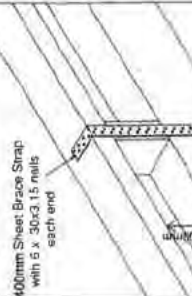
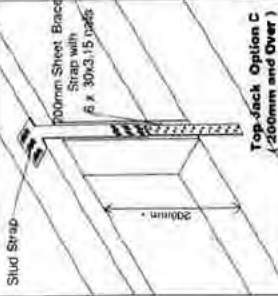
All Fixings are Type A (2x90mm x 3.15 dia. nails) unless shown as Fixing Type B.

Fixing Type B
2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.

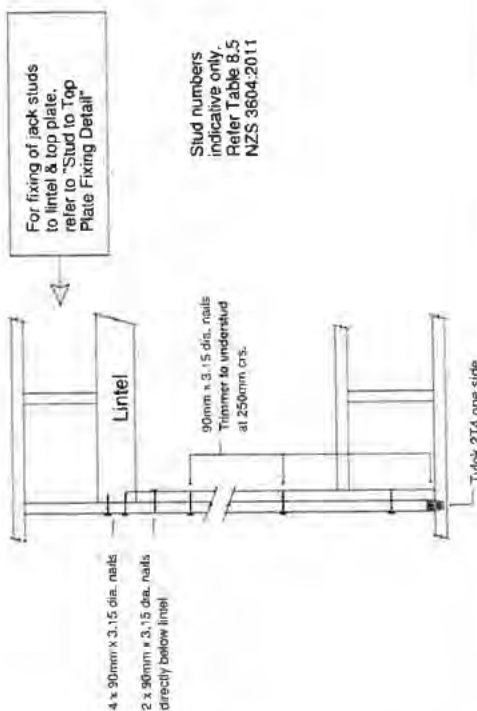
Plus LUMBERLOK Stud Strap (One face only)

To apply the correct number of B type fixings, divide the wall height by the stud centres and add 1 to the figure. Attach the fixings to the studs as evenly as possible along the wall length (include first and last stud).

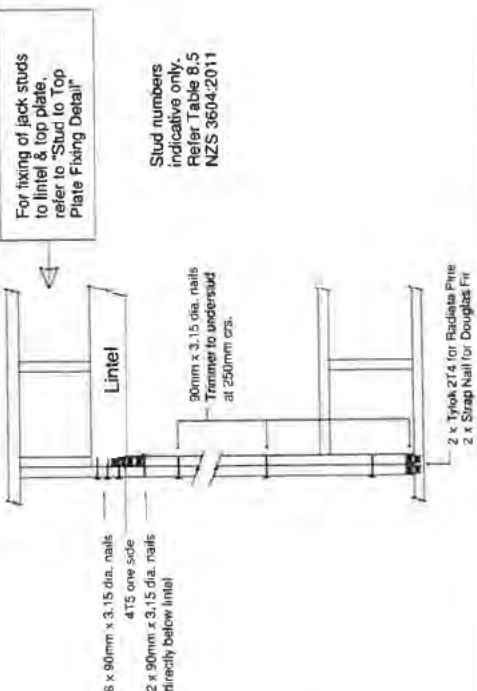
Stud Strap Only when Top Jack is under 75mm



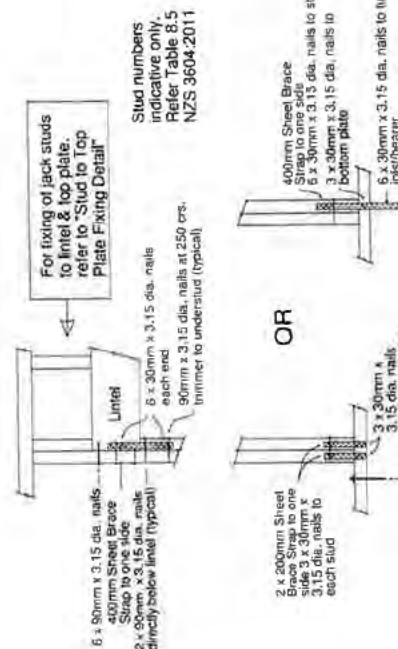
Type E - 1.4 kN



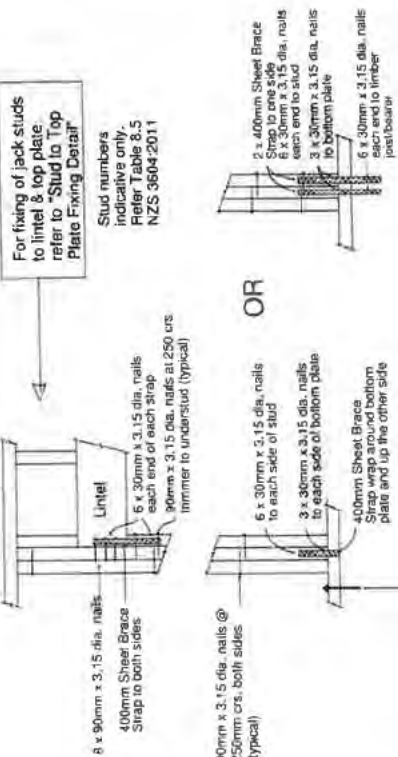
Type F - 4.0 kN



Type G - 7.5 kN



Type H - 13.5 kN



NOTE: These fixings are suggested fixings only. Alternative fixings may be used provided the indicated hold-down is achieved. Refer to the "MITek Structural Fixings On-Site Guide 2012 Edition" or NZStandard3604:2011.



Demand Calculation Sheet

Job Details

Name: Swann Residence
 Street and Number: 5 Hugh Greene Lane
 Lot and DP Number: Lot: 31 DP: 455848
 City/Town/District: Te Kauwhata
 Designer: Terrence Hayes
 Company: DB Architectural
 Date: Friday, 23 September 2016

Building Specification

Number of Storeys: 1
 Floor Loading: 2 kPa
 Foundation Type: Slab

 Cladding Weight: **Single**
 Roof Weight: Heavy
 Room in Roof Space: Light
 Roof Pitch (degrees): No
 22.5
 Roof Height above Eaves (m): 2.9
 Building Height to Apex (m): 5.3
 Ground to Lower Floor (m): 0.2

 Average Stud Height (m): 2.4
 Building Length (m): 21.55
 Building Width (m): 15.45
 Building Plan Area (m²): 245.7

Building Location

Wind Zone = High

Earthquake Zone 1

Soil Type: D & E (Deep to Very Soft)
 Annual Prob. of Exceedance: 1 in 500 (NZS3604:2011 Default)

Bracing Units required for Wind

	Along	Across
Single Level	879	1338

Bracing Units required for Earthquake

	Along & Across
Single Level	990



Single Level Along Resistance Sheet

Job Name: Swann Residence

									Wind	EQ
									Demand	
									879	990
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1583 180%	1405 142%
A	1	2.20		2.4	GS1-N	GIB®	152	132		
	2	1.44		2.4	GS1-N	GIB®	99	86		
	3	1.44		2.4	GS1-N	GIB®	99	86		
	4	0.85		2.4	GS1-N	GIB®	53	50		
	5	0.85		2.4	GS1-N	GIB®	53	50		
									456 OK	405 OK
B	1	3.30		2.4	GS1-N	GIB®	228	198		
	2	2.90		2.4	GS1-N	GIB®	200	174		
									428 OK	372 OK
C	1	0.75		2.4	GS1-N	GIB®	45	44		
	2	1.44		2.4	GS1-N	GIB®	99	86		
	3	1.06		2.4	GS1-N	GIB®	70	63		
	4	1.06		2.4	GS1-N	GIB®	70	63		
									284 OK	256 OK
D	1	3.21		2.4	GS1-N	GIB®	221	193		
									221 OK	193 OK
E	1	0.80		2.4	GS1-N	GIB®	49	47		
	2	0.80		2.4	GS1-N	GIB®	49	47		
	3	1.40		2.4	GS1-N	GIB®	97	84		
									194 OK	178 OK

GIB EzyBrace® Bracing Software



Single Level Across Resistance Sheet

Job Name: Swann Residence

									Wind	EQ
									Demand	
									1338	990
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1398 104%	1280 129%
M	1	0.60		2.4	BL1-H	GIB®	59	61		
	2	0.60		2.4	BL1-H	GIB®	59	61		
	3	1.30		2.4	GS1-N	GIB®	90	78		
	4	1.30		2.4	GS1-N	GIB®	90	78		
									298 OK	277 OK
N	1	2.11		2.4	GS1-N	GIB®	146	127		
	2	1.78		2.4	GS1-N	GIB®	123	107		
									268 OK	233 OK
O	1	1.60		2.4	GSP-H	GIB®	240	240		
	2	0.86		2.4	GS1-N	GIB®	53	51		
									293 OK	291 OK
P	1	3.10		2.4	GS1-N	GIB®	214	186		
									214 OK	186 OK
Q	1	1.50		2.4	GS1-N	GIB®	104	90		
	2	0.62		2.4	GS1-N	GIB®	35	35		
									139 OK	126 OK
R	1	0.75		2.4	GS1-N	GIB®	45	44		
	2	2.04		2.4	GS1-N	GIB®	141	122		
									186 OK	167 OK



GIB EzyBrace® Systems specification GS1-N

Specification code	Minimum length (m)	Lining requirement
GS1-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard to one side only

WALL FRAMING

Wall framing to comply with:

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING**Timber floor**

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and 600mm centres thereafter.

External Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for external wall bottom plate fixing.

WALL LINING

- Any 10mm or 13mm GIB® plasterboard lining.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING**Fasteners**

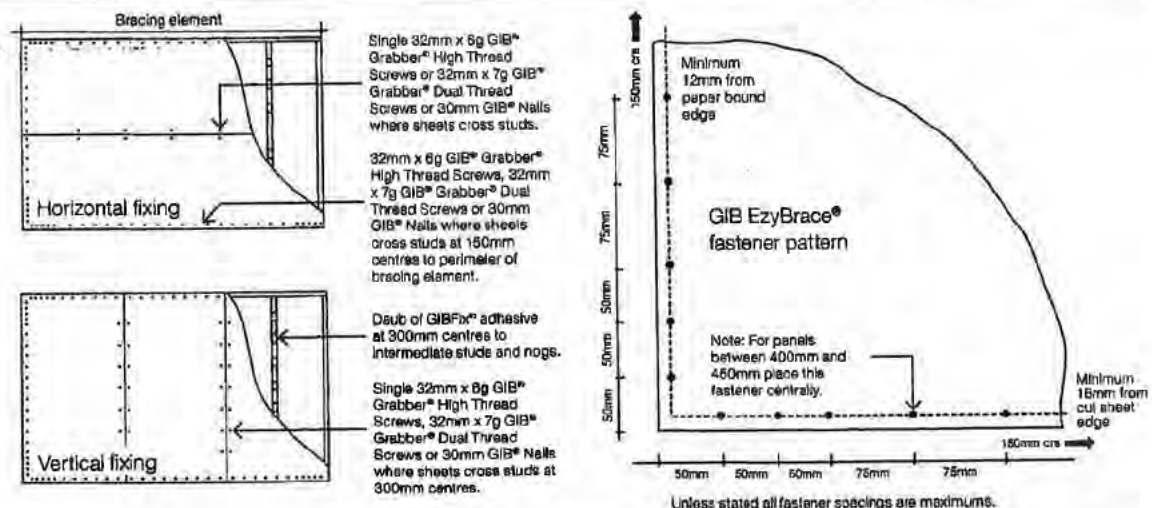
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems



GIB EzyBrace® Systems specification BL1-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BL1-H	0.4	10mm or 13mm GIB Braceline® to one side only	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING**Timber floor**

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline®
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING**Fasteners**

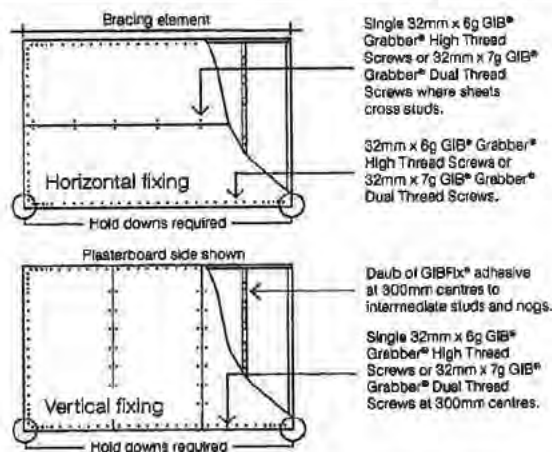
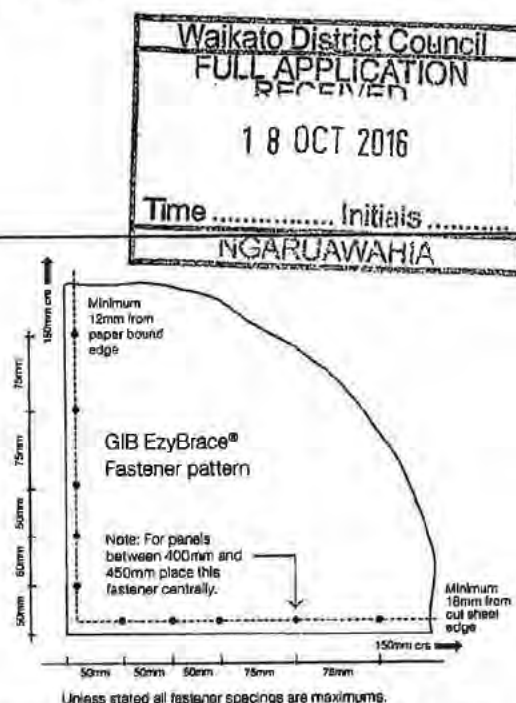
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

60,100,150, 225, 300mm from maximum each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the sheet joint. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems



Design Navigator H1 Compliance Report

Project Summary

H1 Report created by:

DB Architectural Ltd

Project Name:

Swann Residence

Client:

Swann

Lot No:

31

Comment:

Project Id:

93846

Report Date:

17/10/2016

Compliance Result

This building complies with H1 via the following methods:

- the Schedule Method in NZS4218:2004 (Sept 2008 R-values)
- the Calculation Method in NZS4218:2004 (Sept 2008 R-values)
- the BPI Method

H1 Compliance Details

NZS4218:2004 Schedule Method Compliance

The use of the Schedule Method is permitted .

In order to comply the R-values for all the construction elements must be the same or larger than the permitted minimum R-values. This design complies with the NZS4218:2004 Schedule Method.

Non-Solid Construction			
	Permitted Minimum	Proposed Minimum	
Floor:	1.3	2.28	✓
Non-solid Walls:	1.9	2.03	✓
Glazing in Non-solid Walls:	0.26	0.26	✓
Roof:	2.9	3.05	✓
Skylights:	0.26		✓

If multiple solid wall types levels are used the table shows the requirements for the corresponding walls and windows in them. For solid timber and for other solid constructions two options are shown for each. But the components of these options can not be mixed, i.e. it is not permitted to use the solid timber wall R-value from option 1 and the solid timber window R-value from option 2.

NZS4218:2004 Calculation Method Compliance

The use of the Calculation Method is permitted .

In order to comply the Actual Heat Loss must be the same or smaller than the Reference Heat Loss AND all component R-values must be the same or larger than 60% of the R-values in the '60% Rule' table below. This design complies with the NZS4218:2004 Calculation Method.

Heat Loss:

Reference building	Proposed building
491	378

Minimum R-values ("60% rule"):

	Permitted Minimum	Proposed Minimum	
Floor:	0.8	2.28	✓
Non-solid Walls:	1.1	2.03	✓
Glazing in Non-solid Walls:	0.15	0.26	✓
Roof:	1.7	3.05	✓
Skylights:	0.15		✓

The Reference building has the following areas and R-values.

