



WAIMAKARIRI
DISTRICT COUNCIL

AS BUILT TRUSS LAYOUT REQUIRED –

This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to the
Structure Pre-Roof Pre-Wrap Inspection

Truss “As-Built” Designs may be sent to:
buildinginfo@wmk.govt.nz

BC No: 201170

SITE DETAILS:

11 CRETE ROAD

RANGIORA

LEGAL:

LOT 41 DP 542543

APPROVED BUILDING CONSENT DOCUMENTS AND PLANS
(FULL SET SUPPLIED)

- ON SITE COPY -

- These plans and specifications must be kept on site during construction, and made available to the building officer on request. Failure to do so will mean an automatic failure of the building inspection and will necessitate re-booking the inspection at the applicant's expense.
- All boundary survey pegs must be located and flagged by the owner before work is commenced.

INSPECTIONS

for bookings or building enquiries

please phone the BUILDING UNIT on:

03 3118906

or

Email inspection bookings to: bcbooking@wmk.govt.nz

- Please refer to your inspection schedule for details of inspections to be carried out.
- 2-3 working day's notice should be given and provision made to allow access.
- The Code Compliance Certificate will be issued once the:
 - Final inspection has been carried out and passed
 - Audit of WDC building consent file has been completed
 - Payment of any outstanding invoices is received

THINGS YOU SHOULD KNOW ABOUT...

Noisy Heat Pumps

AS THE DISTRICT GROWS WE'RE SEEING MORE HOMES BEING BUILT ON SMALLER SECTIONS.

Smaller sections mean that you need to pay closer attention to products which both eliminate and produce noise.

While a heat pump is not assessed under the Building Consent application, and therefore not checked or signed off under any building inspection, some models produce noise which is deemed excessive under the District Plan.

The onus is upon the individual / landlord to ensure that it complies with your local council's District Plan rules.

BELOW ARE QUESTIONS TO ASK YOURSELF BEFORE INSTALLING A HEAT PUMP:

- **Does your heat pump comply with the permitted noise levels allowed by the Waimakariri District Council?**
i.e. Does the noise produced from your heat pump measure less than 50dBA during the day and less than 40dBA at other times? You may not be allowed to use it if complaints are received.
- **Where are you mounting the unit?**
The level of noise produced by your heat pump will depend upon the size, the location and how it has been fixed /mounted.

It is common sense that heat pumps will produce some noise as they do contain a compressor and fan. However what is regarded as 'acceptable noise' is a personal and subjective opinion.



Please note that if the unit makes a constant penetrating monotone engine noise similar to generators or water heater pumps, then those types of noise may cause significant issues for neighbours who will render the noise 'unreasonable'. Such noise may not even be exceeding the noise levels but will potentially still be rated as 'unreasonable'.

Most noise issues occur when the outdoor unit is located too close to the neighbouring boundary or not raised off the ground.

Noise specifications will be found in the sales brochure, and you are advised to check these prior to purchase and installation.

If you are having a heat pump installed, make sure the installer is trade qualified to install air conditioning units and heat pumps. The installer should be a member of IRHACE.

Have your heat pump installed by a qualified installer.

MORE INFORMATION

Visit waimakariri.govt.nz for more information, or contact Customer Services on 0800 965 468 (0800WMKGOV)

Dial Before You Dig

Safety near underground cables and services

MainPower is committed to providing a safe, secure and reliable electricity supply to all customers.

This fact sheet is designed to inform you about safety around electricity, particularly underground cables.

Working near electricity cables

Serious personal injury can result from damaging underground services during excavation and ground penetration. Supply disruption and repairs can be costly and extremely irritating to customers.

The positions where cables are buried are subject to reasonable tolerance however, the depth of cover may have changed since installation.

It is your responsibility to verify the position and depth of cables before excavation.

Steps to ensure safe digging

- Obtain up-to-date plans from the relevant local authorities.
- Use a cable locator, if possible, to mark-out the underground services before commencing work.
- Practice safe digging procedures.
- The Worksafe Guide for Safety with Underground Services sets out agreed work methods and preferred work practices for the location and excavation of underground services. Download the guide at - <http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/underground-services-guide-for-safety-with/underground.pdf>

Underground electricity cables

For copies of plans showing MainPower's electricity cables phone 03 311 8300, weekdays 8am - 5pm or email us at underground.records@mainpower.co.nz.

Please allow 2 working days to receive copies of plans. MainPower may hold some records of privately-owned cables connected to the MainPower network system; contact MainPower in the first instance.

Additional services MainPower can provide if you are planning your digging:

- Mark-out Services: MainPower can trace cables using an electronic locator.
- On-Site Supervision: For difficult work or locations, MainPower can provide on-site safety supervision.

Disclaimer This fact sheet is not an exhaustive list of all safety matters that need to be considered. Whilst care is taken in the preparation of this material, MainPower does not guarantee the accuracy and completeness of the information.

Underground council services

All contractors are reminded of their legal responsibility to take all practicable steps to locate and protect existing services. In the road corridor, service plans and a Corridor Access Request (CAR) permit need to be obtained through the Beforeudig website (www.beforeudig.co.nz). The Beforeudig service helps contractors to determine the location of any underground services before excavating. For service plans on private property, and lateral locations for work on private property that will not extend into any part of the road reserve, contact the Waimakariri District Council's Customer Services team at office@wmk.govt.nz.

Contact MainPower

To report a fault:
0508 60 70 80

For electricity emergencies:
0508 60 70 80

For general enquiries:
www.mainpower.co.nz
info@mainpower.co.nz
03 311 8300 (8am to 5pm, Monday to Friday)

mainpower

Dial before you dig.

Always remember to locate underground cables and services before digging and avoid serious injury, supply disruption and costly repairs. Phone MainPower for cable location advice.

03 311 8300



Think for
Safety's Sake



www.mainpower.co.nz

DWELLING & OTHER WORKS - NOT COMMERCIAL

SECTION 1

Statutory Forms

- **Inspection List – By Council**
- **Building Consent Form (Form 5) – By Council**
- **Code Compliance Application (Form 6) – By Council**
- **Installation & PS3 Forms – By Council**
- **Application Form**
- **LBP Design Certificates**
- **Certificate of Title or Sales & Purchase Agreement**
- **PIM, Resource Consent – By Council**

SECTION 37 OF THE BUILDING ACT
APPLIES TO THIS CONSENT

AN APPLICATION HAS BEEN APPLIED FOR AT THE TIME OF
GRANTING THIS CONSENT

Until The Resource Consent Has Been Granted Refer To The Special
Conditions Of The Building Consent For The Extent Of Work, If Any,
That Can Be Carried Out.

PLEASE NOTE

- Although your Consent documentation states 48 hours notice is required, it is not always possible to carry out an inspection within this period.
- If an inspection of the building works is not carried out in accordance with the Inspection Schedule it could affect the issue of the Code Compliance Certificate.

To book inspections ring WDC on
03 311 8906

All inspections are subject to a separate charge.

All re-inspections will be charged and recorded separately even if other inspections are carried out on the same day.

Using engineers & other professionals

If an engineer has been engaged to carry out various site inspections you will need to provide copies of his/her site notices to us and a producer statement, a PS4 from the engineer confirming the building elements designed and inspected by the engineer were completed in accordance with the approved design.

Confirmation of installation of products

We require producer statements, warranties & installation certificates from various installers as a way of confirming products have been installed in accordance with the manufacturer's recommendations. These are commonly required for exterior claddings, wet area tanking, membrane roofing/decking and effluent fields. Energy certificates such as electrical and gas certificates need to be provided too. You will need to provide these to us prior to the issue of the Code Compliance Certificate.

Applying for a Code Compliance Certificate (CCC)

When you are satisfied your project is complete please book a final inspection and complete and sign *form 6*, application for Code Compliance Certificate which is enclosed with your building consent. You should have this form ready for when the building Inspector arrives on site to carry out the final inspection. Please note all outstanding monies must be paid prior to the issue of the CCC.

Grant or refuse a CCC

We are required to make a decision to grant or refuse a CCC if you do not formally apply for a CCC within two years of the granting of the building consent. The date your consent was granted is the date at the bottom of the building consent form. If you do not apply for a CCC or arrange an extension with us within the two year period we may carry out an inspection of the building work. An additional fee applies for this work.

Lapsing of your consent

Your building consent will lapse if building work has not commenced within 12 months after the date of issue of the building consent. The issue date is deemed to be the day you paid for the consent. In saying this we understand things don't always run smoothly so you can apply for a time extension which we may agree to. A fee applies for this.

Site Inspection Sheet

Application

Dean E Cameron, Hollie R Cameron C/- Dixon Design Limited 704 Hills Road Christchurch 8051	No.	BC201170
	Issue date	14 December 2020
	Overseer	Nicola McNulty

Project

Description	1100 New (& prebuilt) House, Unit, Bach, Crib, Town Houses BC - New or Relocated Dwelling, Solid-fuel (Wood or Coal) fire, New Detached Dwelling, 01 Standard Building Consent(20 W Processing Days)
Intended Life	Indefinite (50+)
Intended Use	Residential Dwelling
Estimated Value	\$450000.00
Location	11 Crete Road RANGIORA
Legal Description	LOT 41 DP 542543 0.060100 Ha
Valuation No.	2165716256

This inspection sheet and all the approved plans and specifications relating to this building consent are to be available on site during construction. If the documentation required for a particular inspection is not available, this will mean automatic failure of the building inspection and will necessitate re booking the inspection at the applicant's expense.

Please give at least 48 hours notice for the next required inspection.

Work cannot proceed past each step until that step has been inspected and approved.

All inspections listed below are to be inspected by a WDC Building Inspector, an Engineer may also need to be engaged to inspect engineer requirements, this will be noted below.

BC201170
Compacted Hardfill - pre DPM - Engineer to also inspect Site cut & fill compaction
Foundation / Floor Slab - Engineer to also inspect Raftfloor pre-pour
Structure Pre Roof Pre Wrap -
Building Wrap & Sill Tape -
Cavity Battens & Flashings -
Mid Height Veneer - 90 series stack bond. Engineer to also inspect throughout block laying
Mid Height Cladding -
AAC-AAC Panel Part Installed -
Pre Plaster & Flashings -
Drains -
Preline & Plumbing -
Prestopping -
Wet Area Tanking -
Free Standing Fire / Boiler -
Final -



Form 5

Building consent BC201170

Section 51, Building Act 2004

The building

Street address of building: 11 Crete Road RANGIORA

Legal description of land where building is located: LOT 41 DP 542543 0.060100 Ha

Valuation number: 2165716256

Building name:

Location of building within site/block number:

Level/unit number: 1

The owner

Name of owner: Dean E Cameron and Hollie R Cameron

Contact person: Dean Ewen Cameron

Mailing address: 15 Hamlett Drive Woodend 7610

Street address/registered office:

Phone number: Landline:

Mobile: 0274283507

Daytime:

After hours:

Facsimile number:

Email address: deancameron87@hotmail.com

Website:

First point of contact for communications with the council/building consent authority:
Dixon Design Limited

Building work

The following building work is authorised by this building consent:

DWELLING WITH LOG BURNER AND ATTACHED GARAGE 11 CRETE ROAD RANGIORA LOT 41 DP 542543

Primary Specified Intended Use: Housing - Detached dwellings

Description of Intended Use: Residential Dwelling

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.

This building consent is subject to the following condition:

The Building Act 2004, s90, states that agents authorised by the building consent authority (the Council) for the purposes of this section are entitled, at all times during normal working hours or while building work is being done, to inspect –

- (a) land on which building work is being or is proposed to be carried out; and
- (b) building work that has been or is being carried out on or off the building site; and
- (c) any building.

This building consent is issued with the following advice notes:

All inspections listed must be requested and carried out in accordance with the attached schedule (list) of inspection types. It is advisable to request bookings at least two full working days in advance of the required inspection date. It is the owner's responsibility to ensure all necessary inspections are carried out. Please contact the building consent authority if you are unsure what requires inspection - do not cover or enclose any building work without prior inspection.

Please note that the consent fees allow for a single inspection of construction stages of the project as specified in the inspection schedule. Any extra inspections required will be invoiced and must be paid for before a code compliance certificate is issued.

All boundary survey pegs must be located by discovery or redefinition before work is commenced.

Comply with the endorsements on the plan.

An inspection of the installation of the heating unit is required before its first use.

The duplicate copy of the approved consent documents and inspection schedule must remain on site during construction.

Engineers site reports are to be kept on site for the review and collection by the building Inspector.

A PS4 construction review will be required from the engineer prior to the issue of a Code Compliance Certificate.

Please note that any material deviation from the approved documents will require a formal application for amendment. Amendments that are not of a material nature can be approved by a Building Officer or Building Inspector by way of the endorsement of the approved consent documentation.

Occupational Health and Safety and the Labour Department to be notified prior to any disturbance of asbestos or hazardous materials on site during demolition or construction.

The electrical certificate shall be provided to the building consent authority prior to issue of Code Compliance Certificate

Your consent is issued subject to manufactures technical information about their products, installation and maintenance is to be as this technical information requires.

Licensed building practitioners records of work shall be provided to the building consent authority for foundations, carpentry / primary structure, roof cladding, wall cladding systems, brick & block laying as applicable at the conclusion of the relevant work.

A Building Consent lapses and is of no effect if the building work to which it relates does not commence within 12 months after the date of issue of the building consent or any further period that the Building Consent Authority may allow. (Time extensions to commence building work after 12 months must be submitted to the Building Consent Authority in writing stating the reason for the request, prior to the lapse date of the consent.

A Building Consent is not completed until it has been issued with a Code Compliance Certificate. The owner is required to complete a separate application for a Code Compliance Certificate as soon as practicable after the

building work is completed. In any event no later than two (2) years after the granting of the Building Consent. Council is required to decide whether or not a Code Compliance Certificate can be issued. If your project will not be completed within two years you will need to apply for a time extension*. *fees apply

CRITICAL - Consent has been granted subject to Section 37 of the Building Act 2004.

Accordingly, you must either amend your plans to comply with the District Plan/Regional Plan or have granted a Resource Consent under the provisions of the Resource Management Act 1991.

BUILDING WORK CANNOT PROCEED until either the Building Consent has been amended to comply with the District or Regional Plan or Resource Consent is granted. It is also possible that any Resource Consent approval may contain conditions that affect this Building Consent and require alterations or amendments to be made.

The certifying drainlayer's registration number shall be provided to the Building Consent Authority prior to issue of the Code Compliance Certificate.

The plumbing pressure test PS3 & plumbers registration number shall be provided to the Building Consent Authority prior to issue of the Code Compliance Certificate

The installer shall provide the building consent authority a PS3 for the installation of the AAC exterior cladding system prior to issue of Code Compliance Certificate

The installer shall provide the building consent authority a PS3 for the installation of the Internal wet area membrane prior to issue of Code Compliance Certificate.

The installer shall provide a PS3 for the installation of the Heating Unit prior to issue of Code Compliance Certificate

Compliance schedule

A Compliance Schedule is not required for this building.

Attachments

Copies of the following documents are attached to this building consent:

Project Information Memorandum (PIM)

Section 37 Certificate (Form 4)

Consented Plans

Consented Specifications

Inspection List

Form 6 Application for Code Compliance



Lauren Anson | Building Unit Administrator

On behalf of: Waimakariri District Council
Date: 14 December 2020

BUILDING UNIT

Code Compliance Certificate Application

Under The Building Act 2004, Section 92

Please submit the Application for Code Compliance Certificate, when work has been completed, by emailing to: **ccc@wmk.govt.nz**

BC No. Issued by: **The Building**1. Site address:

(Street / Road / Township)

2. Legal description of the land where the building is located:

Lot: DP: Valuation Number: 3. Building Name (if applicable): 4. Location of building within site:

(Only applicable to multi-development sites)

The Owner - All details must be the legal owner's

PLEASE NOTE - By entering your name in the box below you are giving your authority for this Code Compliance Certificate application to proceed under Section 92 of the Building Act 2004.

5. Owner's name:

(Company or organisation name if applicable)

6. Contact person: 7. Mailing address: 8. Street address / Registered office: 9. Mobile: Landline: Email: **The Agent - Only required when the application is being made on behalf of the owner**

PLEASE NOTE - Authorisation is required from the owner of the property

10. Agent's name:

(Company or organisation name if applicable)

11. Contact person: 12. Mailing address: 13. Street address / Registered office: 14. Mobile: Landline: Email:

Agent authorisation

(To be authorised by Owner)

I authorise to act as Agent on my behalf for this Code Compliance Certificate application under *Section 92 of the Building Act 2004*.

PLEASE NOTE - By entering your name in the box below you are giving your authority for this application to proceed.

Name (Owner): Date:

Application

15. I request that you issue a Code Compliance Certificate for this work under *section 95 of the Building Act 2004*.

16. The Code Compliance Certificate should be sent to: ☐ Owner ☐ Agent

17. I wish to receive my certificate in the following format:

PLEASE NOTE - If hard copy, please confirm if you wish to pick it up from the Council or have it posted.

Hard copy: ☐ (post) OR ☐ (pick-up) OR ☐ Email

18. The following field must be completed when submitting the Code Compliance Certificate application:

All building work carried out under the Building Consent specified in this form was completed on:

Restricted building work

Did the building work include any restricted building work? ☐ Yes ☐ No

The Licensed Building Practitioner(s) who carried out or supervised the restricted building work is/are as follows:

Licence class	Name	Licensed building practitioner number (or registration number if treated as being licensed under section 291 of the Building Act 2004)
Foundations		
Carpentry		
Exterior Plasterer		
Bricklayer		
Blocklayer		
Roofer		

Key personnel

Builder

Name: Reg. No.:

Address:

Phone No.: Email:

Designer(s)

Name: Reg. No.:

Address:

Phone No.: Email:

Certifying drainlayer

Name: Reg. No.:

Address:

Phone No.: Email:

Certifying plumber

Name: Reg. No.:

Address:

Phone No.: Email:

Certifying gasfitter

Name: Reg. No.:

Address:

Phone No.: Email:

Registered electrician

Name: Reg. No.:

Address:

Phone No.: Email:

Structural engineer

Name: Reg. No.:

Address:

Phone No.: Email:

Specified systems

The following specified systems are contained on the compliance schedule for the building and, in the opinion of the personnel who installed them, are capable of performing to the performance standards set out in the Building Consent. Tick appropriate specified systems below:

- ☐ **There are no specified systems in the building**
- | | |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <input type="checkbox"/> SS1 Automatic systems for fire suppression | <input type="checkbox"/> SS12/1 Audio loops |
| <input type="checkbox"/> SS2 Emergency warning systems | <input type="checkbox"/> SS12/2 FM Radio and infrared beam transmission systems |
| <input type="checkbox"/> SS3/1 Automatic door | <input type="checkbox"/> SS13/1 Mechanical smoke control |
| <input type="checkbox"/> SS3/2 Access controlled doors | <input type="checkbox"/> SS13/2 Natural smoke control |
| <input type="checkbox"/> SS3/3 Interfaced fire or smoke doors or windows | <input type="checkbox"/> SS13/3 Smoke curtains |
| <input type="checkbox"/> SS4 Emergency lighting systems | <input type="checkbox"/> SS14/1 Emergency power systems |
| <input type="checkbox"/> SS5 Escape route pressurisation systems | <input type="checkbox"/> S14/2 Signs for SS1-13 |
| <input type="checkbox"/> SS6 Riser mains | <input type="checkbox"/> SS15/1 Spoken information to facilitate evacuation |
| <input type="checkbox"/> SS7 Automatic back-flow prevention | <input type="checkbox"/> SS15/2 Final exits |
| <input type="checkbox"/> SS8/1 Passenger carrying lifts | <input type="checkbox"/> SS15/3 Fire separations |
| <input type="checkbox"/> SS8/2 Service lifts | <input type="checkbox"/> SS15/4 Signs for facilitating evacuation |
| <input type="checkbox"/> SS8/3 Escalator and moving walks | <input type="checkbox"/> SS15/5 Smoke separations |
| <input type="checkbox"/> SS9 Mechanical ventilation or air conditioning systems | <input type="checkbox"/> SS16 Cable cars |
| <input type="checkbox"/> SS10 Building maintenance units | |
| <input type="checkbox"/> SS11 Laboratory fume cupboards | |

Attachments

The following documents are attached to this application:

(Where applicable)

- ☐ Certificates that relate to the energy work
(e.g. gas and electricity)
- ☐ Evidence that the specified systems are capable of performing to the performance standards set out in the building consent
- ☐ Proof of potability of drinking water from private well, and/or rain water catchment, supply
(Refer to New Zealand Drinking Water Standards 2005)
- ☐ Memoranda (records of building work) from licensed building practitioner(s) stating what restricted building work they carried out or supervised
- ☐ Other documents from personnel that carried out the work

Terms of trade

I/We understand that:

Fees associated with the Building Consent shall be paid for i.e. development contributions, amendments, additional inspections, and extensions prior to the issue of Code Compliance Certificate.

All other accounts shall be paid by the 20th day of the month following the month in which the invoice is issued.

I/We agree to pay according to these terms for any goods or services you supply to us. Failure to meet these Terms of Trade may result in any credit arrangement being withdrawn with any balance becoming payable within seven days. Should failure to meet the terms of trade result in debt recovery and/or legal proceedings, any costs whatsoever incurred in the collection of the debt including debt collector's fees and commissions and legal costs, charges and expenses on a solicitor and own client basis will be added to the account and will be payable by me/us.

Important information

All the relevant information on this form is required to be provided under the *Building Act 2004* and/or *Resource Management Act 1991* for the Waimakariri District Council to assess your application. Under these Acts this information has to be made available to members of the public if requested. The information contained in this application may be made available to other units of the Council. You have the right to access the personal information held about you by the Council which can be readily retrieved. You can also request that the Council correct any personal information it holds about you.

Code compliance certificate

A Building Consent is not completed until it has been issued with a Code Compliance Certificate. The owner is required to complete a separate application for a Code Compliance Certificate as soon as practicable after the building work is completed. In any event no later than two (2) years after the granting of the Building Consent, the Council is required to decide whether or not a Code Compliance Certificate can be issued. If your project will not be completed within two years, you will need to apply for a time extension*.

*Fees apply

Inspections

During the process of construction, inspections will be necessary to confirm all work complies with your approved Building Consent documentation. Please phone the Council Building Unit on 03 311 8906 at least **48 hours in advance** of requiring an inspection. Bookings are subject to demand and availability of inspectors, **please be advised that it is not always possible to carry out an inspection within 48 hours.**

The inspections required will be set out in the Building Consent documentation issued by the Council. Failure to have a prescribed inspection carried out may put the issue of the Code Compliance Certificate at risk.

All inspections including re-inspections are subjected to a separate charge, even if carried out on the same day.

Agency

The owner may authorise an agent to submit an application on their behalf.

The Agent will be the first point of contact for all communications with the Council/Building Consent Authority regarding the application for a Code Compliance Certificate under *Section 92 of the Building Act 2004*. They will receive all correspondence and must be authorised by the owner - see page 2. All amendments require new authorisation.

Fees

Please note - All work for the issue of a Code Compliance Certificate will be invoiced and must be paid in full before the Code Compliance Certificate will be issued.

Notice to fix

If a Notice to Fix is issued, it will state the building work that must be carried out and will set a timeframe in which this work must be completed. Once the work listed has been completed a further inspection should be booked by phoning the Council Building Unit on 03 311 8906.



Private Bag 1005, Rangiora 7440
Ph 03 311 8900, 03 327 6834 Fax 03 313 4432
www.waimakariri.govt.nz

PRODUCER STATEMENT PIPEWORK TESTING

BC No.

Issued by (Plumber):

At (address):

For (Owner):

In respect of the testing of water pipe work prior to concealment.

I hereby state that I have personally tested the water pipe work installed in the building authorised under this Building Consent by the method indicated hereunder.

- ☐ By pressurising the pipe work to 1500 kPa for a period of not less than 15 minutes for the hot and cold water supply and checking to see there are no leaks. (NZBC G12/AS1 7.5.1 (a), (b).)
- ☐ By pressurising the uPVC pipe work to 1.5 times the maximum working pressure for a period of not less than 15 minutes and checking that there are no leaks. (NZBC G12/AS1 7.5.2, NZS 7643).

Max working pressure was:

- ☐ By pressurising the pipe work to 1500 kPa for a period of not less than 5 minutes and checking to see there are no leaks. (NZBC G12 VM1, AS3500:Part 1.2 1998)

And believe on reasonable grounds that the pipe work has passed that test.

- ☐ All work complies with the NZBC

I also understand that Waimakariri District Council in accepting this producer statement will be relying on it to issue the Code Compliance Certificate at the completion of the building work.

SIGNATURE OF LICENSED CERTIFYING PLUMBER:

Signature:

Registration Number:

Company Name:

Date:



WAIMAKARIRI
DISTRICT COUNCIL

215 High Street, Rangiora
Private Bag 1005, Rangiora 7440
Free Phone 0800 965 468
Email office@wmk.govt.nz
waimakariri.govt.nz

**BUILDING CONSENT AND/OR PIM APPLICATION
FOR DWELLINGS & OTHER WORK THAT DOES NOT FIT THE
CRITERIA FOR SPECIFIED MINOR WORKS FIXED FEE
NOT FOR COMMERCIAL PROJECTS**

Under The Building Act 2004, Sections 33, 45 & Schedule 1, Part 1,
Section 2, BAA13

BC No.

THE BUILDING

1. Site address:
(Street / Road / Township)
2. Legal description of the land where the building is located:
Lot: DP: Valuation Number:
3. Building Name (if applicable):
4. Location of building within site:
(Only applicable to multi-development sites)
5. Number of levels: 6. Unit/Level No.:
7. Floor area m² - Existing: New: Total:
8. Current lawfully established use:
(i.e. use on any previous consent for the existing building)
9. Year building first constructed:
(Only applicable to existing buildings, approximate date is acceptable, eg 1920's)

THE OWNER

10. Owner's name:
(Company or organisation name if applicable)
11. Contact person:
12. Mailing address:
13. Street address / Registered office:
14. Mobile: Landline: Email:
15. The following evidence of ownership is attached to this application:
 - ☐ Copy of Certificate of Title OR ☐ Council to provide (additional charge of \$15)
(Current within 1 month of being issued and must include a deposited plan [diagram])
 - ☐ Signed copy of Sale and Purchase Agreement
(If Certificate of Title is not issued)

THE AGENT

PLEASE NOTE - Authorisation is required from the owner to act as agent.

16. Agent's name:
(Company or Organisation name if applicable)
17. Contact person:
18. Mailing address:
19. Street address / Registered office:
20. Mobile: Landline: Email:

APPLICATION

21. I request that the following (please select one) be issued for the Building Work described in this Application:

- ☐ Project Information Memorandum (PIM) only
 ☐ Building Consent for PIM No:
- ☐ Building Consent with PIM
 ☐ Building Consent without PIM (Compliance Check applies)
- ☐ Exemption from the need for B/C
(Refer Schedule 1, Part 1, Section 2, BAA13)
 ☐ Amendment to Building Consent
- ☐ Building Consent for Above Ground Pool and/or Non-Exempt Small Heated Pool

22. I wish to receive my approved documentation in the following format:

PLEASE NOTE - If USB or Hard Copy please confirm if you wish to pick it up from the council or have it posted/couriered (couriered will incur an additional cost).

☐ Electronically via Sharefile Transfer Portal (You must be set up and registered for this option)

☐ USB: ☐ (post) OR ☐ (pick-up) OR ☐ (courier)

☐ Hard copy (on site): ☐ (post) OR ☐ (pick-up) OR ☐ (courier)

PLEASE NOTE - One set of "On-site" hard copy consented documents must be available at all times for inspections.

23. All consent related invoices/refunds to be billed and sent to:

☐ Owner
 ☐ Agent
 ☐ Or other (If other please complete below)

Company name:
(If applicable)

Contact person:

Mailing address:

Mobile: Landline: Email:

PLEASE NOTE - Any refunds are to the receipted name unless written authorisation has been received from the receipted person or company.

SPECIFY AND PROVIDE WITH APPLICATION

APPLICANT TO COMPLETE

OFFICE USE ONLY

Building Element – Site information

- | | | |
|--------------------------------------------------|--------------------------|--------------------------|
| Completed application form | <input type="checkbox"/> | <input type="checkbox"/> |
| Set of plans / specifications (1 copy) | <input type="checkbox"/> | <input type="checkbox"/> |
| Certificate of Title / Sales & Purchase (1 copy) | <input type="checkbox"/> | <input type="checkbox"/> |

ONLY FOR SWIMMING POOL:

Building Element – Drawn Information / Specifications / Details

- | | | |
|------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| Site plan, showing location of pool and existing buildings, location of fence, boundaries and existing waterways | <input type="checkbox"/> | <input type="checkbox"/> |
| Fence construction. Show the height, gates, self closing device, construction type etc (see "A guide to pool fencing") | <input type="checkbox"/> | <input type="checkbox"/> |
| Also show how any doors or windows that form part of the fence will comply | <input type="checkbox"/> | <input type="checkbox"/> |
| Brand and model of pool: <input type="text"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Size of the pool: <input type="text"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Drainage plan. Show discharge point | <input type="checkbox"/> | <input type="checkbox"/> |
| Producer statement (where applicable) | <input type="checkbox"/> | <input type="checkbox"/> |
| Installation instructions/manual | <input type="checkbox"/> | <input type="checkbox"/> |
| Show filling point for pool (tap) and backflow protection | <input type="checkbox"/> | <input type="checkbox"/> |

PROJECT

25. Description of work (e.g. dwelling, alteration/addition). If an amendment, please provide a complete description of the nature of the amendment.

26. Specify the intended use of the building (e.g. residential/show home)

27. Will the building work result in a change of use of this building? ☐ Yes ☐ No

If yes provide details

28. Will hazardous substances be stored in the building? ☐ Yes ☐ No

29. Intended life of the building:

Indefinite but not less than 50 years ☐ Or specified as years

30. Is this a staged consent: ☐ Yes ☐ No

If staged, provide details

(e.g. Stage 1 of 3)

31. List Building Consents previously issued for this building (if any):

(i.e. is this project being constructed in stages? Is this consent for a relocated or transportable building?)

32. Estimated value (incl GST) \$

(i.e. the estimated aggregate of the values of all goods and services to be supplied for the building work and includes GST).

GEOTECHNICAL REPORT

If a geotechnical report has been included in this application, please confirm that it has been uploaded to the Canterbury Geotechnical database by providing its unique report reference number below.

Report number:

PROJECT INFORMATION MEMORANDUM

The following matters are involved in the project:

- ☐ Subdivision
- ☐ Alterations to land contours
- ☐ New or altered connections to public utilities
- ☐ New or altered locations and/or external dimensions of buildings
- ☐ New or altered access for vehicles
- ☐ Building work over or adjacent to any road or public place
- ☐ Disposal of stormwater and wastewater
- ☐ Building work over any existing drains or sewers or in close proximity to wells or water mains
- ☐ Other matters known to the applicant that may require authorisations from the territorial authority:

NOTES

Other notes or comments which you may wish to add, eg: Resource Consents

BUILDING CODE COMPLIANCE

The building work will comply with the building code as follows:

(If you are not sure what clauses are applicable, consult with your builder, designer or architect).

Clause (Tick relevant clause numbers of Building Code)	Means of compliance (Refer to the relevant compliance document(s) or detail of alternative solution in the plans and specifications; if not applicable, put n/a)	Waiver / modification required (State nature of waiver or modification of building code required; if not applicable, put n/a)
<input type="checkbox"/> B1 Structure		
<input type="checkbox"/> B2 Durability		
<input type="checkbox"/> C1 - C6 Protection from fire		
<input type="checkbox"/> D1 Access routes		
<input type="checkbox"/> D2 Mechanical installations for access		
<input type="checkbox"/> E1 Surface water		
<input type="checkbox"/> E2 External moisture		
<input type="checkbox"/> E3 Internal moisture		
<input type="checkbox"/> F1 Hazardous agents on site		
<input type="checkbox"/> F2 Hazardous building materials		
<input type="checkbox"/> F3 Hazardous substances and processes		
<input type="checkbox"/> F4 Safety from falling		
<input type="checkbox"/> F5 Construction and demolition hazards		
<input type="checkbox"/> F6 Visibility in escape routes		
<input type="checkbox"/> F7 Warning systems		
<input type="checkbox"/> F8 Signs		
<input type="checkbox"/> F9 Means of restricting access to residential pools		
<input type="checkbox"/> G1 Personal hygiene		
<input type="checkbox"/> G2 Laundering		
<input type="checkbox"/> G3 Food preparation and prevention of contamination		
<input type="checkbox"/> G4 Ventilation		
<input type="checkbox"/> G5 Interior environment		
<input type="checkbox"/> G6 Airborne and impact sound		
<input type="checkbox"/> G7 Natural light		
<input type="checkbox"/> G8 Artificial light		
<input type="checkbox"/> G9 Electricity		
<input type="checkbox"/> G10 Piped services		
<input type="checkbox"/> G11 Gas as an energy source		
<input type="checkbox"/> G12 Water supplies		
<input type="checkbox"/> G13 Foul water		
<input type="checkbox"/> G14 Industrial liquid waste		
<input type="checkbox"/> G15 Solid waste		
<input type="checkbox"/> H1 Energy efficiency		

General Provision	Building Code Clause		Means of Compliance		Waiver / Modification required
			Acceptable Solution	Alternative Solution. Details verifying compliance.	
STABILITY	B1	Structure	Yes	AS1 , VM1 (Trusses) , NZS3604 , VM4	N/A
	B2	Durability	Yes	B2/AS1, NZS3101, NZS3602, NZS3604	N/A
FIRE SAFETY	C1	Objectives of clauses C2-C6	Yes	C/AS1	N/A
	C2	Prevention of fire occurring	Yes	C/AS1	N/A
	C3	Fire affecting areas beyond the fire source	N/A	C/AS1	N/A
	C4	Movement to place of safety	Yes	C/AS1	N/A
	C5	Access and safety for firefighting operations	N/A	C/AS1	N/A
	C6	Structural stability	N/A	C/AS1	N/A
ACCESS	D1	Access Routes	Yes	D1/AS1,NZS4121	N/A
	D2	Mechanical installations for access	N/A	D2/AS1,NZS4332, EN81, EN115	N/A
MOISTURE	E1	Surface water	Yes	E1/AS1, AS/NZS3500.3	N/A
	E2	External moisture	Yes	E2/AS1 Specific design and testing	N/A
	E3	Internal moisture	Yes	E3/AS1	N/A
SAFETY OF USERS	F1	Hazardous agents on site	Yes	F1/VM1	N/A
	F2	Hazardous building materials	Yes	F2/AS1, NZS4223	N/A
	F3	Hazardous substances and processes	N/A	F3/AS1	N/A
	F4	Safety from falling	Yes	F4/AS1, FSP Act	N/A
	F5	Construction and demolition hazards	Yes	F5/AS1	N/A
	F6	Lighting for emergency	N/A	F6/AS1	N/A
	F7	Warning systems	Yes	F7/AS1, AS/NZS1668, NZS4512, NZS4515	N/A
	F8	Signs	N/A	F8/AS1	N/A
	F9	Restricting access by young children to residential pools	N/A	F9/AS2	N/A
SERVICES AND FACILITIES	G1	Personal hygiene	Yes	G1/AS1	N/A
	G2	Laundrying	Yes	G2/AS1	N/A
	G3	Food preparation and prevention of contamination	Yes	G3/AS1	N/A
	G4	Ventilation	Yes	G4/AS1, AS1668.2	N/A
	G5	Interior environment	N/A	G5/AS1	N/A
	G6	Airborne and impact sound	N/A	G6/AS1	N/A
	G7	Natural light	Yes	G7/AS1	N/A
	G8	Artificial light	Yes	G8/AS1, NZS6703,	N/A
	G9	Electricity	Yes	G9/AS1	N/A
	G10	Piped services	Yes	G10/AS1	N/A
	G11	Gas as an energy source	Yes	G11/AS1, NZS5601	N/A
	G12	Water supplies	Yes	G12/AS1,	N/A
	G13	Foul water	Yes	G13/AS1 , G13/AS2	N/A
	G14	Industrial liquid waste	N/A	G14/AS1	N/A
	G15	Solid waste	N/A	G15/AS1	N/A
ENERGY EFFICIENCY	H1	Energy efficiency provisions	Yes	H1/AS1, NZS4218, NZS4243, NZS4214	N/A

COMPLIANCE SCHEDULE

The specified systems for the building are as follows (specified systems are defined in regulations):

The following specified systems are being altered, added to, or removed in the course of the building work:

There are no specified systems in the building ☐

RESTRICTED BUILDING WORK

Does the building work include any restricted building work? ☒ Yes ☐ No

If Yes, provide the following details of all Licensed Building Practitioners who will be involved in carrying out or supervising the restricted building work (if these details are unknown at the time of the application, they must be supplied before the work begins).

LICENCE CLASS	NAME	LICENSED BUILDING PRACTITIONER NUMBER (or registration number if treated as being licensed under section 291 of the Building Act 2004)
FOUNDATIONS		
CARPENTRY		
EXTERIOR PLASTERER		
BRICKLAYER		
BLOCKLAYER		
ROOFER		

KEY PERSONNEL

BUILDER

Name:	<input type="text"/>	Reg. No.:	<input type="text"/>
Address:	<input type="text"/>		
Phone No.:	<input type="text"/>	Fax No.:	<input type="text"/>
Email:	<input type="text"/>		

DESIGNER(S)

Name:	<input type="text"/>	Reg. No.:	<input type="text"/>
Address:	<input type="text"/>		
Phone No.:	<input type="text"/>	Fax No.:	<input type="text"/>
Email:	<input type="text"/>		

CERTIFYING DRAINLAYER

Name:	<input type="text"/>	Reg. No.:	<input type="text"/>
Address:	<input type="text"/>		
Phone No.:	<input type="text"/>	Fax No.:	<input type="text"/>
Email:	<input type="text"/>		

CERTIFYING PLUMBER

Name:	<input type="text"/>	Reg. No.:	<input type="text"/>
Address:	<input type="text"/>		
Phone No.:	<input type="text"/>	Fax No.:	<input type="text"/>
Email:	<input type="text"/>		

CERTIFYING GASFITTER

Name:	<input type="text"/>	Reg. No.:	<input type="text"/>
Address:	<input type="text"/>		
Phone No.:	<input type="text"/>	Fax No.:	<input type="text"/>
Email:	<input type="text"/>		

REGISTERED ELECTRICIAN

Name:	<input type="text"/>	Reg. No.:	<input type="text"/>
Address:	<input type="text"/>		
Phone No.:	<input type="text"/>	Fax No.:	<input type="text"/>
Email:	<input type="text"/>		

STRUCTURAL ENGINEER

Name:	<input type="text"/>	Reg. No.:	<input type="text"/>
Address:	<input type="text"/>		
Phone No.:	<input type="text"/>	Fax No.:	<input type="text"/>
Email:	<input type="text"/>		

OWNER / AGENT AUTHORISATION

PLEASE NOTE - By entering your name in the box below you are giving your authority for the application to proceed.

Name: Date:

I am the ☐ Owner ☐ Agent

Note: If acting on behalf, by entering your name above you hereby declare that you are authorised to act as Agent for the Owner.

NB: Ensure Agent Authorisation section is completed - see below.

AGENT AUTHORISATION (TO BE AUTHORISED BY OWNER)

PLEASE NOTE - By entering your name in the box below you are giving your authority for this application to proceed.

I authorise to act as Agent on my behalf for this Building Consent application under Sections 33 and 45 of the Building Act 2004.

With respect to this Building Consent application, I authorise to act as Agent on my behalf for the application for Code Compliance Certificate under Section 92 of the Building Act 2004.

Name (Owner): Date:

TERMS OF TRADE

I/We understand that:

Building Consents shall be paid for when the consent is collected or if the consent is not collected within three months after the date of consent being granted, the work done to date portion i.e. admin and processing costs of the account will be due and payable. The balance of the invoice will be payable when the consent is collected.

All other accounts shall be paid by the 20th day of the month following the month in which the invoice is issued.

I/We agree to pay according to these terms for any goods or services you supply to us. Failure to meet these Terms of Trade may result in any credit arrangement being withdrawn with any balance becoming payable within seven days. Should failure to meet the terms of trade result in debt recovery and/or legal proceedings, any costs whatsoever incurred in the collection of the debt including debt collector's fees and commissions and legal costs, charges and expenses on a solicitor and own client basis will be added to the account and will be payable by me/us.

DOCUMENTATION CHECKLIST

Applicants must mark all items provided with ☒ or leave blank if not applicable.

PIM

This section must be completed if you are applying for a PIM.

DO NOT complete this section if a PIM has already been issued.

The following documents are attached to this application:

- ☐ Site plan, Floor plans, Elevations for proposed building
- ☐ Certificate of Title, or Sales and Purchase Agreement if C/T is not issued. Current C/T required (current within one month of application)
- ☐ One copy of all information required (all plans to be dimensioned, scaled and accurate. Plans preferred size A3)
- ☐ Application fee (as per Council Fees and Charges Schedule)

BUILDING CONSENT

(DO NOT complete this section if the Application is for a Project Information Memorandum only)

The following documents are attached to this application:

- ☐ 1 copy - building plans (site plans, floor plans, elevation plans. All plans to be dimensioned, scaled and accurate preferred size A3)
- ☐ 1 copy of each - specifications, producer statements, truss details (refer below)
- ☐ 1 copy - Certificate of Title or Sale and Purchase Agreement if C/T is not issued. Current C/T required (current within one month of application)
- ☐ Project Information Memorandum Development Contribution Notice (if applicable)
- ☐ Certificate attached to Project Information Memorandum (Resource Management Act)
- ☐ Certificate of design work from licensed building practitioner
- ☐ Restricted building work - see page 5
- ☐ Key personnel - see page 6
- ☐ See page 5 for a schedule confirming the building work will comply with the Building Code

APPLICATION FORM (One copy)

- ☐ Fully complete all sections
- ☐ Means of Compliance with NZBC - designer to complete
- ☐ Provide the correct legal description (Council can help with this)
- ☐ Provide one copy of the current Certificate of Title, or Sales and Purchase Agreement - not more than one month old
- ☐ Give name and contact numbers of contact person (if not the owner)
- ☐ State the project location (street address or location details as near as possible if no address)
- ☐ Sign and date the form
- ☐ Agent Authorisation (section completed where applicable)
- ☐ Certificate/s of design work (LBP)

DESIGN BASIS (To be completed by the designer)

Please list the following basis for the building design:

- ☐ Wind zone
- ☐ Earthquake zone
- ☐ Snow zone/altitude
- ☐ Corrosion zone (if applicable)
- ☐ Building is specifically engineer-designed
- ☐ Complies with NZS 3604:2011
- ☐ Both specific design and NZS 3604:2011

DESIGN DOCUMENTS (One copy)

- ☐ Weather tightness risk matrix
- ☐ Truss design layout and Producer Statement
- ☐ Bracing calculations / plan
- ☐ H1 Energy efficiency calculations

SITE PLAN (One copy)

- ☐ Overview of site showing legal boundaries as per current Title
- ☐ Showing proposed and existing structures (including swimming pools)
- ☐ Distances to boundaries
- ☐ Proposed and existing site levels
- ☐ North point
- ☐ Utility infrastructure (sewer, water pipelines, septic tanks etc) where applicable
- ☐ Water races, drains, topographic features

DRAINAGE LAYOUT (One copy to scale usually 1:100 or 1:50)

- ☐ Foul water - showing waste pipes, sizes, grades, venting
- ☐ Foul water to discharge point
- ☐ Storm water - pipe sizes, grades, downpipe locations
- ☐ Storm water drain to discharge point

FOUNDATION LAYOUT (One copy to scale usually 1:100 or 1:50)

- ☐ Full foundation layout plan
- ☐ For timber floors, show all pile layout, pile types and bracing location
- ☐ Slab thickenings, shrinkage control joints and reinforcing rebates

**OFFICE
USE ONLY**
These have
been provided:

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FLOOR PLANS (One copy to scale usually 1:100 or 1:50)

- ☐ Layout of all floors fully dimensioned. For alterations and/or additions provide both new and existing floor plans
- ☐ Doors and window positions and sizes
- ☐ Layout of amenity areas (laundry etc)
- ☐ Main structural beams that are not shown elsewhere
- ☐ Lintel sizes
- ☐ HWC location
- ☐ Roof space access
- ☐ Gas cylinder location
- ☐ Room names
- ☐ Location of smoke alarms
- ☐ Location of heating unit (if applicable)

EXTERIOR ELEVATIONS (One copy to scale usually 1:100 or 1:50)

- ☐ Elevations of all external walls showing claddings
- ☐ Doors and windows showing opening sections
- ☐ Show location of solar panels
- ☐ Accurate ground levels existing and proposed
- ☐ Subfloor ventilation for timber floors
- ☐ Show roof bracing on elevations if not shown elsewhere

CROSS SECTION AND CONSTRUCTION DETAILS (One copy to scale usually 1:50 or 1:20 for sections and 1:10 for details - minimum scale)

- ☐ Roof lines, overhangs, floor levels, ground levels
- ☐ Major vertical dimensions
- ☐ Foundation, wall and roof structure materials
- ☐ Upper level decks or balconies over lower level room must be fully detailed including the stormwater disposal and overflow precautions
- ☐ Stairs, handrails and balustrade showing pitch and head clearances
- ☐ Structural connections, posts to footings, beams to posts, trusses or beams to walls
- ☐ Component fixing information is to be provided for all structural and framing components
- ☐ Foundation and footing details and reinforcing. Show height from finished floor to ground level
- ☐ Pile details for timber floors
- ☐ Floor bracing details
- ☐ Timber grade and treatment
- ☐ Damp proof membranes, building papers and insulation systems/materials
- ☐ Flashing details and documents
- ☐ Roof penetrations
- ☐ Shower floor details and wall to shower base junction detail
- ☐ Sealing to wet area fixtures
- ☐ Water splash prevention
- ☐ All other building components that are not otherwise detailed or are unusual in any way

SPECIFICATION (One copy)

The specification must be for the project. We will not accept standard specifications unless they relate directly to the building and they cover the project accurately and fully. Multichoice specifications will not be accepted. A brief accurate specification is usually best.

- ☐ Provide a written specification to cover all of the trades involved in the project. All materials used in the project are fully specified including fixings of all materials and components
- ☐ The specification can be written on the drawings as long as all materials are fully covered

OFFICE USE ONLY

These have
been provided:

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☐
☐

IMPORTANT THINGS TO INCLUDE IN YOUR APPLICATION (One copy - where relevant)

- ☐ The chartered professional engineer's Producer Statement
- ☐ The engineer's monitoring schedule if the engineer chooses to do site monitoring
- ☐ All structural calculations
- ☐ Structural details showing connections and details of the components
- ☐ Solar technical details and plumbing schematic
- ☐ Log fire and flue installation instructions.
- ☐ If log fire secondhand, engineer's certification required
- ☐ Current potable water test (current within 18 months)
- ☐ Effluent disposal design & ECan's copy of the submitted application form or approval
- ☐ Wastewater system designs when required to be done by a chartered professional engineer such as in a hazard zone

**OFFICE
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These have
been provided:

☐

GEOTECHNICAL REPORT

- ☐ Unique report reference number provided, if applicable

☐

OFFICE USE ONLY

Further information required? ☐ Yes ☐ No

Date of acceptance: Officer:

OFFICE USE ONLY

Amount paid: \$ Date: Officer:

☐ Fee paid on application ☐ Deposit invoice sent

Date payment processed: Receipt Officer:

IMPORTANT INFORMATION

All the relevant information on this form is required to be provided under the Building Act 2004 and/or Resource Management Act 1991 for the Waimakariri District Council to assess your application. Under these Acts this information has to be made available to members of the public if requested. The information contained in this application may be made available to other units of the Council. You have the right to access the personal information held about you by the Council which can be readily retrieved. You can also request that the Council correct any personal information it holds about you.

APPLICATION INFORMATION

- (a) Project Information Memorandum (PIM):
A PIM will be issued within 20 working days provided all the required information is supplied with the application.
Processing time is stopped whenever further information is required and starts again when the correct information is received.
It is not mandatory to apply for a PIM. Applicants can choose not to apply for a PIM when they consider that the information would not be relevant for their building project.
A fee is required to accompany your PIM application (as per Council's fees and Charges Schedule).
- (b) Compliance Check:
Where a PIM is not sought, a Compliance Check will be undertaken to ensure your proposal complies with the District Plan.
- (c) Building Consent (BC):
A Building Consent will be processed within a maximum allowable time of 20 working days provided all the information required has been supplied. Processing time is stopped whenever further information is required and starts again when the correct information is received.
Once the Building Consent has been granted, you will receive notification, which will include an invoice for the fees payable. Once the fees are paid in full, your Building Consent will be issued. Work must not start until the Building Consent is issued, and any Resource Consent requirements have been resolved.
A Building Consent lapses and is of no effect if the building work to which it relates does not commence within 12 months after the date of issue of the Building Consent or any further period that the Building Consent Authority may allow.
- (d) Combined Project Information Memorandum & Building Consent Applications:
Applications for a combined PIM/BC will only be accepted when sufficient information is provided to permit the Building Consent to be processed.
If insufficient information is provided, then further information will be requested, or your application may be returned to you.
- (e) If the applicant does not own the land, they must provide written approval from the owner to submit this application.

LEVIES PAYABLE

Under the Building Act 2004 s53, s55 s402 Council are authorised to collect levies for the MBIE (Building Levy Order 2005) and BRANZ (Building Research Levy Act 1969). Levies are only payable on building works where the construction value exceeds a prescribed amount.

Building Act 2004 – <http://www.legislation.govt.nz/act/public/2004/0072/latest/whole.html>

Building Levy Order 2005 – <http://www.legislation.govt.nz/regulation/public/2005/0033/latest/whole.html#DLM313989>

Building Research Levy Act 1969 - <http://www.legislation.govt.nz/act/public/1969/0023/latest/whole.html>

INSPECTIONS

During the process of construction, inspections will be necessary to confirm all work complies with your approved Building Consent documentation. Please phone the Council Building Unit on 03 311 8906 at least 48 hours in advance of requiring an inspection to ensure that this can be arranged.

The inspections required will be set out in the Building Consent documentation issued by the Council. Failure to have a prescribed inspection carried out may put the issue of the Code Compliance Certificate at risk.

All inspections including re-inspections are subjected to a separate charge, even if carried out on the same day.

RESOURCE CONSENT

Your application will be assessed by the Planning Unit of the Council to determine whether your project complies with the relevant District Plan requirements.

If your application does not comply with District Plan requirements you will need to either amend your proposal to comply or apply for a Resource Consent. A Certificate will be attached to your Project Information Memorandum to notify that a Resource Consent is required prior to building work commencing. It is recommended that you phone the Planning Unit on 0800 965 468 to discuss the process.

CODE COMPLIANCE CERTIFICATE

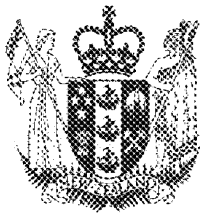
A Building Consent is not completed until it has been issued with a Code Compliance Certificate. The owner is required to complete a separate application for a Code Compliance Certificate as soon as practicable after the building work is completed. In any event no later than two (2) years after the granting of the Building Consent, Council is required to decide whether or not a Code Compliance Certificate can be issued. If your project will not be completed within two years you will need to apply for a time extension*.

*Fees apply

AGENCY

The owner may authorise an agent to submit an application on their behalf.

The Agent will be the first point of contact for all communications with the Council/Building Consent Authority regarding this application under Sections 33 and 45 and if authorised, the application for a Code Compliance Certificate under Section 92 of the Building Act 2004. They will receive all correspondence and must be authorised by the Owner - see page 8. All amendments require new authorisation.



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



Identifier **913998**
Land Registration District **Canterbury**
Date Issued 08 May 2020

Prior References

796972

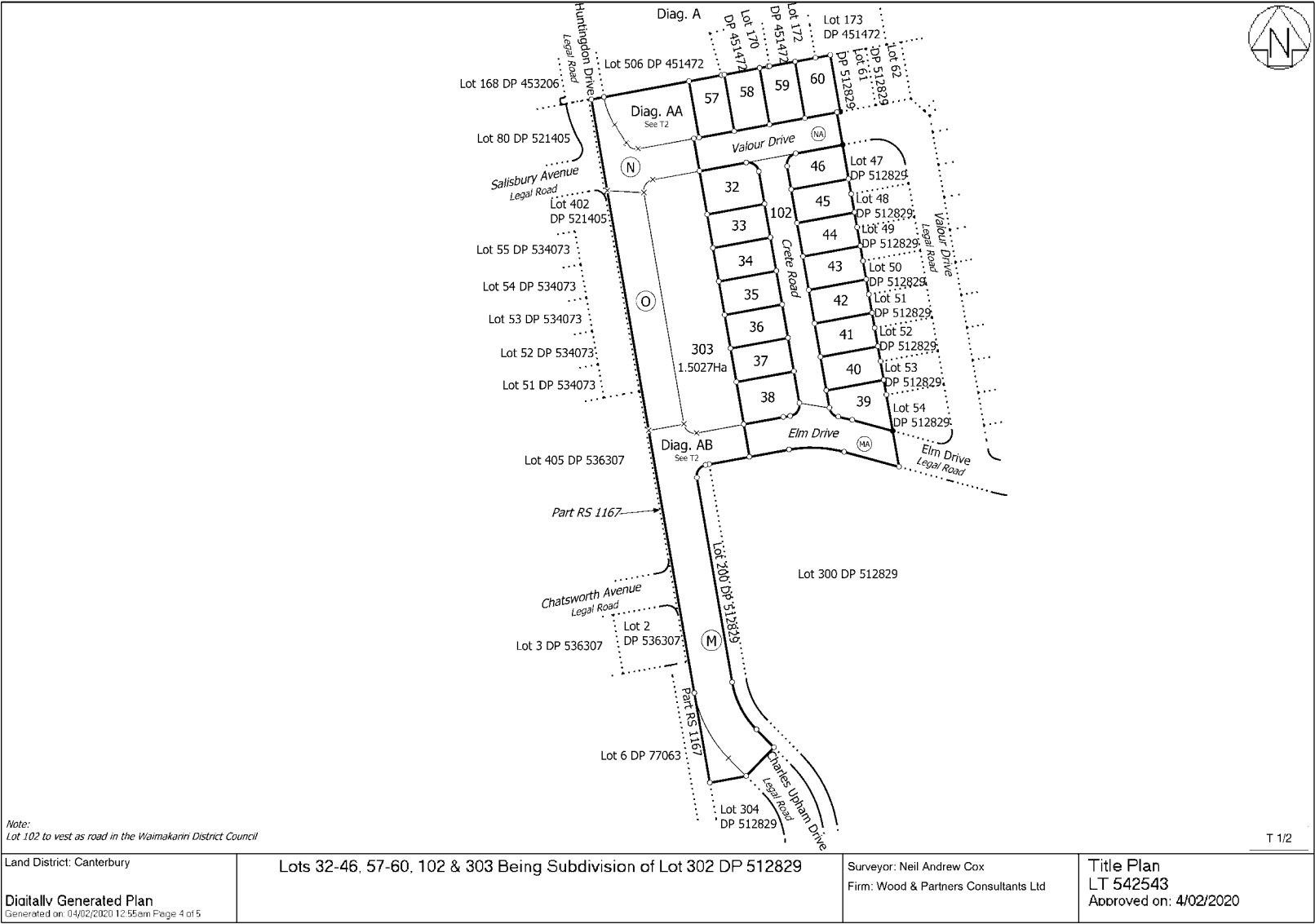
Estate	Fee Simple
Area	601 square metres more or less
Legal Description	Lot 41 Deposited Plan 542543

Registered Owners

Hollie Rose Cameron and Dean Ewen Cameron

Interests

Appurtenant hereto is a right to drain water created by Easement Instrument 6479943.4 - 1.7.2005 at 9:00 am
The easements created by Easement Instrument 6479943.4 are subject to Section 243 (a) Resource Management Act 1991
Land Covenant in Easement Instrument 9792249.5 - 6.11.2014 at 12:50 pm
Land Covenant in Easement Instrument 10875287.15 - 22.12.2017 at 12:07 pm
Land Covenant in Easement Instrument 10875287.16 - 22.12.2017 at 12:07 pm
10875287.17 Encumbrance to Charles Upham Retirement Village Limited - 22.12.2017 at 12:07 pm
11664032.8 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 8.5.2020 at 3:54 pm
11664032.9 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 8.5.2020 at 3:54 pm
11848155.2 Mortgage to The Co-operative Bank Limited - 4.9.2020 at 12:15 pm



Form 2A

Memorandum from licensed building practitioner: Certificate of design work

Section 30C or section 45, Building Act 2004

The building

Street address of building: 11 Crete rd Rangiora

The owner

Name: D and H Cameron

Address : 15 Hamlet dr Woodend

Telephone number: 0274283507

Email address: deancameron87@hotmail.com

BASIS FOR PROVIDING THIS MEMORANDUM

	I am providing this memorandum in my role as the: Please cross the option that applies (X)
()	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
(x)	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

I carried out or supervised the following design work that is restricted building work:

Design work that is restricted building work	Description	Carried out/ supervised	Reference to plans and specifications
[Cross]	[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

Foundations and ()		() Carried out	
Conc. floor		() Supervised	
Walls (x)		(x) Carried out	

		() Supervised	
Roof trusses by others	(x)	() Carried out (x) Supervised	
Columns and beams	()	() Carried out () Supervised	
Bracing	(x)	(x) Carried out () Supervised	
Roof bracing	(x)	(x) Carried out	
Purlin fixing		() Supervised	

External moisture management systems

Damp proofing	(x)	(x) Carried out () Supervised	
Roof cladding or roof cladding system	(x)	(x) Carried out () Supervised	
Ventilation system (for example, subfloor or cavity)	(x)	(x) Carried out () Supervised	
Wall cladding or wall cladding system	(x)	(x) Carried out () Supervised	
Waterproofing	(x)	(x) Carried out () Supervised	
Other	()	() Carried out () Supervised	

Fire safety systems

Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or other	(x)	(x) Carried out () Supervised	
--------------------------------------------------------------------------------------------------------------------	-------	-------------------------------------	--

Note: The design of fire safety systems is only restricted building work when it involves small-to-medium apartment buildings as defined by the Building (Definition of Restricted Building Work) Order 2011.

Note: continue on another page if necessary.

Are waivers or modifications of the building code required? () Yes (x) 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: Lance Dixon

LBP or registration number: BP111614

The practitioner is a: (x) Design LBP () Registered architect () Chartered professional engineer

Mailing address: 704 Hills rd Chch

Street address or registered office:

Phone number: Landline: 3862502

Mobile:

Daytime: 3862502

After hours:

Fax number:

Email address: dixondesign@xtra.co.nz

Website:

Declaration

I Lance Dixon *[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 described on this form and that based on this I also state that the RBW

(a) complies with the building code; or

(b) complies with the building code subject to any waiver or modification of the building code recorded on this form.

Signature: 

On behalf of Dixon Design Ltd

Date: 28 / 10 / 2020

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah



17 November 2020

Our Reference: BC201170.01

Dean E Cameron, Hollie R Cameron
C/- Dixon Design Limited
704 Hills Road
Christchurch 8051

Dear Sir/Madam

PROJECT INFORMATION MEMORANDUM

Please find enclosed your Project Information Memorandum in respect of the proposed work at 11 Crete Road RANGIORA.

Prior to **commencing building work**, the applicant must ensure that a Building Consent has been applied for and issued and that any "authorisations" have been obtained and any conditions of the PIM have been verified.
These include:

Section 37 – Breach of site coverage

The applicant is advised that Resource Consent will need to be sought as the proposed application plans show site coverage to be approximately 39.97%.

Rule 31.1.1.10

The structure coverage of the net area of any site shall not exceed:

- b. 35% in Residential 2, 3, 5 and 6 Zones;

A Land Use consent application form is attached for your use. Alternatively, the applicant can submit amended plans showing compliance.

For further information or clarification, please contact WDC's Duty Planner 0800 965 468.

RC145670 – Consent Notices

The applicant is made aware of the consent notices pertaining to Lot 41 as detailed below. A copy of the 224c and consent notices is attached for your reference.

Finished Floor Level - Any dwelling to be constructed on Lot 41 shall have a minimum finished floor level 300mm above the finished platform levels identified on the schedule provided under Condition 16.1 of RC145670 held on WDC File RC145670.

Stormwater - Stormwater runoff from the roofs of structures on Lot 41 shall discharge to an individual soak pit on each lot designed and constructed to infiltrate roof water generated by a 10 minute 10% AEP even with a Factor of Safety of 3 applied to the site soils infiltration rate.



Vehicle Crossing – Urban

Please note – Vehicle Crossing location inspection must be approved prior to the Building Consent being granted.

This property has been identified as requiring a new vehicle crossing. **A formal Vehicle Crossing application will need to be submitted (along with a \$160.00 processing fee) for approval and established prior to the erection of a dwelling or other significant building.** (Rule 3.2, Waimakariri District Council Vehicle Crossing Bylaw 2007). Note that a legal and compliant vehicle crossing will need to be established (in accordance with WDC Engineering Code of Practice **DWG 600-211** (Urban)). Resource Consent approval **will** need to be sought if the location of the proposed vehicle crossing cannot be **located within 1m or greater than 7m** to the adjacent vehicle crossing. The minimum width must be no less than 4mtrs and the maximum width must be no greater than 6mtrs. (Waimakariri District Plan Rule 30.6.1.19). **Any person who begins work on a vehicle crossing without first receiving a vehicle crossing permit from the Council commits an offence against this bylaw.** (Rule 4.4 Waimakariri District Council Vehicle Crossing Bylaw 2007)

The approval plan along with any Development Contribution notification or Resource Consent Certificate (where applicable) attached to this Project Information Memorandum must be included with the Building Consent for the project (when issued). Any significant departure from the original plans may require that a new Project Information Memorandum be issued.

Yours faithfully



Melissa Brettell
PIMs Officer

3 Project Information Memorandum [continued]

Project Information Memorandum

Sections 31-38, Building Act 2004

Application

D E Cameron, H R Cameron 15 Hamlett Drive Woodend 7610	No.	BC201170.01
	Issue date	17 November 2020
	Received date	29 October 2020
	Responsible Officer	Melissa Brettell

Project

Description	DWELLING WITH LOG BURNER AND ATTACHED GARAGE
Intended Life	Indefinite (50+)
Intended Use	Residential Dwelling
Estimated Value	\$450000.00
Location	11 Crete Road RANGIORA
Legal Description	LOT 41 DP 542543 0.060100 Ha
Valuation No.	2165716256

This project information memorandum is confirmation that the proposed building work may be undertaken, subject to the provisions of the Building Act 2004, and any requirements of the building consent.

This project information memorandum includes:

- ☐ Information identifying special features of the land concerned
- ☐ Information about the land or building concerned notified to the Council by any statutory organisation having the power to classify land or buildings
- ☐ Details of relevant utility systems
- ☐ Details of authorisations which have been granted
- ☐ Notification of any other authorisations which must be obtained before the proposed building work may be undertaken
- ☐ Important information

All boundary survey pegs are to be located by discovery or redefinition and flagged before work is commenced.

A current copy of the certificate of title is to be submitted with the building consent application.

The certificate of title may make reference to land covenants - a copy of which should be submitted with the Building Consent application.

No part of the structure is to exceed the Councils recession plane.



4 Project Information Memorandum [continued]

This project Information Memorandum does not purport to be a full report on every aspect of the property which is likely to be relevant to the building works proposed. It is information that is known to the Council at the date of the issue of this memorandum. It is issued pursuant to Sections 30-39 of the Building Act 2004.

INFORMATION IDENTIFYING RELEVANT SPECIAL FEATURES OF THE LAND

Wind Zone High

Snow zone 4

Earthquake zone 2

This building is located at approximately 41m above mean sea level. The AMSL is given for snow loading only and is not to be used for finished floor level or other design purposes.

Comments:

Finished Floor Level - Any dwelling to be constructed on Lot 41 shall have a minimum finished floor level 300mm above the finished platform levels identified on the schedule provided under Condition 16.1 of RC145670 held on WDC File RC145670.

Attachments:

224c and consent notices

INFORMATION ABOUT THE LAND OR BUILDINGS NOTIFIED TO THE COUNCIL BY ANY STATUTORY ORGANISATION HAVING THE POWER TO CLASSIFY LAND OR BUILDINGS

Environment Canterbury (Canterbury Regional Council).

Comments:

Liquefaction – Grey Area

The applicant is made aware that the proposed project falls within an area of shading on the ECAN liquefaction study map.

A report has been received with this application, this will be reviewed as part of the consent processing.

Installing a Woodburner / solid Fuel Burner, or other forms of heating in your home.

The applicant is advised to check with Environment Canterbury (Canterbury Regional Council) as to what type of fire if any may be installed into your proposed dwelling, this is determined by the Clean Air Zones. Tel: 0800324636 – This property is located within the **Clean Air Zone**.

Attachments:

Liquefaction study map.

DETAILS OF RELEVANT UTILITY SYSTEMS (administered by the Waimakariri District Council)

Sewer

Is a connection to a public sewer scheme available?

Yes

If yes, which public sewer scheme?

Eastern District

Is the property already connected?

No

Comments: Connect to the service lateral provided in compliance with conditions of the Resource Consent for this development.

The reticulation shall gravitate to the existing main located in Crete Road. The reticulation design shall incorporate the following minimum requirements:

- The shared lateral between the road boundary and the sewer main (into which the shared lateral discharges) shall be verified for grade related capacity and condition.
- If lateral grade related capacity in (a) above is not satisfactory, then the sub divider shall install a new lateral within the road reserve to connect to the public main.
- The minimum grade for this shared lateral within the road reserve shall be a minimum of 1 in 80.

Notes:

Sewer connections must be installed by registered drainlayers. It is the property owner's responsibility to arrange connections. New connections to sewer mains must be inspected and approved by the Council prior to backfilling.



5 Project Information Memorandum [continued]

A trench opening permit is required to open a footpath or street.
A Capital charge is payable where the property has not previously paid sewer rates.

Water

Is a connection to a public water supply available?	Yes
If yes, which public water supply?	Rangiora
Is the property already connected?	No

Comments: Connect to the service lateral provided in compliance with conditions of the Resource Consent for this development.

Notes:

Water connections to property boundaries are installed by the Council after the receipt of charges payable.

A capital charge is payable where the property has not previously paid water rates.

Stormwater

Is a connection to a public drainage system available?	Yes
Is the property already connected?	No
Discharge point: Kerb and Channel via on site soak pit.	

Comments: **RC145670 Consent Notice** - Stormwater runoff from the roofs of structures on Lot 41 shall discharge to an individual soak pit on each lot designed and constructed to infiltrate roof water generated by a 10 minute 10% AEP even with a Factor of Safety of 3 applied to the site soils infiltration rate.

Notes:

Stormwater connections must be installed by registered drainlayers. It is the property owner's responsibility to arrange connection. New connections to drainage systems must be inspected and approved by the Council prior to backfilling.

A trench opening permit is required if crossing a footpath.

A Capital charge is payable where the property has not previously paid urban drainage rates.

Attachments

Services map.

DETAILS OF AUTHORISATIONS THAT HAVE BEEN GRANTED

Resource Consent

Comments:

RC145670 – 75 lot residential 2 subdivision. Decision, 223, 224c and consent notices issued

RC165175 – Variation

RC165276 – Variation

RC175113 - Variation

Attachments:

RC145670 – 224c and consent notices.

A copy of the above Resource Consents are available on request.

DETAILS OF AUTHORISATIONS THAT MUST BE OBTAINED BEFORE BUILDING CAN COMMENCE:

Section 37 – Breach of Site Coverage

Compliance with Consent Notices

Vehicle Crossing

Comments:

Section 37 – Breach of site coverage

The applicant is advised that Resource Consent will need to be sought as the proposed application plans show site coverage to be approximately 39.97%.

Rule 31.1.1.10

The structure coverage of the net area of any site shall not exceed:

b. 35% in Residential 2, 3, 5 and 6 Zones;



6 Project Information Memorandum [continued]

A Land Use consent application form is attached for your use. Alternatively, the applicant can submit amended plans showing compliance.
For further information or clarification, please contact WDC's Duty Planner 0800 965 468.

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Vehicle Crossing – Urban

Please note – Vehicle Crossing location inspection must be approved prior to the Building Consent being granted.

This property has been identified as requiring a new vehicle crossing. A formal Vehicle Crossing application will need to be submitted (along with a \$160.00 processing fee) for approval and established prior to the erection of a dwelling or other significant building. (Rule 3.2, Waimakariri District Council Vehicle Crossing Bylaw 2007). Note that a legal and compliant vehicle crossing will need to be established (in accordance with WDC Engineering Code of Practice DWG 600-211 (Urban). Resource Consent approval will need to be sought if the location of the proposed vehicle crossing cannot be located within 1m or greater than 7m to the adjacent vehicle crossing. The minimum width must be no less than 4mtrs and the maximum width must be no greater than 6mtrs. (Waimakariri District Plan Rule 30.6.1.19). Any person who begins work on a vehicle crossing without first receiving a vehicle crossing permit from the Council commits an offence against this bylaw. (Rule 4.4 Waimakariri District Council Vehicle Crossing Bylaw 2007)

Attachments:

Vehicle Crossing application form

DETAILS OF VEHICLE CROSSING (ENTRANCEWAY), TYPE OF FRONTAGE AND TRENCH OPENING PERMIT

Vehicle Crossing (Entranceway)

Is formation of a vehicle crossing from road edge to property boundary required? Yes

Type of access required: Urban

Advice Notes

None applicable.

This project information memorandum is confirmation that the proposed building work may be undertaken subject to the provisions of the Building Act 2004 and any requirements of the building consent **Not yet Approved**.

Signed for and on behalf of the Council:

Name: Melissa Brettell

Date: 17/11/2020



Form 4

Certificate attached to project information memorandum BC201170.01

Section 37, Building Act 2004

Restrictions on commencing building work under the Resource Management Act 1991

The building work referred to in the attached project information memorandum is also required to have the following resource consents under the Resource Management Act 1991:

Section 37 – Breach of site coverage

The applicant is advised that Resource Consent will need to be sought as the proposed application plans show site coverage to be approximately 39.97%.

Rule 31.1.1.10

The structure coverage of the net area of any site shall not exceed:

- b. 35% in Residential 2, 3, 5 and 6 Zones;

A Land Use consent application form is attached for your use. Alternatively, the applicant can submit amended plans showing compliance.

For further information or clarification, please contact WDC's Duty Planner 0800 965 468.

As these resource consents will or may materially affect the building work to which the attached project information memorandum relates, until they have been granted no building work may proceed.

Failure to comply with the requirements of this notice may result in legal action being taken against you under the Resource Management Act 1991.

Melissa Brettell

Signature

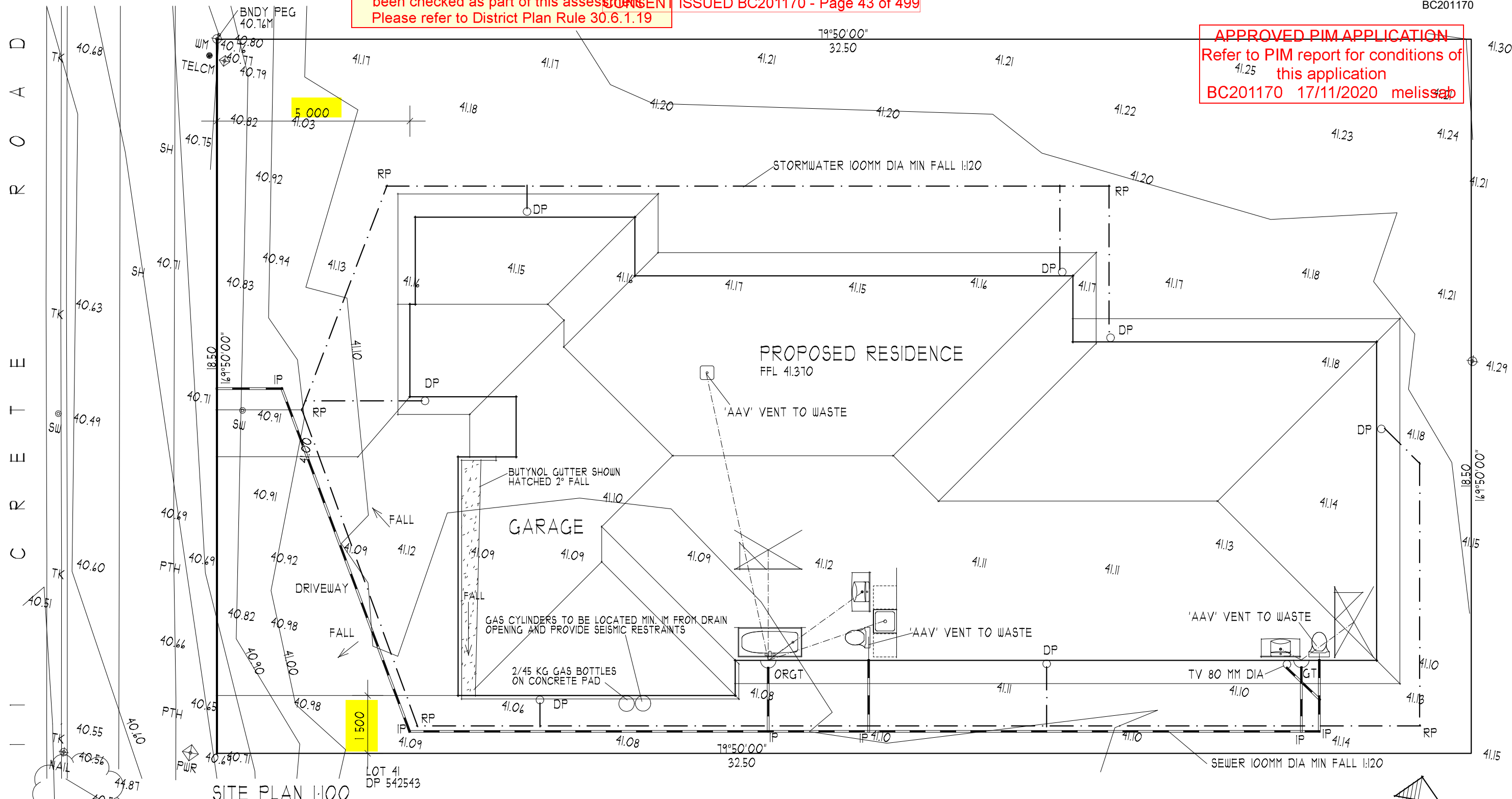
PIMs Officer.

Position

On behalf of: Waimakariri District Council

Date: 17 November 2020

APPROVED PIM APPLICATION
Refer to PIM report for conditions of this application
BC201170 17/11/2020 melissap



SITE PLAN 1:100

MINIMUM REQUIREMENTS FOR WASTE PIPES G13/AS1

SHOWER WASTE :	40 MM AT 1 IN 40
BASIN WASTE :	32 MM AT 1 IN 20
WC WASTE :	100 MM AT 1 IN 60
TUB WASTE :	40 MM AT 1 IN 30
SINK WASTE :	50 MM AT 1 IN 40
'AAV' VENT TO WASTES OVER 3.500 M LONG	
ALL TOILETS TO BE VENTED IN ACCORDANCE WITH G13/AS1 TABLE 5	

DRAIN LEAK TEST IS TO BE CARRIED OUT AS REQUIRED BY CLAUSE 8.0 EI/AS1 AND CLAUSE 4.0 G13/AS2.

ORGT - GULLY TRAP 150 MM BELOW FFL
MIN 100 MM ABOVE GROUND

GROUND CLEARANCES TO GROUND:
-TO PAVING, DRIVEWAY 150MM
-NATURAL GROUND 225 MM

TEMPORARY FENCE TO COMPLY WITH
NZBC F5 CONSTRUCTION AND DEMOLITION
DEMOLITION HAZARDS

NOTE: " BEDDING " AND " BACKFILLING " OF DRAINS
COMPLIANT WITH G13/AS2 FIG 1

NOTE: ALL DOWNPIPES 63 MM DIAMETER

NOTE: DRAINS LAID AT A GRADIENT OF 1:80 OR LESS
A VARIABLE LEVELLING DEVICE SHALL BE USED TO
ENSURE UNIFORM AND ACCURATE GRADIENTS.
(G13/AS2 CLAUSE 5.22)

NOTE: SEE OWNER FOR CLOTHESLINE , LETTERBOX
BIN , HEAT PUMP UNIT (IF APPLICABLE) AND
FENCES AND GATES

→ = 1:100 FALLS TO PAVING

NOTE: ALL ENTRIES AND EXITS TO COMPLY WITH
N.Z.B.C. DI, AS1 . TREAD MINIMUM 280 MM , RISER
MAXIMUM 190 MM. NON-SLIP FINISH TO TREADS

NOTE: SLIP RESISTANCE FOR WALKING SURFACES TO BE
COMPLIANT WITH DI - AS1 TABLE 2 , CLAUSE 2.1.1 AND
COMMENTS 1 AND 2

DRAIN SCHEDULE

IP	INSPECTION POINT
DP	DOWNPIPE
RP	RODDING POINT
GT	GULLY TRAP

AREAS:

PROPOSED RESIDENCE	240.24 M²
LAND	601 M²
SITE COVERAGE	39.97 %

-BUILDING WRAP IS TO BE FIXED OVER SILLS AND OPENING STUDS
 -FLEXIBLE FLASHING TAPE IS REQUIRED TO LINTELS AND 250 MM DOWN OPENING STUDS AT EITHER END
 -FLEXIBLE FLASHING TAPE IS REQUIRED TO SILL TRIMERS AND 150 MM UP OPENING STUDS AT EITHER END
 - FLASHING TAPE IS ALSO REQUIRED 250 MM IN EITHER DIRECTION AT UPPER CORNERS OF WINDOWS AND DOORS
 - AS THE BUILDING WRAP / PAPER EXTENDS AROUND AND IS FIXED TO THE UNDERSIDE OF THE LINTEL THE HEAD FLASHINGS NEED TO BE SEALED TO THE BUILDING WRAP WITH 50 MM WIDE FLASHING TAPE

WANZ BARS
 - ADDITIONAL SILL SUPPORT TO ALL WINDOW / DOOR JOINERY IE WANZ BARS

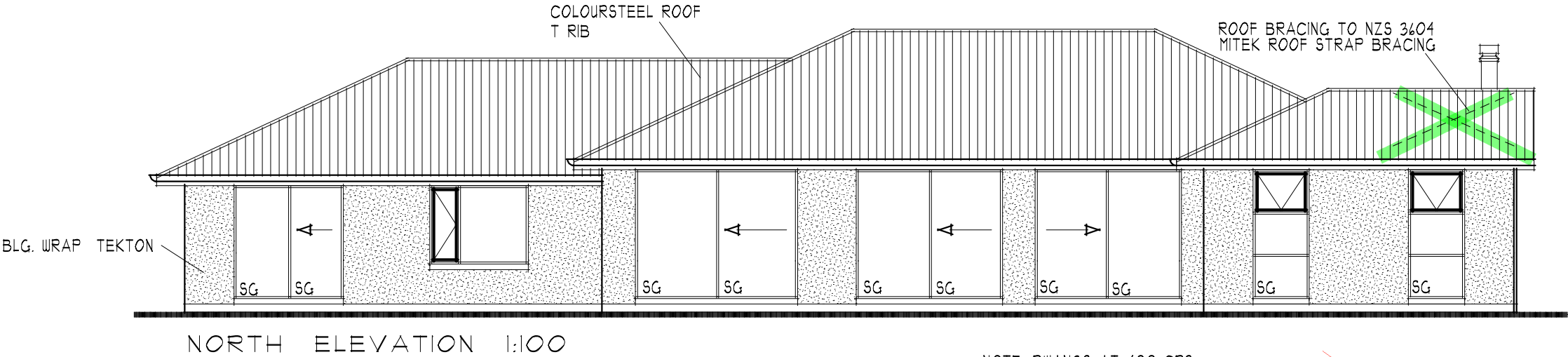
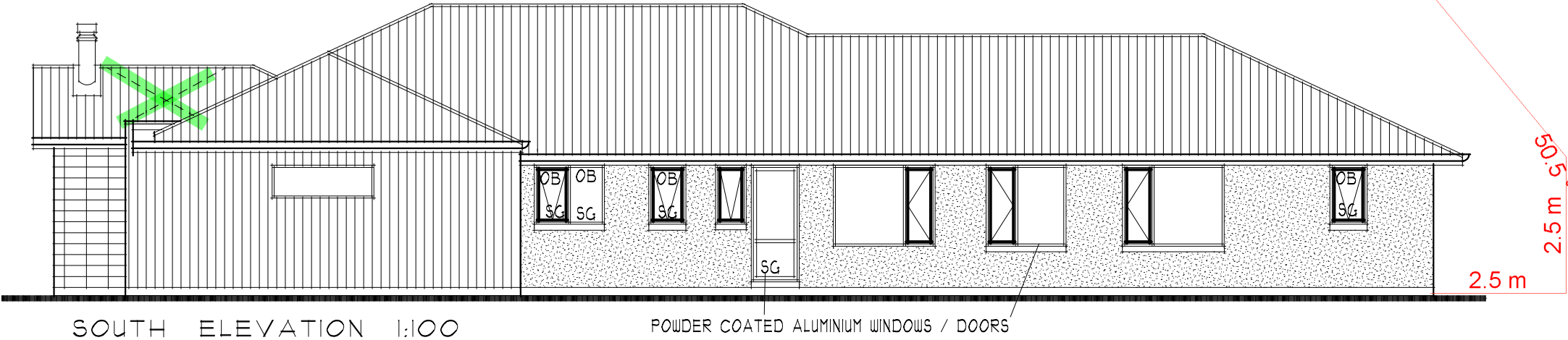
OB OBSCURE GLAZING

SG SAFETY GLASS TO COMPLY WITH THE REQUIREMENTS OF NZS 4223.3:2016 2.1.1 AND TABLE 1

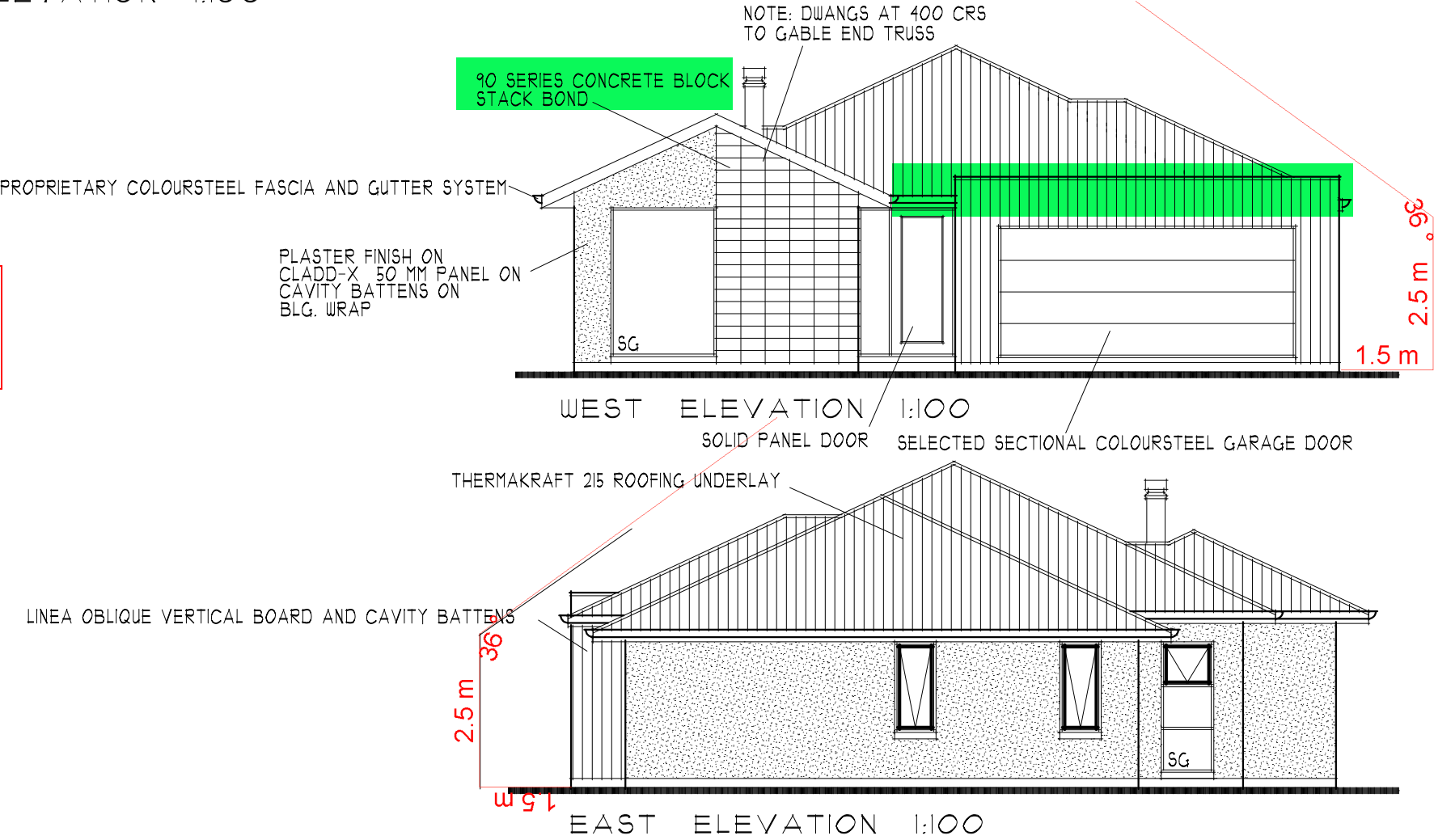
LARGE PANES OF GLASS ARE SAFETY GLASS IF WITHIN 800MM OF FLOOR AND EXCEED 500MM WIDE AND 1000MM HIGH. PLEASE ALSO CONFIRM THAT ALL GLAZING WITHIN 800MM OF THE FLOOR IS EITHER 5MM FLOAT GLASS OR SAFETY GLASS.