		Non-solid	Solid Timber	Other Solid
		100.0	0.0%	0.0%
Floor:	Area: 199 m ² R-values:	1.3	1.3	1.5
Walls excl. glazing:	Area: 123.8 m ² R-values:	1.9	1.2	1
Glazing (up to 30%):	Area: 53.1 m ² R-values:	0.26	0.26	0.26
Glazing (surplus of 30%):	Area: 0 m ² R-values:	0.31	0.31	0.31
Roof:	Area: 199 m ² R-values:	2.9	3.5	3.5
Skylights:	Area: 0 m ² R-values:	0.31	0.31	0.31
Heat Loss:		491	517	517

For mixed constructions the heat loss of the reference building is calculated as the sum of the heat losses for each type of wall construction multiplied by the fraction of the wall area of each type. This approach is based on clause 4.2.6 of NZS4218:2009 because NZS4218:2004 has no clear guidance on mixed constructions. Note that all other requirements (window area (30%) and skylight area (1.2m²) threshold for Schedule Method, maximum R-value tradeoff (40%), etc.) are still using NZS4218:2004 including the 2007 H1 amendments because this is the Acceptable Solution for Clause H1.

Building Performance Index Compliance

The use of the Building Performance Index (BPI) method is permitted.

This design complies with the BPI.

In order to comply the design must have a BPI smaller or equal to 1.55 kWh/DegMonth.m². Your building has a BPI of 1.12 kWh/DegMonth.m².

Please refer to www.designnavigator.co.nz/BPICorrelation.pdf regarding the recognition of the BPI for NZBC compliance verification.

Compliance with Clause E3

This building complies with the R-value targets in NZBC Clause E3.

Component	Minimum R-value	Project R-value
Framed wall constructions with cavities	1.5	
Single skin masonry wall without a cavity	0.6	
Solid timber wall no less than 60 mm thick	0.6	
Roof or ceilings	1.5	

Design Details

Building Dimensions

Floor Area	199
Gross Wall Area	176.9
Net Wall Area	134.8
Wall (North) Area	40.6
Wall (East, South and West) Area	94.2
Gross Roof Area	199
Net Roof Area	199
Glazing Area	42.1
Window (North) Area	13.8
Window (East, South and West) Area	28.3
Skylight Area	0

Glazing Area Percentages

Total Vertical Glazing Percentage	23.8
East, South and West Window Percentage	23.1
Total over 30%	no
East, South and West over 30%	no
Total over 50%	no

Information required for BPI calculation

Living Floor Area 199 Note: This includes also internal floors.

Average Room Height 2.4

Thermal Mass Level Medium weight Slab floor with some carpeting or direct glued timber, timber framed walls.

Climate

Location Te Kauwhata

Climate Zone 2

Heat Loss Details

	ID	Orient.	Width	Height	Gross Area	Net Area	R-value*	Heat Loss	Shad. Coeff.**	Solid Wall***
Floors										
Floor 1	Floor				199.0	199.0	2.28	87.3		
Walls										
Wall 1	Office	E	3.1	2.4	7.4	5.2	2.16	2.4		C
Window 1-1	W1		1.6	1.4		2.2	0.26	8.3	0.86	
Wall 2	Office/Entry	S	1.0	2.4	2.4	2.4	2.16	1.1		C
Wall 3	Entry	E	1.8	2.4	4.3	2.5	2.16	1.2		C
Window 3-1	D1		0.9	2.2		1.9	0.26	7.1	0.86	
Wall 4	Living/Entry	N	2.3	2.4	5.5	5.5	2.16	2.6		C
Wall 5	Living	E	4.4	2.4	10.5	8.4	2.16	3.9		C
Window 5-1	W2		1.6	1.4		2.2	0.26	8.3	0.86	
Wall 6	Living/Family	N	9.5	2.4	22.7	16.7	2.16	7.7		C
Window 6-1	W3		0.9	2.2		1.9	0.26	7.5	0.86	
Window 6-2	W4		0.9	2.2		1.9	0.26	7.5	0.86	
Window 6-3	W5		1.6	1.4		2.2	0.26	8.3	0.86	
Wall 7	Fam/Dining	W	7.2	2.4	17.3	8.2	2.16	3.8		C
Window 7-1	W6		1.6	1.4		2.2	0.26	8.3	0.86	
Window 7-2	D2		3.2	2.2		6.9	0.26	26.5	0.86	
Wall 8	Bed4/WIR	N	10.9	2.4	26.1	18.4	2.16	8.5		C
Window 8-1	D3		1.8	2.2		3.9	0.26	14.9	0.86	
Window 8-2	D4		1.8	2.2		3.9	0.26	14.9	0.86	
Wall 9	WIR/Bed2	W	8.3	2.4	19.8	16.6	2.16	7.7		C
Window 9-1	W7		0.9	1.2		1.0	0.26	4.0	0.86	
Window 9-2	W8		1.6	1.4		2.2	0.26	8.3	0.86	
Wall 10	Bed2/Media	S	15.5	2.4	37.1	28.9	2.16	13.4		C
Window 10-1	W9		1.6	1.4		2.2	0.26	8.3	0.86	
Window 10-2	W10		1.6	1.4		2.2	0.26	8.3	0.86	
Window 10-3	W11		0.6	1.2		0.7	0.26	2.7	0.86	
Window 10-4	W12		0.9	1.2		1.0	0.26	4.0	0.86	
Window 10-5	W13		1.6	1.4		2.2	0.26	8.3	0.86	
Wall 11	Media/Garage	E	6.1	2.4	14.6	13.0	2.03	6.4		C
Window 11-1	D5		0.8	2.0		1.6	0.26	6.2	0.86	
Wall 12	Garage	S	3.8	2.4	9.1	9.1	2.03	4.5		C
Roofs										
Roof 1	Roof				199.0	199.0	3.05	65.2		
Total Heat Loss								377.5		

* Any concrete slab-on-ground floor regardless of its dimensions can be assumed to have an R-value of at least R-1.3

(H1/VM1 and H1/AS1, Replacement Table 1, Note (4)).

** The Shading Coefficient is only required for BPI calculations.

*** C: Cavity Construction (any construction that is not solid), T: Solid Timber, S: Other Solid Construction (Note that the use of solid timber and other solid construction types is discretionary, i.e. solid timber walls and other solid walls can be treated as if they are non-solid (NZS4218:2004 section 3.1.4.).)

Floor Construction Details

Name:	Floortype 1	2.28 m ² K/W
Type: Floor: Custom - enter R-value manually		
	Insulation : 2.28	

Wall Construction Details

Name:	Walltype 1	2.16 m ² K/W
Type: Wall: Timber frame with vented cavity		
external surface 0.03		
Cladding : 70mm brick ▼		
R-value: 0.06		
Air Barrier : Building paper ▼		
R-value: 0.01		
Timber Frame & Cavity : 90mm, studs @ 600mm, dwangs @ 1200mm ▼		
Wall Frame Area: 12.7%		Cavity Area: 87.3%
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08		15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : R-value: 0.75	Pink®Batts® R2.2 Wall 2.2	
		still Airgap: 20-90mm airgap (non-reflective) ▼ R-value: 0.16
Wall Lining : Gypsum plasterboard 10mm ▼		
R-value: 0.04		
internal surface 0.09		

Name:	Walltype 2	2.03 m ² K/W
Type: Wall: Timber frame (direct fixed cladding)		
external surface 0.03		
Cladding : Gypsum plasterboard 10mm into still air (garage, etc.) ▼		
R-value: 0.10		
Air Barrier : none ▼		
R-value: 0.00		
Timber Frame & Cavity : 90mm, studs @ 600mm, dwangs @ 1200mm ▼		
Wall Frame Area: 12.7%		Cavity Area: 87.3%
Framing : R-value: 0.75	Pink®Batts® R2.2 Wall 2.2	
		still Airgap: none ▼ R-value: 0.00
Wall Lining : Gypsum plasterboard 10mm ▼		
R-value: 0.04		
internal surface 0.09		



Roof Construction Details

Name: <u>Rooftype 1</u>		3.05 m²K/W
Type: Roof: Timber framed roof, direct fixed or battened flat ceiling		
external surface 0.03		
Roofing : Corrugate iron with building paper ▼		
R-value: 0.01		
Insulation :		
Timber Frame & Cavity : 90mm rafters or joists @ 900mm, battens (covered with insulation) ▼		
Roof Frame Area: 5.0%	Cavity Area: 95.0%	
Roof space (still air) 0.11	Roof space (still air) 0.11	
Framing : R-value: 0.75	Pink®Batts® R3.2 Ceiling 3.2	
Roof Lining : Gypsum plasterboard 13mm ▼		
R-value: 0.06		
internal surface 0.09		
Recessed downlights		
Ceiling Area [m²]:	192.4	Number of downlights: 38 Clearance from lamp holder side [m]: 1.7



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4

Barricade™

Building Wrap

SPECIFICATION



1. HT Green Concrete Underlay
2. Hydro™ Seal Bituminous treatment
3. Dry-Fix DPC
4. **Building Wrap**
5. Wrapstrap™
6. Window Tape
7. Air Tight P.E.F Backing Rod

PRODUCT DESCRIPTION

Barricade Building Wrap is a hydrophobic non-woven fabric that has a unique clear breathable overlay, which allows moisture and condensation to run off the face and then evaporate in the cavity area.

PHYSICAL PROPERTIES

Barricade Building Wrap is a 90 gsm hydrophobic non-woven breathable composite building wrap.

The following tests have been carried out 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
- Resistance to water penetration in accordance with AS/NZS 4201.1.4
- Surface Water absorbency in accordance with AS/NZS 4201.6
- Air resistance to BS 6538.3
- Shrinkage in accordance with AS/NZS 4201.3
- pH of extract in accordance with AS/NZS 1301.421s

COMPATIBILITY

Barricade Wall Wrap has been appraised for use as a flexible wall underlay on timber framed buildings within the following scope:

- The scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- With absorbent wall claddings directly fixed to the frame; and,
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity; and,
- With masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- Situated in NZS 3604 Wind Zones up to and including 'Very High'

Barricade Wall Wrap has been appraised for use as a flexible wall underlay on steel framed 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 absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity; and,
- With masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- Situated in NZS 3604 Wind Zones up to and including 'Very High'

Barricade Wall Wrap has been appraised for use as a flexible wall underlay over rigid wall underlays on timber and steel framed buildings within the following scope:

- The scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity; and,
- With masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- Situated in NZS 3604 Wind Zones up to and including 'Extra High'

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Barricade™

Building Wrap



INSTALLATION

- 1 *Masons Building Wrap* must be fixed (with the printed side out) to all framing members at maximum 300 mm centres with large-head clouts 20 mm long, 6-8 mm staples, self drilling screws or proprietary underlay fixings. The membrane must be pulled taut over the framing before fixing.
- 2 *Masons Building Wrap* must be run horizontally and must extend from the upper-side of the top plate to the under-side of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs. Horizontal laps must be no less than 75 mm wide, with the direction of the lap ensuring that water is shed to the outer face of the membrane. End laps must be made over framing and be no less than 150 mm wide.
- 3 The wall underlay should be run over openings and these left covered until windows and doors are ready to be installed. Openings are formed in the membrane by cutting on a 45 degree diagonal from each corner of the penetration. The flaps of the cut membrane must be folded inside the opening and stapled to the penetration framing. Excess underlay may be cut off flush with the internal face of the wall frame. *Masons Flashing Tape* needs to be installed around the openings prior to fitting the doors and windows.
- 4 *Masons Building Wrap* must be restrained from bulging into the drained cavity in accordance with NZBC Acceptable Solution E2/ AS1, Paragraph 9.1.8.5. Installing *Masons WrapStrap* - horizontal at 300mm centres - prevents the wrap and insulation from bulging.
- 5 *Masons Building Wrap* can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.7(e).
- 6 When fixing the product in windy conditions, care must be taken due to the large sail area created by wide roll widths.
- 7 Any damaged areas of *Masons Building Wrap*, 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 with *Masons Flashing Tape*.

Provided *Masons Wrap* is not exposed to the weather or ultra-violet light for a total of more than 42 days, and provided the exterior cladding is maintained in accordance with the manufacturers instructions and the cladding remains weather resistant, the wrap is expected to have a serviceable life equal to that of the cladding.

DURABILITY



BRANZ Appraised
Appraisal No.785 (2012)

Barricade Building Wrap has been BRANZ appraised to ensure it meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years for building wraps used where the cladding DURABILITY requirement or expected serviceable life is not less than 50 years.

STORAGE

Masons Wrap whether on or off site should

- Be stored on end under a cover, in a clean and dry area
- Do not crush the rolls
- The rolls must be protected from damage

Masons Building Wraps	Roll Sizes	Masons Code
Masons Barricade Building Wrap - 50m ²	H 2.74 m x L 18.24 m	MPBBW50 2.74m
Masons Barricade Building Wrap - 100m ²	H 2.74 m x L 36.49 m	MPBBW100 2.74m
Masons Barricade Building Wrap - 100m ²	H 1.37 m x L 73 m	MPBBW100 1.37m
Masons Barricade Building Wrap - 50m ²	H 1.37 m x L 36.50 m	MPBBW50 1.37m
Masons Barricade Building Wrap - 25m ²	H 1.37 m x L 18.25 m	MPBBW25 1.37m

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AnyLength

Custom Run Ceiling Battens

Custom Run Ceiling Battens

Producer Statement

AnyLength CB35 ceiling battens are manufactured from .50g G550 Z275 galvanized Steel coil cut to the required length.

AnyLength CB35 ceiling battens have been produced to support Plaster Board and Fibrous Plaster Board onto ceiling joists and truss bottom chords.

AnyLength Ceiling Battens comply with the requirements as laid down by the New Zealand Standard 4203: Table 3.4.1 for non-habitable roof spaces on domestic dwellings provided they are fitted in accordance with the manufacturers recommendations.

AnyLength CB35 ceiling battens should be fixed at no greater than 1200mm spacing to the joists or bottom of the Truss Chord using 50mm ring shank nails.

AnyLength BH35 ceiling batten hangars may be used in place of direct fixing.

AnyLength CB35 ceiling battens spacings may be at 450mm centers when using 10mm Plasterboard using Gypfast adhesive and 25x6 screws

or

AnyLength CB35 ceiling battens spacings may be at 600mm centers when using 13mm Plasterboard using Gypfast adhesive and 32x6 screws

Adhesives may also be used as recommended by the lining manufacturer.

Load Bearing

AnyLength CB35 is not designed to support loads other than the board fitted and are not designed to support foot traffic.

AnyLength CB35 is designed for internal use only and should not be exposed to moisture or other corrosive environments.

Storage

AnyLength CB35 should be stored in a dry flat area free of moisture and dampness which could impair the performance of the galvanized coating.

Installation of battens should not happen until the building has the roof on.

Manufactured and Distributed
by Anylength
PO Box 2092
81 Birch Avenue
Tauranga
Phone (07) 579 4296
Email: Anylength@xtra.co.nz

battenMAN
custom-run metal ceiling battens

John Overwater
Managing Director

Hamilton
Ph 027 460818 - 167 450 5213
E John@battenman.co.nz

BRICKLAYING SPECIFICATION PREMIER MASONRY BRICKS

DESIGNER

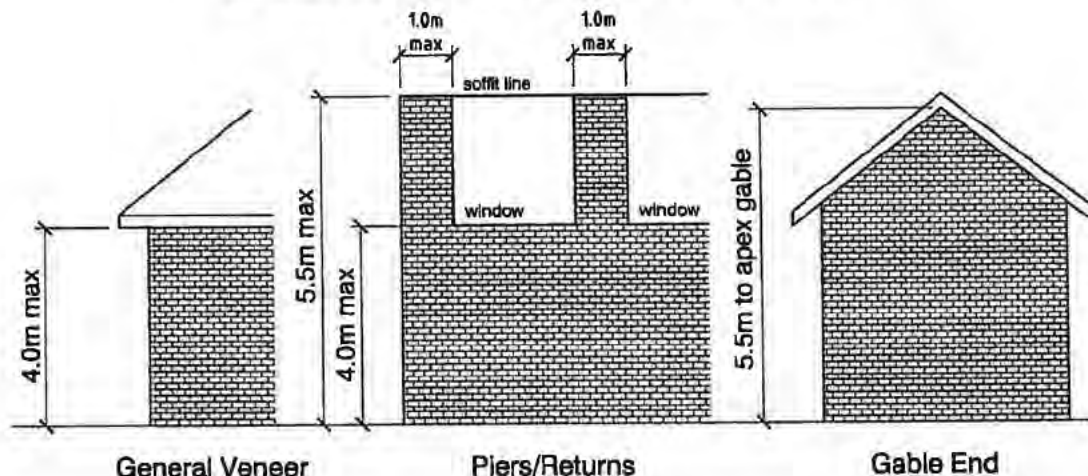
The 'Architectural Designer' is responsible for ensuring that the 'brick veneer', as detailed on the Building Consent Plans and Specification, complies with all aspects of this 'Specific Design' bricklaying specification, provided as an 'Alternative Solution' to E2/AS1; applicable only when PREMIER Concrete bricks are specified and used. If an aspect has not been specifically addressed in this specification then E2/AS1 Masonry and NZS4210 will apply.