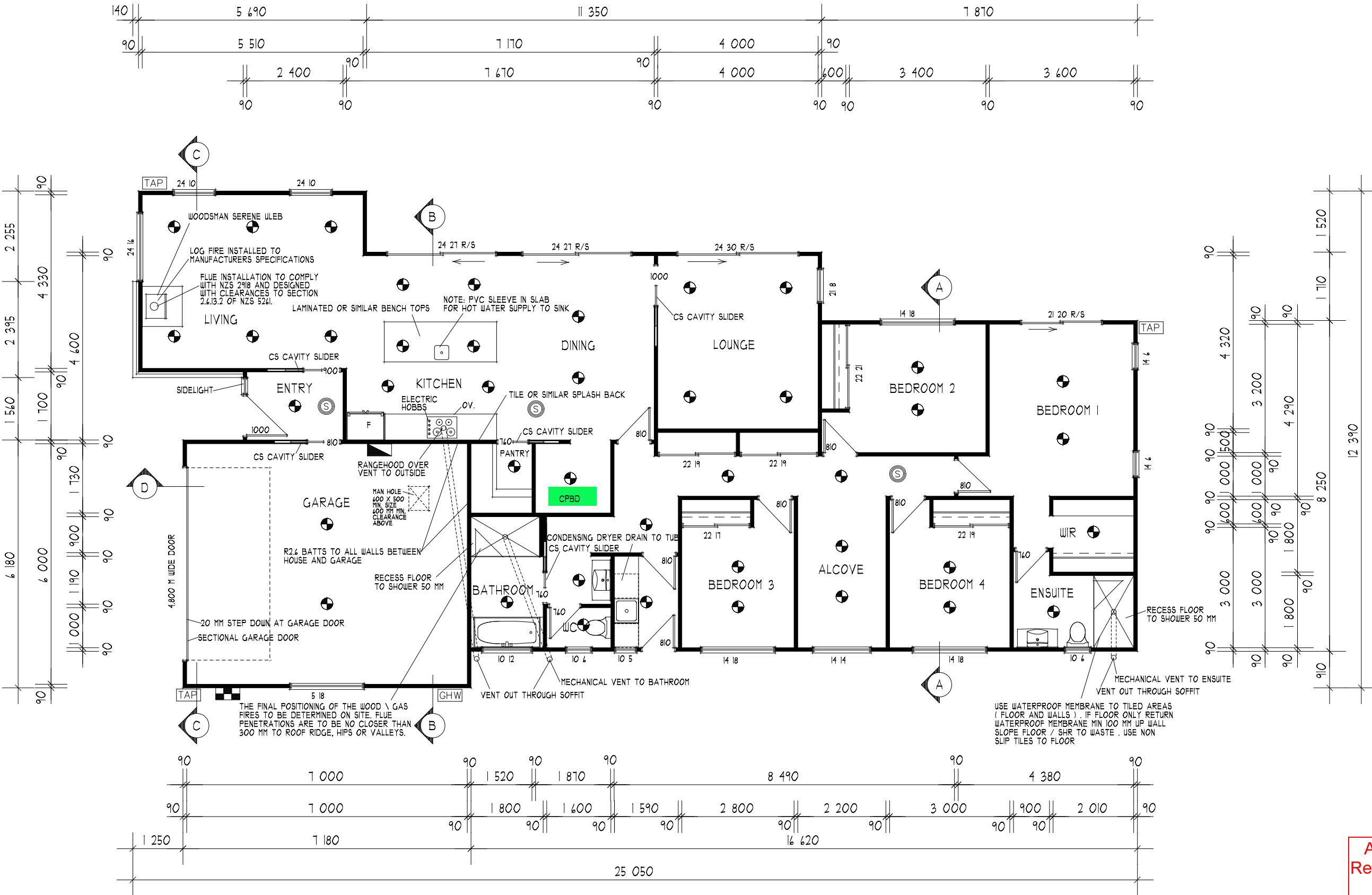
CORROSION ZONE B
 WIND ZONE - HIGH
 EARTHQUAKE ZONE - 2
 SNOW ZONE - N4 44.00 M

NORTH ELEVATION				
RISK FACTOR	LOW	MEDIUM	HIGH	VERY HIGH
WIND ZONE			1	
NUMBER OF STOREYS	0			
ROOF/WALL INTERSECTION DESIGN	0			
EAVES WIDTH	0			
ENVELOPE COMPLEXITY	0			
DECK DESIGN	0			
TOTAL RISK FACTOR	1			
SOUTH ELEVATION				
RISK FACTOR	LOW	MEDIUM	HIGH	VERY HIGH
WIND ZONE			1	
NUMBER OF STOREYS	0			
ROOF/WALL INTERSECTION DESIGN	0		3	
EAVES WIDTH				5
ENVELOPE COMPLEXITY			3	
DECK DESIGN	0			
TOTAL RISK FACTOR	12			
WEST ELEVATION				
RISK FACTOR	LOW	MEDIUM	HIGH	VERY HIGH
WIND ZONE			1	2
NUMBER OF STOREYS	0			
ROOF/WALL INTERSECTION DESIGN			3	5
EAVES WIDTH				5
ENVELOPE COMPLEXITY			3	
DECK DESIGN	0			
TOTAL RISK FACTOR	12			
EAST ELEVATION				
RISK FACTOR	LOW	MEDIUM	HIGH	VERY HIGH
WIND ZONE			1	
NUMBER OF STOREYS	0			
ROOF/WALL INTERSECTION DESIGN			3	
EAVES WIDTH				5
ENVELOPE COMPLEXITY			3	
DECK DESIGN	0			
TOTAL RISK FACTOR	12			

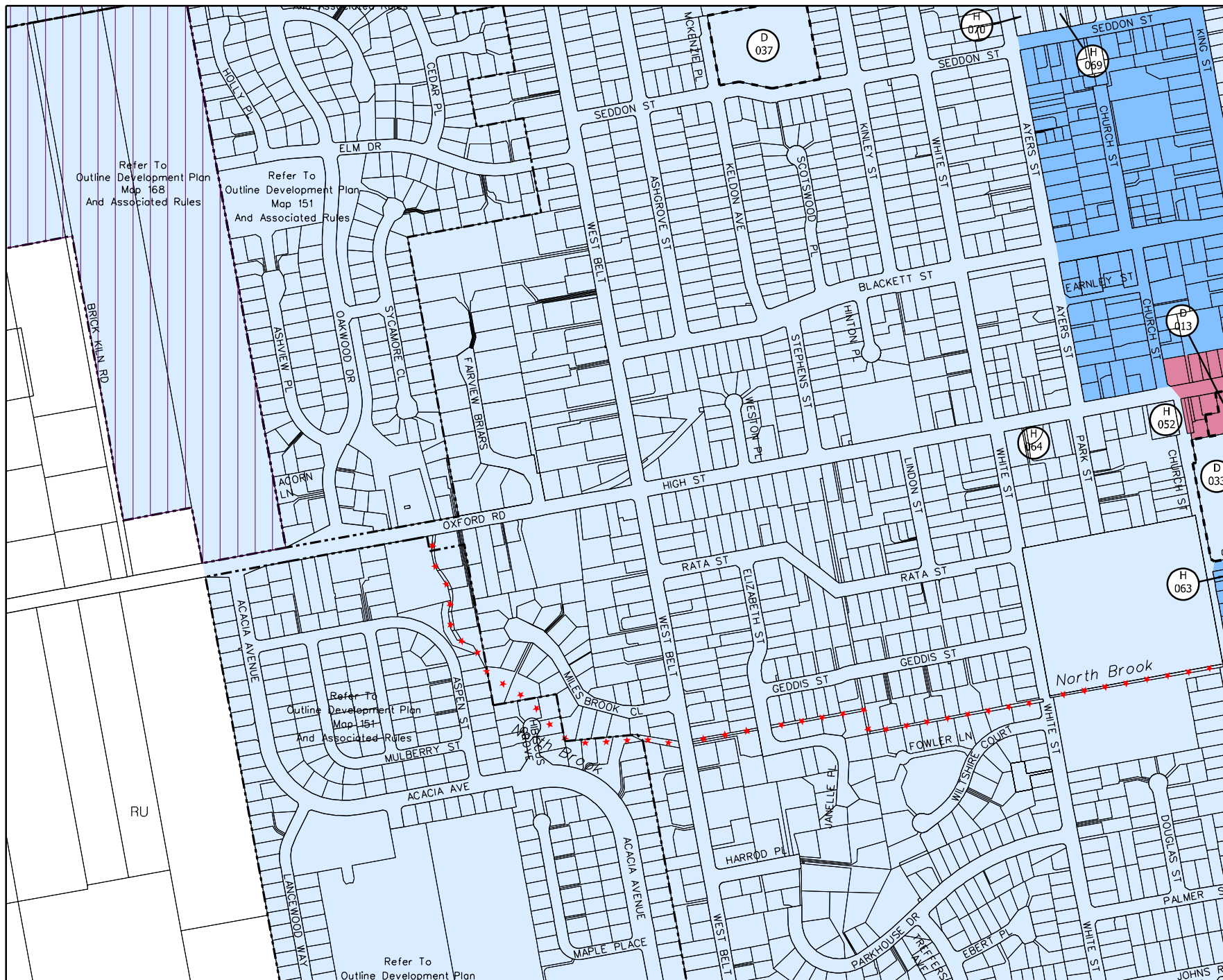


APPROVED PIM APPLICATION
 Refer to PIM report for conditions of
 this application
 BC201170 17/11/2020 melissab





APPROVED PIM APPLICATION
Refer to PIM report for conditions of
this application
BC201170 17/11/2020 melissab



NOTE:
Disclaimer - refer to map legend sheet



Metres

0 60 120 180

Scale 1:7,500 (A4)

110A	110	111
112A	112	113
95	46	116
		117

Rangiora

112



- OUTLINE DEVELOPMENT PLAN AREA
- EXISTING ROAD
- LOCAL ROAD
- URBAN COLLECTOR ROAD
- PROPOSED ROAD DESIGN
- PEDESTRIAN CYCLEWAY ACCESS
- OVERLAND FLOW DRAIN
- ▨ LOCAL PURPOSE RESERVE
- STORMWATER MANAGEMENT AREA

NOTES:

WATER RACE SHALL NOT BE LOCATED WITHIN MULTIPLE PRIVATE OWNERSHIP.

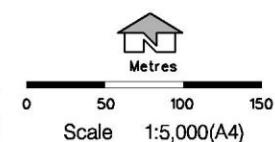
SUBDIVISION AND DEVELOPMENT SUBJECT TO GROUND AND FLOOR LEVEL CONTROLS TO ADDRESS NATURAL HAZARD ISSUES.

SUBDIVISION AND DEVELOPMENT SHALL ACCOMMODATE OVERLAND FLOW ROUTES THROUGH THE SITE.

THE STORMWATER MANAGEMENT AREA TO THE NORTH OF BRICK KILN LANE SHALL BE DESIGNED TO AVOID MIGRATION OF WATER Laterally. SECONDARY FLOW TO BE DIRECTED OVERLAND TO THE LOCAL PURPOSE RESERVE.

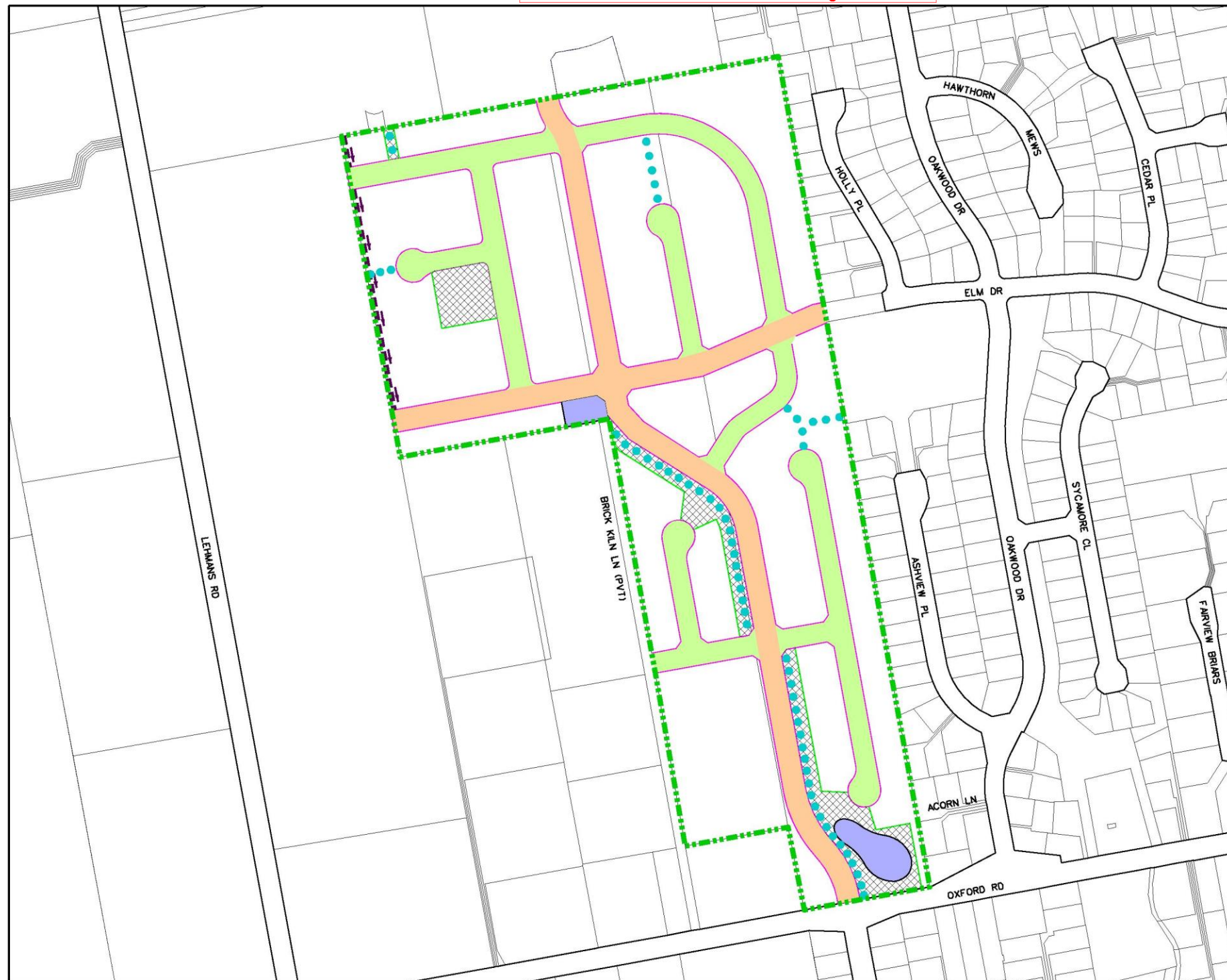
NOTE:

Disclaimer - refer to map legend sheet




































Oxford Road, West Rangiora
Outline Development Plan

168

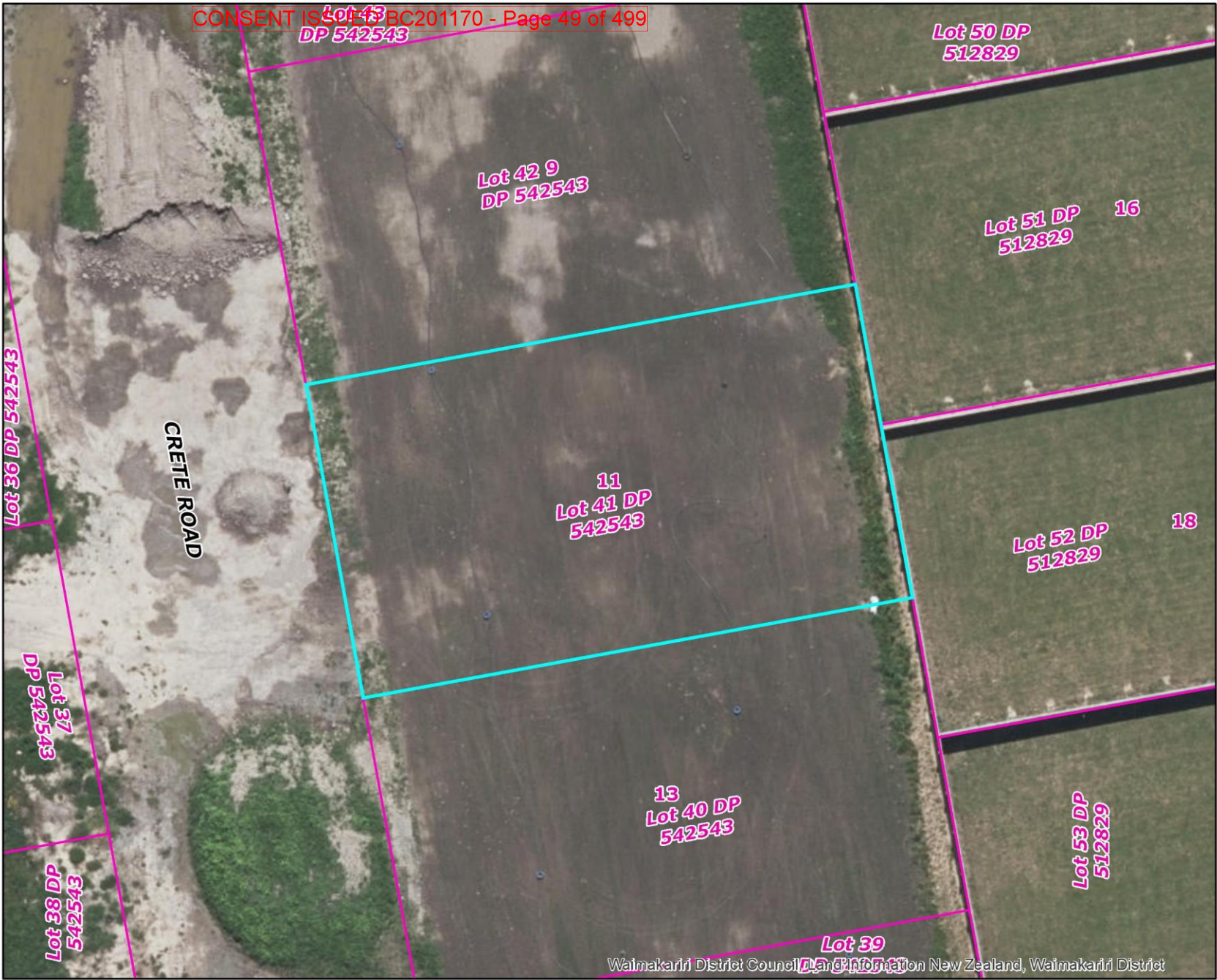


URBAN LEGEND (Sheets 77 to 133)

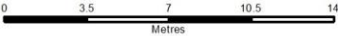
	Zone Business 1		Zone Rural		Designations		River Reaches subject to esplanade provisions
	Zone Business 2		Zone Mapleham Rural 4B		Heritage Sites		Limited Access Road
	Zone Business 3		Subdivision Constraint Rural		Vegetation and Habitat Sites		Road to be Closed
	Zone Business 4		Subdivision Constraint Area (Policy 18.1.1.8)		Notable Plant Sites		Outline Development Plan Required Boundary
	Zone Business 5		Pegasus Rural Zone See Map 142		Archaeological Sites		Coastal Marine Area boundary
	Zone Business 6		Localised Flooding Area		Waahi Tapu / Waahi Taonga		Average Noise Exposure Contours Christchurch International Airport
	Zone Residential 1		Goat control area	NOTE: These notations do not necessarily indicate the precise position of the Site, nor relate to the size of any Site.			Noise Level in dBA Ldn
	Zone Residential 2	LURP (Land Use Recovery Plan)		NOTE: See Rule 23.1.1.17 for goat control (includes Outstanding Landscape areas)			Transit New Zealand Designation
	Zone Residential 3	LURP Priority Areas - Business					Tranz Rail Designation
	Zone Residential 4A		Zoned				Transpower High Voltage Lines
	Zone Residential 4B		Not Yet Zoned				Waimakariri District boundary
	Zone Residential 5	LURP Priority Areas - Residential					Projected Infrastructure Boundary
	Zone Residential 6		Zoned			NOTE: The planning maps are produced in colour and are intended to provide accurate and adequate information as at the date of publication and at the scale at which they are published. The Waimakariri District Council will not accept liability to any person or entity arising out of any reliance in part or full, by such person or entity upon any of the contents of the planning maps for any purpose in circumstances where they are reproduced in a way that alters the scale, and / or colour or any other detail of the maps, and the information contained therein.	
	Zone Residential 6A		Not Yet Zoned				
	Zone Residential 7						

Legend

- Road
- Property Address
- River
- Approved to Survey Land Parcel
- Property Boundary
- Land Parcel



Waimakariri District Council Land Information New Zealand, Waimakariri District



Scale 1:322
Original Size - A4

Property Information








Date: 12/11/2020

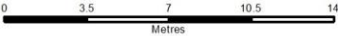
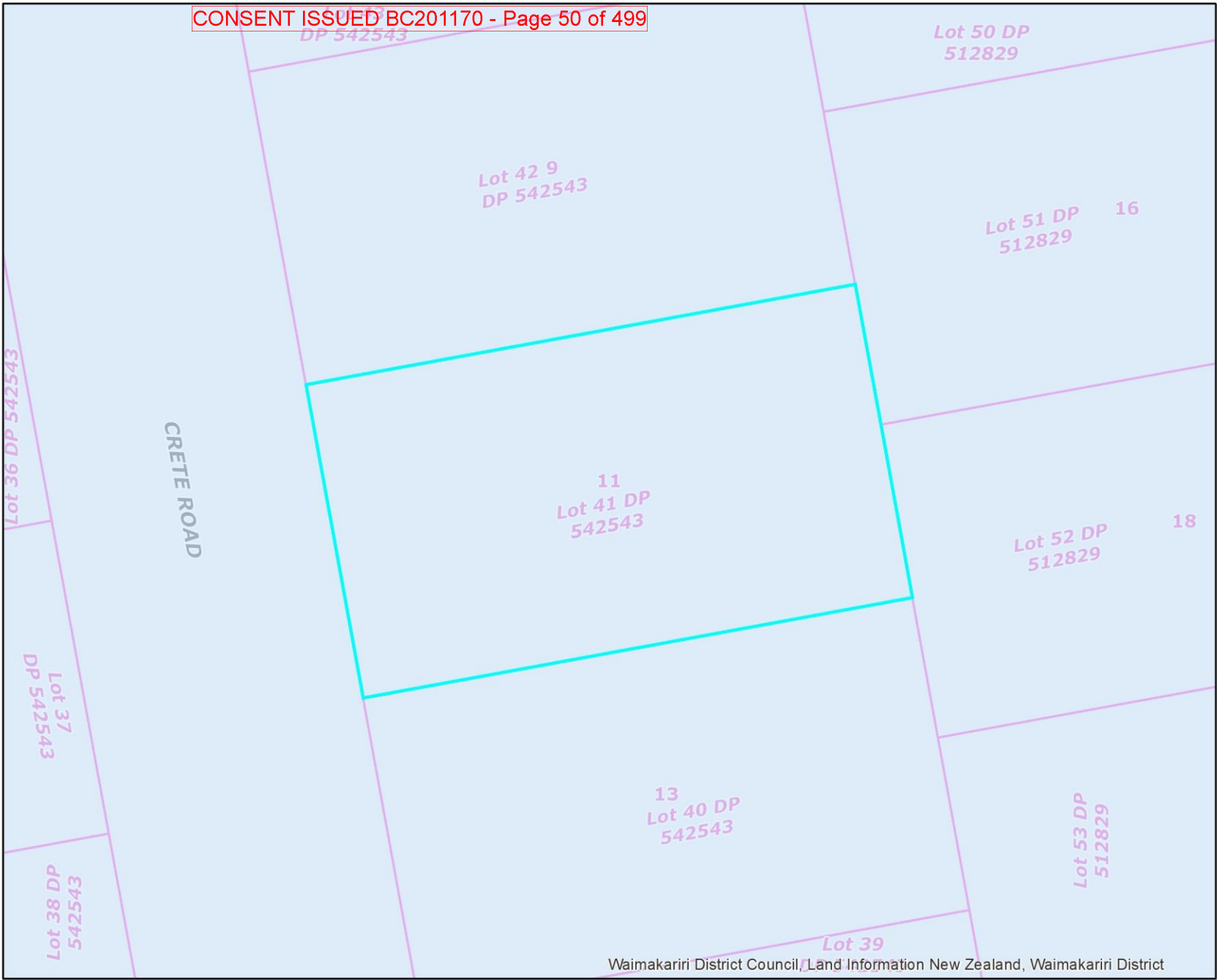
DISCLAIMER
Boundary information is derived under licence from LINZ Digital Cadastral Database (Crown Copyright Reserved). The Waimakariri District Council does not give and expressly disclaims any warranty as to the accuracy or completeness of the information or its fitness for any purpose. Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it. Land and property information is based on/includes LINZ's data which is licensed by Land Information New Zealand (LINZ) for re-use under the Creative Commons Attribution 3.0 New Zealand licence.



Legend

District Plan Zones

-  Residential 2
-  Road
-  Property Address
-  River
-  Approved to Survey Land Parcel
-  Property Boundary
-  Land Parcel



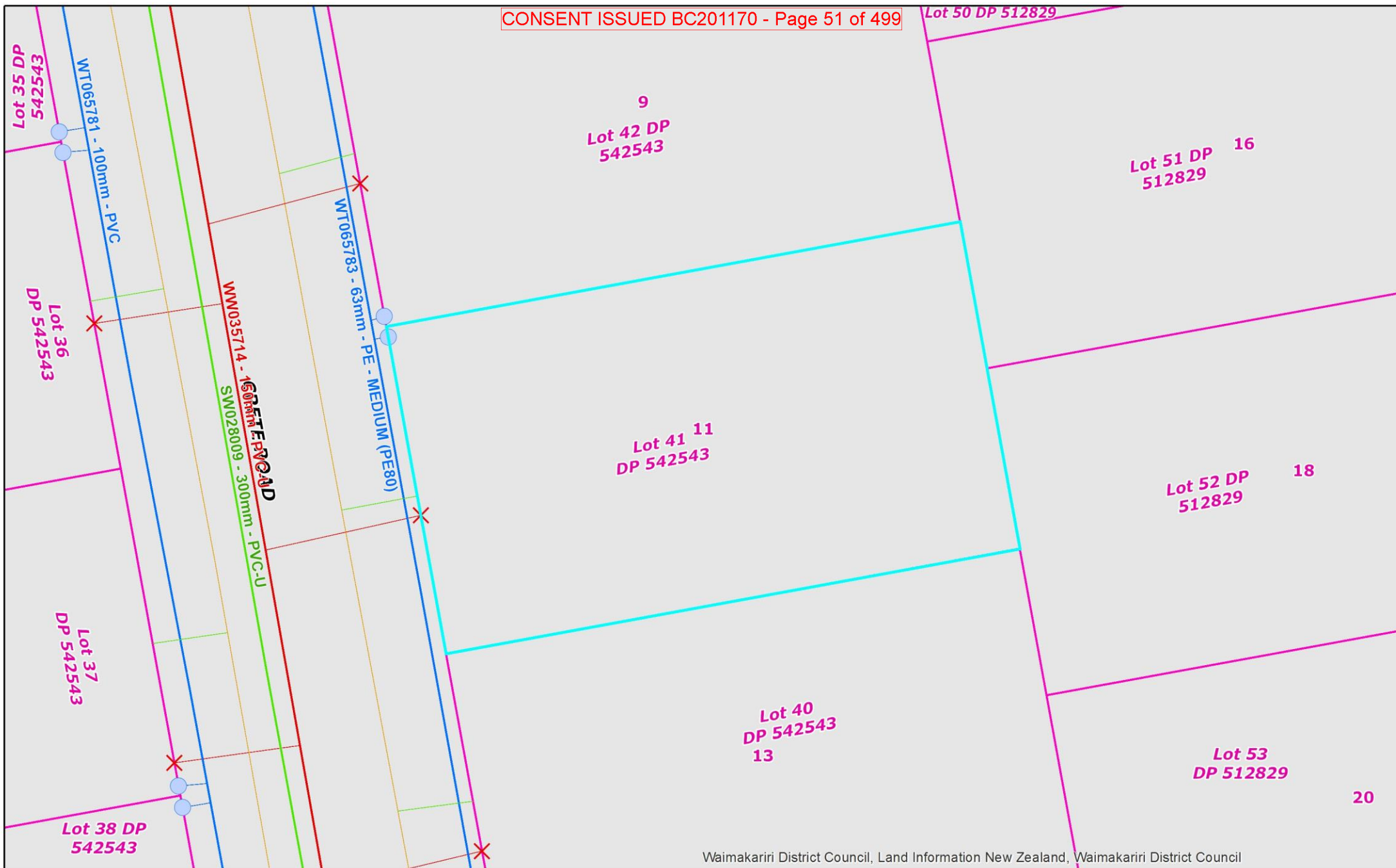
Scale 1:322
Original Size - A4

District Plan

Date: 12/11/2020

DISCLAIMER
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0 3 6 9 12
Metres

Scale 1:271
Original Size - A4

Utilities














Date: 12/11/2020

DISCLAIMER



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WATER SUPPLY

	Main
	Abandoned Main
	Lateral
	Hurunui Main
	Facility
	Endcap
	Hydrant
	Valve
	Node
	Well
	Pump
	Tank
	Toby

















WATER RACE

	Water Race Pond
	Water Race

STORMWATER

	Main
	Abandoned Main
	Lateral
	Kerb
	Swale
	Channel Other
	Channel WDC
	Facility
	Manhole
	End
	Valve
	Node
	Pump
	Sump
	Inspection
	Inspection Chamber

WASTEWATER

	Main
	Abandoned Main
	Lateral
	Facility
	Manhole - Standard
	Manhole - Vented
	Flush Tank
	Lamphole
	Rodding Eye
	Unknown
	Valve
	Node
	Pump
	Septic Tank
	Inspection
	Inspection Chamber

DISCLAIMER:

While reasonable measures have been taken to ensure the accuracy of the information contained in this map, the Waimakariri District Council shall have no liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this map or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

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Contractors will be held responsible for all damage to Council property.

The Council does not guarantee the existence of service laterals to vacant lots, regardless of whether a lateral is shown or not.

The Waimakariri District Council does not give and expressly disclaims any warranty as to the accuracy or completeness of the information or its fitness for any purpose.

An experienced practitioner should be consulted if this information is to be used for Building or Development purposes.

Please refer to the District Plan and the Council's Planning Unit if you wish to use this information for planning purposes.

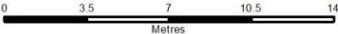
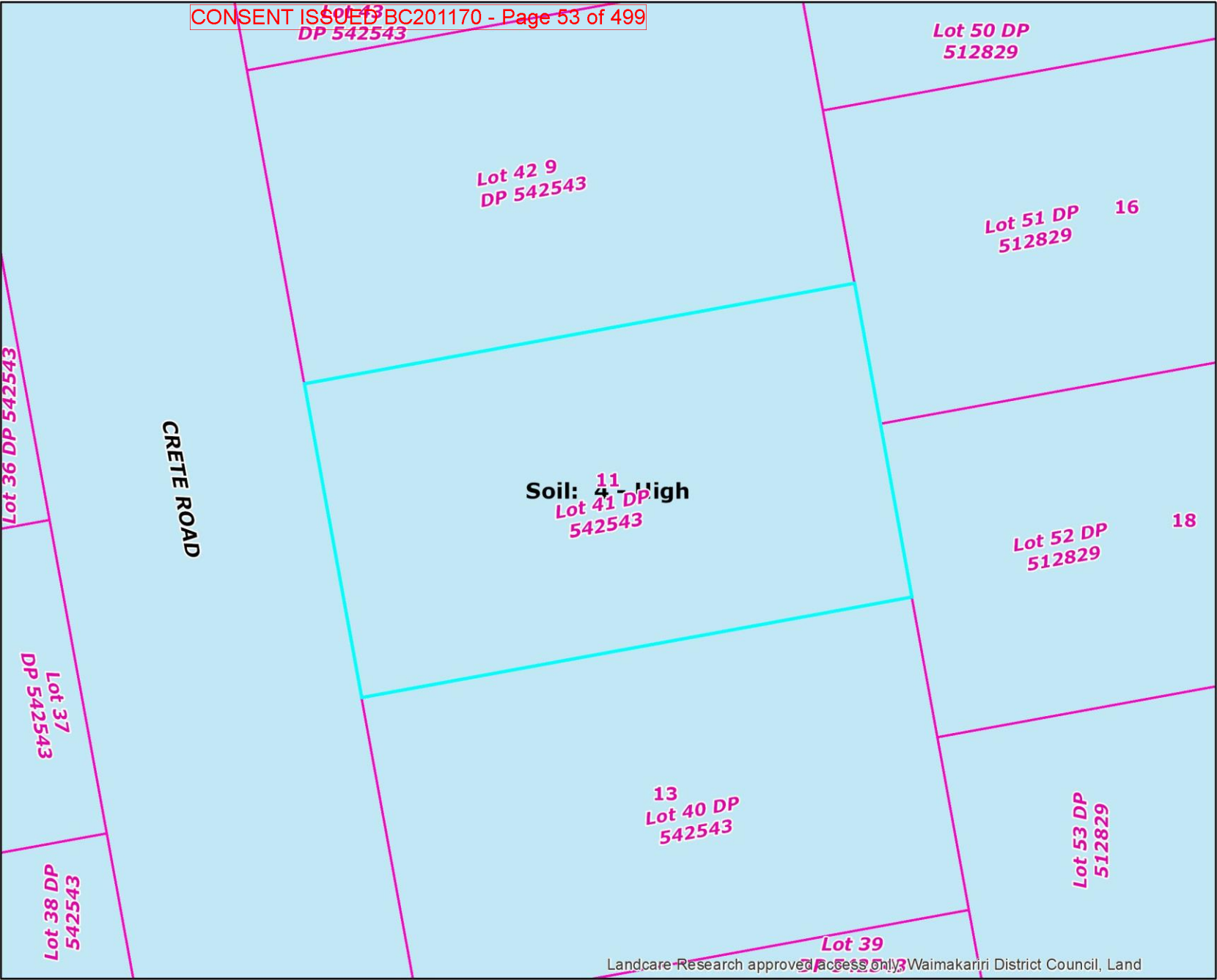
Any one who acts on any of this information does so at their own risk.

Legend

- Road
- Property Address
- River
- Approved to Survey Land Parcel
- Property Boundary
- Land Parcel

Landcare Soils

- 5 - Highest
- 4 - High
- 3 - Medium
- 2 - Low
- 1 - Lowest
- 0 - Unknown



Scale 1:322
Original Size - A4

Soil Infiltration

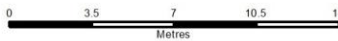
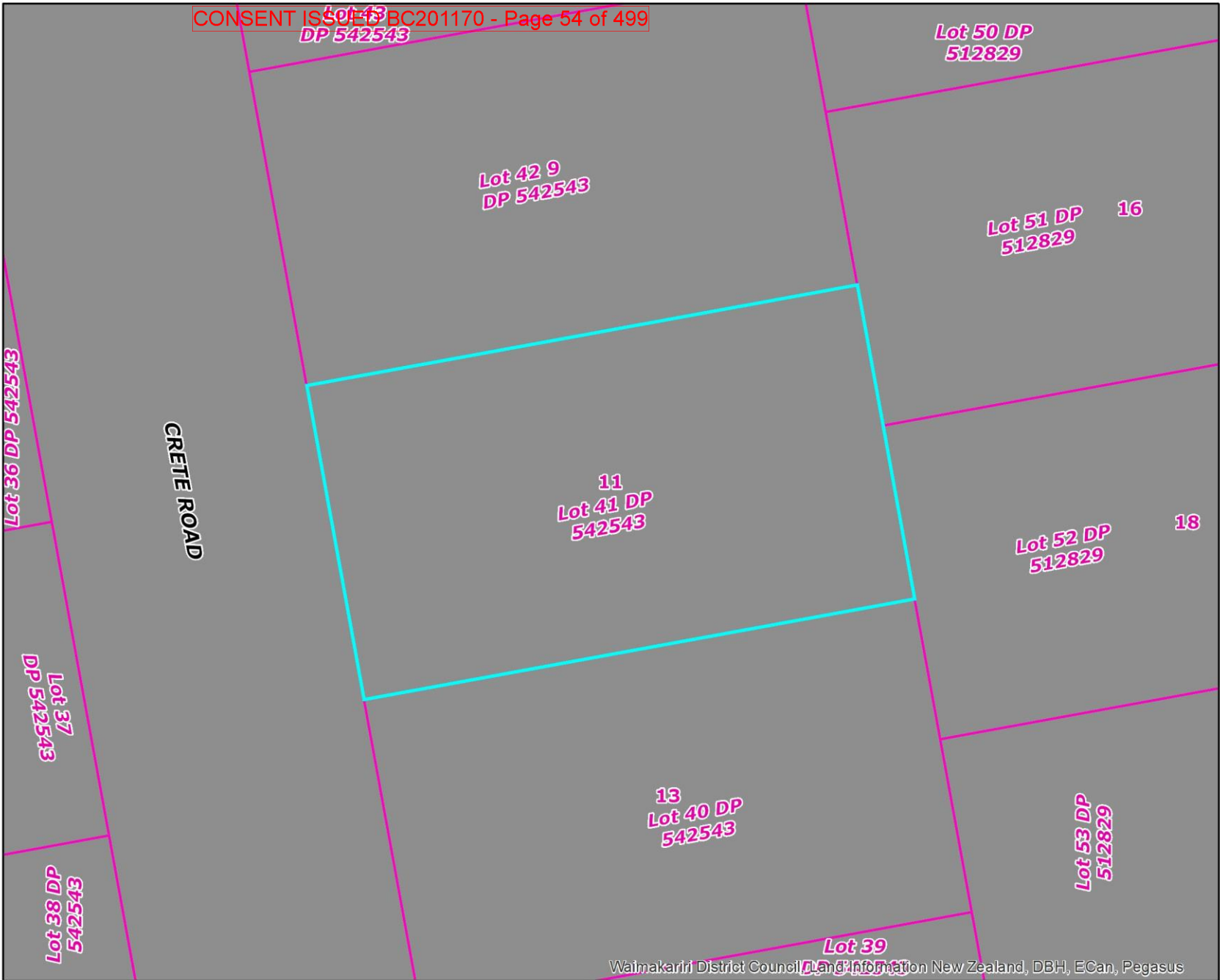
Date: 12/11/2020

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Legend

- Road
 - Property Address
 - River
 - Approved to Survey Land Parcel
 - Property Boundary
 - Land Parcel
- Liquefaction Risk**
- Broadly Equivalent To TC1
 - Broadly Equivalent To TC2
 - TC2
 - TC3
 - Further Geotechnical Assessment Required
 - Red Zone
 - DBH not zoned
 - Damaging liquefaction unlikely
 - Liquefaction assessment needed



Scale 1:322
Original Size - A4

Liquefaction Risk

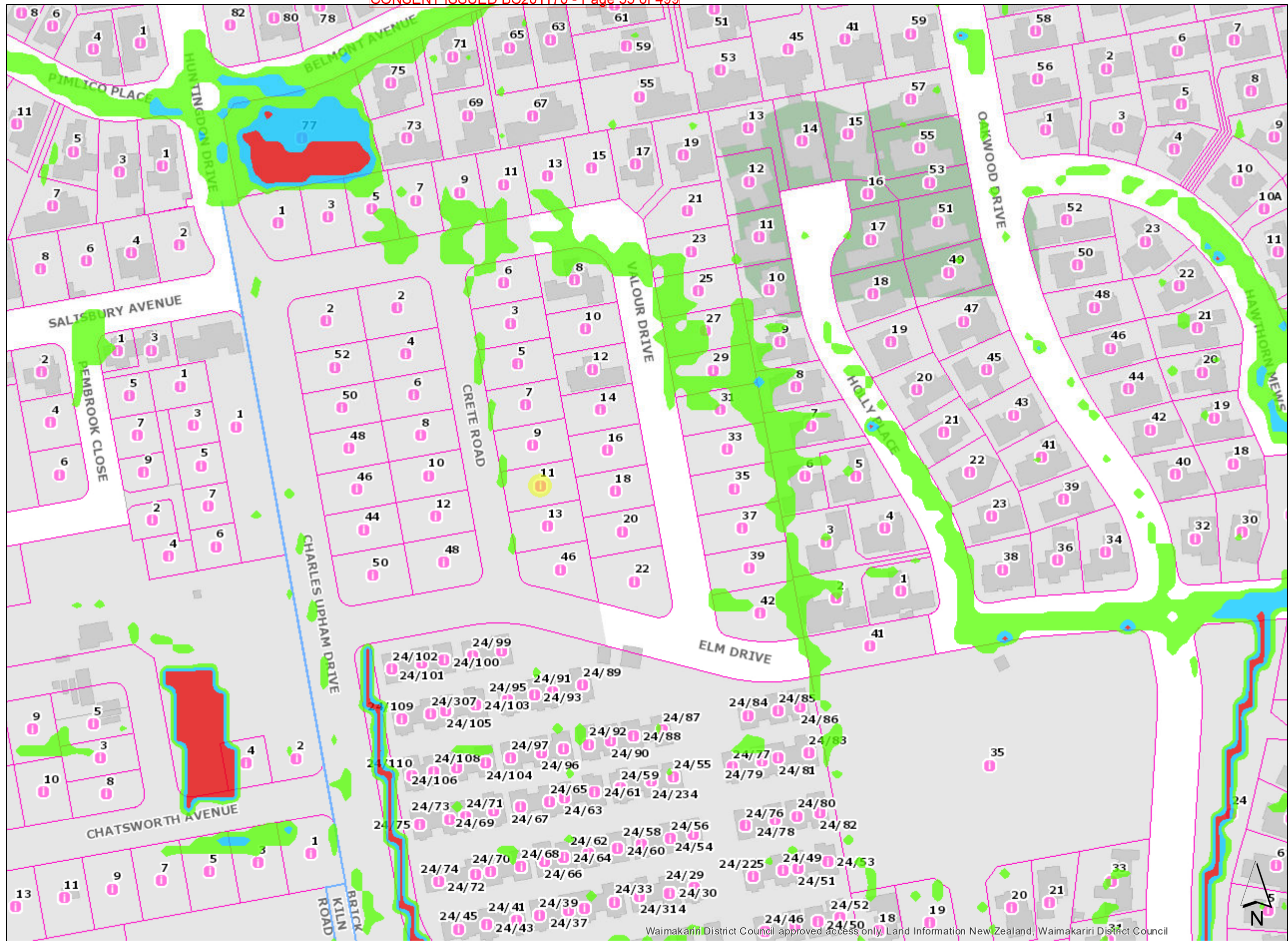
Date: 12/11/2020

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Legend

- 0
- 1
- Low
- Medium
- High
- Properties < 1 ha
- Properties > 1 ha
- Approved to Survey Land Parcels
- Property Boundaries
- Deposited Land Parcels



District Plan & Property

Date: 17/11/2020
Author: melissab@WMK

0 20 40 60 80
Meters
Scale 1:1687 @ A3

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Flood information on this map is based on modelling outputs and the accuracy of this data is limited by the assumptions used in the model. The Council reserves the right to update this information and cannot guarantee that the information is accurate and up to date at all times. An experienced practitioner should be consulted if this information is to be used for Building or Development purposes. Please refer to the District Plan and the Council's Planning Unit if you wish to use this information for planning purposes. Anyone who acts on any of this information does so at their own risk.

Map Created by WAIMAP Utilities at 10:41:39 AM



TA Approvals

Territorial Authority	Waimakariri District Council TA Certification Division	TA Reference	RC145670
Survey Number	LT 542543	Survey Purpose	LT Subdivision
Surveyor Reference	61099 - Stage 3 RC145670 RC 175113	Land District	Canterbury
Surveyor	Neil Andrew Cox		
Surveyor Firm	Wood & Partners Consultants Ltd		
Dataset Description	Lots 32-46, 57-60, 102 & 303 Being Subdivision of Lot 302 DP 512829		

TA Certificates

Pursuant to Section 224(c) Resource Management Act 1991 I hereby certify that some of the conditions of the subdivision consent have been complied with to the satisfaction of the Waimakariri District Council TA Certification Division and that two (2) consent notices have been issued in respect of those conditions that have not been complied with. Dated this 22nd day of April 2020.



Signature

Signed by Yvonne Sally Fear, Authorised Officer, on 22/04/2020 09:58 AM

*** End of Report ***

IN THE MATTER of the Resource
Management Act 1991

AND

IN THE MATTER of an application by
Ryman Healthcare Limited to
subdivide land into residential lots
(stage 3)

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

To: District Land Registrar
Canterbury land Registry

TAKE NOTICE that the land described in the Schedule below is subject to a condition in relation to a subdivision consent as follows

1. Any dwelling to be constructed on Lots 32 – 46, 57 – 60 and Lot 303 (balance) shall have a minimum finished floor level 300mm above the finished platform levels identified on the schedule provided under Condition 16.1 of RC145670 held on Waimakariri District Council File RC145670

The above condition, as it applies to Lots 32 – 46, 57 – 60 and Lot 303 (balance) shall be subject to a consent notice to be registered on the Records of title on Lots 32 – 46, 57 – 60 and Lot 303 (balance)

AND YOU are requested to register this Consent Notice as prescribed by Section 221 of the Resource Management Act 1991

SCHEDULE

Estate in fee simple and being Lots 32 – 46, 57 – 60 and Lot 303 (balance) Deposited Plan 542543 and being a subdivision of Lot 302 DP 512829 Record of title RT 796972.

Dated this 22nd day of April 2020

SIGNED for and on behalf of the
WAIMAKARIRI DISTRICT COUNCIL



Sally Fear
**AUTHORISED OFFICER
WAIMAKARIRI DISTRICT COUNCIL**

IN THE MATTER of the Resource
Management Act 1991

AND

IN THE MATTER of an application by
Ryman Healthcare Limited to
subdivide land into residential lots
(stage 3)

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

To: District Land Registrar
Canterbury land Registry

TAKE NOTICE that the land described in the Schedule below is subject to a condition in relation to a subdivision consent as follows

1. Stormwater runoff from the roofs of structures on Lots 32 – 46, 57 – 60 and Lot 303 (balance) shall discharge to an individual soak pit on each lot designed and constructed to infiltrate roof water generated by a 10 minute 10% AEP event with a Factor of Safety of 3 applied to the site soils infiltration rate.

The above condition, as it applies to Lots 32 – 46, 57 – 60 and Lot 303 (balance) shall be subject to a consent notice to be registered on the Records of title on Lots 32 – 46, 57 – 60 and Lot 303 (balance)

AND YOU are requested to register this Consent Notice as prescribed by Section 221 of the Resource Management Act 1991

SCHEDULE

Estate in fee simple and being Lots 32 – 46, 57 – 60 and Lot 303 (balance) Deposited Plan 542543 and being a subdivision of Lot 302 DP 512829 Record of title RT 796972.

Dated this 22nd day of April 2020

SIGNED for and on behalf of the
WAIMAKARIRI DISTRICT COUNCIL



Sally Fear
**AUTHORISED OFFICER
WAIMAKARIRI DISTRICT COUNCIL**

Lionsgate Development

Stage 3

Schedule of Finished Lot Levels

This schedule has been prepared to meet the requirements of Subdivision Consent RC175113 conditions 16.1 and 16.3.

Condition 16.1 states: "The consent holder shall provide a schedule of finished platform levels for each lot that demonstrate the achievement of finished ground levels that avoid inundation in a 0.5% Annual Exceedance Probability flood event."

Condition 16.3 states: "Any dwelling to be constructed on Lots 1, 25 to 75 and Lots 300 and 304 shall have a minimum floor level of 300mm above the finished platform levels identified on the schedule provided under Condition 16.1."

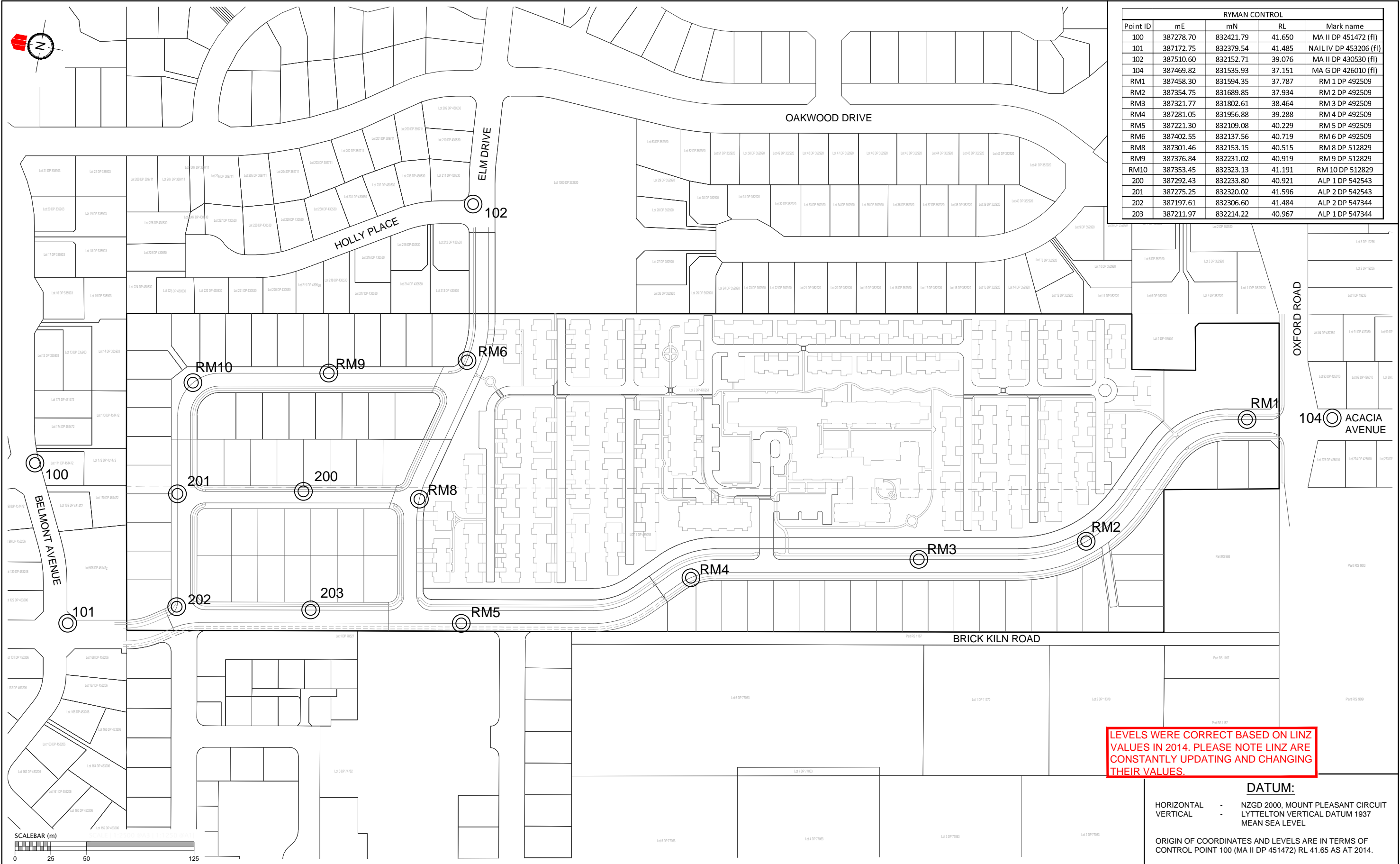
This information is provided for the purposes of compliance with these Consent Conditions. The lot platforms have been finished with a slope toward the subdivision roads and as such there is not one single level that can be defined for the lot platform, therefore we have selected a level on each of the lot platforms that achieves the requirements of the conditions. The information provided should not be used for any purposes other than defining minimum floor levels that achieve the resource consent requirements. Building floor levels must comply with the New Zealand Building Code, which in some cases may result in a higher floor level requirement than the minimum levels provided below.

We have analysed Waimakariri District Localised Flood Hazard Assessment 2015 200 Year ARI Event (Waimakariri District Council) and can confirm that Stage 3 is not affected by any offsite flow. We have therefore determined flood depths in the secondary flow paths from a peak 200 year ARI rainfall event occurring within the local catchment. The flow depths determined are all contained within the road reserve.

Levels are in terms of Lyttelton Vertical Datum 1937, origin of levels MA II DP 451472 (RL: 41.65 as at 2014).

Lot Number	Peak Flowrate in Adjacent OLFP (Road Reserve) (m ³ /s)	Peak Flood RL in Adjacent OLFP used to define minimum floor level (m)	Complying Finished Ground Level on Lot (m)	Required Freeboard (m)	Minimum Floor Level for Dwelling (m)
32	0.15	41.41	41.50	0.30	41.80
33	0.15	41.29	41.30	0.30	41.60
34	0.15	41.15	41.20	0.30	41.50
35	0.15	41.01	41.10	0.30	41.40
36	0.30	40.88	40.90	0.30	41.20
37	0.30	40.75	40.80	0.30	41.10
38	0.30	40.62	40.70	0.30	41.00
39	0.30	40.6	40.60	0.30	40.90
40	0.30	40.66	40.70	0.30	41.00
41	0.30	40.79	40.80	0.30	41.10
42	0.30	40.92	41.00	0.30	41.30

Lot Number	Peak Flowrate in Adjacent OLFP (Road Reserve) (m ³ /s)	Peak Flood RL in Adjacent OLFP used to define minimum floor level (m)	Complying Finished Ground Level on Lot (m)	Required Freeboard (m)	Minimum Floor Level for Dwelling (m)
43	0.15	41.05	41.10	0.30	41.40
44	0.15	41.19	41.20	0.30	41.50
45	0.15	41.32	41.40	0.30	41.70
46	0.05	41.41	41.50	0.30	41.80
57	0.05	41.71	41.80	0.30	42.10
58	0.05	41.68	41.70	0.30	42.00
59	0.05	41.59	41.60	0.30	41.90
60	0.05	41.52	41.60	0.30	41.90



REVISION DETAILS		NAME	DATE	CLIENT:	<div>CONTROL MARKS</div> <div>RYMAN DEVELOPMENT, OXFORD ROAD, RANGIORA</div> <div>WAIMAKARIRI DISTRICT COUNCIL</div>	<div>WOODS</div> <div>Engineers. Surveyors. Planners.</div>	DESIGNED: NC		ISSUED FOR INFORMATION	
A ISSUED FOR INFORMATION		JLS	2/09/2015	CHECKED:			DRAWN: JS			
B NEW CONTROL ADDED. DESTROYED MARKS REMOVED		JLS	16/02/2016	APPROVED:			SURVEYED: JS			
C NEW CONTROL ADDED.		JLS	18/03/2016	JOB NUMBER: 61099			SCALE: 1:2500 @ A3			
D NEW CONTROL ADDED.		JLS	22/03/2016	ISSUED: SEPTEMBER 2015						
E NEW CONTROL ADDED, LEVELS ON 118 AND 119 ADJUSTED		JLS	19/05/2016	DWG. NO. 034-502_S01_U0-102			REV. I			
F 120 AND 121 ADDED, LEVELS FOR 111, 112, 113 ADJUSTED (3-8mm)		JLS	29/07/2016							
G RM8-RM10 ADDED		JLS	15/12/2016							
H 200-203 ADDED		CC	21/09/2020							
I										

**APPLICATION TO FORM A VEHICLE CROSSING
(ENTRANCEWAY)**

Made under Section 335 Local Government Act/Waimakariri District Vehicle Crossings Bylaw 2007

VEHICLE CROSSING No.

THE PROPERTY OWNER

1. Owner's name:
(Company or organisation name if applicable)
2. Mailing address:
3. Mobile: Landline: Email:

THE AGENT

4. Agent's name:
(Company or organisation name if applicable)
5. Mailing address:
6. Mobile: Landline: Email:

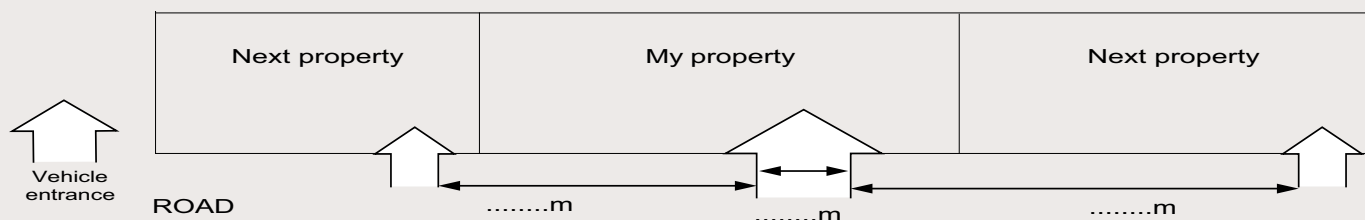
THE CONTRACTOR

7. Contractor's name:
(Company or organisation name if applicable)
8. Mailing address:
9. Mobile: Landline: Email:

PROPERTY DETAILS OF PROPOSED VEHICLE ENTRANCE

PLEASE NOTE: Vehicle Crossing location inspection must be approved prior to the Building Consent being granted.

10. Site address:
(Street / Road / Township)
11. Legal description:
Lot: DP: Valuation Number:
12. Building/Resource Consent Number: BC: RC:
13. Location Sketch (Please tick type of vehicle crossing):
Residential Rural Commercial/Industrial



Using the sketch above, show the location, width of vehicle crossing and distances to the nearest vehicle crossings on the same side of the road. If more relevant (eg. when adjacent vehicle crossings have yet to be formed) please show the distance to the neighbouring boundaries / nearest intersection if beside a corner.

Please show the location of any trees or services on the plan.

PAYMENT

14. If sending this application via email, please make no payment until you receive an invoice via reply.

Fee of \$160.00 attached

VEHICLE CROSSING INSPECTIONS

- I will notify the Council two working days prior to excavation to confirm location and make arrangements for consequent inspections. Please note a fee of \$80.00 will apply for any failed inspections.

DECLARATION

- I will construct a vehicle crossing (entranceway) that complies with any Resource Consent and meets Council specifications from the formed roadway to my property. Between the initial construction and final surfacing of the vehicle crossing, the crossing will be kept in good condition to allow for the safe passage of pedestrians
- I note that stamped concrete, coloured concrete, cobbles and non standard paving blocks are NOT permitted
- I understand that all costs are the responsibility of the property owner and that a vehicle crossing that does not meet Council specifications will be upgraded at the property owner's cost
- I understand that I will be responsible for the costs associated with any repair work required as a result of settlement or poor workmanship during a 12-month period of maintenance.

INFORMATION

- Your permit is valid for 12 months with your vehicle entrance to be completed within that period.
- It is the property owner's responsibility to arrange and pay for the construction of a vehicle entrance.
- A vehicle entrance constructed without Council inspections will be deemed as an illegal entrance.
- A vehicle entrance must be formed to top-course stage prior to the commencement of any building work.
- You or your Contractor will need to fill in a Temporary Traffic Management Plan at least 2 working days before construction, you cannot work on the road or footpath until it has been approved. (If there is a need for public notification eg road closure, then additional notice is required).

A Vehicle Crossing Information Pack is available from Waimakariri District Council Service Centres and website:
<http://www.waimakariri.govt.nz/services/roads-and-transport/driveways-and-vehicle-crossings>
 It contains specifications and additional information as well as plans for typical urban and rural vehicle crossings.

OWNER AUTHORISATION

PLEASE NOTE - By entering your name in the box below you are giving your authority for the application to proceed.

Name:

Date:

I am the Owner Agent

OFFICE USE ONLY

	Front Counter	Roading	Plan Admin	CSO - PIMs
Officer				
Date				

INSPECTION TYPE	Yes	No	Date	Comments	Inspected by
Location					
Excavation					
Base Course					
Final Surfacing (completed satisfactorily)					
Additional Inspection (completed satisfactorily)					

Date payment processed:

Receipt

Officer:

Fee paid on application

Deposit invoice sent



Application for Resource Consent Subdivision and Land Use Form 9

Lodgement of your application to:
Waimakariri District Council
Private Bag 1005
Rangiora 7440

For planning enquiries please phone or email:
Phone: 0800 965 468
Email: duty.planner@wmk.govt.nz

Electronic applications (up to 22MB) may be lodged via email to RCapplications@wmk.govt.nz

1. Application

About this form: This form is to be used for an application as required under Section 88 of the Resource Management Act 1991 and must be accompanied with an assessment of environmental effects, full set of scaled plans, a Certificate of Title and any other supporting information.

A fixed fee / deposit is required to be paid prior to the processing of the application. An invoice for the fixed fee payable will be issued once the application has been formally received (unless payment is made at the time of lodgement). Additional fees will be invoiced in accordance with Waimakariri District Council's fees and charges schedule.

Applications are checked for completeness prior to acceptance. Please ensure that you have compiled your documents carefully to avoid delays in accepting your application

This application is for:

☐ Land Use Consent ☐ Subdivision Consent ☐ Combined Subdivision & Land Use Consent

2. Applicant Details

Please note: The **applicant** is responsible for all fees and costs associated with this application, unless specified otherwise in Section 4

Full Name:	
Company / Trust / Organisation name:	
Contact person / Trustee names	
Postal Address:	
Email Address:	
Mobile No:	

The applicant is the: ☐ Owner(s) ☐ Occupiers (s) ☐ Prospective purchaser ☐ Director(s) ☐ Trustee(s) ☐ Other
(please specify below) of the site

If the applicant is not the only owner and occupier of the site, please provide the full name and address of each owner or occupier (other than the applicant) of the site to which the application relates:

Full Name	Address

3. Agent / Consultant

Name of Agent	
Company (if applicable)	
Postal Address:	
Email Address:	
Mobile No:	

4. Invoicing details

All consent related invoices to be made out to:

☐ Applicant ☐ Agent ☐ Other (specify below)

Name:	
Company (if applicable)	
Postal Address:	
Email Address:	
Mobile No:	

Please note: Any refund will only be paid to the receipted name on the invoice

5. The Location/Site

This application relates to the property located at the below location(s):

Street Address	
Legal description	
General description*	

- ☐ I have provided a Certificate of Title (Computer Register) less than 3 months old, INCLUDING a copy of any consent notice, covenant or other encumbrance to which the Council is a party.**
- ☐ I request that the Council obtain a copy of the Certificate of Title (Computer Register) and any relevant encumbrances from Land Information New Zealand and on-charge the cost to me.

**Describe the site including its location, as it is commonly known and in a way that will enable it to be easily identified (eg the name of any relevant stream, river or other water body to which the application relates, proximity to any well-known landmark etc) and its natural and physical characteristics and any adjacent uses that may be relevant to the consideration of the application.*

****Notes:**

- These documents can be obtained from Land Information New Zealand: <https://apps.linz.govt.nz/survey-titles/order-copy>
- If a Certificate of Title is not yet available, include details of relevant lot numbers and subdivision consent numbers. If you are purchasing a lot from a new subdivision, please provide a copy of your Sale & Purchase Agreement.

6. The Proposal

The activity to which the application relates (the **proposed activity**) is as follows (*describe the proposed activity, using additional paper if required*):

7. Pre-application discussions

Was there any pre-application advice / discussion prior to this application being lodged?

☐ Yes ☐ No

If Yes, what was the Planners name?:.....

8. Attachments

I/We **attach** the following documents:

Assessment of Environmental Effects (AEE)

- ☐ An assessment of the proposed activity's effect on the environment that—
- (a) includes the information required by [clause 6](#) of Schedule 4 of the Resource Management Act 1991; and
 - (b) addresses the matters specified in [clause 7](#) of Schedule 4 of the Resource Management Act 1991; and
 - (c) includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.
- ☐ An assessment of the proposed activity against the matters set out in [Part 2](#) of the Resource Management Act 1991.
- ☐ An assessment of the proposed activity against any relevant provisions of a document referred to in [section 104\(1\)\(b\)](#) of the Resource Management Act 1991, including the information required by [clause 2\(2\)](#) of Schedule 4 of that Act.

Other Information:

- ☐ A current search of the Certificate of Title (within last 3 months) (*see section 5 above*)
- ☐ Full Details of the proposal
- ☐ Scaled application plans
- ☐ Sufficient detail to satisfy the requirements of the National Environmental Standard for Assessing & Managing Contaminants in Soil to Protect Human Health (where relevant). (*See section 11 of this form below*)
- ☐ Section 106 assessment (subdivision consent application only)
- ☐ Any further information required to be included in this application by the district plan, the regional plan, the Resource Management Act 1991, or any regulations made under that Act.*

* This information should include (if applicable) the information required by clauses 10, 11 and 13 of Form 9 – Application for Resource consent (or fast-track consent) of the Resource Management (Forms, Fees, and Procedure) Regulations 2003 and should be listed in the AEE.

Additional requirements for subdivision consent applications:

- ☐ I attach information that adequately defines the following:
- (a) the position of all new boundaries; and
 - (b) the areas of all new allotments;* and
 - (c) the locations and areas of new reserves to be created, including any esplanade reserves and esplanade strips; and
 - (d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips; and
 - (e) the locations and areas of any parts of the bed of a river or lake to be vested in the territorial authority under [section 237A](#) of the Resource Management Act 1991; and
 - (f) the locations and areas of any land within the coastal marine area (which is to become part of the common marine and coastal area under [section 237A](#) of the Resource Management Act 1991); and
 - (g) the locations and areas of land to be set aside as new roads.

* Omit this paragraph if the subdivision involves a cross lease, company lease or a unit plan.

9. Other Activities or Applications

Are there any other activities that are part of the proposal to which this application relates? ☐ Yes ☐ No

If Yes, include a description of the other activities in the AEE*

Are additional resource consents are needed for the proposed activity? ☐ Yes ☐ No

If Yes, have you applied for, or are required to apply for, any other resource consents for this project, either from the Waimakariri District Council or Environment Canterbury, and if so, what type?

		Has been applied for:	Is required to be applied for:	Has been obtained:	Reference No. (if applicable)
Waimakariri District Council	Subdivision Consent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Land Use Consent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Environment Canterbury	Water Permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Discharge Permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Coastal Permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Have you applied for a Project Information Memorandum (PIM) or a building consent for this project? ☐ Yes ☐ No

If Yes, what is the PIM/BC number?

* If any activities are permitted activities, explain how the activity complies with the requirements, conditions, and permissions for the permitted activity so that a resource consent is not required for that activity under section 87A(1) of the Resource Management Act 1991.

10. National Environment Standard (NES)

This section relates to the National Environmental Standard for Assessing & Managing Contaminants in Soil to Protect Human Health (NES). www.mfe.govt.nz/laws/standards/contaminants-in-soil

The NES includes regulations controlling **soil disturbance, change of use, subdivision, and removal/replacement of fuel storage systems** on properties which have been used either now or in the past for a hazardous activity or industry (known as HAIL) that may have resulted in contamination of the soil. The table below determines whether the NES applies to your proposal.

Is the application site listed on Environment Canterbury's Listed Land Use Register (LLUR)? www.llur.ecan.govt.nz If YES . Please include a copy of the LLUR statement with your application.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
If the site is not listed on the LLUR, is an activity described on the Hazardous Substances and Industries List (HAIL) currently being undertaken on the piece of land to which this application relates, or is it more likely than not to have ever been undertaken on the land? The HAIL list is available to view at: www.mfe.govt.nz/laws/standards/contaminants-in-soil	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Type of HAIL activity:		
If the answer to either of the above questions is YES, then the NES will apply, depending on the type of activity. Please identify whether the application involves the activities below. <i>Note: If the answer to both of the previous questions is No, you do not need to answer the remaining questions in this section)</i>		
Does the application involve subdivision of the land?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Will the proposed activity involve the disturbance of more than 25m ³ of soil (per 500m ² of disturbed area)? Volume of soil disturbed:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Will the proposed activity involve the removal of more than 5m ³ of soil (per 500m ² of disturbed area) from the site? Volume of soil removal:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does the application involve changing the use of the land to one which, because the land has been subject to a HAIL activity, is reasonably likely to harm human health? (e.g. service station to office, orchard to residential lots)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does the application involve replacing or removing fuel storage systems or parts of it?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
If the answer to any of the above activity questions is also YES, then the NES will apply and you will need to establish whether the proposed activity complies with the NES. <ul style="list-style-type: none"> Subdividing or changing the land use will require resource consent if the permitted activity requirements of the NES are not complied with. These include provision of a Preliminary Site Investigation carried out by a suitably qualified and experienced practitioner. Soil disturbance or removal exceeding the specified volumes require resource consent. Removal or replacement of a fuel storage system will require consent if the permitted activity requirements of the NES are not complied with. 		
Does the proposed activity require resource consent under the NES? If YES , the assessment of the application under the NES must be provided as part of your AEE. A Detailed Site Investigation may be required.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

11. Notification

Are you requesting the application to be publicly notified? ☐ Yes ☐ No

Have all the persons you consider to be adversely affected given their written approval to the proposal?*

☐ Yes ☐ No

**Ensure any Written Approval forms and all application plans have been completed & signed and provided as part of this application.*

12. Fees & Charges

I/We enclose the required processing fee of:
(see *Waimakariri District Council fees and charges schedule*)

\$

- ☐ I/We understand that as the applicant I am/we are responsible for payment of all fees associated with this application. The payment terms for processing fees and those relating to disbursements, hearings and additional charges are payable by the 20th of the month following the month in which the invoice is issued.
- ☐ I/We understand that the processing fee must be paid before processing of the application will start.
- ☐ I/We understand that the fees paid on lodgement are a fixed fee (where indicated) and that the Council is able to charge additional fees to recover actual and reasonable costs.
- ☐ I/We agree to pay according to those terms for any goods or services Waimakariri District Council supplies for processing this application and should failure to meet the terms of trade result in debt recovery and/or legal proceedings, any costs incurred in the collection of the debt will be payable by me/us.
- ☐ I/We understand where an invoiced amount has not be paid by the stated due date, the Council may commence debt recovery action. The Council reserves the right to charge interest, payable from the date the debt became due, and recover the costs it incurs in pursuing recovery of the debt.

13. Privacy Information

All the information on this form is required to be provided under the Resource Management Act 1991 for Waimakariri District Council to process your application.

Under this Act this information has to be made available to members of the public, including business organisations and the media. The information contained in this application may also be made available to other departments of the Council. If there is commercially sensitive information in the proposal, please let us know.

You have the right to access the personal information held about you by the Council which can be readily retrieved and you can request that the Council correct any personal information it holds about you.

14. Declaration

- ☐ I/We have completed all relevant sections of this form and understand that my application may be returned as incomplete if it does not include all the relevant information.
- ☐ I/We understand that the fees paid on lodgement are a deposit only (unless charged as a Fixed Fee as per the Councils Fees & Charges Schedule) and that the Council will invoice all costs actually and reasonably incurred in processing this application.
- ☐ All of the information provided with this application is, to the best of my knowledge, true and correct. I/We understand that all information submitted as part of an application is required to be kept for public record, therefore the public (including business organisations and other areas of the Council) may view this application, once submitted. It may also be made available to the public on the Councils website. .

Signature of applicant
(or person authorised to sign on behalf of applicant)*

Print Name: **Date**

- * 1. Signature not required if lodging form electronically
2. if you are signing this application on behalf of a company/trust/or other entity (the applicant), by signing this form you are declaring that you are duly authorised to sign on behalf of the applicant to make such an application.

15. Notes to applicants

1. You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.
2. You may apply for two or more resource consents that are needed for the same activity on the same form. If you lodge the application with the Environmental Protection Authority, you must also lodge a notice in Form 16A at the same time.
3. If your application is to the Environmental Protection Authority, you may be required to pay actual and reasonable costs incurred in dealing with this matter (see section 149Z of the Resource Management Act 1991).

16. Further Information for applicants

1. All applicants are asked to check the accuracy of the information supplied. Inaccuracies in information supplied can cause difficulties at a later date, such as additional costs, delays and legal proceedings initiated by the Council and/or by other persons.
2. If resource consent is granted, the applicant has a legal obligation to comply with any conditions of the consent.
3. The required Application Fee/deposit will be invoiced and emailed (if applicable) upon formal acceptance of the application. Please note that any fee is required to be paid prior to the processing of any application.
4. The application for resource consent under the Resource Management Act 1991 is separate from and in addition to any building consent application required under the Building Act 2004 and any consents, approvals or licences required under any other legislation. Any application for building consent must be applied for separately.
5. The written approval of persons the Council considers may be adversely affected by the proposal may be required as part of the application, if it is to be processed on a non-notified basis. This will be determined after the application has been lodged and assessed. Pre Application consultation with neighbours and other affected persons is at the discretion of and responsibility of the applicant.
6. Under section 88 of the Resource Management Act 1991, if your application is deemed incomplete, it may be returned to you. If additional information is required, you will be advised and processing of the application will be suspended until the information is received. To avoid any delays it is in your best interests to submit a complete application.
7. **Monitoring Fees** – Please note that if this application is approved you will be required to meet the costs of monitoring undertaken by Council pursuant to section 35 of the Resource Management Act 1991, in accordance with section 36 of that Act.
8. **Development Contributions** – Your development, if granted, may also incur development contributions under the Local Government Act 2002 in accordance with the Council's Development Contributions Policy. Any development contributions payable will be invoiced to the applicant. For any subdivision consent, these development contributions are invoiced at the time a section 224 application is lodged.
12. The Waimakariri District Council Resource Management Fees & Charges Schedule may be viewed at: <https://www.waimakariri.govt.nz/services/fees-and-charges/resource-management-fees-and-charges>

SECTION 2

Geotech, Engineer

Reports & Conditions

PS1 & 2

- Calculations**
- A4 Details**



New Zealand
Institute of Architects
Incorporated



Building Code Clause(s) **B1**

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at www.engineeringnz.org)

ISSUED BY: The Engineering Company Ltd (ENGCO)
(Design Firm)

TO: D. Cameron
(Owner/Developer)

TO BE SUPPLIED TO: Waimakariri District Council
(Building Consent Authority)

IN RESPECT OF: 90 Series Block framing fixings for new dwelling
(Description of Building Work)

AT: 11 Crete Road
(Address)

Town/City: Rangiora **LOT** **DP** **SO**
(Address)

We have been engaged by the owner/developer referred to above to provide:

Structural design of 90 Series Block framing ties

(Extent of Engagement)

services in respect of the requirements of Clause(s) **B1** 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 **VM1** or
(verification method/acceptable solution)

☐ Alternative solution as per the attached schedule

The proposed building work covered by this producer statement is described on the drawings titled:

CAMERON RESIDENCE, 11 CRETE ROAD, RANGIORA and numbered Ref No. 2020 (18th November 2020), 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 Please see attached addendum
(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, Matthew Cusiel am: ☒ CPEng 161509 # ☐ Reg Arch #
(Name of Design Professional)

I am a member of: ☒ Engineering New Zealand ☐ NZIA and hold the following qualifications: BE(hons), CMEngNZ, CPEng

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: Matthew Cusiel (Signature) ...
(Name of Design Professional)

ON BEHALF OF The Engineering Company Ltd (ENGCO) Date 18.11.2020
(Design Firm)

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, ENGINEERING NEW ZEALAND AND NZIA



ENGCO
Consulting Engineers

ADDENDUM TO PRODUCER STATEMENT – PSI – DESIGN

ISSUED BY: The Engineering Company Ltd

(Design Firm)

TO BE SUPPLIED TO: Waimakariri District Council

(Building Consent Authority)

IN RESPECT OF: 90 Series Block framing fixings for new dwelling

(Description of Building Work)

AT: 11 Crete Road, Rangiora

(Address)

In respect of the requirements of Clause(s) B1 of the Building Code for **part only** (as specified in the attachments to this statement) of the proposed building work.

On behalf of the Design Firm, and subject to:

- (i) Engco shall be responsible for conducting the structural inspections required in order to issue a PS4 on completion, in accordance with the attached inspection schedule.
- (ii) All proprietary products meeting their performance specification requirements.

I, Matthew Cusiell, am a Chartered Professional Engineer, CPEng#161509, and am a Member of Engineering New Zealand. The Engineering Company Ltd holds a current policy of Professional Indemnity Insurance no less than \$200,000*.

Signed by Matthew Cusiell, BE(hons), CMEngNZ, CPEng, IntPE
on behalf of The Engineering Company Ltd, Unit 2, First Floor, 596 Ferry Rd, Woolston, Christchurch

(signature)

Date: 18 November 2020

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.

ADDENDUM TO PRODUCER STATEMENT PSI - DESIGN

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah



LOCATION

11 Crete Road, Rangiora

Schedule of Engineering Inspections	
Inspection Stage	Purpose of Inspection
Throughout block laying	Confirm ties are installed as per drawings (Progress photos may suffice)

It is the contractor's responsibility to notify **The Engineering Company Ltd** 48 hours (**office@engco.co.nz**) before engineering inspections are required. The total number of inspections will depend upon the construction methodology and staging. Additional inspections from those listed above may be required upon conditions found on site.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

- BUILDING WRAP IS TO BE FIXED OVER SILLS AND OPENING STUDS
- FLEXIBLE FLASHING TAPE IS REQUIRED TO LINTELS AND 250 MM DOWN OPENING STUDS AT EITHER END
- FLEXIBLE FLASHING TAPE IS REQUIRED TO SILL TRIMERS AND 150 MM UP OPENING STUDS AT EITHER END
- FLASHING TAPE IS ALSO REQUIRED 250 MM IN EITHER DIRECTION AT UPPER CORNERS OF WINDOWS AND DOORS
- AS THE BUILDING WRAP / PAPER EXTENDS AROUND AND IS FIXED TO THE UNDERSIDE OF THE LINTEL THE HEAD FLASHINGS NEED TO BE SEALED TO THE BUILDING WRAP WITH 50 MM WIDE FLASHING TAPE

WANZ BARS

- ADDITIONAL SILL SUPPORT TO ALL WINDOW / DOOR JOINERY IE WANZ BARS

OB OBSCURE GLAZING

SG SAFETY GLASS TO COMPLY WITH THE REQUIREMENTS OF NZS 4223.3:2016 2.1.1 AND TABLE 1

LARGE PANES OF GLASS ARE SAFETY GLASS IF WITHIN 800MM OF FLOOR AND EXCEED 500MM WIDE AND 1000MM HIGH. PLEASE ALSO CONFIRM THAT ALL GLAZING WITHIN 800MM OF THE FLOOR IS EITHER 5MM FLOAT GLASS OR SAFETY GLASS.

CORROSION ZONE B
 WIND ZONE - HIGH
 EARTHQUAKE ZONE - 2
 SNOW ZONE - N4 44.00 M

NORTH ELEVATION				
RISK FACTOR	LOW	MEDIUM	HIGH	VERY HIGH
WIND ZONE			1	
NUMBER OF STOREYS	0			
ROOF/WALL INTERSECTION DESIGN	0			
EAVES WIDTH	0			
ENVELOPE COMPLEXITY	0			
DECK DESIGN	0			
TOTAL RISK FACTOR	1			
SOUTH ELEVATION				
RISK FACTOR	LOW	MEDIUM	HIGH	VERY HIGH
WIND ZONE			1	
NUMBER OF STOREYS	0			
ROOF/WALL INTERSECTION DESIGN	0		3	
EAVES WIDTH				5
ENVELOPE COMPLEXITY			3	
DECK DESIGN	0			
TOTAL RISK FACTOR	12			
WEST ELEVATION				
RISK FACTOR	LOW	MEDIUM	HIGH	VERY HIGH
WIND ZONE			1	2
NUMBER OF STOREYS	0			
ROOF/WALL INTERSECTION DESIGN			3	5
EAVES WIDTH				5
ENVELOPE COMPLEXITY			3	
DECK DESIGN	0			
TOTAL RISK FACTOR	12			
EAST ELEVATION				
RISK FACTOR	LOW	MEDIUM	HIGH	VERY HIGH
WIND ZONE			1	
NUMBER OF STOREYS	0			
ROOF/WALL INTERSECTION DESIGN			3	
EAVES WIDTH				5
ENVELOPE COMPLEXITY			3	
DECK DESIGN	0			
TOTAL RISK FACTOR	12			

EVERY UNIT ON CORNER SHALL BE TIED

PLASTER FINISH ON CLADD-X 50 MM PANEL ON CAVITY BATTENS ON BLG. WRAP

BLG. WRAP TEKTON

SOUTH ELEVATION 1:100

POWDER COATED ALUMINIUM WINDOWS / DOORS

COLOURSTEEL ROOF T RIB

ROOF BRACING TO NZS 3604 MITEK ROOF STRAP BRACING

NORTH ELEVATION 1:100

NOTE: DWANGS AT 400 CRS TO GABLE END TRUSS

90 SERIES CONCRETE BLOCK STACK BOND

PROVIDE TIES AT 400 CRS HORIZONTAL AND VERTICAL ON DIAMOND PATTERN

PROVIDE VERTICAL CONTROL JOINTS AS REQUIRED BY NZS 4210 AND NCBZ/E2

EVERY UNIT ON CORNER SHALL BE TIED

VENEER TIES SHALL BE
 - 95 MM LONG (MIN) MEDIUM DUTY (EM) TIES
 WITH MIN 45 MM MORTAR EMBEDMENT
 - FIX WITH 8G X 35 SS POSI-DRIVE WOOD SCREWS

WEST ELEVATION 1:100

SOLID PANEL DOOR SELECTED SECTIONAL COLOURSTEEL GARAGE DOOR

THERMAKRAFT 215 ROOFING UNDERLAY

PROPRIETARY COLOURSTEEL FASCIA AND GUTTER SYSTEM

LINEA OBLIQUE VERTICAL BOARD AND CAVITY BATTENS

EAST ELEVATION 1:100

WAIMAKARIRI DISTRICT COUNCIL
 Plans and specifications APPROVED in accordance
 with the Building Act 2004, clause 49 and the Building
 Regulations 1992, Clause 3
 BC201170 9/12/2020 nicolah



Job No: 53413.006
9 October 2018

Ryman Healthcare Limited
PO Box 771
Christchurch

Attention: Jeremy Moore

Dear Jeremy

Oxford Road Development, Rangiora Residential Subdivision - Geotechnical Summary

1 Introduction

Ryman Healthcare Ltd engaged Tonkin & Taylor Ltd (T+T) to undertake geotechnical investigation and assessment and provide ongoing geotechnical support for the Charles Upham Village and associated subdivision along Charles Upham Drive, Valour Road, and Crete Road, Rangiora.

This letter has been prepared in accordance with our agreed terms and conditions to provide a summary of geotechnical conditions expected within the Residential Subdivision area including stages 2, 3, and 4 as outlined in red in Figure 1 below. Stage 1 of the subdivision is not included in this letter. This letter is a summary for information only; the full suite of information is presented in the geotechnical report for the site; *Geotechnical Investigation and Assessment Report, 56 & 74 Oxford Road, Rangiora*, Tonkin & Taylor Ltd, February 2015, T+T Ref. 53413.004.



Figure 1: Site aerial showing approximate extent of subdivision (red outline), with Stages 2, 3 and 4 highlighted. Image sourced from Google Earth Pro, copyright CNES/Airbus, imagery date 25 August 2018.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

Exceptional thinking together

www.tonkintaylor.co.nz

2 Site specific geotechnical investigations

During 2013 and 2014 two phases of geotechnical investigation of the site were undertaken prior to the site being developed. These investigations included machine-drilled boreholes, Scala Penetrometer tests, hand-auger boreholes, multichannel analysis of surface waves (MASW) survey, and ground penetrating radar. The specific investigations undertaken within the area outlined in Figure 1 above included the following:

- 17 No. machine-drilled boreholes (to minimum 12.0 m below ground level (bgl))
- 63 No. Scala penetrometer tests advanced to between 1.0 m and 3.0 mbgl,
- 29 No. hand augers advanced to between 1.5 m and 3.0 mbgl,

The information provided in this letter is based on the results of these site investigations. The individual results of the investigations listed above are not included in this report but are presented in the full T+T Geotechnical Report (2015).

3 Geotechnical conditions

3.1 Stratigraphy

The site is underlain by a layer of firm to stiff sandy silt typically 1.0 m to 2.5 m thick, overlying dense gravel. Within the area of the subdivision bulk filling was undertaken as part of the development process. The results of the construction observations undertaken by T+T during filling within stage 2 (shown on Figure 1) have been presented in the previously issued report: *Stage 2 Residential lots 47-54 and 61-75 Fill Certification Report, 52 & 74 Oxford Road, Rangiora*, Tonkin & Taylor Ltd, October 2017, T+T Ref. 53413.004. This report presents the results of field density tests and concludes that the fill generally achieved the standard of compaction required by the specification. Similar reports will be compiled for stages 3 and 4 upon completion of those stages of the subdivision.

The depth to groundwater at the site was monitored regularly prior to the beginning of earthworks. Groundwater was found to typically be greater than 4 mbgl and within in the underlying gravel.

3.2 Technical Category

The likelihood of liquefaction occurring at the site as a result of a future earthquake is assessed as very low, and the site is assessed to be equivalent to Technical Category 1 (TC1) in terms of the MBIE guidelines.

3.3 Bearing capacity and foundation considerations

Based on our investigations the site is considered suitable for standard shallow foundations for most typical one and two level residential construction. In general, standard MBIE Option 4 ('waffle slab') foundations can be used. NZS3604:2011 standard foundation types can also be used providing they are designed using an appropriate geotechnical ultimate bearing capacity. A minimum geotechnical ultimate bearing capacity of 200 kPa (ULS = 100 kPa, SLS = 67kPa) may be adopted for preliminary design without the need for additional ground investigations. **This should be confirmed on site, and is likely to be required by Council at construction stage.** It likely that if site specific investigations are undertaken, the bearing capacity could be demonstrated to comply with NZS3604:2011 'good ground' (300 kPa geotechnical ultimate).

If heavy-weight (e.g. brick clad) single storey structures are constructed, a waffle slab is likely to be more suitable, and can be designed to limit settlement to within normally acceptable tolerances.

4 Applicability

This report has been prepared for the exclusive use of our client Ryman Healthcare Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Recommendations and opinions in this report are based on data from the geotechnical investigations described in the full geotechnical Report. The nature and continuity of subsoil away from the investigation locations are inferred and it must be appreciated that actual conditions could vary from the assumed model.

During excavation and construction, the Site should be examined by an engineer competent to judge whether the exposed subsoils are compatible with the inferred conditions on which the full geotechnical report has been based.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:




David Hatton

Pierre Malan

Geotechnical Engineer

Project Director

dsah

t:\christchurch\tt projects\53413\53413.0060\issueddocuments\2018-10-09 - t+t charles upham subdivision - geotechnical summary letter.docx

Prepared for
Ryman Healthcare
Prepared by
Tonkin & Taylor Ltd
Date
January 2020
Job Number
53413.0060

www.tonkintaylor.co.nz

Document Control

Title: 52-74 Oxford Road Rangiora					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
16/01/2020	1	Final Copy	NIMO	SWSU	PMM

Distribution:

Ryman Healthcare (PDF)	1 copy
Tonkin & Taylor Ltd (FILE)	1 copy

Table of contents

1	Introduction	1
1.1	Project description	1
1.2	Site geology	1
2	Earthworks construction	2
2.1	Organisations involved	2
2.2	Construction plant	2
2.3	General earthworks methodology	3
2.4	Filling materials	3
3	Construction inspection and testing	4
3.1.1	Subgrade testing	4
3.1.2	Laboratory testing of fill material	4
3.1.3	Fill compaction testing	4
4	Proposed building foundations	6
5	Conclusions	7
6	Applicability	8
Appendix A :	As-built fill plans	
Appendix B :	Earthworks Specification	
Appendix C :	Laboratory compaction testing	
Appendix D :	Field compaction testing	
Appendix E :	Statement of Suitability of Earthfill	

1 Introduction

This report presents the results of the fill certification assessment which has been completed by Tonkin & Taylor Ltd (T+T), under the instruction of Ryman Healthcare Ltd (Ryman), for the construction of parts of Stage 3 and Stage 4 residential lots at 52-74 Oxford Road, Rangiora, between the periods of September 2015 to September 2017.