The 'Architectural Designer' is also to ensure that the details submitted to council for the building consent on any one particular dwelling, specifically relate to the methodology and veneer to be installed on that dwelling. Studs at 600mm c/s are permitted.

The maximum height for a veneer in relation to this specification is 4.0m, 5.5m to the apex of a gable or 5.5m for a pier not exceeding 1.0m in width and not supporting a steel lintel.

Ensure WANZ support bars have been specified under all doors and windows.

Maximum Veneer Heights under Design Note PG-B1



GENERAL

Bricklaying – Workmanship

The veneer is to be installed by a 'qualified' tradesman and 'supervised' by a Licenced Building Practitioner (If not the tradesman doing the laying) who will be responsible on completion of the brick veneer installation, certifying that the veneer meets all requirements of Design Note PG-B1 – Specific Design Bricklaying Specification and/or E2/AS1 Masonry - NZS4210; in addition to any requirements on the 'Approved Plans' and Specification.



Important: This specification applies, and will be enforced, regardless of the specified wall finish, such as plastered or painted veneer. Laying must be to 'Face Brick' standard regardless.

Where the plans and specification deviate from what is being asked for on-site, the bricklayer must raise the issue with the main contractor prior to proceeding to ensure compliance – if plans need to be amended, establish a paper trail.

Related Documents

All relevant NZ Standards shall apply in their latest revisions for all items NOT covered by this 'Specific Design'. In particular, the following documents:

E2/AS1	Building Code , External Moisture, Masonry Veneer
NZS4210	Materials and Workmanship
NZS4229	Masonry Buildings not requiring Specific Design
NZSHB4236	All standards relating to masonry veneers – summary.

Building Wrap

Where studs exceed 450mm crs, and the 'building wrap' is not Eco-ply or similar, the building wrap is to be taped and fixed horizontally at 300mm crs up the height of the stud to comply with E2/AS1. The bricklayer is to check prior to laying any bricks and advise the Builder/Contracts Manager if this has not been done.

PRODUCTS

All materials shall be the best of their respective kinds, free from impurities, imperfections and other faults likely to impair the finished masonry veneer. In addition, all materials are to comply with any NZ Standards applicable to them.

Bricks

This specification is applicable only to the following concrete brick product manufactured by PREMIER GROUP INTERNATIONAL

Table 1

PRODUCT	SIZE	NO/m ²	WEIGHT	WEIGHT/m ²
City Brick	230x76x70mm	50	2.42kgs	121kgs
	230x76x90mm	50	3.04kgs	152kgs
Heritage Brick	230x115x70mm	33	3.50kgs	117kgs
Country Brick	290x145x70	22	6.16kgs	133kgs

The bricks specified on this contract are to be.....

Mortar

The mortar to be used on this contract is to be a pre-bagged factory manufactured Premier 'Trade Mortar'. Alternatively, the mortar may be site mixed using a formula by volume, not exceeding 1 cement to 4 wash-mixed sand, clean water and any plasticizing agents or bonding agents deemed appropriate. Premier washed mortar sand is available in 500kg and



PREMIER GROUP
Head Office: PO Box 12172 Hamilton 3216
P +64 7 850 8417 F +64 7 850 9100
0800 22 22 98
info@premier-group.co.nz
www.premier-group.co.nz

1000kg bags. Premier cement is also available in grey or white, which can be delivered to site.

Note: The 'wash-mixed' sand is to have a maximum salt content of 0.04%.

Brick ties

Screw-fixed galvanised or stainless steel EH ties to be used complying with AS/NZS2699.1, having sufficient length to span the cavity and ensure a minimum 50% bedding in the mortar course.

Fixed to studs as per following table:

Table 2

Placement of Brick ties in Mortar Courses		
Brick Height	Studs at 600mm	Studs at 400mm
76mm	4 th course	5 th course
115mm	3 rd course	4 th course
145mm	2 nd course	3 rd course

Prior to commencing work ensure the 'durability' of the brick tie matches the zone.

Steel Lintels

All steel lintels are to be galvanised and sized as follows:

Traditionally Installed

Lintels that span from one side of the brick opening to the other, completely free of the structural frame, with no less than 100mm seating for up to 2.0m spans and 200mm for >2.0m. Keep 20mm behind the brick face.

Table 3

Max. Span	Size of Angle
3.0m	80x80x6mm 100x100x6mm
3.5m	125x75x6mm
4.5m	125x75x8mm
4.8m	125x75x10mm

Fixed to Framing

Galvanised steel lintels may be fixed directly to the timber lintels conditional upon the following being adhered to.

- The steel is kept completely free of the bricks.
- The total length of the steel angle is 10mm less than the width of opening.
- The angle is fixed to the timber lintel using 75x10 galv. Coach-screws at 400mm crs
- The fixing is positioned approx. one third down from the top of the vertical leg of the angle.

Flashings

Flashings around all openings are to be designed and installed using one of the following alternatives:

Head Flashing:

- a. Metal flashing secured to the timber lintel, sloping a minimum of 5° across the cavity, then turned down 15mm, 6mm in front of the joinery. The ends of the flashing are to be turned up to help prevent water entering the cavity. Allow a minimum gap of 5mm between the top side of the flashing and the underside of the steel lintel.
- b. 200mm wide Supercourse 500 polyethylene plastic, nailed to the studs and over-flashed, taken across the cavity and tucked into the back of the vertical leg of the steel lintel (normally applies only to the traditional lintel). The flashing is to be extended 200mm each side of the opening. Sealant is to be applied between the underside of the steel lintel and the top of the joinery extrusion.

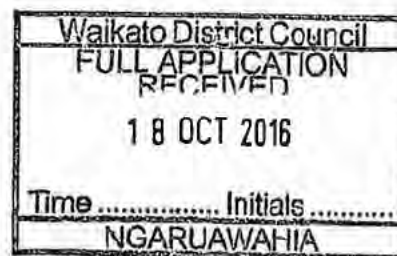
Jamb Flashings

Use 200mm wide Supercourse 500 polyethylene plastic, tucked into the joinery and the other side held off the building wrap using either a 20mm timber packer or 40mm galvanised clouts left 20mm proud of the frame. The flashing is to extend 200mm above and below the opening.

Sill Flashings

For window openings use 200mm wide Supercourse 500 polyethylene plastic, tucked into the joinery and the other side left hanging in the cavity and held off the building wrap using either a 20mm timber packer or 40mm galvanised clouts left 20mm proud of the frame. The flashing is to extend 200mm each side of the opening.

For door sills use a metal tray flashing as shown in E2/AS1 Masonry.



BRICKLAYING

Brick Delivery

The bricklayer is responsible for checking that the correct bricks and quantity have been delivered to site, and that the quality is acceptable on all pallets. Ensure that one batch number has been supplied. Any issues regarding brick quality is to be raised immediately with the contracts manager and is to be taken up with the supplier prior to laying any bricks. **IMPORTANT:** A brick laid by the bricklayer, is a brick accepted. Any bricks laid that have unacceptable surface defects, chips or cracks, as determined by the contracts manager, are to be removed and replaced at the bricklayer's expense.

Protection of Bricks

The top of all pallets and bricks stacked around the site ready for laying, are to be protected from becoming wet by covering with plastic when rain threatens, and at the end of each working day. The top of all unfinished veneer is to be treated likewise.

Important: Freshly laid brick veneer is to be protected from rain for a minimum of 6 hours after laying, by covering with polythene - protect overnight.

The brickwork is to be protected from damage and staining due to mortar, paints and other chemicals at all times. Care must be taken with the handling of scaffold and planks so as not to impact on the brick veneer. Any damaged veneer is to be replaced at the bricklayer's cost where this specification has not been adhered to.

Hot Weather – Drying Winds

During the bricklaying process, when the air temperature is above 25°C and/or hot drying winds are present, the newly laid brick veneer must be properly cured for the first 24 hours by adding moisture to the veneer and protecting it from direct sun and drying winds. It is critical that 'hydration' takes place and the mortar sets firmly. In the event that 'hydration' has not occurred, and the mortar is powdery, the veneer is to be removed and re-laid at the bricklayer's expense.

Tolerances

All bricks are to be laid plumb and level, and within the tolerances given in Table 2.2, NZS4210. In the event that this is not possible due to the alignment of the structural frame, the Construction Manager is to be advised immediately.

Bonding of Bricks

The bricks, unless otherwise specified, are to be laid half-bonded. This requires corner bricks to be cut to a length of 190mm for standard length bricks. It is important that all perpend joints throughout the height of the veneer are in vertical alignment (+/-10mm). Any 'Stack-bonding' other than minor isolated areas where it may be unavoidable, requires 'Specific Design' as specified in Design Note PG -B2.

Bricks across the heads of openings and on sills are to appear uniform in width.

Blending of Bricks

The final appearance of the brickwork on this project is of the utmost importance to both the company and the client. Bricks are to be thoroughly blended, selecting and laying from a minimum of 3 pallets, to ensure an even spread of colour throughout the veneer, and the



bricklayer is to take measures to achieve this goal, including stepping back and viewing the veneer as it progresses.

If it appears there will be a shortage of bricks on the job, STOP laying immediately until more are delivered in order that new ones, which may be from a different batch, can be blended in properly.

Mortar Joints

The width of the mortar joints shall be determined by measuring 20 bricks together (in all dimensions), and incorporating a mortar joint as close to 10mm as possible and within a +/- 2mm tolerance. The minimum permitted mortar joint thickness is 7mm and a maximum permitted thickness for the PREMIER product is 16mm. The job is then to be set out using a 'Storey Rod' so that all joints, including perpend joints, are the same thickness. Allow for a 5mm gap between the top of the bricks, and the soffit lining, top vent holes not required. If the top bricks are generally closer than 5mm to the underside of the soffit, then insert 75mm x10mm vents at 800mm c/s horizontally, in the second brick from the top brick. Where the height and brick size results in the need to cut bricks horizontally for the top course, discuss the possibility of a soldier course on the top row with the contracts manager, to provide what may be a more acceptable appearance.

Unless otherwise specified, all mortar joints are to be raked to a depth of 4mm, tooling smooth is optional. The maximum permitted depth is 10mm.

All bed and perpend mortar joints are to contain a full spread of mortar; any holes in the finished veneer are to be minimal and filled on completion.

Mortar

All mortar to be mixed in accordance with NZS4210, using a mechanical mixer for 4 – 8 minutes. The sand, cement, water ratios of the mix need to be recorded, and consistent for the whole project. The mix needs to be as wet as practically possible to ensure good bond strength in the veneer, and aid the 'hydration' process.

Discard any mortar that is older than 1.5 hours. Tool the mortar when it can hold a clear thumb print to ensure an even coloured mortar.

If a coloured mortar has been specified, use quality Premier oxides and accurately measure. Construct a sample panel or panels, that can be referred back to, prior to commencing the work and obtain sign off from the client and contracts manager in regards to acceptance of the colour.

Brick Cavity

Unless specified otherwise, the brick cavity will be 50mm from the frame to the inside face of the veneer.

Wash-outs are to be installed every 10th brick, and one at each corner around the base of the veneer. The cavity is to be thoroughly cleaned on a daily basis as the job progresses. Minimum cavity 40mm (clear) and maximum 75mm – where exceptions occur; adjust length of ties accordingly.



PREMIER GROUP
Head Office PO Box 37172, Hamilton 3240
P +64 7 850 8417 F +64 7 850 9180
0800 22 22 98
Info@premier-group.co.nz
www.premier-group.co.nz



Brick Ties

The brick ties are to be installed in accordance with the positioning mentioned previously in this specification. In addition, brick ties are to be installed within 300mm of the perimeter of all openings, control joints, base of the veneer and the top of the veneer.

The screw on the brick ties is to be installed hard against the framing and its full length into the stud or alternative acceptable framing timber.

Where sheet material is installed over the framing timber adjust the length of the screws accordingly.

Control Joints

Control joints are required in concrete masonry veneers to manage shrinkage cracking. If control joints are not installed in the PREMIER concrete masonry veneers, any issues to do with the veneer, in particular cracking becomes the owner's responsibility and the veneer becomes non-compliant with this specification.

There are 3 options available for installing 'Control Joints'

(Note: a Control Joint is simply a controlled crack, the 10mm gap is only required to match a mortar joint).

1. A vertical saw cut to a depth of 30mm.
2. A vertical or zig-zag 10mm gap with a foam backing rod and flexible sealant.
3. A vertical or zig-zag 10mm gap with a foam backing rod and 20mm of mortar.

Location:

Control Joints are to be installed in the following locations in the veneer.

- Window openings less than 1.8m wide – control joint one side
- Window openings over 1.8m wide – control joints down both sides.
- Where no openings are present, no greater than 6.0m spacings.
- Where corners are bonded, no greater than 3.0m from the corner.

Control joints 10mm wide, are to be installed as per plans, unless otherwise directed by the Construction Manager.

Refer to diagrams.

Joint Reinforcement

It is recommended that consideration be given to installing MASONS 4.0mm Bricklock STR and CNR joint reinforcement to provide the veneer with additional strength to help prevent any cracking occurring in the veneer. Generally it is positioned at approximately 800mm c/s through the height of the veneer, and must not be installed in the same mortar joints as the brick ties are located.

Window and Door Sills

All window sills are to be consistent in appearance throughout the veneer. There is no set requirement on the slope or amount of overhang and unless detailed on the plans otherwise, the slope of the sill bricks should be 15°, +/-1°, door sills can be flat. It is recommended that bricks overhang the sills by 35mm +/- 5mm. All bricks are to be of a similar width, as are mortar joints.



PREMIER GROUP
Head Office PO Box 12177 Hamilton 3248
P +64 7 850 8017 F +64 7 850 9180
0800 22 22 98
info@premier-group.co.nz
www.premier-group.co.nz

Weep and Vent Holes

Around the base of the veneer, install weep holes every 800mm, 75mm high in the perpendicular joint, or, 1000sqmm's per 1.0m of veneer length. Install vent holes to match in the second row of bricks from the top only if a 5mm gap has not been left.
Only sills over 2.4m in length require vents under the sill bricks at 800mm crs.

Cleaning

The brick veneer is to be thoroughly cleaned using fresh clean water, as the job progresses. Any staining on the brickwork is to be removed by the bricklayer in conjunction with the brick supplier if necessary. Premier Acid Wash is available if required.
Remove all debris associated with bricklaying, unused materials, and elements, from the site upon completion.

Efflorescence (Salting)

The term 'efflorescence' refers to the deposits of white calcium salts on the surface of the bricks. This can come from the mortar as well as from the bricks. Keeping the bricks and the brick veneer dry during the construction process is essential in helping prevent the occurrence of salts on the surface.
Regardless of this statement, the proper curing of the mortar is without question the number one priority and during hot weather, the light wetting of bricks prior to being laid is an important step in the curing process.

Sealing the Veneer

It is recommended that once the veneer is completely dry, that it is sealed using Premier Sealer. This will help reduce the risk of efflorescence (salting) and will help retain the colour. Adhering to the application instructions is important. Premier Gloss Sealer will darken the brick colour (wet look) whereas Premier Stone & Concrete Sealer will retain the dry look.

Inspections and Completion

It is the bricklayer's responsibility to ensure that all flashings have been installed correctly, and inspected, prior to being covered by the brickwork. A half-height inspection is to be called for at appropriate times as the job progresses along with a final inspection upon completion. The veneer is to be 'Certified' in the Record of Works held by council as compliant with Design Note PG-B1 (Specific Design), upon completion by a Licenced Building Practitioner – (Bricklaying).