This document is limited to those areas within Stage 3 and Stage 4 that have been filled and observed by T+T, as described in the following Section 1.1.

1.1 Project description

The Ryman development at 52-74 Oxford Road is located at the western extent of the Rangiora Village, extending north of Oxford Road. The project includes the Charles Upham retirement village and the surrounding subdivision consisting of residential lots. The project has been separated into four stages as is shown on the scheme plan drawing¹. This report covers Stage 3 and Stage 4 only, comprising of residential subdivision lots 25 to 46 and 55 to 60, inclusive.

All of the earthworks were cut to fill, with no imported fill used. As part of the fill certification assessment, T+T has carried out earthworks observations and review of test data supplied by the Contractor in general accordance with:

- T+T Specification – Bulk Earthworks Technical Specification, Oxford Road, Rangiora (ref 53413.006), dated September 2015; and,
- A level of construction supervision broadly equivalent to CM3².

The extent and thickness of fill is shown in the as-built cut-fill survey plan³. We note that the extent of fill is less than that shown on the original earthworks design cut-fill plan⁴ as Ryman advised us that the fill thickness was adjusted to achieve cut-fill balance. The cut-fill survey data and the cut-fill as-built plan are presented in Appendix A.

1.2 Site geology

Published geological information⁵ indicates that the site is underlain by the Halkett Member of the Springston Formation. The Halkett Member of the Springston Formation is described as post-glacial fluvial gravel, sand and silt, representing aggradation of primarily the Ashley and Waimakariri Rivers. The Burnham Formation, comprised primarily of glacial outwash gravels, underlies the Springston Formation.

During 2013 and 2014 T+T undertook two stages of geotechnical investigations of the site. The results of this work are summarised in the T+T geotechnical summary letter, dated 9 October 2018⁶, and in the geotechnical report for the site⁷. The geotechnical investigation indicated that the ground conditions across the site are generally uniform in terms of material composition. The site was

¹ Woods drawing "Ryman Rangiora Development, Scheme Plan - Overall" drawing number 034-502_C0-001, Rev C, dated 10 April 2017.

² Engineering New Zealand Construction Monitoring Services guidelines 2014, downloaded from <https://www.engineeringnz.org/resources/practice-notes-and-guidelines/> on 16 January 2020

³ Woods drawing "Ryman Rangiora Development, cut fill asbuilt plan" drawing number 61099-02-AB-EW-00, dated 5 October 2017.

⁴ Blakely Construction "Rymans Rangiora Development, As-built cut-fill plan survey plan"

⁵ Brown, L. J. 1973: Sheet S76 Kaiapoi (1st edition) "Geological Map of New Zealand 1: 63 360". Department of Scientific and Industrial Research, Wellington.

⁶ T+T letter, *Oxford Road Development, Rangiora; Residential Subdivision – Geotechnical Summary*, Job No: 53413.0060, 9 October 2018

⁷ *Geotechnical Investigation and Assessment Report, 56 & 74 Oxford Road, Rangiora*, Tonkin & Taylor Ltd, February 2015, T+T Ref. 53413.004

assessed to be underlain by a thin surface layer of topsoil overlying predominantly sandy silt material. Gravel of the Springston Formation underlies the silt at a depth of between 1.0m and 3.0m bgl. The inferred generalised site subsurface profile is summarised in Table 1 below.

Table 1 – Generalised subsurface profile at project site

Unit No.	Description	Inferred geological unit	Approx. depth to top of layer (m bgl)	Approx. layer thickness (m)
1a	Topsoil	Springston Formation	0.0	0.2
1b	Sandy SILT, firm to stiff		0.2	1.5 to 3.0
1c	Dense to very dense GRAVEL		1.7 to 3.2	20.0+

Groundwater levels were monitored monthly for a year following the geotechnical investigations. Ground water was typically encountered between 6m and 7m below ground level (bgl) with spikes following periods of prolonged heavy rain reaching 4m to 5m bgl.

2 Earthworks construction

2.1 Organisations involved

Earthworks were carried out on-site by Blakely Construction. T+T acted as the Inspecting Engineer (as defined in NZS 4431:1981). The organisations contracted to perform the works are listed in Table 2 below, together with their site role.

Table 2 – Construction roles

Organisation	Abbreviation	Role
Ryman Healthcare Ltd	Ryman	Owner and developer
Blakely Construction	BC	Earthworks Subcontractor
Tonkin & Taylor Ltd	T+T	Inspecting Engineer (as defined in NZS 4431:1989)
Woods Ltd	Woods	Earthworks design and topographical survey
Geotechnics Ltd	Geotechnics	Geotechnical Testing
Fulton Hogan Ltd	FH	Geotechnical laboratory testing

2.2 Construction plant

The construction plant used to complete the earthworks described in Section 2.3 are summarised in Table 3 below:

Table 3 – Description of construction plant

Plant	Size/Capacity	Number (typical)	Primary Task
Excavator	Typical operating weight: 10 tonne	1 unit	Removal of topsoil, excavation of soft zones
Excavator	Typical operating weight: 30 tonne	1 unit	Removal of topsoil, excavation of soft zones, loading topsoil from stockpiles

Plant	Size/Capacity	Number (typical)	Primary Task
Sheepsfoot vibratory roller	Operating weight: 10 tonne	1 unit	Compaction of site won fine grained fill
CAT 815B sheepsfoot compactor	Operating weight: 20 tonne	1 unit	Compaction of site won fine grained fill
Rammax vibratory roller	Operating weight: 1.5 tonne	1 unit	Compaction of site won fine grained fill
Articulated dump truck	Operating Weight: 50 tonne	2 units	Transporting topsoil and site-won fill
Water cart	Tank capacity: 10,000 L	1 unit	Dust control & moisture conditioning.
D51-PX Dozer	Operating Weight: 13 tonne	1 unit	Spreading of material

2.3 General earthworks methodology

The following methodology was adopted for construction of the site earthworks:

- The topsoil material was stripped to approximately 0.2 to 0.3 m depth and stockpiled. The exposed subgrade was proof rolled using a 50T loaded articulated dump truck under the observation of a T+T engineer. Where (in the opinion of the observer) significant deflection was observed during proof rolling, Scala penetrometer testing was undertaken. The areas of nonconforming material were excavated, removed and the area inspected to ensure that the nonconforming material had been removed.
- Upon approval of the prepared subgrade by T+T, fill material was placed and compacted in layers using the compaction equipment as detailed in Table 3 above. The fill material was placed in uniform layers approximately 0.2m in thickness and compacted until the required minimum dry density was attained.
- In-situ density testing of the compacted fill was undertaken using a Nuclear Density Meter (NDM).
- When design levels were achieved, topsoil was placed and spread by dozer and grader. The topsoil was sourced from on-site stockpiles that were generated from during the stripping of the initial site surface. The topsoil was placed to establish vegetation growth and to protect the fill from wind and rain erosion. It is noted that the topsoil depth, quality, and type of grass seeding was not assessed or measured by T+T. Topsoil is not considered appropriate as a founding material.

2.4 Filling materials

The fill material was sourced from on-site cut material. On some occasions the natural silt fill material had been mixed with Gravel. The material used as fill met the material type requirements of the filling specification and comprised either:

- Sandy Silt, or,
- Gravelly Silt.

3 Construction inspection and testing

A level of construction observation generally consistent with CM3⁸ was completed by T+T during the earthworks. T+T completed periodic site inspections, typically at a rate of two to three times a week during construction.

Earthworks were typically completed to a lesser thickness of fill than that indicated by the design cut-fill plan. BC have provided survey data showing the extent and thickness of fill which was placed. BC have advised that the fill thickness was adjusted to achieve cut-fill balance.

3.1.1 Subgrade testing

T+T observed the prepared subgrade surface and confirmed that topsoil, organics, and other unsuitable material had been removed prior to placement of the fill. The prepared subgrade surface was generally observed to predominantly comprise a clayey silt or sandy silt.

Prior to fill placement, proof rolling of the subgrade was undertaken, typically using a 50T loaded dump truck, to identify areas of soft or unsuitable soil and provide confirmation of the subgrade strength. Where significant deflection was observed during proof rolling Scala penetrometer testing was undertaken. The strength of the subgrade was deemed acceptable for fill placement if 2 (or greater) blows per 100mm penetration of the Scala penetrometer rod were achieved once the rod was deemed to be seated. The surficial 50 to 100mm penetration depths were generally considered as 'test seating' blows.

Where test results were below design values, the depth and extent of unsuitable areas was conveyed to BC on-site and unsuitable materials were excavated and removed.

3.1.2 Laboratory testing of fill material

New Zealand standard compaction tests (NZS 4402:1986 – 4.1.1) have been carried out on representative soil samples at IANZ approved laboratories for the assignment of reference densities.

The tests were carried out in accordance with the appropriate methodology as set out in NZS 4402:1986 - Test 4.1.1, excluding all over-size soil particles greater than 37.5mm (gravels and cobbles), at the Fulton Hogan Canterbury Laboratory.

A detailed description of fill materials and the assignment of standard compaction reference tests values are presented in Appendix C, together with the testing certificates of the dry density/moisture relationship, and as summarised in Table 4 below.

Table 4 – Assignment of reference densities

Material Type	Description	Reference Maximum Dry Density (MDD) (t/m ³)	Target Dry Density 95% MDD (t/m ³)
Site won fill	Sandy SILT	1.68-1.71	1.61

3.1.3 Fill compaction testing

BC completed periodic visual assessments and reviewed compaction testing of the cut to fill material throughout the fill construction process. In general, fill density testing was undertaken using a NDM during the earthworks. In-situ density tests were carried out by BC and verification testing was

⁸ Engineering New Zealand Construction Monitoring Services guidelines 2014, downloaded from <https://www.engineeringnz.org/resources/practice-notes-and-guidelines/> on 16 January 2020

undertaken by T+T. Scala penetrometer tests and shear vane tests were also used in conjunction with NDM testing and following completion of earthworks, prior to issue of this report.

The target density level for the earthworks filling was 95% of New Zealand standard Compaction test (NZS 4402:1986-4.1.1), which is defined as:

$$\% \text{ relative compaction} = \frac{\text{field dry density}}{\text{reference standard maximum dry density}} \times 100$$

Including re-work, a total of approximately 43 NDM tests were performed during the fill compaction process for Stage 3 and Stage 4 (areas covered by this report as described in Section 1.1). All 43 NDM tests were assessed to pass the fill compaction criteria.

The measured in-situ density of the fill materials tested was between 97% and 112% of the reference maximum dry densities. Areas of fill with test results below the target of 95% were re-worked and re-tested until the target was achieved.

The relative compaction results indicate that some unusually high densities were obtained for some sections of the site won fill. Due to on-site sourcing of cut materials, some of the silt fill had become mixed with the gravel from layer 1c of Table 1 above. When testing fill of this nature the assigned reference density may not be appropriate. Where site blending has given rise to blended material with variable gravel content, a higher reference density would be applicable. It is judged that the unusually high relative compaction results are a result of low reference density levels at some test locations.

NDM test data was not supplied for the final lift of fill placed lots 32 to 36 and lots 57 to 60. For this reason T+T undertook additional shear vane and Scala penetrometer testing on these lots. 16 Scala penetrometer tests and 12 sets of ten shear vane tests were completed over the 28 lots.

Results from the 12 shear vane tests indicate that the fill (sandy silt) has an average undrained shear strength of 133 kPa with values ranging from 48 kPa to 225 kPa. Some values are lower than the target set in the T+T specification (Average minimum shear strength of 140 kPa and single test minimum shear strength of 120 kPa). It is not possible to confirm whether these test results represent the condition of the fill when earthworks were completed, or whether the shear strength has reduced due to moisture content change.

The ground surface on lots 25 to 38 was too hard to penetrate for shear vane testing, however the Scala penetrometer tests on these lots indicated an average blow count per 50 mm of 4, with values ranging from 2 to 6 blows per 50 mm. This is greater than the target 1.5 blows per 50 mm set by the specification.

The fill layer ranges from 0 mm to 600 mm thick and we assess the fill strength to be equal to, or greater than, the underlying natural materials. On this basis, we consider the site to be generally suitable for residential buildings, subject to appropriate geotechnical investigations and foundation design in accordance with building consent requirements.

The NDM test results as presented by BC are presented in Appendix D. The results of the T+T verification NDM testing are also presented in Appendix D. A site plan showing approximate locations of the T+T testing is presented on Figure 1, Appendix D.

4 Proposed building foundations

The fill platform has been constructed without regard for the position of future building construction on any particular lot. The details of future buildings were not available at the time of construction of the fill platform.

This report does not remove the necessity for the normal investigation and design process to be undertaken for the design and construction of buildings at the site, as is likely to be required by Council. The geotechnical conditions at the site may not comply with NZS3604:2011 'good ground' (300 kPa geotechnical ultimate), and a reduced geotechnical ultimate bearing capacity of 200 kPa (ULS = 100 kPa, SLS = 67kPa) can be adopted for preliminary design purposes. Refer to the T+T geotechnical summary letter⁹, and in the geotechnical report for the site¹⁰, for further information.

Consideration should be given to the potential effects that trenching into the fill platform may have on any future structures built on the site.

Recommendations and opinions in this report are based on data from the testing regime described. The nature and continuity of subsoils away from the test locations are inferred but it must be appreciated that actual conditions could vary between test locations.

⁹ T+T letter, *Oxford Road Development, Rangiora; Residential Subdivision – Geotechnical Summary*, Job No: 53413.0060, 9 October 2018

¹⁰ *Geotechnical Investigation and Assessment Report, 56 & 74 Oxford Road, Rangiora*, Tonkin & Taylor Ltd, February 2015, T+T Ref. 53413.004

5 Conclusions

- 1 This report covers residential lots 25 to 46, and 57 to 60 within Stage 3 and Stage 4 only, which have been filled by BC and observed by T+T between September 2015 and September 2017.
- 2 A level of construction observation generally equivalent to CM3 was completed by T+T during the fill construction process.
- 3 T+T's site observations indicate that:
 - An appropriate construction methodology was adopted by the Contractor for the fill construction;
 - Topsoil, organic and other unsuitable founding materials were removed from the prepared subgrade surface prior to the placement of cut to fill material;
 - The prepared subgrade surface was typically observed to comprise clayey Silt. Proof rolling of the subgrade material was used to identify any areas of softer material. These were then excavated and replaced with compacted fill criteria prior to fill placement;
 - The as-built fill material is similar to the material which was sampled for the laboratory reference tests, and,
 - The fill material placed was generally observed to be uniform in nature and free from unsuitable materials.
- 4 In-situ testing of the fill material comprising NDM, Scala penetrometer and shear vane tests has been undertaken. The test results indicate that the fill material generally meets the recommendations of T+T Specification – Bulk Earthworks Technical Specification, Oxford Road, Rangiora (ref. 53413.006), dated September 2015. Additional testing undertaken in lieu of NDM tests not supplied for the final lift of fill in one area indicated a lower undrained shear strength than the target set in the Specification (potentially due to moisture change since filling was completed in 2017). The strength of this material is still considered to be consistent with that of the underlying natural material, however specific foundation design is still required.
- 5 The site is generally assessed to be suitable for residential buildings, subject to appropriate geotechnical investigations and foundation design in accordance with building consent requirements. This report and the associated earthworks testing does not remove the necessity for proper engineering investigation, inspection, assessment and design of all future building foundations. The geotechnical conditions at the site may not comply with NZS3604:2011 'good ground', and a reduced geotechnical ultimate bearing capacity of 200 kPa (ULS = 100 kPa, SLS = 67kPa) can be adopted for preliminary design.
- 6 The statement of suitability of earthfill for residential development within the parts of Stage 3 and Stage 4 covered by this report is provided in Appendix E.

6 Applicability

This report has been prepared for the exclusive use of our client Ryman Healthcare, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

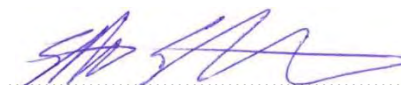
Tonkin & Taylor Ltd

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Authorised for Tonkin & Taylor Ltd by:



Pierre Malan
Project Director

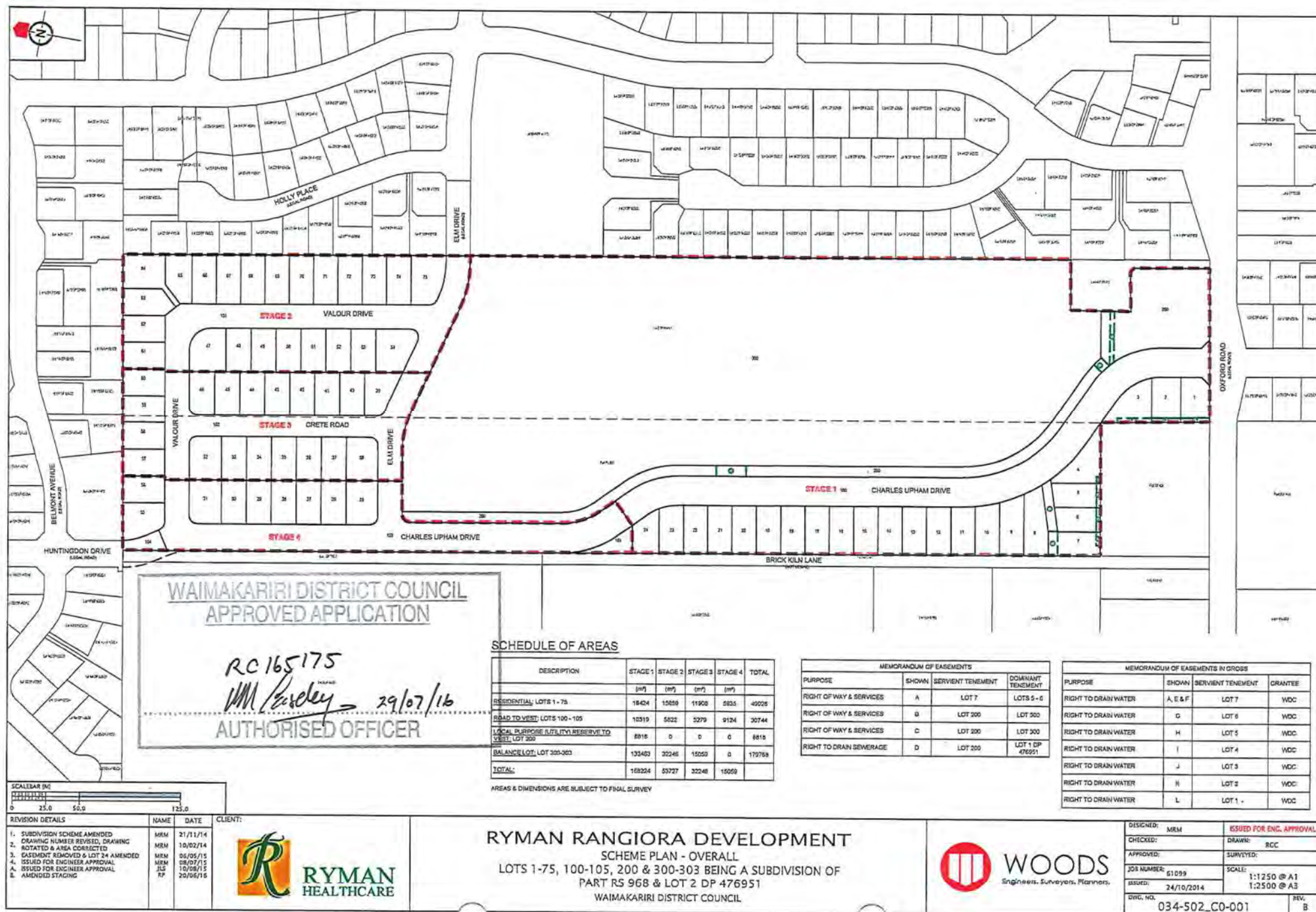
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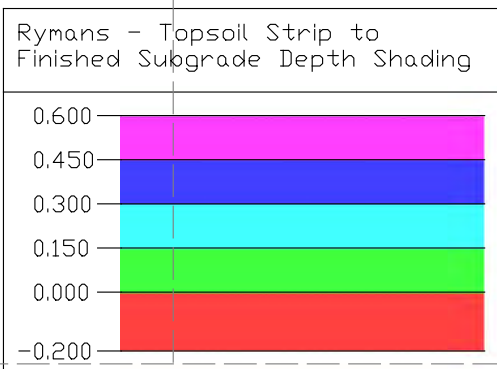
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WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

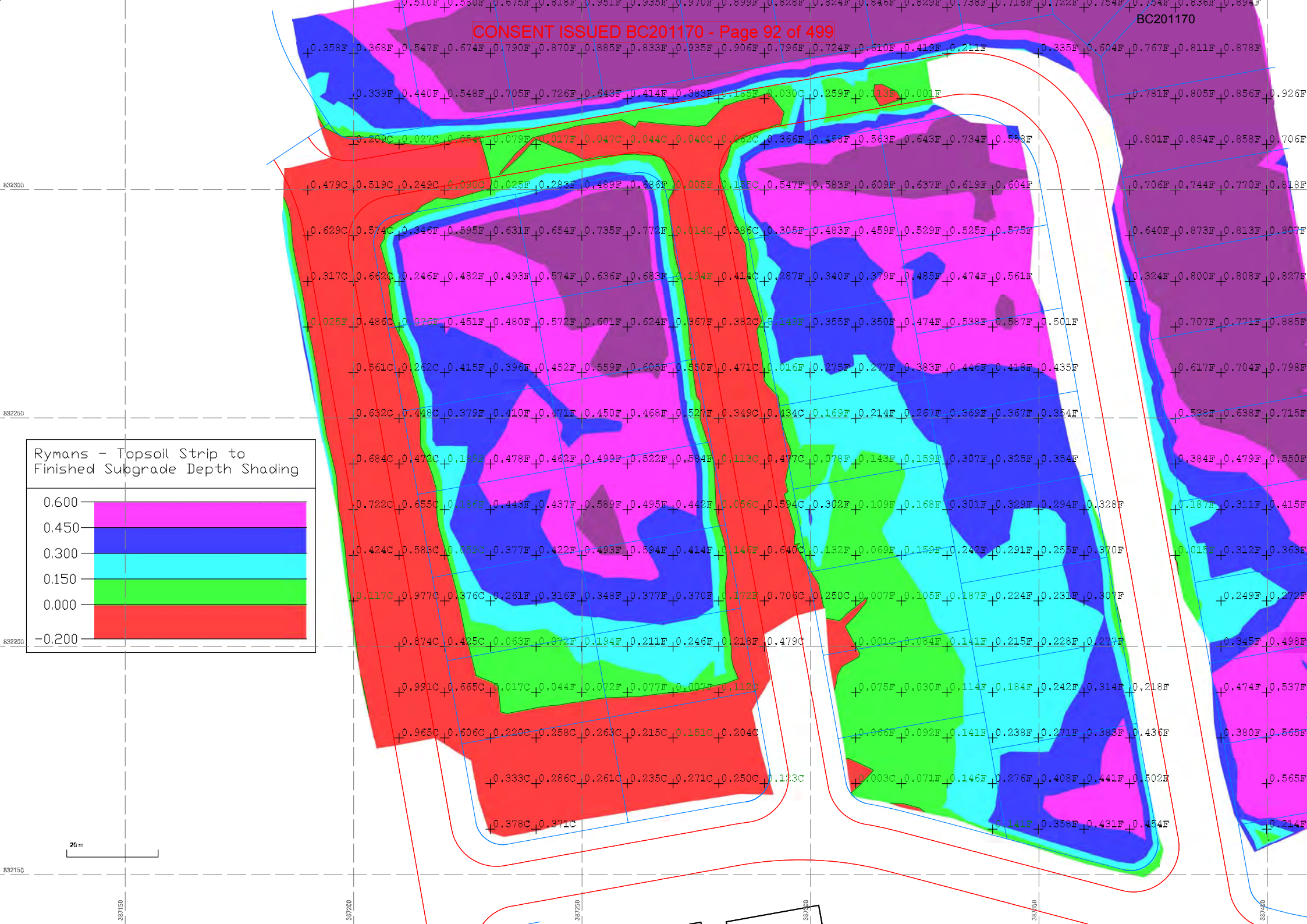
Appendix A: As-built fill plans

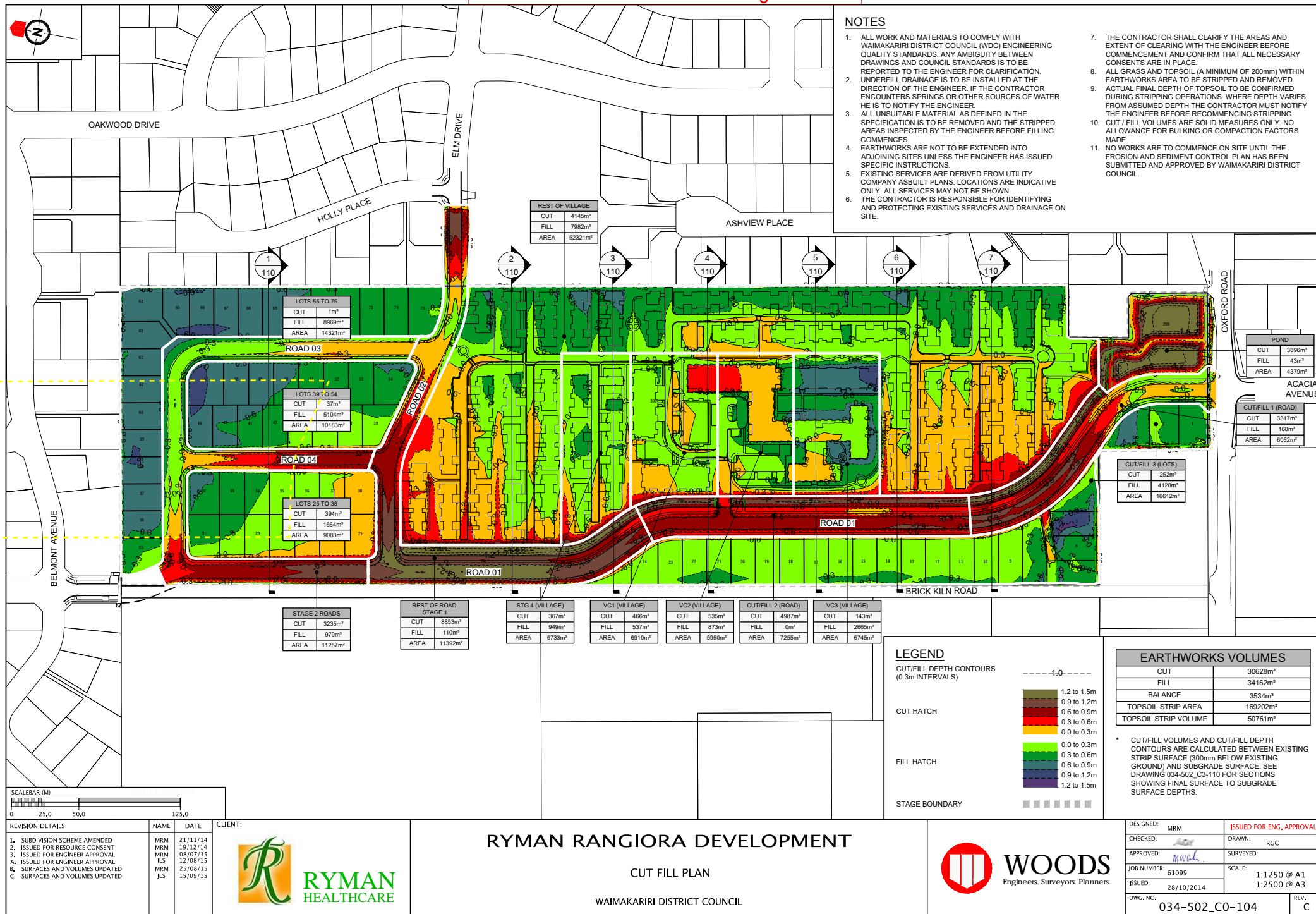
- **Site Plan**
- **As-built cut-fill plan survey plan**
- **Original earthworks design cut-fill plan**





20 m





Appendix B: Earthworks Specification

- Bulk Earthworks Technical Specification

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

SPECIFICATION



Bulk Earthworks Technical Specification

Oxford Road, Rangiora

Prepared for
Ryman Healthcare Ltd

Prepared by
Tonkin & Taylor Ltd

Date
September 2015

Job Number
53413.006



Exceptional thinking together

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Table of contents

1	Bulk Earthworks	1
1.1	Scope	1
2	Definition of fill types	1
2.1	Bulk fill	1
2.2	Approved natural soil (site won material)	1
2.3	Imported hardfill (AP 40, AP 65 and AP 100)	1
2.4	Blended material	1
2.5	Unsuitable material	2
2.6	Rubbish	2
2.7	Topsoil	2
3	General requirements	2
3.1	Drainage control	2
3.2	Preservation and maintenance	2
3.3	Inspections and approvals	2
4	Excavation	3
4.1	General	3
4.2	Removal of topsoil	3
4.3	Excavation management	3
4.4	General undercutting	4
5	Subgrade	4
5.1	Fill sub-grade preparation	4
5.2	Protection of subgrade	5
6	Filling	5
6.1	General	5
6.2	Conditioning and spreading of fill	5
6.3	Imported hardfill materials - AP 100	6
6.3.1	General	6
6.3.2	Maximum dry density	6
6.3.3	Grading	6
6.3.4	Surface finish of the hardfill	7
6.4	Imported hardfill materials – AP 40 and AP 65	7
6.4.1	General	7
6.4.2	Maximum dry density	7
6.4.3	Broken face content	7
6.4.4	Grading	8
6.4.5	Surface finish of the hardfill	8
6.5	Compaction	9
6.5.1	General	9
6.5.2	Compaction trials	9
6.6	Compaction standards and testing	10
6.6.1	General	10
6.6.2	Fill test methods	10
6.6.3	Compaction standards	11
6.6.4	Frequency of testing	12
7	Applicability	14

1 Bulk Earthworks

1.1 Scope

This technical specification covers all the works necessary to cut and fill the Site to the required levels, grades and standards. These works include but are not limited to:

- Stripping topsoil
- Excavation of unsuitable materials to waste or designated areas
- Cut to waste or fill
- Controlled filling using site-won or imported approved materials

This specification does not cover the construction of fill within the subgrade for road pavements.

2 Definition of fill types

2.1 Bulk fill

Defines all general fill placed to form the required levels and to provide founding for the structures, access roads, services and similar.

2.2 Approved natural soil (site won material)

Defines natural material recovered from cut operations at the site. The natural materials may comprise silt, sand or a blend of these materials. The natural materials shall have the following requirements:

- No individual particles greater than 100mm
- No material with a plasticity index $\geq 12\%$
- No material with an organic content $> 3\%$

The optimum moisture content shall be determined through laboratory testing.

2.3 Imported hardfill (AP 40, AP 65 and AP 100)

Defines a well graded aggregate, with slightly weathered to unweathered fragments of rock up to maximum 40, 65 or 100 mm characteristic dimension. All imported hardfill shall be relatively free of fines and other mineral matter such that when compacted the rock fragments can achieve point-to-point contact. Rock is as defined in TNZ F/1, (i.e. any igneous, sedimentary, or metamorphic stone which is solidly bonded, or cemented together and which occurs in masses, ledges, seams, or layers).

All imported hardfill shall conform to the appropriate grading envelopes provided in Sections 6.3.3 and 6.4.4 of this specification.

2.4 Blended material

Where directed by the Geotechnical Engineer, or specified in this document, materials shall be blended. Blending shall be undertaken using a method that results in a well-mixed homogeneous material and the method and end product must be approved by the Geotechnical Engineer prior to use. Testing of the material post-blending is required to ascertain the compaction targets for use as bulk fill.

2.5 Unsuitable material

Defines material that is either organic material, other than topsoil, within cuts or fill areas, or material which by its inherent nature cannot be satisfactorily reconditioned by wetting and drying for use as Bulk fill.

2.6 Rubbish

Rubbish is defined as inorganic material e.g. steel, concrete, plastic, refuse and other debris found during cut and fill operations and is categorised as Unsuitable Material unless otherwise approved by the Geotechnical Engineer.

2.7 Topsoil

Topsoil is defined as the layer of organic material immediately below the ground level that is unsuitable for use as fill, but which is considered by the Geotechnical Engineer to be suitable for re-spreading as a surface soil layer for establishing vegetation growth at the completion of the works.

3 General requirements

3.1 Drainage control

All earthworks shall be carried out in fully drained conditions with no free water on the working surfaces. All preparatory excavation work and subsequent excavations in borrow areas or areas to be filled shall be kept effectively drained at all times. Cut and fill areas shall be sloped and graded adequately at all times so that they do not pond water or allow water to infiltrate. Temporary drains shall be installed or pumping carried out as necessary on a regular basis to remove or deflect water from the areas of operations, or to drain water as soon as it is seen to pond. If the Contractor considers it impracticable to maintain excavations or areas to be filled in a fully drained condition the Contractor shall propose, for the Geotechnical Engineer's approval, any measures to revise these drainage requirements.

Any fill or final excavation surface materials which have been allowed to become too wet or soft shall be removed and dried, or replaced. All fill surfaces shall be graded and rolled at the end of each day's work to prevent any ponding and erosion. Prior to commencement of the following day's filling operations, the previously graded and rolled surface shall be scarified by approved plant to remove any softened materials and to prevent the formation of sub-standard, or weak layers within the fill.

3.2 Preservation and maintenance

The Contractor shall preserve and maintain all earthworks, including partly completed earthworks, within their relevant specified standards, and shall make good, at their own cost, any earthworks which have deteriorated below the specified standards.

The Contractor shall carry out the works so as to minimise passage of construction plant over areas of fill or cut formed to final profiles. Areas of fill or cut that are softened or otherwise damaged due to repeated passage of construction plant shall be undercut and replaced. The Geotechnical Engineer shall inspect and approve the depth and extent of any such undercutting and the requirements for the replacement materials, which will be at the Contractor's own cost.

3.3 Inspections and approvals

Before fill is placed in any area, the Geotechnical Engineer shall be notified so that the stripped surface can be inspected and instruct whether further excavation and/or undercutting and

backfilling is required. No filling shall be undertaken in an area until such inspections of the stripped surface, and any other works that may be required below the stripped surface, have been made and the Geotechnical Engineer has approved the commencement of filling.

The Contractor shall allow sufficient time for any subsurface and surface inspections and shall programme the operations and provide drainage, access and survey control so that any further works instructed prior to any filling can be carried out in an orderly manner without delay or damage to the works.

Where there is a delay of more than 24 hours between approval of a stripped area and placement of fill, or rainfall has occurred within the vicinity of the stripped area, the Contractor shall obtain a new approval of the surface finish from the Geotechnical Engineer. The period of 24 hours may be relaxed at the Geotechnical Engineer's discretion. The surface shall be maintained in its approved condition until filled over.

4 Excavation

4.1 General

Excavation includes removal of topsoil, excavation to form the cut profiles shown on the Contract Drawings, excavation of fill from borrow areas, removal of unsuitable materials and rubbish, and preparation for drains and foundations for structures.

4.2 Removal of topsoil

The depth of topsoil stripping shall be sufficient to remove all organic material, turf and significant plant roots such as to expose soil containing an insignificant amount of organic material to the approval of the Geotechnical Engineer. Except where limited by boundaries, existing works or other limiting features, stripping shall extend 2 metres beyond the limits of areas subject to earthworks or construction. The Contractor shall determine the proposed stripping depth prior to starting operations, and shall avoid unnecessary over-excavation.

4.3 Excavation management

Cut areas shall be progressively excavated to form a uniformly graded surface within the batter limits. The Contractor shall form the excavations in a logical and orderly manner to minimise wastage and shall undertake continuous visual inspections of materials as they are excavated. Any unexpected variations in material types or properties, evidence of slip debris or slope instability or observations of buried vegetation, groundwater flows, or seepages should be immediately reported to the Geotechnical Engineer.

The Contractor shall plan the earthworks carefully so as to optimise the use of the available fill materials. In particular the Contractor shall assess the volumes of different materials available, their locations relative to proposed fill areas and the degree of drying and conditioning required for the various materials.

All earthworks surfaces shall be sealed off with rubber tyre plant when rain is imminent to minimise erosion and protect exposed materials from strength loss due to increase in moisture content.

4.4 General undercutting

The requirements for general undercutting, i.e. within gullies, for the fill foundations and below areas of cut, shall be as follows:

- All organic materials and other unsuitable materials, or instructed by the Geotechnical Engineer, shall be undercut.
- The depth of the undercut in materials will be specified by the Geotechnical Engineer when the material at the subgrade level has been exposed and evaluated.
- On completion of the undercut, the surface shall be shaped, trimmed and compacted so as not to hold water. The compaction shall be as specified in Section 6.5.
- The Contractor shall treat any excavated undercut material as unsuitables and dispose of accordingly, unless instructed otherwise by the Geotechnical Engineer.

5 Subgrade

5.1 Fill sub-grade preparation

Prior to beginning any filling operations in a new area of the site, or after a significant period where no filling has taken place, an inspection of the prepared fill sub-grade shall be undertaken by the Contractor and the Geotechnical Engineer.

Prior to the placement of any fill material the exposed subgrade surface should be inspected and approved by the Geotechnical Engineer. The Geotechnical Engineer may undertake appropriate testing to assess the subgrade strength. If requested, the Contractor shall undertake proof-rolling of the subgrade surface with a 15-tonne drum roller or similar high ground pressure equipment. Any soft or loose areas shall be removed by the Contractor to a depth determined by the Geotechnical Engineer. When the proof-rolled subgrade surface is approved, the subgrade shall be thoroughly scarified to a depth of at least 100mm, and moisture conditioned as necessary prior to placement of the first lift of fill.

Preparation of the fill sub-grade may comprise as appropriate:

- Scarifying the existing ground surface within the area where fill is to be placed to prevent the development of distinct layering between existing material and the new fill.
 - The removal of any areas identified as weak/unsuitable by the Geotechnical Engineer.
- Unsuitable areas on the proposed fill sub-grade will include the following:

- Areas where vegetation has been allowed to establish
- Areas where stormwater has been allowed to collect
- Areas where plant trafficking has caused deterioration of the surface
- Areas of existing weak/filled ground
- Any other area that the Geotechnical Engineer identifies as being unsuitable

The Contractor shall provide the Geotechnical Engineer with at least 2 working days' notice of the intention to begin filling a new area so that an inspection can be organised. The Contractor at their own expense shall make good any area of the sub-grade, which in the opinion of the Geotechnical Engineer, has not been prepared to an acceptable standard.

New fill shall not be spread over surfaces that have deteriorated from their specified and/or approved condition, and where necessary and appropriate, the old surface shall be scarified, conditioned, and re-compacted before placing new fill.

5.2 Protection of subgrade

The Contractor shall programme the work such that subgrade is at all times protected from the effects of weather, construction plant or similar prior to commencing any undercut treatment, fill placement, foundation construction and/or pavement construction. If the surface of the subgrade becomes damaged or deteriorates prior to subgrade undercut treatment and/or fill placement then the affected area should be scarified, reshaped, replaced, recompacted or otherwise treated and retested until the requirements for the subgrade are again obtained to the approval of the Geotechnical Engineer.

6 Filling

6.1 General

Fill materials shall be sourced from areas of cut, or imported to site. If the Contractor wishes to propose materials from alternative sources then details of such sources shall be provided for the Geotechnical Engineer's approval. Material types are required to be selected, handled and compacted to form zoned fills as instructed by the Geotechnical Engineer. The compaction standards are specified in Section 6.6.

The Contractor shall take all precautions and maintain a tidy operation to minimize the presence of any loose, excavated materials that could become wet during rain. It is likely that considerable drying effort will be required for some of the materials if they become too wet to allow the required compaction criteria to be met. The Contractor shall also ensure that all fill is free of organic matter or other unsuitable materials.

6.2 Conditioning and spreading of fill

Before fill is placed in any area, the Contractor shall notify the Geotechnical Engineer that the fill foundation has been stripped, drained, including subsoil drains and prepared as required by the Contract Drawings and Specification and is ready for the Geotechnical Engineer's inspection and approval.

Prior to compaction, the fill materials shall be spread uniformly in horizontal layers and, if necessary, conditioned to an appropriate water content by aeration and drying or wetting (as the case may be), and/or by blending and mixing "wet" and "dry" materials. When soil is to be dried, the Contractor shall disc the soil and allow it to dry uniformly to its full depth. When the soil is to be wetted, the shall be done with sprinkling equipment ensuring uniform and controlled distribution of water in conjunction with blading and discing. In all cases the fill shall be mixed and conditioned thoroughly so that immediately prior to compaction the material type and the water content of the fill is reasonably uniform within one area. The layers prior to compaction shall be less than 250 mm loose thickness, and all fragments with less than 100 mm maximum dimension.

No new fill shall be placed over previously placed fill that has not achieved the required standard of compaction, or has become contaminated, or has deteriorated from the required fill standards, or requires testing and approval prior to placement of a new layer. Previously placed fill that does not comply shall be reworked by scarifying, conditioning and recompacting so as to meet the Specification or alternatively it shall be removed and replaced with complying material.

6.3 Imported hardfill materials - AP 100

6.3.1 General

This section sets out the requirements and parameters for imported aggregates that may be used as bulk fill, not including areas beneath building foundation elements as detailed on the structural drawings. The intent is that full use is made of all available on-site material and the quantity of imported aggregate is minimised.

All necessary reference test results shall be submitted to the Engineer no less than 5 working days prior to their required use in the Works to obtain acceptance of the material.

All laboratory tests which are undertaken by the Contractor for the purposes of this project shall be completed by an IANZ accredited Laboratory that is approved by the Geotechnical Engineer.

6.3.2 Maximum dry density

The maximum dry density (MDD) of the imported hardfill material shall be determined in accordance with the methodology described by NZS 4402: 1986 Test 4.1.3 - NZ vibrating hammer compaction test. This test shall include all soil particles that pass a 37.5mm sieve and the mass retained on this sieve shall be measured and recorded on the results sheet.

6.3.3 Grading

The aggregate shall have a grading which falls within the limits defined in Table 6.1 below when tested according to NZS 4402:1986 Test 2.8.1.

Table 6.1: AP 100 grading envelope

Aperture Size (mm)	Percentage Passing by Weight
100	100
75.0	80 – 92
65.0	70 – 85
40.0	54 – 75
19.0	39 – 60
13.2	32 – 52
9.50	27 – 46
4.75	20 – 34
2.36	15 – 25
1.18	10 – 18
0.6	6 – 13
0.3	3 – 10
0.15	1 – 7.5
0.075	0 – 5

Alternative AP materials with a non-complying grading envelope may be proposed by the Contractor, but such material may not be incorporated into permanent works without the prior written approval of the Geotechnical Engineer.

6.3.4 Surface finish of the hardfill

The surface finish of the fill shall be:

- A tightly consolidated surface where large aggregate is exposed and secured in place by a matrix of smaller and finer aggregates, and
- Shall not displace or dislodge under normal sweeping or vehicle movements

6.4 Imported hardfill materials – AP 40 and AP 65

6.4.1 General

This section sets out the requirements and parameters for imported aggregates that may be used as hardfill beneath building foundation elements as indicated on the structural drawings.

All necessary reference test results shall be submitted to the Engineer no less than 5 working days prior to their required use in the Works to obtain acceptance of the material.

All laboratory tests which are undertaken by the Contractor for the purposes of this project shall be completed by an IANZ accredited Laboratory that is approved by the Geotechnical Engineer.

6.4.2 Maximum dry density

The maximum dry density (MDD) of the imported hardfill material shall be determined in accordance with the methodology described by NZS 4402: 1986 Test 4.1.3 - NZ vibrating hammer compaction test. This test shall include all soil particles that pass a 37.5mm sieve and the mass retained on this sieve shall be measured and recorded on the results sheet.

6.4.3 Broken face content

The requirements for broken face content for imported AP 40 and AP 65, when tested according to NZS 4407:1991 - Test 3.14 *Broken Face Test*, are as follows:

AP 40: The aggregate broken face content in each of the three aggregate fractions between the 37.5 mm and 4.75 mm sieves shall not be less than 70% by weight and shall have two or more broken faces.

AP 65: The aggregate broken face content shall not be less than 35% by weight, and shall have two or more broken faces, between 19.5mm and 63.0mm sieve sizes.

6.4.4 Grading

The aggregate shall have a grading which falls within the limits defined in Table 6.2 and Table 6.3 below when tested according to NZS 4402:1986 Test 2.8.1.

Table 6.2: AP 65 grading envelope

Aperture Size (mm)	Percentage Passing by Weight
63.0	100
37.5	60 – 90
19.0	45 – 65
9.50	30 – 50
4.75	20 – 40
2.36	10 – 28
1.18	7 – 22
0.60	5 – 16
0.30	4 – 12
0.150	3 – 8
0.075	0 – 6

Table 6.3: AP 40 grading envelope

Aperture Size (mm)	Percentage Passing by Weight
37.5	100
19.0	66 – 81
9.50	43 – 57
4.75	28 – 43
2.36	19 – 33
1.18	12 – 25
0.60	7 – 19
0.30	3 – 14
0.15	0 – 10
0.075	0 – 7

6.4.5 Surface finish of the hardfill

The surface finish of the fill shall be:

- A tightly consolidated surface where large aggregate is exposed and secured in place by a matrix of smaller and finer aggregates, and
- Shall not displace or dislodge under normal sweeping or vehicle movements.

6.5 Compaction

6.5.1 General

The Contractor shall employ sufficient dedicated compaction plant so as to achieve the specified compaction. Allowances should be made by the Contractor for specialised rolling equipment where necessary (i.e. “sheepsfoot” roller for cohesive fill material). Equipment used in transportation and spreading will not be accepted as compaction plant. Compaction plant shall cover the entire area of each layer of fill and give each layer a uniform degree of compactive effort. The combined operations of spreading and compacting shall be undertaken using systematic and properly managed procedures, to the Geotechnical Engineer’s approval, so as to ensure that each loose layer receives the required passes of the roller or other approved compaction equipment before further loose material is spread.

Notwithstanding the requirements of Section 6.6 of this Specification, the Geotechnical Engineer may carry out check tests of compaction at any time. The Contractor shall stop or divert the machines as required by the Geotechnical Engineer to allow the tests to be carried out. Where field tests indicate that the specified standard of compaction has not been achieved, corrective action shall be taken to bring the fill to the required standard and as required by the Geotechnical Engineer. This may require the affected fill to be reworked by scarifying, conditioning and recompacting so as to meet the specification or alternatively it may need to be removed and replaced with complying material.

Competent and well-experienced Supervisors shall be provided by the Contractor to control procedures and shall carry out their duties primarily at the fill platform and not by delegation.

6.5.2 Compaction trials

Before placing any fill the Contractor shall carry out compaction trials (plateau tests) to confirm to the satisfaction of the Geotechnical Engineer the adequacy of the machinery and procedures which is proposed for use for each of the fill types defined in Section 2. The trials shall be carried out using the same compaction equipment and on fill materials considered representative of those to be used for the permanent works. Separate trials will be necessary for each distinct fill material type and ongoing compaction trials may become necessary as the works proceed and/or where other fill types are accessed or identified. The Contractor shall keep the Geotechnical Engineer informed of fill material types being used or encountered during the course of the works and, depending on the materials encountered, the Geotechnical Engineer may instruct additional compaction trials be carried out.

Prior to commencing any compaction trials the programme and procedures shall be proposed by the Contractor for the Geotechnical Engineer’s approval. The compaction trials shall comprise the spreading and compacting of a minimum of three superimposed 250 mm loose thickness layers of soil. The area of the compaction trial shall be sufficient to allow construction procedures and compactive effort to be representative of those proposed for the permanent works. Compaction standards of the trial areas shall be assessed using procedures and equipment as defined in Section 6.6.

Following completion of the compaction trials the procedures and construction plant shall be approved by the Geotechnical Engineer and shall not be subsequently modified without the prior approval of the Geotechnical Engineer.

The required standards of compaction shall be as defined in Section 6.6.3 for the various fill types. However, during the compaction trials the Contractor may develop ad hoc tests which the Contractor may use as an approximate guide to the standard of compaction being achieved at any time, subject to their approval by the Geotechnical Engineer.

6.6 Compaction standards and testing

6.6.1 General

The tests and testing frequency described and defined in Section 6.6.4 will be used to confirm that the placed fill materials meet the required Contract standards, design criteria and parameter values. At any time either prior to or during the course of construction, the Geotechnical Engineer may direct modifications to the compaction standards, frequencies and test methods defined in this Section with the object of ensuring that the design criteria and objectives for the particular materials and conditions encountered, are achieved.

Compaction and test requirements have been defined in this specification for the materials expected to be used for the construction of the works. Should alternative materials be proposed by the Contractor then they shall also propose appropriate Quality Control testing methods and procedures in order to demonstrate to the Geotechnical Engineer that the necessary design criteria can be achieved.

All testing, both in-situ and laboratory, is to be carried out using an IANZ accredited testing organisation, with all equipment calibrated to relevant standards at the required frequency. Full details of the proposed testing organisation(s) shall be submitted to the Geotechnical Engineer for approval.

If the Geotechnical Engineer is satisfied that quality of materials is consistent and that the work is being carried out in a systematic and consistent manner, then an instruction may be issued that the frequency of testing given in Table 6.6 can be reduced.

6.6.2 Fill test methods

The fill testing methods have been defined in Table 6.4 for the materials expected to be used for the construction of the works. Should alternative materials be proposed by the Contractor then the Contractor shall also propose appropriate quality control testing methods and procedures in order to demonstrate to the satisfaction of the Geotechnical Engineer that the necessary design criteria can be achieved.

Table 6.4: Fill test methods

Parameter	Test Description	Test Method
In-situ Density	“Rapid” (Cohesive)	NZS 4407:1991, Test 4.2.1 (Nuclear Densometer Direct Mode)
	“Rapid” (Cohesionless)	NZS 4407:1991, Test 4.2.2 (Nuclear Densometer Backscatter Mode)
Maximum Dry Density & OMC determination	Heavy Compaction	NZS 4402:1986, Test 4.1.2
	Vibrating Hammer	NZS 4402:1986, Test 4.1.3
Strength	Scala Penetrometer	NZS 4402:1986, Test 6.5.2
	Pilcon Shear Vane	NZ Geotechnical Society Inc. “Guideline for hand held shear vane”
Moisture Content	Moisture Content	NZS 4402:1986, Test 2.1
Broken Face Content	Broken Face Test	NZS 4407:1991, Test 3.14
Particle Size Distribution	PSD Wet Sieving	NZS 4402:1986, Test 2.8.1

Note 1: In the water content test the oven performance and forced ventilation requirements shall be waived provided that operating temperature range is verified and checked daily. Before the mass of a dried sample is accepted, it shall be dried for at least 14 hours, and be weighed at least twice at periods not less than four hours apart until the loss in mass between successive weighing is less than 0.1 grams per 100 grams.

Note 2: In-situ Density: The air voids content of the compacted soil at any test location shall be taken as the mean of the air voids results from a set of density tests. A set of density tests shall comprise two or more individual tests made within an area of 0.5 m².

Note 3: Before a new shear vane is first used it should be calibrated to obtain values of torque versus spring deflection. It should be re calibrated at intervals of not more than 12 months.

6.6.3 Compaction standards

Fill materials shall be compacted so as to achieve the standards defined in Table 6.5 with the frequency of those tests as defined in in Table 6.6.

Table 6.5: Compaction standards for fill

Material Type	Parameter	Target Criteria
Cohesive	Average Minimum Shear Strength ⁽¹⁾	≥ 140 kPa
	Single Test Minimum Shear Strength ⁽²⁾	> 120 kPa
	Single Test Maximum Air Voids	< 10 %
	In-situ Dry Density	> 95 % Maximum Dry Density
Cohesionless	Minimum DCP	10 blows/300mm
	Single 50 mm interval minimum DCP	1.5 blows/50 mm
	In-situ Dry Density	> 95 % Maximum Dry Density
	Single Test Maximum Air Voids	< 10 %

Note 1: Corrected undrained shear strength determined by hand held Shear Vane. Average of 10 consecutive single readings within 1.0 m of each other.

Note 2: Corrected undrained shear strength determined by hand held Shear Vane. Single reading. (Corrected means in accordance with the calibration of the instrument so that it represents the actual shear strength of the material and not just the dial reading of the instrument).

6.6.4 Frequency of testing

The frequency of testing shall be as described below in Table 6.6 and is the minimum considered acceptable. Additional tests and/or changes to the testing frequency may be instructed by the Geotechnical Engineer as the works proceed, particularly if the Geotechnical Engineer believes the material type/properties have changed and/or the laboratory tests are not representative of the material being compacted.

All In-situ Density and Air Voids tests shall be undertaken on a 30m staggered grid pattern across the fill platform on every lift with details of testing location, layer depth and if the test is a retest. Positions shall be either recorded by GPS or in relation to a predicated and as-built grid for the site. The frequency of tests may be changed at the discretion of the Geotechnical Engineer.

Every NDM test round shall be recorded on a sheet which is provided to the Geotechnical Engineer within a maximum of 72 hours of testing. As a minimum, the following details are to be included on the sheet:

- File sheet number and date as electronic file name
- Job number
- Name of person undertaking test
- Date of test
- Sample description
- Nuclear Densometer number
- Calibration details
- Material
- Material source
- Max dry density
- Optimum water content
- Name of person entering data and date data is entered
- Signature and date when checked

Each test shall have the following details recorded on the sheet:

- Location and lift (location is to be marked on an attached site plan and each test shall be given a unique identifier)
- Backscatter or Probe and probe depth
- Dry density
- Wet density
- Compaction %
- Air voids %
- Moisture content

The Contractor shall control the earthworks operation so as to minimise the failure rate of any tests carried out as part of the Quality Control testing programme. Should any test result fail to meet the required design criteria the Contractor shall be required to propose remedial measures for the

Geotechnical Engineer's approval. Such measures are expected to usually comprise the removal, replacement and satisfactory retesting of any fill within the agreed area of influence of the failed test location.

The Contractor shall rework and re-compact any area disturbed by any testing undertaken within the site, to the Geotechnical Engineer's approval.

Table 6.6: Minimum testing frequency

Fill Type	Parameter	Test Type	Test Frequency
Cohesive	Strength	Shear Vane	1 set per lift on 30m by 30m grid or 1 Test per 200 m3 and 1 set for each material type
	In-situ Density, water content and air voids	Nuclear Densometer (NDM) "Rapid"	1 set per lift on 30m by 30m grid or 1 Test per 200 m3 and 1 set for each material type
	Maximum Dry Density and OMC	"Heavy" Compaction Test	1 initial test for each material type and then 1 test per 5,000 m3 for that particular material type or at Geotechnical Engineer's discretion
Cohesionless	Strength	Scala Penetrometer	1 set per lift on 30m by 30m grid
	Particle Size Distribution	Wet sieving	1 initial test for each material type and then 1 test per 5,000 m3 for that particular material type or at Geotechnical Engineer's discretion
	In-situ Density, water content and air voids	Nuclear Densometer (NDM) "Rapid"	1 set per lift on 30m by 30m grid or 1 Test per 200 m3 and 1 set for each material type
	Maximum Dry Density and OMC	"Heavy" or "Vibrating Hammer" Compaction Test	1 initial test for each material type and then 1 test per 5,000 m3 for that particular material type or at Geotechnical Engineer's discretion

Note 1: When In-Situ Density "Rapid" tests are carried out a set shall comprise 2 measurements using the same probe hole but oriented at 90° to each other.

Note 2: The Contractor shall make every effort to ensure an even spread of test locations, both vertically and horizontally, through all fill areas. Spatial separation of tests within the completed fill areas shall be such that at least one set of tests is completed within any given continuous 0.5m thickness of fill. For the purposes of this clause a "fill area" is defined as the area or zone of continuous fill placed on a particular working day.

7 Applicability

This specification has been prepared for the benefit of Ryman Healthcare Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

SAFF

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earthworks technical specification.docx

Appendix C: Laboratory compaction testing

- **MDD Report**



Canterbury Laboratory

325 Pound Rd, Yaldhurst, Christchurch
PO Box 16-064, Christchurch 8441
Telephone: +64 3 349 9142
Facsimile: +64 3 349 9143
www.fultonhogan.com
0800 LABORATORY

Report No: MDD:CAN15S-15616

Issue No: 1

Maximum Dry Density Report

Client:

Blakely Construction Ltd
PO Box 36322
Merivale

Christchurch 8146
NZ

Project:

Nuclear Density - QA

The test (s) reported herein (unless otherwise indicated) have been performed in accordance with the laboratory's scope of accreditation. This report may only be reproduced in full.



Max Burford

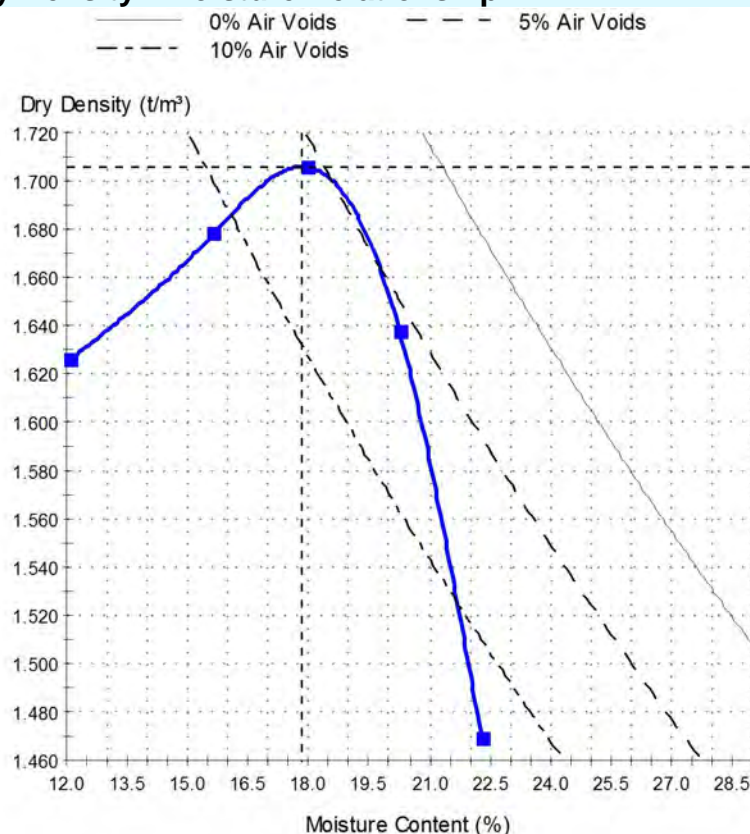
Approved Signatory: Max Burford
(Supervisor)
IANZ Accreditation No:200
Date of Issue: 11/08/2015

Sample Details

Sample ID: CAN15S-15616
Material: Fine Sandy Gravel
Site/Sampled From: Ryman Rangiora Development
Specification: Standard Compaction Test
Sampling Method: As Received - Not Accredited
Technician: Atu Rova

Client Sample ID: Sample 1
Sample Source: Field Sample [Taken From Site]
Date Sampled: 05/08/2015
Sampled By: Advised - See Comments
Date Tested: 07/08/2015
Sampling Endorsed?: No

Dry Density - Moisture Relationship



Test Results

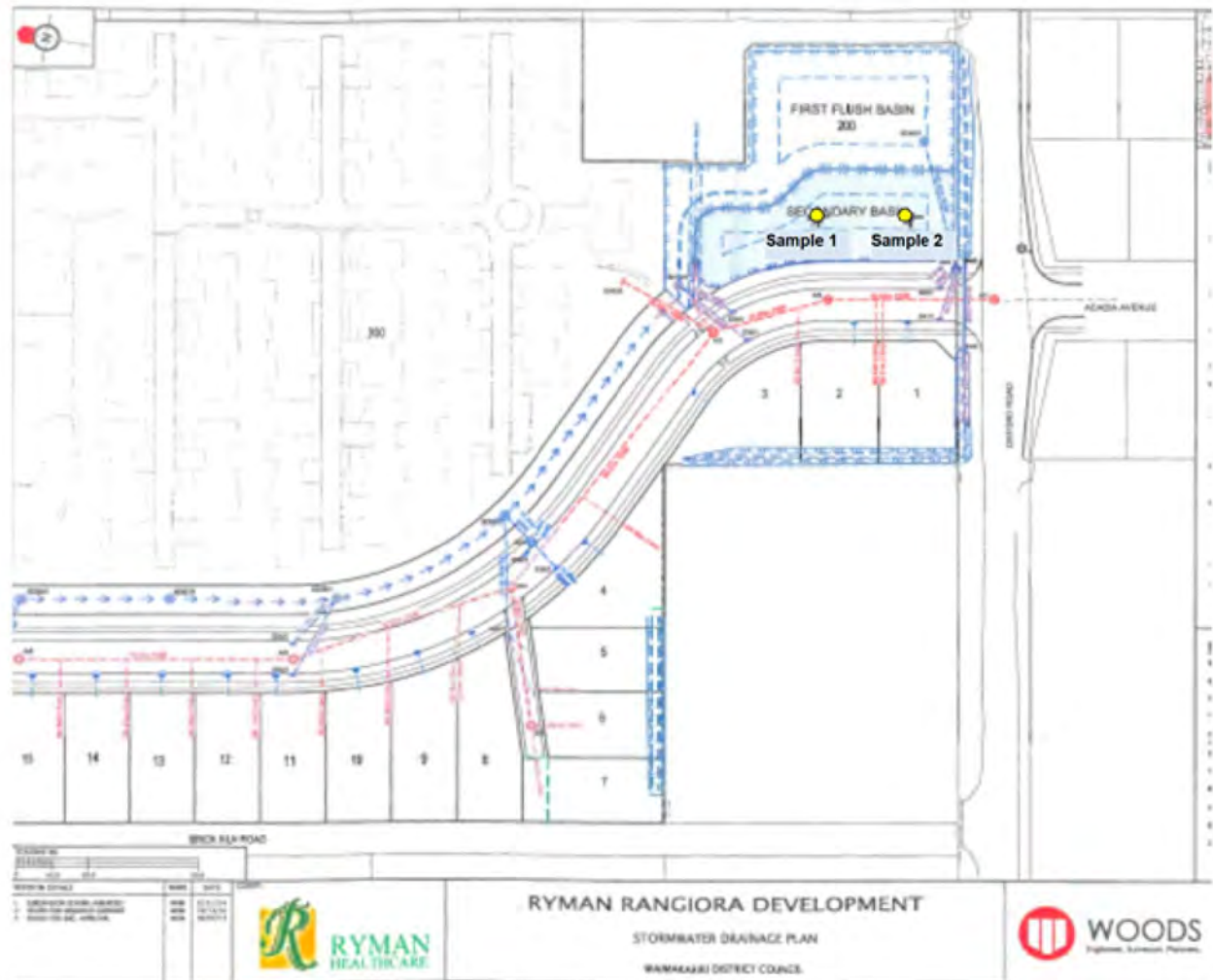
NZS 4402:1986 Test 4.1.1 - 1986
Maximum Dry Density (t/m³): 1.71
Optimum Moisture Content (%): 18
Solid Density (t/m³): 2.680 assumed
Oversize Sieve (mm): 19.0
Oversize Material (%): 0
Sample History: Naturall

Comments

Sample 1 by Mathew Havill

CAN15W3625

Test Site: Standard Compaction Test, Ryman Rangiora



Site plan is not to scale & test sites are approximate only.



Canterbury Laboratory

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PO Box 16-064, Christchurch 8441
Telephone: +64 3 349 9142
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0800 LABORATORY

Report No: MDD:CAN15S-15617

Issue No: 1

Maximum Dry Density Report

Client:

Blakely Construction Ltd
PO Box 36322
Merivale

Christchurch 8146
NZ

Project:

Nuclear Density - QA

The test (s) reported herein (unless otherwise indicated) have been performed in accordance with the laboratory's scope of accreditation. This report may only be reproduced in full.



Max Burford

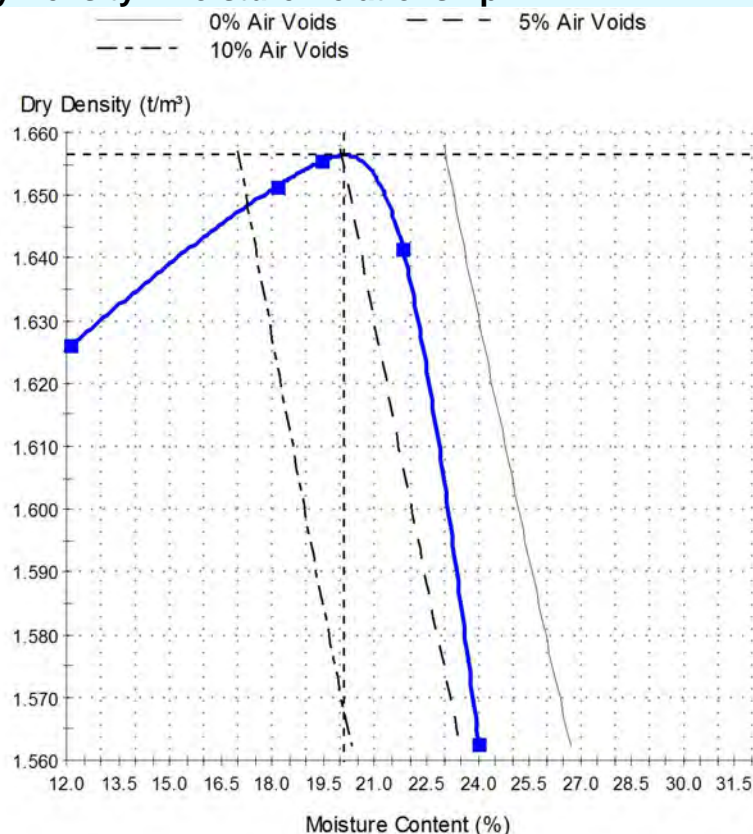
Approved Signatory: Max Burford
(Supervisor)
IANZ Accreditation No:200
Date of Issue: 11/08/2015

Sample Details

Sample ID: CAN15S-15617
Material: Clayey SILT
Site/Sampled From: Ryman Rangiora Development
Specification: Standard Compaction Test
Sampling Method: As Received - Not Accredited
Technician: Greg Orr

Client Sample ID: Sample 2
Sample Source: Field Sample [Taken From Site]
Date Sampled: 05/08/2015
Sampled By: Advised - See Comments
Date Tested: 07/08/2015
Sampling Endorsed?: No

Dry Density - Moisture Relationship



Test Results

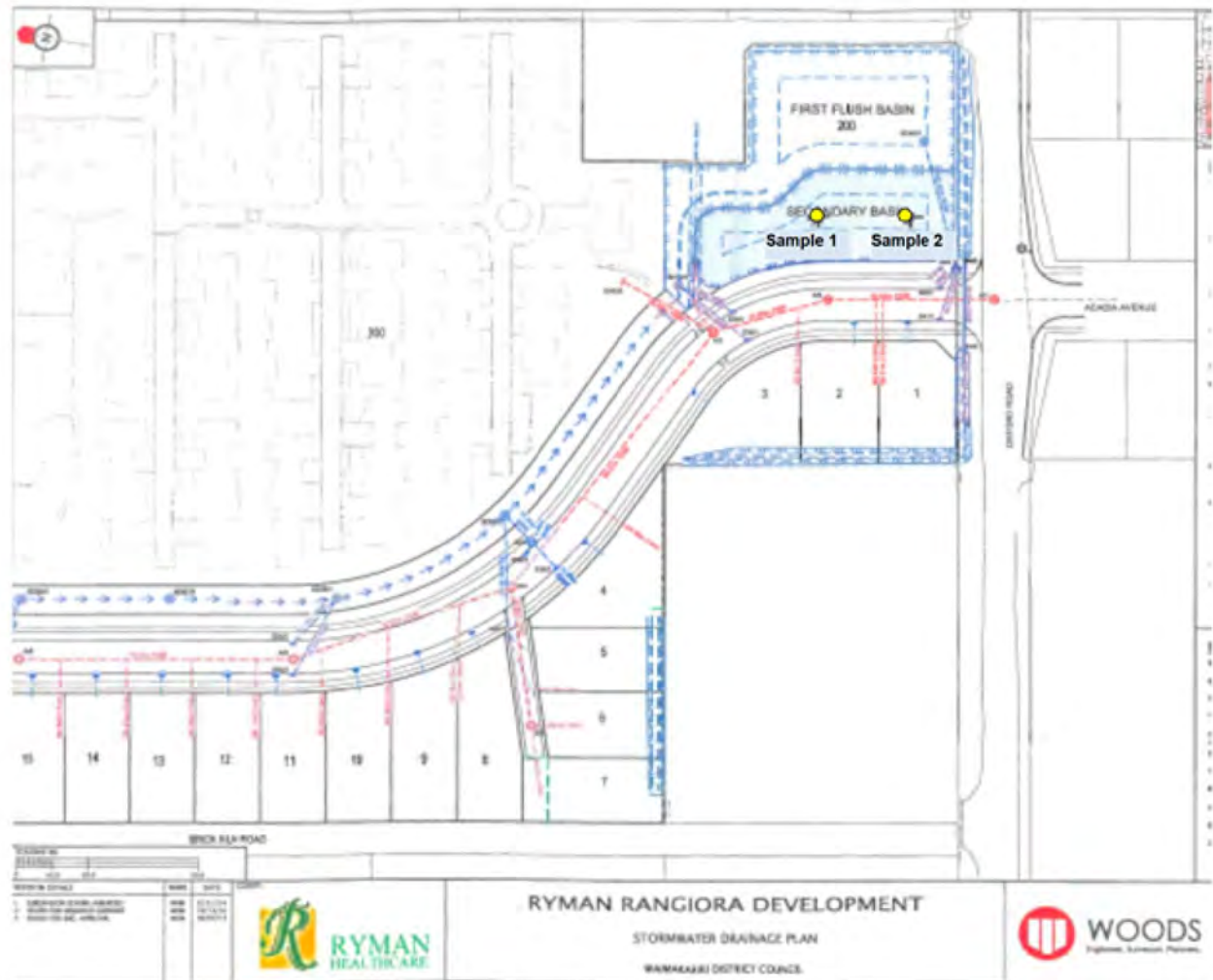
NZS 4402:1986 Test 4.1.1 - 1986
Maximum Dry Density (t/m³): 1.66
Optimum Moisture Content (%): 20
Solid Density (t/m³): 2.680 assumed
Oversize Sieve (mm): 19.0
Oversize Material (%): 0
Sample History: Natural

Comments

Sample # 2 by Mathew Havill

CAN15W3625

Test Site: Standard Compaction Test, Ryman Rangiora



Site plan is not to scale & test sites are approximate only.



Canterbury Laboratory

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0800 LABORATORY

Report No: MDD:CAN15S-18239

Issue No: 1

Maximum Dry Density Report

Client:

Blakely Construction Ltd
PO Box 36322
Merivale

Christchurch 8146
NZ

Project:

QA Testing - Aggregates

The test (s) reported herein (unless otherwise indicated) have been performed in accordance with the laboratory's scope of accreditation. This report may only be reproduced in full.



Max Burford

Approved Signatory: Max Burford
(Supervisor)
IANZ Accreditation No:200
Date of Issue: 11/09/2015

Sample Details

Sample ID: CAN15S-18239

Material: Silty SAND

Site/Sampled From: #3, Road 2 opposite Lot 54, Ryman Healthcare.

Specification: Standard Compaction Test

Sampling Method: As Received - Not Accredited

Technician: Atu Rova

Client Sample ID: QA Testing # 3

Sample Source: Field Sample [Taken From Site]

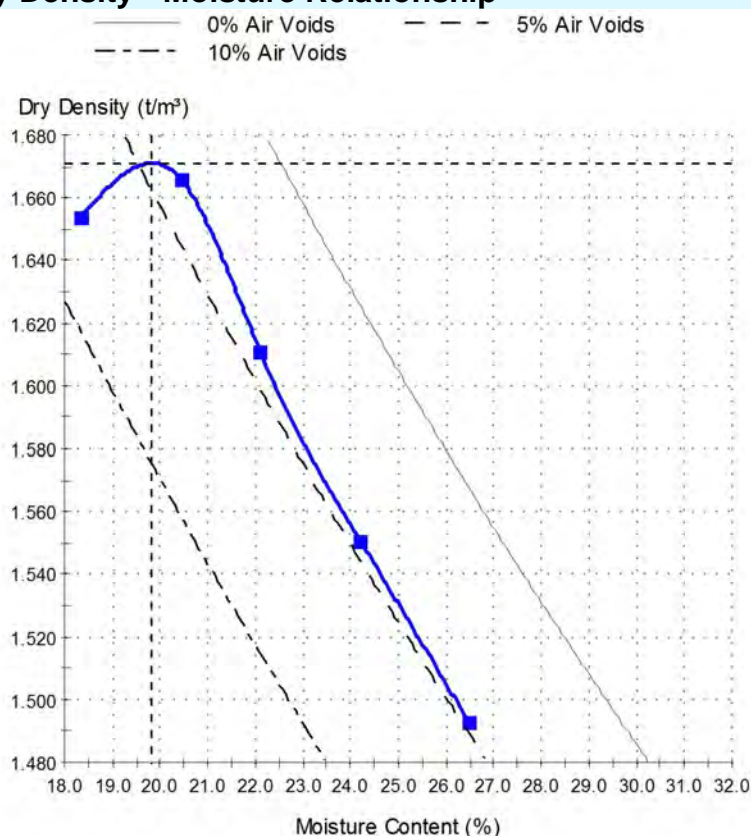
Date Sampled: 08/09/2015

Sampled By: Advised - See Comments

Date Tested: 09/09/2015

Sampling Endorsed?: No

Dry Density - Moisture Relationship



Test Results

NZS 4402:1986 Test 4.1.1 - 1986
Maximum Dry Density (t/m³): 1.67
Optimum Moisture Content (%): 20
Solid Density (t/m³): 2.680 assumed
Oversize Sieve (mm): 19.0
Oversize Material (%): 0
Sample History: Natural

Comments

Material sampled from site by Mathew Havill. Moisture content of natural material (# 3) @ arrival condition 18.84% .



Canterbury Laboratory

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0800 LABORATORY

Report No: MDD:CAN15S-18240

Issue No: 1

Maximum Dry Density Report

Client:

Blakely Construction Ltd
PO Box 36322
Merivale

Christchurch 8146
NZ

Project:

QA Testing - Aggregates

The test (s) reported herein (unless otherwise indicated) have been performed in accordance with the laboratory's scope of accreditation. This report may only be reproduced in full.



Max Burford

Approved Signatory: Max Burford
(Supervisor)
IANZ Accreditation No:200
Date of Issue: 11/09/2015

Sample Details

Sample ID: CAN15S-18240

Material: Silty SAND

Site/Sampled From: #4, Junction of Road 1 & Road 2 ,Ryman Healthcare.

Specification: Standard Compaction Test

Sampling Method: As Received - Not Accredited

Technician: Atu Rova

Client Sample ID: QA Testing # 4

Sample Source: Field Sample [Taken From Site]

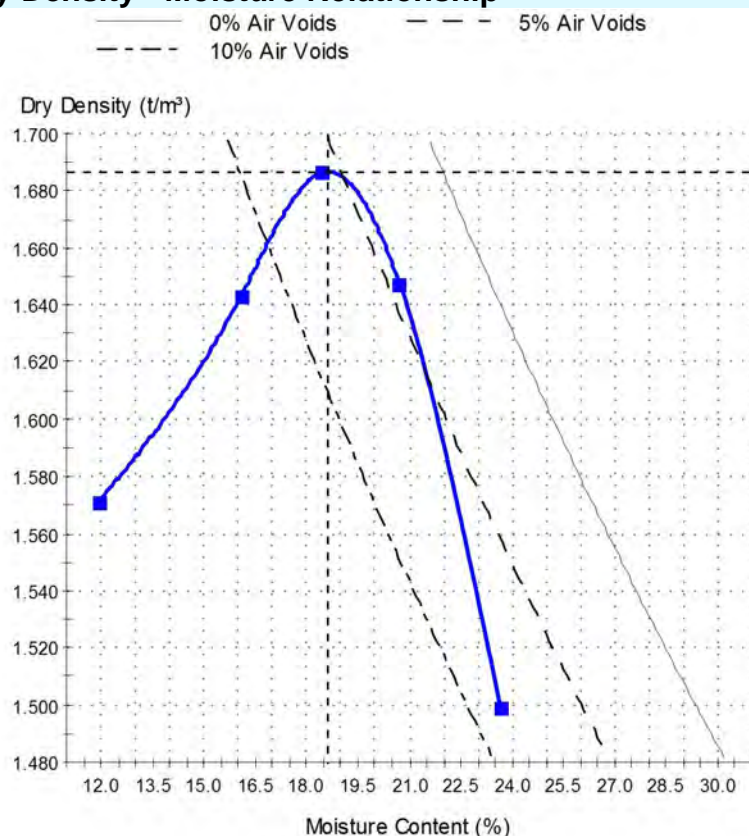
Date Sampled: 08/09/2015

Sampled By: Advised - See Comments

Date Tested: 09/09/2015

Sampling Endorsed?: No

Dry Density - Moisture Relationship



Test Results

NZS 4402:1986 Test 4.1.1 - 1986

Maximum Dry Density (t/m³): 1.69

Optimum Moisture Content (%): 19

Solid Density (t/m³): 2.680 assumed

Oversize Sieve (mm): 19.0

Oversize Material (%): 0

Sample History: Natural

Comments

Material sampled from site by Mathew Havill. Moisture content of material (#4) @ arrival condition 12.39 %.

Appendix D: Field compaction testing

- NDM plans
- 20151127 Eng NDMs Lots 39-42 & 51-54
- 20151127 Eng Fill NDMs Lots 43-46 & 50-47
- 20160302 Eng Fill NDMs Lots 55-62
- 20160329 Eng Fill NDMs Lots 25-38

NDM tests - 2 lifts

STAGE 3

NDM tests - 2 lifts

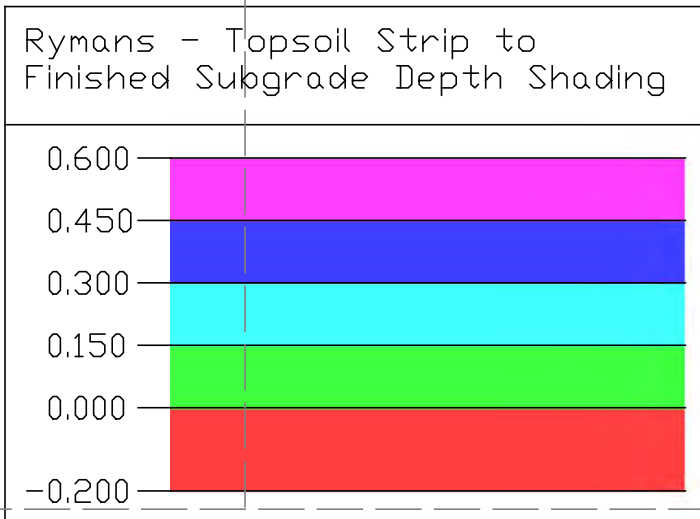
NDM tests - 2 lifts

NDM tests - 2 lifts

NDM tests - 1 lift

NDM tests - 1 lift

NDM tests - 1 lift



20 m

387150

387200

387250

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387350

~~387400~~



NDM Compaction Report

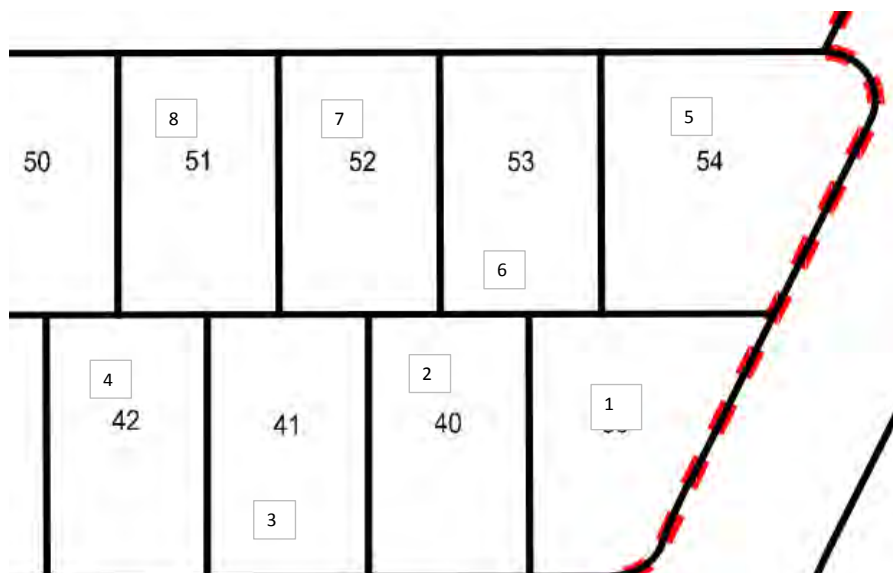
Ryman Healthcare Rangiora

52 Oxford Road
Canterbury
Rangiora
New Zealand

Test Location: Lots 39-42 & 51-54
Test undertaken by: Tim Scott
Optimum Moisture Content:

Material: Clay
MDD: 1680
Unit serial No: 7874

Test no.	Test Date	Layer	Location	Material	Target DD	Test Depth	DD	WD	%M	Pass/Fail	%AV	Northing	Easting
1	4/12/15	1	Lot 39	Clay	1610	0.15	1639.7	1762.8	7.51%	Pass	23.78	832174.013	387319.325
2	4/12/15	1	Lot 40	Clay	1610	0.15	1654.1	1835.2	10.95%	Pass	20.59	832194.518	387329.925
3	4/12/15	1	Lot 41	Clay	1610	0.15	1668	1810.6	8.55%	Pass	21.46	832214.656	387307.432
4	4/12/15	1	Lot 42	Clay	1610	0.15	1748.8	1911.5	9.30%	Pass	18.93	832233.61	387322.624
5	4/12/15	1	Lot 54	Clay	1610	0.15	1722.6	1879.9	9.13%	Pass	20.44	832164.669	387369.638
6	4/12/15	1	Lot 53	Clay	1610	0.15	1717.2	1894	10.30%	Pass	18.68	832187.035	387364.733
7	4/12/15	1	Lot 52	Clay	1610	0.15	1684.2	1768.9	5.03%	Pass	24.82	832205.637	387348.251
8	4/12/15	1	Lot 51	Clay	1610	0.15	1685.2	1758.7	4.36%	Pass	25.9	832223.705	387357.59

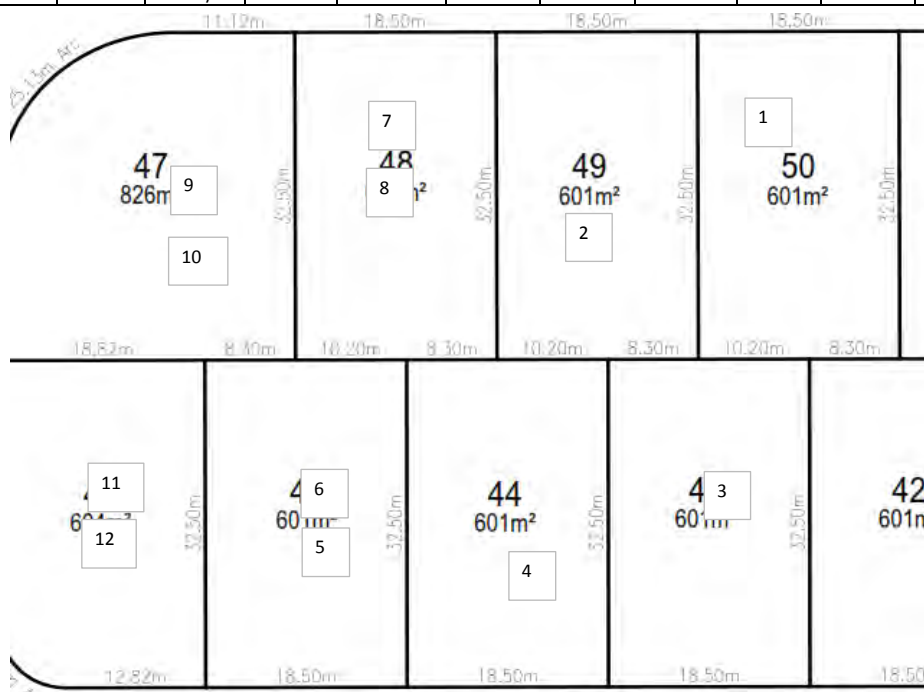




52 Oxford Road
Canterbury
Rangiora
New Zealand

Material: Clay
MDD: 1680
Unit serial No: 7874

Test no.	Test Date	Layer	Location	Material	Target DD	Test Depth	DD	WD	%M	Pass/Fail	%AV	Northing	Easting
1	10/12/12	1	Lot 50	Clay	1610	0.15	1662.9	1874.1	12.70%	Pass	17.25	832243.441	387351.855
2	10/12/12	1	Lot 49	Clay	1610	0.15	1677.8	1873	11.63%	Pass	18.29	832257.922	387348.736
3	10/12/12	1	Lot 43	Clay	1610	0.15	1642.1	1844.7	12.34%	Pass	18.87	832241.292	387319.204
4	10/12/12	1	Lot 44	Clay	1610	0.15	1748.8	1911.5	9.30%	Pass	18.93	832264.437	387308.374
5	11/12/15	1	Lot 45	Clay	1610	0.15	1729.8	2020.7	16.82%	Pass	6.78	832289.451	387310.922
6	11/12/15	2	Lot 45	Clay	1610	0.15	1692.4	1986.4	17.37%	Pass	12.4	832289.451	387310.922
7	11/12/15	1	Lot 48	Clay	1610	0.15	1736.7	2032.9	17.06%	Pass	5.99	832302.423	387299.514
8	11/12/15	2	Lot 48	Clay	1610	0.15	1712.4	1999.01	16.74%	Pass	8.54	832302.423	387299.514
9	11/12/15	1	Lot 47	Clay	1610	0.15	1741.3	2022.4	16.14%	Pass	7.34	832301.252	387334.043
10	11/12/15	2	Lot 47	Clay	1610	0.15	1689.5	1987.63	17.65%	Pass	9.69	832301.252	387334.043
11	11/12/15	1	Lot 46	Clay	1610	0.15	1727.6	2022.5	17.07%	Pass	6.46	832302.423	387299.514
12	12/12/15	2	Lot 46	Clay	1610	1.15	1779.6	2043.1	14.81%	Pass	7.81	832302.423	387299.514





NDM Compaction Report

Ryman Healthcare Rangiora

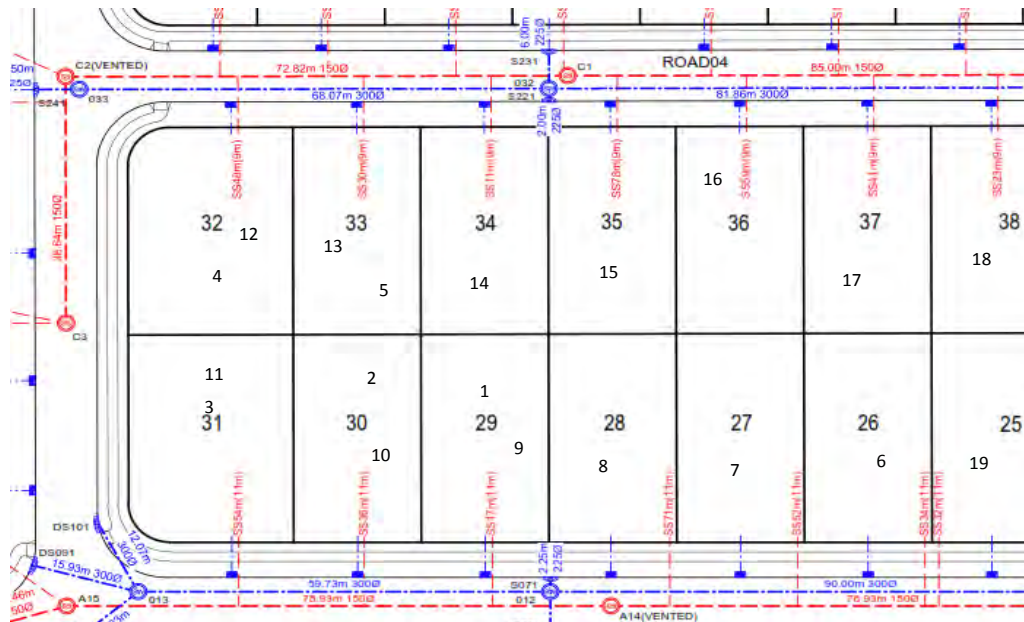
52 Oxford Road
Canterbury
Rangiora
New Zealand

Test Location: Lots 26-37
Test undertaken by: Tim Scott
Optimum Moisture Content: 18%

Material: Clay
MDD: 1.68t/m3
Unit serial No: 7874

Test no.	Test Date	Layer	Location	Material	Target DD	Test Depth	DD	WD	%M	Pass/Fail	%AV	Northing	Easting
1	23/11/15	1	Lot 29	Clay	1610	Backscatter	1695.3	1854.3	9.40%	Pass	21.28	832243.282	387227.186
2	23/11/15	1	Lot 30	Clay	1610	Backscatter	1757.7	1923.1	9.40%	Pass	18.32	832268.113	387235.521
3	23/11/15	1	Lot 31	Clay	1610	Backscatter	1707.4	1857.8	8.80%	Pass	18.47	832286.05	387231.558
4	23/11/15	1	Lot 32	Clay	1610	Backscatter	1717.3	1935.6	12.70%	Pass	14.52	832294.759	387247.405
5	23/11/15	1	Lot 33	Clay	1610	Backscatter	1792	2004.6	11.90%	Pass	12.32	832267.245	387261.886
6	28/04/16	1	Lot 26	Clay	1610	Backscatter	1786	1943	8.80%	Pass	18.1	832187.738	387244.74
7	28/04/16	1	Lot 27	Clay	1610	Backscatter	1883	2018	7.20%	Pass	16.74	832201.117	387225.558
8	28/04/16	1	Lot 28	Clay	1610	Backscatter	1780	1941	8.70%	Pass	18	832226.404	387221.704
9	28/04/16	2	Lot 29	Clay	1610	Backscatter	1811	1930	6.60%	Pass	20.99	832239.999	387237.857
10	28/04/16	2	Lot 30	Clay	1610	Backscatter	1755	1883	7.30%	Pass	22.14	832256.156	387227.371
11	28/04/16	2	Lot 31	Clay	1610	Backscatter	1857	2002	7.80%	Pass	16.04	832282.243	387229.955
12	28/04/16	2	Lot 32	Clay	1610	Backscatter	1797	1920	6.90%	Pass	21.09	832283.329	387248.791
13	28/04/16	2	Lot 33	Clay	1610	Backscatter	1882	2010	6.80%	Pass	17.53	832264.485	387245.672
14	28/04/16	1	Lot 34	Clay	1610	Backscatter	1832	1925	6.70%	Pass	19.85	832248.013	387265.673
15	28/04/16	1	Lot 35	Clay	1610	Backscatter	1696	1832	8.02%	Pass	15.68	832227.281	387261.756
16	28/04/16	1	Lot 36	Clay	1610	Backscatter	1729	1841	6.50%	Pass	24.68	832219.417	387255.303
17	5/05/16	1	Lot 37	Clay	1610	Backscatter	1674	1841	9.98%	Pass	16.11	832190.488	387266.377
18	5/05/16	1	Lot 38	Clay	1610	Backscatter	1693	1856	9.63%	Pass	13.64	832175.402	387269.195
19	5/05/16	1	Lot 25	Clay	1610	Backscatter	1725	1911	10.78%	Pass	15.64	832178.6	387246.27
20	15/07/16	1	Lot 38	Clay	1610	Backscatter	1813	2063	13.79%	Pass	12.08	Not Recorded	Not Recorded
21	15/07/16	1	Lot 25	Clay	1610	Backscatter	1746	1931	10.60%	Pass	16.22	Not Recorded	Not Recorded

Please Note: Lots 25 & 38 were raised 300mm above original design, tests 18 & 19 are 300mm below finished subgrade for the avoidance of doubt



Appendix E: Statement of Suitability of Earthfill

- **Statement of Suitability**

Date: 16/10/2017

To: Ryman Healthcare Ltd
Airport Business Park,
92 Russley Road,
PO Box 771,
Christchurch 8042

**STATEMENT OF SUITABILITY OF EARTHFILL
FOR RESIDENTIAL DEVELOPMENT**

Building: Following lots in Stage 2 of the Ryman Rangiora Development Subdivision

Stage 3 and 4 Lot Numbers
Lots 25 to 46 and 57 to 60 (Inclusive)

Owner / Developer: Ryman Healthcare Ltd.