MAINTENANCE SCHEDULE

Brick veneer is a cladding, correctly installed, that requires little in the way of maintenance over a long period of time. However, if one follows the following simple procedures, the performance of the veneer as a cladding and its appearance will ensure it meets all requirements.

Cleaning

The exterior of the brick veneer must be washed down at least once a year using a soapy water and soft scrubbing brush. It may be given a light water-blast to remove stubborn dirt particles.

Spray for spiders if necessary; check for and remove all spider webs at least twice a year.

Weep Holes

Check all weep and vent holes around the top and bottom of the veneer annually to ensure they are not blocked up with dirt, grass, insects and other debris - clean where required.

Mortar Joints

Check mortar joints annually for erosion and deterioration, if there is some obvious deterioration or loose mortar, consult a bricklayer and have the mortar joints in question repointed.

All individuals involved in the design, building and laying of PREMIER concrete masonry brick veneers need to read this document prior to commencing a project and take ownership of their involvement. Should a situation develop that contravenes Design Note PG-B1, stop and resolve the issue prior to proceeding.

Signed as read.....Date.....

Print name.....

This document has been written and prepared by John Oliver, Building Consultant, Lifetime Promotions Ltd; specialist in brick veneer construction and author of John Oliver's BRICK BOOK



PREMIER GROUP
Head Office PO Box 12572 Hamilton 3248
P +64 7 850 8437 F +64 7 850 9180
0800 22 22 98
info@premier-group.co.nz
www.premier-group.co.nz

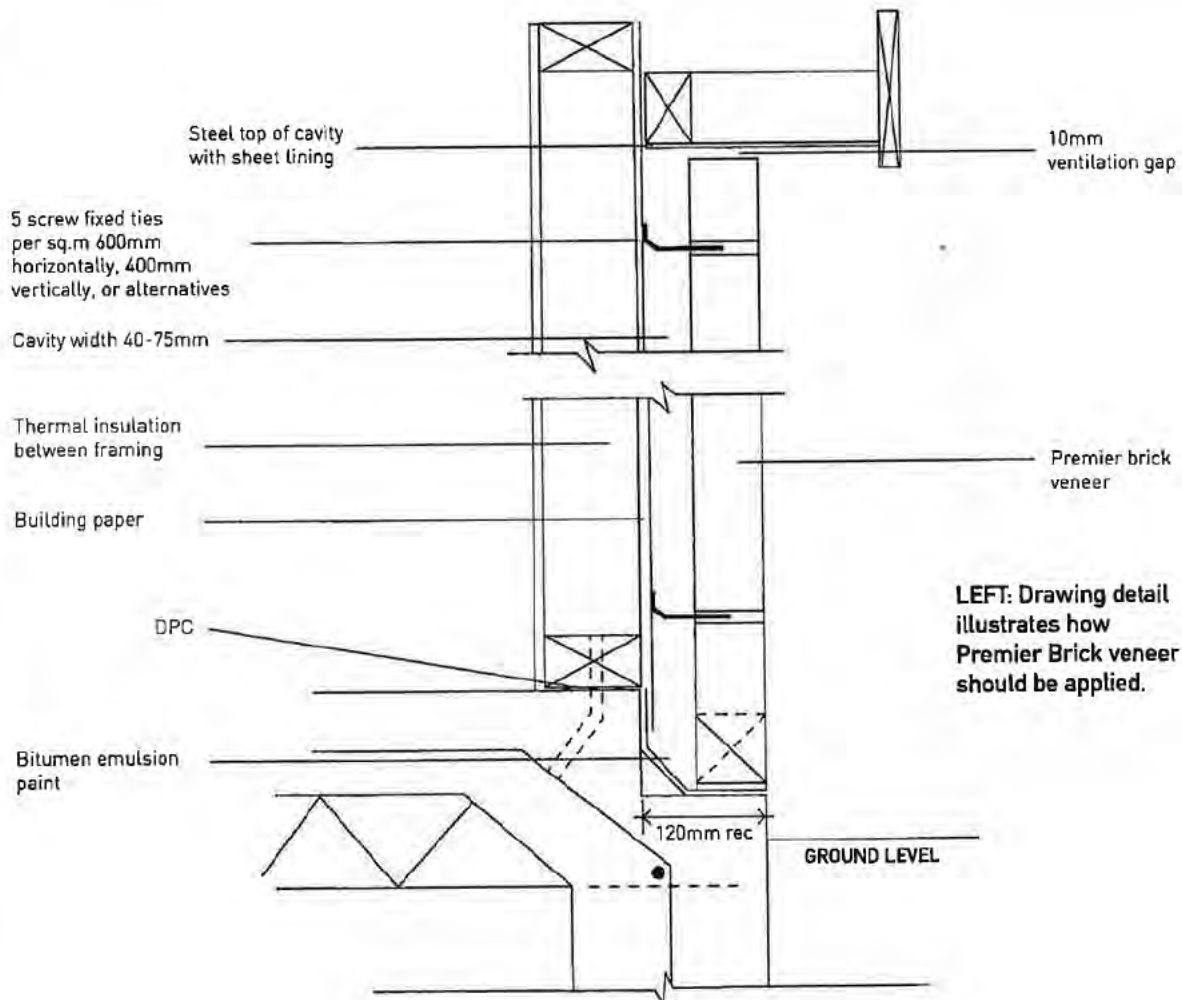


STRENGTH. ENDURANCE.
QUALITY. BEAUTY.



GROUP INTERNATIONAL
For Beautiful Landscapes

PREMIER BRICK VENEER CONSTRUCTION DETAILS



LEFT: Drawing detail illustrates how Premier Brick veneer should be applied.

PLEASE NOTE:

- Any moisture can escape through weepholes as per NZS3604.
- Required ventilation top and bottom is 1000sq mm per metre length of wall.

CONTROL JOINT INFORMATION

PREMIER BRICK SPECIFICATIONS

CONTROL JOINTS: If control joints are not installed, Premier Group will not be held liable for any random cracking in either brick or mortar, that may result from ground settlement or drying. Please do not use mortar any stronger than 15 MPa.

KEEP BRICKS DRY before and during laying. Wet bricks will increase the risk of efflorescence in the mortar and shrinkage.

BLENDING the bricks from 3 or more pallets as you lay is recommended to ensure an even overall appearance.

QUALITY: If for some reason, you are not completely satisfied with the quality of the bricks please contact Premier Group immediately. We will not accept any claims for labour costs to remove or re lay bricks that have already been laid. Our warranty is limited to free replacement of product, deemed to be unsatisfactory by Premier Group before laying takes place. Terms and conditions apply.

COLOUR: Premier Bricks are manufactured from natural materials for natural results. Colour variation is normal and is part of the natural beauty of the product.

EFFLORESCENCE: Premier Bricks can display "whitening" (efflorescence). This occasional and naturally occurring phenomenon is characteristic of many natural products and will gradually diminish in time. You can use a Premier Sealer after laying to reduce efflorescence.

SEALING: When dry, you can choose to seal your bricks with a Premier Sealer. This will help retain colour, reduce maintenance and reduce efflorescence. If you choose to seal, please follow instructions very carefully.

All masonry products will contract and expand slightly due to change of temperature, drying and ground settlement. This may cause cracking. To avoid any risk of unsightly cracking please follow these instructions.

1. Control joints should be spaced at 5-6 meters apart. Consult NZS 4210.
2. In long walls (unbroken by windows) joints should be spaced to produce panels having length $1\frac{1}{2}$ to 2 times their height.
3. Windows and door openings up to 1.8m width require a "Zig Zag" control joint in line with only 1 jamb. (FIGURE 1).
4. Openings wider than 1.8m should have control joints in line with both jambs (FIGURE 2).
5. If there are no openings within 6m of a corner then install a control joint within 3m of the corner.

"ZIG ZAG" CONTROL JOINTS

1. Scrape out all mortar prior to initial set along the "Zig Zag" line where control joints are needed.
2. Install a 12 or 15mm diameter P.E.F (Polyethylene Foam) rod continuously into the joint 30mm back from face of brick to form a backing strip (FIGURE 3).
3. Leave the joint without mortar as long as possible to allow any shrinkage to occur.
4. Install 20mm of matching mortar to complete the control joint.
5. If you install the appropriate number of control joints, any visible cracking will be minimised.
6. If cracks widths are not acceptable, the control joints can be re-mortared or you can fill the crack with matching silicone.

PLEASE NOTE: Consult NZS4210 for more information if required.

VERY IMPORTANT NOTICE:

- Please keep bricks covered and dry before and during laying or serious variation in mortar colour could occur! (Use pallet shrouds provided)
- When handling straight edge bricks, please take care not to scratch the face of the brick
- Ensure that you lay all bricks "face out".
- During winter months, we advise that you cease laying at 3pm and that you carry out cuts and set out for the following day. This will minimise any risk of moisture bleeding from the bricks and affecting the mortar colour.

FIGURE 1

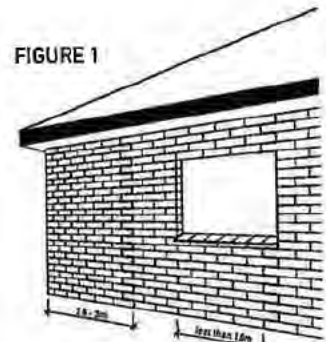


FIGURE 2

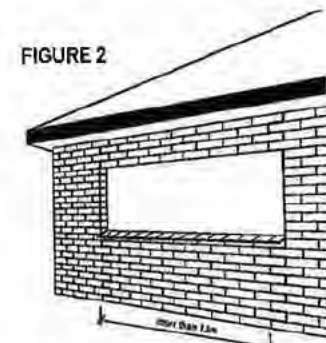
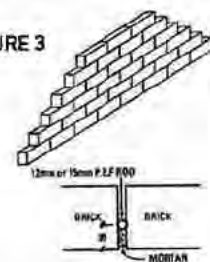


FIGURE 3



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CALL NOW FOR MORE INFO

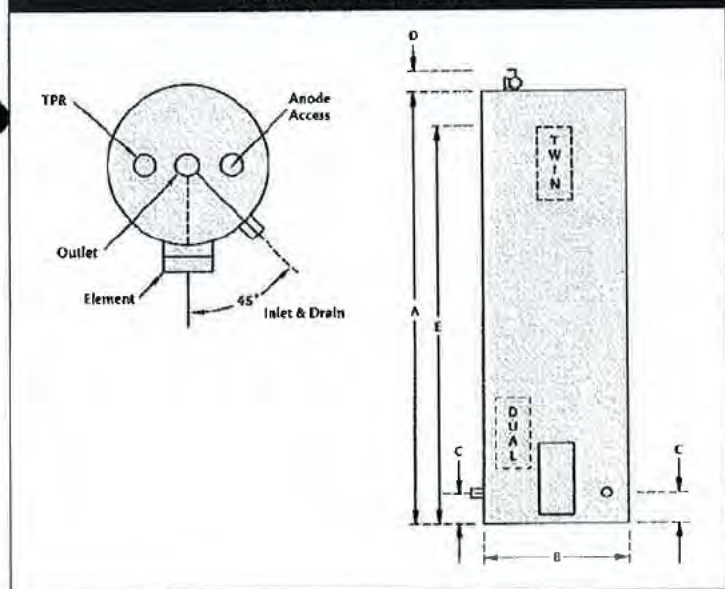
Superior Quality
Venues



MAINS PRESSURE ELECTRIC

PRODUCT	WARRANTY* See page 40	MODELS									
Rheem Single Element	5 Years	31202519	31204515	31209015	31213513	31213515	31218013	31218015	31225015	31230015	
Rheem Twin Element	5 Years						31218015				
Dual Bottom Element	5 Years										
Rheem Optima	10 Years						91318015				
Rheem Optima Twin Element	10 Years										
Initial Storage Capacity	Litres	25	45	90	135	135	180	180	250	300	400
Boost Capacity (Twin Element)	Litres						45		50	50	90
Height	A (mm)	385	535	955	1335	935	1720	1166	1560	1825	1890
Width	B (mm)	405	488	488	488	580	488	580	580	580	690
	C (mm)	110	80	76	75	75	75	75	75	75	80
	D (mm)	N/A	120	120	120	120	120	120	120	120	N/A
	E (mm)										1559
Approx Weight Empty	kg	15	24	35	50	53	65	65	85	95	111
Relief Valve Setting	kPa	1400	1400	1400	1400	1000	1400	1000	1000	1000	1000
Without Expansion Control Valve	kPa	1120	1120	1120	1120	800	1120	800	800	800	800
Water Connections		RP 1/4 /20	RP 3/4 /20	RP 3/4 /20	RP 1/2 /20	RP 1/4 /20	RP 1/4 /20	RP 3/4 /20	RP 3/4 /20	RP 3/4 /20	RP 3/4 /20
Element Rating	kW	2.4	3.0	3.0	2.0 or 3.0	3.0	2.0 or 3.0	3.0	2.0 or 3.0	3.0 or 5.0	4.8

CYLINDER DIMENSIONS



1. Inlet/Outlet and TPR valve are side mounted on left-hand side of 31202519 and A46240088.
2. Inlet/outlet and TPR valve are side mounted on right-hand side of 91318015 and 91330025.



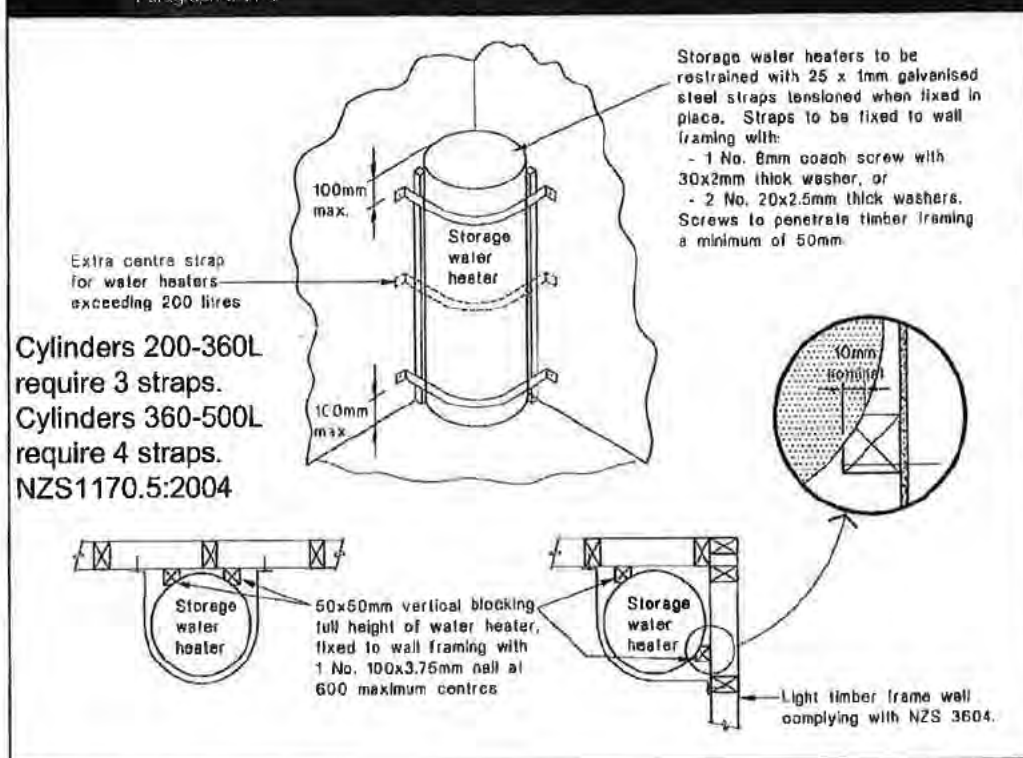
SPECIFICATIONS ELECTRIC

kW	RECOVERY ON A 50°C RISE	AMPS
2.0 kW	34 LITRES PER HR	8.7AMP
2.4 kW	40 LITRES PER HR	10.4AMP
3.0 kW	51 LITRES PER HR	13.1AMP
3.6 kW	62 LITRES PER HR	15.7AMP
4.8 kW	82 LITRES PER HR	20 AMP
5.0 kW	85 LITRES PER HR	21.8AMP
6.0 kW	103 LITRES PER HR	25AMP
2 X 3.0 kW	103 LITRES PER HR	26.2 AMP
2 X 5.0 kW	171 LITRES PER HR	43.6 AMP

0661/17
APPROVED

Amend 6
Feb 2004

Figure 14: Seismic Restraint of Storage Water Heaters 90 – 360 litres
Paragraph G11.4



6.11.4 Structural Support

NZBC B1.3.2 requires *building elements* (including *storage water heaters*) to be adequately supported including support against earthquake forces. The method illustrated in Figure 14 is acceptable for *water heaters* up to 360 litre capacity. Where fittings and pipework are attached to the *water heater* through the supporting platform or floor a 50 mm minimum clearance shall be provided between the fitting and the support structure.