Location: 56-74 Oxford Road, Rangiora, Waimakariri District

This document certifies that the earthworks for Lots 25 to 46 and 57 to 60 (Inclusive), Part RS 968 & Lot 2 DP 476951 Oxford Road, Rangiora, Waimakariri, have been constructed in general accordance with the terms of NZS 4431 over the period September 2015 to September 2017.

While work was in progress the engineer named below, who is registered as a Chartered Professional Engineer, was retained to assess the quality of the fill:

Pierre Malan
Tonkin & Taylor Limited
PO Box 5271
Wellesley Street
Auckland 1141

During the construction works I, or appropriately qualified and experienced staff under my direction, made periodic visits to the site to inspect and test the earthworks. Full details of these inspection and testing works are provided in the document "52-74 Oxford Road Rangiora, Stage 3 and 4 Lots 25 to 46, 55 to 60, Fill Certification Report." by Tonkin & Taylor Limited, January 2020, Report Number 53413.0060.

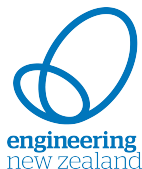
This certifies that the bulk earth fill has been placed in general compliance with the terms of NZS 4431. This certification does not remove the necessity for proper engineering investigation, inspection, assessment and design of all future foundations.

This report does not remove the necessity for the normal investigation and design process to be undertaken for the design and construction of buildings at the site. The geotechnical conditions at the site may not comply with NZS3604:2011 'good ground'; further detail is provided in the report.

Yours Faithfully
On Behalf of Tonkin & Taylor Limited



Pierre Malan
Project Director
Tonkin & Taylor Limited



New Zealand
Institute of Architects
Incorporated



Building Code Clause(s) **B1**

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at www.engineeringnz.org)

ISSUED BY: Wilton Joubert Limited
(Design Firm)

TO: Christchurch Ready Mix Concrete Ltd
(Owner/Developer)

TO BE SUPPLIED TO: Waimakariri District Council
(Building Consent Authority)

IN RESPECT OF: structural design services
(Description of Building Work)

AT: 11 Crete Road
(Address)

Town/City: Rangiora (Address) LOT 41 DP 542543 SO

We have been engaged by the owner/developer referred to above to provide:
rafft floor slab

(Extent of Engagement)

services in respect of the requirements of Clause(s) **B1** 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 **B1/VM1, VM4** or
(verification method/acceptable solution)

☒ Alternative solution as per the attached schedule **MBIE Guidance Document, 2012.**

The proposed building work covered by this producer statement is described on the drawings titled:

Lot 41, 11 Crete Road, Rangiora and numbered **S0-S2.1, Site Plan, D1-D2.**
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
(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, David Lau am: ☒ CPEng 221906 # ☐ Reg Arch #
(Name of Design Professional)

I am a member of: ☒ Engineering New Zealand ☐ NZIA and hold the following qualifications: **BE(Hons), PhD, CMEngNZ, CPEng, IntPE**

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: David Lau (Signature)

ON BEHALF OF: Wilton Joubert Limited Date: 27/10/2020
(Design Firm)

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, ENGINEERING NEW ZEALAND AND NZIA



Recommended Site Inspections / Construction Review

WJ Job #: 101272

Site Address: 11 Crete Road

Important Notes:

- Check building consent conditions for any inspections that are required by the Building Consent Authority.
- In order to issue Producer Statement – Construction Review (PS4) for specific item(s) as per the building consent conditions, Wilton Joubert needs to carry out the inspection for the item(s) specified.
NO INSPECTION = NO PS4.
- It is the building consent applicant's (or authorised agent) responsibility to ensure that Wilton Joubert is notified in advance of the required inspection. Bookings should be made 48 hours prior to the intended time of inspection.

Ultimately, it is up to the building consent authority to determine which step of the construction process requires an engineer's review. Please check your eventual building consent conditions thoroughly for these. In support of your application for building consent, the following inspections / construction reviews are suggested:

- Site cut (this may be carried out by the author of the geotechnical report)
- Fill compaction (this may be carried out by the author of the geotechnical report)
- Raft/floor pre-pour
- WAIMAKARIRI DISTRICT COUNCIL

Plans and specifications APPROVED in
with the Building Act 2004, clause 49 and
Regulations 1992, Clause 3

BC201170 9/12/2020 nicol

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

For bookings call: (09) 527 0196



Site address: 11 Crete Road

Re: B2 (Durability) Compliance

To whom it may concern,

We have provided a Producer Statement for Design (PS1) for clause B1 of the Building Act - Structure. Our PS1 does not cover clause B2 of the Building Act – Durability because there is no effective means of compliance for structural durability in the Building Code. However, we can confirm that the structural elements shown in our documentation have been treated as noted below:

Timber

The timber has been specified in accordance with NZS3640:2003. The quality of timber treatment is dependent on the QA systems of manufacturers, suppliers and the onsite contractors and sub-contractors. Refer to the contractor's PS3 and QA records where available.

Concrete

Compliance with cover and concrete quality requirements for B1/VM1 are in accordance with NZS3101:2006 Section 3.

Reinforced Concrete Masonry

Compliance with cover and concrete quality requirements for B1/VM1 are in accordance with NZS4230:2004 Section 4.

Mild Steel

Protective coatings as specified in building consent documentation (may be by others) in accordance with AS/NZS 2312:2014 and SNZ TS 3404:2018 on a life to first major maintenance basis.

The quality of mild steel protective coatings is dependent on:

- Steel preparation
- Quality and production consistency of the coating products
- QA of the application and curing
- QA of the handling, protection and repair

Refer to:

- Contractor's and sub-contractor's PS3s and QA records where available
- Third-party inspection and test results

On-going maintenance plan (attached)

Yours faithfully

David Lau, Wilton Joubert Ltd.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

Dated: 27/10/2020



STRUCTURAL MAINTENANCE SCHEDULE

This schedule of ongoing inspection and maintenance of structural elements shall be included with the O&M manuals and provided to the Owner/Body Corporate and building managers.

Inspection/Maintenance timeframe and item	
(a) Half-yearly	<p>Wash down all exposed steelwork that is not in a fully interior environment including:</p> <ul style="list-style-type: none"> • Veranda steelwork • Steel carpark structure (beams, columns, braces etc) • Deck and balcony steelwork • Exposed façade steelwork, both primary and secondary structure • Sub-ground floor mild-steel structures such as beams.
(b) 5-yearly	Inspect and repair sealant that encloses structural mild-steel components and/or timber with mild-steel fixings.
(c) 10-yearly	Check exposed timber fixings for corrosion, repair as required.
	Inspect/replace sealant that encloses structural mild-steel components and/or timber with mild-steel fixings. This will typically include sealants around the perimeter of precast panels. Note that 10 years is the expected useful life for many sealants.
	Check all exposed steelwork that is not in a fully interior environment for signs of corrosion. Repair protective coatings as required.
(d) 25-yearly	Inspect samples of structural steel that is hidden from view but not enclosed within a vapour barrier, and repair protective coatings as necessary. A typical example is a veranda with built-in steelwork (Such steelwork should typically have duplex protective coatings). Inspection may typically require removal of claddings and/or the drilling of holes for borescope access. Repair as required.
	Inspect all exposed, external timber. Repair as required.
	Inspect all exposed, external reinforced concrete for signs of spalling. Repair as required.
Following seismic shaking > SLS1 event	Inspections and repair as per b), c) and d) above.

PRODUCER STATEMENTS – Advisory Note

Producer Statements shall be submitted to territorial authorities or building consent authority in order for Code of Compliance Certificates to be issued. The requirement for consultants to issue the related Producer Statements may appear as a condition under the building consent documents or as a separate letter from the territorial authority or building certifier. **It is the owner's (or consent applicant) responsibility to check the building consent documentation and notify Wilton Joubert Ltd. in relation to the requirement for construction inspections required (and the subsequent PS4: Producer Statement for Construction Review) as stated on the consent documents. Please note, we cannot issue PS4 if we did not carry out the inspection.**

In order to secure our inspection services, it is strongly recommended that Wilton Joubert Ltd. be given at least 48 hours notice prior to time of inspection. Our inspections are limited to items that have been designed and detailed by us. We are also unable to inspect non-consented or unauthorised work. Building consented, stamped plans with consent numbers (or legible copy of the same) including amendments where applicable shall be made available on site during inspections.

In some cases due to the distance of the job from our offices, it may be more practical and cost effective to contact a local professional engineer to carry out the inspection, who may contact us with any questions that may arise. The engineer who carried out the inspection would subsequently be responsible for the issue of the producer statement for construction review.

The costs associated with site inspections and issuing of Producer Statements are separate from any previous work that we have been engaged for, such as engineering design of works. The costs for carrying out the inspections and related work are based on time spent travelling to site, time on site and other associated costs. Please contact us for an estimate of costs. Our assumptions are that the person(s) who arranged the inspection is responsible for payment of the fees, unless otherwise stated at time of engagement.

Building Consent BC201170
Received 17/11/20



NORTHLAND

Po Box 8130
Kensington
Whangarei 0145
T: +64 9 945 4188

AUCKLAND

WAIKATO

Po Box 11381
Ellerslie
Auckland 1542
T: +64 9 527 0196

SOUTHERN LAKES

Po Box 169
Wanaka 9343
T: +64 3 443 6209

CANTERBURY

T: +64 21 824 063

Structural Design Calculations for:
Lot 41
11 Crete Road
Oxford Road Residential Subdivision
Rangiora
Waimakariri District
Canterbury Region

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

Job #: 101272

October 2020

Date : 22/10/2020
 Designer : RC
 Checker : NL
 Job Number : 101272

Building Consent BC201170
 Received 17/11/20

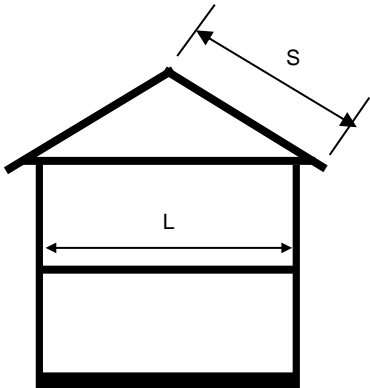
Raftfloor Design



Site Address : Lot 41, 11 Crete Road
 Description : EDGE BEAM

Loadings

Upper Wall must be Timber



Tributary Roof and Floor Lengths

WALLS

Lower:

Timber		
		(North/South Taupo)
	=	38 kg/m ²
	=	0.37 kPa
Height	=	m
Load/m	=	kN/m

Upper:

Timber		
		(North/South Taupo)
	=	38 kg/m ²
	=	0.37 kPa
Height	=	m
Load/m	=	kN/m

Other (Specify Wall Weight)

Weight	=	180 kg/m ²
	=	1.77 kPa
Height	=	4.00 m
Load	=	7.06 kN/m

SUSPENDED MID-FLOOR

		Tributary Length L/2
Unit/Floor	=	Timber
Topping	=	N/A
	=	0.38 kPa
Live Loading	=	1.50 kPa
Super Imposed Dead	=	kPa
Tributary Span	=	m
Dead Load/m	=	kN/m
Live Load/m	=	kN/m

ROOF

		Tributary Length = S
Light	=	0.46 kPa
Live Loading		0.25 kPa
Tributary Span	=	1.16 m
Dead Load/m	=	0.53 kN/m
Live Load/m	=	0.29 kN/m

Loadings Summary

Walls	7.06	kN/m	Dead
Mid Floors		kN/m	Dead
		kN/m	Live
Slab*	3.42	kN/m	Dead+SDL
	0.90	kN/m	Live
Roof	0.53	kN/m	Dead
	0.29	kN/m	Live^
Extra Dead		kN/m	Dead
Extra Live		kN/m	Live

* Includes Edge Beam Weight, SDL = 0.5 kPa LL = 1.5 kPa

^ Roof LL not added if midfloor exists else LL = 0.25 kPa

Date : 22/10/2020
 Designer : RC
 Checker : NL
 Job Number : 101272

Building Consent BC201170
 Received 17/11/20
Rafffloor Design



Site Address : Lot 41, 11 Crete Road
 Description : EDGE BEAM

Working Loads

	Dead	11.02	kN/m
	Live	1.19	kN/m
Ultimate Loads (1.2G + 1.5Q)	Dead	13.22	kN/m
	Live	1.78	kN/m
Total Ultimate Load on Edge	w =	15.00	kN/m

Edge Beam Details

Wall Construction Type

Plasterboard Cladding min beam width 200mm

Beam Width = 300 mm
 Pod Depth = 220 mm
 Top slab Depth = 85 mm
 Self Weight = 2.20 kN/m
 Construction Type = Standard Raft

Standard Raft Construction

Dependable bearing capacity: 100 kPa

Bearing Check = OK!
 Working Pressure = 39 kPa

Point load capacities

Remaining PL capacity before pads required	9.1 kN
PL capacity before 600Φ pads fail	14.1 kN
PL capacity before 600x600 pads fail	18.0 kN

Steel Requirements - As Per Std Drg's

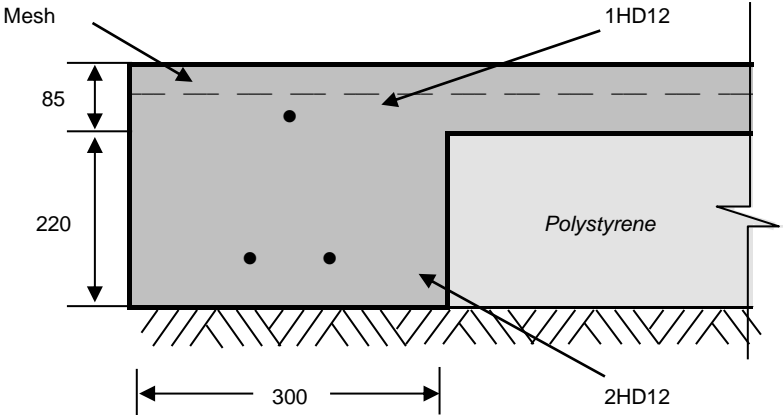
Top Steel: 1HD12
 Btm Steel: 2HD12

Prescribed Edge Beam Design

Location (ie: which wall):

EDGE BEAM

Standard Raft Construction
 300 mm wide edge beam with
 1HD12 in top & 2HD12 in bottom



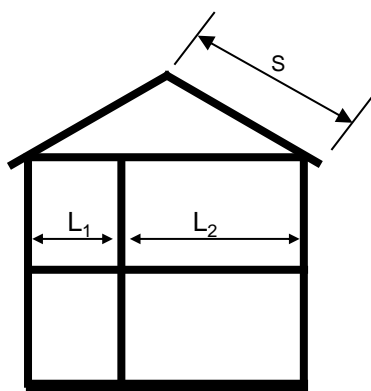
Date : 22/10/2020
 Designer : RC
 Checker : NL
 Job Number : 01272

Building Consent BC201170
 Received 17/11/20
Rafffloor Design



Site Address : Lot 41, 11 Crete Road
 Description : INTERNAL THICKENING

Loadings



Tributary Roof and Floor Lengths

WALLS

Lower:

Timber			
		(North/South Taupo)	
Internal	=	30	kg/m ²
	=	0.29	kPa
Height	=		m
Load/m	=		kN/m

Upper:

Timber			
		(North/South Taupo)	
Internal	=	30	kg/m ²
	=	0.29	kPa
Height	=		m
Load/m	=		kN/m

Other (Specify Wall Weight)

Weight	=	30	kg/m ²
	=	0.29	kPa
Height	=		m
Load	=		kN/m

SUSPENDED MID-FLOOR

Tributary Length = $(L_1 + L_2)/2$

Unit/Floor	=	Timber	
Topping	=	N/A	
	=	0.38	kPa
Live Loading	=		kPa
Super Imposed Dead	=		kPa
Tributary Span	=		m
Dead Load/m	=		kN/m
Live Load/m	=		kN/m

ROOF

Tributary Length = S (Check if Rafter or Truss)


Light	=	0.46	kPa
Live Loading	=	0.25	kPa
Tributary Span	=	5.49	m
Dead Load/m	=	2.53	kN/m
Live Load/m	=	1.37	kN/m

Loadings Summary

Walls		kN/m	Dead
Mid Floors		kN/m	Dead
		kN/m	Live
Slab*	4.64	kN/m	Dead+SDL
	1.80	kN/m	Live
Roof	2.53	kN/m	Dead
	1.37	kN/m	Live^
Extra Dead		kN/m	Dead
Extra Live		kN/m	Live

* Includes Internal Rib Weight, LL = 1.5 kPa

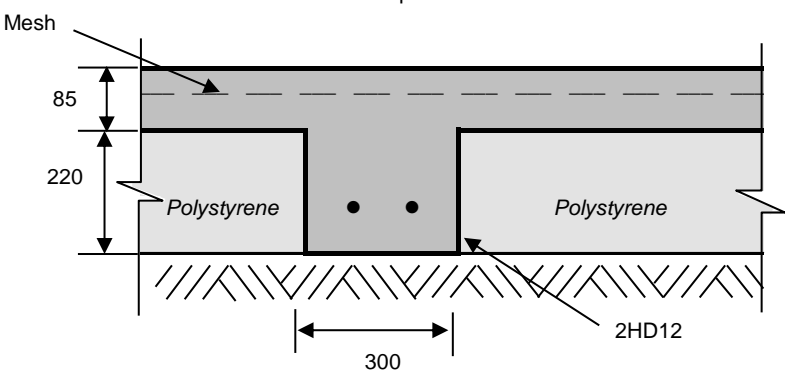
^ Roof LL not added if midfloor exists else LL = 0.25 kPa

Date : 22/10/2020 Designer : RC Checker : NL Job Number : 01272	Building Consent BC201170 Received 17/11/20 Rafffloor Design	 <div style="display: inline-block; text-align: left;"> WILTON JOUBERT <i>Consulting Engineers</i> </div>
Site Address : Lot 41, 11 Crete Road Description : INTERNAL THICKENING		

Working Loads		Dead	7.17	kN/m
		Live	3.17	kN/m
Ultimate Loads (1.2G + 1.5Q)		Dead	8.60	kN/m
		Live	4.76	kN/m
Total Ultimate Load on Internal	w =		13.36	kN/m

Internal Rib Details	Rib Width = 300 mm Pod Depth = 220 mm Top slab Depth = 85 mm Self Weight = 2.20 kN/m Construction Type Standard Raft
-----------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Standard Raft Construction	Dependable bearing capacity: 100 kPa Bearing Check = OK! Working Pressure = 29 kPa Point load capacities Remaining PL capacity before pads required 10.1 kN PL capacity before 600Φ pads fail 15.7 kN PL capacity before 600x600 pads fail 20.0 kN Steel Requirements - As Per Std Drg's Btm Steel: 2HD12
-----------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Prescribed Internal Rib Design	<div style="text-align: center;"> Standard Raft Construction 300 wide Rib required with 2HD12 in bottom </div> <div style="display: flex; align-items: center;"> <div style="width: 30%; padding-right: 10px;"> Location (ie: which wall): <div style="background-color: #d9e1f2; padding: 2px; text-align: center;">INTERNAL THICKENING</div> </div> <div style="width: 70%;">  </div> </div>
---------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Date : 22/10/2020

Designer : RC

Checker : NL

Job Number : 01272

Building Consent BC201170

Received 17/11/20

Raftfloor Design



Site Address : Lot 41, 11 Crete Road

Description : SLIDING RESISTANCE

Calculation of Shear Pile Requirements

Use AS1170 design philosophy of preventing damaging movement up to an SLS event,and thereafter accepting increasing levels of damage as the event increases.

Assumed Class C soil:

City/town: Rangiora

$C(t) = Ch(t) Z R N(T,D)$

$Ch(t) = 2.36$

$Z = 0.33$

$Rs \text{ (25 yr RP)} = 0.25$

$Ru \text{ 500yr} = 1$

Assume $T1 = 0.4$

$N(T,D) = 1 \text{ SLS}$

$ku = 1 + (u-1)T1/0.7$

$C(t) \text{ SLS} = 0.19$

$ku = 1$

$C(t) \text{ ULS} = 0.78$

$Cd(T1) = C(t) Sp/ku$

For base sliding $Sp = 1.0$

$SLS Cd(T1) = 0.19$

Note for Class D soil $SLS Cd(t1) = 0.25$

$ULS Cd(T1) = 0.68$

$ULS Cd(t1) = 0.87$

Testing by Dr McManus University of Canterbury (Geotechnical Society Symposium, 2003) found the friction co-efficient of slab on polythene on sand had peak friction co-efficients of 0.42 for an unloaded slab and 0.53 for a loaded slab. Residual friction coefficient were 0.38 and 0.49 respectively.

These values are some what lower than that published by other sources, normally 0.7 peak and 0.5 residual.

Even using the lower values there will be no relative movement between the slab and the ground at SLS level event on either Class C or D. At ULS level event there may be relative movement between the slab and the ground, this may break services to the house, but will also serve to reduce the forces transferred to the structure of the house. This is acceptable within the intent of NZS 1170.5 2004.

Therefore, based on the above, shear key piles are unnecessary.

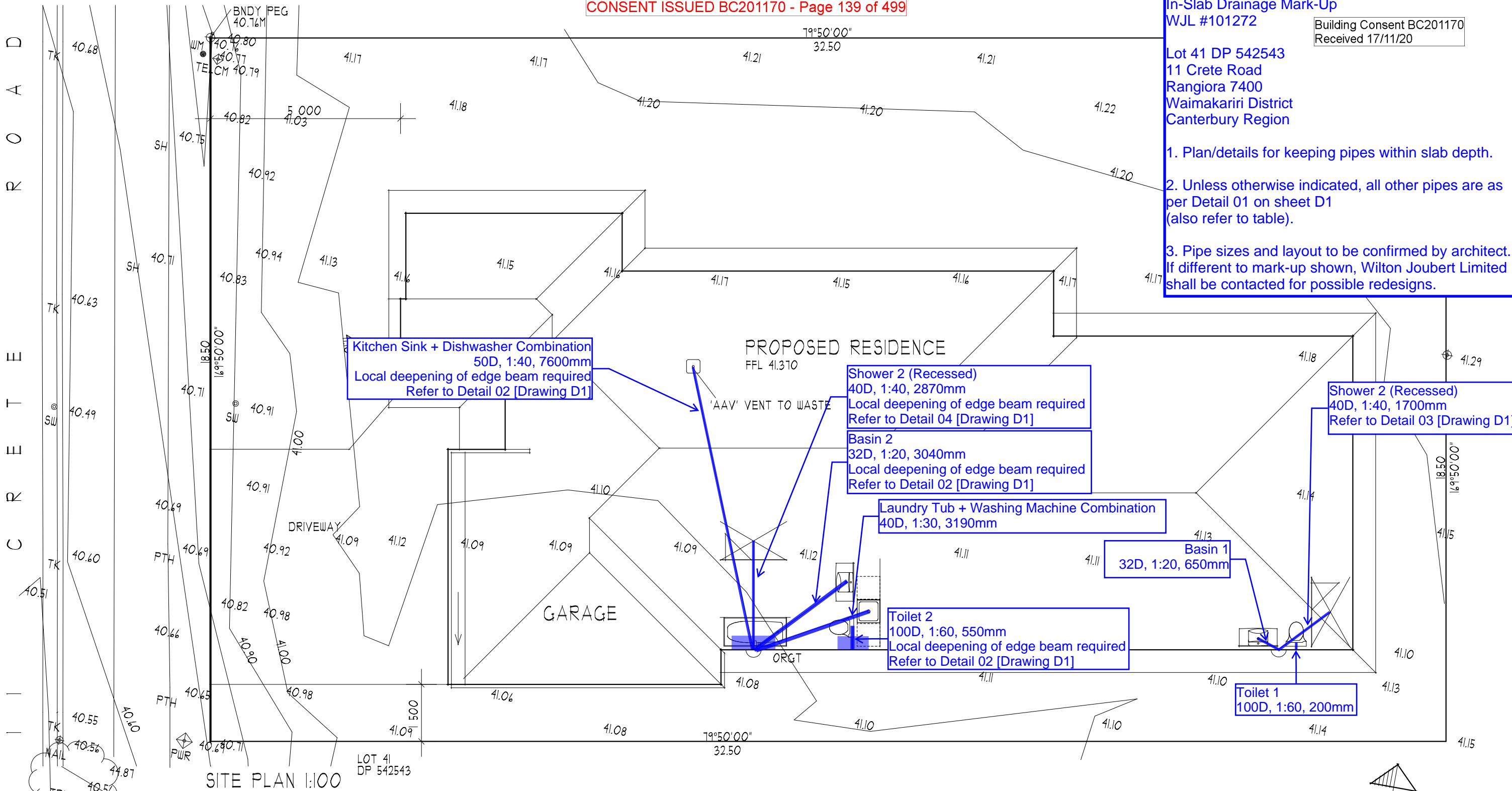
In-Slab Drainage Mark-Up

WJL #101272

Building Consent BC201170
Received 17/11/20

Lot 41 DP 542543
11 Crete Road
Rangiora 7400
Waimakariri District
Canterbury Region

1. Plan/details for keeping pipes within slab depth.
2. Unless otherwise indicated, all other pipes are as per Detail 01 on sheet D1 (also refer to table).
3. Pipe sizes and layout to be confirmed by architect. If different to mark-up shown, Wilton Joubert Limited shall be contacted for possible redesigns.



SITE PLAN 1:100

MINIMUM REQUIREMENTS FOR WASTE PIPES G13/AS1	
SHOWER WASTE :	40 MM AT 1 IN 40
BASIN WASTE :	32 MM AT 1 IN 20
WC WASTE :	100 MM AT 1 IN 60
TUB WASTE :	40 MM AT 1 IN 30
SINK WASTE :	50 MM AT 1 IN 40
'AAV' VENT TO WASTES OVER 3.500 M LONG	
ALL TOILETS TO BE VENTED IN ACCORDANCE WITH G13/AS1 TABLE 5	

DRAIN LEAK TEST IS TO BE CARRIED OUT AS REQUIRED BY CLAUSE 8.0 EI/AS1 AND CLAUSE 6.0 G13/AS2.

ORGT - GULLY TRAP 150 MM BELOW FFL
MIN 100 MM ABOVE GROUND

GROUND CLEARANCES TO GROUND:
- TO PAVING, DRIVEWAY 150MM
- NATURAL GROUND 225 MM

TEMPORARY FENCE TO COMPLY WITH
NZBC F5 CONSTRUCTION AND DEMOLITION
DEMOLITION HAZARDS

NOTE: " BEDDING " AND " BACKFILLING " OF DRAINS
COMPLIANT WITH G13/AS2 FIG 1

NOTE: ALL DOWNPIPES 63 MM DIAMETER

NOTE: DRAINS LAID AT A GRADIENT OF 1:80 OR LESS
A VARIABLE LEVELLING DEVICE SHALL BE USED TO
ENSURE UNIFORM AND ACCURATE GRADIENTS.
(G13/AS2 CLAUSE 5.22)

NOTE: SEE OWNER FOR CLOTHESLINE , LETTERBOX
BIN , HEAT PUMP UNIT (IF APPLICABLE) AND
FENCES AND GATES

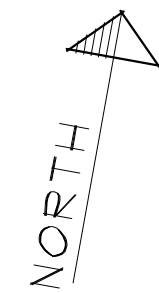
→ = 1:100 FALLS TO PAVING

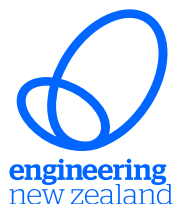
NOTE: ALL ENTRIES AND EXITS TO COMPLY WITH
N.Z.B.C., DI, AS1 . TREAD MINIMUM 280 MM , RISER
MAXIMUM 190 MM. NON-SLIP FINISH TO TREADS

NOTE: SLIP RESISTANCE FOR WALKING SURFACES TO BE
COMPLIANT WITH DI - AS1 TABLE 2 , CLAUSE 2.1.1 AND
COMMENTS 1 AND 2

DRAIN SCHEDULE	
IP	INSPECTION POINT
DP	DOWNPIPE
RP	RODDING POINT
GT	GULLY TRAP

AREAS:	
PROPOSED RESIDENCE	240.24 M ²
LAND	601 M ²
SITE COVERAGE	39.91 %





CERTIFICATE OF DESIGN WORK MEMORANDUM FROM LICENSED BUILDING PRACTITIONER

Section 30C and Section 45, Building Act 2004

The Building	
Street address	11 Crete Road
Suburb	Town/city Rangiora
Postcode	7400 Building consent no.
The Owner	
Name(s)	Dean Cameron
Email	Phone
Address	

Basis for providing this memorandum

I am providing this memorandum in my role as the **specialist** designer who carried out or supervised specific Primary structure elements of restricted building work (RBW) design work as described in this memorandum. Other designers will provide memoranda covering the remaining RBW design work. Refer also to the attached PSI.

Identification of restricted building work (RBW) design work

I, David Lau carried out or supervised the following RBW design work:

Primary structure: B1

Design work that is RBW	Description (as required) and reference to plans and specifications	Carried out or supervised
Foundations and subfloor framing ✓	SED Foundations as per S0-S2.1, Site Plan, D1-D2.	Supervised
Retaining walls ✗		
Beams ✗		
Portal ✗		
Bracing ✗		
Other (primary) ✗		

Note: SED = Elements subject to Specific Engineering Design outside of the scope of NZS3604:2011, unless otherwise noted.

Initial

Date

27/10/2020

Waivers and modifications

Are waivers or modifications of the Building Code required?

No

If yes, please provide details of the waivers or modifications:

Building Code clause	Waiver/modification required
N/A	N/A

Issued by

Name	David Lau	Design entity/company	Wilton Joubert Limited
Chartered status	CPEng	Chartered no.	221906
Email	david@wjl.co.nz	Website	www.wiltonjoubert.co.nz
Phone (daytime)	09 527 0196	Phone (after hours)	
Mobile			
Postal address	PO Box 11381 Ellerslie, Auckland 1542		
Physical address	108 Lunn Avenue, Mt. Wellington, Auckland 1072		

Declaration

I, David Lau, LBP state that I have applied the skills and care reasonably required of a competent design professional in carrying out or supervising the RBW described in this memorandum and that based on this, I certify that the RBW described in this memorandum:

- complies with the Building Code; or
- complies with the Building Code subject to any waiver or modification of the Building Code described in this memorandum.

Signature



Date 27/10/2020

SECTION 3

Truss Details & Bracing Details

(Include Fixings of Gib & Ecoply)

- Design IT Calcs
- Hyspan etc.

-- AS BUILT TRUSS LAYOUT REQUIRED --
This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to
the Structure Pre-Roof Pre-Wrap inspection.

Truss "As-Build" designs shall be sent to
buildinginfo@wmk.govt.nz



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

Printed: 10:33:05 05 Oct 2020

MiTek 20/20 Engineering 4.7.334.0

PRODUCER STATEMENT for MiTek 20/20® TRUSS DESIGN - Version 4.7

ISSUED BY: **MiTek New Zealand Limited**

TO: **Kaiapoi ITM Building Centre**

IN RESPECT OF: **MiTek® Truss Designs**

-- AS BUILT TRUSS LAYOUT REQUIRED --
This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to
the Structure Pre-Roof Pre-Wrap inspection.

Truss "As-Built" designs shall be sent to
buildinginfo@wmk.govt.nz

This producer statement covers the MiTek 20/20® truss design and the structural performance of the GANG-NAIL® connector plate for the job reference **092034R** 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 Clause B1 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: Monday, 5 October 2020

In Ling Ng, BE (Hons), CPEng, IntPE, MIPENZ (ID: 146585)
TECHNICAL SERVICES MANAGER, MiTek New Zealand Limited

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

Kaiapoi ITM Building Centre

Fabricator Design Statement : Page 1

Job: 092034R Client: Dean Cameron Site: Lot 41
 Description: Building Consent No.: 11 Crete Road
 Phone: Lionsgate
 MiTek 20/20 Engineering 4.7.334.0 MiTek New Zealand Limited Printed: 10:33:05 Oct 2020

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **Kaiapoi ITM Building Centre**, 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:	25.000 deg	Nominal Overhang:	600 mm
Timber Group:	DDFx45 H1.2		Ceiling		Wind	
Material:	Galv Iron .5mm		Material:	Rondo screwed to BC	Area:	High (44.0 m/s)
Dead Load:	0.210 kPa		Dead Load:	0.200 kPa	Pressure Coeff:	Cpe = varies; Cpi = -0.30, 0.20
Restraints:	900 mm centres		Restraints:	600 mm centres	Snow	
Live Load:	Qur = 0.250 kPa		Live Load:	Qc = 1.400 kN	Location:	Christchurch (N4) at 100 m
	Qc = 1.100 kN				Open Ground Load:	0.900 kPa
					Basic Roof Load:	0.441 kPa

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, ✕ = 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)
ET01	1D	4510	25.000	900	J16	1	1694	25.000	900	T07	1	4510	25.000	855
*HB01	2	6650	18.249	900	J16B	2	1694	25.000	900	V01	1	1409	25.000	900
*HB02	1	7405	18.249	900	J17A	1	2594	25.000	900	V02	1	1785	25.000	900
*HB03	1	1638	18.249	900	J18	1	492	25.000	900	V03	1	2685	25.000	900
*HB04	1	3945	18.249	900	*R01	2	1093	25.000	900	J02	1	2302	25.000	900
*HB05	1	2483	18.249	900	*R02	8	891	25.000	900	J02A	1	2302	25.000	900
*HB06	1	4006	18.249	900	R03	1	900	25.000	900	J04B	1	3736	25.000	900
*HB07	1	546	18.250	900	*R04	1	1627	25.000	900	J06	1	2836	25.000	900
*HB08	1	4880	18.249	900	*R05	1	1023	25.000	900	J08	1	2178	25.000	900
*HB09	1	4942	18.249	900	*R06	1	5710	25.000	900	J10	1	2178	25.000	900
J01	2	3202	25.000	900	*R07	1	1455	0.000	900	J12	1	2232	25.000	900
J01C	1	3202	25.000	900	*R07A	7	1455	0.000	900	J16A	1	1694	25.000	900
J02B	2	2302	25.000	900	*R08	1	785	25.000	900	J17	1	2594	25.000	900
J03	2	1402	25.000	900	*R09	2	291	25.001	900	J01A	1	3202	25.000	900
J03A	2	1402	25.000	900	S01	1	9960	25.000	900	J01B	1	3202	25.000	900
J04	1	3736	25.000	900	S02	1	6179	25.000	900	J05	1	3736	25.000	900
J04A	1	3736	25.000	900	S02A	3	6179	25.000	900	J14A	1	3494	25.000	900
J06A	1	2836	25.000	900	S03	2	6421	25.000	900 LB	J15	1	2292	25.000	900
J07	1	1936	25.000	900	S05	4	9960	25.000	814	SG02	1	6421	25.000	900
J07A	1	1936	25.000	900	S05A	1	9960	25.000	814	T06A	1	4510	25.000	900
J09	1	4077	25.000	900	T01	1	8250	25.000	900	J14	1	3494	25.000	900
J11	1	2079	25.000	900	T01A	1	8250	25.000	900	SG01	1	9960	25.000	900
J13	1	1332	25.000	900	T01B	3	8250	25.000	900	T02A	1	6731	25.000	900
J13A	1	1332	25.000	900	T03	2	1278	25.000	900	TG01	1	8250	25.000	900
J14B	1	3494	25.000	900	T05	1	4510	25.000	900	T02	1	6731	25.000	900
J15A	1	2292	25.000	900	T06	1	4510	25.000	900					

Total quantity : 107

WAIMAKARIRI DISTRICT COUNCIL
 Plans and specifications APPROVED in accordance
 with the Building Act 2004, clause 49 and the Building
 Regulations 1992, Clause 3
 BC201170 9/12/2020 nicolah

-- AS BUILT TRUSS LAYOUT REQUIRED --
 This must be received by the Building Unit
 AT LEAST 10 WORKING DAYS PRIOR to
 the Structure Pre-Roof Pre-Wrap inspection.

Truss "As-Build" designs shall be sent to
 buildinginfo@wmk.govt.nz

The computer design input has been carried out by:

Signed:

Name of Detailer: Ranjit Singh

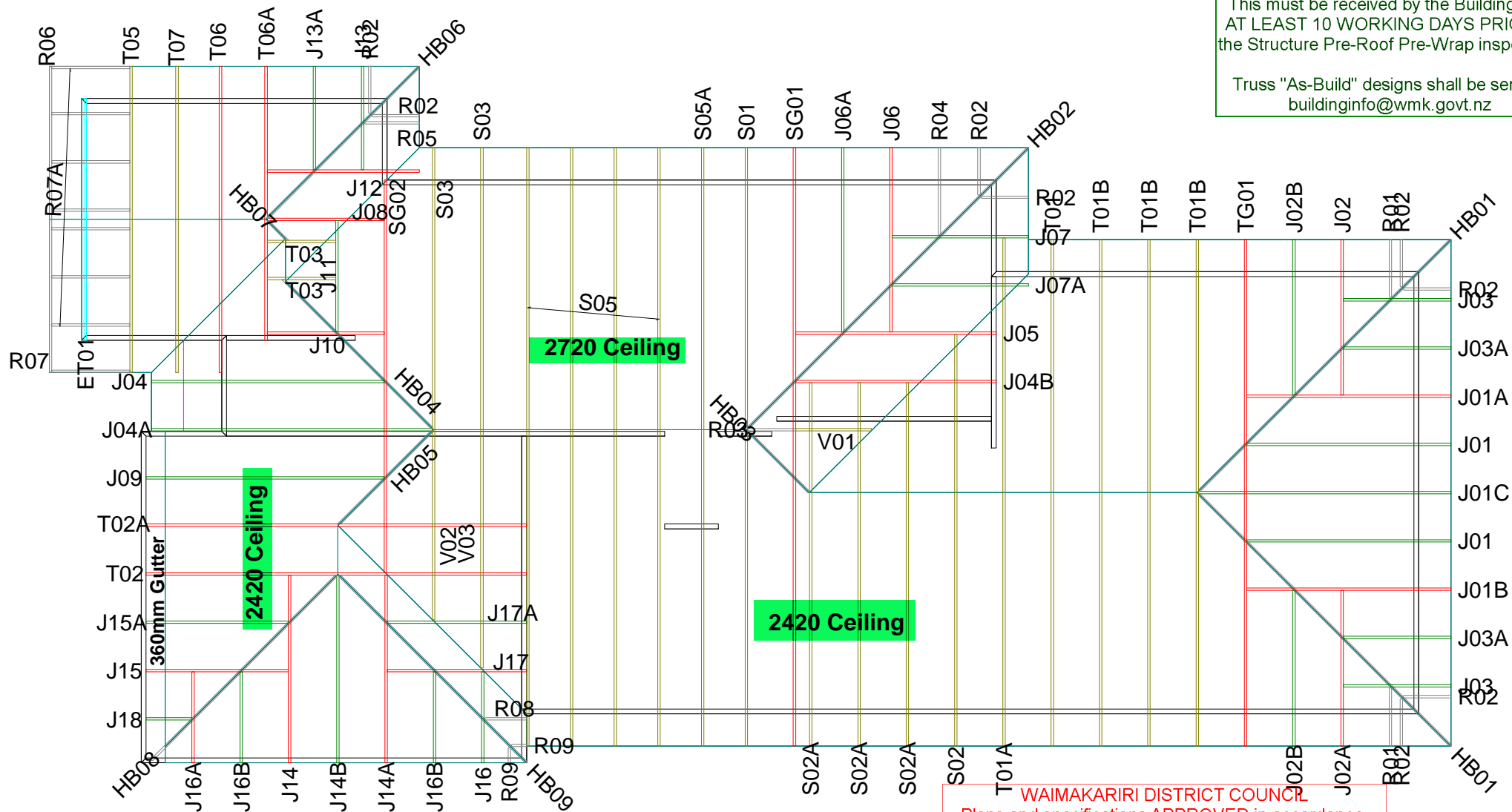
On behalf of: Kaiapoi ITM Building Centre

Date: Monday, 5 October 2020

Qualifications and Title:

-- AS BUILT TRUSS LAYOUT REQUIRED --
This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to
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WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

PrimeCad v4.7.334



Site Address :

Lot 41
11 Crete Road
Lionsgate

Sheet Title :
For Building Consent
Buildable Truss Layout

Date : 2 Oct,2020	Drawn : Ranjit Singh
Scale : 1: 100	System : MiTek 20/20

Job Details:

Roof Pitch	: 25.00deg
Roof Material	: Galv Iron .5mm
Ceiling Material	: Rondo screwed to BC
Wind Zone	: High
Roof Snow Load	: 0.441kPa

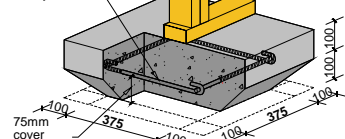
Truss Centres : 900mm
Roof Live Load : 0.250kPa
Floor Live Load :
Wind Speed : 44m/s
Overhang : 600mm



Job Title :	092034R
Sheet :	1
Revision Number :	

SLAB THICKENING & STUD REQUIREMENTS

TYPE FP1

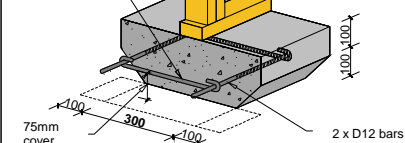
375mm² Pad2 x D12 Bars
both ways

2

3

TYPE FS1

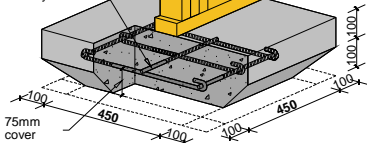
300mm Strip

R10 bars @
600 crs

2

3

TYPE FP2

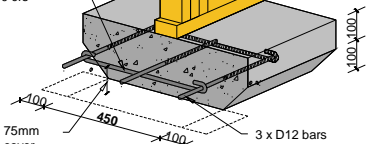
450mm² Pad3 x D12 Bars
both ways

3

4

TYPE FS2

450mm Strip

R10 bars @
600 crs

3

4

Notes:

- The numbers found in the hatched areas are the numbers of studs required below each truss
- Standard 100mm reinforcing concrete slab, as per NZS3604:2011

Refer to:

MiTek Internal Load Bearing on Concrete Floor Slabs 10/2011
MiTek Structural Fixings **On-Site Guide** for Building Code Compliance

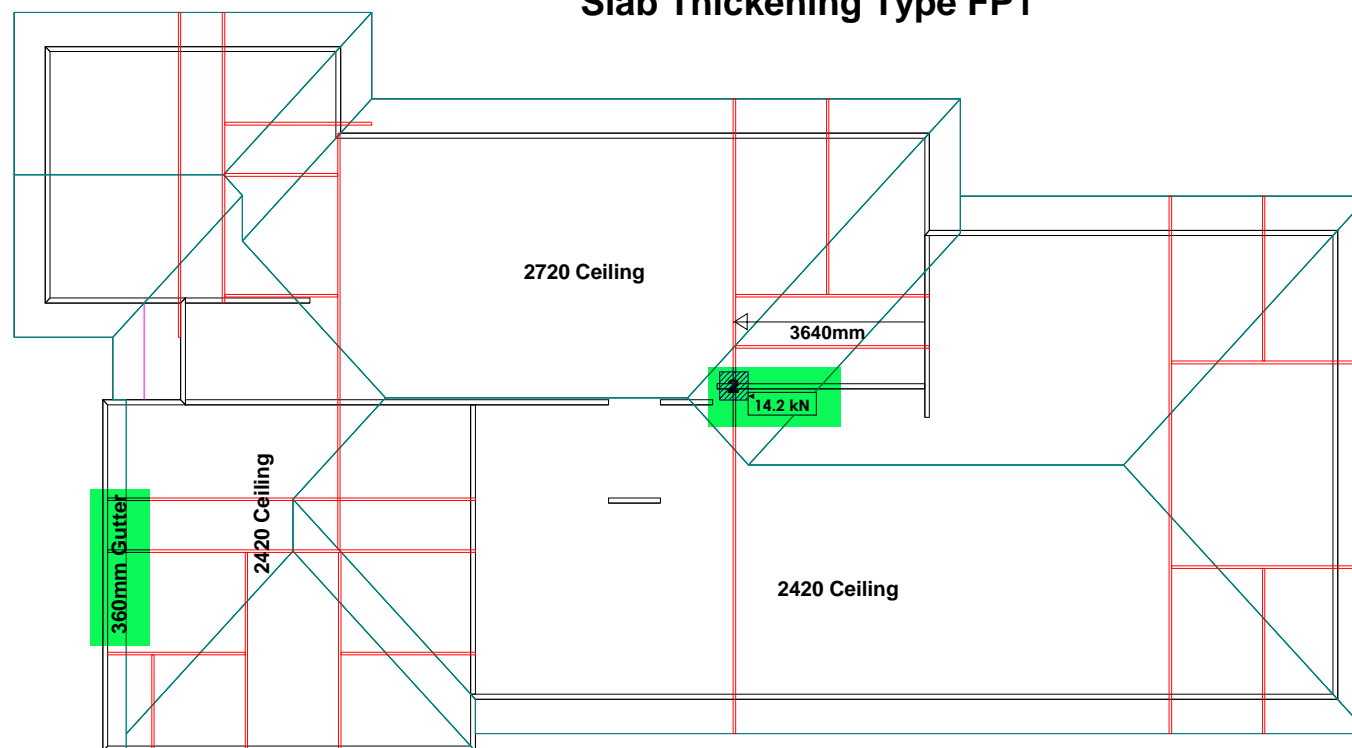
Concrete Slab
Thickening
Guide



-- AS BUILT TRUSS LAYOUT REQUIRED --
This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to
the Structure Pre-Roof Pre-Wrap inspection.

Truss "As-Built" designs shall be sent to
buildinginfo@wmk.govt.nz

Slab Thickening Type FP1



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah



Site Address :

Lot 41
11 Crete Road
Lionsgate

Sheet Title :

For Building Consent
Slab Thickening

Date : 2 Oct, 2020
Scale : 1: 100

Drawn : Ranjit Singh
System : MiTek 20/20

Job Details:

Roof Pitch : 25.00deg
Roof Material : Galv Iron .5mm
Ceiling Material : Rondo screwed to BC
Wind Zone : High
Roof Snow Load : 0.441kPa

Truss Centres : 900mm
Roof Live Load : 0.250kPa
Floor Live Load :
Wind Speed : 44m/s
Overhang : 600mm



PrimeCad v4.7.334

Job Title :

092034R

Sheet :

2

Revision Number :

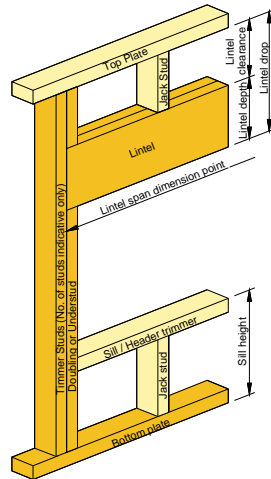
LUMBERLOK® LINTEL FIXING OPTIONS

TYPE E
1.4 kN

TYPE F
4.0 kN

TYPE G
7.5 kN

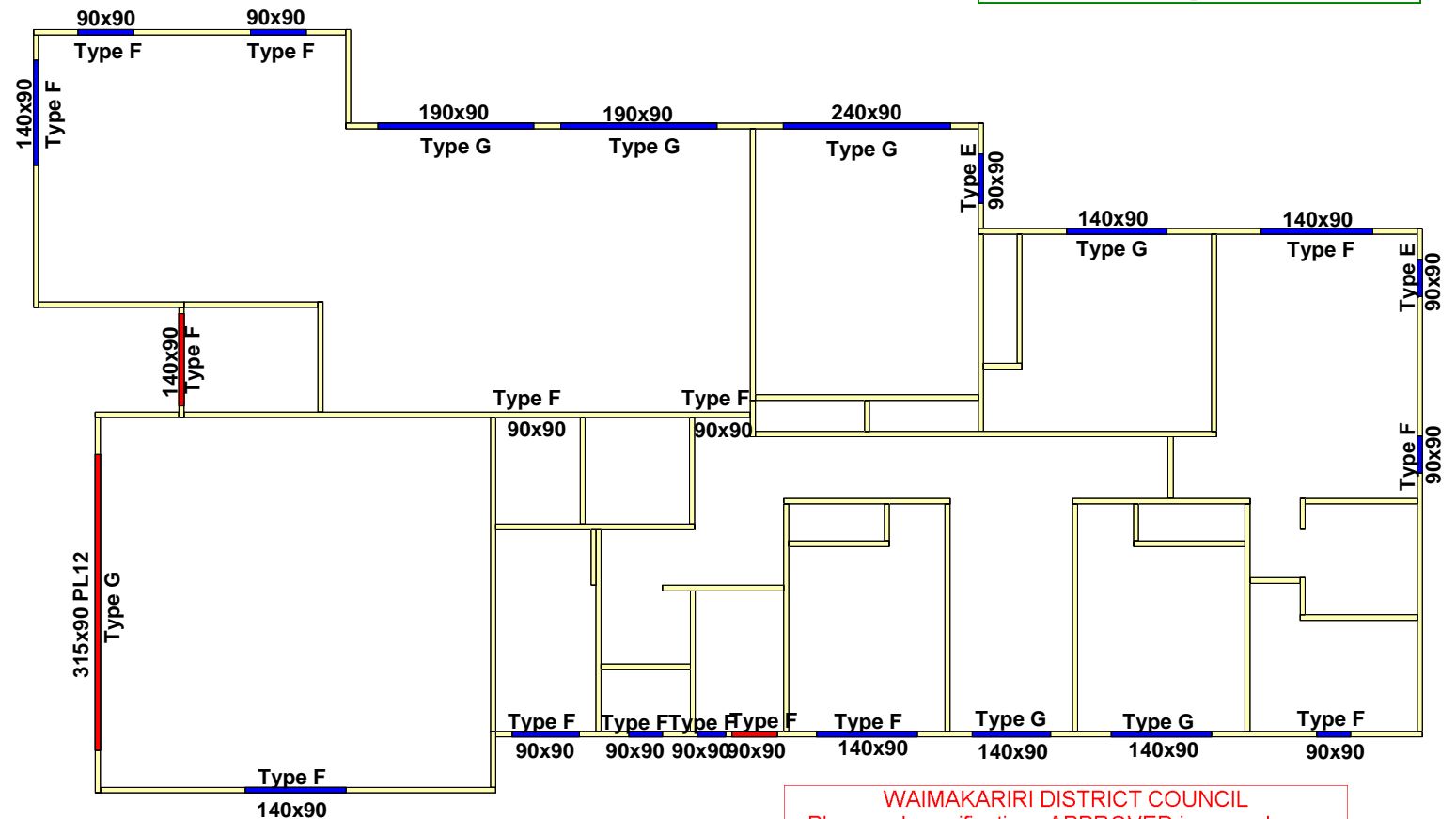
TYPE H
13.5 kN



Lintels Designed By Mitek Ganglam Chart 04/2008 & Prolam Design Program

-- AS BUILT TRUSS LAYOUT REQUIRED --
This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to
the Structure Pre-Roof Pre-Wrap inspection.

Truss "As-Build" designs shall be sent to
buildinginfo@wmk.govt.nz



Refer to:
LUMBERLOK Lintel Fixing Schedule 10/2011
MiTek Structural Fixings **On-Site Guide** for Building Code Compliance
(Alternative to Table 8.14 & Figure 8.12 NZS 3604:2011)

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170_9/12/2020_nicolah

PrimeCad v4.7.334



Site Address :

Lot 41
11 Crete Road
Lionsgate

Sheet Title :

For Building Consent
Lintel Fixing

Date : 2 Oct, 2020
Scale : 1: 100

Drawn : Ranjit Singh
System : MiTek 20/20

Job Details:

Roof Pitch : 25.00deg
Roof Material : Galv Iron .5mm
Ceiling Material : Rondo screwed to BC
Wind Zone : High
Roof Snow Load : 0.441kPa

Truss Centres : 900mm
Roof Live Load : 0.250kPa
Floor Live Load :
Wind Speed : 44m/s
Overhang : 600mm



Job Title :

092034R

Sheet :

3

Revision Number :

B BOWMAC[®] STUD-LOK

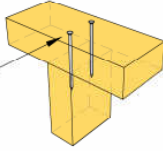
STUD TO TOP PLATE FIXING OPTIONS

TYPE A - 0.7 kN

Non-Load Bearing Walls

*Images are indicative only.
Timber sizes may vary.

2 x 90mm x 3.15 Ø plain
steel wire nails driven
vertically through single Top
Plate into stud



TYPE B - 4.7 kN

Load Bearing Walls

1 x STUD-LOK SL125
screwed vertically through
single Top Plate into stud.

Max. Top Plate
Depth = 45mm

2 x 90mm x 3.15 Ø plain
steel wire nails driven
vertically into stud.

OPTION 1 ▲

STUD-LOK SL125
• Yellow Head
• 125mm long



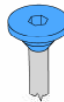
1 x STUD-LOK SL170
screwed vertically through
single or double Top Plate
into stud.

Max. Top Plate
Depth = 90mm

2 x 90mm x 3.15 Ø plain
steel wire nails driven
vertically into stud.

OPTION 2 ▲

STUD-LOK SL170
• Blue Head
• 170mm long



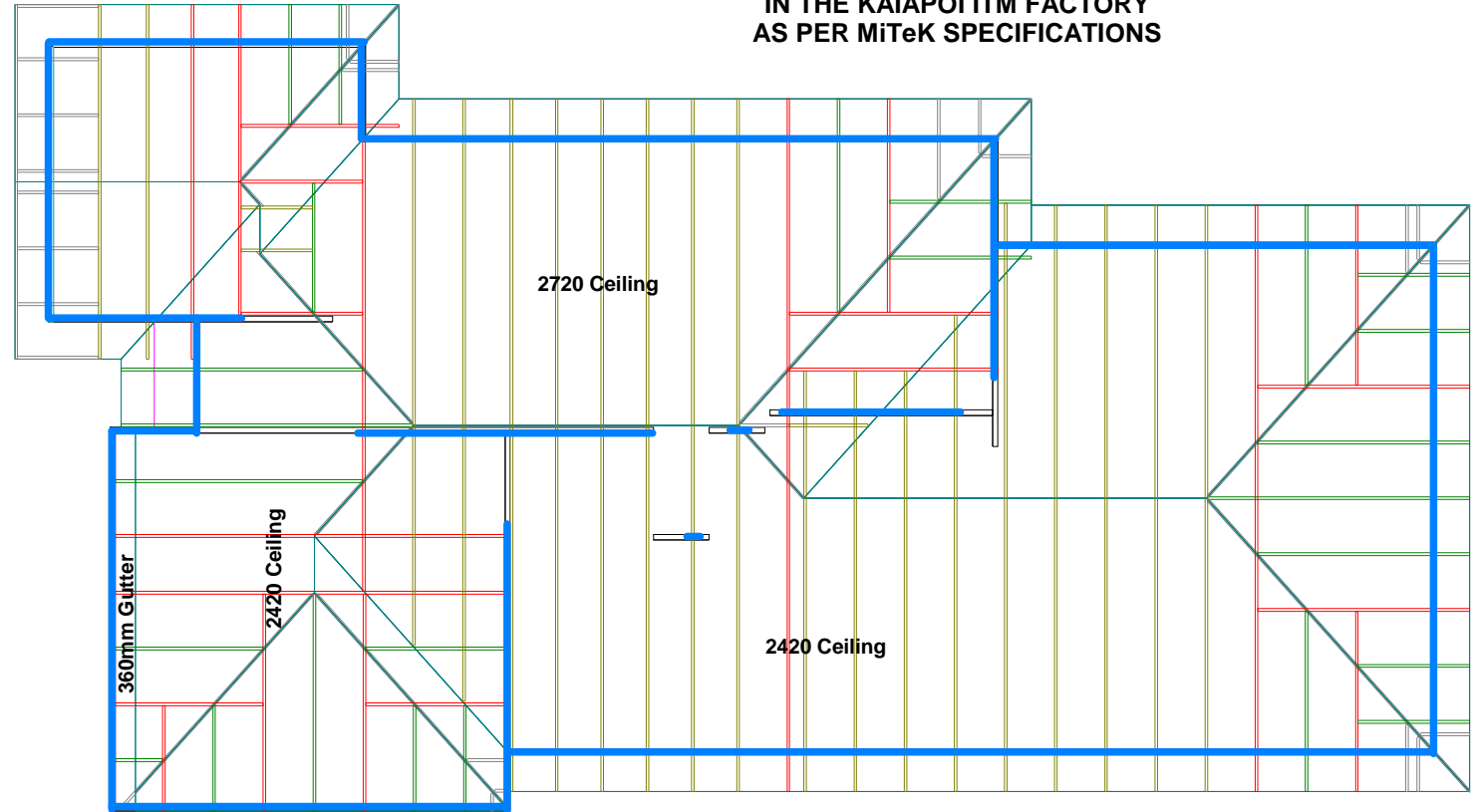
(Alternative to NZS 3604:2011 Section 8)

CONSENT ISSUED BC201170 - Page 148 of 499

-- AS BUILT TRUSS LAYOUT REQUIRED --
This must be received by the Building Unit
AT LEAST 10 WORKING DAYS PRIOR to
the Structure Pre-Roof Pre-Wrap inspection.

Truss "As-Built" designs shall be sent to
buildinginfo@wmk.govt.nz

**ALL MARKED WALLS
ARE TYPE B FIXING**
**STUD-LOK SL125 YELLOW HEAD,
125mm LONG SCREW INSTALLED
IN THE KAIAPOI ITM FACTORY
AS PER MiTek SPECIFICATIONS**



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah



Site Address :

Lot 41
11 Crete Road
Lionsgate

Sheet Title :

**For Building Consent
Stud To Top Plate Fixing**

Date : 2 Oct, 2020

Drawn : Ranjit Singh

Scale : 1: 100

System : MiTek 20/20

Job Details:

Roof Pitch : 25.00deg
Roof Material : Galv Iron .5mm
Ceiling Material : Rondo screwed to BC
Wind Zone : High
Roof Snow Load : 0.441kPa

Truss Centres : 900mm
Roof Live Load : 0.250kPa
Floor Live Load :
Wind Speed : 44m/s
Overhang : 600mm



PrimeCad v4.7.334

Job Title :

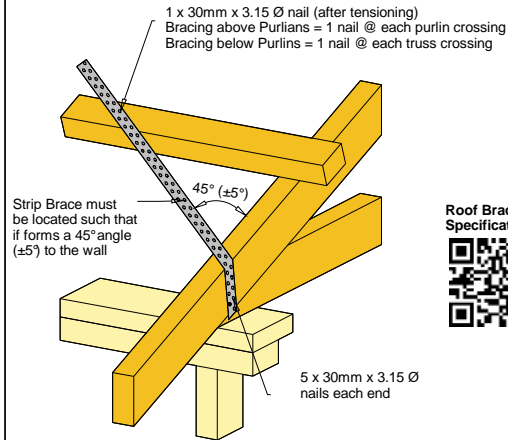
092034R

Sheet :

4

Revision Number :

LUMBERLOK[®] ROOF BRACING



Refer to:
LUMBERLOK Roof Bracing Specifications 10/2011
MiTek Structural Fixings **On-Site Guide** for Building Code Compliance
(As per NZS 3604:2011)

LUMBERLOK[®] TRUSS FIXINGS

- D - Pair of Wire Dogs and 2 x 90mm 3.15mm skew nails
- X - LUMBERLOK JH47x90 Joist Hanger
- Z - LUMBERLOK JH47x120 Joist Hanger
- P - LUMBERLOK JH47x190 Joist Hanger
- E - LUMBERLOK JH95x165 Joist Hanger
- T - LUMBERLOK CT200 Ceiling Tie
- O - Pair of LUMBERLOK CT200 Ceiling Ties
- H - LUMBERLOK CT400 Cyclone Tie
- B - LUMBERLOK CT600 Cyclone Tie
- 4 - LUMBERLOK Multi Grip
- M - Pair of LUMBERLOK Multi Grips
- NP - LUMBERLOK Nailon Plate
- N - LUMBERLOK N21 Diagonal Cleat
- V - LUMBERLOK CPC40 Cleat
- W - Pair of LUMBERLOK CPC40 Cleats
- K - LUMBERLOK TTP 16kN Truss to Top Plate set
- G - LUMBERLOK TTP 9kN Truss to Top Plate set

Joist Hanger Installation



CT200 Truss to Top Plate Fixing Installation



16kN & 9kN Truss to Top Plate Fixing Installation



Notes:
All other areas must have the minimum 2 x 90mm 3.15mm skew nails and
2 x wire dogs for truss to top plate connections

Refer to:
LUMBERLOK Timber Connectors Characteristic Loadings Data Brochure
08/2014

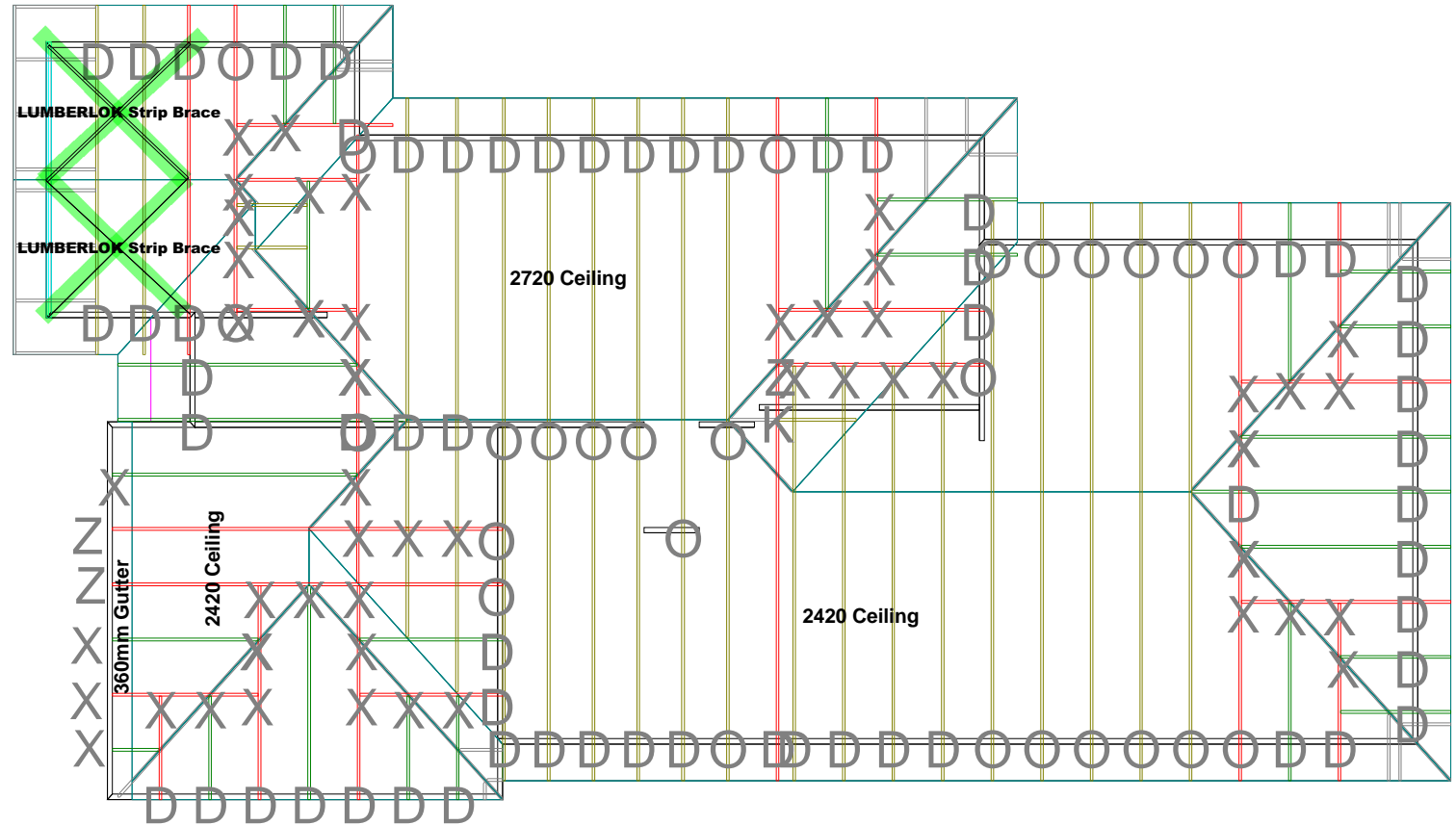


Site Address :

Lot 41
11 Crete Road
Lionsgate

-- AS BUILT TRUSS LAYOUT REQUIRED --
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Truss "As-Built" designs shall be sent to
buildinginfo@wmk.govt.nz



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

PrimeCad v4.7.334

Sheet Title :
**For Building Consent
Truss Fixings & Roof Bracing**

Date : 2 Oct, 2020
Scale : 1: 100

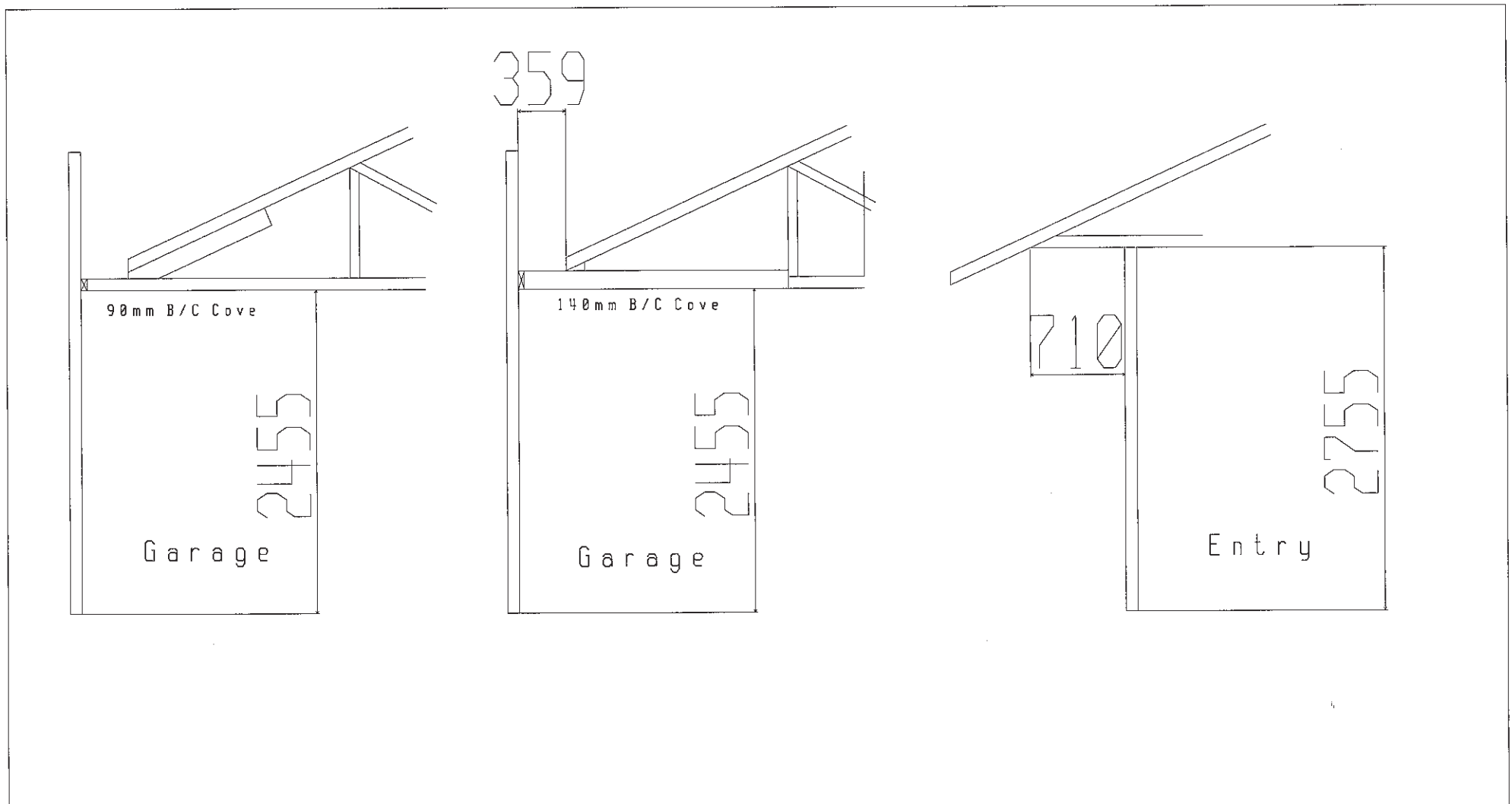
Drawn : Ranjit Singh
System : MiTek 20/20

Job Details:
Roof Pitch : 25.00deg
Roof Material : Galv Iron .5mm
Ceiling Material : Rondo screwed to BC
Wind Zone : High
Roof Snow Load : 0.441kPa

Truss Centres : 900mm
Roof Live Load : 0.250kPa
Floor Live Load :
Wind Speed : 44m/s
Overhang : 600mm



Job Title :
092034R
Sheet :
5
Revision Number :



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 with the Building Act 2004, clause 49 and the Building
 Regulations 1992, Clause 3
 BC201170 9/12/2020 nicolah

4 October 2020



SN-R10156166

PROLAM SUMMARY

Customer/Project: Dean Cameron #092034R
Physical Address: 11 Crete Road, Lot 41 Lionsgate
Designer: Ranjit Sagoo, Kaiapoi Itm
197 Ohoka Road, Kaiapoi 7630
E: ranjit@kaiapoiitm.co.nz P: 033278829

Garage Door

Prolam Lintels Supporting Girder/Setback Trusses

Building Type	House	Roof Weight	Light with Ceiling
Timber	Pine, Machined	Roof Load	0.40 kPa
Treatment	H1.2	Live Load	0.25 kPa uniform
Visual	No		1.10 kN concentrated
Exposed	No	Wind Zone	High (44.0 m/s)
Roof Pitch	25 °	Snow Region	Region N4
Position of Girder Truss on Lintel	2.40 m	Altitude	100 m
Setback	5.27 m	Ground Snow Load	0.90 kPa
Supported Truss Span	7.09 m	Roof Snow Load	0.44 kPa
Lintel Span	4.80 m		

Use Prolam PL12H1-350100 315 x 90mm PL12

Capacity Ratio	1.3
Long Term Deflection	2.9 mm
Max. Bearing Reaction	10.7 kN
Load Combination	1.2G + W _{down}
Minimum Bearing Length	35 mm
Uplift Fixing Requirements	8.375 kN Characteristic Load

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PRODUCER STATEMENT



Tasman Consulting Engineers Limited has been engaged by Prowood to provide design services for the development of the Prolam Online calculator.

The design has been carried out using sound and widely accepted engineering principles to the requirements of AS/NZS1170:2002, NZS3603:1993 and NZS3604:2011 using the timber properties for GL8, GL12 and GL17 glulam and LVL15.

I believe on reasonable grounds that the above design will meet the requirements of clauses B1/VM1 of the Building Code Documents.

David King
David King

ME (civil, MIPENZ CPEng (no 145511) IntPE

For Tasman Consulting Engineers, PO Box 3631, Richmond, NELSON 7050

4 October 2020

283 Waiwhero Rd P O Box 413 Motueka New Zealand Phone 03 526 7436 Fax 03 526 7437

Email: info@prowoodnz.com • www.prolamnz.com

LUMBERLOK® LINTEL FIXING OPTIONS

TYPE E 1.4 kN

- 4 x 90mm x 3.15 Ø nails into lintel
- 2 x 90mm x 3.15 Ø nails directly below lintel
- Fix trimmer to understud with 1 x 90mm x 3.15 Ø nail @ 250mm crs
- Tylok 2T4 one side

TYPE F 4.0 kN

- 6 x 90mm x 3.15 Ø nails into lintel
- 2 x 90mm x 3.15 Ø nails directly below lintel
- 2 x 90mm x 3.15 Ø nails directly below lintel
- 2 x Tylok 2T4 for Radiata Pine
- 2 x Strap Nail for Douglas Fir
- Tylok 4T5 one side



Notes:
For fixing of jack studs to lintel and top plate, refer to Stud to Top Plate Fixing Schedule

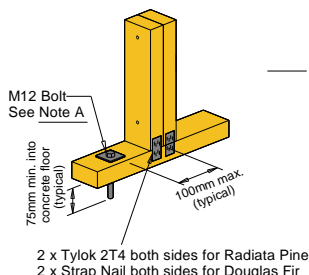
Stud numbers indicative only.
Refer to Table 8.5 NZS 3604:2011

LUMBERLOK Lintel Fixing Schedule 10/2011,
MiTek Structural Fixings On-Site Guide for Building Code Compliance
(Alternative to Table 8.14 & Figure 8.12 NZS 3604:2011)

TYPE G 7.5 kN

- 200mm Sheet Brace Strap to one side
- 6 x 30mm x 3.15 Ø nails each end
- 6 x 90mm x 3.15 Ø nails into Lintel
- 2 x 90mm x 3.15 Ø nails directly below lintel
- Fix trimmer to understud with 1 x 90mm x 3.15 Ø nail @ 250mm crs (typical)

Note A:
M12 proprietary concrete fixing bolt with 50x50x3mm square washer
Or
M12 x 150mm coach screw with 50x50x3mm square washer into timber joist/bearer



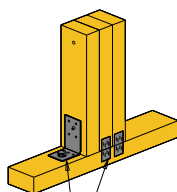
- 400mm Sheet Brace Strap to one side.
- 6 x 30mm x 3.15 Ø nails into stud.
- 3 x 30mm x 3.15 Ø nails into bottom plate.
- 6 x 30mm x 3.15 Ø nails into timber joist/bearer
- 2 x Tylok 2T4 both sides for Radiata Pine
- 2 x Strap Nail both sides for Douglas Fir

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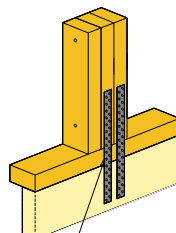
TYPE H 13.5 kN

- 200mm Sheet Brace Strap to both sides
- 6 x 30mm x 3.15 Ø nails each end
- 8 x 90mm x 3.15 Ø nails into lintel
- 2 x 90mm x 3.15 Ø nails directly below lintel
- Fix trimmer to understud with 1 x 90mm x 3.15 Ø nail @ 250mm crs (typical)

Note A:
M12 proprietary concrete fixing bolt with 50x50x3mm square washer
Or
M12 x 150mm coach screw with 50x50x3mm square washer into timber joist/bearer



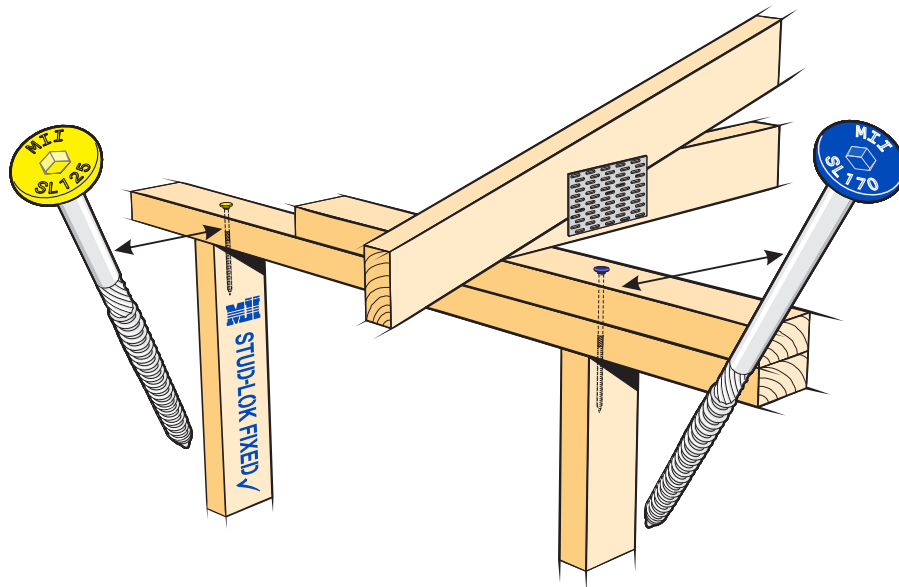
GIB® HandiBrac™ M and
2 x Tylok 2T4 both sides



- 2 x 400mm Sheet Brace Strap to one side.
- 6 x 30mm x 3.15 Ø nails into stud.
- 3 x 30mm x 3.15 Ø nails into bottom plate.
- 6 x 30mm x 3.15 Ø nails into timber joist/bearer

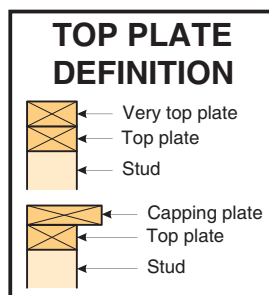
NOTICE

BOWMAC® STUD-LOK Top Plate to Stud Fixing

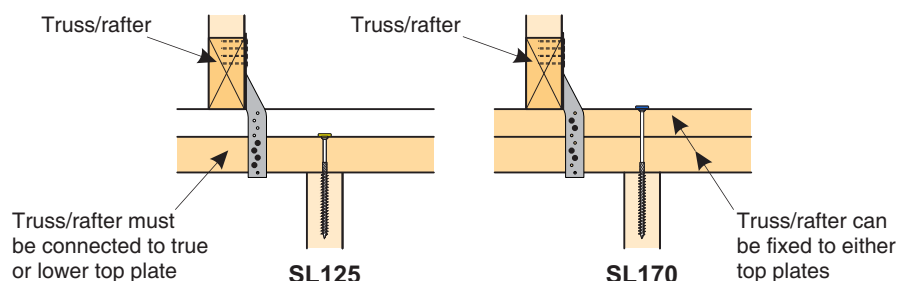


Inspection Note:

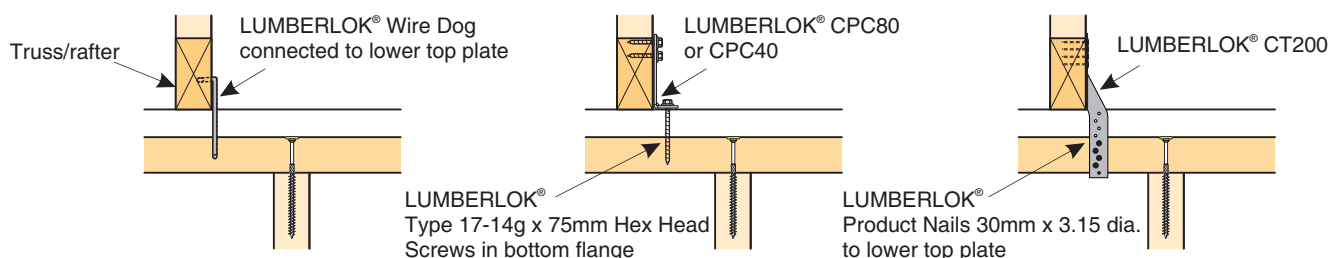
This wall frame has used the BOWMAC® STUD-LOK SL125 or SL170 as a method of fixing the top plate to the stud in place of the LUMBERLOK® Stud Strap or Type B fixings as shown on the MiTek 'Stud to Top Plate Fixing' template on the accompanying truss and frame design. Where the BOWMAC® STUD-LOK SL125 or SL170 has been applied in the factory by an accredited MiTek Fabricator, identification of this is by the "STUD-LOK✓" noted on the load bearing walls around the structure.



TRUSS/RAFTER TO TOP PLATE CONNECTIONS



TRUSS/RAFTER TO TOP PLATE CONNECTIONS WHERE BOWMAC® STUD-LOK SL125 IS USED

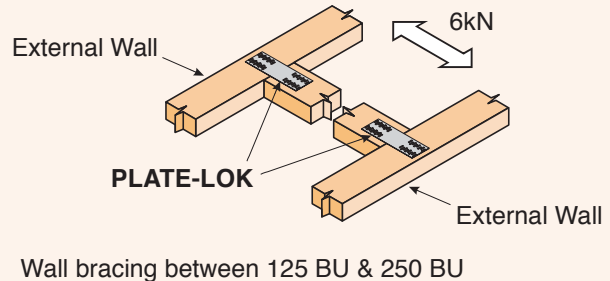
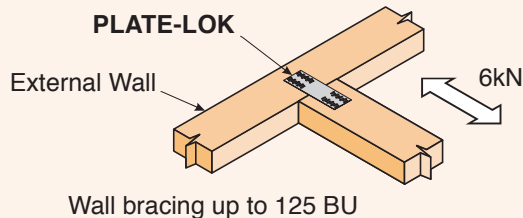


Where the BOWMAC® STUD-LOK SL170 is used to fix through the 'Very Top Plate' or 'Capping Plate', the truss fixings can be connected to any of these plates.

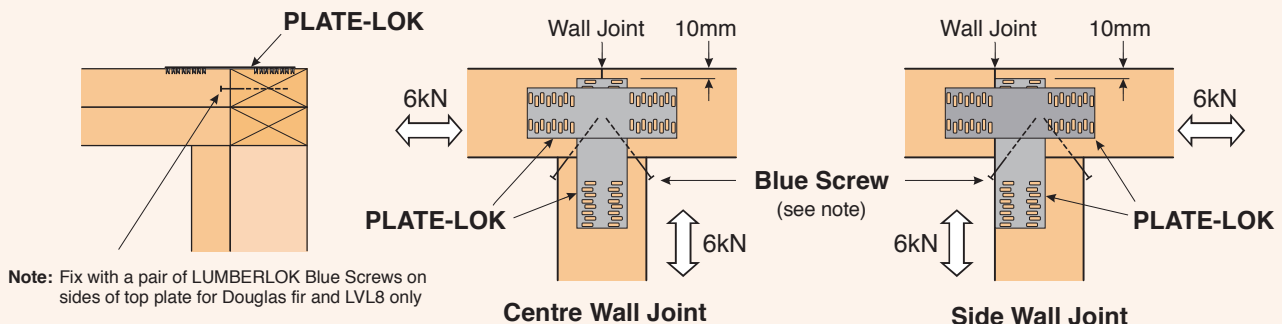


TOP PLATE CONNECTIONS AS REQUIRED BY CLAUSE 8.7.3 NZS 3604:2011

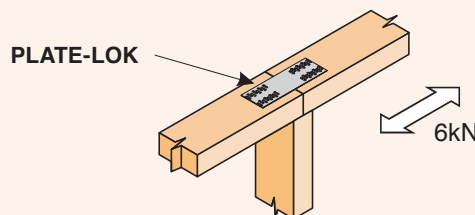
- ① Top plate joints for walls at right angles to external walls:
- (a) Walls with bracing elements not exceeding 125 bracing units (BU) require a 6kN capacity connection to one external wall.
 - (b) Walls with bracing elements not exceeding 250 BU require a 6kN capacity connection to two external walls.



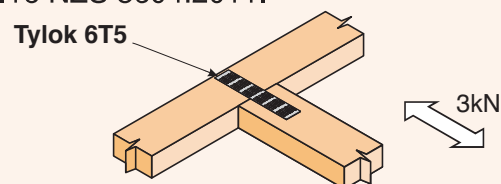
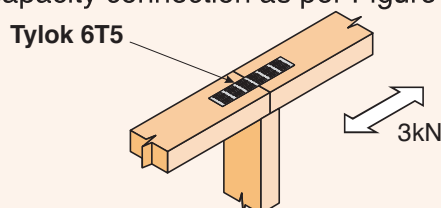
- ② Details of top plate joints using LUMBERLOK PLATE-LOK at "T" junction walls are shown below:



- ③ Top plate joints for all walls in line that have wall bracing elements exceeding 100 BU or have a ceiling diaphragm attached require a 6kN capacity connection as per Figure 8.15 NZS 3604:2011.



- ④ Top plate joints for walls at right angles and in line that have either no bracing elements or are on a single storey building only with wall bracing demands not exceeding 100 BU require a 3kN capacity connection as per Figure 8.15 & 8.16 NZS 3604:2011.



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Demand Calculation Sheet

Job Details

Name: D Cameron
 Street and Number: 11 Crete road
 Lot and DP Number:
 City/Town/District: Rangiora
 Designer:
 Company:
 Date:

Building Specification

Number of Storeys 1
 Floor Loading 2 kPa
 Foundation Type Slab

Single

Cladding Weight Medium
 Roof Weight Light
 Room in Roof Space No
 Roof Pitch (degrees) 25
 Roof Height above Eaves (m) 3
 Building Height to Apex (m) 5.4
 Ground to Lower Floor (m) .2

Average Stud Height (m) 2.42
 Building Length (m) 25.05
 Building Width (m) 12.39
 Building Plan Area (m²) 240.24

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Building Location

Wind Zone = High

Wind Region A
 Lee Zone No
 Ground Texture Open
 Site Exposure Exposed
 Hill Ste Category T1

Earthquake Zone 2

Soil Type D & E (Deep to Very Soft)
 Annual Prob. of Exceedance: 1 in 500 (Default)

Bracing Units required for Wind

	Along	Across
Single Level	719	1621

Bracing Units required for Earthquake

	Along & Across
Single Level	1068

Single Level Along Resistance Sheet

Job Name: D Cameron

									Wind	EQ
									Demand	
									719	1068
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1844 256%	1713 160%
a	1	0.70		2.42	GS1-N	GIB®	41	41		
	2	1.70		2.42	GS1-N	GIB®	116	101		
	3	0.70		2.42	GS1-N	GIB®	41	41		
	4	1.00		2.42	BL1-H	GIB®	117	102		
	5	0.45		2.42	BL1-H	GIB®	41	45		
External Length = 17.04									356 OK	330 OK
b	1	2.40		2.42	EP1 1.2 ply		286	321		
	2	1.00		2.42	BL1-H	GIB®	117	102		
	3	0.70		2.42	BL1-H	GIB®	72	70		
External Length = 25.05									475 OK	494 OK
c	1	2.00		2.42	GS1-N	GIB®	137	119		
	2	3.60		2.42	GS1-N	GIB®	246	214		
	3	1.80		2.42	GS1-N	GIB®	123	107		
External Length = 23.8									506 OK	440 OK
d	1	2.50		2.42	GS1-N	GIB®	171	149		
	2	2.50		2.42	GS1-N	GIB®	171	149		
	3	0.45		2.42	BL1-H	GIB®	41	45		
	4	1.80		2.42	GS1-N	GIB®	123	107		
External Length = 2.38									506 OK	449 OK

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Single Level Across Resistance Sheet

Job Name: D Cameron

									Wind	EQ
									Demand	
									1621	1068
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	2140 132%	1922 180%
m	1	0.50		2.42	BLP-H	GIB®	63	69		
	2	0.50		2.42	BLP-H	GIB®	63	69		
	3	2.00		2.42	EP1 1.2	ply	238	268		
	External Length = 12.39								364 OK	405 OK
n	1	1.70		2.42	BL1-H	GIB®	216	175		
	2	1.40		2.42	GS1-N	GIB®	96	83		
	External Length = 12.39								312 OK	259 OK
o	1	6.00		2.42	GS1-N	GIB®	411	357		
	External Length = 10.87								411 OK	357 OK
p	1	2.30		2.42	GS1-N	GIB®	157	137		
	2	2.20		2.42	GS1-N	GIB®	151	131		
	External Length = 9.96								308 OK	268 OK
q	1	2.10		2.42	BL1-H	GIB®	267	217		
	External Length = 9.96								267 OK	217 OK
r	1	3.20		2.42	GS1-N	GIB®	219	190		
	External Length = 8.25								219 OK	190 OK
s	1	1.80		2.42	GS1-N	GIB®	123	107		
	2	2.00		2.42	GS1-N	GIB®	137	119		
	External Length = 8.25								260 OK	226 OK

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Custom Wall Elements

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
ply	EP1 .4	.4	80	95
ply	EP1 .6	.6	95	105
ply	EP1 1.2	1.2	120	135
ply	EPG .4	.4	100	115
ply	EPG 1.2	1.2	150	150
conc block	RC0.75	1.5	42	42
conc block	RC1.5	1.5	100	100
conc block	RC3.0	1.5	200	200
conc block	RC4.5	1.5	300	300
nzsip	nzsip	.6	114	116



EzyBrace® Systems

Specification and installation manual



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CBI 5113

AUGUST 2016

NATIONAL SUPPORT

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Free Fax: 0800 229 222

EMAIL: info@gib.co.nz

WEB: gib.co.nz

GIB® HELPLINE

0800 100 442

Based on learnings derived from the 2011 Canterbury earthquakes GIB EzyBrace® Systems have been updated to offer improved design flexibility and further simplification of the bracing design and build process.

NEW GIB EZYBRACE® 2016 DESIGN SOFTWARE

- Improved user interface with simplified bracing design process.
- Increased functionality including exterior line check function, easy insert/deletion of bracing elements and built in software help function.
- Includes the new GIB® Bracing element GS2- NOM
- Allows the GIBFix® Framing System to be used in GIB EzyBrace® designs.

NEW GIB® BRACING ELEMENT GS2-NOM

- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute to bracing resistance.
- Potentially reduces the amount of fasteners¹
- Encourages more even bracing distribution throughout the building.

¹ Actual savings dependent on building and bracing design

UPDATE TO OPENINGS IN BRACING ELEMENTS AND CEILING DIAPHRAGMS

- Large hole specification updated to use a more conservative methodology.
- Guidance included for fireplace flues and range hoods.

NEW — GIBFIX® FRAMING SYSTEM

- Reduced potential for fastener pop and joint cracking as a result of timber frame movement.
- Reduced potential for on-site call backs.
- Improved thermal performance.
- Reinforced plasterboard junctions.



BRANZ Appraised
Appraisal No.928 [2016]

CONTENTS

System Summary	5
GIB EzyBrace® Systems — August 2016	5
GIB® Plasterboard Substitution Table	5
Introduction	6
Scope of Use	6
Finish Quality — Framing and Substrates	6
New GIBFix® Framing Systems	6
New GS2-NOM Bracing Element	6
Compliance with the NZ Building Code	7
CAD Design Detail	7
Appraisal	7
Bracing Resistance and Demand	8
Bracing Resistance	8
Bracing Demand	9
Software Functionality	10
Design and Construction	12
GIB® Plasterboard Linings	12
GIB EzyBrace® Systems in Water-Splash Areas	12
Renovation	12
Openings in Bracing Elements	12
Timber Framing	13
GIBFix® Framing System (Alternative Layout)	13
Guidelines for Intersection Walls	13
Top Plate Connections	14
Parapets and Gable End Walls	14
Bottom Plate Fixing	14
Bracing Strap Installation	15
GIB HandiBrac® Installation	16
GIB HandiBrac® Placement with GIBFix® Framing	
System Layout	17
Ceiling Diaphragms	18
Ceiling Battens in Ceiling Diaphragms	19
Openings in Ceiling Diaphragms	20
Length of GIB EzyBrace® Elements ('N' Type)	21
Length of GIB EzyBrace® Elements ('H' Type)	22
System Specifications	23
GIB EzyBrace® Systems Specification — GS1-N	23
GIB EzyBrace® Systems Specification — GS2-NOM	24
GS2-NOM Adhesive Fixing Option at Door Jamb	25
GIB EzyBrace® Systems Specification — GS2-N	26
GIB EzyBrace® Systems Specification — GSP-H	27
GIB EzyBrace® Systems Specification — BL1-H	28
GIB EzyBrace® Systems Specification — BLG-H	29
GIB EzyBrace® Systems Specification — BLP-H	30
Sustainability and the Environment	31



SYSTEM SUMMARY

GIB EzyBrace® Systems — August 2016

Winstone Wallboards Ltd accepts no liability if GIB EzyBrace® Systems are not designed and installed in strict accordance with instructions contained in this publication.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication at any time. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. Check for the current publication at gib.co.nz/library before using this publication. If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442.

GIB EzyBrace® 2011 software and specification literature remains valid until further notice.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights reserved.

Beware of substitution

The performance of GIB® Systems are very sensitive to design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. It is important to use only GIB® branded components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

For further information call our GIB® Helpline on 0800 100 442.

GIB EzyBrace® Systems have been designed and tested using only the products specified. When additional GIB® plasterboard properties are required the table below provides acceptable alternative options.

	Acceptable alternative GIB® plasterboards								
Specified GIB® plasterboard	GIB® Standard	GIB Ultraliner®	GIB Braceline/ Noiseline®	GIB Aqualiner®	GIB Toughliner®	GIB Fyreliner®			
						10mm	13mm	16mm	19mm
GIB® Standard		OK	OK	OK	OK	Note 1 and 3			
GIB Braceline®	X	X		Note 2	OK	X	Notes 1, 2 and 3		

Note 1 The fastener type and length must be as required for the relevant FRR system using the perimeter fixing pattern illustrated for the relevant bracing specification.

Note 2 The element must be 900mm or longer. Decrease perimeter fastener centres to 100mm. The bracing corner fastening pattern, as illustrated for the relevant specification applies to all four corners of the element. Panel hold-down fixings are required.

Note 3 Specify traditional wall framing layout (see figure 1) where a Fire Resistance Rating (FRR) is required.



Scope of use

This document is a guide to wall bracing of light timber frame (LTF) buildings constructed in accordance with NZS3604:2011 Timber Framed Buildings and presents a simple and efficient method for calculating and incorporating bracing resistance. This information draws on recent experiences from seismic activity in New Zealand and seeks to minimise earthquake damage to plasterboard linings in LTF buildings.

This document outlines the main principles of bracing design and construction using GIB® plasterboard products and systems. Further detailed information can be found in the GIB® Bracing Supplement by visiting gib.co.nz/library. This 'live' on-line document is updated continuously in response to market feedback and Winstone Wallboards' development initiatives.

Finish quality — framing and substrates

Home owners are increasingly demanding a high quality of interior finish. Finish quality is heavily influenced by the substrate to which linings are fixed. Detailed information on 'Levels of Finish' is given in AS/NZS 2589 and the latest version of the GIB® Site Guide.

New GIBFix® Framing System

With increased NZ Building Code requirements and growing customer demand for thermal efficiency and high quality interior finishes, traditional framing practices present problems such as multiple framing members at wall intersections creating thermal 'bridges' and cavities where insulation cannot be installed effectively.

Figure 1 shows a traditional wall framing layout. Figure 2 shows the alternative GIBFix® Framing System layout.

Multiple timber framing members also take longer to dry resulting in an increased risk of fastener pops and blemishes resulting from timber frame movement.

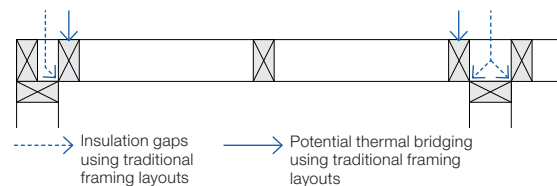
The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

The GIBFix® Framing System can be used in conjunction with GIB EzyBrace® Systems.

Bracing resistance is not affected by the GIBFix® Framing System if the use of this alternative timber framing layout is preferred. Refer to the GIBFix® Framing System literature for more information.

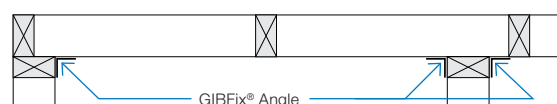
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

FIGURE 1: TRADITIONAL WALL FRAMING LAYOUT



GFS004

FIGURE 2: GIBFix® FRAMING SYSTEM (ALTERNATIVE LAYOUT)



GFS005

NEW GS2-NOM Bracing Element

The new GS2-NOM bracing element allows most homes to be braced with a single lining type and less fixings so that a high quality finish is maintained throughout.

GS2-NOM permits the contribution of 'nominally fixed' internal walls. Higher performance elements are commonly specified on external walls and where limited wall area is available or adjacent to significant openings.

Winstone Wallboards recommends the use of the GIBFix® Framing System in conjunction with GS2-NOM elements. Key benefits of this approach include:

- Reduced potential for fastener pop and joint cracking of plasterboard linings.
- Enhanced thermal performance.
- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute bracing resistance.
- Potentially reduces the amount of fasteners!
- Encourages more even bracing distribution throughout the building.

1. Actual savings dependent on building and bracing design.



Compliance with the NZ Building Code

NZBC CLAUSE B1 — STRUCTURE

The design and material specification for steel and timber framing used in conjunction with this literature must be in accordance with the performance requirements of NZBC Clause B1. GIB EzyBrace® Systems comply with the requirements of NZS 3604:2011, when designed and installed in accordance with this publication and relevant technical literature. NZS 3604:2011 is an acceptable solution to NZBC Clause B1.

NZBC CLAUSE B2 — DURABILITY

Under normal conditions of dry internal use GIB EzyBrace® Systems have a service life in excess of 50 years and satisfy the requirements of NZBC Clause B2. When in conditions of dry internal use, the components specified in this literature satisfy the requirements of NZBC Clause B2.

GIB® EzyBrace® Systems must not be specified in areas where 15 year durability applies and where linings are subject to direct water pressure, e.g. shower cubicle or shower over bath situations.

NZBC CLAUSE F2 — HAZARDOUS BUILDING MATERIALS

Under normal conditions of use, during handling, installation or serviceable life, the products detailed in GIB EzyBrace® Systems do not constitute a health hazard and meet the provisions of the NZBC Clause F2.

NZBC CLAUSE H1 — ENERGY EFFICIENCY

Buildings must be constructed to achieve an adequate degree of energy efficiency and the building envelope must provide adequate thermal resistance. The required thermal resistance (R-value) of timber framed external walls depends on climate zone but is commonly in the range from R 1.9 to R 2.0.

CAD design details

Where applicable drawings related to GIB EzyBrace® Systems have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box. CAD design details can be found at gib.co.nz/library.

Appraisal

GIB EzyBrace® Systems 2016 have been appraised by the Building Research Association of New Zealand (BRANZ), Appraisal No. 928 (2016) GIB EzyBrace® Systems, 2016.

It is of prime importance to comply with the details of design, construction and workmanship in this document.

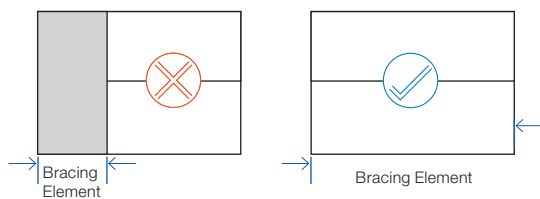


Bracing resistance

WALL BRACING LAYOUT

When designing the bracing layout, carefully consider the final finished appearance and utilise full wall lengths where possible, avoiding unnecessary fastenings in the centre of a clear wall. Using the available wall length provides additional bracing and achieves improved aesthetics.

FIGURE 3: WALL BRACING LAYOUT



BRACING DISTRIBUTION

Distribute bracing by drawing a grid pattern of bracing lines along and across the building. Bracing lines must coincide as much as possible with the wall bracing elements. Pairs of elements may be counted on a single line provided they are no more than 2 metres apart and parallel. See figure 4.

Locate bracing evenly throughout the building and as close as practical to corners of external walls.

Space bracing lines no more than:

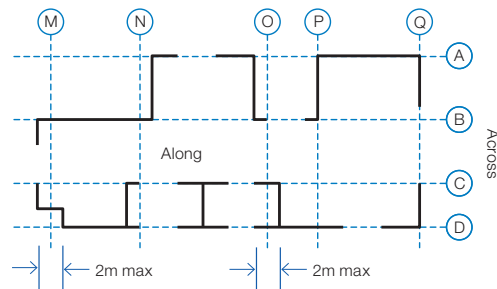
- 6 metres for standard construction with any GIB® plasterboard ceiling, or
- 7.5 metres where dragon ties in accordance with NZS3604:2011 have been installed, or
- 12 metres with a GIB® plasterboard ceiling diaphragm.

The construction of ceiling diaphragms is described in detail on p.18–20.

NZS3604:2011 requires that no bracing line shall have a capacity less than the greater of:

- 100 Bracing Units (BUs), or
- 15 x the external wall length (BUs) for bracing lines coinciding with external walls, or
- 50% of the total demand (D) divided by the number of lines (n) in the direction being considered (BUs).

FIGURE 4: BRACING GRID LAYOUT



The NZS3604 'rules' are merely minimum guidelines and compliance with them does not in itself ensure even distribution. The designer is responsible for checking distribution. Poor distribution can cause torsional effects and localised or more significant damage in an earthquake event.

GIB EZYBRACE® SYSTEMS

The GIB EzyBrace® Specification Numbering System (and sub-components thereof) is protected by copyright and makes specification and identification of GIB EzyBrace® Systems transparent.

- 'GS' stands for GIB® Standard.
- 'BL' for GIB Braceline®.
- 'P' for plywood.
- '1' and '2' for linings one or both sides.
- 'N' stands for 'no specific panel hold-down fixings'.
- 'H' stands for 'specific panel hold-down fixing' required.
- 'NOM' stands for 'nominal plasterboard fixing'. This refers to the standard fixing method used to install plasterboard as shown in the current GIB® Site Guide.

Where specific hold-down fixings are specified, refer to p.15-16. GIB HandiBrac® is fully contained within the framing cavity and does not interfere with lining installation and quality of finish.

Where no specific hold-down fixings are required, the minimum NZS3604:2011 bottom plate fixings apply.

Full bracing element construction details are provided in this technical literature.

Further general design and construction information can also be found in our GIB® Bracing Supplement by visiting gib.co.nz/library.

Specifying GIB EzyBrace® elements (minimum wall length 400mm)

Inside lining external walls.	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required. If the other side of the frame is lined with plywood consider GSP-H or BLP-H elements or use alternative proprietary bracing systems.
Internal walls (only one side available for bracing).	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required.
Internal walls (both sides available for bracing).	Nominate available length of wall as GS2-NOM elements. Change to GS1-N if higher ratings are required. Change to GS2-N if higher ratings are required. Change to BLG-H for even higher ratings. Consider GSP-H or BLP-H if the opposite side is lined with plywood.



Bracing demand

GIB EZYBRACE® CALCULATOR

The GIB EzyBrace® calculator is a software tool to determine the wind and earthquake bracing demand and to design the bracing resistance for light timber-framed buildings constructed in accordance with NZS 3604:2011.

The updated GIB EzyBrace® calculator combines an up-to-date user-friendly interface with the latest knowledge relating to the performance of GIB® plasterboard in light timber-framed structures when subjected to high winds or earthquakes. The calculator can be down-loaded free of charge by visiting gib.co.nz/ezybrace and can be installed on either Microsoft® or Apple® Mac environments.

DEMAND

Wind and Earthquake 'Demand' calculates the forces a structure must be able to resist during its 'design life'. The GIB EzyBrace® calculator's Demand sheet determines the number of Bracing Units required depending on building location, building dimensions and materials used. The Demand sheet closely follows the familiar format of our Excel based GIB EzyBrace® calculator, and includes additional features such as a pop-up help facility explaining required input.

Bracing resistance sheets ('tabs') are added depending on the building specification entered. For example, subfloor bracing resistance tabs only show when a 'subfloor' foundation type has been selected.

The Demand sheet gives the designer the option to select a longer earthquake return period which represents a higher earthquake design force. The default for buildings constructed in accordance with NZS3604:2011 is an earthquake that has a 10% chance of being exceeded within the assumed 50 year 'design life' of a light timber framed residential structure, a 'return period' of 500 years.

Many commercial and public buildings are designed for the more stringent requirement of a 10% probability of exceedance in a 100 or 250 year life expectancy.

A screen shot of the GIB EzyBrace® 2016 Demand Sheet and Help Facility is shown in figure 5.

FIGURE 5: GIB EZYBRACE® 2016 — DEMAND CALCULATION SHEET AND 'POP UP' HELP FACILITY

GIB EzyBrace® Bracing Software

Job Details

Name: A Job
 Street and Number: 100 Job Street
 Lot and DP Number: Lot 321, DP 456
 City/Town/District: Johnson
 Designer: AR Client
 Company: John Limited
 Date: 1/08/15

Building Specification

Number of Storeys: Single
 Floor Loading: 2 MPa
 Foundation Type: Slab

Single

Cladding Weight: Light
 Roof Weight: Light
 Room in Roof Space: No
 Roof Pitch: 25
 Roof Height above Eaves (m): 1.5
 Building Height to Apex (m): 4.5
 Ground to Lower Floor (m): 0.2
 Stud Height (m): 2.4
 Building Length (m): 10
 Building Width (m): 10
 Building Area (m²): 100

Building Location

Wind Zone = Low
 Wind Zone or Consent Authority: Not Available
 Wind Region: A
 Lee Zone: No
 Ground Roughness: Urban
 Site Exposure: Sheltered
 Topography Class: 11

Earthquake Zone: 1
 Soil Type: D & E (Deep to Very Soft)
 Annual Prob. of Exceedance: 1 in 500 (NZS3604:2011 Default)

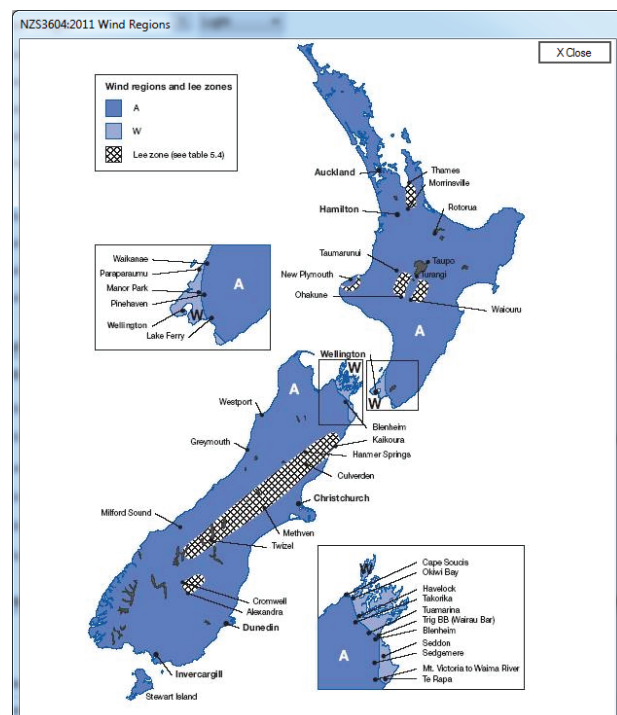
Bracing Units required for Wind

	Along	Across
Single Level	258	222

Bracing Units required for Earthquake

	Along and Across
Single	264

Demand | Single Along | Single Across | Custom



Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace



Software functionality

Innovations adopted in the GIB EzyBrace® 2016 bracing 'resistance' calculation sheets include the ability to easily add and delete lines and elements during calculations.

The software compares bracing resistance achieved with demand and for wall bracing lines incorporating external walls, the external wall length can now be entered to check minimum

bracing units required on that line. The NZS 3604:2011 rules and associated software output are not the only check. Designers must additionally check the building layout to ensure adequate bracing distribution.

Figures 6 and 7 show screen shots of the Wall and Subfloor Resistance Sheets respectively.

FIGURE 6: GIB EZYBRACE® 2016 — WALL BRACING RESISTANCE CALCULATION SHEET

Line	Ext. Len. (m)	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BU)	Earthquake (BU)
a	11.25	1	0.5		2.44	GSP-H	GIB®	53	58
		2	1.1		2.44	GS1-N	GIB®	72	65
		3	0.6		2.44	GSP-H	GIB®	67	73
b	6.41	1	1.2		2.44	GS1-N	GIB®	81	71
		2	0.6		2.44	GS1-N	GIB®	34	35
		3	4		2.44	GS2-NOM	GIB®	197	197
c		1	3.2		2.44	GS2-NOM	GIB®	157	157
d		1	7.9		2.44	GS2-NOM	GIB®	389	389
e	17.9	1	0.6		2.44	BL1-H	GIB®	58	60
		2	0.6		2.44	BL1-H	GIB®	58	60
		3	0.8		2.44	GS1-N	GIB®	48	46
		4	2.1		2.44	GS1-N	GIB®	143	124
		5	1.2		2.44	EP1-1.2	CHH	142	159

Wind Demand	Earthquake Demand	Wind Resistance	Earthquake Resistance
682	880	1499	1492
220%	170%		

193 OK 196 OK

312 OK 302 OK

157 OK 157 OK

389 OK 389 OK

449 OK 449 OK

FIGURE 7: GIB EZYBRACE® 2016 — SUBFLOOR BRACING RESISTANCE CALCULATION SHEET

Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

Line	Ext. Len. (m)	Element	Length (m)	Angle (degrees)	Type	Supplier	Wind (BU)	Earthquake (BU)
A		1	1		Braced Piles	NZS3604	160	120
		2	1		Anchor Pile	NZS3604	160	120
		3	1		Braced Piles	NZS3604	160	120
B		1	1		Braced Piles	NZS3604	160	120
		2	1		Cantilever Pile	NZS3604	70	30
		3	1		Cantilever Pile	NZS3604	70	30
C		1	1		Anchor Pile	NZS3604	160	120
		2	1		Anchor Pile	NZS3604	160	120

Wind Demand	Earthquake Demand	Wind Resistance	Earthquake Resistance
426	687	1100	780
258%	114%		

480 OK 360 OK

300 OK 180 OK

320 OK 240 OK



Software functionality

Custom elements can be entered by accessing the 'custom' tab as shown in figure 8.

FIGURE 8: GIB EZYBRACE® 2016 — CUSTOM ELEMENTS SHEET

Supplier	System	Min. Length m	Wind BU/s/m	EQ BU/s/m	Element Height Dependant	Element Foundation Dependant
Custom1	CU1.0.4	0.4	80	95	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom1	CU1.0.6	0.6	95	105	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom1	CU1.1.2	1.2	120	135	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom2	CU2.0.4	0.4	90	90	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom2	CU2.0.6	0.6	127	136	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Custom2	CU2.1.2	1.2	164	135	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Engineer	Portal	1	300	300	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Note: Values and systems shown in Custom Elements Sheets are for illustrative purposes only.

Help can be accessed by pressing the ? symbol which displays a window with further information.

The GIB EzyBrace® 2016 software has a number of options that can be accessed via the File tab at the top left hand corner of the window. The options include: New, Save, Save As, Open, Recent and Print.

- The New option closes any opened job ready for the input of a new job.
- The Save option saves the currently opened job to the same filename and the Save As option saves the job to a new filename.

- The Open option prompts for the name of an existing job.
- The Recent option displays a list of the ten latest jobs and allows for the selection of one of these jobs to be opened.
- The Print option displays the print screen. In this screen, a print preview is displayed. The print preview can be copied to the clipboard by clicking the right-hand mouse button. Also on the print screen is the option to choose which pages are to be printed and the option to print the output to a portable data format, PDF, file.
- The Print Screen View is shown in figure 9.

FIGURE 9: GIB EZYBRACE® 2016 — PRINT SCREEN VIEW

Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

GIB EzyBrace® PLUS

File Home

New, Save, Save As, Open, Recent, Print, Exit

GIB EzyBrace® Bracing Software

Demand Calculation Sheet

Job Details

Name: Example
 House and Number: 100 Job Street
 Lot and DP Number: Lot 123 DP 101
 City/Town/District: Sydney District
 Designer: A.R. Architect
 Company: JKL Limited
 Date: 11/01/15

Building Specification

Number of Storeys: 1
 Floor Loading: 2 kPa
 Foundation Type: Raft

Building Location

Wind Zone: High
 Earthquake Zone 1
 Soil Type: C (Shallow)
 Annual Prob. of Exceedance: 1 in 500 (NZS3104:2011 Default)

Bracing Units required for Wind

	Along	Across
Single Level	682	960

Bracing Units required for Earthquake

	Along & Across
Single Level	177

Preview Page: 1 of 4
 Magnification: 100%

Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

Openings in bracing elements

SMALL OPENINGS

- Small openings (e.g. power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element. A block may need to be provided alongside the perimeter stud as shown below.

Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

No Penetrations

Stud

Block

90 x 90mm max.

90mm min.

Edge of bracing element

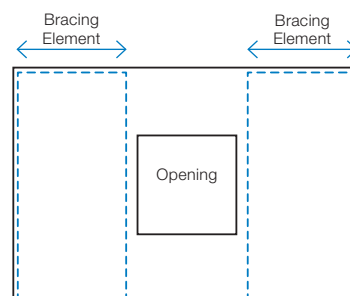
90mm

90 x 90mm max.

Small opening e.g. switch box

GEB001

FIGURE 11: LARGE OPENINGS AND BRACING ELEMENTS



For further design details refer to the current GIB Aqualine® Wet Area Systems literature.



Timber framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604:2011. To achieve the published bracing performance the minimum actual framing dimensions are 90 x 45mm for external walls and 70 x 45mm for internal walls.

As a minimum the use of Kiln Dried Stress Graded timber for all wall, roof and mid-floor framing members is recommended.

GIBFix® Framing System (alternative layout)

Practices recommended as part of the GIBFix® Framing System aim to increase timber framing efficiencies, reduce reliance on unnecessary framing at wall junctions and minimise surface imperfections that commonly arise from constructing plasterboard junctions over multiple timber members. GIBFix® Angles fixed to a single timber framing member are introduced to tie together plasterboard junctions, improving seismic resilience and decrease the risk of future defects due to timber movement. The GIBFix® Framing System can be used in conjunction with the GIB EzyBrace® System.

Note: GIBFix® Angles and 32mm x 7g GIB® Grabber® Dual Thread Screws may also be used in traditional wall framing layouts and in GIB EzyBrace® Systems.

When the GIBFix® Framing System is used a minimum of 2 equally spaced nogs for walls between 2.4m and 3m in height are required at corners and wall junctions.

When used in GIB EzyBrace® systems GIBFix® Angles must run from top to bottom on all applicable studs. If 2 GIBFix® Angles are required on a stud they must be overlapped by a minimum of 300mm with 2/32mm 7g GIB® Grabber® Dual Thread Screws penetrating through both GIBFix® Angles.

For full specification details refer to GIBFix® Framing System literature available at gib.co.nz/gibfix.

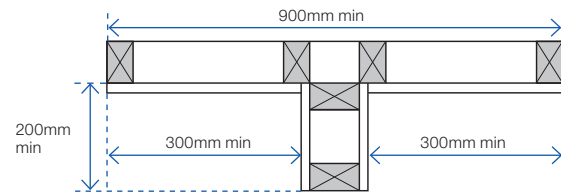
Guidelines for intersection walls

GIB® Bracing Elements may have intersecting walls with a minimum length of 200mm. Fasteners are required around the perimeter of the bracing element. Vertical joints at T-junctions shall be fixed and jointed as specified for intermediate sheet joints. The bracing element length must be no less than 900mm.

Where a Wall Bracing Element is interrupted by a T-junction the element is deemed to be continuous for the whole length (900mm minimum in the example illustrated).

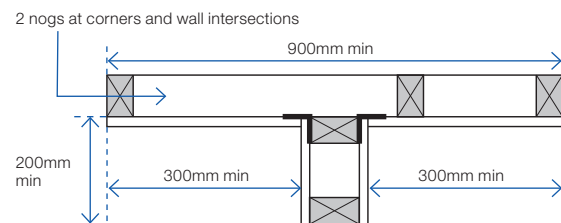
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



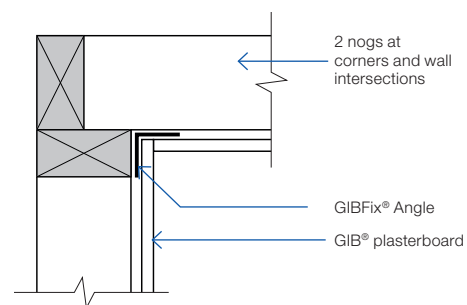
GEB002

FIGURE 13: WALL INTERSECTION (GIBFix® FRAMING SYSTEM)



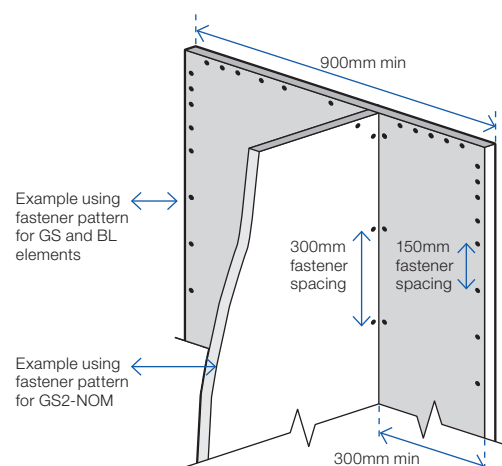
GEB003

FIGURE 14: CORNER INTERSECTION (GIBFix® FRAMING SYSTEM)



GFS001

FIGURE 15: WALL INTERSECTION FASTENER PLACEMENT



Junction

Min 32mm x 6g GIB® Grabber® High Thread or 32mm x 7g GIB® Grabber® Dual Thread Screws @ 300mm ctrs each side.



Top plate connections

For top plate connections refer to NZS3604:2011 section 8.7.3.

Parapets and gable end walls

Bracing elements must be fixed from top plate to bottom plate. Fixing to a row of nogs is not acceptable unless either:

A continuous member such as an ex 90 x 45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line, as shown in figure 16.

or

GIBFix® Angle as shown in figure 17. The angle is fixed to a row of nogs with 30 x 2.5mm galv flat head nails or 32mm x 7g GIB® Grabber® Dual Thread Screws at 300mm centres.

Bottom plate fixing

TIMBER FLOOR

For elements with an 'N' specification use 2/100 x 3.75mm hand or 3/90 x 3.15mm power-driven nails at 600mm centres.

In addition, for elements with an 'H' specification, use GIB HandiBrac® panel hold-down fixings at each end of the bracing element, see p.16.

CONCRETE FLOOR – EXTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix external wall plates in accordance with NZS 3604:2011.

Use GIB HandiBrac® panel hold-down fixings at each end of bracing elements with an 'H' specification and minimum intermediate fixings as required by NZS 3604:2011.

CONCRETE FLOOR – INTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix plates in accordance with NZS 3604:2011 or use 75 x 3.8mm shot-fired fasteners with 16mm discs spaced at 150 and 300mm from end-studs and 600mm centres thereafter.

For bracing elements with an 'H' specification use GIB HandiBrac® panel hold-down fixings at each end of the element and minimum intermediate fixings as required by NZS 3604:2011.

FIGURE 16: PARAPETS AND GABLE ENDS WITH RIBBON PLATE

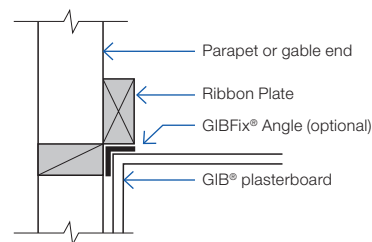
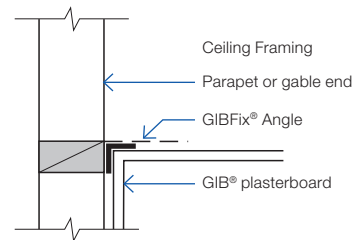


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



GFS003

BOTTOM PLATE FIXINGS FOR GIB® BRACING ELEMENTS

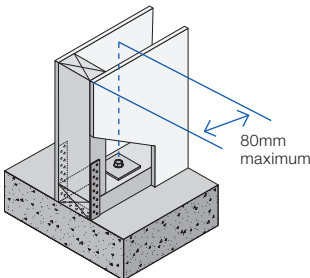
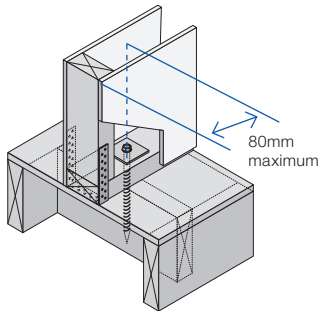
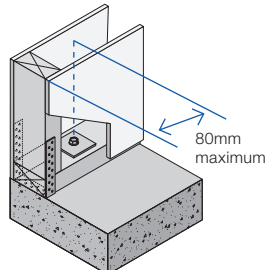
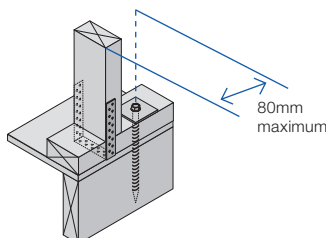
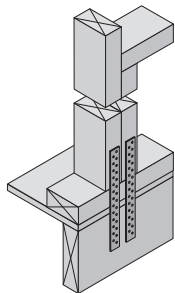
Brace type	Concrete slabs		Timber floors
	External wall	Internal wall	External and Internal walls
GS1-N	As per NZS 3604:2011. No specific additional fastening required.	As per NZS 3604:2011. Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs, 150mm and 300mm from each end of the bracing element and at 600mm thereafter.	Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011.
GS2-N	Not applicable.		
GS2-NOM			
GSP-H BL1-H BLP-H	Intermediate fastenings to comply with NZS 3604:2011 In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.		Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011. In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.
BLG-H	Not applicable	As for GSP-H, BL1-H, BLP-H on concrete slab as illustrated on p.15 and 16.	



Bracing strap installation

Care needs to be taken with the installation of the bracing strap. It should be checked in to be flush with the face of the stud providing a flat substrate for the plasterboard and

positioned in such a way that the corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown will allow the corner fastenings to be installed without having to penetrate the bracing strap.

Concrete floor		Timber floor	
<p>400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5mm flat head galvanised nails to each side of the stud. Three 30 x 2.5mm flat head galvanised nails to each side of the plate. Hold down bolt with 50 x 50 x 3mm washer to be fitted within 80mm of the end of the element.</p>			
Internal wall			
			
GEB004		GEB005	
External wall			
			
GEB006		GEB007	
<p>Note: Where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at gib.co.nz/library.</p>		<p>2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.</p>	
			
		GEB008	
Hold-down fastener requirements			
Concrete floor		Timber floor	
<p>A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element.</p>		<p>12 x 150mm galvanised coach screw fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element</p>	

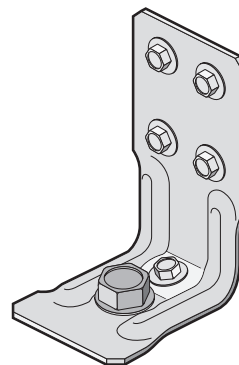


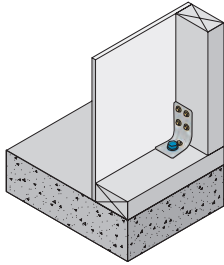
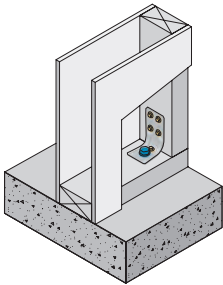
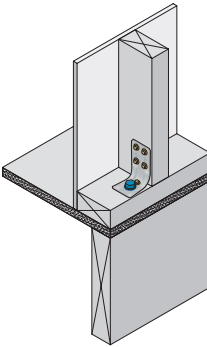
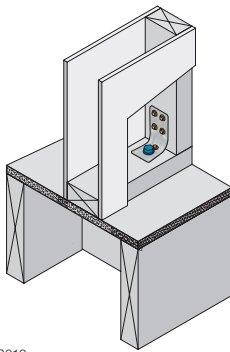
GIB HandiBrac® installation

Developed in conjunction with MiTek™, the GIB HandiBrac® has been designed and tested by Winstone Wallboards for use in GIB EzyBrace® elements that require hold-downs. The GIB HandiBrac® is a substitute for bottom plate hold-down straps.

- Quick and easy to fit.
- May be fitted at any stage before lining.
- Framing face is clear to allow flush lining.
- Easily inspected.

The GIB HandiBrac® with BOWMAC® blue head screw bolt is suitable for timber and concrete floors constructed in accordance with NZS 3604:2011.



Concrete floor		Timber floor	
External walls	Internal walls	External walls	Internal walls
 <p>GEB009</p> <p>Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.</p>	 <p>GEB010</p> <p>Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.</p>	 <p>GEB011</p> <p>Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.</p>	 <p>GEB012</p> <p>Position GIB HandiBrac® in the centre of floor joist or full depth solid block.</p>
Hold-down fastener requirements			
<p>A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.</p>		<p>12 x 150mm galvanised coach screw or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.</p>	



GIB HandiBrac® placement with GIBFix® Framing System for concrete floors

Figure 18 shows the preferred positioning of the GIB HandiBrac® panel hold-down brackets within the GIBFix® Framing System layout and where they are required by bracing systems with an 'H' in the specification code.

Note that, in corners and at wall junctions, a single GIB HandiBrac® can serve 'H' type bracing elements in both directions, but additional intermediate concrete anchors may need to be installed to meet the minimum requirements of NZS 3604:2011 for bottom plate fixing.

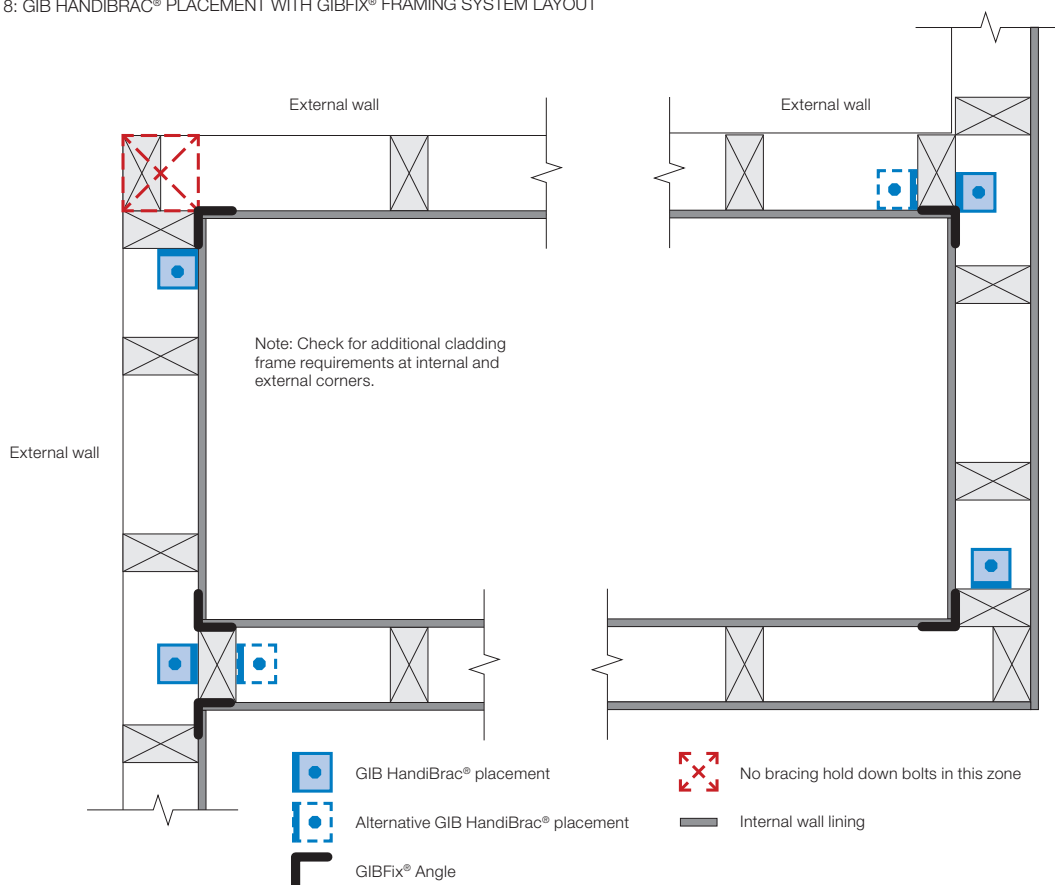
The GIB HandiBrac® is fixed to the stud which has the GIBFix® Angle.

For bracing elements with sheet material both sides of the wall connect corner studs using 8/90mm gun nails as shown in figure 19.

TIMBER FLOORS

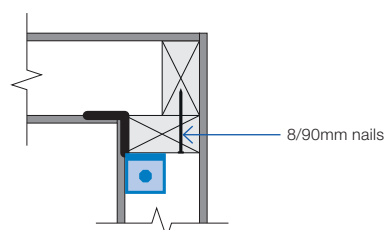
For timber floors bolt fixing in to solid joist or block is required, as shown on p 15.

FIGURE 18: GIB HANDIBRAC® PLACEMENT WITH GIBFIX® FRAMING SYSTEM LAYOUT



GEB013

FIGURE 19: STUD CONNECTION FOR 'H' TYPE BRACING ELEMENTS WITH SHEET MATERIAL BOTH SIDES



GEB014



Ceiling diaphragms

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements which effectively transfer loads to bracing walls. They themselves do not have a bracing unit rating but are used when bracing lines exceed 6m separation. The basic shape of a ceiling diaphragm is square or rectangular. Protrusions are permitted but cut-outs are not. The length of a ceiling diaphragm shall not exceed twice its width. Dimensions are measured between supporting bracing lines. Supporting bracing lines shall have a bracing capacity no less than the greater of 100 bracing units or 15 bracing units per metre of diaphragm dimension, measured at right angles to the line being considered, see figure 21.

Limitations for GIB® plasterboard ceiling diaphragms

Ceiling diaphragms may be constructed using any GIB® plasterboard provided perimeter fixing is at;

150mm centres for: Diaphragms up to 7.5m in length, no steeper than 15°.

100mm centres for: Diaphragms up to 7.5m in length, no steeper than 45°. Diaphragms up to 12m in length, no steeper than 25°.

Diaphragms outside these parameters must be specifically designed.

General fixing requirements for GIB® Ceiling Diaphragms:

- Linings must be installed over the entire area of the diaphragm.
- Fastening must be no less than 12mm from sheet edges and not less than 18mm from sheet ends.
- Sheets must be supported by framing members (e.g., ceiling battens) spaced at no more than 500mm centres for 10mm GIB® plasterboard and at no more than 600mm centres for 13mm GIB® plasterboard.
- Sheets within the diaphragm area may be fastened and finished conventionally in accordance with the publication entitled, "GIB® Site Guide". All joints shall be GIB® Joint Tape reinforced and stopped. It is recommended that sheet butt joints are formed off framing and back-blocked (see "GIB® Site Guide").
- Use full width sheets where possible. At least 900mm wide sheets with a length not less than 1800mm shall be used. Sheets less than 900mm wide but no less than 600mm may be used provided all joints with adjacent sheets are back-blocked (see "GIB® Site Guide" and figure 22).
- Fasteners are placed at the specified centres around the ceiling diaphragm with the corners fastened using the GIB EzyBrace® fastener pattern.

FIGURE 20: PROTRUSIONS AND CUTOUTS

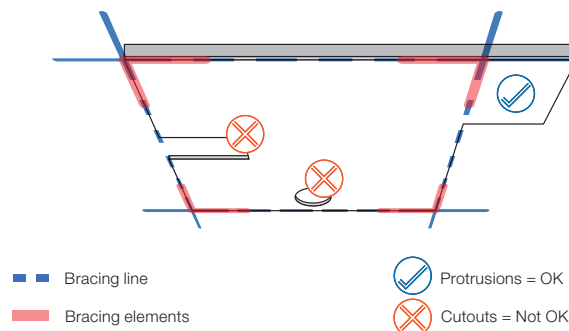


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

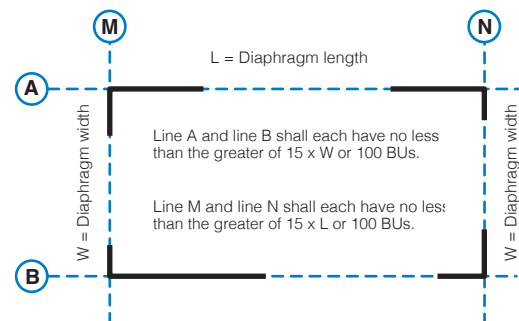
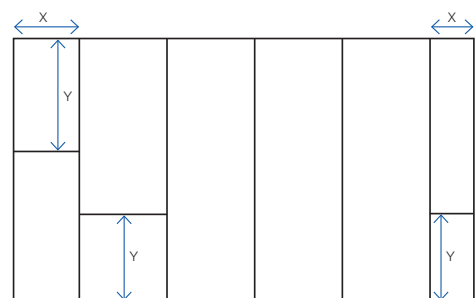
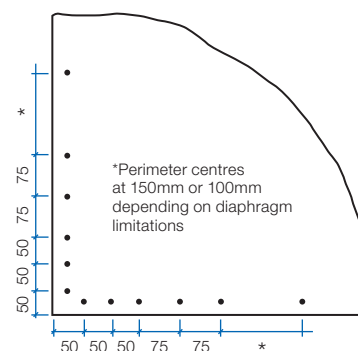


FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS



X = 900mm min or 600–900mm Y = 1800mm min sheet lengths min provided all adjacent joints at ends of ceiling diaphragms are back-blocked.

FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



Unless stated all fastener spacings are maximums.

GEB015



Ceiling battens in ceiling diaphragms

Ceiling diaphragms may be constructed using steel or timber ceiling battens.

Battens shall be spaced at a maximum of:

- 500mm for 10mm GIB® plasterboard.
- 600mm for 13mm GIB® plasterboard.

Timber battens shall be fixed in accordance with the requirements of NZS 3604:2011.

Metal battens shall be GIB® Rondo® battens with two external flanges of 8mm to allow direct screw fixing to roof framing.

GIB® Rondo® metal battens shall be fixed with 2/32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws to supporting framing.

GIB® Rondo® metal battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten, see figure 26.

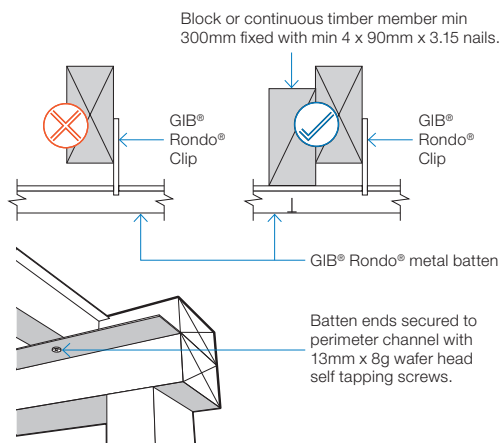
For GIB® Rondo® metal battens, a GIB® Rondo® metal channel or metal angle is required at the perimeter of the diaphragm. The perimeter channel shall be fastened to the top plate with 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screw at 300mm centres maximum.

Linings are fastened to metal using 25mm x 6g GIB® Grabber® Self Tapping screws and to timber framing using 32mm x 6g GIB® Grabber® High Thread screws. Alternatively 32mm x 7g GIB® Grabber® Dual Thread screws can be used in both cases. Fastener centres are specified on p.18.

Coved ceiling diaphragms can be achieved by using nominally 32 x 32 x 0.55mm proprietary galvanised metal angles ("back-flashing") at the changes in direction. These angles shall be:

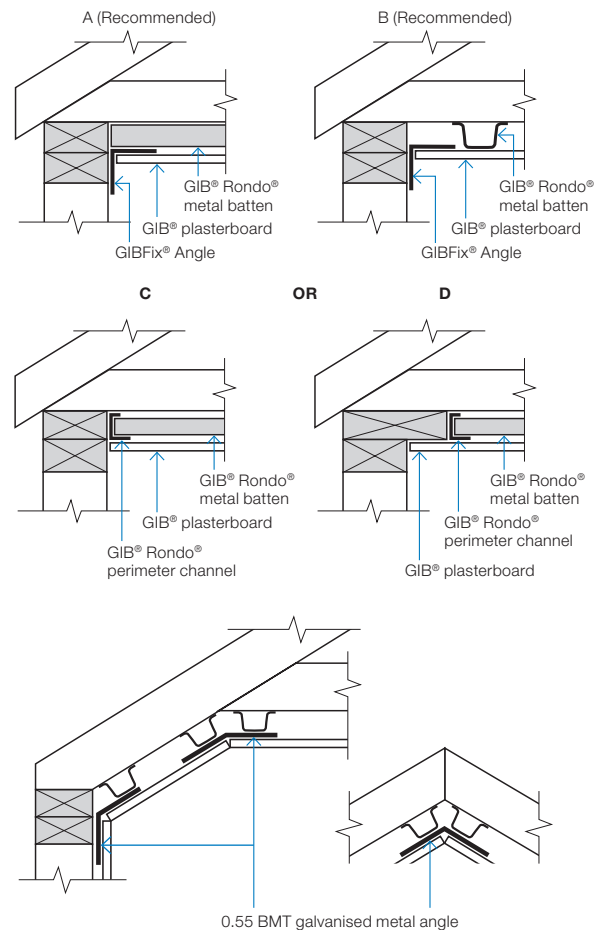
- Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
- Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



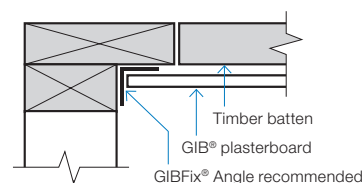
GEB016

FIGURE 27: GIB® RONDO® METAL CEILING BATTENS WITH CORNER ANGLES



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018



Openings in ceiling diaphragms

SMALL OPENINGS

Small opening (e.g. down lights) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the ceiling diaphragm.

LARGE OPENINGS

Openings are allowed within the middle third of the diaphragms length and width. Fixing of sheet material to opening trimmers shall be at 150mm centres. Neither opening dimension shall exceed a third of the diaphragm width. Larger openings or openings in other locations require specific engineering design.

Where fireplace flue or range hood openings are required in a ceiling diaphragm use a galvanised metal backing plate as shown in figure 25, with a maximum hole diameter of 350mm.

Figure 25 can also be used for range hood openings in walls.

For information on openings in ceiling diaphragms contact the GIB® Helpline on 0800 100 442.

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

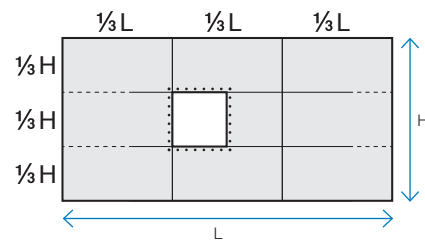
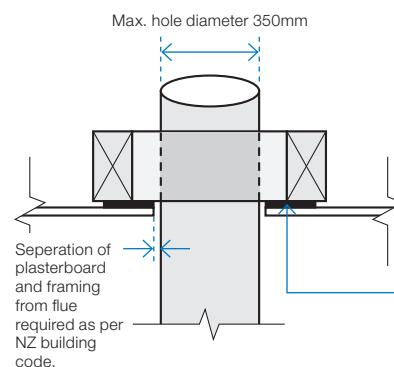


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

Section view

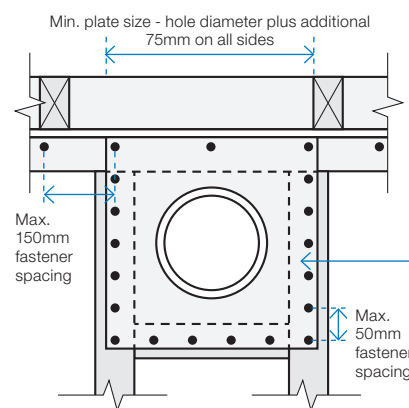


Steel plate
0.55 BMT
Galvanised sheet
Max. opening
350mm diameter.
Installed prior to
GIB® plasterboard.

Framing
90 x 45mm framing
trimmed to provide
extra fixing.

GIB® plasterboard ceiling
Installed over the
steel plate and into
framing using a
minimum of 32mm
x 6g GIB® Grabber
High Thread or
32mm x 7g GIB®
Grabber Dual Thread
screws at 50mm
max centre spacing.

Plan view



Plasterboard ceiling not shown in plan view



Length of GIB EzyBrace® elements ('N' Type)

The length of GIB EzyBrace® elements with an 'N' extension (requiring standard NZS3604:2011 plate connections) can be taken as the full frame length measured from the outside of the end-stud to the opening face as illustrated in figures 29-32.

'N' type GIB EzyBrace® elements are identified by GIB® specification numbers GS1-N, GS2-N and GS2-NOM

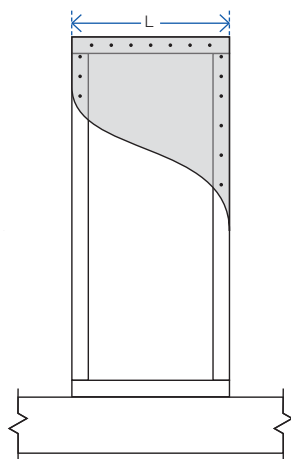
The dimension 'L' shall not be less than 400mm.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening.

Fastener spacings and diagram scales shown in Figures 29-32 are indicative only. Refer to p.23-30 for construction details.

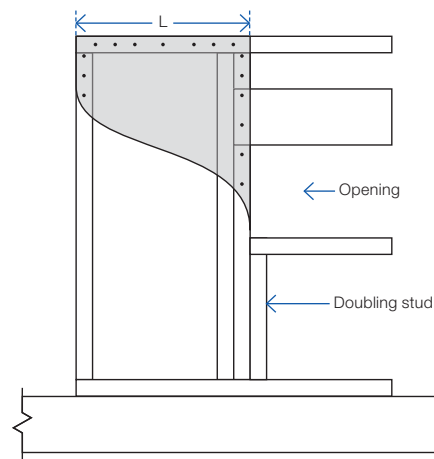
WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

FIGURE 29: GS BRACING ELEMENTS (OPTION A)



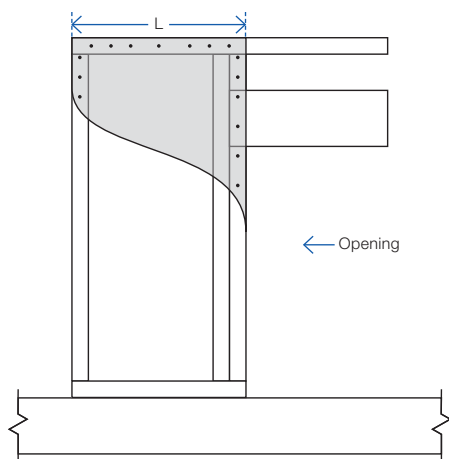
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



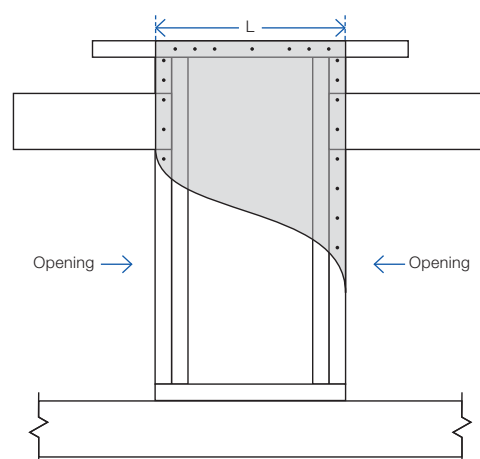
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 31: GS BRACING ELEMENTS (OPTION C)



GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 32: GS BRACING ELEMENTS (OPTION D)



GS1-N, GS2-N elements
'L' indicates the length of the bracing element



Length of GIB EzyBrace® elements ('H' Type)

GIB EzyBrace® elements with an 'H' extension (requiring special panel hold-down fixings) can be used when the dimension 'L' as illustrated in figures 33–36 is 400mm or more.

'H' type GIB EzyBrace® elements are identified by GIB® specification numbers GSP-H, BL1-H, BLG-H and BLP-H.

The length of an 'H' type element is not only determined by the sheet material, but also by the placement of the hold-down fixings.

Hold-down fixings cannot be placed closer together than what is shown for the standard panel in figure 33.

Hold-down fixings can be placed under windows provided sill trimming studs beneath the opening are connected to the bracing element using 8/90mm gun nails, as illustrated in figure 34.

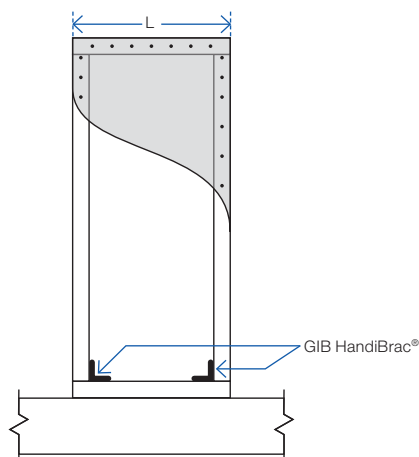
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening as indicated in figures 34–36.

When using bracing straps, installed in accordance with p.17, fix the strap to the same framing member as shown for the GIB Handibrac® below, and install the adjacent anchor bolt in the same position as the GIB Handibrac® bolt.

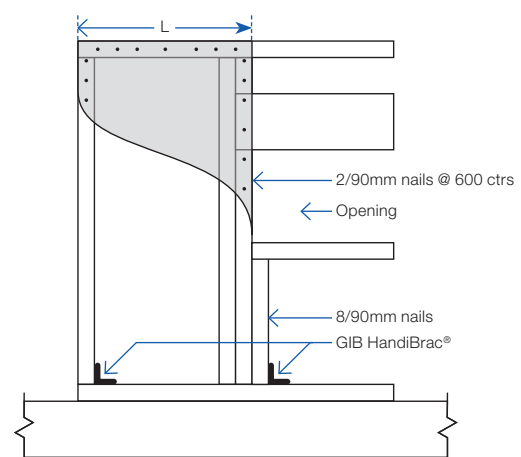
Fastener spacings and diagram scales shown in figures 33–36 are indicative only. Refer to p.23–30 for construction details.

FIGURE 33: BL BRACING ELEMENTS (OPTION A)



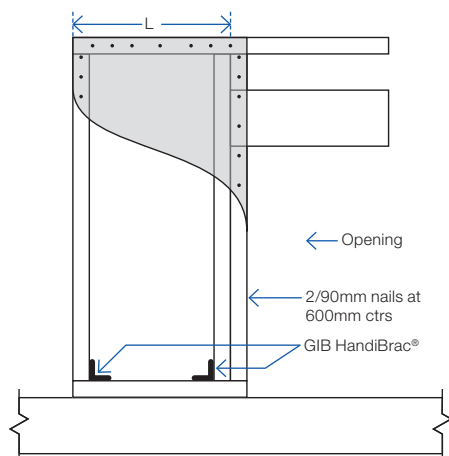
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 34: BL BRACING ELEMENTS (OPTION B)



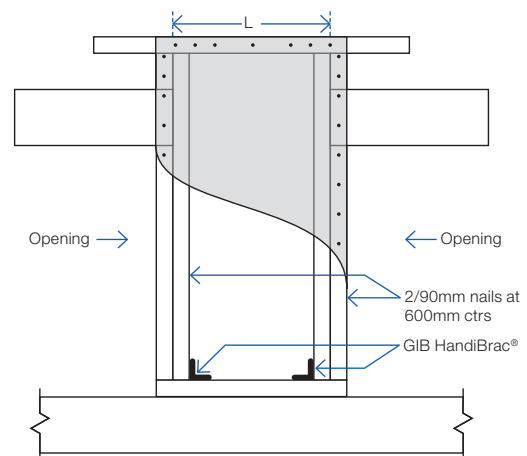
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 35: BL BRACING ELEMENTS (OPTION C)



'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 36: BL BRACING ELEMENTS (OPTION D)



'H' type elements with specific hold downs
'L' indicates the length of the bracing element



SYSTEM SPECIFICATIONS

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

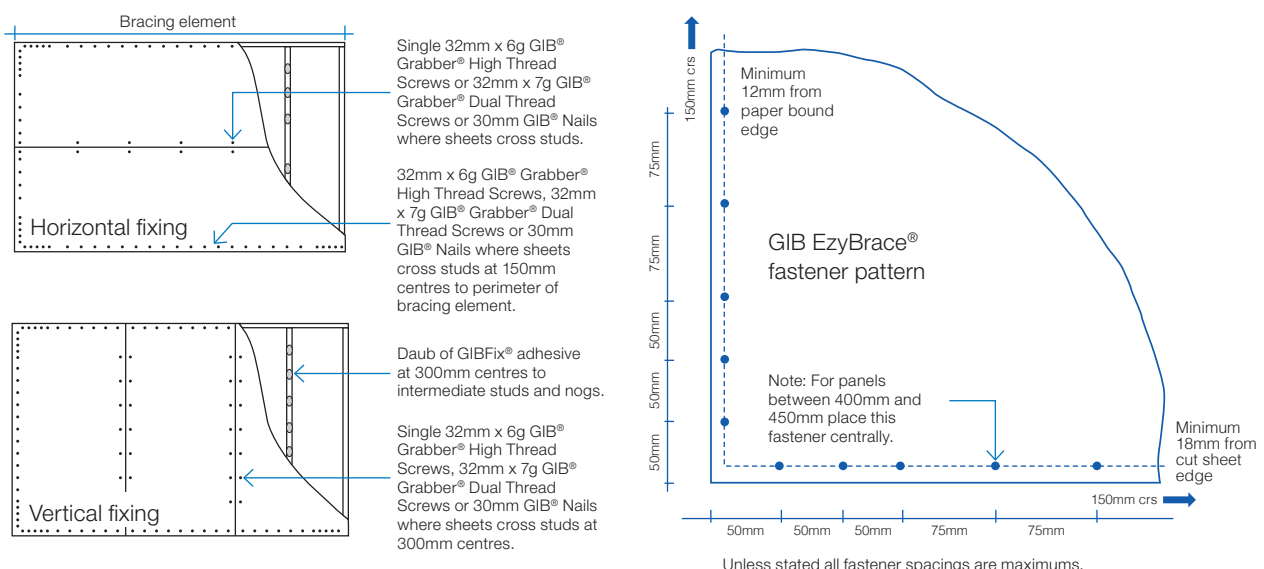
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

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 GS2-NOM

Specification code	Minimum length (m)	Lining requirement
GS2-NOM	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

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 100mm x 3.75mm nails at 600mm centres; or three power driven 90mm 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 75mm x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- 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

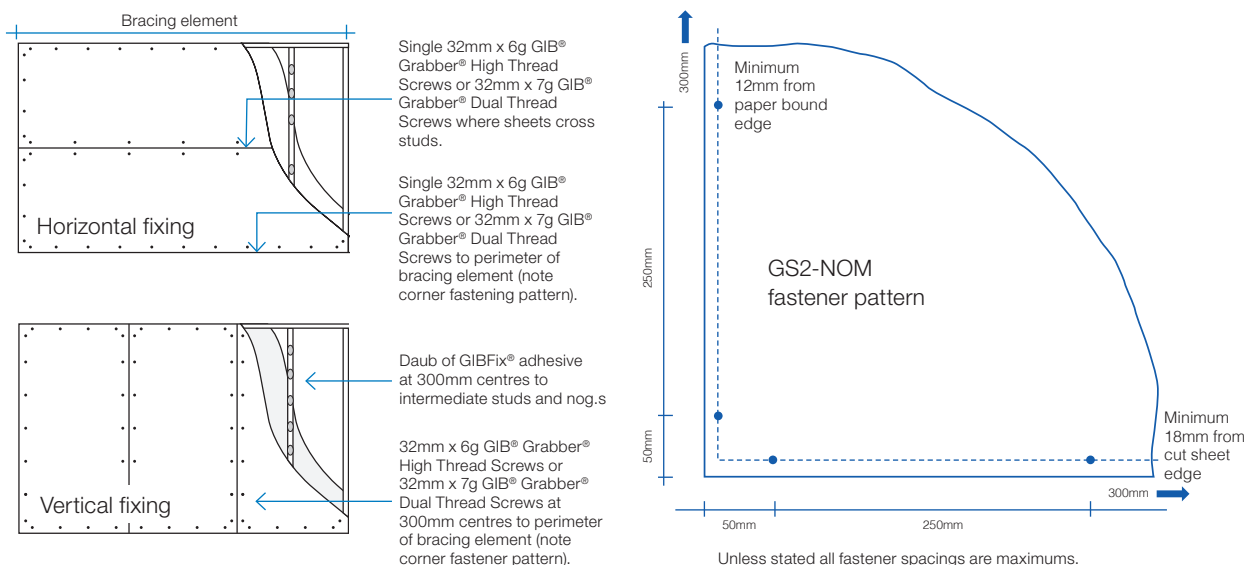
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Angle use 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50, 300mm from each corner and 300mm maximum thereafter around the perimeter of the bracing element. 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



GS2-NOM ADHESIVE FIXING OPTION AT DOOR JAMBS

As an alternative to using screw fixings, a continuous 6-10mm bead of solvent based GIBFix® All-Bond can be applied along the full height studs immediately adjacent to an internal door opening and at the door lintel or head trimmer. The lining is then bedded into the adhesive and installed into the rebated jamb, as shown in figure 38.

This solvent based adhesive option may only be used with GS2-NOM specification and is designed to reduce popping of fasteners around door openings on internal walls.

FIGURE 37: SCREW FIX FOR OPENINGS

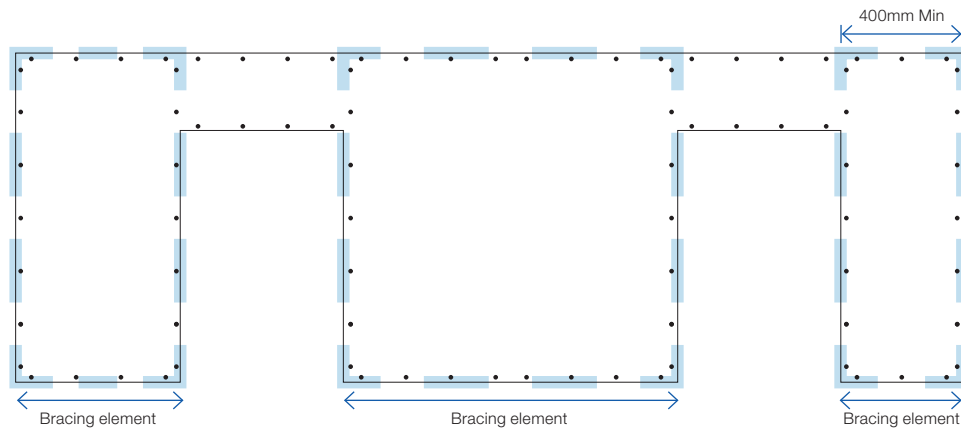
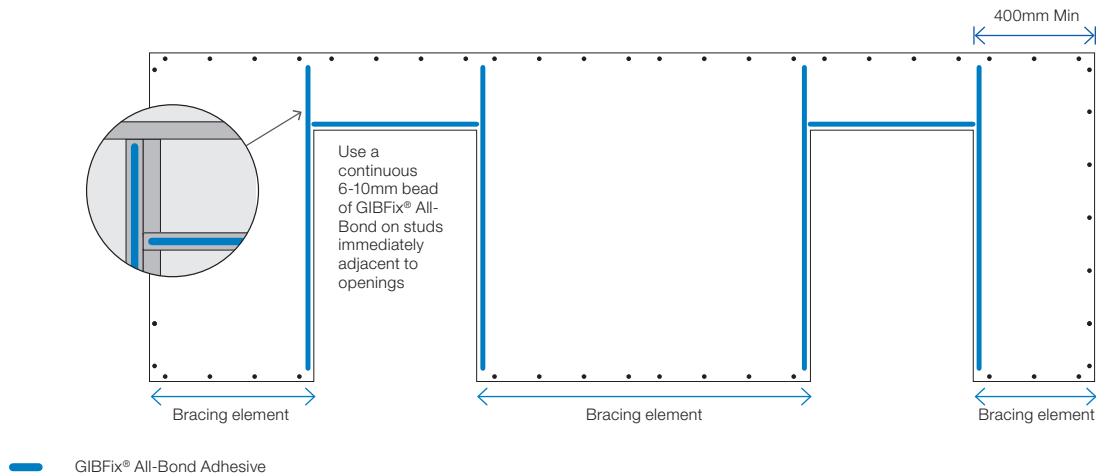
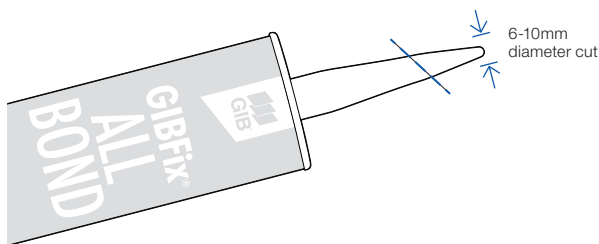


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



ADHESIVE NOZZLE APERTURE





SYSTEM SPECIFICATIONS

GIB EzyBrace® Systems specification GS2-N

Specification code	Minimum length (m)	Lining requirement
GS2-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

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 then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- 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

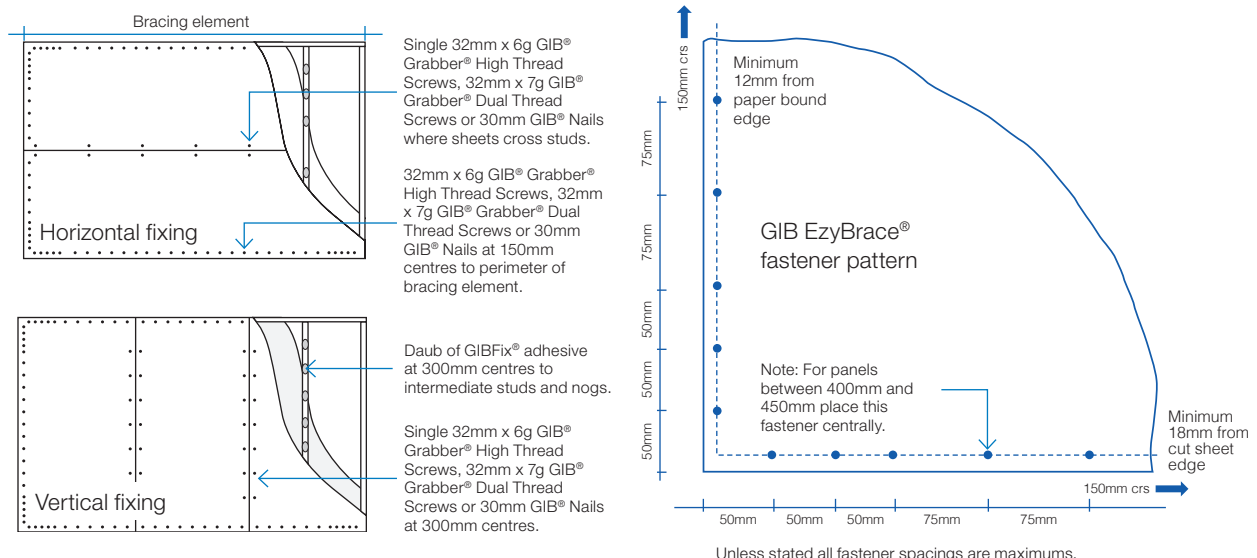
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

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 GSP-H

Specification Code	Minimum length (m)	Lining requirement	Other requirements
GSP-H	0.4	Any 10mm or 13mm GIB® plasterboard lining to one side of framing and minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	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® plasterboard to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally, with edges supported.
- 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.

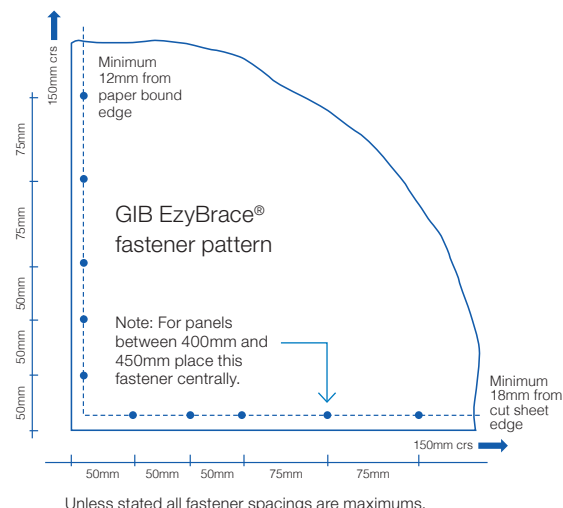
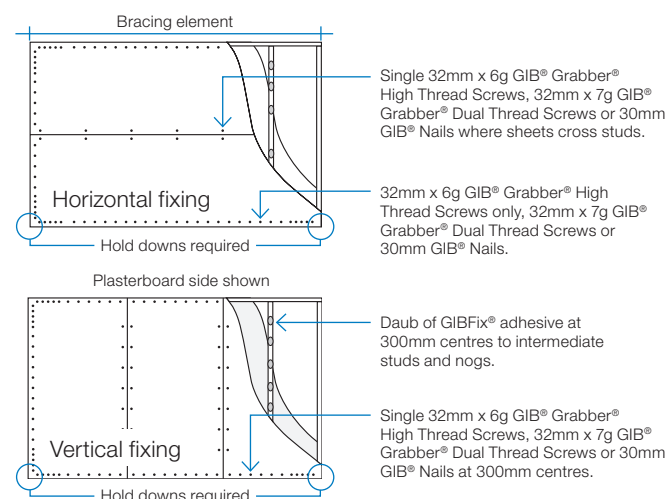
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails.

Fastener centres

GIB® plasterboard side: 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 the 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. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

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

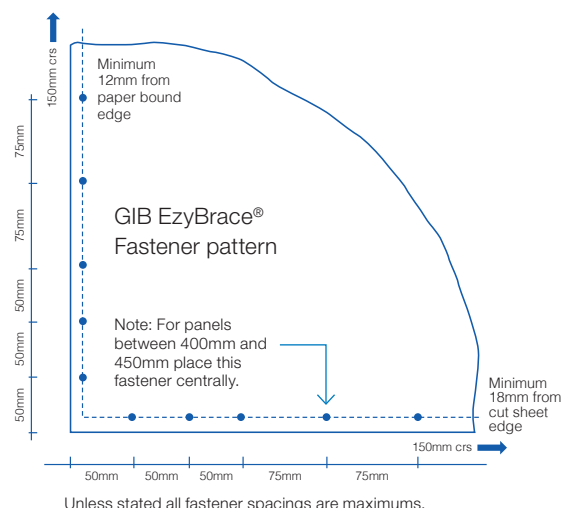
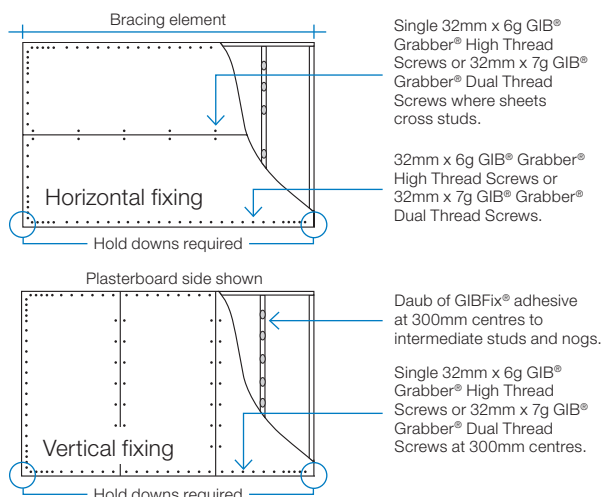
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 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



GIB EzyBrace® Systems specification BLG-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLG-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus any 10mm or 13mm GIB® plasterboard to the other side	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 2011 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® to one side of the wall plus any 10mm or 13mm GIB® plasterboard lining to the other side.
- 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

GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Other side: 32mm x 6g GIB® Grabber® High Thread Screws, 30mm GIB Nails or 32mm x 7g GIB® Grabber® Dual Thread Screws.

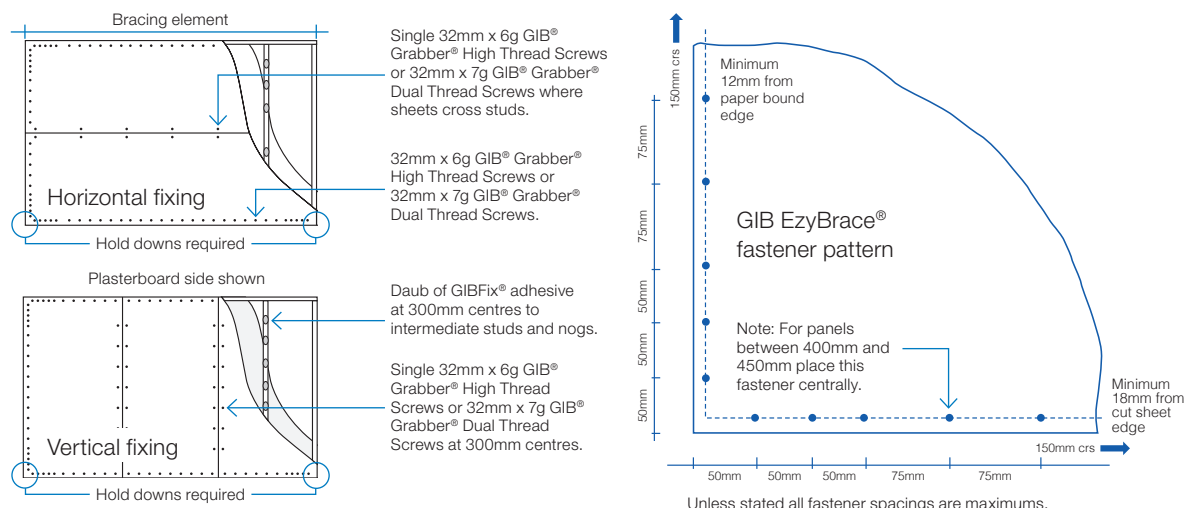
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the 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 BLP-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLP-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	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.

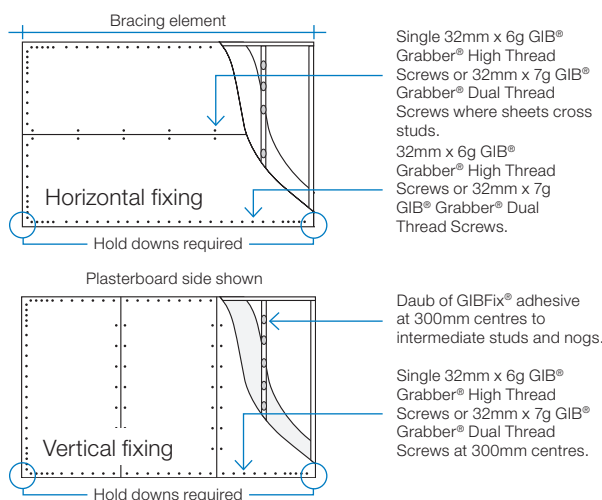
Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

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 AS/NZ 2269/0 :2012.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZS 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally.
- Plywood is to be fixed vertically with edges supported.
- 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

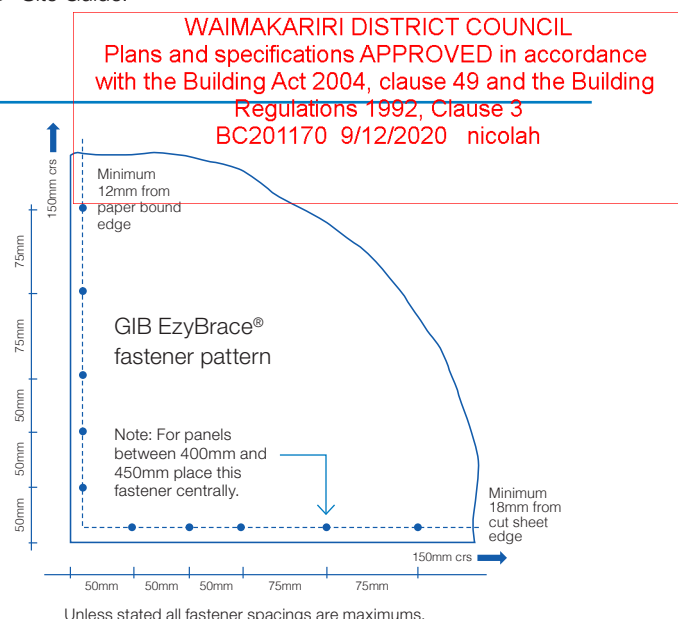
GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

GIB® Plasterboard side: 50,100,150, 225, 300mm from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm centres to the 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 centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

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



SUSTAINABILITY AND THE ENVIRONMENT

Winstone Wallboards is committed to protecting the environment. Environmental matters are integrated into all business activities:

- Our operations strive to exceed all environmental regulatory requirements at all times.
- Protection of the environment is a day to day responsibility that we all must accept.
- We allocate appropriate management time and resources to address relevant environmental issues and continuously improve our activities in that area.
- We will achieve our standards of performance through positive action, employee involvement and constant communication with our neighbours, local authorities and customers.

Minimise on-site waste when designing and/or installing GIB® Systems. For larger projects give consideration to our cut-to-length service to reduce waste. GIB® plasterboard off-cuts, if separated from other waste building materials, can be readily recycled.

For larger projects waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and use it in compost. For smaller projects, the GIB® plasterboard can be ground up and spread around the building site.

GLOBAL GREENTAG^{CERT}™

The Global GreenTag^{Cert}™ certified eco-label acknowledges product as meeting the GreenRate Standard set by Global GreenTag^{Cert}™

GIB® plasterboard has a Level B green rating.