6.11.5 Another acceptable solution for securing *storage water heaters* against seismic forces is given in Section 203 of NZS 4603.

6.12 Hot water pipe sizes

6.12.1 The *diameter* of hot water supply pipes from *storage water heaters* and to *sanitary fixtures* shall be no less than those required by Table 4.

6.13 Wet-back water heaters

6.13.1 Wet-back *water heaters* shall be:

- Connected only to *open vented storage water heaters*, or a *water storage vessel* (see Figure 15), and
- Made of copper.

6.13.2 Copper pipework shall be used between the wet-back and the *water tank*.

Third Edition
Dec 2007

Amend 6
Feb 2004

5.0 Water Supply

5.1 Water tanks

5.1.1 To ensure the health and safety of people in the event of the *water main* supply being interrupted, *buildings* having the classification of Community Care (e.g. hospitals, old people's homes, prisons) shall be provided with cold water storage of no less than 50 litres per person.

COMMENT:

1. Cold water storage is required only to maintain adequate personal hygiene within *buildings* where the principal users are legally or physically confined.
2. Refer to the NZBC A1 for classification of *buildings*.
3. *Network utility operators* cannot guarantee a continuous supply of water. *Building owners* may therefore wish to provide water storage to *buildings* having a classification other than Community Care, to enable continuation of a business, service, industrial process or other reason.
4. The "litres per person" is based on a daily use of 20 litres WC, 25 litres washing, 5 litres drinking.

5.2 Water tank installation

5.2.1 Location

Water tanks in roof spaces shall be located and supported as detailed in Figure 4.

5.2.2 Overflow pipes

Water tanks shall have an overflow pipe to discharge any overflow to a visible place within the same property that does not create a nuisance or damage to *building elements*. The overflow pipe shall be sized so that the discharge capacity is no less than the maximum inlet flow. The outlet of the overflow pipe shall not permit the entry of birds or vermin. Overflow from a WC cistern may discharge internally into a WC pan.

5.2.3 Safe trays

Performance E3.3.2 requires water to be prevented from penetrating another *household unit* within the same *building*. An acceptable method of preventing water damage is to locate a safe tray below the *water tank* (see Figure 4). The safe tray shall incorporate an overflow pipe with a minimum *diameter* of 40 mm. Where the tank overflow discharges

into the safe tray the *diameter* of the drain shall be greater than the overflow pipe from the tank and comply with Paragraph 5.2.2.

5.2.4 Covers

Covers shall be provided to:

- a) *Potable water tanks* to prevent contamination and the entry of vermin, and
- b) All tanks located in roof spaces to prevent condensation damaging *building elements*.

5.2.5 Access

Covers to *water tanks* shall be removable or shall contain a covered opening to allow access for inspection and maintenance. A minimum height clearance of 350 mm above the opening is necessary for easy access.

5.2.6 Supporting structure

The supporting structure for *water tanks* shall be protected from damage due to condensation where durability of the supports could be compromised by moisture. A material such as H3 treated timber shall be installed under the *water tank*.

5.2.7 Structural support

NZBC B1 requires *water tanks* to be adequately supported including seismic restraint. The method illustrated in Figure 4 is acceptable for *water tanks* up to 150 litre capacity and the maximum height to breadth ratio of 1:1.

5.3 Water pipe size

5.3.1 Pipe sizing

Pipes shall be sized:

- a) To achieve the flow rates given in Table 3, or
- b) Using the sizes given in Table 4.

COMMENT:

Manufacturers' literature must be referenced for pressure and flow information on tempering valves and tapware. Outlets (e.g. shower mixers and showerheads) must be appropriate for the available flow and pressure. Note the limitations on lengths and pipe sizes given in Table 3.

Notes: Water tanks to be restrained by 4 chocks.
Maximum tank ratio h:l (height not to exceed diameter)
Water tank maximum capacity - 150 litres
Support framing to NZS 3604.

(a) Structural support

(b) Pipe connections

Figure 5 illustrates how to determine available head to the outlet or valve.



318581D-10
November 2012

INSTALLATION INSTRUCTIONS & OWNERS GUIDE

RHEEM MAINS PRESSURE ELECTRIC HOT WATER HEATERS

Congratulations for choosing a Rheem Water Heater

It is important that you take a few minutes
to read this booklet as it may save you
time and trouble later.

If you require any further information or your
water heater needs to be serviced, please contact the
Rheem Service Department on 0800 657 335,
or the nearest service centre
(look in the Yellow Pages under Plumbers)
Or visit www.rheem.co.nz

Important to the Installer

Do not leave this booklet inside the element cover
after installation

Please leave the booklet with the water heater's owner

SAFETY

On all models, a Temperature and Pressure Relief valve is supplied with each water heater. It can be found inside the front cover and must be mounted on top of the water heater.

Also fitted to the water heater is a thermostat, which incorporates an over-temperature thermal cut-out device.

Warning: The operation of the thermal cut-out indicates a possible dangerous situation. Do not reset the thermal cut-out until the water heater has been serviced by an authorised service person.

These safety devices must not be tampered with, or removed, and under no circumstances operate the water heater unless both devices are fitted.

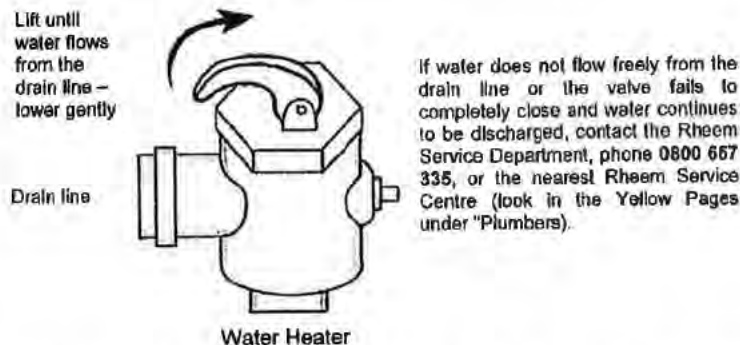
REGULAR CARE

MANUALLY OPERATING THE TEMPERATURE AND PRESSURE RELIEF VALVE:

Valve manufacturers recommend that you operate the easing lever (see diagram. 1) on the Temperature and Pressure Relief valve once every six months. **It is very important that you raise and lower the lever gently.**

Warning: To ensure the relief valve is working correctly, operate the relief valve easing lever at least every six months. Failure to do this may result in the water heater over-pressurising.

DIAGRAM 1



GOING ON HOLIDAYS:

If you plan to be away from home for one or two nights, we suggest that you leave the water heater switched on. However, if you plan to stay away more than a few nights, conserve energy by switching the water heater off at the isolating switch, or at the main switchboard. In locations where freezing could occur, you should leave the water heater turned on.

SAVE A SERVICE CALL

CHECK THE ITEMS BELOW BEFORE MAKING A SERVICE CALL. YOU MAY BE CHARGED FOR SERVICE IF THE FAULT IS NOT RELATED TO THE WATER HEATER MANUFACTURE OR PARTS SUPPLIED WITH THE WATER HEATER BY RHEEM.

WATER DISCHARGING FROM EXPANSION CONTROL VALVES

It is normal for the cold water expansion valve and the temperature and pressure relief valve to discharge a small quantity of water during the heating cycle. If either of these valves discharge more than a bucket full of water in 24 hours, one of the following may be the cause.

- **Continuous dribble**
Try gently raising the easing lever on the relief valve for a few seconds. This may dislodge small particles of foreign matter and clear the fault.
- **Heavy flow of hot water until the water is cold – then stops while the water reheats**
Immediately turn off the electricity supply to the water heater. Call the Rheem Service Department or look in the Yellow Pages under "Plumbers" for your nearest Rheem Service Centre or www.rheem.co.nz to arrange an inspection.
- **A steady flow of water (often at night)**
This may indicate that your cold water pressure sometimes rises above the design pressure of the water heater. A Pressure Limiting valve should be installed, or if one is installed, it may need replacing.

PIPE SIZES

The cold water line to the water heater should be the same size or bigger than the hot water line from the water heater. For best results, choose the most suitable pipe size for each individual application.

COLD WATER EXPANSION VALVE

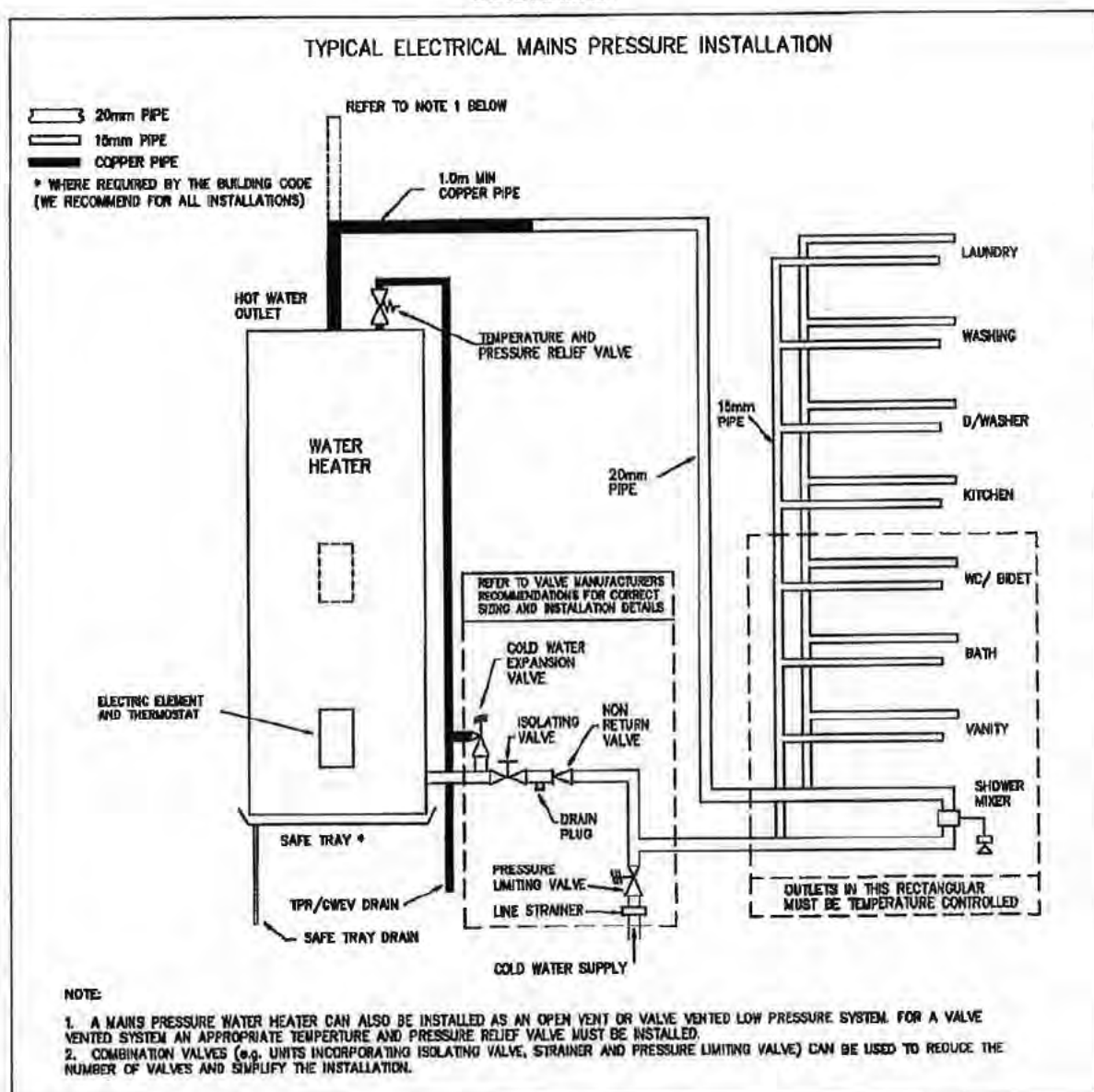
A cold water expansion valve must be fitted to the cold water line to the water heater.

TEMPERATURE AND PRESSURE RELIEF VALVE

When fitting the temperature and pressure relief valve, ensure the probe has not been bent. Seal the thread with PTFE tape, or similar, as recommended by the valve manufacturer and screw the valve into the off-centre socket. Do not use a wrench on the valve body – use the spanner flats provided. Drain the TPR valve with a pipe the same size as the valve outlet. The drain must run downwards to a visible point outside the house, preferably over a gully trap. In locations where the pipe exceeds 3 metres unbroken length, or freezing could occur, an air break must be provided within 300 mm of the TPR valve.

Warning: The drain line from the TPR valve must be in copper. A Rheem mains pressure water heater must **not** be installed and operated without a suitable (valve that complies with AS 1357.1) temperature and pressure relief valve. Under no circumstances block the outlet of this valve or its drain pipe.

DIAGRAM 2:



HARSH WATER AREAS

Rheem water heaters are designed for use in areas where the Total Dissolved Solids (TDS) content of the water supply is less than 2500 mg/L.

In areas where the TDS exceeds 600 mg/L it is possible the standard magnesium anode fitted to the water heater, may be excessively active. To alleviate this, the magnesium anode should be replaced with an aluminium anode. Where the TDS of the water is less than 40 mg/L, such as when the water has been deionised or is from an alpine supply, a high potential anode should be used. The changing of anodes must be carried out by a plumber or qualified service person.

CAUTION

If your water supply has a TDS greater than 600 mg/L and the anode has not been changed, there is a possibility of hydrogen gas accumulating in the top of the water heater during long periods of no use.

If, under these conditions, the water heater has not been used for two or more weeks the following procedure should be carried out before using any electrical appliances (e.g. automatic washing machines and dishwashers) which are connected to the hot water supply.

The hydrogen, which is highly flammable, should be vented safely by opening a hot tap and allowing the water to flow. There should be no smoking or naked flames near the tap whilst it is turned on. Any hydrogen gas will be dissipated as indicated by an unusual spurting of the water from the tap. Once the water runs freely again any hydrogen in the system will have been released.

SATURATION INDEX

The saturation index is used as a measure of the water's corrosive or scaling properties. In a scaling water supply calcium carbonate is deposited out of the water onto any hot metallic surface. When scaling water has a saturation index greater than +0.40 an expansion control valve must be fitted on the cold water line after the non-return valve.

Where the saturation index exceeds +0.80, low watts density elements should be used. Where the saturation index is less than -1.0, a corrosive resistant heating unit should be used (contact your local Rheem Service Department or an authorised service person).

Scaling water is water that containing levels of calcium carbonate (total hardness in excess of 200 mg/litre at any time when the water heater is operating) Scaling water can block and prevent the pressure & temperature relief valve from operating, resulting in damage to the water heater storage cylinder and water components.

A cold water expansion control valve must be fitted where in all areas with scaling water to assist in preventing blockage of the pressure and temperature relief valve.

⚠ Warning: Failure to install an expansion control valve where scaling water conditions occur may result in the water storage cylinder failing or under certain circumstances exploding.

To avoid damage to the storage cylinder and components Rheem strongly recommends scaling water be treated before entering the water heater by fitting appropriate water filters, conditioners, etc – refer to your local water authority for information on water in your area. A build up of white sediment on the hot taps or shower rose can be indicative of scaling water. Contact Rheem if this condition is observed.

⚠ Warning: Damage caused by scaling water can affect the Rheem warranty.

The Rheem warranty of this water heater will not cover resultant faults on components, including storage tank, due to the effects of sludge and/or sediment as a result of connection to a water supply from silted or untreated sources, i.e. springs, dams, bores, rivers or town supplied from a bore.

WATER HEATERS NOT INSTALLED IN ACCORDANCE WITH THE ABOVE ADVICE WILL NOT BE COVERED BY THE RHEEM WARRANTY.