DECLARE CERTIFICATION

Declare is a database of non-toxic, sustainably sourced building products.

Many GIB® plasterboard products including GIB® Standard, GIB Braceline®, GIB Noiseline® and GIB Aqualine® have achieved Red List Free status in Declare certification.

For more information on Winstone Wallboards sustainability commitments visit gib.co.nz.

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Winstone Wallboards asserts its moral rights and reserves all other intellectual property rights in the materials contained in this brochure and related to GIBFix® Framing System and GIB EzyBrace® Systems.

TRADEMARKS

The names GIB®, GIB Fyrelime®, GIB Ultraline®, GIB Braceline®, GIB Toughline®, GIB Noiseline®, GIB Aqualine®, GIB Nail®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, the colour mauve for GIB Toughline®, GIB HandiBrac®, GIB EzyBrace®, the colour blue for GIB Braceline®, the colour pink for GIB Fyrelime®, the colour green for GIB Aqualine®, and the shield device are registered trademarks of Fletcher Building Holdings Limited.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights.



FOR MORE INFORMATION VISIT

gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442



ECOPLY®
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FLOORING

ECOPLY®
STRUCTURAL
ROOFING

ECOPLY®
STRUCTURAL
Square
EDGE

ECOPLY®
STRUCTURAL
BARRIER

ECOPLY® SPECIFICATION & INSTALLATION GUIDE

SEPTEMBER 2015

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah



ECOPLY® SPECIFICATION & INSTALLATION GUIDE

Contents

1.0 Ecoply® Product Range	3
1.1 Technical Information and CAD Details	3
1.2 Product Description and Range	4
1.3 Surface Grades	5
1.4 Preservative Treatment	6
1.5 Section Properties	7
1.6 Product Identification	8
1.7 Code Compliance	9
1.8 General Design Considerations	9
1.9 Sustainability	11
1.10 Health & Safety	11
1.11 Storage & Handling	11
2.0 General Installation Guide	12
2.1 Framing	12
2.2 Sheet Fasteners and Fixing	12
2.3 Adhesives	14
3.0 Structural Bracing & Ceiling Diaphragms	15
3.1 Design to Comply with the New Zealand Building Code	15
3.2 Ecoply Bracing Specifications Summary	17
3.3 Ecoply Bracing Specification - EPI	18
3.4 Ecoply Bracing Specification - EPG	20
3.5 GIB Handibrac® – Recommended Installation Method	22
3.6 Structural Ceiling Diaphragms	22
4.0 Roofs and Decks	23
4.1 Flexible Membrane Systems	23
4.2 Roof Tile Systems	24
4.3 Roofing & Decking – Product Selection Guide	24
4.4 Frame Spacings for Ecoply Roofs and Decks	25
4.5 Roofing – Design Considerations	26
4.6 Roofing – Installation	28
5.0 Flooring	30
5.1 Flooring – Range	30
5.2 Flooring – Installation	30
5.3 Flooring – Finishing	31
6.0 Frequently Asked Questions	32
7.0 References and Sources of Information	34
8.0 Limitations	34



1.0 ECOPLY® PRODUCT RANGE

Manufactured in New Zealand by Carter Holt Harvey Woodproducts, the Ecoply® portfolio represents a range of structurally rated plywood products.

Ecoply is manufactured under a third party audited quality control programme to monitor compliance with AS/NZS 2269 Plywood Structural. All Ecoply products carry Engineered Wood Products Association of Australasia (EWPA) Joint Accreditation System - Australia and New Zealand (JAS-ANZ) certification.

For information relating to Shadowclad® panels and plywood used as an exterior cladding, refer to the current Shadowclad Specification & Installation Guide for Cavity Construction. For information relating to Ecoply Barrier used as a rigid air barrier refer to the current Ecoply Barrier Specification & Installation Guide. Both of these documents can be downloaded from www.chhwoodproducts.co.nz.

Ecoply products must be competently installed in accordance with good building practices and sound design principles to satisfy the requirements of the Building Act 2004, the New Zealand Building Code (NZBC), and applicable New Zealand Standards. This is the responsibility of building owners and the design professionals and builders that they engage. This document contains information, limitations, and cautions regarding the properties, handling, installation, usage, and the maintenance of Ecoply products. However, to the maximum extent permitted by law, Carter Holt Harvey Woodproducts assumes no legal liability to you in relation to this information.

1.1 TECHNICAL INFORMATION AND CAD DETAILS

When specifying or installing any Ecoply® plywood products visit www.chhwoodproducts.co.nz or call 0800 326 759 to ensure you have current specification material and any relevant technical notes.

The information contained in this document is current as at September 2015. It is your responsibility to ensure you have the most up to date information available.

The information contained in this publication relates specifically to Ecoply structural plywood products manufactured by Carter Holt Harvey Woodproducts and must not be used with any other plywood manufacturer's product no matter how similar they may appear.

Alternative plywood products can differ in a number of ways which may not be immediately obvious and substituting them for Ecoply structural plywood products is not appropriate, and could in extreme cases lead to premature failure and/or buildings which do not meet the requirements of the NZBC.

1.2 PRODUCT DESCRIPTION AND RANGE

Ecoply structural plywood panels are manufactured from radiata pine wood veneers. The veneers are placed at right angles to each other for maximum strength and stability then bonded together with synthetic phenolic (PF) resin to form a strong and permanent Type A bond.

The strength of Ecoply plywood is optimised for maximum performance parallel to the face grain with cross plies providing enhanced stability across the grain.

The Ecoply plywood range can be specified for:

- Surface grade (e.g. CD) - where the first letter describes the face veneer appearance and the second letter describes the back veneer of the Ecoply sheet. Surface grades are defined in AS/NZS 2269 and summarised in Tables 2A & 2B
- Stress grade - utilises the symbol F and a suffix, for example;
 - F8 as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade. F8 is the standard stress grade for Ecoply products
 - Ecoply 19 mm Longspan Flooring and 15 mm Ecoply Roofing are F11¹ stress grade (See Tables 1, 4 and 5). Other Ecoply products are also available in F11¹ upon request
- Thickness - ranging from 7 mm to 25 mm. (Thicknesses above 25 mm subject to availability)
- Length - being 2400 mm and 2700 mm with a standard nominal width of 1200 mm

- Preservative treatment - being untreated, H3.2 CCA or H3.1 LOSP Azole treated
- Edge finish - being square edge or for Ecoply Flooring and Roofing, routed on the long edges of the sheet with a polypropylene plastic tongue inserted into one side for a tongue-in-groove joint

For general installation advice refer to section 2.0: General Installation Guide.

For specification and installation advice for Ecoply used in typical applications refer to the following sections.

Typical Application	Section
Structural bracing and ceiling diaphragms	3.0
Roofs and decks	4.0
Flooring	5.0

Note: Technical notes referenced in this guide can be downloaded from www.chhwoodproducts.co.nz or contact Carter Holt Harvey Woodproducts on 0800 326 759.

Table 1: Ecoply® Product Range

Nominal Thickness (mm)	7		9		12		15		17		19		21		25	
Sheet length (x 1200 mm width)	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700
Ecoply Structural Square Edge																
BD			●		●	●	●		●							
CD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
DD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ecoply Flooring (pt)																
CD							●	●	●	●	● LS	● LS	●	●		●
Ecoply Roofing (pt)							●	●	●	●						
DD							●	●	●	●						

- Available untreated only
- Available either untreated or H3.2 CCA
- Available either untreated or H3.1 LOSP

pt Machine grooves on both long edges with a plastic polypropylene tongue in one groove, 1200 mm cover

LS Ecoply 19 mm F11/F8 Longspan Flooring

- Full range may not always be available ex stock, check with your Ecoply supplier to ensure availability
- Non standard specifications, including thicker sheets may be available to special order in significant quantities
- All products are F8 stress grades
- Ecoply 15 mm/17 mm Roofing and Ecoply 19 mm Longspan Flooring are supplied as standard in F11 stress grade¹
- Other Ecoply products are also available in F11¹ upon request

¹ Where the stress grade F11 is referred to in all CHH Woodproducts plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain

1.3 SURFACE GRADES

Table 2A summarises the surface appearance grades in which Ecoply structural plywood is available with some typical applications for each surface grade.

The surface grade specifications are defined in AS/NZS 2269. Table 2B details surface appearance grades for specialty Ecoply plywood and typical applications.

Table 2A: Ecoply® Structural Square Edge Products






Face Grade B	Face Grade C	Face Grade D
		
Appearance grade with a solid sanded surface. Suitable for a higher quality finish.	Solid sanded surface with filled holes and splits, with intergrown knots. Suitable for a basic paint finish.	Non appearance grade allowing open imperfections up to 75 mm across the face veneer. Splits and knots allowable
Possible Uses: <ul style="list-style-type: none"> Furniture/Joinery/Signs Interior Linings Sheathing Engineering components where a superior visual finish is required 	Possible Uses: <ul style="list-style-type: none"> Structural gussets Stressed skin panels Bins, boxes, crates Hoardings Membrane substrate 	Possible Uses: <ul style="list-style-type: none"> Non visual bracing Strength critical pallets Structural components Portal frame gussets

Table 2B: Speciality Ecoply® Products

Flooring CD	Roofing DD
	
Solid sanded C grade surface with tongue and groove profile on long edges. Features void free second layer under the face veneer for increased protection against high point loads	Unfilled D grade surface with tongue and groove profile on long edges
Possible Uses: <ul style="list-style-type: none"> Substrate for flooring overlays such as linoleum, tiles and rigid coverings Substrate for membrane roofing and decking where visible appearance is critical 	Possible Uses: <ul style="list-style-type: none"> Substrate for asphalt shingles Substrate for roof systems where a smooth substrate is not required

Notes: A higher visual grade may be substituted if required. e.g. Ecoply CD can be used anywhere DD is used. Pictures shown above are scaled down versions of typical Ecoply sheets. Grain pattern and colour may vary. If sheet appearance is critical select panels individually.

I.4 PRESERVATIVE TREATMENT

Ecoply structural plywood is available untreated or treated in accordance with AS/NZS 1604.3. If treated, Ecoply structural plywood is treated with either H3.2 CCA (Copper Chrome Arsenate) or H3.1 LOSP (Azole) clear treatment. H3.1 LOSP is the standard preservative treatment for BD Structural Square Edge products and by special request for other Ecoply plywood products.

H3.2 CCA and H3.1 LOSP treated plywood in accordance with AS/NZS 1604.3 is described as suitable for: "outside, above ground, subject to periodic moderate wetting and leaching."

Ecoply plywood is envelope preservative treated. Where sheets are cut, cuts must be coated with a brush on timber preservative. Holdfast® Metalex® Concentrated Timber Preservative Clear (Holdfast® Metalex® Clear) is recommended. Failure to do so will affect the long term durability of the panel.

The characteristics of the treatments are shown in Table 3.

Table 3: Preservative Treatment

	Untreated	H3.2 CCA	H3.1 LOSP (Azole)
Preservative carrier	N/A	Water	Light organic oil (white spirits)
Colour	Natural	Green	Clear (i.e. natural)
Fungicide	Heat treated dry wood	Copper	Propiconazole and Tebuconazole
Insecticide	Heat treated dry wood	Arsenate	Permethrin
Other chemicals	N/A	Chrome (to fix preservative in wood)	Butyl Oxitol (co-solvent to assist active stability)
Mouldicide	N/A	Copper (limited efficacy)	IPBC
Notes	Plywood for dry interior use, supplied ex mill at <15% moisture content	Dried after treatment to average 18% moisture content for use in service at higher moisture contents	Solvent does not affect dimensions. Solvent smell disappears over time
Availability	Readily available	Standard treatment except for Ecoply BD	Treated to order for CD, DD, flooring and roofing products. Standard treatment for Ecoply BD
Applications (Refer NZ3602)	Interior dry protected	Exterior/Interior damp (service performance subject to detailing & coatings)	

H3.2 CCA

Ecoply structural plywood, which is H3.2 CCA treated (waterborne preservative with a green colour), is dried following treatment so that sheets may return to the correct dimensions. The moisture content after treatment with CCA and drying will be higher than the limits placed in AS/NZS 2269 on untreated product. The target is for an average moisture content of approximately 18% to provide a panel closer to the expected equilibrium moisture content for most H3.2 CCA applications.

The fillets used to separate sheets in drying may leave marks on the sheet surface. These will fade over time as the plywood weathers, and can be disguised with paint but may be visible under stain. The process of treating with H3.2 CCA and subsequent drying is likely to increase the face checking of the panel.

For more information on face checking refer to section 1.8 General Design Considerations - Aesthetics.

H3.1 LOSP

H3.1 LOSP treated Ecoply retains the wood colour and does not contain moisture so the plywood remains at the same dimensions and moisture content during treatment. However, the plywood when freshly treated may contain more than 60 litres of organic fluid per cubic metre. When coating H3.1 LOSP treated plywood, traces of residual solvent may be present on the sheet surface from the treatment process. Sheets feeling greasy to touch should be placed in a well ventilated area and allowed to flash off to ensure proper adhesion of paints and stains to the sheet surface.

The H3.1 LOSP solvent smell can be quite strong and venting is recommended until most of the solvent has evaporated. Untreated plywood is recommended for internal applications where NZS 3602 allows the use of untreated plywood

Mechanical fasteners are recommended to fix H3.1 LOSP treated Ecoply to framing. If adhesives are required, thorough venting is recommended and H3.1 LOSP tolerant adhesives should be applied according to the adhesive manufacturer's instructions. See section 2.3 Adhesives.

1.5 SECTION PROPERTIES

Table 4A: Section Properties of Ecoply® Structural Plywood

Nominal plywood thickness ²	ID code ³	Section properties per mm width						
		Parallel to the face grain			Perpendicular to the face grain			
		Mass	Parallel Moment of Inertia	Section Modulus	Shear Constant	Perpendicular Moment of Inertia	Section Modulus	Shear Constant
(mm)		(kg/m ²)	(mm ⁴)	Z (mm ³)	I/Q (mm ²)	I (mm ⁴)	Z (mm ³)	I/Q (mm ²)
7	7-24-3	4.0	30.0	8.3	5.2	2.0	1.7	2.3
9	9-30-3	5.0	58.6	13.0	6.4	4.0	2.7	2.9
12	12-24-5	6.6	115.0	19.2	9.3	33.4	9.3	5.4
15	15-30-5	8.3	225.0	29.9	11.6	65.2	14.5	6.8
17	17-24-7	9.2	285.0	33.9	12.2	122.0	20.4	9.4
17	17-24-6	9.2	273.0	32.5	12.3	134.0	22.3	9.5
19	19-30-7	10.6	451.0	46.9	13.7	157.0	23.8	10.7
21	21-30-7	11.6	556.0	52.9	15.2	239.0	31.9	11.8
25	25-30-9	13.5	897.0	72.9	17.8	381.0	41.0	13.9

Table 4B: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F8 Grade

Nominal plywood thickness ²	ID code ³	Nominal strengths (Limit States) per mm width					
		Parallel to the face grain (F8)			Perpendicular to the face grain (F8)		
		Bending Stiffness EI	Bending Moment $f_{pb}Z$	Rolling Shear $f_{pr}I/Q$	Bending Stiffness EI	Bending Moment $f_{pb}Z$	Rolling Shear $f_{pr}I/Q$
(mm)		(1000 Nmm ²)	(Nmm)	(N)	(1000 Nmm ²)	(Nmm)	(N)
12	12-24-5	1046.5	480.0	15.6	303.9	231.7	9.2
15	15-30-5	2047.5	747.5	19.5	593.3	362.5	11.4
17	17-24-7	2593.5	847.5	20.5	1110.2	510.0	15.9
17	17-24-6	2484.3	812.5	20.7	1219.4	557.5	16.0
19	19-30-7	4104.1	1172.5	23.0	1428.7	595.0	18.0
21	21-30-7	5059.6	1322.5	25.5	2174.9	797.5	19.8
25	25-30-9	8162.7	1822.5	29.9	3467.1	1025.0	23.4

Table 4C: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F11 Grade (Including Longspan Flooring)

Nominal plywood thickness ²	ID code ³	Nominal strengths (Limit States) per mm width					
		Parallel to the face grain (F11)			Perpendicular to the face grain (F8)		
		Bending Stiffness EI	Bending Moment $f_{pb}Z$	Rolling Shear $f_{pr}I/Q$	Bending Stiffness EI	Bending Moment $f_{pb}Z$	Rolling Shear $f_{pr}I/Q$
(mm)		(1000 Nmm ²)	(Nmm)	(N)	(1000 Nmm ²)	(Nmm)	(N)
12	12-24-5	1207.5	595.2	16.7	303.9	231.7	9.2
15	15-30-5	2362.5	926.9	20.9	593.3	362.5	11.4
17	17-24-7	2992.5	1050.9	22.0	1110.2	510.0	15.9
17	17-24-6	2866.5	1007.5	22.1	1219.4	557.5	16.0
19	19-30-7	4735.5	1453.9	24.7	1428.7	595.0	18.0
21	21-30-7	5838.0	1639.9	27.4	2174.9	797.5	19.8
25	25-30-9	9418.5	2259.9	32.0	3467.1	1025.0	23.4

1 Where the stress grade F11 is referred to in all CHH Woodproducts plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain

2 Actual thickness of Ecoply sheets manufactured to thickness tolerances stated in AS/NZS 2269

3 Identification code: panel thickness – outermost veneer thickness x 10 – number of plies

4 I/Q values for rolling shear are for stress at the neutral axis calculated as in NZS 3603

Notes:

- Use Tables 4A & B values for all F8 stress grade Ecoply products
- Use Tables 4A & C values for all F11 stress grade Ecoply (including 19 mm Ecoply Longspan Flooring)
- The section properties in Tables 4A, B & C have been calculated in accordance with AS/NZS 2269
- For section properties for other thicknesses and Shadowclad® products contact CHH Woodproducts on 0800 326 759

Structural properties of Ecoply® plywood

The majority of Ecoply plywood is F8 grade (exceptions are identified in section 1.2: Product Description & Range) and the

characteristic values may be used in conjunction with both NZS 3603 and AS 1720 for the design of timber components. The characteristic strengths in Table 5 have been used to provide the nominal strengths in Tables 4B and 4C.

Table 5: Structural Properties of Ecoply® Plywood

Stress Grade	Characteristic Strength MPa	
	F8	F11
Bending (f_{pb})	25.0	31.0
Tension (f_{pt})	15.0	18.0
Panel shear (f_{ps})	4.2	4.5
Rolling shear (f_{pr})	1.7	1.8
Compression in plane of sheet (f_{pc})	20.0	22.0
Compression normal to the plane of the sheet (f_{pp})	9.7	12.0
Modulus of elasticity (E)	9100	10500
Modulus of rigidity (G)	455	525

Source: AS/NZS 2269

Wood is strongest when stressed parallel to the grain and weakest across the grain, so the lay up or arrangement of veneers in the panel determines the properties. Because of its cross banded construction, plywood possesses significant strength and stiffness both parallel and perpendicular to the direction of the face grain, but is generally strongest and stiffest along the direction of the face grain.

The section properties of structural plywood in Table 4A are calculated in accordance with AS/NZS 2269 to allow for the

reduced contribution of veneers perpendicular to the direction of stress. For engineering design to NZS 3603, the section properties are multiplied by stresses and 'k' and ϕ factors to determine resistances for limit states design.

Resistances and nominal strengths in Tables 4B and 4C assume all 'k' factors are equal to 1.0. Multiply tabled values by the strength reduction factor ϕ and 'k' factors for specific in-service conditions for design to a structural code such as NZS 3603.

Table 5A: Strength Reduction Factors

Structural Timber Material	Application of Structural Member		
	Category 1	Category 2	Category 3
	Structural members for houses for which failure would be unlikely to affect an area ¹ greater than 25 m ² ; OR secondary members in structures other than houses	Primary structural members in structures other than houses; OR elements in houses for which failure would be likely to affect an area ¹ greater than 25 m ²	Primary structural members in structures intended to fulfil essential services or post disaster function
	Value of Strength Reduction Factor ϕ		
Structural Plywood – AS/NZS 2269.0	0.95	0.85	0.75

¹ In this context area should be taken as plan area.

1.6 PRODUCT IDENTIFICATION

In accordance with AS/NZS 2269, Ecoply structural plywood sheets have the following information marked on the back:

- Brand name: e.g. ECOPLY
- Face grade, back grade: e.g. CD
- Intended application: e.g. STRUCTURAL
- Panel construction code: e.g. 19-30-7 (Thickness (mm)-Face veneer thickness (mm x 10)-Number of veneers)
- Glue bond: e.g. A BOND
- Formaldehyde emission class: E0 for A Bond Ecoply
- Australasian Standard: e.g. AS/NZS 2269
- Treatment Standard (if applicable): e.g. AS/NZS 1604.3:2012
- Date and time of manufacture: e.g. 01/12/15 12:23:45
- Stress grade: e.g. F8 (exceptions include Shadowclad® and Grooved Lining which are performance rated)
- The Engineered Wood Products Association of Australasia (EWPPAA) brand and mill number: e.g. 911 (Tokoroa mill)

Untreated example:

ECOPLY CD FLOORING STRUCTURAL
19-30-7 A BOND E0 AS/NZS 2269.0:2012
PAT 01/12/15 12:23:45 F11/F8



Treated example:

ECOPLY CD STRUCTURAL
25-30-9 A BOND E0 AS/NZS 2269.0:2012
AS/NZS 1604.3:2012 046 01 H3 E CCA
RETREAT CUTS PAT 01/12/15 12:23:45 F8/F8



Note: Performance based products like Grooved Lining and Shadowclad may include brand identification instead of visual quality, stress grade, and panel code. These panels, when accompanied with specification literature, are still deemed to comply with AS/NZS 2269

1.7 CODE COMPLIANCE

Ecoply plywood manufacture is third-party audited through the product quality control programme of the Engineered Wood Products Association of Australasia (EWPAA) which is itself audited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

CHH Woodproducts is licensed by the EWPAA to stamp plywood with the EWPAA/JAS-ANZ Product Certification Mark. This certifies it has been manufactured under the third party audited Joint Product Certification programme to monitor compliance with joint Australian/New Zealand Standard AS/NZS 2269 Plywood – Structural. Plywood to this standard is referenced in the NZBC Acceptable Solutions and Verification Methods through:

- NZS 3602 The Use of Timber and Wood-based products for Use in Building
- NZS 3603 Timber Structures
- NZS 3604 Timber Framed Buildings
- AS/NZS 1604.3 Specification for Preservative Treatment, Part 3:Plywood
- E2/AS1 External Moisture



WARNING: Plywood which is non-certified or is manufactured to standards other than AS/NZS 2269, such as US voluntary standard PSI-95, is not referenced in the NZBC. There can be significant differences between AS/NZS 2269 certified and non certified plywood around bond durability, structural ratings and veneer quality.

Structure B1

Design to NZS 3603 Timber Structures complies with the NZBC in Verification Method B1/VM1 Clause 6.0 Timber. Plywood is the only sheet material with properties listed in NZS 3603. Ecoply structural plywood is available in F8 stress grade. Some specialty products are available F11 or with specifically designed properties for specialised applications.

1.8 GENERAL DESIGN CONSIDERATIONS

Durability (Clause B2) and exterior moisture (Clause E2)

Ecoply plywood is made from softwood solid radiata pine veneer. Designers should assess the level of exposure to biological, moisture, and other hazards and apply appropriate preservative treatment and detailing to minimise exposure to these hazards.

Information in this manual outlines suggested practices for detailing building components to exclude moisture to comply with the durability requirements of the NZBC.

Formaldehyde

Ecoply plywood is manufactured using phenol formaldehyde resins which are fully cured in the hot press. Cured resin is thermally and moisture stable and formaldehyde emissions for the glued plywood are similar to background levels for the wood by itself when tested to AS/NZS 2098.11 Determination of formaldehyde emissions for plywood. Accordingly every panel is branded with the lowest emission class (less than 0.5 mg/litre for E₀).

Actual formaldehyde emissions for Ecoply plywood have been tested and approved as having an actual formaldehyde emission level of less than 0.3 mg/ litre (equivalent to a Super E₀ emission level).

Moisture content and dimensional change

At the time of leaving the factory, the moisture content of untreated Ecoply plywood should generally be in the range of 8% to 15% as required by AS/NZS 2269. All wood products including plywood respond to changes in ambient humidity so the eventual moisture content of plywood varies according to how dry or how wet the environment is. After manufacture, the moisture content will move to equilibrium with the environment, and the veneers swell or shrink across the grain in response. The total expansion both along and across a 2400 x 1200 mm panel can be in the order of 1.5 mm to 3 mm as the plywood changes from a dry to a saturated state.

Ecoply that is treated with waterborne preservatives (e.g. H3.2 CCA) is expected to be used in applications that have higher humidity than interior dry use, so following treatment it is dried to a higher average moisture content of approximately 18%. This provides for a more stable panel in service than placing a dry (less than 15%) sheet in a higher moisture environment.

Detailing and construction must allow for movement if the plywood will be subject to cycles of moisture change. Seasonal and daily cycles can be significant depending on the end use.

Temperature

Wood will expand upon heating as do practically all solids. The thermal expansion of plywood is quite small and there is little effect on the structural performance or durability of plywood when used in temperatures below 54°C. The average co-efficient of thermal expansion of plywood is 4.5×10^{-6} mm/mm/°C. At temperatures above 55°C wood begins to deteriorate. Colours of coatings and finishes should be selected to reduce heat gain. For extreme conditions, further technical information is available by calling CHH Woodproducts on 0800 326 759.

The thermal resistance or insulating effectiveness of plywood panels can be calculated using NZS 4214 Methods of determining the total thermal resistance of parts of buildings. e.g. Plywood has a Conductivity (k) of 0.13 W/mK so a 12 mm panel has a thermal resistance $R = 0.012/0.13 = 0.09$.

Aesthetics

Ecoply plywood products can be selected for decorative or weather protection functions as well as structural performance. Acceptable Solution E2/AS1 - External Moisture allows plywood manufactured to AS/NZS 2269, (minimum CD appearance grade, minimum 12 mm thickness and treated as required by NZS 3602) to be used for exterior cladding. For exterior cladding applications CHH Woodproducts strongly recommends Shadowclad® exterior cladding rather than smooth faced plywood such as Ecoply.

Shadowclad® features a textured (bandsawn) face which reduces the visibility of face checking and other appearance related issues which can occur on smooth faced plywood if not regularly maintained by the homeowner. For more information on plywood used as an exterior cladding refer to the current Shadowclad Specification and Installation Guide for Cavity Construction.

Face checks on plywood exposed to weather

Face checks are lengthwise separations of wood fibres in the face veneer of the plywood. They result from the normal swelling and shrinking of wood as it gains and loses moisture. It is important to realise that these checks are superficial, being confined to the face veneer. They do not alter the structural integrity of the plywood in any way. If you are the specifier, it is important to discuss these issues with your client and consider the length of exterior exposure, climate conditions and protection offered by the surface coating before finalising product choice.

Durability

The durability of Ecoply structural plywood will depend on the application. Detailing, treatment and installation details need careful consideration to satisfy the requirements of the NZBC.

Normally, 50 year durability can be achieved with untreated Ecoply in dry, interior exposure. For internal environments subject to high humidity or condensation H3.2 CCA treated Ecoply should be used.

For plywood as a rigid air barrier (including rigid air barrier acting as bracing) refer to the current Ecoply Barrier Specification and Installation Guide which can be downloaded from www.chhwoodproducts.co.nz.

Fire, spread of flame and smoke development

The following data on early fire hazard properties of uncoated Ecoply plywood are the result of tests carried out by Australian Wool Testing Authority AWTA to test structural plywood manufactured to AS/NZS 2269 in accordance with ISO 5660, reaction to fire tests (heat release, smoke production and mass loss rate). Part 1: Heat Release rate (cone calorimeter method).

Table 6 summarises the test configurations and associated material groups.

For plywood with decorative finish coatings or intumescent coating, performances depend on spread rates of the coating. For advice on specific coating systems and their suitability for use with Ecoply products, always refer to the coating manufacturer.

Table 6: Early Fire Hazard Properties of Ecoply® Plywood

Material	Species	Origin	Thickness	Treatment	Material groups
Plywood	Radiata Pine	New Zealand	7mm	CCA Treated	Group 3
Plywood	Radiata Pine	New Zealand	12mm	Untreated	Group 3
Plywood	Radiata Pine	New Zealand	12mm	LOSP Treated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	Untreated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	LOSP Treated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	CCA Treated	Group 3

1.9 SUSTAINABILITY

Ecoply is manufactured from radiata pine. It is grown on tree farms which are tended and harvested to provide wood for plywood manufacture. The crop is managed on a sustainable basis to yield millable trees.

New Zealand plantations are managed in compliance with the New Zealand Forest Accord.

Ecoply is manufactured in New Zealand at CHH Woodproducts Tokoroa plywood mill.

Ecoply is available Forestry Stewardship Council (FSC) (SCS-COC-001316) certified upon request.

1.10 HEALTH & SAFETY

Ecoply should be handled in accordance with the Material Safety Data Sheets (MSDS) for untreated, H3.2 CCA and H3.1 LOSP treated Ecoply, which can be downloaded from www.chhwoodproducts.co.nz.

Always wear safety glasses or non-fogging goggles when machining Ecoply panels.

If wood dust exposures are not controlled when machining (sawing, routing, planing, drilling etc) a class P1 or P2 replaceable filter or disposable face piece respirator should be worn.

Wear comfortable work gloves to avoid skin irritation and the risk of splinters. Wash hands with mild soap and water after handling panels.

1.11 STORAGE & HANDLING

Ecoply panels must be stored and handled with care to maintain good condition before use and after installation:

- The storage area must be protected from sun, rain and wind that would otherwise bring about rapid changes in temperature and humidity
- Support for the sheets must be provided at both ends and middle to avoid distortion. Ensure bearers in packs above are aligned over bearers below (to avoid inducing curves in sheets)
- The stack must be kept dry and clear of ground contact, and placed so that it will not be exposed to mechanical damage
- The sheets must be stacked flat, NOT on edge
- Store in well-ventilated areas away from sources of heat, flame or spark
- To avoid staining, fading and surface checking, the sheets must not be exposed to the weather while awaiting installation
- Store in well-ventilated areas away from sources of heat, flames or sparks

2.0 GENERAL INSTALLATION GUIDE

The following is a general guide to be followed unless otherwise specified. For additional installation instructions for typical applications refer to sections 3, 4 and 5.

2.1 FRAMING

Use kiln dried framing e.g. Laserframe® in accordance with timber framing manufacturer's specifications and treated in accordance with NZS 3602. All timber frame sizes and set out must comply with NZS 3604 (or be specifically designed to NZS 3603). The current Laserframe Product Guide can be downloaded from www.chhwoodproducts.co.nz. Ecoply may be specified for frame spacing determined by design, or using tables in section 3 for specific product applications such as bracing, flooring and as a substrate for shingle roofs or membrane roofs and decks.

H3.1 LOSP treated framing should be vented before fixing and if construction adhesives are required (for example to screw and glue floor panels) the adhesive must be compatible with H3.1 LOSP. See section 1.4: Preservative Treatment.

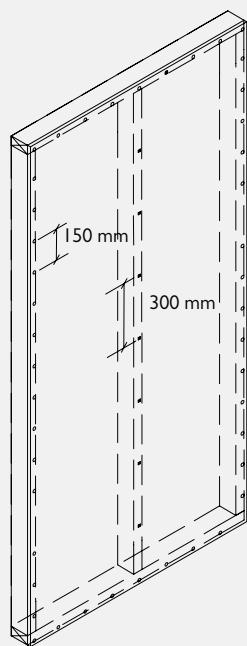
For plywood used as exterior cladding refer to the current Shadowclad® Specification & Installation Guide for Cavity Construction which can be downloaded from www.chhwoodproducts.co.nz

For plywood used as a rigid air barrier refer to the current Ecoply Barrier Specification & Installation Guide which can be downloaded from www.chhwoodproducts.co.nz

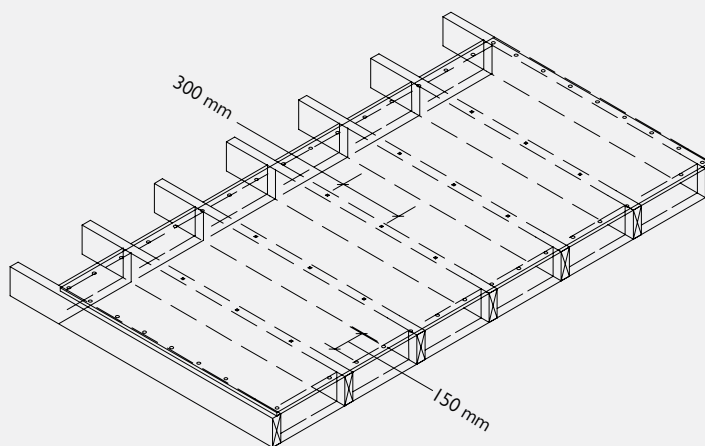
2.2 SHEET FASTENERS AND FIXING

- Where there is risk of panel size change due to changes in moisture levels, allow a 2 to 3 mm expansion gap between sheets
- Use only flathead nails or screws, with or without construction adhesives
- Fastener length should penetrate at least 10 nail diameters into the framing or be three times the sheet thickness, whichever is the greater. Longer or ring shank nails may be specified
- Fasteners must be at least 3 fastener diameters or 7 mm from the edge of the sheet
- For tongue and groove products such as flooring and roofing fasten 15 mm from tongue and groove edges
- Standard fixing pattern: unless otherwise specified fasten edges and ends of sheets at 150 mm centres, and within the panel at no more than 300 mm centres (see diagram below)
- Use hot dipped galvanised fasteners or corrosion resistant fasteners (i.e. stainless steel) determined by design for specific hazards
- Where using stainless steel nails, nails must be annular grooved
- Refer to Table 7 for minimum fastener sizes
- Do not overdrive power driven nails

EC001: Fastener spacings for Ecoply®



Ecoply® fastened in vertical plane



Ecoply® fastened in horizontal plane

EC002: Fastener spacings from edges

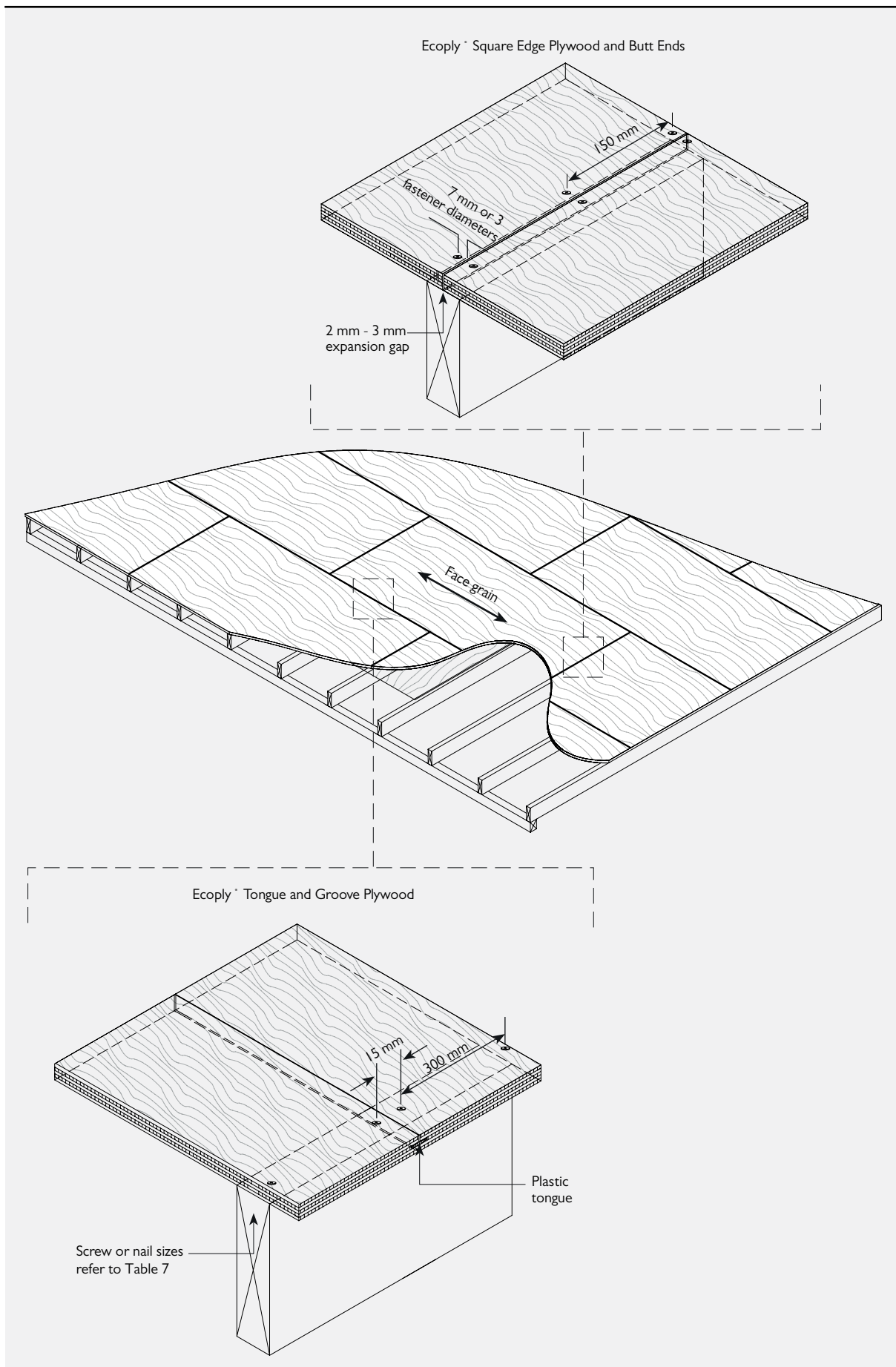


Table 7: Fasteners and Characteristic Shear Loads for Ecopyl®

Nominal Thickness (mm)	7mm 9mm	Load ¹	12mm 15 mm	Load ¹	17 mm	Load ¹	19mm 21mm	Load ¹	25 mm	Load ¹
Minimum nail size in timber framing²	40 x 2.5 mm	570	60 x 2.8 mm	736	60 x 2.8 mm	736	60 x 2.8 mm	736	75 x 3.15 mm	883
Screw size in timber framing²	8g x 30 mm	1230	8g x 40 mm	1230	10g x 40 mm	1650	10g x 45 mm	1650	10g x 50 mm	1650
1.15 mm steel framing²	10-24-35 ⁴	1300	10-24-40 ⁴	2000	10-16-45 ⁴	2100	10-16-45 ⁴	2100	10-16-45 ⁴	2100
Screw size in 2.80 mm steel framing²	10-24-35 ⁴	1200	10-16-40 ⁴	1200	14-20-45 ⁴	3000	14-20-45 ⁴	4000	14-20-45 ⁴	5000

1 The load is the characteristic load (N) for one fastener in single shear

2 Characteristic load based on fixing into a timber of J5 joint group or better

3 Self tapping, self countersinking screw

4 Screw Numbers indicate: Gauge – Threads per inch – Length (mm)

Notes

- Steel thickness, screw sizes, characteristic loads, refer to assemblies actually tested
- Other screw sizes may be used. Screw properties vary between screw suppliers and the suitability of a particular size should be verified by the designer for performance under changing physical conditions and cyclic loading
- Non-standard nailing may be specifically designed with NZS 3603 or similar

Fasteners for H3.2 CCA treated Ecopyl®

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Notes

H3.2 CCA treated timber should not be fixed in direct contact with light gauge steel products. Refer to the framing manufacturer for advice on fixing and treatments.

2.3 ADHESIVES

Tube applied construction adhesives

Site applied construction adhesives may be used together with nails and screws for non permanent loads, reduced fastener popping, and to lower the risk of squeaking in floors. Available types include polyurethane (e.g. Holdfast® Gorilla Nailpower®) and elastomeric (e.g. Bostik® Wallboard Gold) based adhesives.

Elastomeric adhesives should meet the requirements of APA Performance specification AFG 01 Adhesives for field gluing plywood to wood framing. Other types should have appraisal from an independent authorising body such as BRANZ or equivalent authorities for the specific applications proposed. Follow manufacturer's recommendations. In addition:

- Use a bead or daubs of adhesive as per manufacturer's recommendations
- Apply pressure using fastener patterns outlined in section 2.2: Sheet Fasteners and Fixing
- Work from the middle of the sheet outwards to develop glue line pressure
- Ensure adhesives are compatible with treatment in the framing timber; see section 1.4: Preservative Treatment

Structural adhesive joints

Structural bonds are generally only achievable in factory controlled conditions using approved structural adhesives in accordance with approved standards for glue lamination, e.g. Resorcinol formaldehyde joints made to AS/NZS 1328 Glued laminated structural timber. Site gluing is not recommended for structural plywood components. Contact CHH Woodproducts on 0800 326 759 for further information.

3.0 STRUCTURAL BRACING & CEILING DIAPHRAGMS

The Ecoply bracing system provides bracing resistance for walls and subfloor foundations for light timber framed buildings under wind and earthquake loading, to meet the requirements of the NZBC - B1 Structure, and NZS 3604 *Timber Framed Buildings* or specifically designed to NZS 3603 *Timber Structures Standard*.

Any Ecoply structural panel may be used for bracing as long as it is 7 mm, 9 mm or 12 mm thick, has a minimum wall length as described in Table 9, treated for the specific application in accordance with NZS 3602 (summarised in Table 8) and fixed in accordance with Ecoply bracing specifications outlined in this guide.

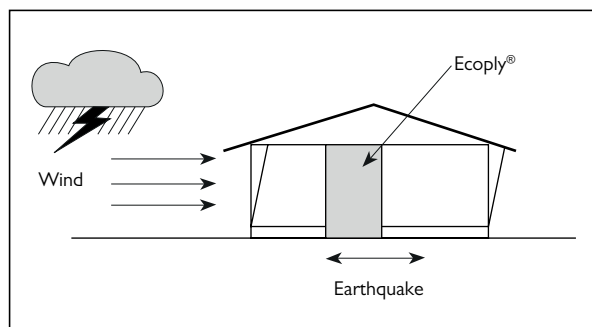
3.1 DESIGN TO COMPLY WITH THE NEW ZEALAND BUILDING CODE

Structure

Timber framed buildings to NZS 3604 *Timber Framed Buildings* is listed as an Acceptable Solution under Clause 3.0 Timber in Acceptable Solution B1/AS1 Structure.

CHH Woodproducts have developed a range of wall bracing elements tested using P21 testing methods referenced in NZS 3604.

Specific design



Ecoply structural plywood is manufactured to AS/NZS 2269, and it is suitable for design and use in earthquake and wind bracing systems constructed in accordance with NZS 3603 and AS/NZS 1170.

Structural plywood to AS/NZS 2269 is the only sheet brace material with properties defined in a published New Zealand engineering design code, NZS 3603 *Timber Structures*, and so can be designed in compliance with Verification method B1/VM1 under Clause 6.0 Timber for use in buildings over three storeys in height.

Demand is calculated by following section 5, Bracing Design of NZS 3604 or using the GIB EzyBrace® software, downloadable from www.gib.co.nz

EP bracing systems properties can be easily loaded into the EzyBrace software by way of an Excel patch downloadable from www.chhwoodproducts.co.nz together with loading instructions.

Timber Floors

When carrying out a bracing design for buildings with timber floor structures, the maximum bracing rating that can be accounted for when summing up the bracing units is 120 BUs/m. This does not exclude the installation of bracing elements that are rated higher than 120 BUs/m, however the extra bracing capacity can not be accounted for in the bracing design.

Specific design of floor and sub-floor framing is required for elements rated higher than 120 BUs/m.

Durability

Ecoply plywood is manufactured to meet the requirements of NZS 3602 *Timber and Wood based products for use in buildings*. If the product is used, handled and installed in accordance with CHH Woodproducts product literature it will meet the durability Clauses of the NZBC.

Table 8 summarises the applications in which Ecoply can be used as structural bracing together with the required preservative treatment and fastener material.

Table 8: Ecoply® Suitability for Bracing Applications Including Treatment Type & Fastener Material

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones as per section 4 of NZS 3604, including sea spray): E.g. Interior linings	Ecoply Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones B & C, as per section 4 of NZS 3604: E.g. Plywood bracing and/or rigid underlay (rigid air barrier), fixed to framing with/ without building paper/ wrap over, with/ without cavity battens behind cladding	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone D (sea spray), as per section 4 of NZS 3604: E.g. Plywood bracing and/or rigid underlay (rigid air barrier), fixed to framing with/without building paper/ wrap over, with/ without cavity battens behind cladding	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply® Barrier Specification and Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B & C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zones D	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones, as per section 4 of NZS 3604 (including sea spray)	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

Note: Power driven nails are suitable for use. Do not overdrive, nails must be full round head

Rain wetting and construction bracing

Untreated Ecoply will withstand normal exposure conditions during construction for up to 3 months however aesthetically the sheet appearance will deteriorate as the level of exposure increases. Rain and exposure can cause thinner plywood panels to buckle. Plywood stability is related to the number of veneers and thickness of the panel. Where panel stability is critical, consider using thicker panels.

Humidity and condensation

In conditions where the moisture content may exceed 18% for prolonged periods, Ecoply must be H3.1 LOSP or H3.2 CCA treated to resist decay or insect hazard.

Subfloor sheet bracing

H3.2 CCA treated Ecoply can be used as sheet bracing where dampness does not allow the use of untreated plywood or other sheet materials (section 5 of NZS 3604). Where Ecoply subfloor sheet bracing is exposed to both rain and sun, it must be coated with a three coat, 100% acrylic exterior coating system with a light reflectance value of 50% or greater.

Adjustments for wall height

Use section 5 of NZS 3604 to calculate bracing values:

"Adjustment of bracing capacity of walls of different heights and walls with sloping top plates shall be obtained by the following method:

- For wall bracing elements of heights other than 2.4 m, the bracing rating determined by test or from Table 9 should be multiplied by $2.4 \div \text{element height in metres}$, except that elements less than 2.4 m high shall be rated as if they are 2.4 m high.
- Walls of varying heights, should have their bracing capacity adjusted in accordance with section 5 of NZS 3604 using the average height."
- Walls with heights < 1.5m, Specific Engineering Design is required.

Joining panels for walls higher than maximum sheet length

Ecoply bracing panels must be fixed from top plate to bottom plate. For wall heights over 2.4 m, Ecoply and Shadowclad® is available in 2.7 m sheet lengths. Alternatively, a part sheet can be stacked above a full sheet, butt joined on a single row of nogs with each sheet/part sheet independently nailed off as per the nail spacing in the Ecoply bracing specifications (e.g. 2.4 m x 1.2 m sheet with a 0.3 m x 1.2 m part sheet above it to give a 2.7 m x 1.2 m bracing element).

Cladding as bracing

12 mm Ecoply (CD face grade or better) can be H3 treated to meet the requirements of Acceptable Solution E2/AS1 and will perform as a structural, durable and weathertight cladding and bracing element when installed in accordance with E2/AS1.

It should be noted smooth faced plywood such as Ecoply may be prone to appearance related issues such as face checking which occurs naturally and is not considered by CHH Woodproducts to be a manufacturing or product fault. For more information refer to section 1.8: General Design Considerations - Face Checks on Plywood Exposed to Weather. H3.2 CCA treated Ecoply may also have a green tinge to the wood surface and may have fillet marks on the face of the sheet.

Plywood for exterior cladding applications where a high visual appearance is desired, CHH Woodproducts recommends the use of Shadowclad as an exterior cladding. Shadowclad has a textured (bandsawn) face which reduces the visibility of face checking and is most commonly H3.1 LOSP treated (clear preservative treatment) which does not leave fillet marks on the panel face.

For further information on Shadowclad as an exterior cladding refer to the current Shadowclad Specification and Installation Guide for Cavity Construction which can be downloaded from www.chhwoodproducts.co.nz.

Soil

Ecoply must not be allowed to come in contact with soil. The bottom edge of the plywood sheet must be a minimum of 100 mm above decks or paved ground and a minimum of 175 mm above unprotected ground.

Service penetrations in bracing elements

Small openings (e.g. power outlets) of 90 x 90 mm or less may be placed no closer than 90 mm to the edge of the braced element, or waste pipe outlets of max. 150 mm diameter placed at no closer than 150 mm to the edge of the braced element.

3.2 ECOPLY® BRACING SPECIFICATIONS SUMMARY

CHH Woodproducts has a range of bracing specifications called the EP bracing series. The EP bracing series simplifies the design and construction of bracing elements using plywood, by itself or in conjunction with GIB® Plasterboard and features:

- Single sided and double sided bracing elements High performance bracing element utilising GIB® Standard plasterboard

- A single type, GIB Handibrac®, hold-down for all bracing elements
- Specifications for each bracing element type

Table 9: Summary P21 Ratings for 2.4m High Ecoply® Wall Elements

Specification No.	Minimum Wall Length	Lining Requirements	BU's/m Wind	BU's/m Earthquake
EPI	0.4 m		80	95
	0.6 m	Ecoply one side	95	105
	1.2 m		120	135
EPG	0.4 m	Ecoply one side and 10 mm GIB® Standard plasterboard other side	100	115
	1.2 m		150	150

Note: Bracing and other technical information has been specifically tested using Ecoply branded structural plywood. This information cannot be used with any other plywood brand and bracing data must be sought directly from the specific plywood manufacturer.

More information

The following pages provide a full specification of EP bracing elements. Copies of specifications can be downloaded from www.chhwoodproducts.co.nz

NZS 3604 provides the method of calculating demand on a building. Calculation sheets are available from BRANZ or GIB EzyBrace® software is available as a free download from www.gib.co.nz. Information is available at www.chhwoodproducts.co.nz which can be placed in the custom elements of GIB EzyBrace® for ease of calculation

Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter

Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB Handibrac® are registered trade marks of Fletcher Building Holdings Ltd.

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3.3 ECOPLY® BRACING SPECIFICATION - EPI

Table 10: Singled Sided Structural Plywood Brace

Specification No.	Minimum Wall Length	Lining Requirements	BU's/m Wind	BU's/m Earthquake
EPI_0.4	0.4 m	Ecoply one side	80	95
EPI_0.6	0.6 m	Ecoply one side	95	105
EPI_1.2	1.2 m	Ecoply one side	120	135

Framing

Wall framing must comply with:

- NZBC B1 - Structure: ASI Clause 3 Timber (NZS 3604)
- NZBC B2 - Durability: ASI Clause 3.2 Timber (NZS 3602)

Framing dimensions and height are as determined by the NZS 3604 stud and top plate tables for load bearing and non load bearing walls. Kiln dried verified structural grade timber must be used. Machine stress graded timber, such as Laserframe® of SG8 stress grade minimum, is recommended.

Bottom plate fixing

Use GIB Handibrac® hold-down connections at each end of the bracing element. Refer to manufacturer installation instructions supplied with the connectors for correct installation instructions and bolt types to be used for either concrete or timber floors. Within the length of the bracing element, bottom plates are fixed in accordance with the requirements of NZS 3604.

Lining

One layer of 7 mm, 9 mm or 12 mm Ecoply plywood fixed directly to framing. If part sheets are used, ensure nailing at required centres is carried out around the perimeter of each sheet or part sheet. A 2-3 mm expansion gap should be left between sheets.

Fastening the Ecoply® panels

Fasten with 50 x 2.8 mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7 mm or 3 fastener diameters from sheet edges. Screws cannot be used. Power driven nails are suitable. Do not overdrive, nails must be full round head.

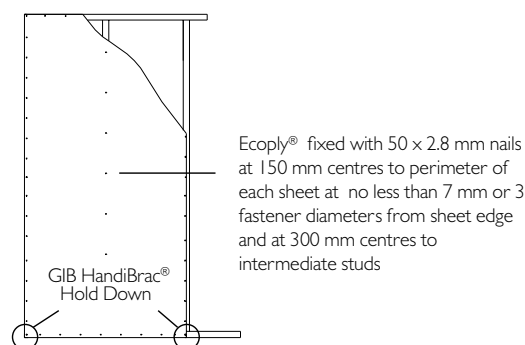
Fasteners for H3.2 CCA treated Ecoply® panels

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised.

In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances and further fastener selection advice. Where stainless steel nails are required, annular grooved nails must be used.

Fastening centres

Fasteners are placed at 150 mm centres around the perimeter of each sheet and 300 mm centres to intermediate studs. Where more than one sheet forms the brace element each sheet must be nailed off independently.



Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/ASI Structure. Testing was carried out using Ecoply manufactured by Carter

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SEPTEMBER 2015

Table 11: Ecoply® Suitability For Bracing Applications Including Treatment Type and Fastener Material*

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones as per section 4 of NZS 3604, including sea spray):	Ecoply Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones B & C, as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone D (sea spray), as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply Barrier Specification & Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B & C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zones D, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones (including sea spray), as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

* Refer to Table 8, page 16 of Ecoply Specification & Installation Guide.

Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter

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3.4 ECOPLY® BRACING SPECIFICATION – EPG

Table 12: Structural Plywood Brace with Plasterboard Other Side

Specification No.	Minimum Wall Length	Lining Requirements	BU's/m Wind	BU's/m Earthquake
EPG_0.4	0.4 m	Ecoply one side and 10 mm	100	115
EPG_1.2	1.2 m	GIB® Standard plasterboard other side	150	150

Framing

Wall framing must comply with:

- NZBC B1 - Structure: AS1 Clause 3 Timber (NZS 3604)
- NZBC B2 - Durability: AS1 Clause 3.2 Timber (NZS 3602)

Framing dimensions and height are as determined by the NZS 3604 stud and top plate tables for load bearing and non load bearing walls. Kiln dried verified structural grade timber must be used. Machine stress graded timber, such as Laserframe® of SG8 stress grade minimum, is recommended.

Bottom plate fixing

Use GIB HandiBrac® hold-down connections at each end of the bracing element. Refer to manufacturer installation instructions supplied with the connectors for correct installation instructions and bolt types to be used for either concrete or timber floors. Within the length of the bracing element, bottom plates are fixed in accordance with the requirements of NZS 3604.

Lining

Side 1: One layer of 7 mm, 9 mm or 12 mm Ecoply plywood exterior wall cladding fixed directly to framing. If part sheets are used, ensure nailing at required centres is carried out around the perimeter of each sheet or part sheet. A 2-3 mm expansion gap should be left between sheets.

Side 2: One layer of 10 or 13 mm GIB® Standard plasterboard vertically or horizontally fixed. Sheet joints are touch fitted and fastener heads and joints stopped in accordance with the GIB® Site Guide.

Fastening the Ecoply® panels

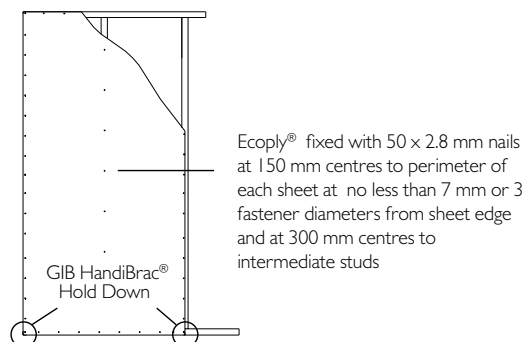
Fasten with 50 x 2.8 mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7 mm or 3 fastener diameters from sheet edges. Screws cannot be used. Power driven nails are suitable. Do not overdrive, nails must be full round head.

Fasteners for H3.2 CCA treated Ecoply®

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances and further fastener selection advice. Where stainless steel nails are required, annular grooved nails must be used.

Fastening centres

Fasteners are placed at 150 mm centres around the perimeter of each sheet and 300 mm centres to intermediate studs. Where more than one sheet forms the brace element each sheet must be nailed off independently.



Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter

Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB HandiBrac® are registered trade marks of Fletcher Building Holdings Ltd.

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Fastening the GIB® Plasterboard

32 mm x 6 g GIB® Grabber® Screws or 35 mm GIB® Nails

Fastening centres

Fasten 50, 100, 150, 225 and 300 mm from each corner and 150 mm thereafter around the perimeter of the bracing element. For vertical fixing place fasteners at 300 mm centres at intermediate sheet joints. For horizontal fixing place single fasteners in the tapered edge where sheets cross studs.

Place fasteners 12 mm from paper bound edges and 18 mm from cut sheet edges. GIB® plasterboard must be treated in every respect in accordance with relevant GIB® literature.

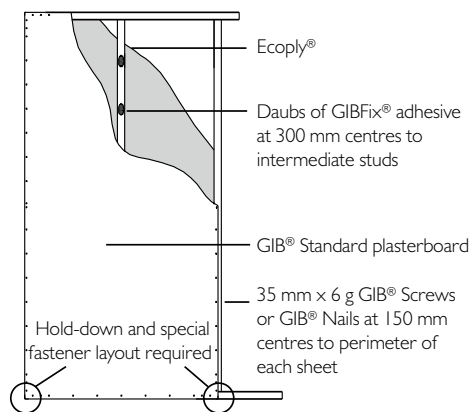


Table 13: Ecoply® Suitability For Bracing Applications Including Treatment Type and Fastener Material*

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones including sea spray, as per section 4 of NZS3604):	Ecoply Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones I B & C, as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone I D (sea spray), as per section 4 of NZS3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply Barrier Specification & Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B & C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zone D, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones (including sea spray), as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

* Refer to Table 8, page 16 of Ecoply Specification & Installation Guide.

3.5 GIB HANDIBRAC® – RECOMMENDED INSTALLATION METHOD

Developed in conjunction with MiTek®, the GIB HandiBrac® has been tested for use as the hold-down in all EP bracing elements.

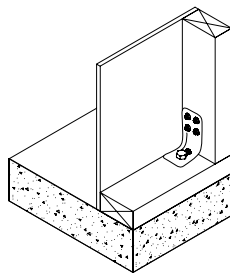
- The GIB HandiBrac® registered design provides for quick and easy installation
- The GIB HandiBrac® provides a flush surface for the wall linings because it is fitted inside the framing. There is no need to

check in the framing as recommended with conventional straps

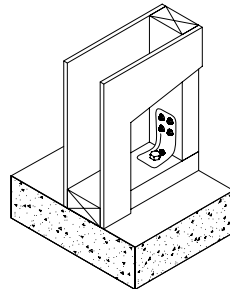
- The GIB HandiBrac® is suitable for both new and retrofit construction
- The design also allows for installation and inspection at any stage prior to fitting internal linings

Concrete Floor

External Walls



Internal Walls



Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate

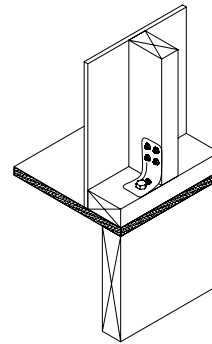
Position GIB HandiBrac® at the stud/plate junction

Hold-down fastener requirements

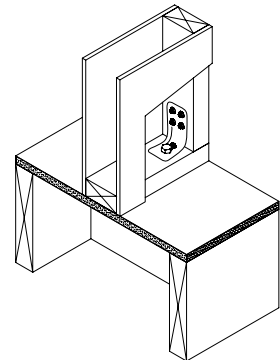
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or screw bolt supplied with the bracket

Timber Floor

External Walls



Internal Walls



Position GIB HandiBrac® in the centre of the perimeter joist or bearer

Position GIB HandiBrac® in the centre of the floor joist or full depth solid block

Hold-down fastener requirements

M12 x 150 mm galvanised coach screw

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3.6 STRUCTURAL CEILING DIAPHRAGMS

Diaphragms are used to transfer lateral loads to braced walls and allow for greater spacing between bracing lines. Diaphragms do not have a BU rating themselves.

Plywood diaphragms are an acceptable solution as described in section 13 of NZS 3604 13.5.2 which allows for plywood not less than 6 mm thick and a minimum of three ply for:

- Diaphragms not steeper than 25 degrees to the horizontal and not exceeding 12 metres long under light or heavy roofs and;
- Diaphragms not steeper than 45 degrees to the horizontal and not exceeding 7.5 metres long under light or heavy roofs

Plywood ceiling diaphragms required to comply with NZS 3604 must be constructed as follows:

- The length of diaphragm shall not exceed twice its width measured between supporting walls
- The ceiling lining must consist of plywood over the entire area of the diaphragm
- Complete sheets with a minimum size of 1800 x 900 must be used
- Framing size and spacing must comply with NZS 3604
- Fastener size should comply with Table 7 of this guide. E.g. 40 mm x 2.5 mm flat head nails for 7 mm and 9 mm Ecoply
- Fastening is at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing
- Fixings are no closer than 10 mm from sheet edges
- Perimeter ceiling framing must be connected to wall framing by a perimeter 140 mm x 35 mm ribbon plate nailed to the top of the top plate or alternative such as a 0.55 mm thick steel angle or proprietary steel channel
- Sheets must be laid in a staggered pattern
- The basic shape of a ceiling diaphragm should be rectangular. Protrusions are permitted but cut-outs are not (see Figure 13.4 NZS 3604)

4.0 ROOFS AND DECKS

The section below covers the use of Ecoply plywood used as a substrate for flexible membrane and tile systems in roofing and decking applications. The information below should be considered as supplementary to system specifications from roofing and decking suppliers.

Further guidance on installation and detailing factors can be found in the EWPA Technical Note; Plywood Roofing and Flooring: Installation and Detailing Factors. This can be downloaded from www.ewp.asn.au

Ecoply is not recommended as a substrate for exterior decks without a properly detailed barrier material such as butyl rubber, vinyl or E.P.D.M to protect the surface from weathering.

Always refer to the roofing and decking system supplier for installation, plywood selection and surface preparation requirements for specific roofing and decking products.

4.1 FLEXIBLE MEMBRANE SYSTEMS

- Roofing and decking membranes may comprise synthetic rubber sheeting glued to the Ecoply, or torch welded bitumen membranes
- Always ensure Ecoply is dry and free of imperfections such as surface dust and blemishes as membranes coatings will telegraph any substrate imperfections
- Use Ecoply Flooring or Structural Square Edge (CD Grade)
- Where Ecoply Flooring is used consider the use of a small daub of glue or nail in the Tongue & Groove of each sheet if potential movement of the plastic tongue joint is not acceptable
- For trafficable decks use a minimum 17 mm thickness, refer to Table 15A and 15C for specification
- Use countersunk stainless steel screws and adhesive on framing to avoid head popping. Apply adhesive between screw locations
- Use kiln dried timber framing such as Laserframe® or appropriate LVL framing from the Futurebuild® range
- Consult the membrane manufacturer regarding use of bond breaker tapes over joints to allow elongation with natural plywood movement
- Where treatment is required use only H3.2 CCA treated Ecoply. Do not use H3.1 LOSP treated Ecoply (solvent based carrier). It is not compatible with most membrane systems. If there is evidence of treatment salt crystals on the Ecoply surface remove by scrubbing with a small amount of water and allow the surface to dry prior to laying the membrane system

Plywood substrates, face checking and flexible membrane systems

All natural wood based products (including Ecoply) have the potential to develop natural surface face checks when exposed to external environmental conditions. The degree of face checking is dependent on a number of factors including the length of time and level of exposure to weather during construction which is outside the manufacturing control of CHH Woodproducts. For more information see section 1.8: General Design Considerations - Face Checking on Plywood Exposed to Weather.

Face checks, while typically not present after manufacture, do not affect structural performance of the sheet and are acceptable under AS/ NZS 2269. They are not a manufacturing fault.

Designers and membrane suppliers must carefully consider the suitability of plywood as a substrate for the membrane system in question if the potential of telegraphing of face checks onto the membrane surface is not acceptable.

The risk of telegraphing can be reduced by protecting the plywood surface from weather and moisture during the construction process.

Where the potential of face checking in the plywood substrate is not acceptable designers should consult the membrane supplier for a more suitable membrane or an alternative substrate.

Allowing for moisture expansion of plywood under roof and floor coverings

Membrane suppliers have held different views on the requirements for plywood substrates. The fixing instructions within this guide are the starting point but designers must detail joints that allow for expansion in accordance with practices recommended by the chosen membrane supplier.

CHH Woodproducts' view, and the recommendation of a number of suppliers here and in North America is that expansion and contraction at sheet edges should be allowed for by loosely butting tongue and grooved edges so that the tongues can absorb movement and providing a small gap (2 to 3 mm) between square sawn edges. Use a bond breaking tape over these joints to spread elongation in the membrane over a longer distance than the narrow gap in the joint itself. This tape can double as a rain seal over the sheet edges during construction.

Other membrane suppliers believe that sheets should be tightly butted and glued and screwed hard up to each other. This practice constrains movement at the small joint between sheets, but over a wider area requires significant allowance for movement around the perimeter of a roof segment. Junctions between the roof slopes and walls need careful detailing to allow for the potential movement. Movement control joints should be provided at regular intervals following the recommendation of the membrane manufacturer, especially if this method is adopted.

4.2 ROOF TILE SYSTEMS

Most fibreglass, asphalt or wooden shingle and tile systems will tolerate DD grade surface characteristics.

- Use unsanded Ecoply Roofing (DD grade), or sanded Ecoply of the required thickness in Table 15A

- The unsanded surface provides extra grip on steeper roofs for roofers
- Fix tiles according to the tile manufacturer's specification
- Under asphalt shingles use felt underlay over the Ecoply

4.3 ROOFING & DECKING – PRODUCT SELECTION GUIDE

Table 14: Roofing and Decking Product Selection Guide

	Structural Square Edge (CD Grade)	Flooring (CD Grade)	Roofing (DD Grade)
Product Description	CD face grade sheets are available in a range of thicknesses and size	Solid sanded C grade surface with tongue and groove profile on long edges	Unfilled D grade surface with tongue and groove profile on long edges
Recommended Applications	Substrate for flexible coverings requiring a smooth substrate and where avoidance of visible surface indentations is critical. Use as a substrate for flexible roof and deck membranes and thin roofing tiles		Substrate for coverings with the ability to span holes in the D face grade (up to 75 mm in diameter) such as asphaltic roof tiles and torch welded polyester reinforce membranes. Do not use under flexible membrane coverings or where avoidance of visible surface indentation is critical
Face Grades	Front: C solid sanded Back: D unsanded		Front & Back: D unsanded
	Refer to Table I for range and treatment options		
Product Features	Blocking required to support all edges	Second void free layer under surface veneer for increased protection against punching through the first veneer under high point loads & increased moisture resistance. Blocking not required to support tongue and groove edges (unless otherwise specified)	15 and 17 mm thickness specifically designed for use under shingles and tiles that have a courser finish. Unsanded surface for extra strength and grip for installers on steep roofs Blocking not required to support ² tongue and groove edges (unless otherwise specified)
Thicknesses Available	12, 15, 17, 19, 21, 25 mm	15, 17, 19, 21, 25 mm	15, 17 mm
Sheet Sizes Available	2400/2700 x 1200m		
Stress Grades Available	F8 (F11' available upon request)	F8 (F11' available upon request) 19 mm Longspan supplied F11' as standard	F11'
Treatment	Untreated, H3.2 CCA and H3.1 LOSP	Untreated, H3.2 CCA, (H3.1 LOSP available upon request)	
Span Capabilities	Refer to frame spacings in Tables 15A to 15C		

- 1 Where the stress grade F11' is referred to in all CHH Woodproducts plywood literature actual stress grade properties of panels are F11' parallel to the face grain and F8 perpendicular to the face grain.
- 2 Where roofing products use tongue and groove CHH Woodproducts recommends fastening the tongue to rafters/joists at a minimum of one point

4.4 FRAME SPACINGS FOR ECOPLY® ROOFS AND DECKS

Table 15A: Roofing - Sheathing, Non Trafficable, Above 2 Degree Pitch

Application	Roof Pitch	Stress Grade	Maximum Wind Zone	Maximum frame centres (mm) for Ecopyl® with face grain across framing				
				Ecopyl nominal thickness (mm)				
				15	17	19	21	25
Sheathing, non trafficable roof for all roof pitches above 2 degrees Suitable for roof mass up to 30 kg/m² (additional to Ecopyl weight or 40 kg/m² including Ecopyl)	>2°	F8	Extra High	600	600	800	800	900
			High	900	900			
		F11	Very High	800	900			
			Extra High	800	800			
	>20°	F11	Very High	900	900			
			Extra High	800	800			

Suggested applications include substrates for Asphalt Shingle and Membrane type roofs. The above suggested maximum framing spans are based on the following deflection criteria:

- Under a short term 1kN point load, deflection is less than Span/130
- Under a long term self weight load, deflection is less than Span/400
- Under a short term wind gust load, deflection is less than Span/150

Table 15B: Sub-Sheathing

Application	Maximum frame centres (mm) for Ecopyl® with face grain across framing					
	Ecopyl nominal thickness (mm)					
	12	15	17	19	21	25
Under steel or self supporting cladding for support of building paper or lateral diaphragm action. Sag not critical.	800	1200				

Table 15C: Decking

Application	Maximum frame centres (mm) for Ecopyl® with face grain across framing			
	Ecopyl nominal thickness (mm)			
	17	19	21	25
1. Trafficable roof decking Limited by dynamic response of roof as floor	540	600	600	750
2. Roof decking to Clause 8.5.5.1 c) of E2/AS1	400	400	400	400

- The current requirement in E2/AS1 is extremely conservative when compared with calculations determined for other applications using VM1 Clause 6 and calibrating the spans against codes of practice from North America and Australia. CHH Woodproducts recommends designers consider the alternative solution in row 1 of Table 15C for membrane decking in consultation with the membrane manufacturer:

Unless otherwise stated spans apply equally to square edge or tongue and groove panels. Check Table 1 for availability of grades and lengths to match span multiples in Table 16

- Use the next lower recommended frame spacing or thicker Ecopyl® where appearance is critical
- To suit trusses at 900 centres, 2700 long sheets are available. See Table 16

Table 16: Frame Set Outs to Match 2400mm and 2700mm Sheet Modules

Length (mm)	Typical Frame Spacing to Suit Sheet Length			
2400	400	480	600	800
2700	450	540	675	900

Limitation for the use of Table 16.

CHH Woodproducts does not have access to information about designs for specific sites. Table 16 is a guide to estimate the initial selection of a span for design. Each site should be evaluated by qualified persons to ensure all loading parameters and site conditions have been considered, and appropriate changes should be made by the building designer.

4.5 ROOFING – DESIGN CONSIDERATIONS

Durability

In general, H3.2 CCA treatment of Ecoply plywood with waterborne preservatives is recommended for roofing.

Roofing materials

Various roofing materials used over Ecoply plywood have different durability expectations, normally in excess of the 15 years required by the NZBC Clause B2. Durability of the roofing is subject to the specifications, installation and maintenance requirements of the roofing manufacturer. The durability of the Ecoply can only be assured as long as the overlying roofing and detailing excludes moisture. With good building practice and maintenance, roofing materials can be repaired or replaced at regular intervals to achieve life from the Ecoply in excess of the original roofing. The durability of Ecoply structural plywood will continue to satisfy the relevant requirements of the NZBC for 50 years, if installed in accordance with the instructions and limitations within this guide and the roof system is adequately maintained.

High humidity, condensation and solar driven moisture

Where the moisture content of wood may exceed 18% for prolonged periods, Ecoply must be H3.2 CCA treated, to resist decay hazard. This includes Ecoply used under roof coverings that may be subject to condensation, or where rain moisture soaked in the roof covering can be driven into the Ecoply by the sun. Appropriate building detailing and ventilation is recommended which can reduce the need for treatment.

Roof ventilation

Good ventilation and the avoidance of moisture are important design considerations when using H3.2 CCA treated Ecoply panels. Poorly ventilated spaces can develop very high temperature and moisture levels. The most likely source of moisture is the condensation of vapour from warm interior air on the underside of cold roofing. Good ventilation can limit the build up of excess moisture vapour in warmer climates

but in regions where winter nights are consistently colder, H3.2 CCA treated Ecoply should be used. Moisture induced decay is only one risk that needs to be managed. If incorrectly detailed, roof spaces can be very tight and the dark colour of many roofing materials means that excessive heat can build up causing distortion in plywood or even framing members. Use the suggested details or alternatives to suit. Designers must consider roofing type, seasonal conditions, wind effects and the intended use of the building.

As a minimum, CHH Woodproducts recommends a vent area of 1/300th of the ceiling plan area (approx 3350 mm² per square metre of ceiling) equally distributed at the eaves and ridge to allow free flow under the Ecoply, up the roof slope, and out.

Roofing material suppliers should detail vent systems suited to their specific membrane or tile roofing. Proprietary ridge capping profiles or vents are available from roofing suppliers.

Detail gaps of 25 mm in the plywood at ridges, and at walls where a roof slopes up to an upper storey. For flat roofs, natural ventilation flows may be impeded. Use proprietary roof vents. Consider forced ventilation as appropriate.

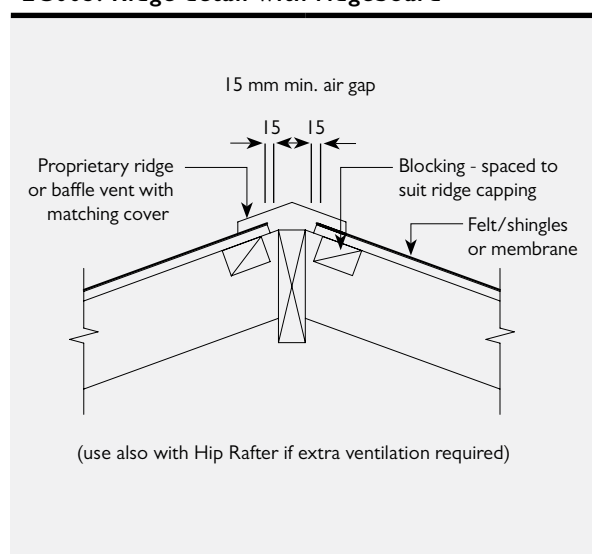
Bubbling

Plywood bubbling occurs when moisture trapped in knot holes in inner veneers expands as the temperature rises. This moisture will dissipate through the face veneer and will not affect the structural integrity of the plywood panel. As membrane coverings can prevent moisture dissipation, Ecoply Flooring and Structural Square Edge CD is recommended if the visual appearance of bubbling is not acceptable, or a high visual finish is required.

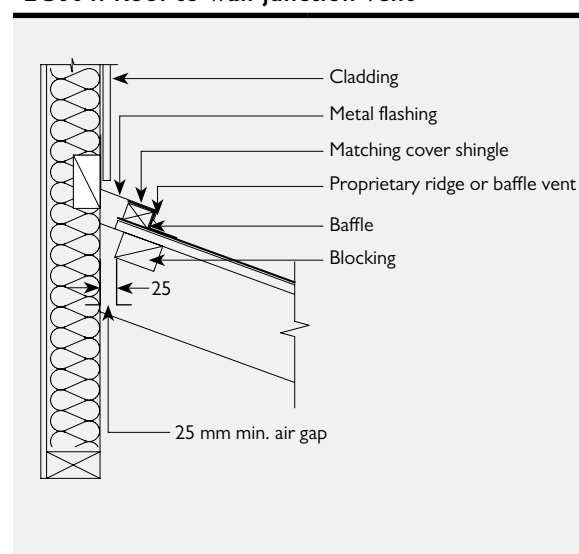
Soil

Ecoply plywood (untreated or H3.1 LOSP/H3.2 CCA treated) must not be allowed to come in contact with soil. Surfaces, flashings and gutters should be detailed to avoid trapping detritus and moisture.

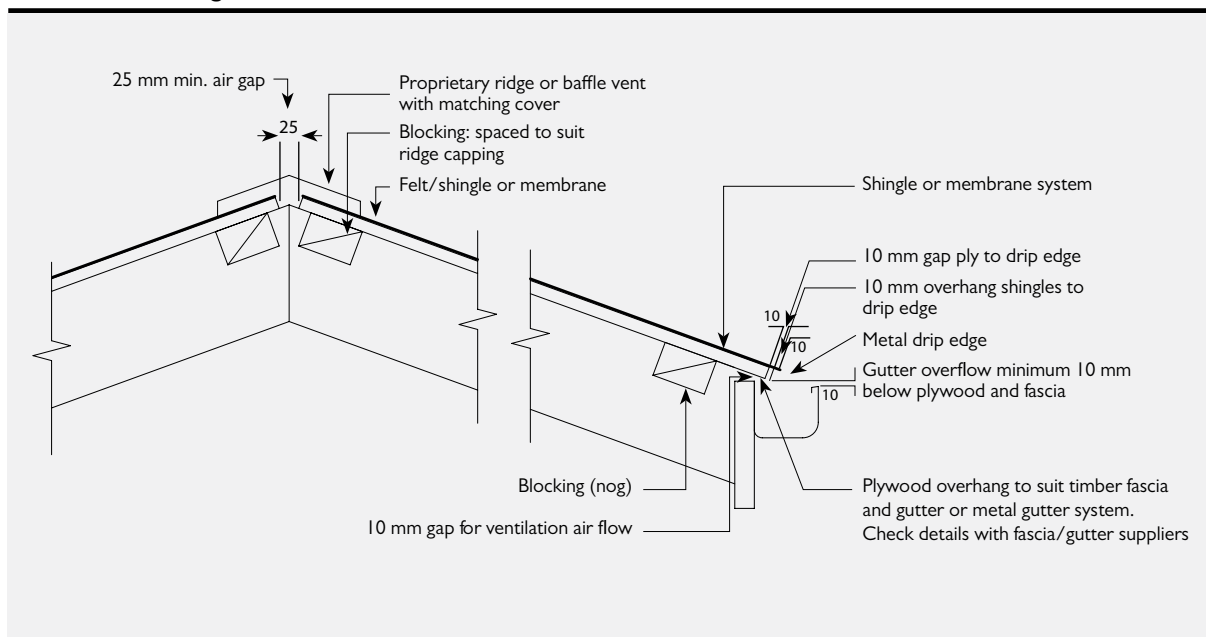
EC003: Ridge detail with ridgeboard



EC004: Roof to wall junction vent



EC005: Truss ridge detail



Rain wetting and construction time

Untreated Ecoply will withstand a reasonable amount of rain wetting and exposure during construction for up to three months. In extreme weather conditions of high temperature and/or high rainfall this period may be less. Appearance issues such as discolouration and face checking of the sheet surface can be expected if Ecoply is exposed. For roofs uncovered for longer periods use H3 treated Ecoply to lower the risk of decay. Return Ecoply to below 18% moisture content before installing moisture sensitive materials, coverings, coatings or adhesives. Where a high visual finish is desired (such as membrane roofing and decking) protect Ecoply from exterior moisture during construction. For detailed information see section 4.1 Flexible Membrane Systems.

Gutter details

Where Ecoply structural plywood sub-sheathing supports roofing at gutters, a metal drip edge must be provided with appropriate gaps to shed water. Gutters should have a front edge overflow or ends lower than the back to shed water overflow away from framing and sub-sheathing Ecoply.

H3.2 CCA treatment is recommended for Ecoply sheets that protrude into gutters, with regular maintenance to avoid leaf mould (soil) development. Untreated Ecoply must not be exposed to gutter splash or moisture.

Fastener spacing for wind suction

Wind pressure applies withdrawal loads to nails holding plywood to purlins and trusses. For the frame spacing in Table 15A designers may use the following guidelines for wind zones expressed in NZS 3604.

Note: Full penetration of fasteners into the supporting member is assumed.

The main body of the roof

For wind zones up to and including high, use 60 x 2.8 mm nails spaced at 150 mm centres on all cross framing. For very high and extra high wind zones, use 75 x 3.15 mm nails spaced at 150 mm centres on all cross framing.

Roof edges

All Ecoply structural plywood used at local pressure suction zones at the roof edges, gutters, eaves and gable ends must be supported on framing, and fixed at 75 mm centres with minimum 60 x 2.8 mm nails for regions up to, and including high wind zones (use 75 x 3.15 mm nails for very high and extra high wind zones). Local pressure zones are interpreted from AS/NZS 1170 as being within 20% of the building length, width or the average of the gutter and ridge height.

Designers and builders should review site conditions to ensure adequate fixing is applied. Buildings in exposed sites and lee zones should be specifically designed using the loading standard (AS/NZS 1170) and the timber structures standard NZS 3603. In some wind conditions, the tiles themselves may be sucked from the plywood. Use a consulting engineer to assess site conditions, calculate wind pressures for the specific site, and determine the fastening and span requirements, and to check that the truss system can resist the loads being applied through the plywood.

Fixing of roofing

Fixing methods for tile, shingle and membrane systems must be designed for the expected wind and weather exposure to protect the Ecoply substrate. Some shingle systems may not be suitable for use in very high or cyclonic wind zones.

Follow the specifications of the roofing manufacturer and refer to the appropriate BRANZ Appraisals.

4.6 ROOFING – INSTALLATION

Framing

Frames should be at spacings to suit plywood thicknesses in Table 15A, page 25. Additional requirements for roof framing are:

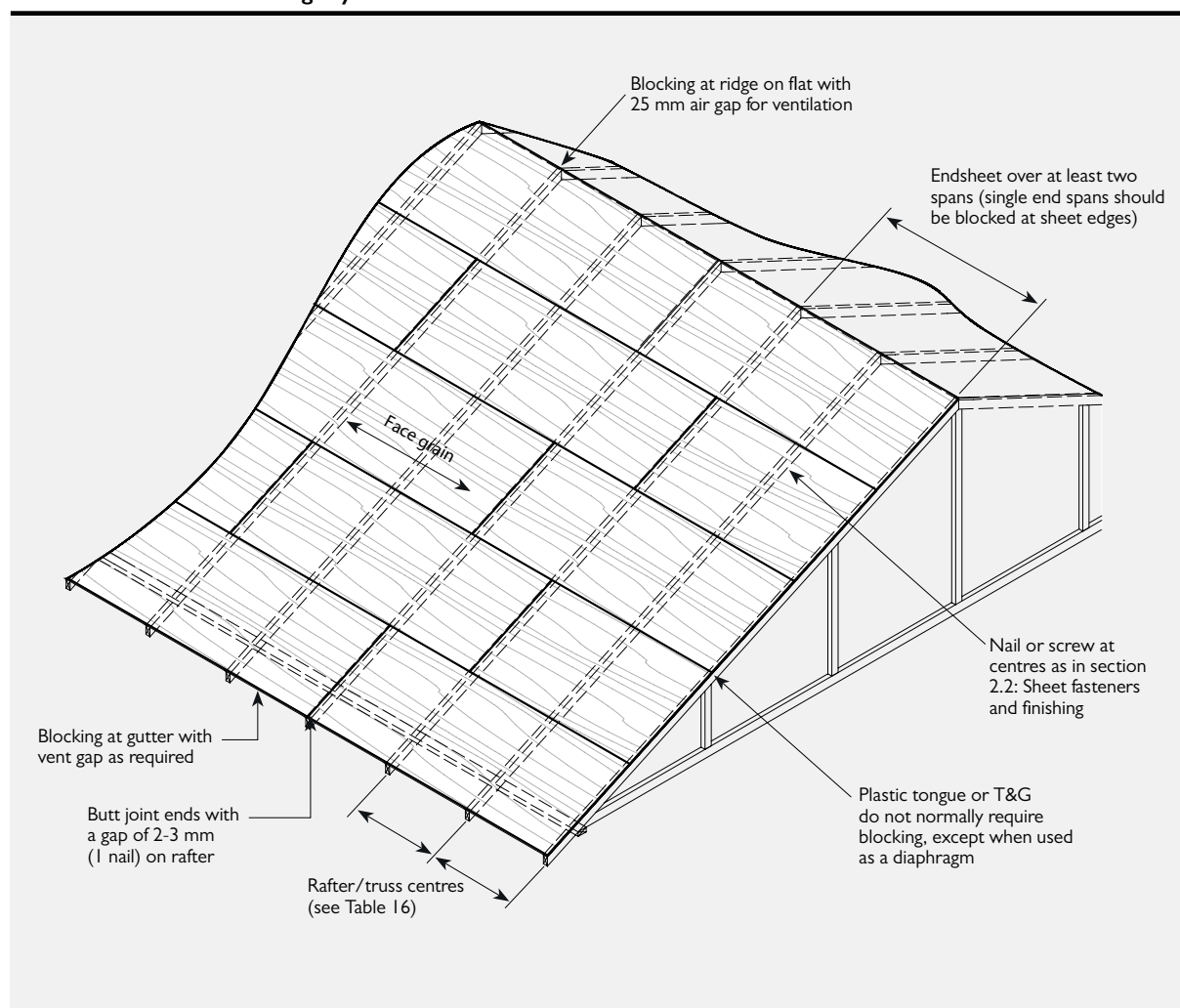
- Ensure top edges of framing are properly aligned
- Use dry Laserframe®, hyJOIST® or hySPAN® framing to lower moisture level in roof spaces, second floor spaces, and reduce differential truss, rafter or joist deflections

Blocking (nogs, dwangs)

- Block all edges of Ecoply Structural Square Edge plywood
- Block all edges at the ridge and gutter lines to prevent sag at capping or gutters

- Block for high face loads or under areas accessed for maintenance
- Blocking within the body of the roof is not required under tongue and grooved edges when using Ecoply Flooring & Roofing, unless required for framing stability or the plywood is being used as a diaphragm to resist horizontal wind or earthquake loads. In this case fixings transfer shear across the joints and details should be specified on drawings
- Use blocking on the flat to provide gaps where air flow is needed for ventilation
- Specific roofing suppliers may require blocking to suit their system

EC006: Sheet and framing layout



Sheet layout

- Ensure Ecoply sheets are dry before installation
- Place face grain at right angles to supports
- Sheets must be continuous over at least two spans (three framing members)
- Lay the sheets in a staggered pattern
- Allow sufficient clearance inside confining structure such as concrete or brick walls adjacent to the roof. Use extra allowances with large areas
- Allow clearance for ventilation as required

Fixing of sheets

Ecoply may be fixed to different types of framing with nails, screws or a combination of fasteners and construction adhesives.

Fasteners should be corrosion resistant to a level appropriate to the end use life expectancy (15 or 50 years) and expected exposure to moisture. Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners must be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

The integrity of a plywood based roof system is directly related to how well the panels are fixed to the framing. Ecoply must be fixed to resist wind suction loads, and to maintain surface qualities of the overlying roof covering.

- Always refer to the roofing system supplier for system requirements
- For roofing, check the additional requirements according to wind exposure
- For very exposed sites, cyclonic conditions or roofs above 10 metres in height, carry out specific structural design to the relevant standards
- Screw fixing must be used for membrane roofing, and is preferred for all systems because of increased holding power and avoidance of head popping
- For minimum fastener spacing for wind suction, refer section 4.5 Roofing - Design Considerations - Fastener spacing for wind suction

Fixing to timber frames

- Ring shank nails or annular grooved nails or screws are recommended for additional holding power
- Use flathead nails. Do not use jolt or bullet head nails
- Stainless steel nails must be annular grooved
- Ensure fastener is compatible with the roofing cover (consult roofing system supplier)
- Staples may be used provided that the withdrawal load is equivalent to the hand driven galvanised flathead nail. A suggested minimum is a 50 mm long staple with 12 mm crown and legs 1.8 mm diameter. Space staples 20% closer than nails. Refer to the manufacturer's information for corrosion resistance and durability

Fixing to steel frames

- Fix directly to roll formed steel (up to 2 mm thick) with self-drilling, self-tapping screws. If plywood gets damp and expands, screws in thicker steel may shear. Keep Ecoply dry or use larger screws or;
- Bolt or screw battens to the steel and apply Ecoply as above for timber. Ensure that battens have adequate thickness for the minimum nail or screw length
- H3.2 CCA treated plywood must not be fixed to steel framing

5.0 FLOORING

The following section covers the use of Ecoply Flooring plywood used as a flooring substrate with flexible and rigid overlays. Ecoply Flooring is suitable as a substrate for overlays such as

carpet, tiles and some membrane products (refer to flooring manufacturer).