- (i) Fair wear and tear from adverse conditions (for example corrosion).
- (j) Cosmetic defects .

2.6 If you require a call out and we find the fault is not covered by Rheem Warranty you are responsible for Rheem Service Centre call out costs if you wish to have the relevant component repaired or replaced by Rheem that service will be at your cost.

2.7 Subject to statutory provisions to the contrary this warranty excludes any and all claims however arising including under contract or tort for damage to furniture carpet walls foundations or any other consequential loss or incidental expenses either directly or indirectly due to leakage from the Rheem water heater or due to leakage from fittings and/or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure that were not reasonably foreseeable as liable to result from the failure.

2.8 This warranty excludes to the extent permissible all implied warranties set out in the sale of goods act 1908 (new Zealand) and all guarantees set out in the consumers guarantees act 1933 (New Zealand) to the extent that the goods are acquired for the purpose of resupply in trade consumption in the course of a process of production or manufacture or repairing or treating in trade other goods or fixtures on land.

WARRANTY INFORMATION

WARRANTY EXCLUSIONS:

The Rheem Warranty does not cover repair or replacement work to the water heater or its components caused directly or indirectly by:

1. Accidental damage
2. Acts of God
3. Failure due to misuse
4. Incorrect installation
5. Attempts to repair the water heater, other than by a Rheem Authorised Service Centre, or the Rheem Service Department
6. Excessive water pressure, negative pressure or excessive heat input
7. Non compliance with a) the Rheem Installation Instructions, b) relevant statutory regulations, c) New Zealand Building Code requirements.

This warranty does not include any additional costs, for removing a heater where dismantling or removal of other materials is required, that is, walls, doors or roofs or trap doors. Where the water heater is installed in a position that does not allow ready and safe access the cost of that access including the cost of materials and/or safety equipment shall be the owner's responsibility, including equipment to bring the water heater to the floor or ground level. Rheem New Zealand Limited will not pay claims for damage to furniture, carpets, walls, foundations or any other consequential loss either directly or indirectly due to leakage or other causes from a water heater.

Repairs to the water heater due to chemical/scale formation in waterways when the heater has been connected to a harmful water supply as outlined on page 7 of the Owner's Manual.

Service under this warranty can be provided by a **RHEEM AUTHORISED SERVICE CENTRE**.

Such services will be provided during their normal business hours.

Additional mileage and cartage charges shall be made for any water heater installed in a location exceeding 25km from the nearest Rheem Service Centre.

Note: You may have other rights in addition to this warranty under the "Consumer Guarantees Act 1993".

RHEEM SERVICE DEPARTMENT, 475 Rosebank Road, Avondale, Auckland

Phone: 0800 657 335, Fax: 09 829 0222

Or consult the Yellow Pages under "Plumbers" for your nearest Rheem Authorised Service Centre



Date Received By

21 NOV 2016

CUSTOMER SUPPORT

ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part

Single Component Undertile Waterproofing Membrane

BRANZ Appraised

Low VOC content – meets Green Building Council of
Australia Green Star IEQ-13 requirements

Fast drying one part acrylic membrane



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 New Zealand 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. Country specific recommendations, depending on local standards, codes of practice, building regulations or industry guidelines, may effect specific installation recommendations. 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 WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part Undertile Waterproofing Membrane



PRODUCT DESCRIPTION

Ardex WPM 001 (Superflex Bathroom & Balcony Premixed 1 Part) 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.

Ardex WPM 001 meets the Green Building Council of Australia Green Star IEQ-13 requirements for Architectural Sealant when tested in accordance with SCAQMD Method 304-91 Determination of Volatile Organic Compounds (VOC) in Various Materials as referenced by South Coast Air Quality Management Division (SCAQMD) Rule 1168.

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/NZ 4858: 2004 Wet Area Membranes
- 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 AS/NZ 4858: 2004 Wet Area Membranes.
(Ref: CSIRO Report 3779)

*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 (HydrEpoxy 300) at a coverage rate of 3.0 square metres per litre and allowed to cure overnight. External wet concrete should be allowed to dry thoroughly or sealed with one coat of Ardex WPM 300 as above.
Renders 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: 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).

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 ²	7.5m ²	20kg(15L) unit
WALLS	0.25mm	0.5mm	0.5mm	30m ²	15m ²	20kg(15L) unit

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.

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 7.5-15m² (based on two coats) depending on area requirements between wall and floor surfaces to be treated. Refer Table 1.

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.

SAFETY 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-hazardous and non dangerous. It may produce discomfort of the eyes, respiratory tract and skin. Do not breathe gas/fumes/vapour/spray. Avoid contact with skin. Wear eye/face protection. In case of contact with eyes, rinse with plenty of water and seek medical advice.

ADDITIONAL INFORMATION IS LISTED IN THE MATERIAL SAFETY DATA SHEET.

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 - 1 Part 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 mm per coat depending on product and application (Refer Table 1).

Critical Areas:

INTERNAL WET AREAS

1. Construction should be in accordance with Australian 3740 - 2004 Waterproofing of wet areas within residential buildings.
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).

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 cure silicone sealant spread approximately 6mm 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. Spreading the sealant to 6mm on either side of the joint.
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 150mm 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

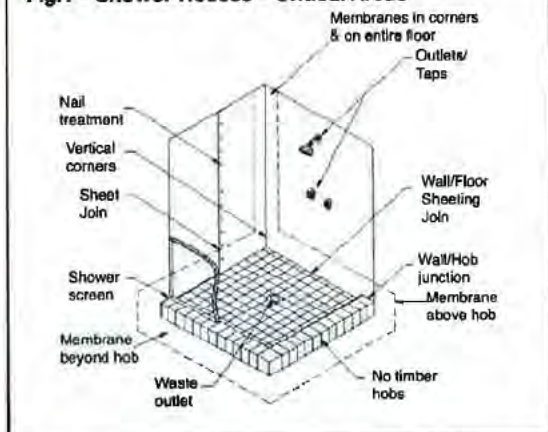
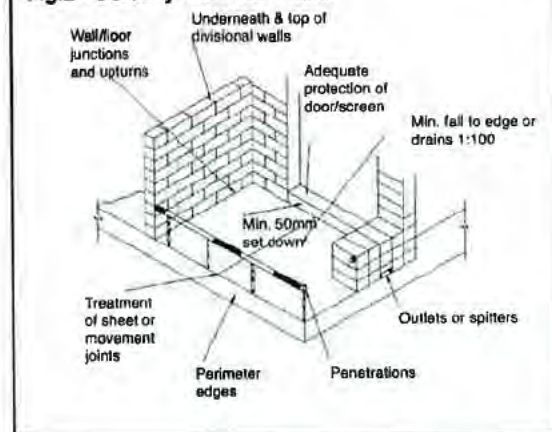


Fig.2 - Balcony - Critical Areas



BALCONIES AND DECKS

1. Ensure that the deck is constructed with falls to edge/drains of min 1:100 (ie. 20mm in 2m) 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, or other items such as planter boxes.
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. 30mm 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 (Sheltercoat/ Superflex 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 6m² 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 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.

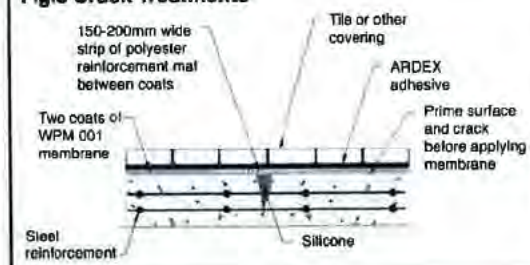
Cracks 2-6mm:

(Refer Fig. 3) Prepare and prime the crack as above. Apply a bead of neutral cure silicone into the crack and extend it 6mm either side. Apply a 300mm wide band of Ardex WPM 001 equidistantly across the crack along the entire length of the crack. Place a 190mm wide band of Ardex "Deckweb" 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 Crack Treatments



ARDEX WPM 001

Superflex Bathroom & Balcony Premixed - 1 Part Undertile Waterproofing Membrane

Movement/construction joints

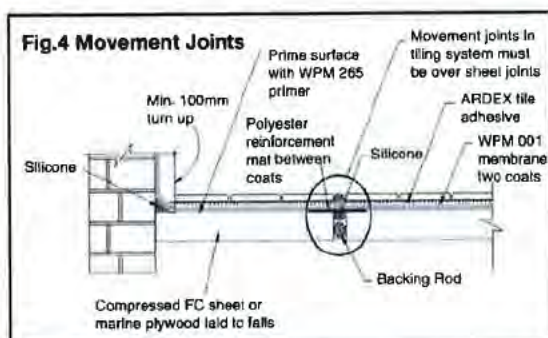
Movement joints (<6mm)

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 6mm 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 190mm wide band of Ardex "Deckweb" 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 120mm of Ardex Coving Bandage. 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 and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates in coving areas and corners. Smooth over the silicone so that it extends 6mm up the wall and 6mm 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 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 and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates. Smooth over the silicone so that it extends 6mm up the wall and 6mm over the floor and allow to touch dry. Place a 190mm wide band of 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. 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 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 sheet 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 150 mm up all perimeter walls.

Prime the surface with Ardex WPM 265 and allow to dry.

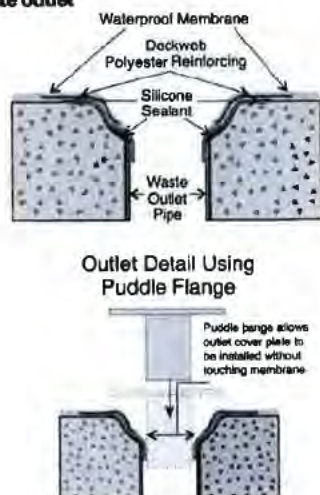
Apply the first coat over the primed surface and allow it to dry (1-2 hours at 23°C, 50%RH) before applying a second coat in an opposite direction. In shower recesses a drainage flange must be installed on all timber/sheeted floors, and are strongly recommended on all other substrates. Where possible 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 and allow to dry. Surfaces of the 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 30mm. 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



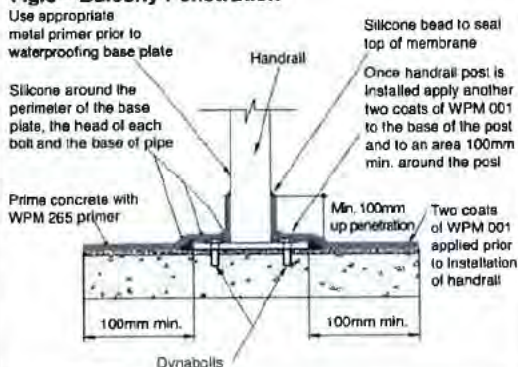
Balcony penetrations (Refer Fig.6)

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	8.5
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
Full Cure	1.92 MPa
Elongation at Break 7 days dry AS1145	780%

Conforms to requirements of class 3 membrane of AS/NZ 4858: 2004 Wet Area Membranes.

NOTE: Most of the tests have been carried out in the Ardex laboratory under standard conditions (23±2°C, 50±5% R.H)

SCALE, 1 : 500

EXPOSURE ZONE: B

NOTE: LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM.



WATKINS DISTRICT COUNCIL
Building Consent Number

69/17

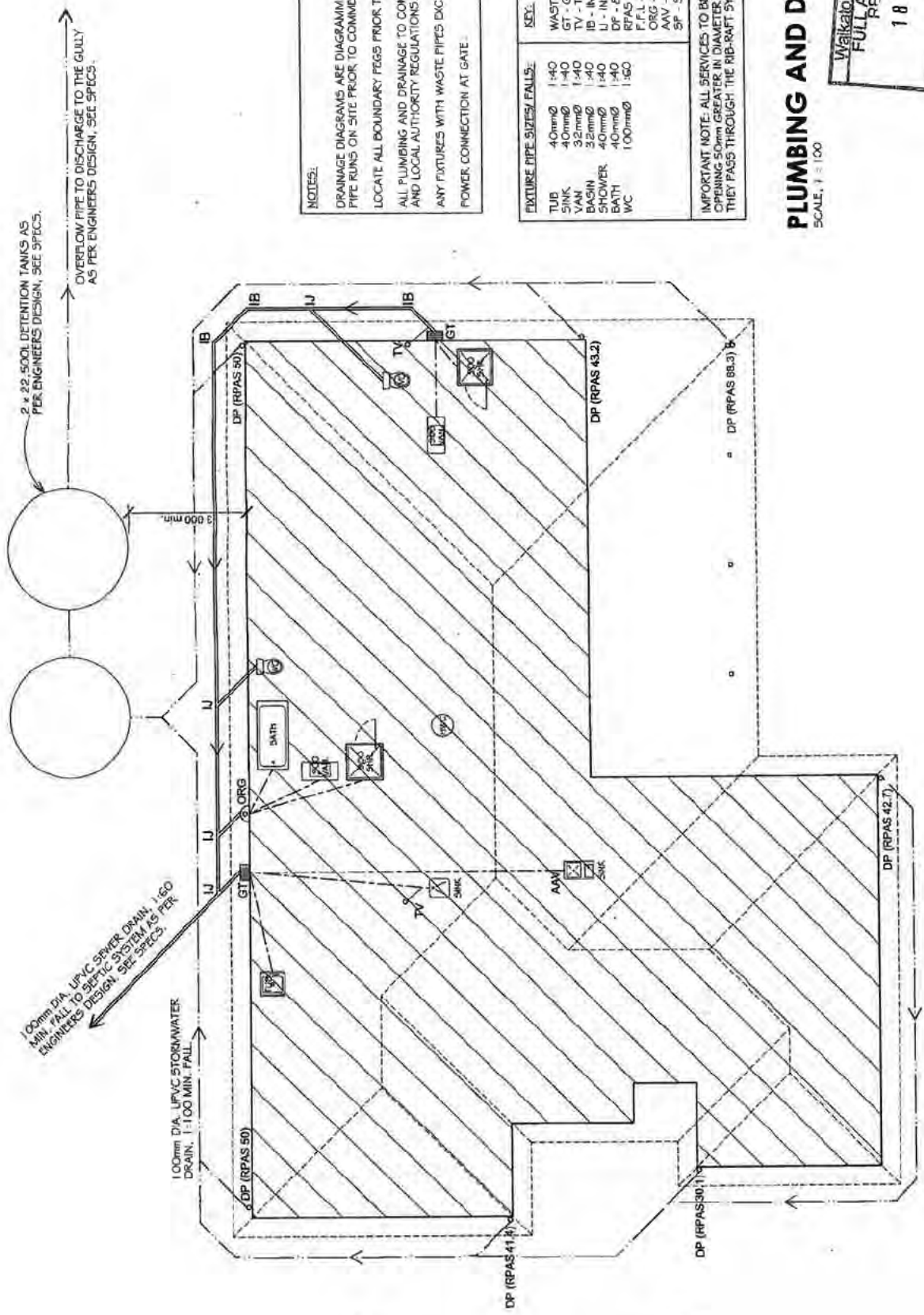
UNPROVED

Waikato District Council
FULL APPLICATION
RECEIVED

18 OCT 2016

Time Initials
NGARUAWAHIA

[illegible]



NOTES:

DRAINAGE DIAGRAMS ARE DIAGRAMMATIC ONLY. PLUMBER TO ESTABLISH PIPE RUNS ON SITE PRIOR TO COMMENCING WORK.

LOCATE ALL BOUNDARY FEES PRIOR TO SET OUT.

ALL PLUMBING AND DRAINAGE TO COMPLY WITH NZS 3500, NZBC G (3/AS) AND LOCAL AUTHORITY REGULATIONS.

ANY FIXTURES WITH WASTE PIPES EXCEEDING 3.5m MUST BE VENTED.

POWER CONNECTION AT GATE.

KEY:	
WASTES: MARLEY UPVC - SIZES AS SHOWN.	
TV - GULLY TRAPS	
TV - TERMINAL VENTS UPVC 90mmØ	
IJ - INSPECTION JUNCTION	
DP - 90mmØ UPVC DOWNPIPES	
RFAS - ROOF PLANE AREA SERVED (m ²)	
F.F.L - FINISHED FLOOR LEVEL	
ORG - OVERFLOW RELIEF GULLY	
AAV - AIR ADMITTANCE VALVE	
SP - SPREADER	

FIXTURE PIPE SIZES/FALLS:	
TUB	40mmØ 1:40
SINK	40mmØ 1:40
VAN	32mmØ 1:40
BASIN	40mmØ 1:40
SHOWER	40mmØ 1:40
BATH	40mmØ 1:40
WC	100mmØ 1:60

IMPORTANT NOTE: ALL SERVICES TO BE PLACED CENTRALLY WITHIN AN OPENING 50mm GREATER IN DIAMETER THAN THE SERVICE DUCTPIPE, WHERE THEY PASS THROUGH THE RB-RAT SYSTEM TO ALLOW SEISMIC TOLERANCES.

PLUMBING AND DRAINAGE LAYOUT SCALE: 1:100

Waikato District Council
FULL APPLICATION
RECEIVED
18 OCT 2016 06:11:17
Time: Initials: APPROVED
NGARUAWAHIA

<p>SWANN RESIDENCE 5 HUGH GREENE LANE TE KAUWHATA</p>		<p>TSW NO: 70247</p>
<p>PLUMBING AND DRAINAGE PLAN</p>		<p>REV</p>
<p>Scale: 1:100 @ A3 Drawn: TH Date: 18/10/2017</p>		<p>DWG NO: 002</p>
<p>NOTE: CONTRACTOR TO SUBMIT TO LOCAL AUTHORITY FOR APPROVAL. DIMENSIONS STATE LEVELS TO COMPLETION OF WORK.</p>		
<p>Design: David Blacklock Architectural Designer not for use without the consent of the designer. PO Box 11154 Hamilton 3244 0274 111 111</p>		
<p>These drawings are issued to you by the architect at the request of the client. They are to be used for the construction of the building. It is the responsibility of the contractor to ensure that the construction complies with the drawings. No liability will be accepted for any errors or omissions. The drawings are to be used for the construction of the building. No liability will be accepted for any errors or omissions. The drawings are to be used for the construction of the building. No liability will be accepted for any errors or omissions.</p>		
<p>Signature YOUR HOME. YOUR WAY.</p>		
<p>Copyright Signature Homes Limited 2015</p>		

[illegible]

SECTION 10.4 AND MANUFACTURING OF ECG:

5 305

1600 x 355 1600 x 355 1600 x 355 600 x 900 1600 x 1355 860 x 1600 x 1155

FFL + 15.295
C.G.L + 16.00

BRICK VENEER CLADDING

RISK FACTOR	LOG
ELEVATION: ALL	0
Wind Zone (per NZS3804)	0
Number of Storeys	0
Roof/Wall Intersection Detail	0
Corner Width	0
Envelope Complexity	0
Deck Design	0

SELECTED POWDERCOATED DOUBLE GLAZED ALUMINUM WINDOW JOINERY:

22:55 PM

F.F.L + 16,225	C.G.L + 16,00
----------------	---------------

CO
COPIES

...

22-2-20

[illegible]

10

7

CONTROL JOINT 'C' AS
PER MANUFACTURERS
SPECIFICATIONS.

SELECTED COLORSTEEL FASCIA
AND EXTERNAL GUTTER SYSTEM

SELECTED LONGRUN COLORSTEEL
ROOFING (MC770 OR SIMILAR)

2 x 90 H5 SG6

L'ACTION 2195

2155

8

000

10

1

ELEVATION C
SCALE 1" = 100'

JOINERY NOTES:	
1.	ALL EXTERIOR (EXCLUDING
2.	JOINERY IS ALL OPENING (MANUFACTURE
3.	ALL BATHROOM SHELVING T

SELECTED 70mm BRICK VENEER,
CLADDING OVER 50mm CAVITY.
SEE BRICK MANUFACTURER'S SPEC.

$$F.L. + 16.225$$

SECTIONAL GARAGE DOOR

00'91 + 1'5'2

10

TO SCOTT. JOINER N

74

Dat

ELEVATION D
SCALE: 1" = 100'

7

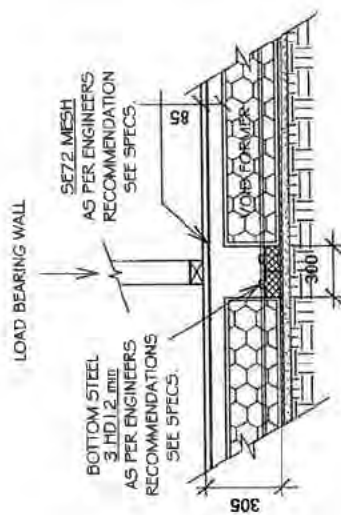
ROOM WINDOWS AND
TO BE SAFETY GLASS

6

27 Oct

[illegible]

Consolidated Financial Statements



SECTION UNDER INTERNAL LOAD BEARING WALLS

SCALE. 1:20

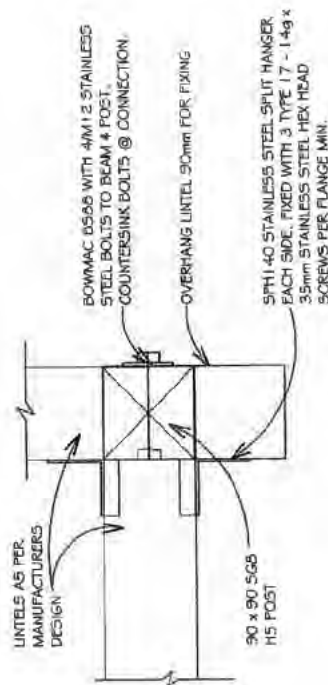
Waikato District Council	Waikato District Council	Initials	APPROVED
FULL APPLICATION	Building Consent Number		
RECEIVED	B.L.D.	Time	
	INGARUAWAHIA 18		

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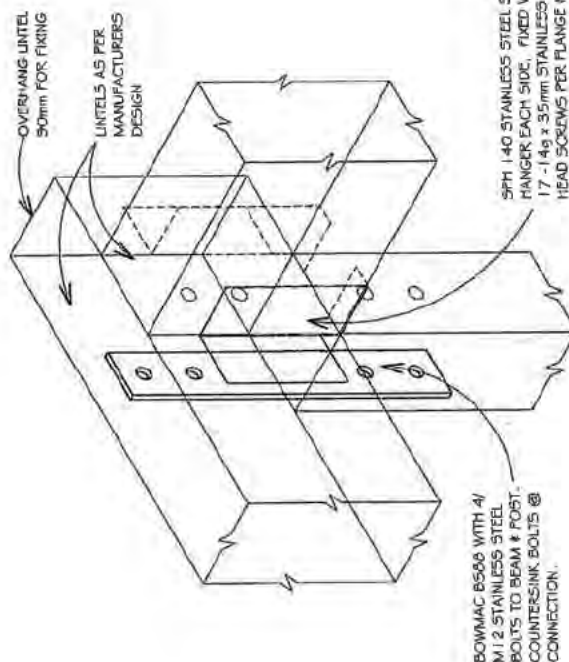
Technical drawing of a covered patio structure, showing a cross-section with various components and dimensions. The drawing includes labels for different parts and their specifications:

- COVERED PATIO**: The main structure shown.
- BED 4**: A label on the left side of the structure.
- MASTER**: A label on the left side of the structure.
- WIR**: A label on the left side of the structure.
- STAINLESS STEEL HPS x 1/2 x 3/8 x 1/2 NAILS PER FLANGE**: A label pointing to the nails used in the structure.
- 20638 BRACKETS WITH 2M12 STAINLESS STEEL CORNER POST WITH BOWMAC BS136 POST BRACKET FIXED TO 90 x 90 H5 POST WITH 2M12 STAINLESS STEEL BOLTS AT BASE**: A label pointing to the brackets and posts used in the structure.
- 240 x 90 H1.2 5G8 BEAM ABOVE (2220mm TO US OF BEAM)**: A label pointing to the beam above the structure.
- 2290 x 45 H1.2 5G8 BEAM ABOVE (2220mm TO US OF BEAM)**: A label pointing to the beam above the structure.
- SINGLE NAILON PLATE 1mm x 110 x 160mm WITH 1230mm x 5 STAINLESS STEEL END AND 2 CORNER NAILS TO END AND 2 CONNECTION. SINGLE STUD 5710 STUD TO BEAM CONNECTION.**: A label pointing to the nylon plate and studs used in the structure.
- SEE POST TO BEAMS, CORNER CONNECTION DETAIL. BOWMAC BS136 POST BRACKET FIXED TO 90 x 90 H5 POST WITH 2M12 STAINLESS STEEL BOLTS AT BASE.**: A label pointing to the corner connection detail.
- B5068 EITHER SIDE OF 180 x 90 H1.2 5G8 BEAM FIXED WITH 4/55 BOLTS TO 90 x 90 H5 TIMBER POST WITH BOWMAC BS136 POST BRACKET FIXED TO 90 x 90 H5 POST WITH 2/ M12 STAINLESS STEEL BOLTS AT BASE.**: A label pointing to the beams and posts used in the structure.

SCALE 1 - 100



SCALE 1:5



SCALE, NTS

IMPORTANT NOTE:
ALL FIXINGS IN CONTACT WITH H3 TREATED
TIMBER OR HIGHER MUST BE STAINLESS STEEL.

SPH 140 STAINLESS STEEL SPLIT
HANGER EACH SIDE, FIXED WITH 3 TYPE
17-14g x 35mm STAINLESS STEEL HEX
HEAD SCREWS PER FLANGE MIN.

WAIKATO DISTRICT COUNCIL
Building Consent Number:
Building R.D.

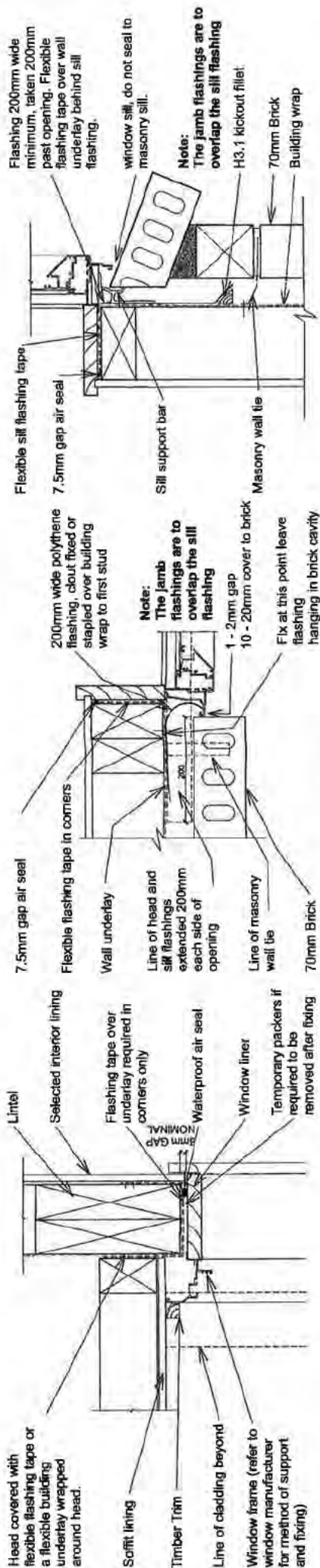
4197

Waikato District Council
FULL APPLICATION

18 OCT 2016

Time Initials
NGARUAWAHIA[illegible]

[illegible]



TYPICAL HEAD DETAIL

70 SERIES BRICK VENEER CLADDING OVER 50mm CAVITY.
SCALE: 1:5

TYPICAL JAMB DETAIL

70 SERIES BRICK VENEER CLADDING OVER 50mm CAVITY.
SCALE: 1:5

TYPICAL SILL DETAIL

70 SERIES BRICK VENEER CLADDING OVER 50mm CAVITY.
SCALE: 1:5

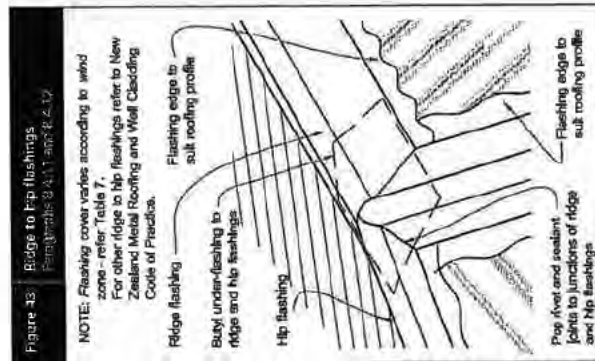
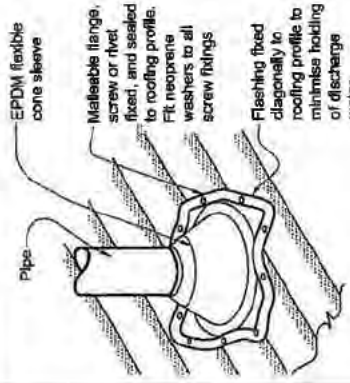


Figure 53: Flashing for small pipes
Paragraphs 3.3, 10.8.4, 17.9, 18.5
and 19.6.6



TYPICAL RIDGE TO HIP DETAIL

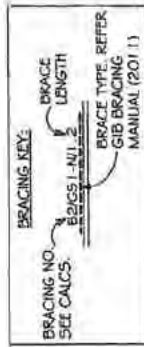
SCALE: 1:5

ROOF PENETRATION DETAIL

SCALE: 1:5



<p>YOUR HOME. YOUR WAY.</p>	<p>These drawings are limited to and by the extent of the information provided by the client. Signature Homes Ltd is not responsible for any errors or omissions in the drawings or for any consequences arising from the use of the drawings. No liability will be accepted for any delay or damage caused by the use of the drawings.</p>	<p>db</p>	<p>Design Building Architectural and Design 301 Mt. Wellington PO Box 11111 Wellington 6144</p>	<p>NOTE: CONTRACTOR & SUB-CONTRACTOR TO OBTAIN APPROVALS, DIMENSIONS & SITE LEVELS FROM TOCOMBERGHE WONG.</p>	<p>SWANN RESIDENCE 5 HUGH GREENE LANE TE KAUWHATA</p>	<p>ROOF AND JOINERY DETAILS Scale: 1:5 NTS @ A3 / Drawn: TH / Date: 18/10/2016</p>	<p>REV DATE AMENDMENT</p>	<p>TSW NO: 70247 DNG NO: 010 REV</p>
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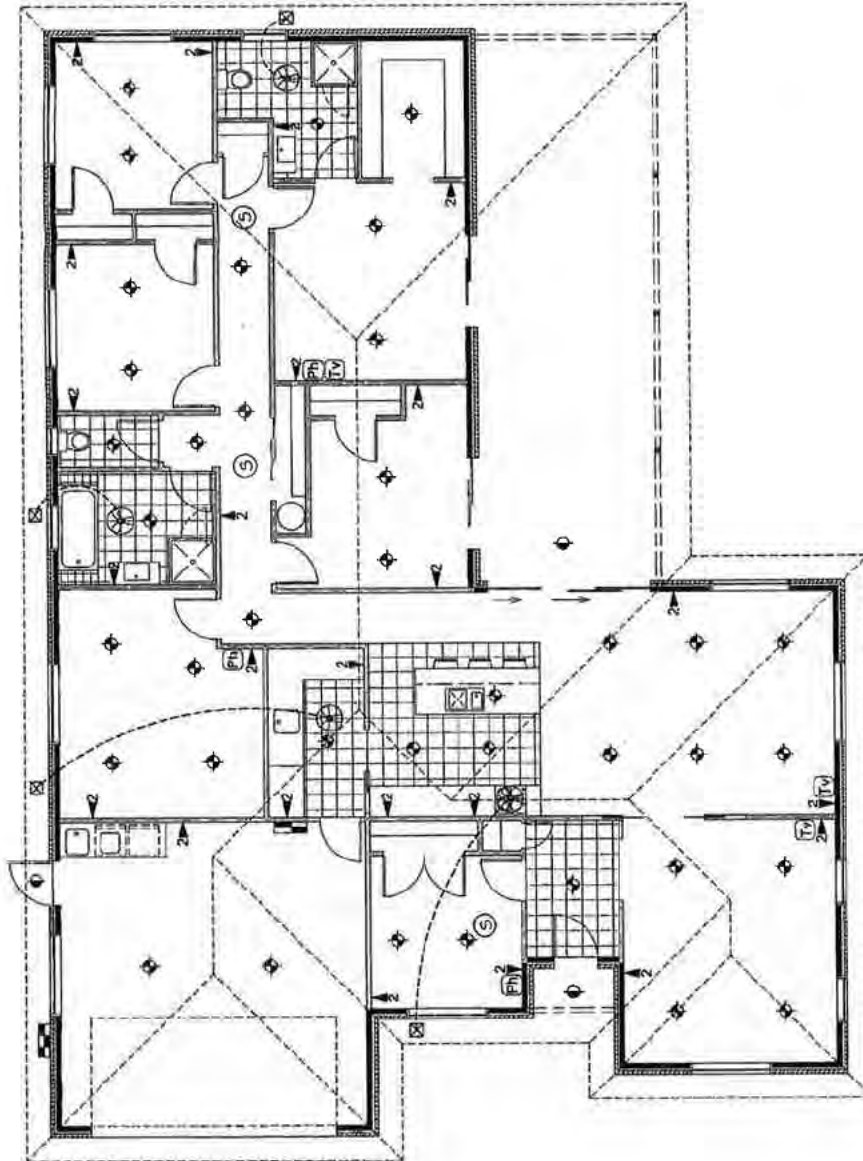