5.1 FLOORING – RANGE

- Ecoply Flooring features a void free second layer under the surface veneer for increased protection against moisture bubbles and punch through of the first veneer under high point loads than normal Ecoply Structural Square Edge plywood
- The tongue and groove on long sheet edges does not require support blocking under the joint (unless otherwise specified)
- Supplied in F8 stress grade (F11 available upon request)
- Ecoply 19 mm Longspan Flooring supplied as standard in F11/F8 stress grade
- Supplied standard with a sanded C grade surface with D grade back
- Sanded B grade surface is available in 19 mm thickness (untreated only) for clear finish applications. Designers must expect the surface to dent or mark more easily than hardwood flooring systems as Ecoply is manufactured from relatively soft radiata pine.
- Available untreated or H3.2 CCA treated, (H3.1 LOSP treated available upon request)
- LOSP treated plywood is not recommended for internal applications
- Refer to Table 1 for range and treatment options

5.2 FLOORING – INSTALLATION

Table 17: Flooring Frame Spacings

Application	Maximum frame centres (mm) for Ecoply® with face grain across framing				
	Ecoply nominal thickness (mm)				
	15	17	19	21	25
1. Domestic flooring 2kPa - 1.8kN	480	540	600 F11 ¹ Longspan	600	750
2. Institutional and public assembly up to 4kPa - 2.7kN		300	480	540	750
3. Institutional and crowd assembly up to 5kPa - 3.6kN			400	450	600
4. Corridors, industrial up to 5kPa - 4.5kN			300	400	540
5. Domestic garage floor** 2.5kPa - 9kN					270

** Provide blocking to all edges of the sheet.

- Use the next lower recommended frame spacing or thicker Ecoply flooring where appearance is critical
- To suit frames at 900 centres, 2700 long sheets are available. See Table 16

¹ Where the stress grade F11 is referred to in all CHH Woodproducts plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain. Please contact CHH Woodproducts for Span/360 deflection limits for internal membrane areas

Floor loads

For domestic garage floors blocking is required under all edges to control wheel loads on the tongue. Testing with 113 mm diameter load head (0.01 m²) confirms commercial floor capabilities.

Refer to Table 16 to match frame set outs with 2400 mm and 700 mm sheet modules.

Framing

- Joist spacings should be at spacings to suit plywood thicknesses in Table 17
- Use dry Laserframe®, hyJOIST® or hySPAN® framing to achieve a moisture content of 18% or less

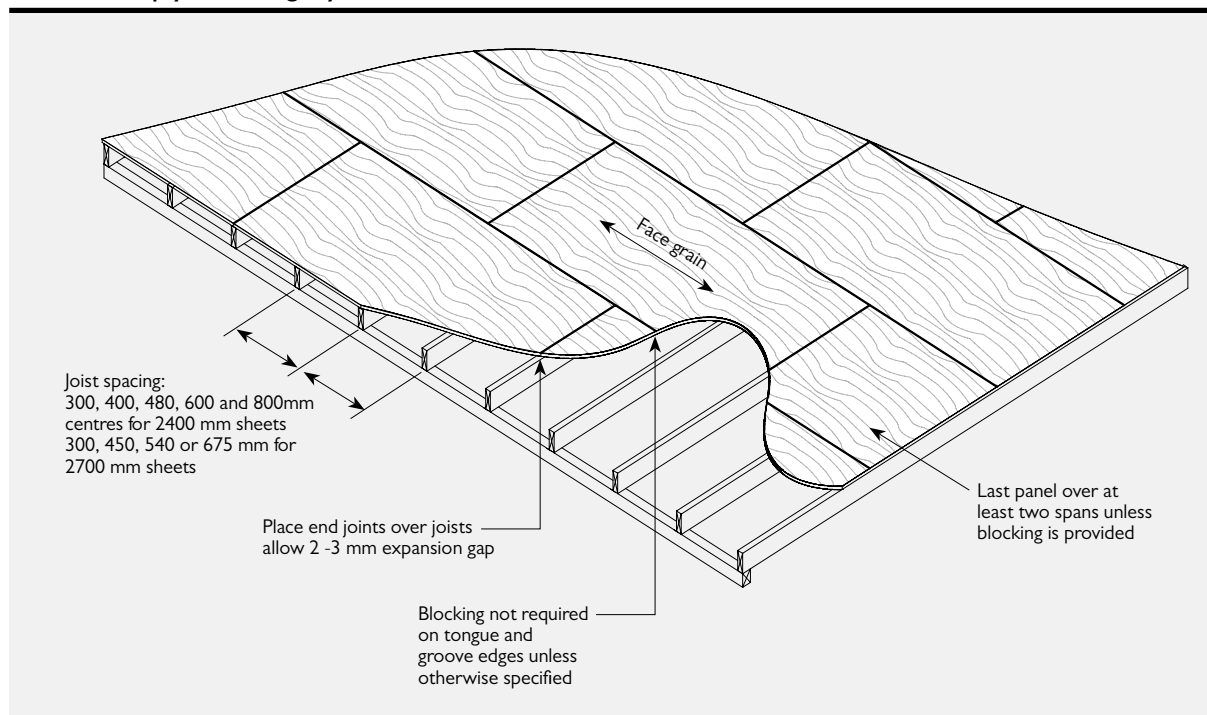
Blocking

- Blocking within the body of the floor is not required under tongue and groove edges unless otherwise specified (such as in domestic garage floors)

Sheet layout

- Ensure Ecoply sheets are dry before installation
- Place face grain at right angles to supports
- Sheets must be continuous over at least two spans (three framing members)
- For panels at floor edges where a continuous two span coverage is not possible, sheet edges must be supported by blocking
- Lay sheets in a staggered pattern
- Allow clearance for ventilation as required

EC007: Ecoply® Flooring layout



Fastener selection and treatment

Fasteners should be corrosion resistant to a level appropriate to the end use, life expectancy (15 or 50 years) and expected exposure to moisture.

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Fasteners and fixing of sheets

- Ecoply Flooring may be fixed with nails or screws or a combination of mechanical fasteners and construction adhesives
- For fastener specifications (including lay out and sizes) refer to section 2.2: Sheet Fasteners and Fixing
- For construction adhesive specifications refer to section 2.3: Adhesives
- Ring shank or annular grooved nails, or screws are recommended for additional holding power
- To reduce the risk of fastener popping or floor squeak the use of construction adhesives is advised.
- Do not use jolt or bullet head nails

5.3 FLOORING – FINISHING

- Overlays and coatings should be applied following the manufacturer's specifications
- Avoid heavy sanding that may remove the critically important structural face veneer
- Adhesives must be compatible with CCA (Copper Chrome Arsenic) treatment in H3.2 CCA treated sheets. Compatibility can often be improved by lightly washing, scrubbing and drying the plywood surface prior to fixing
- Where clear or stained finishes are desired, designers should select sheets and protect the floor as much as possible from the weather and construction activities
- Ecoply is made from relatively soft radiata pine and as such will dent or mark more easily than hardwood flooring systems. This is to be expected and designers must consider the long term appearance requirements of the project. Ecoply Flooring is a good substrate for harder wearing flooring overlays, and is not primarily intended for clear finishing, especially if it is exposed to moisture during construction
- For improved surface finish, floors should be protected from weather during construction as soon as possible

6.0 FREQUENTLY ASKED QUESTIONS

Q: How much space should be allowed for expansion?

A: Allow a 2 - 3mm expansion gap between square edges of Ecoply® sheets. If using Ecoply Flooring, a 5 mm expansion gap is recommended at the perimeter of the floor or deck. Check by calculation for large areas.

Q: Can power driven nails be used to fix Ecoply?

A: Paslode power driven nails have been tested for fixing Ecoply and Shadowclad® plywood products for particular bracing and cladding applications. For power driven nail specifications refer to the Paslode Special Fixing Applications document available from <http://www.paslode.co.nz/images/fix-app-CHH-woodproducts.pdf>. Use the Paslode Impulse Compact Nailers fitted with a No Mar(k) work contact element to eliminate any contact marks on the plywood. Adjust the work contact element to the flush position and fire the nail at 90° to the work surface. Hammer any nails flush which are left proud. Do not overdrive.

Q: How close to sheet edges can I nail?

A: Fixings must be at least 3 fastener diameters or 7 mm from the sheet edge.

Q: Do I have to use stainless steel nails when using Ecoply for bracing?

A: Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners must be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Q: What is the weight of Ecoply?

A: Refer to Table 4A for weight (kg/m²) of different Ecoply thicknesses.

Q: What is the R-value of Ecoply?

A: The thermal resistance or insulating effectiveness of plywood panels can be calculated using NZS 4214. Plywood has a conductivity (k) of 0.13 W/mK so a 12 mm panel has a thermal resistance $R = 0.012/0.13 = 0.09$.

Q: Are there any compatibility issues when using Ecoply with other materials?

A: Adhesives for flexible rubber membranes may react with LOSP treatment and should therefore only be applied to H3.2 CCA treated Ecoply unless the membrane supplier advises differently. Check with the membrane manufacturer if in doubt. H3.2 CCA treatment is also corrosive and this must be taken into account when specifying H3.2 CCA treated plywood next to metals. For further guidance, refer to Tables 21 and 22 in Acceptable Solution E2/AS1.

Q: Can Ecoply be used as a rigid sheathing (air barrier)?

A: CHH has a specific system called Ecoply Barrier. Ecoply Barrier has been developed as a rigid air barrier. Refer to the current Ecoply Barrier Specification & Installation Guide for further information. 7mm H3.2 CCA treated Ecoply can also be used if combined with building underlay in accordance with E2/AS1 for a rigid air barrier system.

Q: What is the relevance of AS/NZS 2269?

A: Ecoply structural plywood is manufactured to AS/NZS 2269 Plywood Structural. This Standard is referenced by the NZBC Compliance Documents including NZS 3602 Timber and Wood-based Products for Use in Building, NZS 3603 Timber Structures, NZS 3604 Timber Framed Buildings, AS/NZS 1604.3 Specification for Preservative Treatment, Part 3: Plywood and Acceptable Solution E2/AS1 - External Moisture. Plywood not manufactured to AS/NZS 2269 does NOT meet the requirements of these NZBC Compliance Documents.

Q: What is the relevance of the PAA stamp?

A: Ecoply is manufactured under a third party audited, product quality control programme by the Engineered Wood Products Association of Australasia (EWPAA) to monitor compliance with AS/NZS 2269. Given that compliance with Standards is not actively policed by Standards New Zealand, this third party auditing provides important peace of mind for users and consumers of Ecoply plywood products.

Q: What is marine ply?

A: Marine plywood manufactured to AS/NZS 2272 Plywood Marine may contain species of low durability (source: BRANZ Good Practice Guide – Timber Cladding). Whilst marine plywood has a Type A glue bond, it is generally specified for its high surface appearance grade and lack of core knots as opposed to structural performance. AS/NZS 2272 limits marine plywood to a number of approved species that pass stringent property requirements for things like moisture permeability. These requirements are different from those in standards from other countries. Marine plywood is rarely treated as it is usually coated with resin, fibreglass, or a paint finish for long term durability.

Q: What should a specification for structural plywood include?

A: A specification for structural plywood should include:

Specification check list	Example
Quantity/size	20 sheets of 2400 x 1200
Thickness	12 mm
Edge finish	Square edge
Brand name	Ecoply® structural plywood
Reference to Standard	To AS/NZS 2269
Stress grade¹/layup	F8 (12-24-5)
Surface grade/bond type	CD A-Bond²
Accreditation	EWPAA product certified³

1 Stress grades may vary between different manufacturers and products.

2 Type A-bonds are suitable for permanent exposed applications and structural applications.

3 The EWPAA JAS-ANZ Product Certification Mark certifies that Ecoply structural plywood products have been manufactured under a third party audited joint product certification programme to monitor compliance with AS/NZS 2269

Q: What are F-grades?

A: The stress grading system is a ranking system which utilises the symbol F and a suffix 8, 11 etc as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade. For plywood of a given thickness, the higher the F-grade, the further it will span. For load bearing applications (e.g. flooring, roofing) the required F-grade as well as the plywood thickness must be specified to achieve the required span. F8 is the most common structural plywood grade found in New Zealand. All Ecoply® structural products are F8. Ecoply 15 mm roofing and Ecoply 19 mm Longspan Flooring are F11/F8. Other Ecoply Flooring products are also available in F11 upon request.

Q: What are surface/appearance grades (eg CD)?

A: Appearance grades (eg BD, CD, DD) denote the appearance grade of the plywood including the number and size of knot holes as defined in AS/NZS 2269 and summarised in Table 2A & 2B of this guide. The first letter describes the appearance of the face veneer and the second letter describes the back face.

Q: How long can Ecoply be left exposed to the weather?

A: Untreated Ecoply will typically maintain its structural integrity when exposed to the weather during construction for up to 3 months. The surface colour will start to silver off and face checking will become evident. Where the finished appearance of the Ecoply is important, it should be protected during construction. Ecoply is also available H3 treated to resist decay or insect hazard. When used in accordance with this guide, it can be specified to meet the durability requirements of the NZBC, however appearance issues such as face checking may still occur dependent upon the degree of exposure to weather during construction.

Q: What treatment levels and types are used for Ecoply?

A: Ecoply is available untreated or preservative treated. Ecoply is treated to the H3 hazard class for above ground use. The standard Ecoply treatment type is H3.2 CCA (Copper Chrome

Arsenate) although H3.1 LOSP Azole (Light Organic Solvent Preservative) may also be specified where a clear treatment is required. LOSP Azole is the standard treatment type for BD, Grooved Lining and Shadowclad®. CCA treatment gives the plywood sheets a green tinge and the drying process after CCA treatment may leave fillet marks on the face of the sheet.

Q: Does Ecoply have to be treated when used as structural bracing?

A: Ecoply used as bracing must be treated unless it is installed in an interior dry situation. Note, behind exterior cladding and in cavities (even if the Ecoply is covered with building wrap) are not considered to be an interior dry situation.

Q: Do I have to re-treat cut edges of treated Ecoply?

A: It is important to re-treat any cuts and holes with a brush on remedial treatment such as Holdfast® Metalex® Clear.

Q: What type of glue is used to manufacture Ecoply?

A: Phenol formaldehyde (PF) resins are used to bond the plywood veneers. This forms a Type A (Marine) bond suitable for structural applications and exterior use. Phenol formaldehyde resins are dark red/brown in colour. Product details printed on the back of Ecoply sheets indicate the 'A Bond'.

Q: Does Ecoply emit formaldehyde?

A: Formaldehyde occurs naturally in the environment and is emitted by processes such as combustion, decay and naturally by all timber species. Ecoply and Shadowclad meets the lowest formaldehyde emission class (E₀ - less than 0.5 mg/litre). Actual formaldehyde emissions have been tested to be less than 0.3 mg/litre.

Q: How should Ecoply be installed to maximise its stiffness properties?

A: Structural plywood has greatest stiffness along the long grain of the sheet (i.e. along its length). Therefore, flooring/roofing should be laid across joists/rafters rather than parallel to them.

7.0 REFERENCES AND SOURCES OF INFORMATION

- New Zealand Building Code (NZBC)
 - CHH Woodproducts technical notes - downloadable from www.chhwoodproducts.co.nz/document-library
 - NZS 3640:2003 "Chemical Preservation of Round and Sawn Timber"
 - NZS 3602:2003 "Timber and Wood-based products for use in Buildings"
 - NZS 3603:1993 "Timber Structures Standard"
 - NZS 3604:2011 "Timber Framed Buildings"
 - AS/NZS 1170:2011 "Structural design actions"
 - AS/NZS 2269:2012 "Plywood Structural"
 - AS/NZS 1604.3:2010 "Specification for Preservative Treatment, Part 3: Plywood"
 - AS 1684:2010 "Residential Timber Framed Construction"
 - US Product Standard PS1-95
 - Acceptable Solution 'E2/AS1 – External Moisture'
 - Acceptable Solution 'B2/AS1 – Durability'
 - BRANZ Bulletin 345: Flat membrane roofs – design and installation
 - BRANZ Bulletin 346: Flat membrane roofs – materials
 - BRANZ Bulletin 289: Asphalt shingle roofing
 - BRANZ Appraisals 307, 404, 411
 - Shadowclad® Specification & Installation Guide for Cavity Construction
 - Ecoply® Barrier Specification & Installation Guide
 - Material Safety Data Sheets
 - MSDS Azole Treated Plywood, LVL & I-Joists
 - MSDS H3 CCA Treated Plywood & I-Joist
 - MSDS Untreated Plywood
 - APA (www.buildabetterhome.org)
 - EWPA (www.ewp.asn.au)
 - Product Technical Statement for Ecoply available online (www.chhwoodproducts.co.nz/product-technical-statements)
 - EWPA Technical Note - Plywood Roofing and Flooring: Installation and detail factors
- Standards can be purchased online at www.standards.co.nz
Building Code Compliance Documents can be downloaded free of charge at www.dbh.govt.nz

8.0 LIMITATIONS

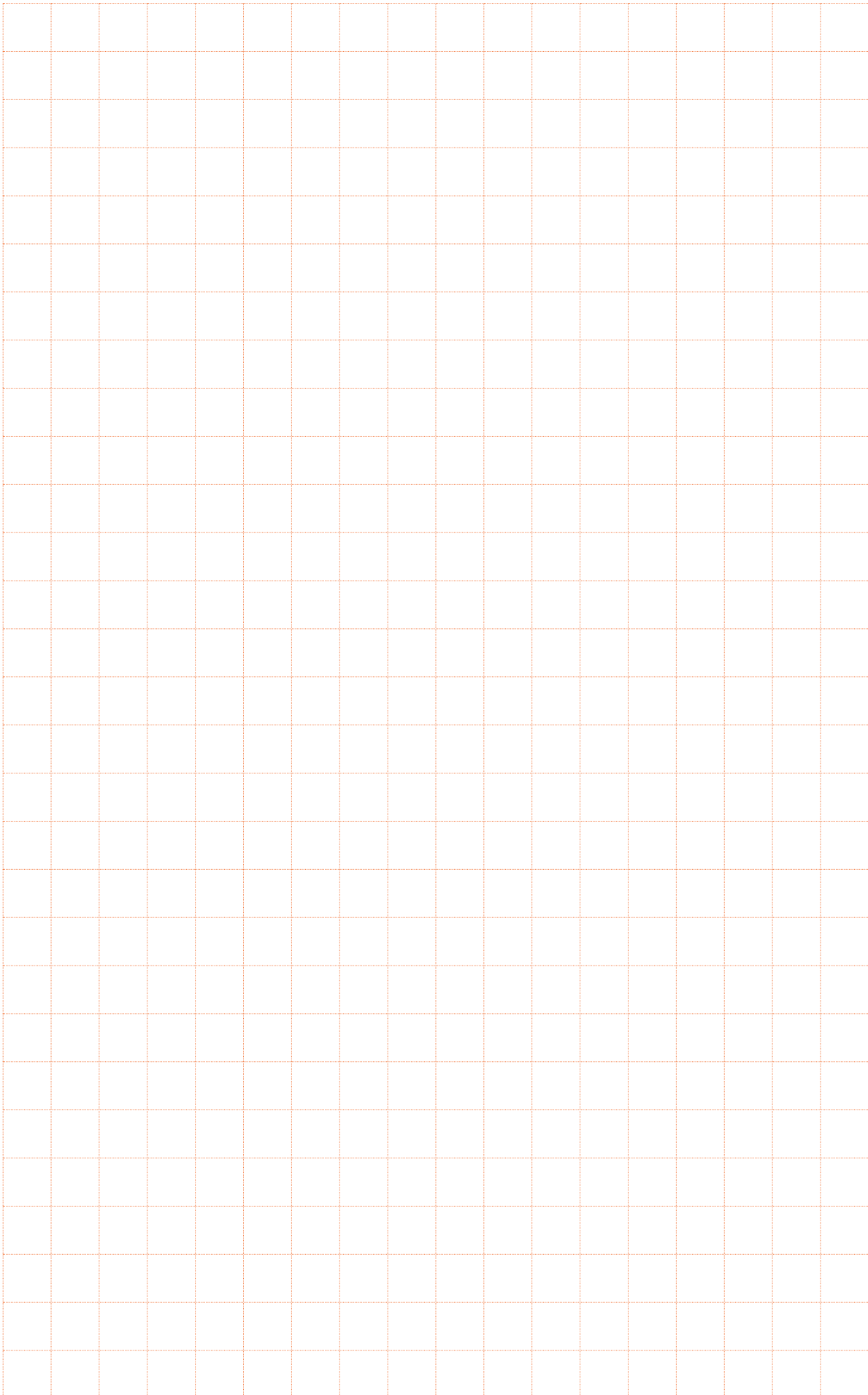
The information contained in this document is current as at September 2015 and is based on data available to CHH Woodproducts at the time of going to print.

All photographic images are intended to provide a general impression only and should not be relied upon as an accurate example of Ecoply products installed in accordance with this document or NZBC compliance documents.

This publication replaces all previous CHH Woodproducts design information and literature relating to Ecoply structural plywood products. CHH Woodproducts reserves the right to change the information contained in this document without prior notice.

It is your responsibility to ensure that you have the most up to date information available, including at the time of applying for a building consent. You can call toll free on 0800 326 759 or visit www.chhwoodproducts.co.nz to obtain current information.

CHH Woodproducts has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. However, to the maximum extent permitted by law, CHH Woodproducts assumes no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.





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September 2015



SECTION 4

H1 Calculations Sheet 5 Plans

Risk Matrix Sheet 1 Plans

SECTION 5

Specifications

SPECIFICATION

Of work to be done and materials to be used in carrying out the works shown on the accompanying drawings.

CAMERON RESIDENCE

11 CRETE ROAD

RANGIORA

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

CONTENTS

- 3 Preliminaries & General
- 6. Excavator
- 7. Carpenter
- 10. Bricklayer
- 11. Electrician
- 12. Plumber
- 15. Drainlayer
- 20. Roofer
- 21. Joiner
- 22. Windows
- 23. Glazier
- 24. Painter
- 25. Gas System
- 27. Formed Driveway

PRELIMINARIES & GENERAL

- **READING OF PLANS & SPECIFICATIONS:**

The plans and specifications will be read as one document. The contractor should ask all sub tradesmen to read the particular section of the specification to see what specific requirements apply, apart from general trade practice.

- **SITE**

Visit the site so as to be fully acquainted with the facilities or difficulties of access thereto and the nature and extent of the proposed work.

- **CONTRACT DOCUMENTS**

The Contract Documents are complimentary and comprise this specification, the accompanying Architectural, Civil, Structural, Mechanical, Electrical and Fire Service drawings, the General Conditions of Contract in accordance with NZS 3910: 2003 . Documents are to be returned with the Tender.

The Specification and Drawings define generally the services, systems and requirements, are mutually explanatory and shall be read together.

Drawings do not attempt to detail items regarded as standard trade practice and are not intended for use as construction drawings. It shall be the responsibility of the Contractor to check all dimensions and details on site and prepare working drawings.

- **REGULATIONS AND GOVERNING AUTHORITIES**

The construction, installation and its execution shall be in strict accordance with the requirements of the Building Act, New Zealand Building Code, all Statutory and Local Authority Regulations, By-Laws and all amendments thereto.

The Contractor shall be responsible for obtaining a Certificate of Compliance in accordance with the Building Code should this be required.

- **TEMPORARY SERVICES**

The Contractor shall arrange with the Local Power Supply Authority, temporary power supply for the duration of the Contract or until such times as permanent power is supplied to the building. Pay all charges in connection with this temporary supply, including the cost of electricity used.

The Contractor shall arrange for and provide temporary water supply for building purposes, including the provision of all necessary pipes, hoses, etc. for every requirement of this Contract and pay all fees and charges in accordance with the same.

The Contractor shall provide all necessary hoists, lighting gear, ladders, staging, scaffolding, tackle, tarpaulins, tools and any other plant (mechanical or otherwise) necessary for carrying out of the works, and pay for all fees, charges, labour and materials in installing, operating, moving, adapting and maintaining as necessary. The Contractor shall provide all temporary accommodation for the use of site administration, staff, Foreman, operatives, tool storage, tearooms, offices etc. All provisions shall be in accordance with Award requirements and Local By-Laws. Site sheds shall be located within the fenced site, but not on the existing sealed area.

The Contractor shall arrange with the appropriate Authority for the provision and installation of a telephone, and pay all fees and charges in connection therewith.

The Contractor shall provide temporary toilet and washing facilities, all in accordance with the Award requirements and Local By-Laws.

The Contractor shall allow sub-contractors free use of all the above mentioned facilities as necessary and when required for the carrying out of their Contracts.

The Contractor shall allow for the dismantling and removal of all temporary services and plant on completion of the Contract.

- **SCOPE OF DRAWINGS**

The drawings and this Specification shall be read together, and anything shown on the drawings and not specified, or vice versa shall be equally binding as though included in both. In the event of ambiguities occurring, the Contractor shall allow for the more costly method or materials and he shall report any such items to the Principal before proceeding with the work. The drawings shall be held to illustrate the general character of the work, and the parts not particularly detailed shall be constructed in accordance with other similar work.

Continued.....

PRELIMINARIES & GENERAL Continued.....

The works shall be completed to the true intent and meaning of the Drawings and Specification taken together. Before submitting their proposals, tenderers shall inform themselves of the nature of the work required.

No claims will be considered in respect of extra work resulting from inadequate knowledge of the site, building or documents unless it is clearly outside the spirit and meaning of the Drawings and Specification, and such work shall have been ordered in writing by the Designer.

The work shall include all items and work required to provide a completed fully operational installation. Items necessary to achieve this shall be deemed as included even though not specifically mentioned in the documents.

• DIMENSIONS AND LEVELS

All dimensions and levels are believed to be reasonably accurate but all must be checked on the site before the work is put in hand, and discrepancies reported to the Principal, so that his decision may be obtained before proceeding further.

Figured dimensions on drawings shall take preference to scaled dimensions and large scale drawings given preference to smaller, unless expressly stated otherwise. Dimensions shall be taken to define bare surfaces on concrete, timber framing, and the like, unless otherwise shown. All dimensions are to be checked on site by the Contractor before commencing fabrication

• TRADE DIVISIONS

This specification is divided into Trade Divisions for convenience only, and it shall not be construed that each trade section is a complete separate contract. The whole of the forgoing Preliminary Clauses shall be read in conjunction with and shall apply to each and every trade section of the specification to their full extent and meaning.

• PROVIDE AND FIX

The words "Provide" and "Fix" when used separately in this specification shall be taken to mean "provide and fix" unless otherwise stated

• WORKS PROTECTION, DAMAGE, CLEARANCE, MAKING GOOD

Throughout the Contract, the Contractor shall store his materials and equipment in a secure and orderly manner and shall take all reasonable steps to protect the work of this trade from damage by others or natural elements. He shall also make good, at his own expense, all damage caused by him to work of other trades, remove promptly from site all trade wastes and surplus materials and maintain the site clear of all trade wastes and debris associated with this Contract. The Contractor shall make good all damage done by him to the Building and make repairs to reinstate surfaces to their original condition.

The Contractor shall allow for the completion of the building in all respects. The Contractor, shall from time to time, remove all rubbish, debris, and builders spoil, as it accumulates, and keep the site and building clean and tidy.

• RECORD DRAWINGS AND INSTRUCTIONS

Neat, accurate, up-to-date on site records, of all deviations from the Contract Drawings and Schedules shall be kept and made available for inspection by the throughout the Contract. At the completion of the Contract, the Contractor shall update the drawings for inclusion in the Maintenance Manuals and As-Built documents as detailed in the Trade sections of this Specification.

• CERTIFICATE OF COMPLIANCE

The Contractor is to obtain a Certificate of Compliance for all work completed by him and his associated subtrades for issuing to the Territorial Authority should it be required. The Certificate is to satisfy that all the relevant NZ Building Code provisions have been met. The contractor is to check with the TA as to the need for this compliance.

The Contractor shall make good at his own expense any items deemed not to comply with the NZ Building Code that are a result of faulty workmanship, materials or negligence.

• HEALTH AND SAFETY IN EMPLOYMENT ACT 1992

It is the Contractor's sole responsibility to comply with all the requirements of the Health and Safety Act. The Contractor must establish and monitor an appropriate safety plan for this project. This safety plan must be presented to the principal to the contract before any work commences. The Contractor must present fortnightly reports on all Health and Safety issues to the principal to the contract.

• CONSENTS & FEES

Allow for giving all notice to local and other authorities, obtain all necessary consents and paying all fees and charges.

Continued.....

PRELIMINARIES & GENERAL Continued.....

- **INSURANCE**

The contractor/owner shall insure the works in an approved Fire Office and such insurance shall cover the full value of the premises when completed. The contractor shall maintain a Public Liability Policy with an Insurance Company in New Zealand indemnifying the contractor against claims in respect of damage to property arising out of the operations of the Contractor or his Subcontractors in the execution of said works.

- **VARIATIONS**

No variations of any kind shall be made to the contract without direct instruction in writing from the employer. The price of any variations must be agreed to in writing before being proceeded with.

- **ATTENDANCE OF TRADES**

Make good after all trades. The contractor shall leave all necessary holes, chases, sleeves, ducts etc as required by subsequent trades.

- **SETTING OUT**

Any discrepancy between work as set out and the drawing must be reported to the designer before any work is carried out. The contractor is responsible for the accuracy of the setting out.

- **SURVEY PEGS**

Survey pegs required by the Contractor to define the site, unless already established, shall be provided by a Surveyor employed by the owner.

- **STABILITY**

The Contractor shall take all precautions to ensure the works are braced, supported or covered as required to prevent damage by wind and protect the works from the elements as necessary at the time.

- **DAMAGE**

The Contractor shall, at his expense, be responsible for any damage to footpaths, kerbs, drains etc, to the satisfaction of the local authority. The Contractor will however be able to recover costs when it is known that such damage is caused by one of the Subcontractors e.g. concrete truck damaging a kerb will therefore establish that the concrete supply company shall reimburse the Contractor.

- **MATERIALS AND WORKMANSHIP**

All materials shall be the best of their respective kinds, qualities, classes and grades as hereinafter specified and shall comply with the requirements of the relevant New Zealand Standards.

Workmanship; conform to good trade practice and the relevant Codes of Practice in current use in NZ. All work to be level, plumb, and true to line and face. Employ only experienced workers familiar with the materials and techniques specified.

- **FINISHED WORK**

It should be clearly understood that a high standard of workmanship and finish is required throughout this contract. Should any trade consider that any surface finish or fitting be not in a satisfactory condition to ensure a proper fitting of his own thereon, it shall be his responsibility to notify the contractor before anything further is done, and under no circumstances whatever shall such finished work be proceeded with until the necessary improvements have been made. Failing such notification and correction, the finishing trade concerned will be held responsible for the poor finish due to such unsatisfactory conditions.

- **CLEARING THE SITE**

The contractor shall allow in his tender for the completion of the building in all respects. At completion, the site and the whole of the building shall be left completely free from rubbish and residue and ready for occupation.

- **MAINTENANCE**

A period of minimum 30 days or to a time agreed between all parties and entered on to the Specification. Any defects in materials, workmanship or any part/s that require adjusting or replacing, which have to been included in the contract shall be adjusted or replaced at the contractors expense.

EXCAVATOR

- **PRELIMINARY AND GENERAL**

Refer to the General and Special Conditions of Contract and Preliminary clauses which shall apply to all work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

- **SCOPE**

The extent of the excavation and associated work shall be as generally shown on the drawings, including all excavation for all building work, backfilling and making good. It shall include all work associated with site works.

- **PROTECTION**

All excavation works shall meet all safety requirements and shall be protected from all water or associated damage. All precautions shall be taken to avoid damage to all public and private property.

- **EXCAVATION**

The area of the top of the site to be covered by the building shall be stripped of all top growth and vegetable matter.

Excavate for all foundation pads, piles, slabs etc as shown on the drawings.

Should soft clay, peat or filled ground be encountered, an engineer shall be consulted for additional foundation details.

Before placing steel or pouring concrete, the excavation shall be cleaned and the bottoms dry and firm.

- **GROUND WATER**

Excavations shall be kept free of water. Any ground water in the excavations shall be away by means of a sump dug clear of the excavation or by other de-watering system as appropriate.

- **BACKFILLING**

Backfill around foundations with approved material and thoroughly consolidate. Remove all timber and other rubbish and loose material before backfilling.

- **REMOVAL OF SPOIL**

The excavator shall remove all surplus material away from the area of the building. Stockpile on the site where directed by the owner.

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CARPENTER

- **PRELIMINARY AND GENERAL**

Refer to the General and Special Conditions of Contract and Preliminary Clauses which apply to all work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

- **SCOPE**

This trade shall include all materials, equipment and labour necessary to carry out the complete carpentry and joinery as shown together with any other items of work reasonably inferred as part of this section

- **MATERIALS**

All materials used shall be the best of their respective types.

Framing generally shall be gauged and treated to NZ timber Preservation Council 3602 and NZMP 3640.

Finishing timber shall be dressed on four sides.

All timber shall conform to relevant standards NZS 3602, NZS 3640 NZS 3631 and the New Zealand Building Code B2 Durability, B1 Stability.

- **WORKMANSHIP**

All work shall be carried out in a workmanlike manner using the best practices in accordance with the New Zealand Building Code and NZS 3604.

- **LINTELS**

Calculate lintel sizes as set out in NZS 3604 unless designed by other ie truss manufacturer .

- **FRAMING**

All framing shall be generally Ex. 90mm x 45mm as shown on the drawings

Purlins, beams , rafters, etc shall be as shown on the drawings

Roof to pitch as indicated on the plan and to detail, well fixed in accordance with NZS 3604.

Allow to frame up and finish whole work as detailed Allow to do all bracing, dwanging, packing etc for linings, finishings and fittings as drawn.

Trussed Roofs; Drawings showing clearly the type, pitch, span, spacing and overhangs of roof trusses and details of roof claddings shall be provided to the truss manufacturer to allow him to comply with Clause 10.2 of NZS 3604. Thereafter, the Contractor shall match construction with the drawings and details provided by the truss manufacturer throughout all stages of fixing and bracing. In all cases anchorage of all trusses to plates shall be with not less than 2/100mm skew nails plus 2/4.9mm wire dogs.

All structurally engineered timber members outside the scope of NZS3604 are to be SG8 timber or better unless otherwise specified .

MAXIMUM ACCEPTABLE MOISTURE CONTENTS

The maximum moisture contents shall be: a) For timber *framing* at the time of installing interior *linings*, the maximum acceptable moisture content shall be the lesser of: i) 18% for insulated buildings, 18% for non- insulated buildings, or ii) as specified in NZS 3602, b) For timber weatherboards and exterior joinery, 20% at the time of painting, c) For reconstituted wood products, 18% at all times, and d) For concrete floors, sufficiently dry to give a relative humidity reading of less than 75% at the time of laying fixed floor coverings

- **DOORS AND FRAMES**

Internal doors shall be hollow core paint grade unless otherwise indicated by the Owner.

All external doors to be Aluminium glazed doors, with the exception of the front door which is to be Cedar door in Timber Frame, unless otherwise indicated by Owner.

- **WARDROBES**

To be lined full height. Provide inside each with 400X25mm full width shelf at 1.7m from floor and 20mm galvanised pipe coat rail at 75mm below shelf, unless shown otherwise on the drawings. Sliding Doors 2.200m High, unless otherwise indicated by Owner.

- **ARCHITRAVES AND SKIRTINGS**

Fit all skirtings to all rooms throughout unless shown otherwise. Confirm with owner as to type of skirting or architrave.

- **HOT WATER CYLINDER**

The hot water cylinder shall have seismic restraints fitted as per NZBC G12/ASI; 4-10.3(b) clause 5 to 7. See plan for Hot Water Cylinder location .Hot water systems complying with NZS 4305 satisfy the requirements of NZBC H1.3.4 for the provision of hot water to sanitary fixtures and sanitary appliances.

- **FINISHING**

Provide all finishing trims to baths, showers, joinery etc. if required.

Continued.....

CARPENTER Continued....

- **DAMP PROOFING**

All timber to be protected from dampness, with a continuous D.P.C. strip when in contact with concrete, except as Clause 2.3.3. of NZS 3604

- **PRIMING**

All exterior finishing timber, all timbers in contact with concrete blockwork and all external faces, rebate, etc., of all doors, windows, frames and all woodwork of sashes, shall be primed before fixing unless otherwise specified in Painter.

- **CLEANING**

The Contractor at the conclusion of the contract shall have all ceilings, walls and woodwork carefully dusted and wiped down. Windows washed and glass free from scratches and paint. Floors brushed and the entire building site left in a clean condition for occupation.

- **FASTENINGS AND FABRICATION**

The contractor should especially note that all aspects of fastening and fabrication of timber framing members and wood based products in this contract shall be in accordance with the relevant clauses of NZS 3604.

Reference shall also be made to NZS 3604 for the proper fixing of sheet lining and cladding materials for walls and ceilings that are not wood based especially where such materials are used as diaphragms and for wall bracing.

Mild steel structural components used in sub floor spaces, exposed to the weather or in a position where condensation or dampness could occur shall be hot dipped galvanised after forming and shall provide necessary "capacities" called for by NZS 3604 dependant on function and location.

In all other cases, select and use connectors according to manufacturers literature conforming to NZS 3604 requirements. Fixings and fastenings being installed to CCA treated timber materials are stainless steel to comply with NZS3604:2011 section 4.4.4.

- **INSULATION**

R 3.6 (or greater) fibreglass shall be installed to all roofed ceilings, R 2.6 (or greater) to exterior walls.

- **BUILDING PAPER**

Breather type building paper to be fixed to the outside faces of the exterior timber wall framing and fixed horizontally with 150mm laps.

- **METER RECESS**

Provide recess for electrical meter board where directed to the satisfaction of the local Electrical Supply Authority and Owner.

- **ACCESS HATCH**

Provide access hatch to ceiling 800mm x 800mm in accordance with NZS 3604 section 13.3.1.

- **FITTED JOINERY**

The carpenter shall take delivery of all joinery fittings and frames and build in carefully, fitting up with the necessary hardware.

- **HARDWARE**

Allow to supply and fit all hardware to include locks, door furniture, cupboard door and drawer handles. Consult with Owner for types and finishes.

- **INTERNAL LININGS**

Internal walls and ceilings (unless otherwise shown) shall be 10 mm and 13 mm Gibralter Board fixed to manufacturers specifications. Wall and ceiling linings to wet areas (kitchen , bathroom , ensuite , laundry etc.) use Aqualine gibboard . Gibralter Board shall be stopped and sanded to paint finish at B2 durability 5 years.

- **WALL BRACING**

Provide all wall bracing has shown on drawings and Wall bracing calculation sheets as is intended to satisfy the N Z B C. Keep strictly to the other our ' type', Lengths and locations shown on the plan. Refer bracing schedules.

Sheet wall bracing elements – permitted penetrations

Plasterboard systems No penetrations are permitted within 90 mm of the perimeter of any bracing element. Where light switches are near a braced panel edge, a block will need to be fixed to the stud to provide the edge separation and fixing for a flush box. For penetrations in the body of the sheet, one supplier allows small penetrations (90 x 90 mm maximum) anywhere else within the bracing element. Another allows up to 125 mm diameter penetrations as long as they are more than 300 mm from the edge of the bracing element.

One plywood system Small openings (such as power outlets) of 90 x 90 mm or less may be located no closer than 90 mm to the edge of the braced element. Wastepipe outlets of up to 150 mm diameter may be located no

closer than 150 mm to the edge of the braced element.

One fibre-cement system Holes or penetrations up to 100 x 100 mm are permitted no closer than 200 mm to the edge of lining or another hole.

8.7.3.4

Each wall that contains one or more wall bracing elements shall be connected at the top plate level, either directly, or through a framing member in the line of the wall, to external walls at right angles to it. Top plate fixing(s) of the capacity in tension or compression along the line of the wall bracing element are given as follows:

- For each wall containing wall bracing elements with a total bracing capacity of not more than 125 bracing units: to at least one such external wall by a fixing as shown in figure 8.16 of 6 kN capacity;
- For each wall containing wall bracing elements with a total bracing capacity of not more than 250 bracing units: to at least 2 external walls by fixings as shown in figure 8.16 each of 6 kN capacity;
- For each wall containing wall bracing elements with a total bracing capacity of more than 250 bracing units: to at least 2 external walls by fixings as shown in figure 8.16 each having a rating of not less than 2.4 kN per 100 bracing units.

SECTION 8 – WALLS

NZS 3604:2011

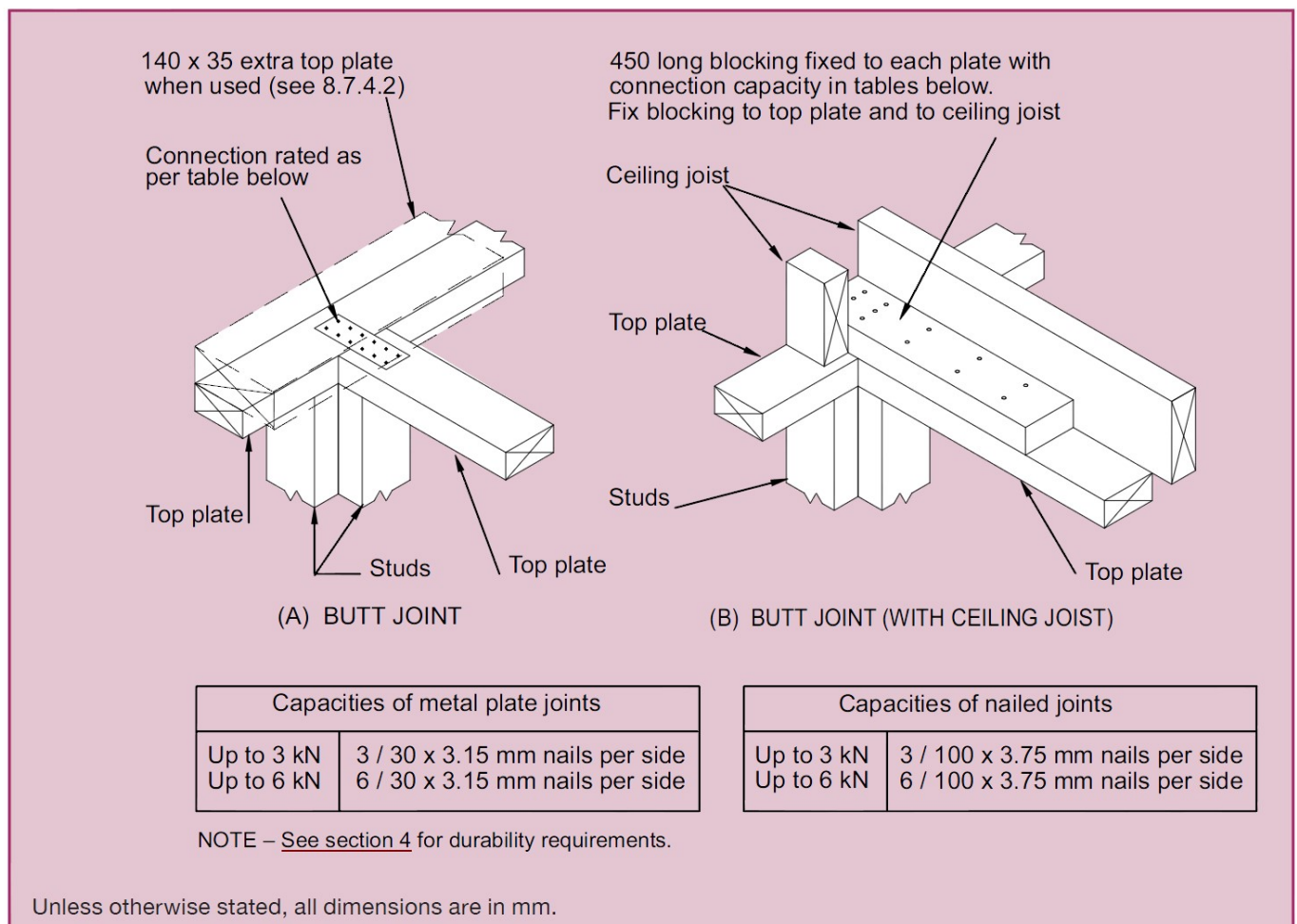


Figure 8.16 – Connecting top plates to external walls at right angles – Walls containing bracing (see 8.7.3.4)

BRICKLAYER

• PRELIMINARY AND GENERAL

Refer to the General and Special Conditions of Contract and Preliminary Clauses which apply to all work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

• MATERIALS AND WORKMANSHIP

All materials and workmanship shall be in accordance with the best bricklaying trade practices and conform to all relevant standards of the New Zealand Building Code and, NZS 3103, NZS 3122, NZS 3604 and NZS 4210.

(A) Bricks for external veneers shall be of colour and type selected by the owner.

(B) Plasticisers shall be used in accordance with the manufacturers instructions. No other additives are to be used in conjunction with these materials. On no account will further additions be made at the time of re-tempering mortars.

(C) Water shall be of drinking quality.

• PREPARATION OF MORTAR

Mortar shall be prepared by mixing in an approved mixer. Measurement of materials shall be by volume using suitable containers. Mortar shall be mixed until a homogenous mass is obtained but not for less than five minutes. All mortar whether on boards or left in mixer shall be used within 90 minutes.

• BRICKLAYING

Bricks shall be laid in stretcher bond true to line level and plumb and in accordance with best trade practice.

All joints will be completely filled with mortar and the bricks shall be disturbed as little as possible up to 24 hours after initial positioning. Joints shall not be more than 9.5mm thick and shall be tooled as work proceeds.

Construct brick veneer with approved ties at spacings in accordance with materials and workmanship to NZS 4210.

A cavity of not less than 40mm and not more than 75mm shall be maintained between building paper and veneer.

Brick ties shall be positioned along the wall at max. 600mm centres and max. 350mm vertically. Alternative spacings to these as detailed in NZ Standards may be used. Form weepholes in the bottom course of walls at ground level, intermediate beams and ledges and wherever the cavity is closed at the base such as window and door openings. Weepholes shall be formed wherever the cavity is closed at the base. Weepholes shall be formed every third perpend (1000sqmm/lineal metre of wall) and shall be clean and free of mortar and other restrictions. Keep the cavity and upstand clean, free from mortar protrusions and droppings. Supply and fix ties to all veneer walls as bricks are laid. Tie sizes shall vary to suit the varying widths of cavities. Wall tie anchorage shall be 35mm minimum into the mortar, with 15mm minimum cover from weather face. Additional ties shall be placed within 200mm of the edge around openings and at the end of unsupported wall panels. Keep pipes or electrical wire, junction boxes etc out of the cavity.

• BRICK OVERHANG

The veneer shall not overhang its supporting foundation by more than 20 mm.

• CLEANING

Thoroughly clean down the face of the work on completion and leave free of mortar stains and efflorescence.

Table 18A: Specification of maximum tie spacings for type B (4) veneer ties
Paragraph 9.2.7

Seismic zone Refer NZS 3604	Masonry veneer Less than 180 kg/m ²			Masonry veneer 180 – 220 kg/m ²			Masonry veneer more than 220 kg/m ²
	Tie type (4)(5)	Maximum spacings (1)		Tie type (4)(5)	Maximum spacings (1)		
		Horizontal	Vertical		Horizontal	Vertical	
1	EL	600	400	EM	600	400	SED (2)
2 (6)	EM	600	400	EH (3)	600	400	SED (2)
3	EH (3)	600	400	EH (3)	600	400	SED (2)
4	SED (2)	SED (2)	SED (2)				

NOTES

(1) Maximum masonry tie spacings of 600 mm horizontally and 400 mm vertically

(2) Spacing of ties to be determined by specific engineering design

(3) EM may be used if the horizontal spacings do not exceed 400 mm and the vertical spacings do not exceed 300 mm

(4) Type B and Prefix E indicate masonry ties manufactured to AS/NZS 2699.1

(5) L (Light), M (Medium), H (High) indicate strength capability of ties in AS/NZS 2699.1

(6) Use seismic zone 2 (minimum) for Christchurch region comprising Christchurch City, Waimakariri District and Selwyn District.

Table 18D: Corrosion protection to lintels
Paragraph 9.2.9, Table 18E

	316 or 316L or 304(2) stainless steel or 600 g/m ² galvanising on mild steel plus duplex coating(1)	600 g/m ² galvanising on mild steel(1) or 300 g/m ² galvanising on mild steel plus Duplex coating(1)
Zone B	Yes	Yes
Zone C	Yes	Yes
Zone D	Yes	

1) To AS/NZS 2699.3

2) 304 stainless steel will exhibit greater levels of surface rusting than 316 stainless steel, especially where not exposed to rain washing.

ELECTRICIAN

- **PRELIMINARY AND GENERAL**

Refer to the General and Special Conditions of Contract and Preliminary Clauses which apply to this section of the contract. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

- **SCOPE**

The electrical contract consists of the supply of all materials, plant and labour for the complete light and power system.

- **MATERIALS AND WORKMANSHIP**

All electrical work to be carried out in a tradesman like manner and comply with New Zealand Building Code G8, G9 and relevant New Zealand Standards and the New Zealand Electrical Wiring Regulations Handbook and the local authority regulations.

- **METER BOX AND SWITCHBOARD**

Supply and install meter box and switchboard where directed by the owner, with underground supply to local authority supply. The switchboard shall be fitted with appropriate circuit breakers and have all circuits neatly labeled.

- **WIRING**

All sub-circuit wiring shall be completely TPS cable reticulated through wall and roof framing. Holes in framing for cable shall be no more than 20mm dia and shall be in the centre of the depth of the member. All wiring including mains shall be concealed. Lighting circuits to be wired in 1.0mm twin cable. Power circuits to be wired in 2.5mm twin and earth cable. Wire to all the wall mounted power points with vertical droppers only – no horizontal runs to adjacent points.

- **SOCKET OUTLETS**

All wall plugs shall be 230v. 10amp, 3 pin flush type. Generally install plugs 300mm above the floor or 225mm above bench top. Points to washer/dryer space and refrigerator 1200mm from the floor. The exact position of all power points shall be determined on the job by the Owner. All plugs to be doubles and horizontally placed.

- **LIGHT FITTINGS**

Wire for, supply, install and connect to services 75Watt light bulbs and batten holders unless otherwise specified. Electrician is to confirm location of all lights and points with the owners prior to commencing wiring.

- **SWITCHES**

Light switches shall be 10 amp, all insulated P.D.L. micro-gap type or equivalent. Where indicated fit flush type with plain bakelite flush plate. Fix switches generally 1200mm above the floor.

- **ELECTRIC WALLOWEN AND HOB**

Provide and fix a 30-amp flush switch for wall oven and hob sufficient cable for connection and allow for installation.

- **WATER HEATING ELEMENTS**

Allow to supply, wire for and install water heating element and thermostat compete with remote control switch. Water heating cylinder and thermostat supplied and installed by plumber.

- **TELEPHONES**

Allow to meet with Owner and discuss exact telephone/modem and line requirements, and wire for these.

- **TV AERIAL AND OUTLETS**

Provide and install aerial and outlets, check final position of the Owner.

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PLUMBER

- **PRELIMINARY AND GENERAL**

Refer to the General and Special Conditions of Contract and Preliminary Clauses which apply to this section of the contract. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

- **SCOPE**

The work shall consist of the supply of all plant, materials and labour for the completion of the installation of a rainwater catchment system, water reticulation and sanitary services, all flashings and cappings, valley gutters, vents, flues, ducts etc.

MATERIALS AND WORKMANSHIP

All materials and workmanship shall be supplied and carried out in accordance with relevant clauses of the New Zealand Building Code G12 AS1, G13 AS1, E 1 & B 2 durability

UPVC WASTE, SOIL AND VENT PIPES

UPVC pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe and manufacturer's requirements.

- **TESTS**

Subject all water installation to a full water pressure test before pipework is closed in.

- **FASCIA AND GUTTERING**

Fascia and guttering shall be as shown on the drawings together with downpipes, all in accordance with manufacturers specifications and recommendations.

- **FLASHINGS**

Flash as necessary to render building watertight where not supplied and fitted by other trades, ie roofing contractor.

- **WASTES**

Waste and vent pipes are to be installed with all work carried out in strict accordance with the manufacturers instructions for working and using the material. Great care will be taken to ensure that they are adequately supported where they run horizontally.

- **PIPES AND PIPEWORK**

Supply and run 40 mm alkathene pipe supply line from street.

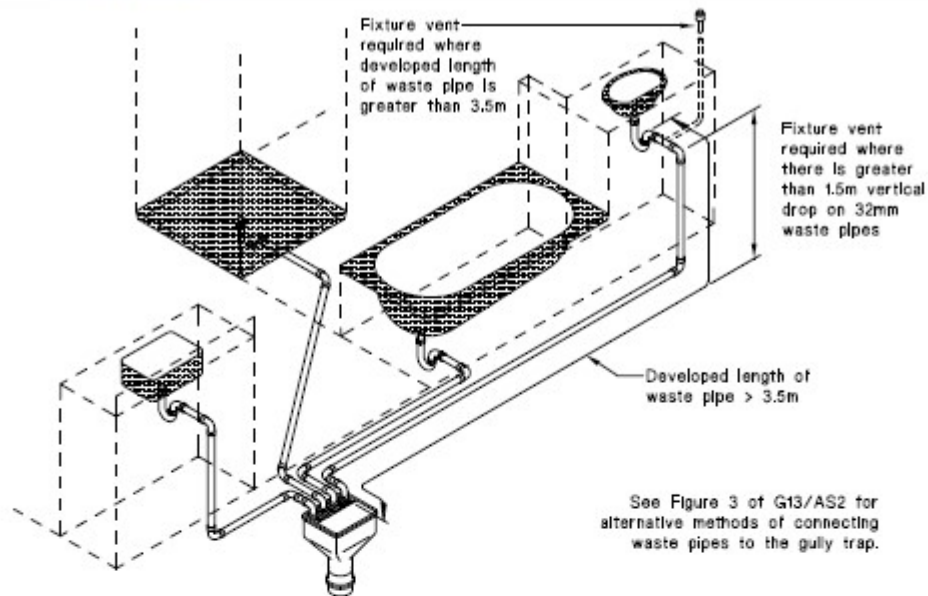
Cold Water reticulation within the dwelling to be run in installed in polybutylene AS/NZS 2462.2 strict accordance with the manufacturers instructions for working and using the material.

Hot Water reticulation within the dwelling to be run in copper or from Butylene polybutylene AS/NZS 2462.2, all fixed exactly to the manufactures specifications. All hot water pipes to be insulated with Aeroflex. All pipes to be concealed in the walls or under the floor.

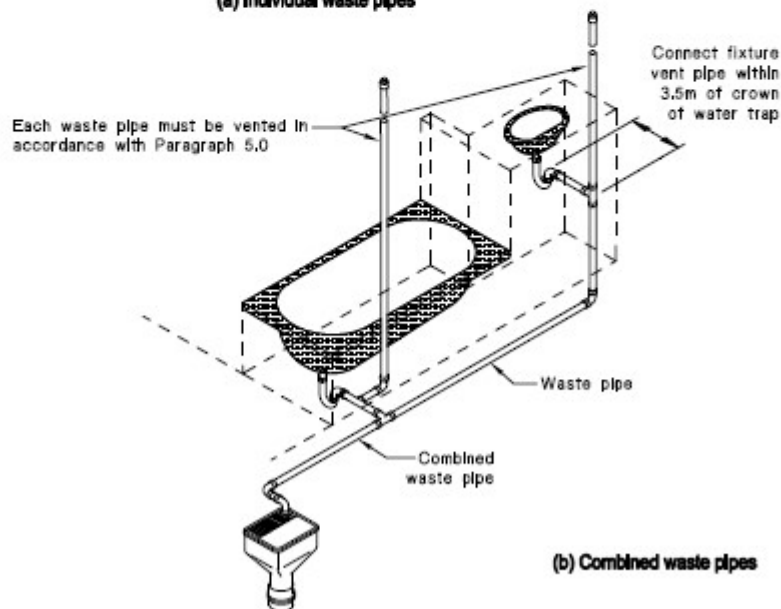
- **TAPS, FAUCETS AND VALVES**

Consult with the owner on choice of brands and fixing of all taps, faucets and mixing valves.

Figure 5: Waste pipes discharging to a gully trap
Paragraph 4.5.1 a)



(a) Individual waste pipes

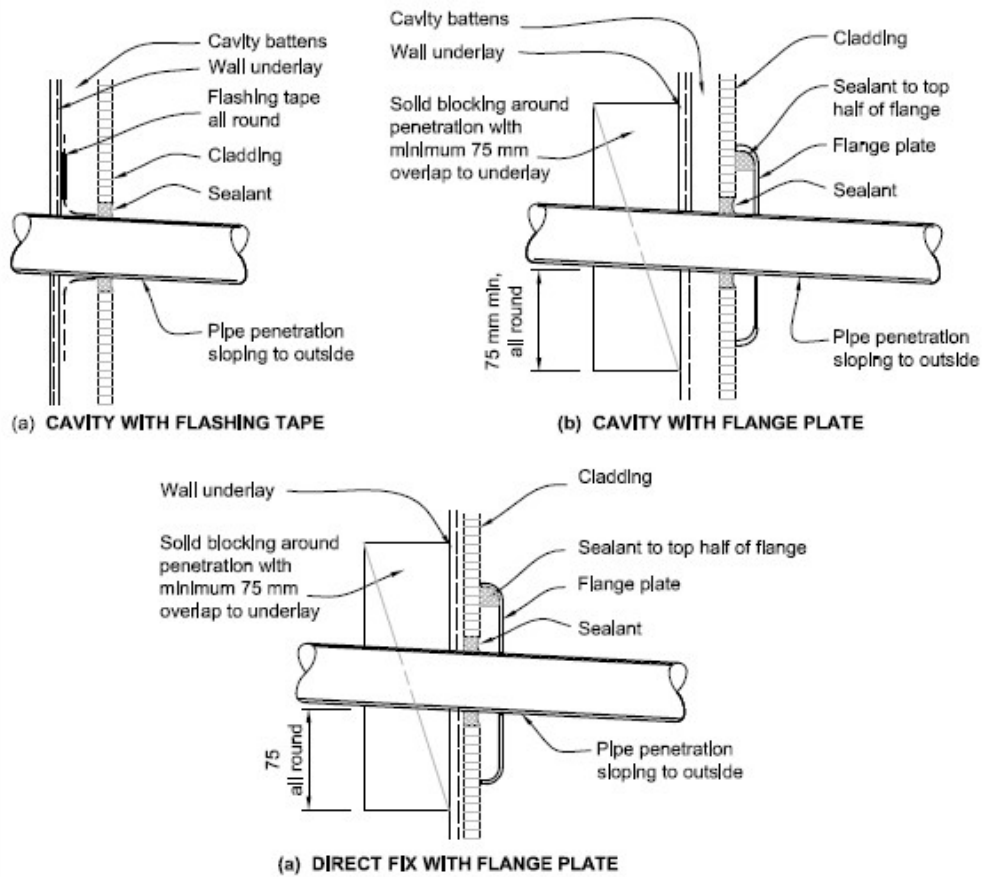


(b) Combined waste pipes

Note:

Upper floor waste pipes may discharge to a gully trap however venting will be required where wastes are combined or where specified lengths are exceeded. See Table 5. Waste pipes may also discharge to a stack. See Figures 7 and 8.

Figure 68: General pipe penetration
Paragraph 9.1.9.3, Figure 126



DRAINLAYER

- PRELIMINARY AND GENERAL

Refer to the General and Special Conditions of Contract and Preliminary Clauses which apply to all work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments of standards issued in substitution

- SCOPE

Work in this section of the contract comprises all surface and foul water drainage up to and above ground level to connect to plumbers work. Include all pipes and fittings, construction of manholes, all gully traps and connections for terminal vents, soil and waste pipes. The drainlayer shall confer with the contractor before the foundations are laid to fix exact position of all connections of wastes and drains.

MATERIALS AND WORKMANSHIP

All materials and workmanship shall be in accordance with the best drainlaying practices conforming to all relevant clauses of the New Zealand Building Code G13 AS2, G14, E1 & B2 durability.

uPVC Pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.

- CONNECTION TO SEPTIC TANK AND SOAK HOLES

The drainlayer is responsible for verifying the position and depth of the connection and commence laying his drains from this point.

- TRENCHES

The excavation of trenches for drains shall be accurately made with base clean and true grade so that unnecessary filling is not required. Adequate width shall be allowed in accordance with depth of drain to enable laying and jointing to be properly carried out. Trenches shall be kept firm and dry and shall be opened up only in lengths that can be protected, utilised and refilled within a reasonable time.

- FITTINGS

The drawings show the layout of the system. Additional fittings such as inspection points and inspection bends that are normally required but are not specifically shown must be allowed for by the drainlayer to comply with the New Zealand Building Code.

- FALL IN DRAINS

The whole of the soil and stormwater drains are to be layed to a regular and even fall.

- GULLY TRAPS

Supply all gully traps and securely bed and build up with 5:1 concrete surround, overflow level of the dish to be no less than 25mm above paved surfaces, or 100mm above unpaved surfaces as per G13/AS2 3.3.1.

- COMPLETION

Drain leakage test is to E1/VM1 sec 8.0 .Properly backfill all trenches, consolidate as filling proceeds and leave area in a tidy state.

Figure 8: Relationship of pipe trench to building foundation
Paragraph 5.6.1

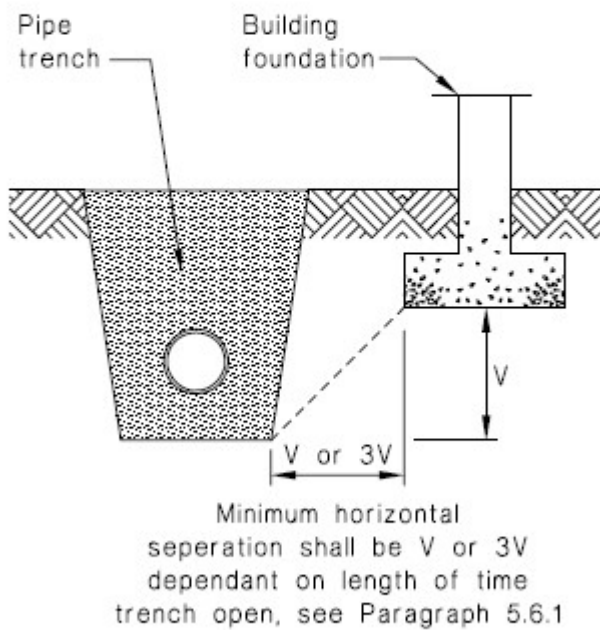
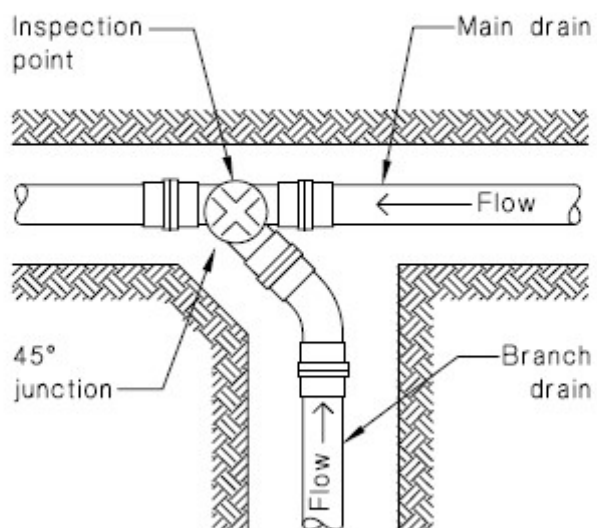


Figure 9: Inspection points
Paragraph 5.7.3



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Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

Table 5: Venting requirements
Paragraphs 4.5.2, 4.6.2, 5.1.1, 5.5.1, 5.5.2 and 5.8.1

Stacks

Stack vent: All stacks discharging to another stack or to a *drain* require an open vent, sized in accordance with Table 6. Venting with an *air admittance valve* is permitted only on second and subsequent stacks as at least one open vent (the stack vent, if acting as main *drain* vent) is required to ventilate the *drain*.

Relief vent: All stacks that receive discharges from 3 floor levels shall be vented with a *relief vent* sized in accordance with Table 6. *Relief vents* shall be open vented.

Fixtures connected to a stack

All connections to a stack, except the highest connection, require venting by either an open vent, or an *air admittance valve*, sized in accordance with Table 6.

Highest fixture connected to a stack

The individual highest connection to a stack requires venting by either an open vent, or an *air admittance valve*, sized in accordance with Table 6, if the *discharge pipe* is longer than:

- 6 m for 100 mm pipe,
- 1.5 m for 80 mm pipe, and
- 3.5 m for 65 to 32 mm pipes.

Soil fixtures connected to an unvented branch drain

All *soil fixtures* connected to an unvented branch *drain* require venting by either an open vent, or an *air admittance valve*, sized in accordance with Table 6.

Soil fixtures connected to a vented drain with a gradient of less than 1:60

All *soil fixtures* connected to a vented *drain*, where the branch and the vented *drain* are at a gradient of less than 1:60, require venting by either an open vent, or an *air admittance valve* sized in accordance with Table 6.

Individual soil fixtures connected to a vented drain with a gradient of 1:60 or steeper

Individual *soil fixtures* connected to a vented *drain*, where the branch and the vented *drain* are at a gradient of 1:60 or steeper, require venting by either an open vent, or an *air admittance valve*, sized in accordance with Table 6, if the *discharge pipe* is longer than:

- 6 m for 100 mm pipe, or includes a vertical drop greater than 2 m, and
- 1.5 m for 80 mm pipe *diameters*.

Fixtures discharging to a gully trap

1. *Fixtures* connected to a combined *waste pipe* require venting by either an open vent, or an *air admittance valve*, sized in accordance with Table 6.
2. Individual *fixture discharge pipes* over 3.5 m in length require venting by either an open vent, or an *air admittance valve*, sized in accordance with Table 6.
3. Where any 32 mm *discharge pipe* has a vertical drop of greater than 1.5 m it shall be vented with a 32 mm vent pipe or an *air admittance valve*.

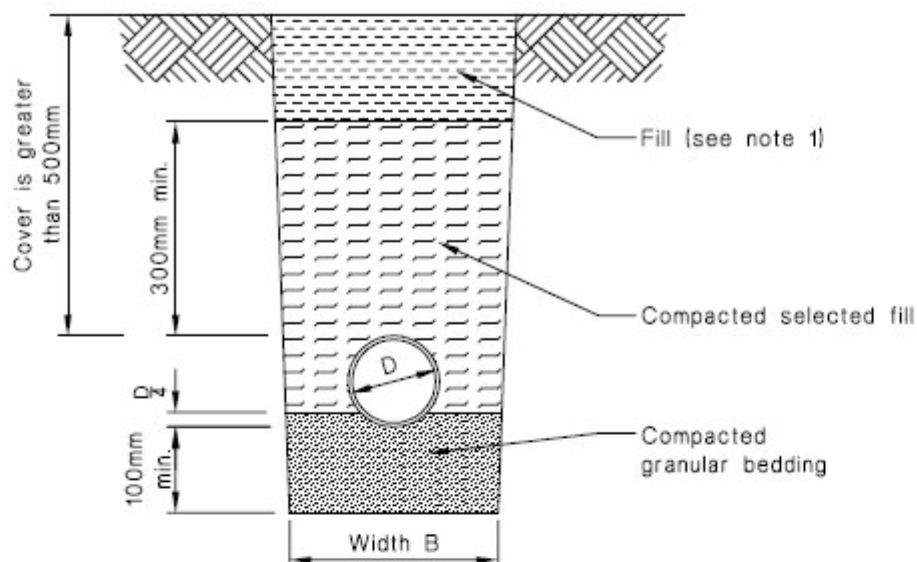
Venting of main drains

Main *drains* discharging to the *sewer* or to an on-site disposal system are required to be vented with a minimum 80 mm open vent.

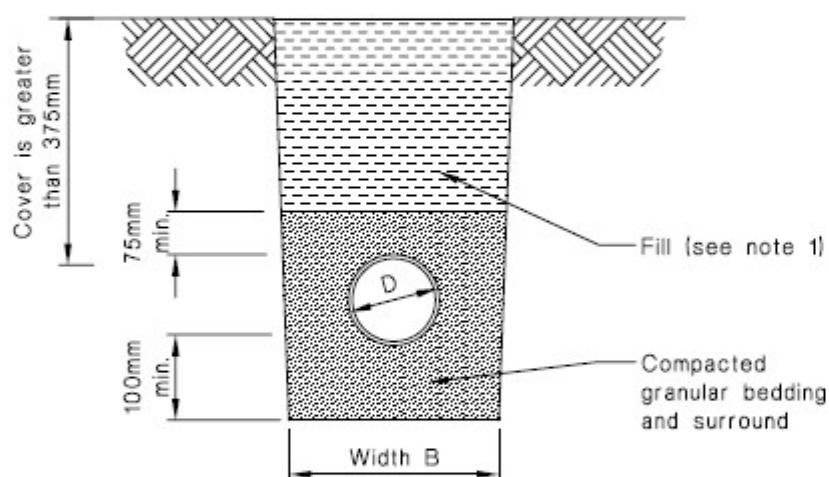
Venting of branch drains

Branch *drains* connected to a vented *drain* that exceed 10 m in length require venting with an open vent, sized in accordance with Table 6.

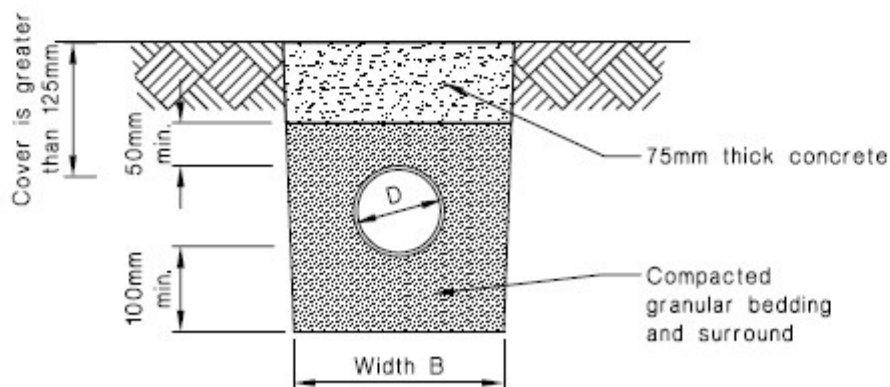
Figure 13: Bedding and Backfilling
Paragraphs 3.9.2, 3.9.4 and 3.9.5



(a) Cover greater than 500 mm
Bedding type 'B' of NZS 4452



(b) Cover greater than 375 mm
Bedding type 'D' of NZS 4452



(c) Cover greater than 125 mm

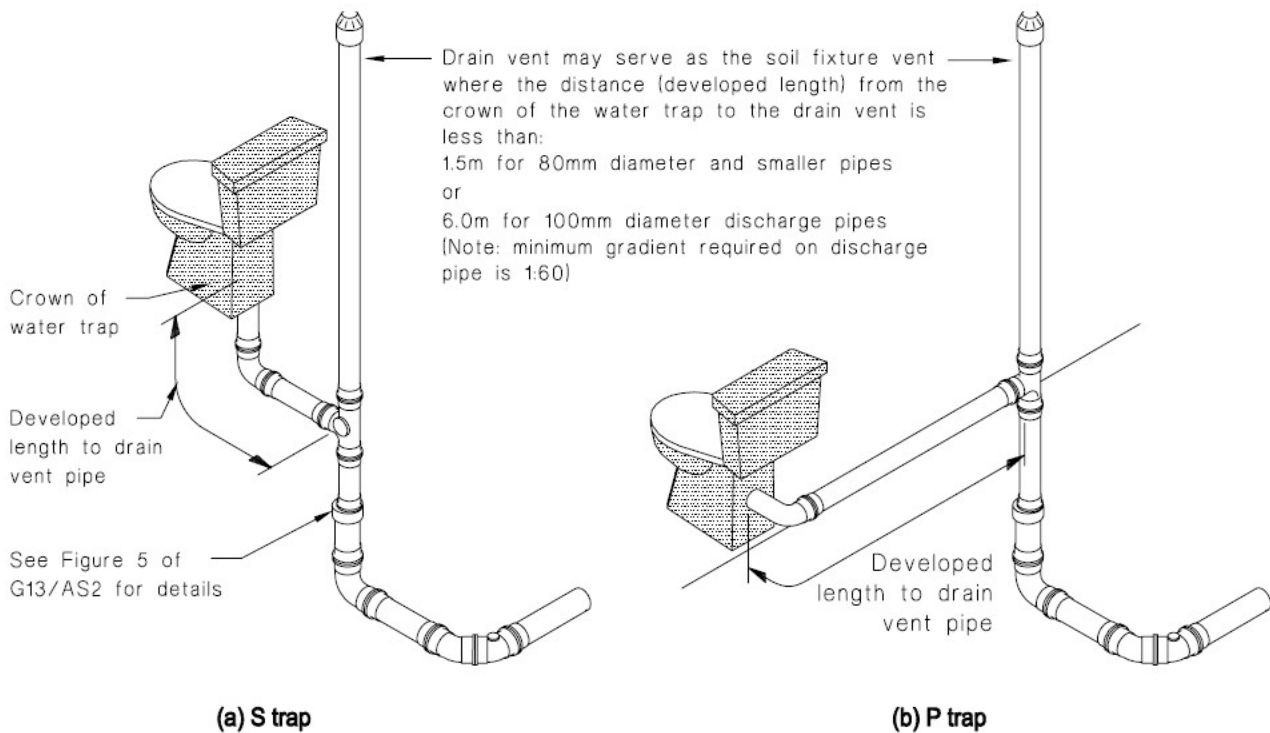
NOTE:

1. Fill shall be:

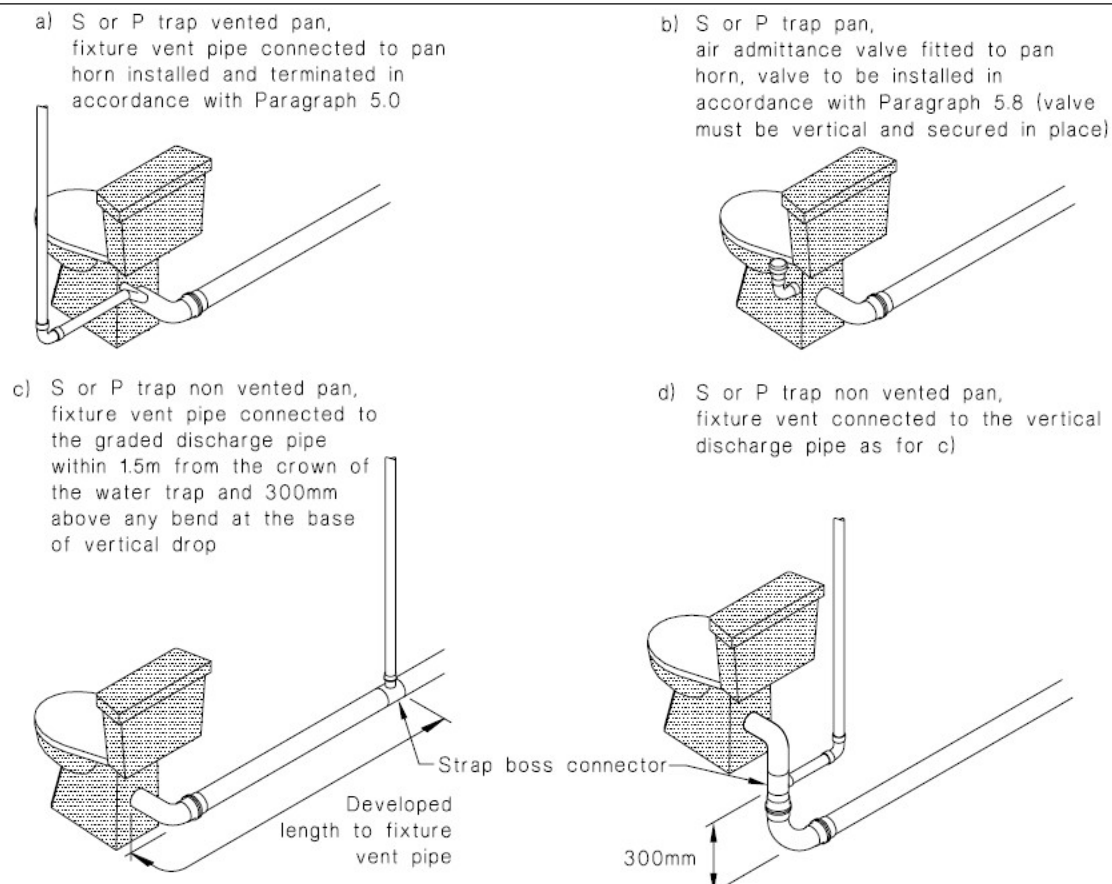
-Ordinary fill where drains are located below gardens and open country.

-Compacted selected fill where the drains are located below residential driveways and similar areas subjected to light traffic.

Figure 6: Soil fixture discharge pipes
Paragraphs 4.6.1 a), 4.6.2, 5.5.2 a)



1) Discharge pipes serving soil fixtures connected individually to the drain and utilising a drain vent as fixture vent



2) Discharge pipes serving soil fixtures connected individually to the drain or to a stack and utilising a fixture vent

ROOFER

- PRELIMINARY AND GENERAL**

Refer to the General and Special Conditions of Contract and Preliminary Clauses which apply to all work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution. (See also Plumber)

- SCOPE**

Supply all labour and supply and fix all materials necessary to complete the roof as shown on the drawings and to render the building watertight.

- WORKMANSHIP AND MATERIALS**

All workmanship and materials shall be carried out in accordance with the relevant clauses of the New Zealand Building Code and NZS 3601, 3602, 1170 and 3604. Self supporting breather type roofing underlay shall be to NZS 4217 and B2 durability.

- PREPARATORY WORK**

Provide all gutters, fascias, valleys and underflashings before cladding commences. Ensure all edges of roof cladding are adequately supported around projections such as pipes, ducting and roof lights. Confirm with owner type and colour of roofing materials.

Table 11: Steel corrugate profiled roofing – 0.4 mm BMT and minimum profile height 16.5 mm
Maximum spans and fixing patterns. Refer to Paragraph 8.4.6

Purlin spacings (metres)		Wind zones		
End span	Intermediate span	Low and Medium	High and Very High	Extra High
0.4	0.6	C2	C2	C2
0.6	0.9	C2	C2	C1
0.8	1.2	C2	C1	C1

NOTE: C1 fixing pattern is – Hit 1, miss 1...

C2 fixing pattern is – Hit 1, miss 1, hit 1, miss 2...

Table 12: Steel corrugate profiled roofing – 0.55 mm BMT with minimum profile height 16.5 mm
Maximum spans and fixing patterns. Refer to Paragraph 8.4.6

Purlin spacings (metres)		Wind zones		
End span	Intermediate span	Low and Medium	High and Very High	Extra High
0.4	0.6	C3	C3	C3
0.6	0.9	C3	C3	C3
0.8	1.2	C3	C3	C3
1.15	1.6	C3	C3	C2

NOTE: C2 fixing pattern is – Hit 1, miss 1, hit 1, miss 2...

C3 fixing pattern is – Hit 1, miss 2, hit 1, miss 3...

JOINER

- **PRELIMINARY AND GENERAL**

Refer to the General Conditions of Contract and the Preliminary Clauses which apply to all work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

- **MATERIALS AND WORKMANSHIP**

- [A] All timbers are to be the best of their classes, free from large, loose or dead knots, waney edges and other defects.
- [B] All interior finishing timbers are to be dried not exceeding the required maximum moisture content.
- [C] All timbers described as Dressing Grade are to be dressed and sanded smooth on all faces.
- [D] All joinery is to be accurately set out, properly machined and framed together, and finished to a clean, even and smooth surface, and free from cutter marks or other imperfections.
- [E] The prices shall include for all work in providing and fixing joinery work complete.
- [F] Before commencing any fabrication work the joiner shall verify all sizes on the job, as measurements shown take no account for wall linings and other variations beyond the designers control.
- [G] All timbers used in joinery shall be treated against borer attack.

- **EXTERIOR JOINERY**

Fabricate exterior timber joinery as shown on the drawings, Check jambs and mullions into head and sills. Generally house members to the depth of the rebate

- **INTERIOR DOOR FRAMES**

Fabricate grooved interior door frames glued and nailed.

- **KITCHEN JOINERY**

Construct kitchen joinery units complete with doors, drawers, shelves and bench tops as shown on the drawings or kitchen plans supplied by the owner. Kitchen design to NZBC G3 AS1 fig 1 & 1.5. Finishes to be selected by the owner.

- **BATHROOM UNITS**

To be constructed as for kitchen joinery. Finishes to be selected by the owner.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

WINDOWS

- **PRELIMINARY AND GENERAL**

Refer to the General Conditions of Contract and the Preliminary Clauses which apply to all work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

- **SCOPE**

For the supply of Aluminium windows, doors, ranchsliders, wardrobe sliders and any associated flashings required as shown on the drawings.

- **MATERIALS AND WORKMANSHIP**

All materials used, shall be the best of their respective types. All work shall be carried out in a workmanlike manner using the best practices in accordance with the NZS4211, B2 durability 15 years.

- **ALUMINIUM JOINERY**

All aluminium joinery shall be site measured and manufactured by a recognised supplier, colour as selected by the owner. Restriction stays shall be fitted to opening windows less than 760mm from floor and falls from openable windows where a toilet pan or any other fixed feature is within 500 mm horizontally of a window, the lower edge of the opening shall be measured vertically from the pan or feature , limiting opening of sash to 100mm maximum.

- **FINISH**

Aluminium frames to be Powdercoat or Anodised as confirmed by Owner.

- **REVEALS**

Reveals to be graded material suitable for paint finish or as confirmed by Owner.

- **HARDWARE**

Hardware as required and selected by Owner.

GLAZIER

- **PRELIMINARY AND GENERAL**

Refer to the General and Special Conditions of Contract and Preliminary Clauses which shall apply to all work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

- **SCOPE**

The glazing contractor shall supply all labour, plant and materials necessary to complete glazing work as shown on the drawings.

- **WORKMANSHIP AND MATERIALS**

All workmanship and materials shall be in accordance with the New Zealand Building Code F2, NZBC BIASI 7-1 B2 durability 15 years and , NZS 4211, NZS 4223 part 1 and 2 (Code of practice for glazing in buildings) , and NZS 4223 part 3 (Human impact safety requirements) 2016. Ensure Safety Glass to relevant locations.

- **MIRRORS**

As required and selected by owners.

- **DOUBLE GLAZING**

To windows and doors

- **OBSCURE GLAZING**

As required and selected by owner.

PAINTER

- **PRELIMINARY AND GENERAL**

Refer to the General and Special Conditions of Contract and Preliminary Clauses which apply to work in this section. Where any standard specifications are quoted they shall be the current issue including any amendments or standards issued in substitution.

- **MATERIALS AND WORKMANSHIP**

All paints, varnishes and stains used shall be proprietary brand names of first quality premium grade and applied to surfaces strictly in accordance with manufacturer's specifications and recommendations.

All preparatory work, ie cleaning, filling, sanding etc, shall be carried out in accordance with the best painting trade practices and with materials of appropriate quality.

- **COLOURS**

The owner shall provide the Building Contractor and the Painter with a full schedule of finishes and colours. The contractor shall ensure that all necessary priming is carried out at the required stage of construction.

- **FINISHES GENERALLY**

Exterior Timber: One coat of primer/undercoat; two top coats acrylic/enamel.

Or alternatively: One coat sealer and two coats of polyurethane.

Or alternatively: Propriety timber stain to manufacturer's specification.

Interior:

Gibraltar Board: One coat of approved sealer and then two coats of Acrylic . Apply to wet area walls and ceilings ,

ie bathroom , ensuite , kitchen , laundry etc.

One coat of approved sealer and then two coats of enamel .

Timber Work One coat Primer/undercoat then two coats gloss/low sheen acrylic.

Or alternatively Approved sealer then two coats of polyurethane

- **WALLPAPER**

All walls to be sized before wallpapering and wall paper hung strictly in accordance with manufacturer's specifications and recommendations.

- **CLEANING UP**

At completion of contract, Painter shall clean up and remove all stains, putty marks and paint splashes, and clean glass to the satisfaction of the Contractor

GAS SYSTEM

- **PRELIMINARY AND GENERAL**

Refer to the General Conditions of Contract and the Preliminary and General Clause of this Specification which are equally binding on all trades. This section shall be read in conjunction with all other sections

- **SCOPE**

Fabrication, installation and operation of piping systems for low pressure natural gas Carry out the whole of this work to the requirements of NZBC G10/AS1: Piped services (Gas); NZBC G11/AS1: Gas as an energy source and NZS 5601. Arrange for the network utility operator to connect their distribution system to the primary meter, to NZS 5258. Check the location of the meter enclosure with the owner Comply with the Gas Regulations, Electricity Regulations and the network utility operator's requirements. Give notices for inspections and carry out tests as required Include for the cost of this service complete with excavation and backfilling

- **Documents**

Documents referred to in this section are: NZBC G10/AS1 Piped services (Gas) NZBC G11/AS1, Gas as an energy Source , AS/NZS 4129 Fittings for polyethylene pipes for pressure applications , AS/NZS 4130 Polyethylene (PE) pipes for pressure applications - Dimensions for series 2 pipes - gas (nominal outside diameter series) , AS/NZS 4130 Polyethylene (PE) pipes for pressure applications - Dimensions for series 3 pipes - gas (nominal inside diameter series) , AS 4176 Polyethylene/aluminium and cross linked polyethylene/aluminium macrocomposite pipe systems for pressure applications , NZS 525 Gas distribution , NZS 5261 Gas Installation , AS 5601 Gas Installations , Electricity Regulations 1997 , Gas Regulations 1993 , Plumbers, Gasfitters and Drainlayers Act 2006

- **MATERIALS AND WORKMANSHIP**

Pipework requirements to NZS 5601, NZS 5601 Table 24 - Gas Pipework, and AS 5601 Table 3.1 Consumer piping materials and duty limits. Complete with fittings to NZS 5061. Polyethylene/aluminium and cross linked polyethylene/aluminium macrocomposite pipe systems for pressure applications to AS 4176. Polyethylene pipes to AS/NZS 4130 Series two, or AS/NZS 4130 Series three. Fittings to AS/NZS 4129. Manual shut-off valves to NZS 5061. Primary meter to suit design load, supply pressure and pressure drop, supplied and installed by the network utility operator. Gasfitters to be experienced competent workers, familiar with the materials and the techniques specified and registered under the Plumbers, Gasfitters and Drainlayers Act Supply a 1:100 scale as-built plan of gas pipe runs, sizes, componentry and fittings at completion of the installation.