SCALE, 1 - 100

WANKATO DISTRICT COUNCIL
Contract Number
Subcontract No. 0664197
APPROVED

Waikato District Council
FULL APPLICATION
RECEIVED
10 OCT 2016
Time Initials
NGARUAWAHIA

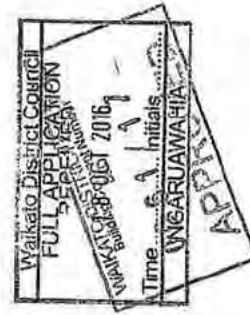
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ELECTRICAL LEGEND	
	CEILING MOUNTED LIGHT FITTINGS
	EXTERNAL CEILING MOUNTED LIGHT FITTINGS
	1/2 SINGLE DOUBLE POWER OUTLET
	METER BOARD
	DISTRIBUTION BOARD
	TELEPHONE JACKPOINT
	TELEVISIONS JACKPOINT
	SMOKE DETECTOR
	EXTERNALLY VENTED CEILING MOUNTED EXTRACT FAN AS PER C.A.S.I.
	EXTRACT FAN TERMINATION POINT
SWITCH POSITIONS TO BE CONFIRMED BY ELECTRICIAN & CLIENT ON SITE	

ELECTRICAL LAYOUT PLAN

SCALE: 1:100



<p>YOUR HOME. YOUR WAY.</p>	<p>These drawings and designs remain the property of SIGNATURE HOMES LTD.</p>	<p>DATE: 27/10/2017 DESIGNER: DREAM BUILDERS LTD. DRAWN: DREAM BUILDERS LTD. CHECKED: DREAM BUILDERS LTD. APPROVED: DREAM BUILDERS LTD.</p>	<p>SWANN RESIDENCE 5 HUGH GREENE LANE TE KAUWHATA</p>	<p>ELECTRICAL LAYOUT PLAN</p>		<p>REV: 012</p>	<p>TSW NO: 70247</p>
						<p>DATE: 27/10/2017</p>	<p>SCALE: 1:100 @ A3</p>



SCALE, 1:5
70 SERIES BRICK VENEER CLADDING OVER 50mm CAVITY



SCALE, 1:5
70 SERIES BRICK VENTILATOR CLADDING OVER 50mm CAVITY.



SCALE, 1:5
TO SERIES BRICK VENEER CLADDING OVER 50mm CAVITY,

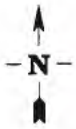


SCALE, 1:5
NO SERIES BRICK VENEER CLADDING OVER 50mm CAVITY

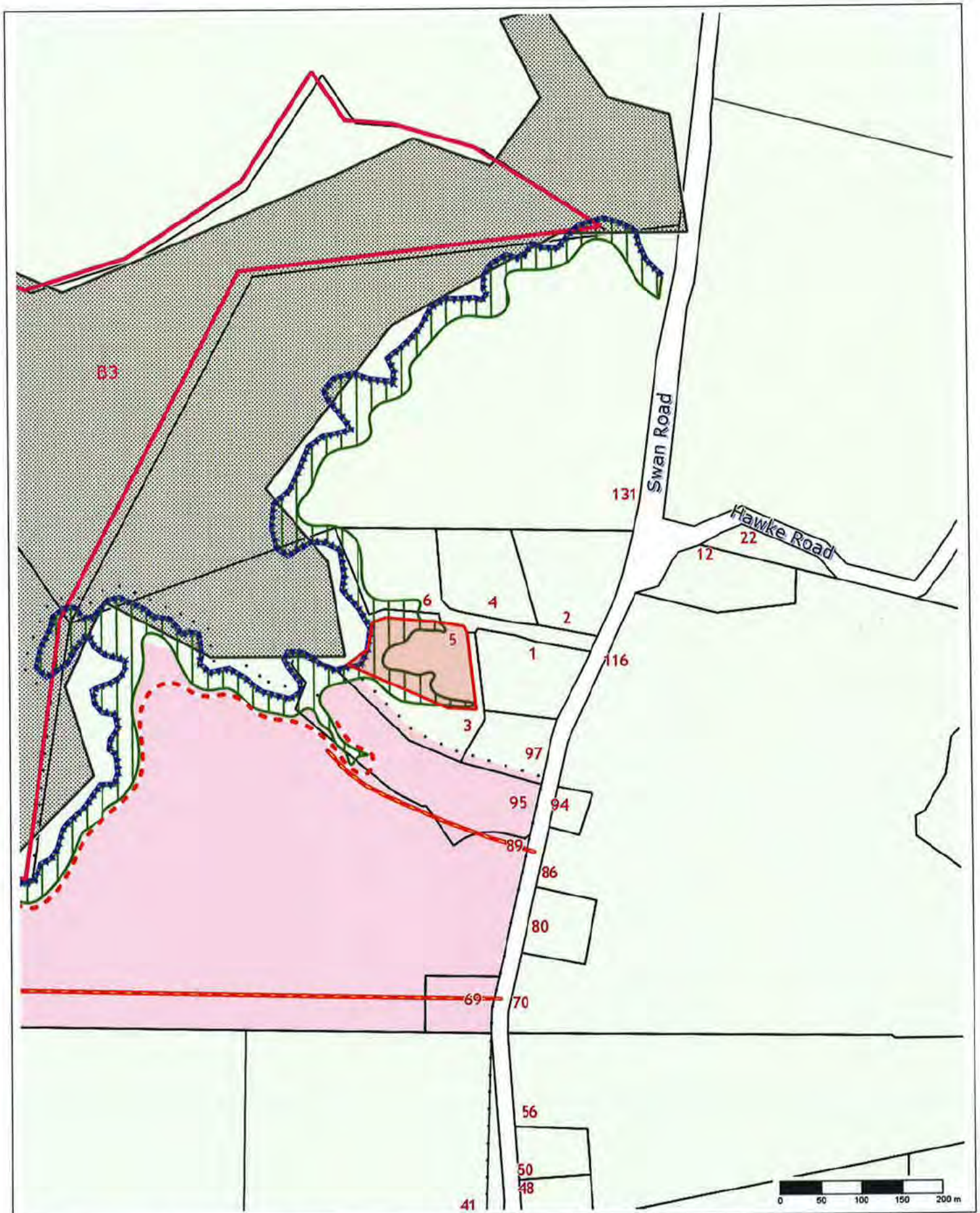
Waikato District Council
FULL APPLICATION
RECEIVED
18 OCT 2015
Time Initials
NGARI AWAHIA

0661117-
APPROVED
CITY OF DALLAS
COUNTY CLERK
JUL 15 2009
NGARUWAHIA

[illegible]



Waikato District Plan



Legend

Context Plan Section Divide State Highway Rail Land Parcel Water Body Reserve	Infrastructure Designation Gas Line Transmission Line Indicative Road Intent Important Local A Indicative Road Intent Important Local B Indicative Road Location Important Collector Indicative Road Location Important Service Lane National Walkway Raglan Navigation Beacon Segregation Strip Walkway Cycleway Bridleway	Minerals Mining Aggregate Extraction Policy Area Aggregate Resource Policy Area Coal Mine Policy Area
Building/Construction Airport Inner Noise Control Boundary 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)	Natural Environment Coastal Marine Area Conservation Policy Area Ecological Corridor Environmental Enhancement Overlay Area 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 Threatened Species Gradual Decline Whaanga Coast Policy Area	Zones Commercial Village Business (Franklin) Business (Waikato) Business (Franklin) Open Space Forest Conservation (Franklin) Queen's Redoubt Heritage (Franklin) Recreation (Franklin) Wetland Conservation (Franklin) Recreation (Waikato) Heavy Industrial (Waikato) Industrial Industrial 2 (Franklin) Industrial Services (Franklin) Light Industrial (Franklin) Industrial Park (Waikato) Light Industrial (Waikato) Industrial (Franklin) Maoro Mining (Franklin) Aggregate Extraction (Franklin) Timber Processing (Franklin) Cultural Pa (Waikato) Residential Residential (Franklin) Living (Waikato) Residential 2 (Franklin) New Residential (Waikato) Living Zone Te Kauwhata Ecological (Waikato) Living Zone Te Kauwhata West (Waikato) Village (Franklin) Rural-Residential (Franklin) Country Living (Waikato) Coastal (Franklin) Coastal (Waikato) Agriculture Production Rural (Franklin) Rural (Waikato)
Commercial Airport Obstacle Limitation Surface Area A and B (Pokeno) Area of Interest / Scheduled Area Business Centre Classification 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	Urban Environment Amenity Planting Requirement Anticipated Dwelling Number 100 Concept Plan Papakainga Policy Area Residential Large Lot Overlay Area Residential Medium Lot Overlay Area Structure Plan Boundary Urban Expansion Policy Area Village Growth Area	
Hazard Policies Catchment Management Plan Area 1% Design Flood Level Flood Limit Flood Risk Huntly East Mine Subsidence Huntly South Assessment 1 Land Stability Policy Area Remediation Policy Area River Stability Policy Area	Culture & Heritage Battlefield View Shaft Heritage Area Heritage Item Notable Tree Schedule 8A Site of Significance Urupa Waikato River Catchment	

Map Information
 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

Introduction to the PLANNING MAPS

These planning maps are part of the Waikato District Plan. The maps are referred to in the text volumes.

Map layout

The maps are arranged to show zones and policy or other special controls. Important to note is the delineation between the Waikato Section and the Franklin Section as shown on Map i and Map ii. This delineation is necessary due to the different zones between the two sections and development controls such as policy and overlay areas. Various colours, shadings and lines on the maps represent these zones, policy areas and special controls. The maps also include information such as the alignment of the major electricity and gas transmission corridors and designations. See the map legend for details.

Zones

Except for roads in the Franklin Section all land in the Waikato District is in a zone. Land uses within each zone are expected to generate a compatible range of effects and provide a similar level of amenity.

Roads in the Waikato Section appear white in the maps, as the zone shading has been left off to assist map users with orientation. Although the roads are not shaded, they are in a zone, which is the zone of the land nearest to each point of the road. Where the zone is different on each side of the road, the boundary between the zones is the centre line of the road. Unformed roads are shown with zone shading.

Roads in the Franklin Section are not in a zone and appear white in the maps. This applies to both formed and unformed roads. For activities affecting roads in the Franklin Section refer to Part 13 or seek advice from the appropriate department within Council.

With the exception of the Waikato River and some of its tributaries within the Franklin Section, lakes and rivers appear with blue shading to assist map users with orientation. Although these rivers and lakes are not given any zone shading, they are in a zone, which is the zone of the land nearest to each point of the river or lake. Where the zone is different on each side of the river or lake, the boundary between the zones is the centre of the river or lake.

Activities on the surface of rivers, lakes and other water bodies are subject to the ordinary zone rules, for example the noise rules. A person wanting to build a structure in the water, such as jetty, would also have to observe the zone building standards (regional council consents may also be required).

Policy and Special Control Areas

These areas are mapped areas of the district where certain resource management issues are addressed in the plan, such as heritage, conservation areas, landscapes and ecological features. Some land in the district is not in any of these areas, while others may be affected by a number of these controls. If a site is in any of these areas various rules will apply to that particular activity. For example, the earthworks standards are stricter in a Landscape Policy Area.

Information items

Some of the notations on the maps are included for information and to assist orientation of map users, and may not be referred to in the text of the plan. These items include the Te Araroa National Walkway, the landfill site and the motorsport park at Hampton Downs, marae, urupa and various retirement homes. Identification of these sites on the planning maps does not change the legal or planning status of activities on the land.

Numbered sites

Some sites are shown on the maps with a number and symbol. These sites contain a Heritage Item, Māori Site of Significance, Notable Tree, Outstanding Natural Feature or Designation. The rules that refer to these items are included in the rules for the zone that the site is in or the relevant chapter.

The numbers refer to the text in the plan: Appendices C and F and Chapter 30 of the Waikato Section, and Part 5, Part 8, Appendix Two and the Schedule of Designations of the Franklin Section. Refer to these sections to confirm the identity of the site and to find further information.

For designations in the Waikato Section, the letter before the number identifies the requiring authority that is responsible for the designation. For example, the letter J identifies all designations of New Zealand Transport Agency. See chapter 30 for more details.

For designations in the Franklin Section, numbers run in numerical order and do not identify the requiring authority that is responsible for the designation. See Schedule of Designations for more details.

Where land is designated, the legal rights and responsibilities of the requiring authority (e.g. New Zealand Transport Agency) and the landowner are set out in the Resource Management Act.

Hazards

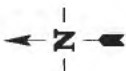
Hazard areas shown on the planning maps are not exhaustive. Extensive areas of the district are subject to some flood, erosion, contaminated land or subsidence hazards, but not all these areas are shown on the planning maps. The Council does not have specific knowledge of all sites within the district. Applicants for resource consent will be required to identify relevant hazards in their locality.

Selected areas in the Living Zone of Hundy have been mapped as flood risk areas because of the particular risks in those areas and the availability of a Regional Council flood management plan. Note that the maps are at a scale of either 1:5,000 or 1:10,000; this means that precise detail for each property cannot be inferred from the maps. The maps are intended only to indicate general areas within which special enquiry about flood risks needs to be made. Within the mapped flood risk areas, there will be land that is not affected by the hazard. These areas can only be identified by a site-specific survey.

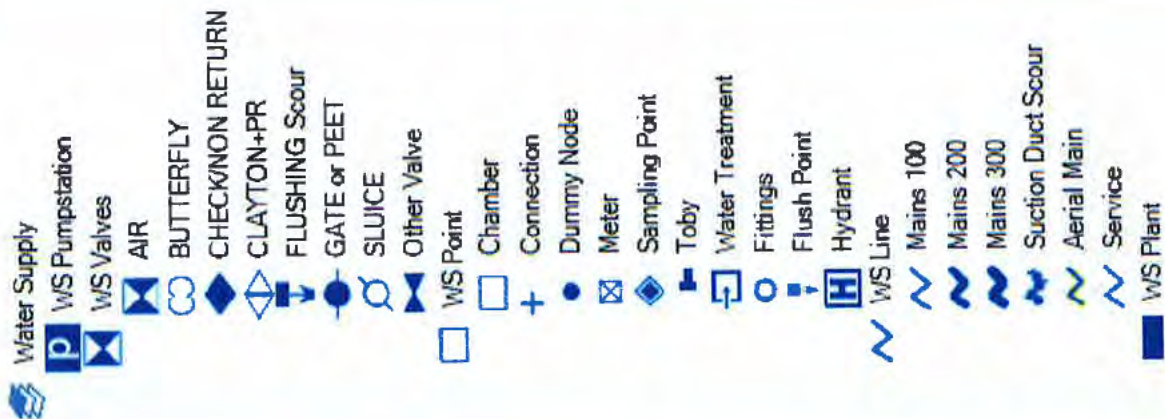


Utilities Plan

5 Hugh Greene Lane TE KAUWHATA
LOT 31 DP 455848



Water Supply



Waste Water



Storm Water



UTILITIES