- **DESIGN**

Design the piping system to NZS 5061 and AS 5601, with pipe sizes to give a minimum pressure at any appliance inlet of 1.13 kPa for natural gas, when all appliances are in use; and with a maximum design pressure drop from meter outlet to any appliance of 80 Pa.

- **APPLICATION**

Run the system, completely concealed, in the most suitable type of pipe for each part of the installation, bent, supported, jointed and complete with all fittings to NZS 5061. Confirm the type of pipe and its location. Label pipework to distinguish it from other services.

HEATSHIELDS

Glazed ceramic tiled heatshields or similar to be installed to walls.

RANGE ANTI TIPPING BRACKETS

Anti tipping brackets must be fitted to all free standing range installations to manufacturer's requirements.

- **TESTS**

Pressure test the system for leakage to NZS 5261 before pipework is concealed. Submit the work for inspection and test and prove to the satisfaction of the network utility operator that the installation complies with all Acts and Regulations and has been tested for leakage and proved to be sound. Provide a Gasfitting Certification Certificate as required by Regulation 24 of the Gas Regulations 1993 and when required provide a copy to the energy supplier.

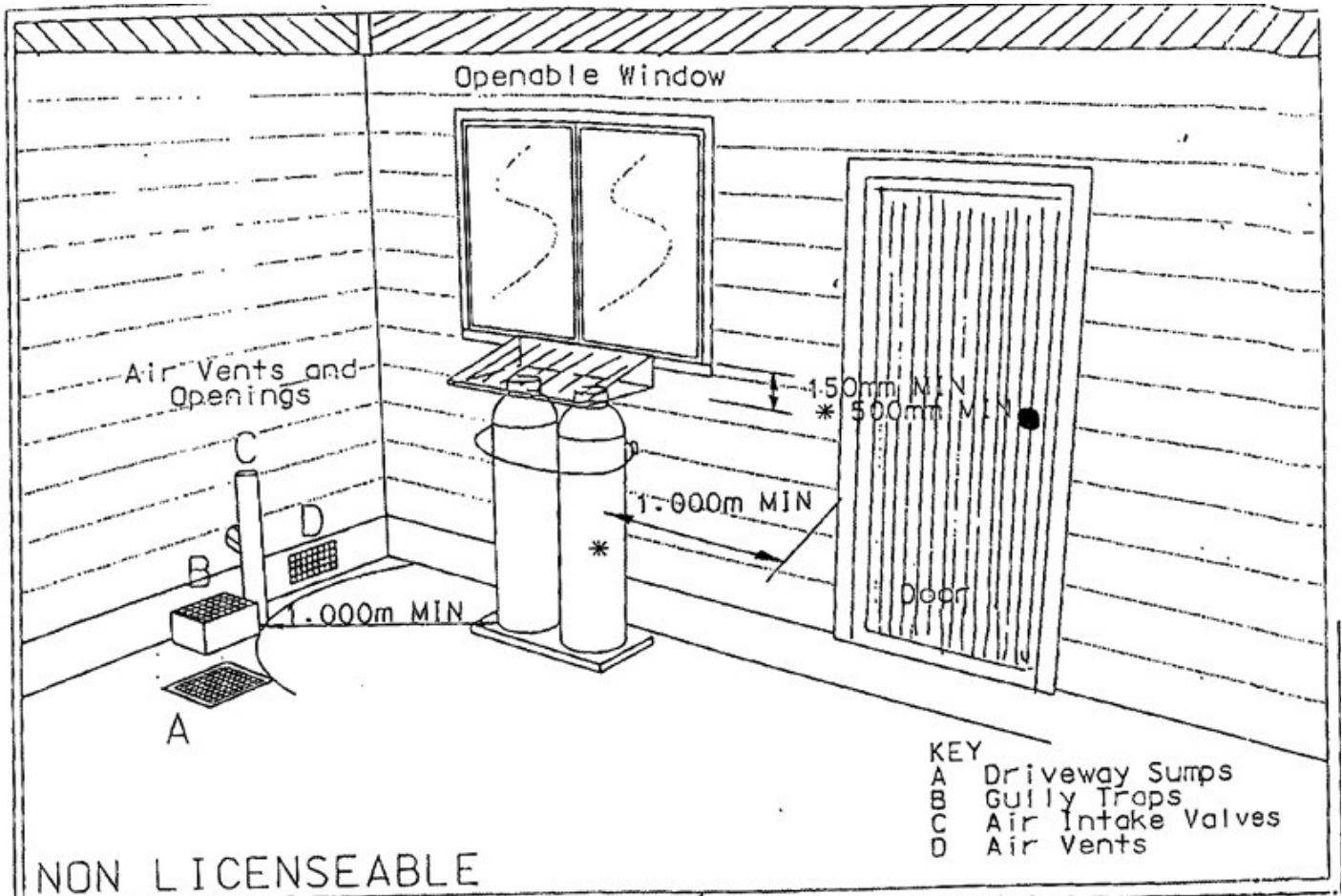
- **COMPLETION**

Replace damaged, cracked or marked elements. Leave appliances clean and in full working order to the standard required by following procedures. Remove debris, unused materials and elements from the site.

Hazardous Substances and New Organisms Act 1996.

Compliance guidelines are set out below.

- * Cylinders shall be positioned on a concrete base or concrete pavers.
- * An approved hood, covering such fittings as valves, hoses, seals plus cylinder valve caps shall be fitted and the appropriate warning notice located on or beside the gas cylinders.
- * Exchange cylinders shall have not less than 150mm.
- * An approved method of restraint shall be installed to prevent the likelihood of cylinders falling, e.g. chain fixed to wall.
- * Openings into a building or a drain are not permitted within 1 metre of the gas cylinders.
- * The surface of building elements (including fences) within 1 metre of the cylinders is to be sealed to prevent gas from spilling to the neighbouring site or under the building, and be of non combustible construction.



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

FORMED DRIVEWAY

- **PRELIMINARY AND GENERAL**

Refer to the General Conditions of Contract and the Preliminary and General Clause of this Specification which are equally binding on all trades. This section shall be read in conjunction with all other sections

- **SCOPE**

This section of the contract consists of;

- (a) The stripping of top soil from driveway
- (b) Excavation, forming and grading to concrete driveway.
- (c) Supply and laying of sub-base, base course and concrete.

All as shown on drawings.

- **MATERIALS AND WORKMANSHIP**

All materials shall be of the best of their respective kinds. All plant shall be of the appropriate type to produce the required standard of workmanship.

All materials and workmanship shall fully comply with the Specification listed herein.

- **MAINTAIN PUBLIC PROPERTY**

The Contractor is to maintain and protect public property and that of drainage, electricity, gas, highway, water and telephone authorities, and that of similar undertakings, and is to make good or pay for the reinstatement of all damage thereto.

- **PROGRAMME OF WORK**

Basecourse and concrete shall not be laid until the work under Drainlayer is completed and power mains have been laid and all kerb and channels and walls have been laid.

- **EXCAVATING AND GRADING**

Excavate to 175mm below the finished driveway levels and grade to the required falls. Provide and lay 175mm finished thickness of basecourse material, laid and compacted in two layers. Basecourse material shall be approved well graded TNZ AP40. It shall be laid at optimum moisture content and mechanically compacted to a level surface in accordance with NRB Specification M14; Aug 1986.

- **CONCRETE**

The surface shall be finished to a brush, even grades with no local depressions or bumps exceeding 6mm in 3.0 metres, and shall be such as to direct water into channels and sumps. Finish neatly against concrete kerbs, channels, slabs and foundations at other boundaries and at the correct surface level. Full precautions are to be taken to prevent disfigurement of any concrete work with the concrete. Any disfigurement or damage shall be make good at the Contractor's expense.

- **CO-OPERATE**

Allow to co-operate with all other trades for holes, chases, etc. for drains, pipes and waste

SECTION 6

Technical Information

(Manufacturer's Information)

- ~~- Septic Tank & Effluent Design incl. fencing~~
- ~~- ECan Approval Documents~~
- ~~- Gas Fire~~
- Heating Unit
- ~~- Solar Panels~~
- ~~- Central Heating Systems~~
- A4 Details/Acceptable Solution Extract
- ~~- Well/Water Test~~

E1/VM1 ESTIMATION OF RUN-OFF

RAINFALL INTENSITY VALUES : <https://hirds.niwa.co.nz/search>

$$Q_c = C I A_c / 360 \quad 0.0017653 \text{ m}^3/\text{s run-off from catchment area } (A_c)$$

$$\begin{aligned} C &= 0.90 \text{ run-off coefficient E1/VM1 table 1} \\ (E1/VM1 \text{ requirement}) \quad I &= 25.40 \text{ Rainfall intensity (1hr 10\%AEP) in mm/hr} \\ &= 278.00 \text{ Catchment area in m}^2 \\ A_c &= 0.0278 \text{ Catchment area in Hectares} \end{aligned}$$

$$(E1/VM1) Q_c = 0.0017653 \text{ m}^3/\text{Hr}$$

Converted values:	1.7653 L/s
	6355.08 L/Hr
	6.35508 m ³ /Hr

E1/VM1 Soakpit Calculator

RUN-OFF DISCHARGED IN 1 HOUR

$$\begin{aligned} R_c &= 10 C I A_c \quad 6.35508 \text{ m}^3 \text{ run-off from catchment area } (R_c) \\ C &= 0.9 \text{ run-off coefficient E1/VM1 table 1} \\ I &= 25.4 \text{ Rainfall intensity (10min 10\%AEP) in mm/hr} \\ &= 278 \text{ Catchment area in m}^2 \\ A_c &= 0.0278 \text{ Catchment area in Hectares} \end{aligned}$$

SOAKAGE RATE

$$\begin{aligned} V_{\text{soak}} &= A_{\text{sp}} S_p / 1000 \quad 1.25 \text{ m}^3/\text{hr soakage rate } (V_{\text{soak}}) \\ A_{\text{sp}} &= 2.5 \text{ soakpit base area m}^2 \\ S_p &= 500 \text{ soakage rate mm/hr} \quad \text{Refer E1/VM1 9.0.2 for test} \end{aligned}$$

Table 1: Run-off Coefficients	
Description of surface	C
Natural surface types	
Bare impermeable clay with no interception channels or run-off control	0.70
Bare uncultivated soil of medium soakage	0.60
Heavy clay soil types:	
– pasture and grass cover	0.40
– bush and scrub cover	0.35
– cultivated	0.30
Medium soakage soil types:	
– pasture and scrub cover	0.30
– bush and scrub cover	0.25
– cultivated	0.20
High soakage gravel, sandy and volcanic soil types:	
– pasture and scrub cover	0.20
– bush and scrub cover	0.15
– cultivated	0.10
Parks, playgrounds and reserves:	
– mainly grassed	0.30
– predominantly bush	0.25
Gardens, lawns, etc.	0.25
Developed surface types	
Fully roofed and/or sealed developments	0.90
Steel and non-absorbent roof surfaces	0.90
Asphalt and concrete paved surfaces	0.85
Near flat and slightly absorbent roof surfaces	0.80
Stone, brick and precast concrete paving panels	
– with sealed joints	0.80
– with open joints	0.60
Unsealed roads	0.50
Railway and unsealed yards and similar surfaces	0.35
Land use types	
Industrial, commercial, shopping areas and town house developments	0.65
Residential areas in which the impervious area is less than 36% of gross area	0.45
Residential areas in which impervious area is 36% to 50% of gross area	0.55

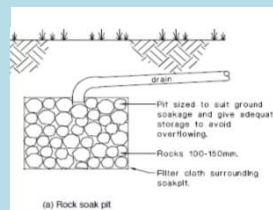
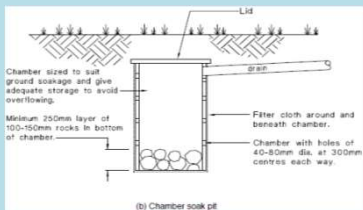
BUILDING CODE - E1/VM1 - Soakpits without Overflow:

Note - if negative Volume value then Soakage Rate exceeds discharge rate from collection area. Decrease Soakpit base area A_{sp} .

Note: Storage Chamber systems may be large-diameter pipe or submerged tank with open base. Design requires S.E.D.

$$\begin{aligned} \text{STORAGE VOLUME} & \quad (\text{net volume between boulders or chamber/pipe storage volume}) \\ V_{\text{store}} &= R_c - (V_{\text{soak}}/D_{st}) \quad 5.105 \text{ m}^3 \text{ Void/Chamber Volume required} \\ & \quad 2.042 \text{ m tall Chamber height } (V_{\text{store}}/A_{sp}) \end{aligned}$$

$$\begin{aligned} \text{BOULDER-FILLED SOAK-PIT} & \quad (\text{gross volume of boulder-filled soakpit}) \\ V_{\text{pit}} &= V_{\text{store}} \times (1/0.38) \quad 13.434 \text{ m}^3 \text{ Boulder Volume (Soakpit) required} \\ & \quad 5.374 \text{ m tall Soakpit Height } (V_{\text{store}}/A_{sp}) \end{aligned}$$



RESOURCE CONSENT - Soakpits/Chambers with Overflow Outlet to an approved outfall:

Storage to accommodate peak flow before overflow from rainfall at rainfall rates and duration periods as defined in the Resource Consent

$$Q_c = C I A_c / 360 \quad 0.0008271 \text{ m}^3/\text{s run-off from catchment area } (A_c) \text{ within design duration period of } (T) = 10 \text{ minutes}$$

Converted values:	0.82705 L/s
	2977.38 L/Hr
	2.97738 m ³ /Hr

$$\begin{aligned} D_{st} \text{ (Design Safety Factor)} &= 3 \quad (\text{Refer RC Conditions: leave at "1" if no specified value}) \\ I_{rc} \text{ (RC Rainfall Intensity)} &= 71.4 \text{ mm/hr (Check RC)} \quad 11.9 \text{ mm/hr (Adjusted rainfall - equivalent hourly rate accumulated in design period } (I_{rc}/(60/T)) \\ T \text{ (Soakpit Design Duration)} &= 10 \text{ Minutes Duration (until Overflow) Rainfall based on \% AEP at "T" Minute Rate - Refer RC Conditions for duration requirement. Set to "10" if none defined.} \end{aligned}$$

RUN-OFF DISCHARGED WITHIN DESIGN DURATION

$$\begin{aligned} R_c &= 10 C I_{rc} (60/T) A_c \quad 2.97738 \text{ m}^3 \text{ run-off from catchment area } (R_c) \\ C &= 0.9 \text{ run-off coefficient E1/VM1 table 1} \\ I &= 71.4 \text{ Rainfall intensity in mm/hr for specified design period} \\ &= 278.0 \text{ Catchment area in m}^2 \\ A_c &= 0.0278 \text{ Catchment area in Hectares} \end{aligned}$$

SOAKPITS BASED ON RESOURCE CONSENT DESIGN WITH OVERFLOW TO APPROVED OUTLET

Note: Storage Chamber systems may be large-diameter pipe or submerged tank with open base. Design requires S.E.D.

$$\begin{aligned} \text{STORAGE VOLUME} & \quad (\text{net volume between boulders or chamber/pipe storage volume}) \\ V_{\text{store}} &= R_c - (V_{\text{soak}}/D_{st}/(60/T)) \quad 2.908 \text{ m}^3 \text{ Void/Chamber Volume required} \\ & \quad 1.163 \text{ m tall Chamber height } (V_{\text{store}}/A_{sp}) \end{aligned}$$

$$\begin{aligned} \text{BOULDER-FILLED SOAK-PIT} & \quad (\text{gross volume of boulder-filled soakpit with overflow}) \\ V_{\text{pit}} &= V_{\text{store}} \times (1/0.38) \quad 7.652 \text{ m}^3 \text{ Boulder Volume (Soakpit) required} \\ & \quad 3.061 \text{ m tall Soakpit Height } (V_{\text{store}}/A_{sp}) \end{aligned}$$

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
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BC201170 9/12/2020 nicolah

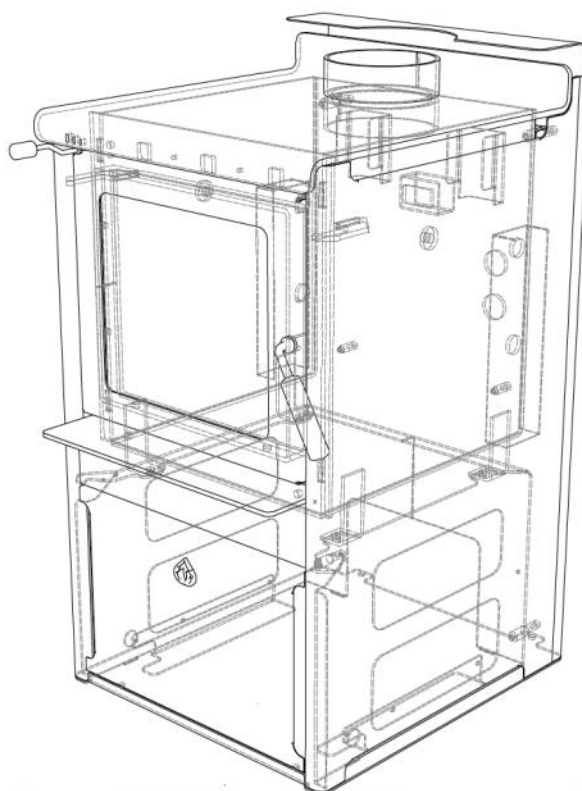
Issued: May 2019 V1.2



WOODSMAN

Specifications, Installation and Operating
Instructions for the:

Woodsman Serene Ultra Low Emission Burner



SERENE

KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

Proudly Manufactured By:



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WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

Testing and Certification

MODEL	AS/NZS 2918:2001	CM1.6 (ULEB)	AS/NZS 4012:2014	AS/NZS 4013:2014	Authorisation Number
Serene	Complies	—	66.2%	0.36g/kg	193597
Serene	Complies	25.7mg/MJ	—	—	194586
Serene WB	Complies	—	65.7%	0.37g/kg	194587
Serene WB	Complies	32.1mg/MJ	—	—	194588

Warnings

- Your appliance and flue system should not be modified in any way without the approval of the manufacturer.
- Any modification of the appliance that has not been approved in writing by the testing authority is considered as breaching the conditions of the Serene certification and could be considered unsafe.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Do not leave children un-attended near a fire and keep them well away from the fire when in use. Supervise young children to ensure that they do not play with the appliance.
- Do not use flammable liquids or aerosols to start or rekindle the fire. Also do not use or store such flammable materials in the vicinity of this appliance when it is operating.
- The use of some types of preservative-treated wood as a fuel can be hazardous and is prohibited.
- Always keep clothing, firewood, furnishing and other combustible materials at a safe distance from the fire.
- Do not attempt to open the **Fire Safe Drawer** when fire is in use.
- Do not touch any part of the fire other than the door handle and the air control when in use as all other parts can be extremely hot.
- Cracked/broken door glass, makes the installation unsafe. Do not operate the fire with cracked glass.
- Do not use the fire if there is a malfunction, a suspicion of breakage or unusual noises. Contact your nearest Woodsman dealer or Harris Home Fires.
- This appliance should be operated & maintained at all times as per instructions given in this manual.

Failure to follow above warnings, cautionary measures and instruction given in this installation and operation manual will void the warranty of this product.

Before You Install

The installation of any solid fuel burner requires a Building Consent prior to installation commencing. We recommend the installation of a Woodsman solid fuel burner or flue system be undertaken by the holder of a current SFAIT (Solid Fuel Appliance Installation Technician) qualification issued by the NZHHA (NZ Home Heating Association Inc.).
www.nzhha.co.nz

Before Your First Light Up

- Ensure that your appliance has received a Code of Compliance from your local council building inspector.
- Ensure that your installer has sealed all the flue joints as per the installation instructions.
- Check to make sure that all the internal parts (bricks, baffles and air tubes) are properly in place and have not been moved during transit or installation.
- Be aware that when you first light the fire, there will be visible smoke that will come off the paint for approximately 30 to 60 minutes. This is quite normal and is the paint going through the final baking on process. The fire should be fully loaded with wood and run at the high setting for this time. We recommend that you light your fire at a suitable time of day where the area can be ventilated by opening doors and windows and disable any smoke alarms that may be affected.
- Read the lighting instructions in this document.

Before You Use

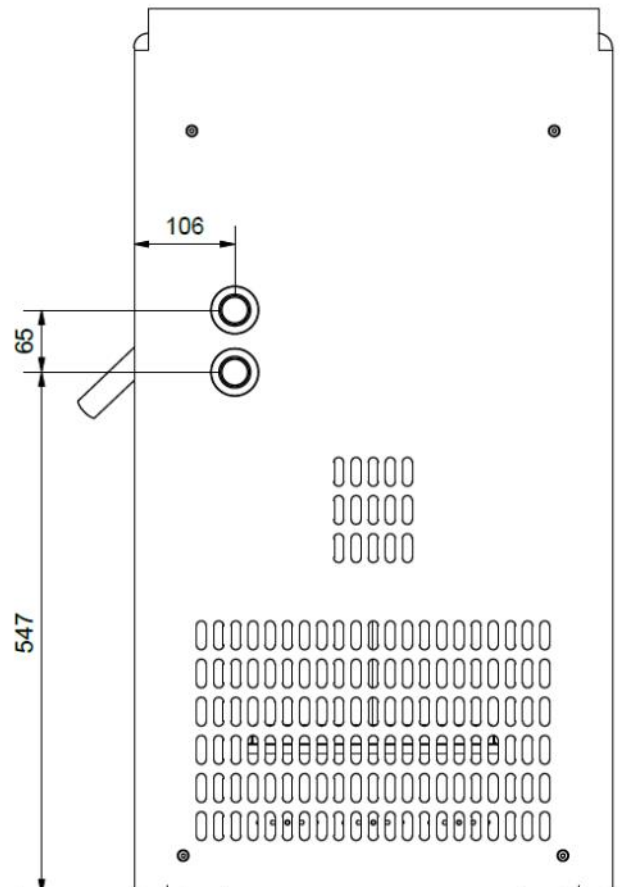
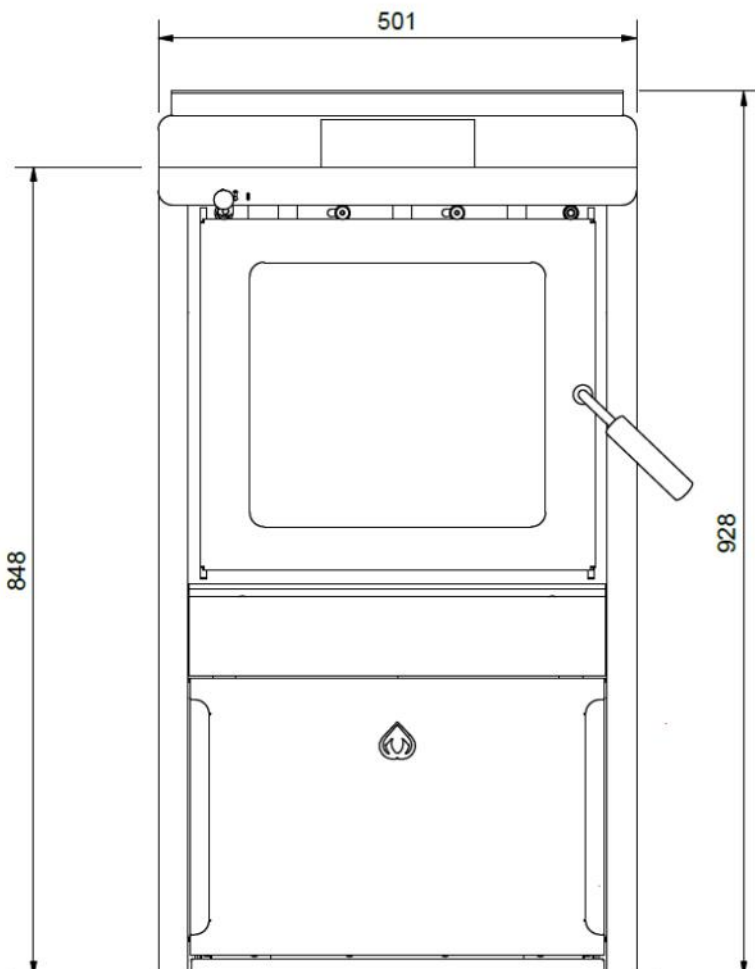
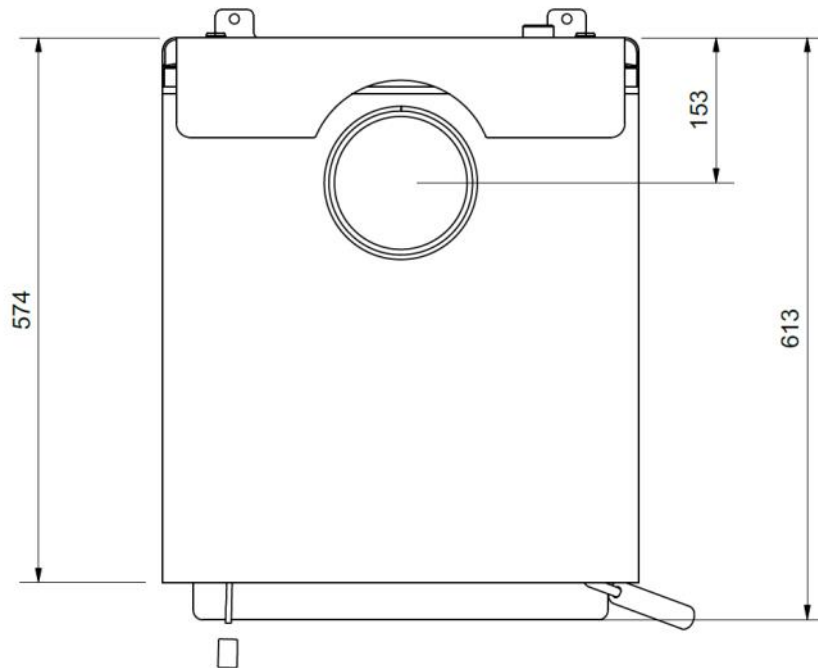
It's important to note that modern clean air wood burners are different from older, non clean air approved burners. They operate differently and have different levels of maintenance. It is important to understand these differences to ensure that your fire operates efficiently, hassle free and you are doing your part to keep the air clean.

- Lighting your fire properly is important to ensure that the rest of the burn is clean and efficient.
- Your clean air approved burner has some consumable parts that your old fire probably didn't have.
- What type of wood you burn, its quality and how you burn it has a big impact on burn efficiency, air quality and the life of the consumable parts.

Please have a careful read of the rest of this manual to familiarise yourself with the best practises for using, maintaining and enjoying your Woodsman fire.

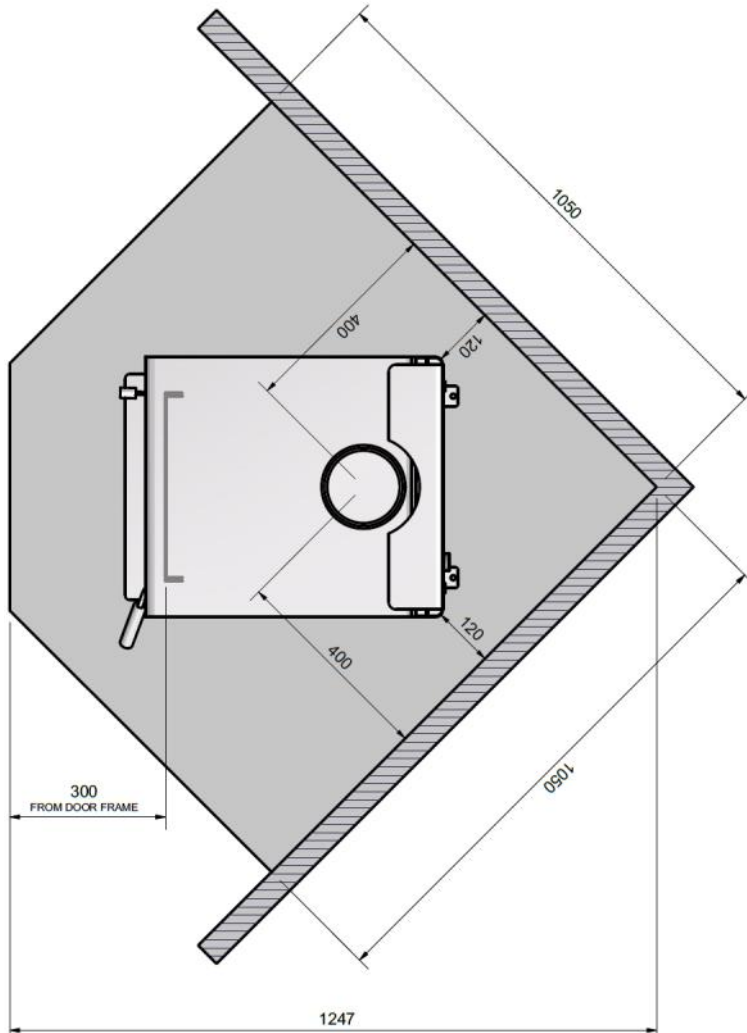
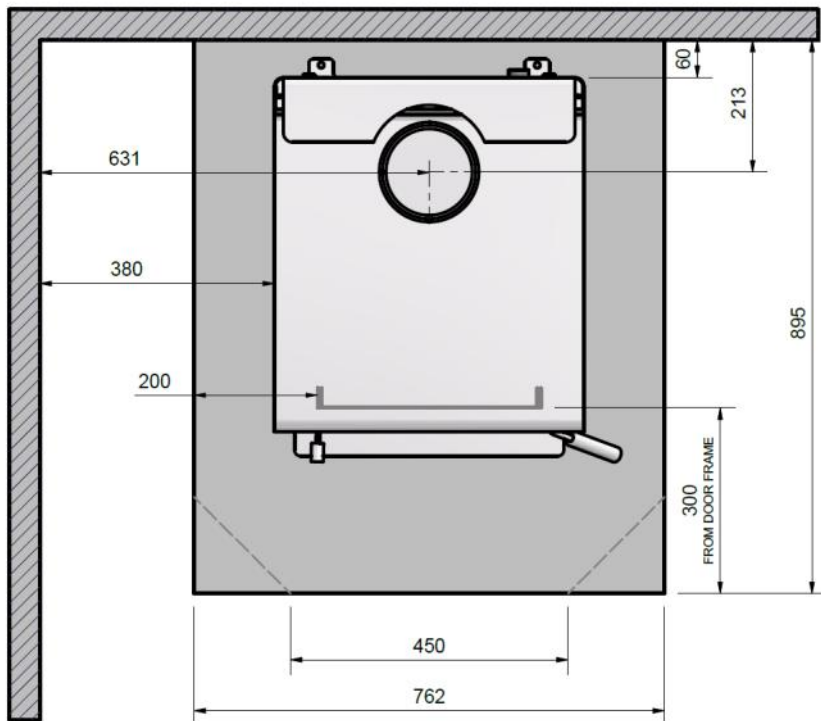
It's also important to be aware that a wood stove is a hands on and practical appliance. It requires user maintenance on a regular basis and you need to be prepared to perform the tasks listed in the guide. If you are not able or confident in performing these tasks, please contact a service agent.

Dimensions



Minimum Safe Installation Clearances to COMBUSTIBLE Materials

As tested to AS/NZS 2918:2001 by Spectrum Laboratories, Test report number 0531



Technical Requirements

Floor protector:

Ash Hearth, any non-combustible material of any thickness

Flue Shield:

1200mm high

Wet-back Rear Clearance

The Serene does not require access for maintenance behind the fire, therefore the fire can be installed as close as 60mm to the rear wall.

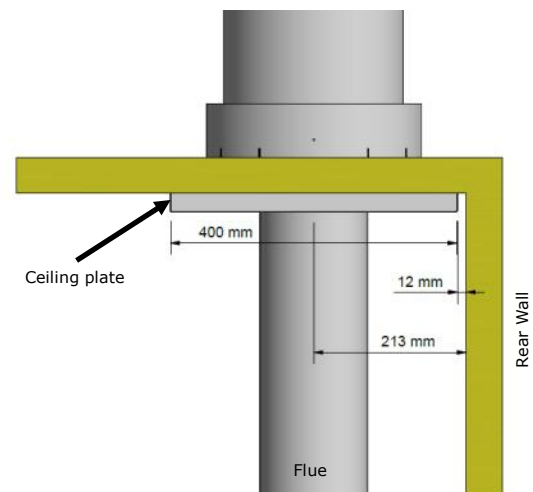
However, this is a minimum and additional clearance may be required for tool access when fitting a wetback.

It is advised that you check with your installer or plumber if additional clearance behind the fire is needed.

Ceiling plate requirements

The Serene has a minimum ceiling plate size of 400mm x 400mm

Due to the Serene's low rear clearance, the ceiling plate may be in close proximity to the wall. This may interfere with ceiling coving or mouldings where the wall and ceilings meet if. If they are a feature of the room, they may need to be cut back to allow the ceiling plate to fit, or the fire may need to be pulled away from the wall further than the minimum rear clearance.



Ceiling Heights

All Woodsman free standing fires have been tested and approved to AS/NZ 2918:2001 App B with a ceiling height of 2.4m and with the factory flue shield fitted in the below configurations. In some cases, the top of the flue shield terminates within 600mm of the ceiling height (refer to AS/NZ 2918:2001 **4.5.2**) but all ceiling temperatures did not exceed the allowable limit in these cases and are therefore able to be installed. Reports are available on request for Councils.

If the ceiling height is less than 2.4m, then heat shielding is required as per AS/NZ 2918:2001 Table 3.2

Sealing Flue Joins

IMPORTANT

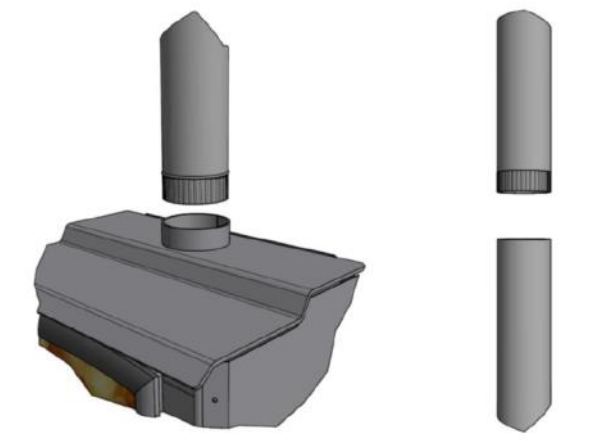
All Flue Joins Are Required To Be Sealed Using Flue Cement

It is extremely important that ALL flue joins are sealed at the time of installation using flue cement or a suitable exhaust cement.

If flue joins are not sealed properly, it can lead to performance issues with the fire such as;

- Lower heat output of the fire, due to decreased performance
- Blocked flue
- Smoke coming out the door when open, due to decreased suction
- Hard to light

The formation of soot and creosote will not seal the flues, especially on the lower lengths, as the high temperatures inhibit its formation.



Any issues that arise as a result of the flues not being sealed, are not covered by the warranty and are not the responsibility of the manufacturer.

It is the installer's responsibility to ensure that this is done at the time of installation.

Installation Instructions

We recommend this appliance be installed by a trained and NZHHA qualified installer.

Warning: the appliance and flue system shall be installed in accordance with AS/NZS 2918:2001 and the appropriate requirements of relevant building code/codes.

Warning: appliances installed in accordance with this standard shall comply with the requirements of CM1.6 where required by the regulatory authority, i.e. the appliance shall be identifiable by a compliance plate with the marking "Tested to CM1.6".

Caution: mixing of appliance or flue system components from different sources or modifying the dimensional specification of components may result in hazardous conditions. Where such action is considered, the manufacturer should be consulted in the first instance.

Caution: cracked and broken components e.g. glass panels or ceramic tiles, may render the installation unsafe.

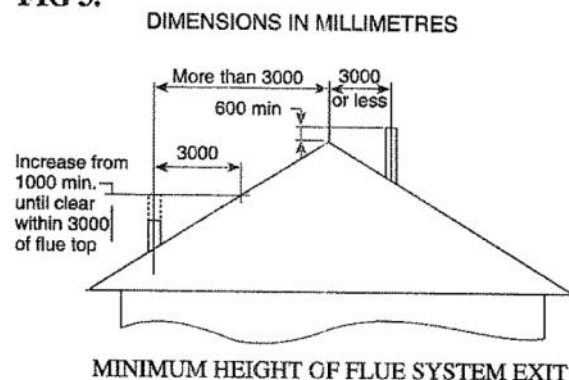
- Maintain a clearance of at least 1 metre between front of the appliance and building structure or any other substantial immovable object.
- Your appliance shall be seismically restrained, including the floor protector using the provided holes or brackets. The restraints should be sufficient enough to resist a seismic loading equal to 0.4 times the mass of the appliance. We recommend a minimum of 8mm dynabolts on concrete floors and 8mm coach screws for wooden floors, of appropriate length.

Minimum Flue Height

The top of the flue system should be at least 600mm above the highest point of the roof ridgeline, if the point of intersection of the flue system and the roofline is less than 3 metres from the ridgeline horizontally.

If the point of intersection of the flue system and the roofline is greater than 3 metres horizontally, the top of the flue system shall be at least 1 metre above the point of intersection with the roofline. (refer FIG 3)

FIG 3.



These are considered to be **minimum dimensions**, and depending on local conditions, **taller flue system heights may be required for satisfactory performance. The total flue height should be no less than 4.6m from the level of the floor protector.**

Flue Installation Detail

Your Woodsman appliance should be installed with a HeatSaver Flue System.

A HeatSaver Flue System is available from all authorised Woodsman dealers throughout New Zealand.

Use of a flue system other than a genuine HeatSaver Flue System may affect the safety of the installation, and may affect your warranty.

Insist on a genuine HeatSaver Flue System.

HeatSaver Flue Kit Installation

HEATING UNIT and FLUE to be installed in strict accordance with the manufacturers instructions. UNIT and HEARTH shall be restrained in accordance with the Building Code, clause B1 and AS/NZS 2918:2001. An INSPECTION is required PRIOR to lighting the fire.

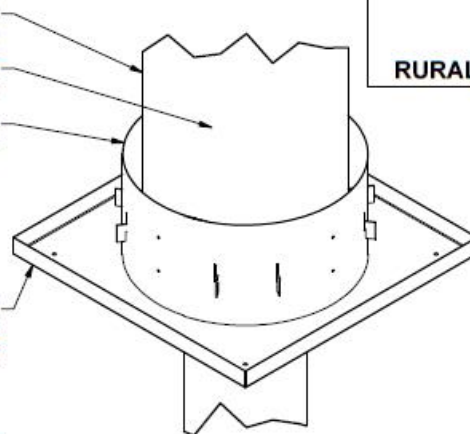
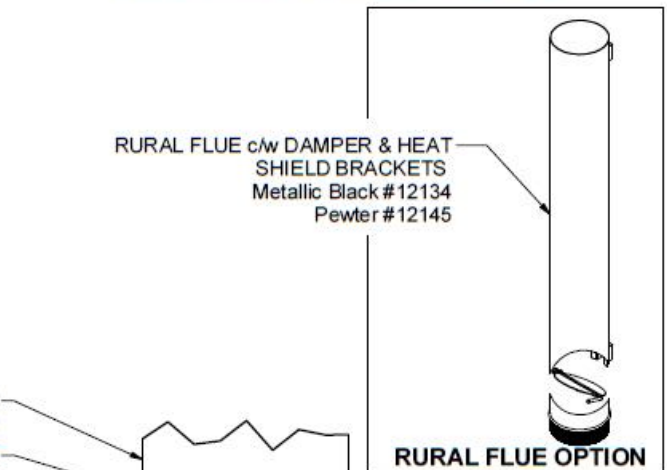
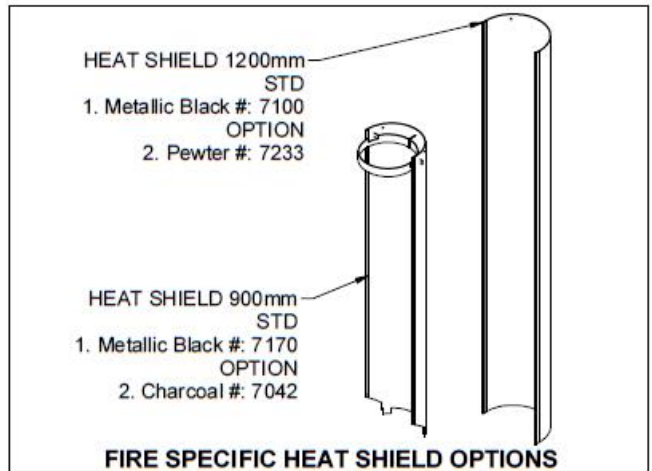
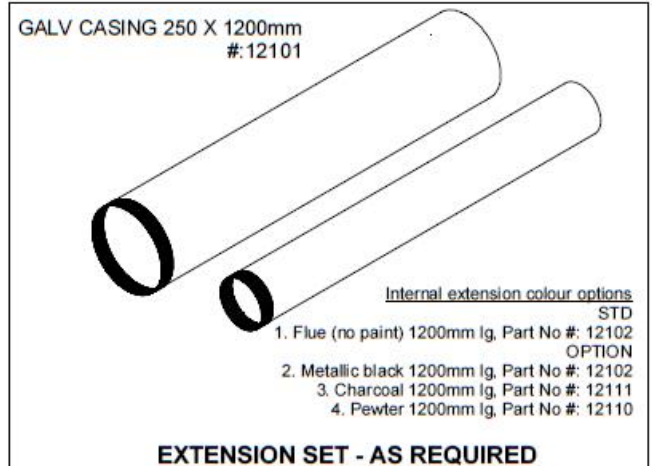
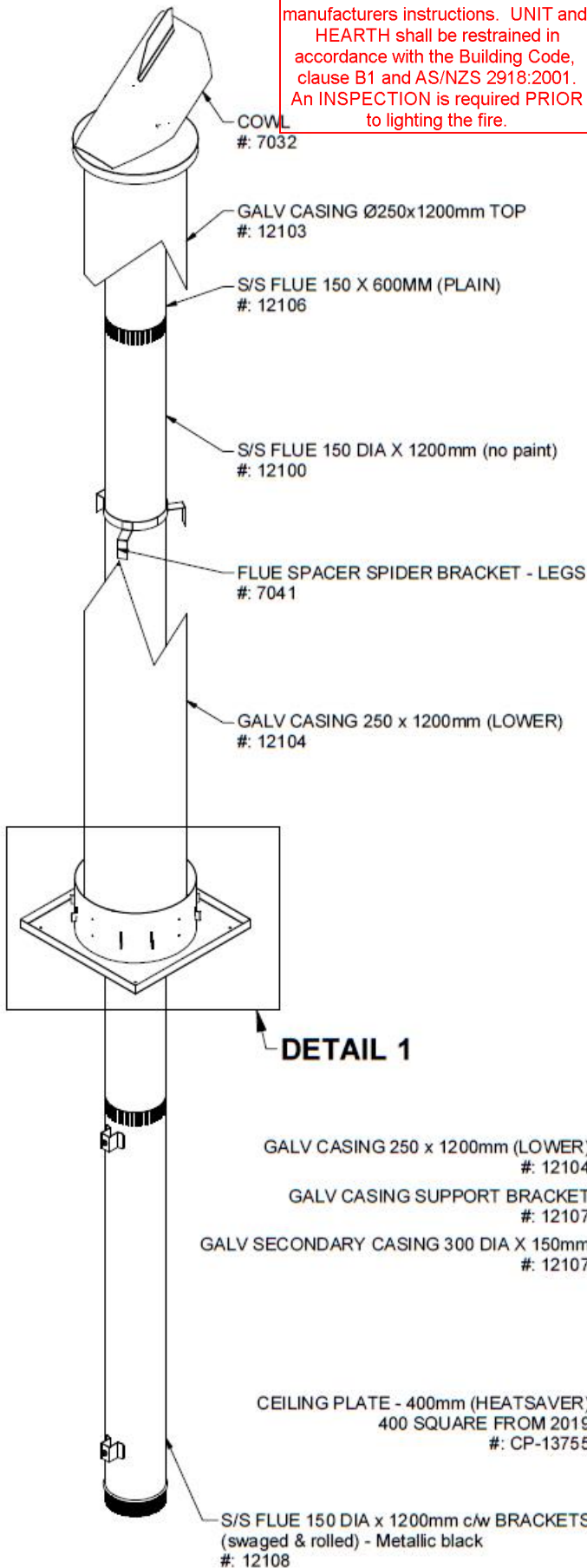


INSTALLATION INSTRUCTIONS

- This HeatSaver flue system is tested and certified to AS/NZS 2918:2001 Appendix F, which means it is approved for use on all solid fuel appliances with a flue diameter of 150mm.
- A copy of the Laboratory Test Certificate for this HeatSaver Flue System is included as part of these Installation Instructions, (refer to paperwork with flue kit).
- Installation of any solid fuel appliance should only be carried out by suitably trained and qualified personnel.
- Position the stove to the desired position, always ensuring that the manufacturer's minimum clearances to combustibles are complied with.
- Check that there are no roofline ridges or valleys in the way, or if they cannot be avoided, that the installer knows how to weatherproof the penetration and reinstate the full strength of the structure.
- At the ceiling level, construct a square frame of 300mm x 300mm internal dimensions and cut away the ceiling materials from the inside of this frame.
- Lower the 300mm flue pipe casing into this frame and nail in place when the bottom edge is 25mm below the ceiling level and the 8 nail holes provided are touching the timber frame.
- Check all 4 locating brackets are securely in place and drop 250mm diameter lower casing in place. This will naturally settle so it protrudes 25mm below the ceiling.
- Make roof penetration, assemble and fit required flue length and install with upper casing. Secure all joins with at least 3 stainless steel rivets or self tapping screws.
- Frame and brace upper installation as required and flash the roof to shield penetration.
- Fit ceiling plate to ceiling.
- When trimming the stainless steel flue length, ensure the flue is flush with the casing at the top. If it is higher than the casing, the cowl can not be fitted correctly.
- Fix the bottom section of the HeatSaver Columbia Cowl in place and ensure that it is firmly down on top of the casing. Then attach top section by bending tab away from the shaft to allow the top section to slide down onto the washer. Bend tab back in place once done. Do not over bend tab so that it touched the shaft. See page 6
- Secure the flue to the fire, drill through flue neck on fire and secure with 2 to 3 s/s screws or rivets.
- All flue joints should be sealed using a flue cement.
- Ensure a 25mm clearance from the 250mm diameter casing to any combustible material.

HEAT SAVER II FLUE KIT

HEATING UNIT and FLUE to be installed in strict accordance with the manufacturers instructions. UNIT and HEARTH shall be restrained in accordance with the Building Code, clause B1 and AS/NZS 2918:2001. An INSPECTION is required PRIOR to lighting the fire.

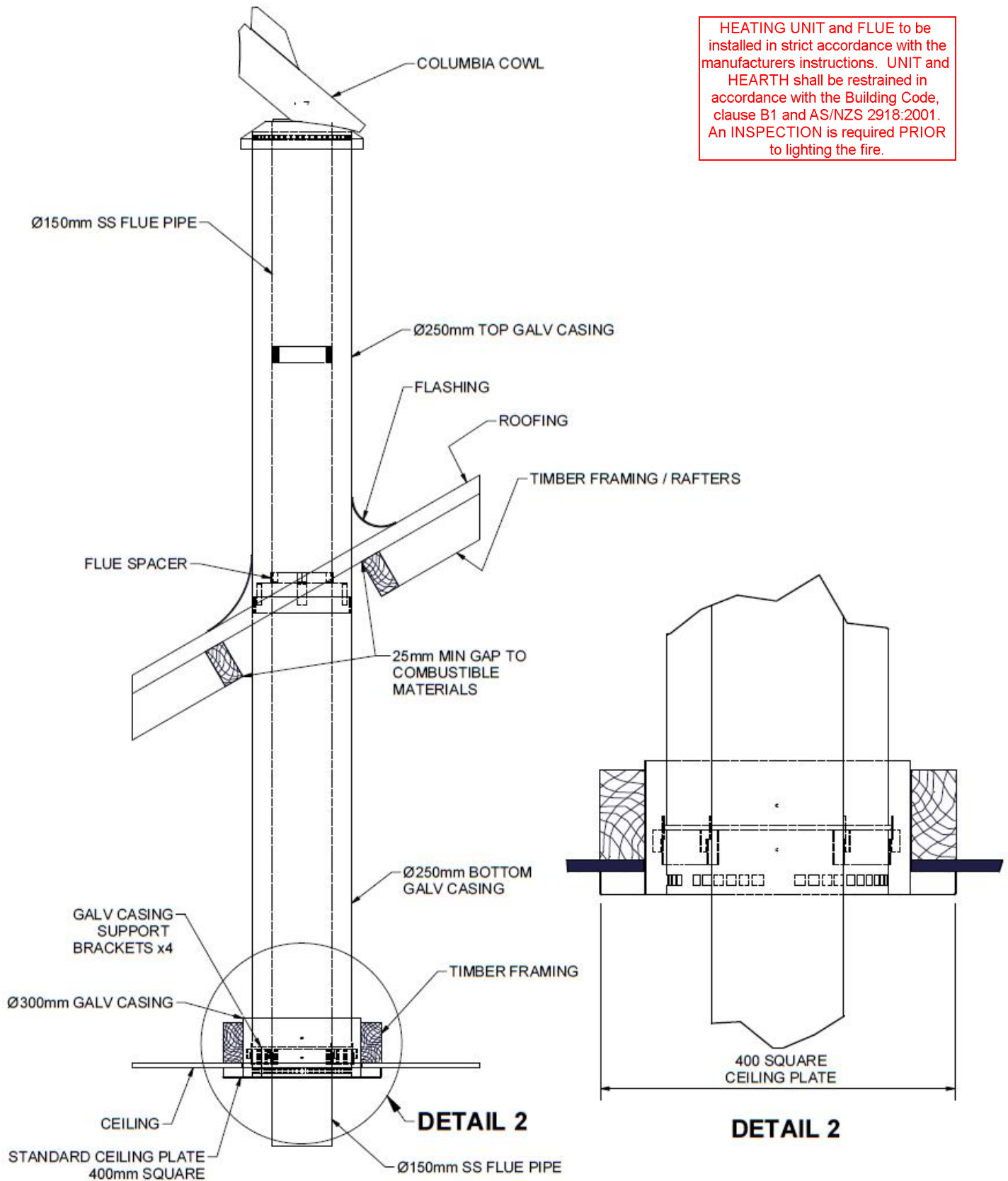


DETAIL 1

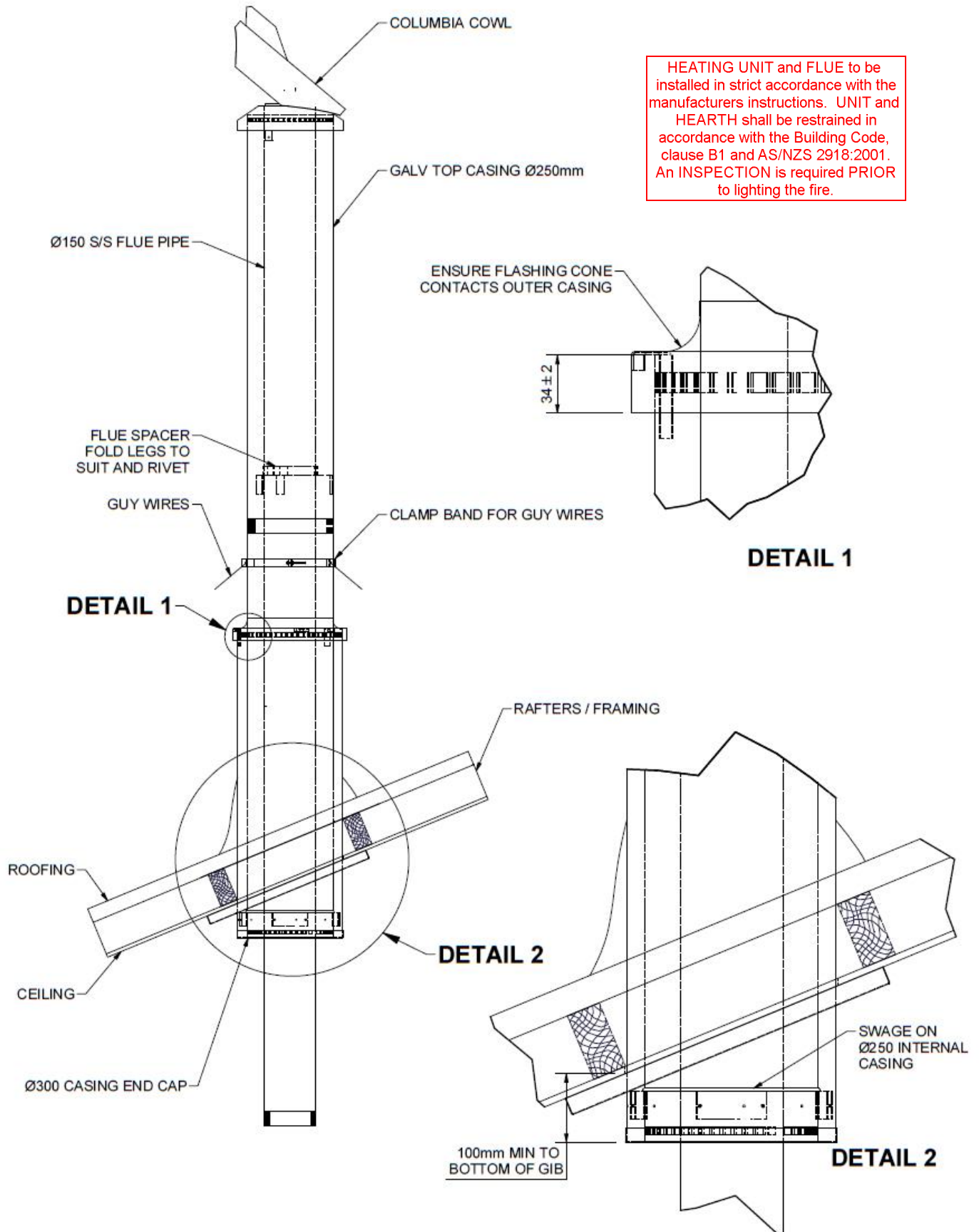
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Standard Ceiling

HEATING UNIT and FLUE to be installed in strict accordance with the manufacturers instructions. UNIT and HEARTH shall be restrained in accordance with the Building Code, clause B1 and AS/NZS 2918:2001. An INSPECTION is required PRIOR to lighting the fire.



No Cavity (Requires Sloping Ceiling Kit)



HeatSaver Flue Kit Certificate



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WEB: www.appliedresearch.co.nz

Report 09/1943

January 27th, 2009

Page 1/1

Customer: W.H. Harris Ltd.
41 Braddon St.
P.O. Box 4043
CHRISTCHURCH

COPY

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Accreditation

Laboratory Registration Number 395

This laboratory is accredited by International Accreditation New Zealand (IANZ). The tests reported herein have been performed in accordance with the terms of our accreditation. This accreditation does not extend to any opinions or any interpretations of test results contained in this report.



IANZ has a Mutual Recognition Arrangement (MRA) with the National Association of Testing Authorities (NATA), Australia, such that both organizations recognize accreditations by IANZ and NATA as being equivalent. Users of test reports are recommended to accept test reports in the name of either accrediting body.

Compliance Certificate

Appliance: HeatSaver 150 mm Diameter Flue Kit

Test Standard: AS/NZS2918:2001 Appendix F

Full Report: 02/749R

(The full report contains the information on the test methods, details of the appliance tested and the results of the test)

This report:

Prepared by: W. S. Webley

W S Webley

Approved by: W. S. Webley

W S Webley

Release Date:

2/3/09

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Lighting Procedure

It is important to follow these steps to ensure the fire will operate as intended and to ensure a clean and efficient light up.

What you will need:

- A. Approximately 16 pieces of kindling wood, about 1kg in weight (total)
- B. 4 x pieces of small sized wood (**intermediate load 1**), approximately 300mm in length, 1.2kg in weight (total)
- C. 4 x pieces of medium sized wood (**intermediate load 2**), approximately 300mm in length, 2.5kg in weight (total)
- D. 3 x natural fire lighter cubes
- E. Matches



Important: Ensure installation instructions have been adhered to before lighting the appliance.

Reminder: For your comfort, it is advised that you light your first fire with the windows open to allow the escape of paint fumes. This will normally happen for the first 30 to 60 minutes of the first burn. Ensure the fire is run at a high temperature during this period.



D

Natural fire lighters

Step 1. Loading the wood for lighting

Place the 4 pieces of small wood (intermediate load 1) across the bottom. Then stack the 16 pieces of kindling wood in a 'cross stack' style on top of the intermediate load 1 with the 3 fire lighter placed on top of the kindling wood as shown.

Lighting Procedure Continued



Step 2. Light the fire lighter cubes

Light the 3 fire lighter cubes. Once the fire lighters have caught well alight, the main door can be fully shut.



30 mins



Step 3. Load intermediate load 2 (4 pieces)

After approximately 30 minutes (or when the fire has burned down to red embers with minimal yellow flame), the fire is ready for the next load.



Load the 'intermediate load 2' onto the embers and close the door.

Lighting Procedure Continued



30 mins

Step 4. Regular loading

After approximately 30 minutes, your fire is ready for regular loading of wood. It is recommended that you use a minimum 3 to 4 pieces of wood when reloading your fire.

Reloading Procedure

It is important to note that when and how you reload your fire is important. Please follow these steps when reloading.

The door should not be opened until the wood inside has burned down to red embers and large yellow flames are minimal. The goal is to burn your wood in cycles for the cleanest and most efficient burn.

- If the fire has been on low, turn the fire onto the high setting for 5 minutes before reloading.
- Place the wood in the 'front to back' orientation, and ensure that the size of wood is appropriate for your firebox.
- Do not overfill your fire box with wood. You should fill your firebox only to about 2/3 capacity, approximately 2 to 4 pieces depending on the size.
- Allow the wood to burn right down to large red embers with minimal yellow flame before repeating the process.

Appropriate Firewood

Your Woodsman wood fire is designed to burn logs from trees which would typically be sourced from a reputable wood merchant as firewood.

The most common species is radiata pine, which is a soft wood. Other common species of wood like macrocarpa are also appropriate to use and some hard woods like eucalyptus (bluegum) can also be used in conjunction with softwood.

The size of the wood will vary, but the typical length should be from 200mm to 350mm and the diameter around 150mm.

The wood should be appropriately seasoned, which will depend on how it is stored, but the moisture content should be below 25% before use.

Your Woodsman wood fire is NOT designed to burn anything other than typical firewood as stated above, at the risk of damaging your firebox and voiding the warranty.

Do not burn, treated wood, building off cuts, drift wood, rubbish, garden waste, coal, old man pine (or other very resinous woods) or anything other than typical fire wood. If you need further clarification on a fuel, please contact Woodsman or your retailer before using it.

Creosote Formation

A small intense fire is preferable to a large smouldering one, to reduce the amount of creosote. When wood is burned slowly it produces tar and other organic vapours, which combine with expelled vapour to form creosote. These creosote vapours condense in the relatively cool flue of a slow burning fire. As a result, creosote residue accumulates on the flue. When ignited, this creosote makes an extremely hot fire.

The flue should be checked at least every 2 months, during the burning season, to determine if a creosote build up has occurred. If this is the case, it should be removed by a chimney sweep to reduce the risk of an unexpected flue fire.

Your appliance has been designed to produce low levels of creosote at high and low settings.

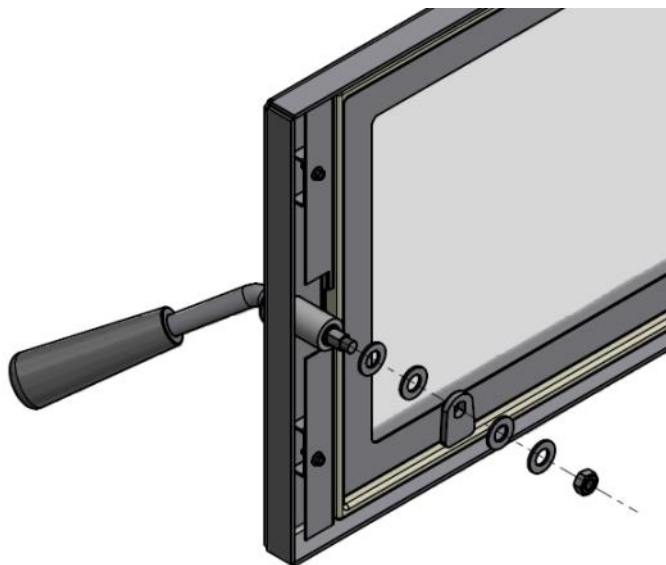
In the event of a chimney fire, close the firebox door, fully close the heat control, vacate the premises and call the fire service.

Storage of Fuel

Do not store fuel within installation clearances or within the space required for refuelling or ash removal. Wood should always be stored in a dry place out of the rain. We recommend your wood be seasoned for at least 6 months before use. Dry wood also burns hotter and more efficient than wet wood.

Door Catch Adjustment

From time to time, your door catch may need to be adjusted to ensure a tight seal. The seal in the door is a fibreglass door rope and will compress over time. To adjust the door catch, undo the nut on the door assembly and redistribute the 4 washers to either tighten or loosen the catch. The door rope will need to be replaced during the life of the fire and you may need to loosen the catch at that time.



Caring for your Fire & Maintenance

Door Glass

- Ensure logs are not too long for the depth of the firebox. Do not attempt to close the door if a log is protruding from the front of the firebox opening.
- A broken glass is caused by the door being closed onto a full firebox or logs not correctly placed into the fire.
- Wiping your glass regularly with the provided glass cleaner wipe when cold will keep the glass clean. The wipe is designed to be used dry and buff the glass clean.

Door Rope

- The door rope will need to be replaced from time to time. When replacing the rope or if the door rope becomes loose, press the door rope firmly back into the retainer. Flue cement or maniseal may be needed to help keep it in place.

Cleaning the Outside of the Fire

- Woodsman fires are finished in a high temperature paint. Only use a damp cloth (no chemicals) when cleaning the outside of the fire. If any scratches occur, you can easily touch up the fire with an aerosol can of matching paint. This is available from your retailer or Harris Home Fires.

Cleaning the Flue

- Keeping your flue clean is important. We recommend that you have your chimney swept at least once a year. A blocked flue not only effects the performance of the fire, but can also be a hazard as you are susceptible to chimney fires.
- Poor quality and wet wood will increase the number of times you will need to clean the flue. Good quality wood is important.

Cowl Maintenance

- Your Columbia Cowl is fitted with a Teflon Sleeve to reduce noise and wear. The Teflon Sleeve may need to be replaced over the life of the fire and should be checked during an annual service or when the flue is cleaned. If the shaft is dry and dirty, it should be cleaned back to a bare metal finish and a thin layer of graphite or high temperature grease applied before replacing the Teflon Sleeve.
- Older versions of the Columbia Cowl do not have a Teflon Sleeve and require re-greasing one to two times a year

Ash Level

- It is important to maintain a 2 - 3cm level of ash in the bottom of the fire for insulation purposes. But do not let the level get too high as you run the risk of logs and coals falling out of the fire. You also get less wood in the firebox.

Fire Safe Drawer

(Not Available in Wood Box model)

Your Serene comes with a Fire Safe Drawer located in the pedestal of the fire. Its purpose is to provide a convenient place to store kindling wood, matches, newspaper and natural fire lighters. Having a place to store these items can make it very quick and easy to light your fire and reduce clutter around the fire.

WARNING: Do not store flammable liquids or aerosols

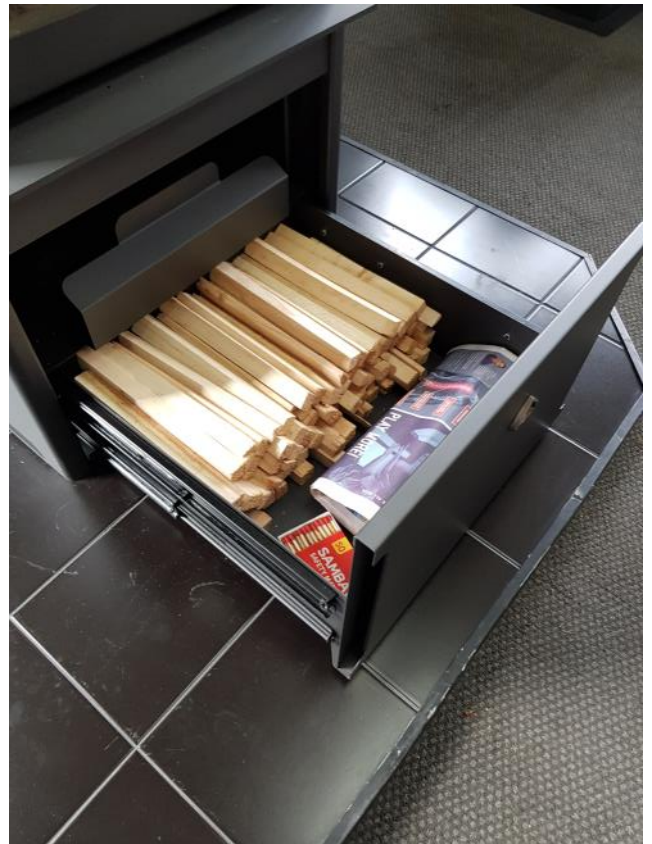
While the Fire Safe Drawer has been lab tested to ensure that temperatures are safe, it is not designed to store anything other than kindling wood, matches, newspaper and natural fire lighters.

WARNING: Do not use Fire Safe Drawer while fire is burning

The Fire Safe Drawer should be not opened or operated while the fire is in use, at the risk of hot ashes or embers falling into the drawer.



Fire Safe Drawer open in position 1 to expose the No Mess Ash Scoop



Fire Safe Drawer open in position 2 to use storage drawer

No Mess Ash Scoop (Not Available in Wood Box model)

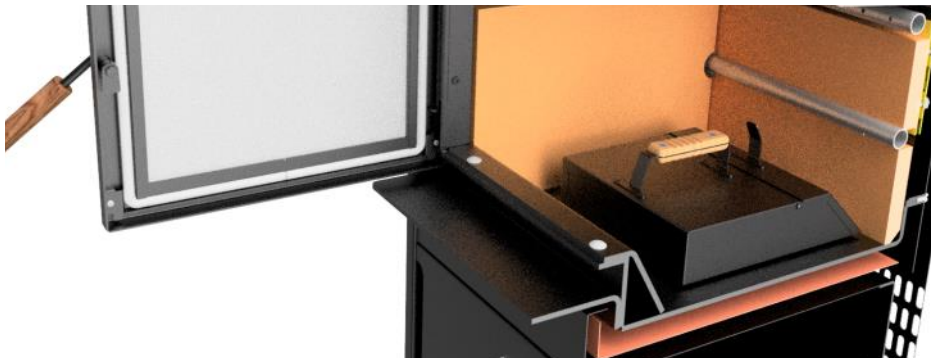
Your Serene comes with a No Mess Ash Scoop located on top of the Fire Safe Drawer, in the pedestal of the fire. Its purpose is to provide a clean and simple way to remove ashes from the fire.

WARNING: Do not remove hot ash and embers from the fire

The No Mess Ash Scoop is designed to remove cold ash only from the fire. Allow up to 12 hours after the fire has gone out before removing ash.



While holding open the lid with the thumb tab, run the scoop along the bottom of the fire-box, towards the rear of the fire.



Once the scoop is full of ash or has reached the rear of the fire-box, release the thumb tab to close the lid to contain the ash.

If needed, the No Mess Ash Scoop can be stored back in the dock with cold ashes inside until disposal, but it is recommended to dispose of the ashes immediately by leaving them outside in a metal or non combustible container. Once you are 100% certain the ash is cold, you may then dispose of the ashes in the garden, compost or rubbish bin.

Consumables

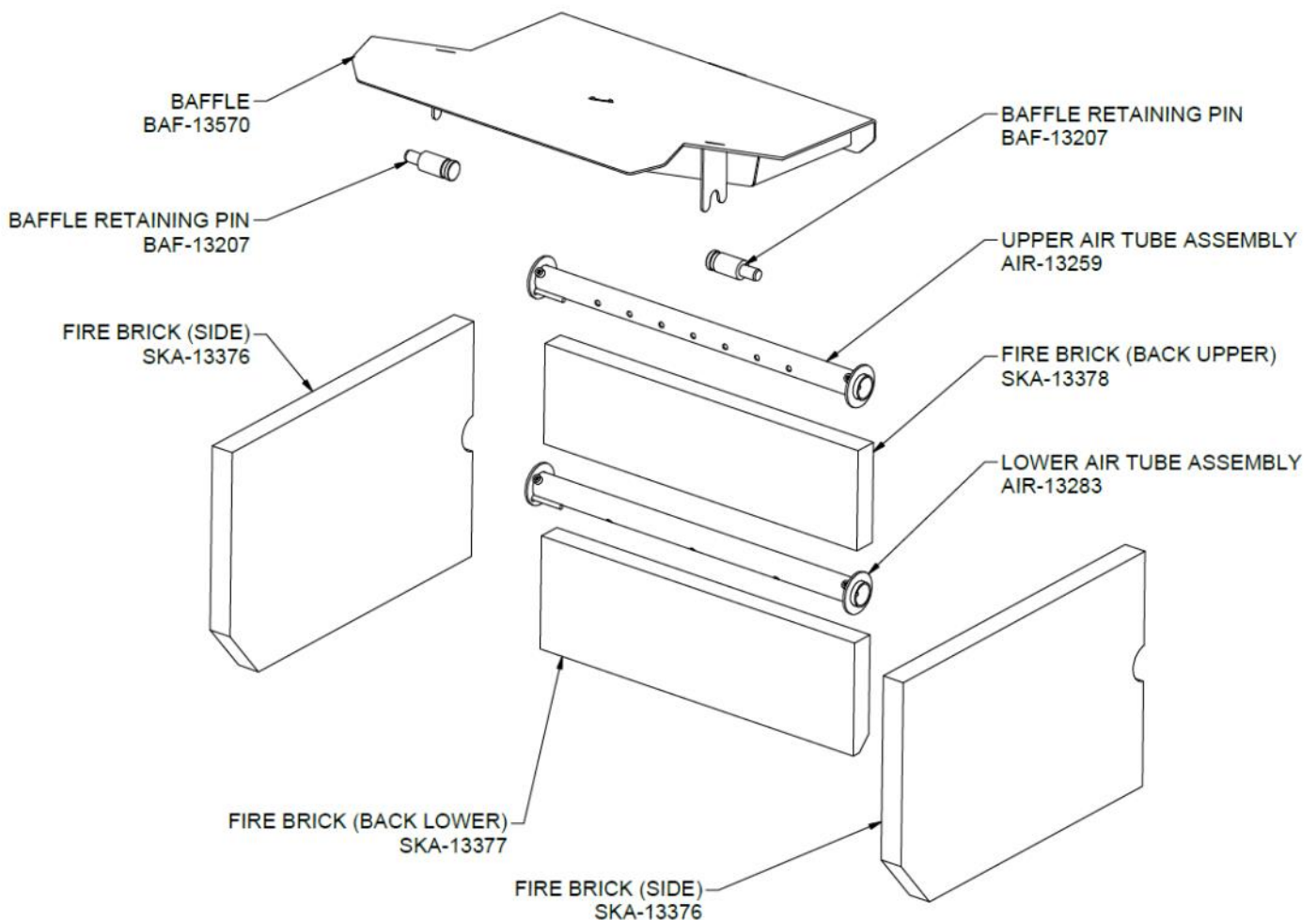
Some parts of your Woodsman fire are considered consumable. They are designed to be replaced as they will degrade over time. The life of the consumables will vary depending on;

- Frequency of use. How often is the fire used?
- Rate of burn. Is the fire burning on low or high the majority of time?
- Type of fuel. Some woods are much harsher than others.
- Level of ash.

General items that are considered consumables:

- Baffles
- Fire bricks
- Air tubes
- Glass seals and door ropes

It is very important that you replace these parts when they show sign of wear. They effect how the fire runs and you may increase your fuel consumption or lower your efficiency if not replaced, and can in some cases, damage the firebox. It is generally obvious once a part is in need of replacement. Steel components may split or large holes may appear and fire bricks may disintegrate. Fire bricks that are cracked but still remain in place are completely safe to use and only need to be replaced when they no longer remain in place. A cracked fire brick may still last years of use.

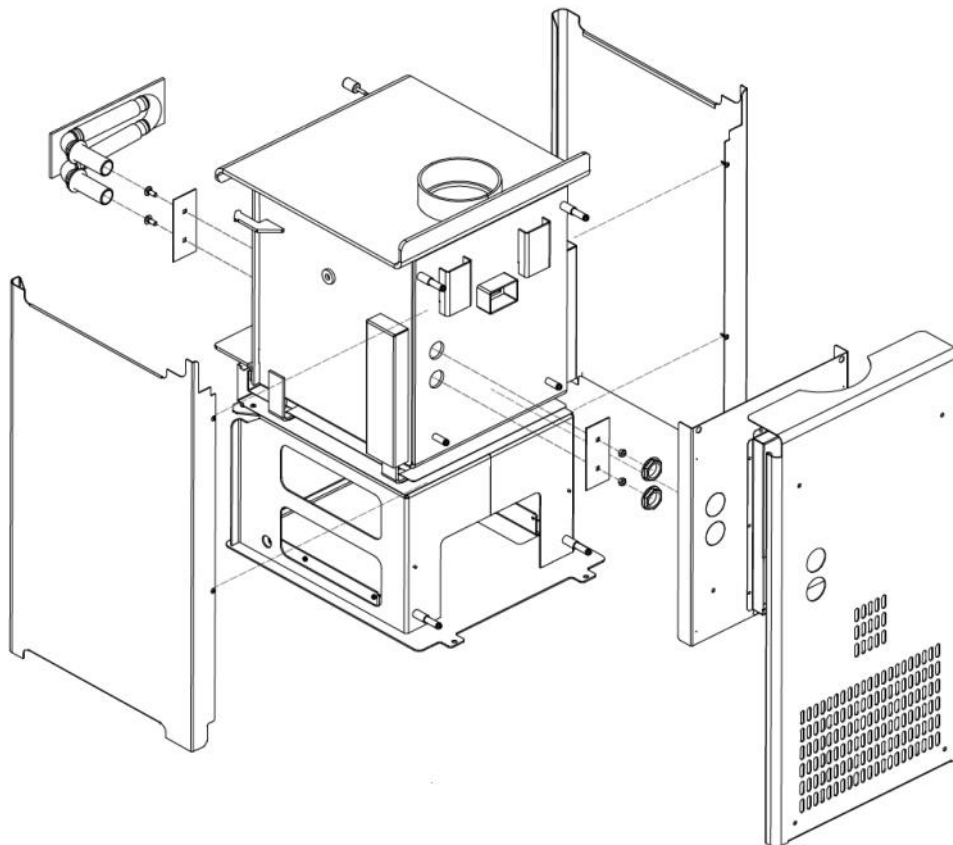


Fitting the Wetback To The Firebox

Instructions for fitting a loose wetback to the firebox where the fire has been pre-punched with wetback holes.

- Remove knock-outs and cover plates in the rear panels
- Remove top rear firebrick
- Undo coach bolts on firebox plug to expose wetback holes
- Remove 1 nut off each wetback tube
- Place wetback into fire (removed firebrick does not need to be replaced)
- Replace nuts onto the rear of the wetback. Ensure the wetback is level before tightening using a 40mm tube socket

This task should be completed before the fire is positioned in place.



Note: Rear panels do not need to be removed if a tube socket is used for tightening

WETBACK WARNINGS:

- Do not connect to an unvented hot water system.
- **NEVER** burn the appliance without the wetback connected to the water system. This will immediately damage the wetback and void the warranty.
- AS/NZS 2918:2001 states; "all water connections to an appliance shall be in accordance with the appropriate requirements of AS 3500.4.1 or NZS 4603 and the regulatory authority, as appropriate".

Useful Tips

Get the most out of your fire

Tips for lighting the fire

- Use finely cut, dry kindling wood.
- Firelighter cubes or gel work best when ensuring ignition of the kindling.
- Cross stack kindling over and around fire lighter like a small tower.
- Use ample kindling wood to ensure a good fire, you want to get the fire hot as fast as you can.

Tips to help get the highest heat output:

- Open the air slide to increase the amount of combustion air to the combustion zone.
- Use smaller pieces of wood and lots of it. Small pieces of wood have a larger surface area compared the same volume of wood but in larger pieces.
- Feed the fire regularly. Keep the fire topped up with fresh wood to keep the temperature up in the combustion zone.
- Use dry wood. Wood with a moisture content of less than 16% will burn much hotter than damp wood. Use a moisture meter to determine the moisture content of the wood.
- Use a soft wood. Soft woods like Radiata Pine burn fast and hot.

Tips for increasing the burn time:

- Shut down the air slide to decrease the amount of combustion air to the combustion zone.
- Use large pieces of wood. Large pieces have a smaller surface area compared to small pieces of the same volume and will burn slower.
- Use a hard wood like Blue Gum (where permitted). Hard woods are denser and take longer to burn.
- Completely fill the fire box with large pieces of wood. The more wood in the fire, the longer it takes to burn.
- Load the wood at the right time. If you load the fire when there is a large amount of red embers, the wood will all combust at the same time. A good idea is to let the fire burn down quite considerably and push the embers off to one side. Stack the wood in the firebox and the wood will ignite on one side only and slowly burn from one side to the other.

Trouble Shooting

My fire won't turn down

The first thing to be aware of is that some new clean air fires do not shut down like old fires. Old fires used to shut all the way off and the wood would just smolder.

Other reasons for this problem may be:

- Consumable parts have burned out and needs replacing, visually check.
- Door seal is not sealing properly and may need replacing. Take a thin strip of news paper, close the door on it at various spots, if the paper can be easily pulled out, then either a new door rope is needed or door latch needs adjusting by redistributing the washers on the door latch.

There is rust on my fire

Rust appearing on your fire can only occur when moisture or water is present and has began to oxidize the steel.

- Identify where the water or moisture has come from and fix the problem.
- Lightly sand the effected area and use matching Woodsman aerosol high temperature paint to touch up.

My glass is dirty

Your glass can get dirty easily if you use poor quality or wet wood or spend a lot of time with the fire on the low setting.

- Give the fire a good hot run on the high setting to burn off the residue on the door
- If that fails, there are special cleaners especially for this purpose or oven cleaner works well. Do not get chemicals on the paint work.

My fire smokes when I open the door

There are many reasons which may cause this symptom and it is often a process of elimination to remedy the problem.

- Your flue length may be too short. Even though it may be of legal length, every installation is different and you may require an additional length of flue.
- Your flue may be blocked, have the flue looked at.
- The baffle may not be in place correctly, visually check to see if it has moved.
- You may need a cowl like the Columbia cowl to help encourage draw, especially where there are environmental problems like high winds.
- Your flue may be getting too cold. If the flue gases get too cold, they can struggle to be exhausted and when the door is opened, they find it easier to exit via the door than the flue. If you suspect your flue is getting cool, turn the fire up onto high for a few minutes before reloading, this will increase the temperature of the flue and increase the flue draught.
- Check that the installer has sealed **ALL** the flue joints and there are no gaps which will leak air into the flue, reducing the draw.

The paint has been damaged

Paint finishes are not as durable as enameled finishes, but they are extremely quick and easy to touch up and the fire can look new in minutes.

- If damage has occurred to the paint, lightly sand the effected area and touch up using Woodsman High Temperature Paint.

My fire seems to be performing poorly, not burning well on high

If your fire doesn't seem to burn well at the high level, check the following:

- Negative pressure, make sure there are no extraction devices like fans creating a negative pressure in the home.
- The flue length is long enough.
- The wood is dry.
- The flue is clean.



WOODSMAN

Serene Warranty

15 Year Firebox Warranty 2 Year Parts Warranty

Your Woodsman Serene fire is warranted for a period of 2 year to the original purchaser, from the date of purchase, against defective materials and workmanship which includes the firebox and all parts.

If a part defect occurs, return the part to the retailer or directly to Harris Home Fires along with a copy of the retailers receipt and a replacement part will be sent at no cost. The parts warranty does not cover the cost of fitting and replacing parts. Bricks that are cracked, but remain in place do not need to be replaced and are not covered by warranty.

If a firebox defect occurs, either contact the retailer or Harris Home Fires and it will be repaired or replaced at our discretion with all costs covered.

This warranty does not cover damage caused by mishandling, misuse, failure to follow the manufacturer's installation and operating instructions, or work done by others, such as installers, or plumbers etc. The manufacturer shall not be responsible for site conditions such as insufficient draught, downdraughts, or routine servicing and adjustments.

Damage caused by the failure to replace consumables like air tubes, baffles and fire bricks or not burning the recommended fuel, may void the warranty.

Your Woodsman Serene firebox is then covered by a further 8 year warranty against defective materials and workmanship during normal domestic use.

In the case of a claim after the second year, this warranty covers the cost of replacement or repair at the manufacturer's discretion and includes freight, painting and all required refurbishment.

Your Woodsman Serene is then covered by a further 5 year warranty on the fire box against defective materials and workmanship during normal domestic use.

In the case of a claim after the first 10 years, It shall be the owner's responsibility and expense to have the fire disconnected and ready for pickup from onsite or another suitable location or deliver the WOODSMAN fire to either the dealer from whom it was purchased or directly to Harris Home Fires. Harris Home Fires will pick-up, repair and refurbish the fire, including painting as necessary and deliver the fire back to the customer.



Harris Home Fires
41 Braddon St
Addington
Christchurch 8024
New Zealand
Email sales@hhf.co.nz

P O Box 4043
Christchurch 8140
New Zealand

Phone 03 366 1796
Freephone 0800 3661796
Fax 03 366 1795



TEKTON SPECIFICATION

PRODUCT DESCRIPTION

Tekton Wall Underlay is a synthetic breather-type Wall Underlay for use as a wall underlay and air barrier under direct and non-direct fixed wall cladding on timber and steel framed buildings. The product is a coated spun-bonded polypropylene, and is approximately 0.6mm thick. Tekton Wall Underlay is supplied in rolls 2740mm x 37m and 1370mm x 37m.

FEATURES /BENEFITS

- Tekton Wall Underlay can be used in all wind zones up to and including very high and extra high with RAB Systems.
- Tekton Wall Underlay is fire retardant with a zero flammability index and can be used without restriction on all buildings, however must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the NZ Building Code.
- Tekton Wall Underlay can be installed as an air barrier to walls that are not lined, such as gable ends.
- Tekton Wall Underlay has superior water hold out - keeping framing drier while permanent cladding is installed.
- Tekton Wall Underlay has 50 year durability.
- Tekton Wall Underlay can be left exposed for up to 60 days.
- Tekton Wall Underlay has optimal surfactant resistance (will not lose integrity if exposed to most soaps, detergents and cleaning chemicals).
- Tekton Wall Underlay is Branz appraised # 548 (2013)
- Tekton Wall Underlay can be used as a non-rigid backing material for stucco plaster and as a slip layer over rigid backing for stucco plaster.
- Tekton Wall Underlay is compatible with metal cavity battens.

APPLICATION RANGE

TIMBER FRAMED BUILDINGS

- With absorbent wall claddings directly fixed to the framing.
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity.
- With masonry veneer.
- In building wind zones up to and including very high.

STEEL FRAMED BUILDINGS

- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity.
- With masonry veneer.
- In building wind zones up to and including very high.

Tekton Wall Underlay can also be used on buildings subject to specific weathertightness design.

STORAGE

Tekton Wall Underlay must be stored on its end in a clean and dry environment. It is the responsibility of the installer to protect the roll from damage and weather.

SURFACE PREPARATION

Studs must be provided at a maximum of 600mm centres. Nogs must be fitted flush between the studs at a maximum of 1200mm centres. The framing must be free from any sharp protrusions that may damage the wall underlay.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah



INSTALLATION

PLACEMENT

- The branded side of the wall underlay must face away from the framing.
- The wall underlay must run horizontally.
- The wall underlay must extend from the upper side of the top plate to the underside of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.
- Horizontal laps must be no less than 75mm with the direction of the lap ensuring that water is shed to the outside.
- End laps must be made over framing and be no less than 150mm wide.

It is preferable to tape all joins.

APPLICATION

- Position the roll of Tekton Wall Underlay against the framing with a short length of wall underlay free of the roll.
- Align the guide marks printed on the Tekton Wall Underlay with visible studs and nail /staple to the framing

Fix the wall underlay into place using 6-8mm zinc/stainless plated staples, hot dip galvanised large head clouts or proprietary wall underlay fixings.

- Unroll the wall underlay across the framing and fix to all framing members at a maximum of 300mm centres.
- Keep the wall underlay straight and taut over the framing.
- The wall underlay should be run over any openings and these should be left covered until the windows and doors are ready to be installed. To form the openings cut the wall underlay at a 45 degree diagonal in from each corner. Fold and staple the wall underlay to the inside of the framed opening. Excess wall underlay can be trimmed.

- All openings must be detailed using a Branz appraised flexible flashing system like Super-Stick, Protecto One Piece Sill Tape or the Protecto Sill System.
- Where cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the wall underlay bulging into the cavity space when insulation is installed.
- Tekton Wall Underlay can be added as a second layer over head flashings as per E2/AS1 or the headflashing can be sealed to the wall underlay using Protecto Head Flashing Tape.
- Any damaged areas of the wall underlay must be repaired by overlapping with new material and taping, or by taping small tears .

When fixing wall underlay in windy conditions, care must be taken due to the large sail area created by the roll widths.

WARRANTY

Tekton Wall Underlay meets the durability requirements of NZBC B2.3.1(a), 50 years and B2.3.1(b), 15 years. Tekton Wall Underlay is warranted to be free of defect in manufacture. This warranty is limited to replacement of the Tekton Wall Underlay material. Marshall Innovations NZ/AUS Ltd (the distributor) is not liable for incorrect installation or any accidental or wilful damage to the product.

TEKTON Specification



BRANZ Appraised
 Appraisal No. 548 [2019]

TEKTON® BUILDING WRAP

Appraisal No. 548 [2019]

This Appraisal replaces BRANZ
 Appraisal No. 548 [2013]



BRANZ Appraisals

Technical Assessments of
 products for building and
 construction.



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 Limited**

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Product

- 1.1 Tekton® Building Wrap is a synthetic breather-type flexible wall underlay and air barrier for use under direct and non-direct fixed wall cladding on timber and steel framed buildings. The product is manufactured of a coated spun-bonded polypropylene.

Scope

- 2.1 Tekton® Building 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 with regards to building height and floor plan area; and,
 - with absorbent wall claddings directly fixed to framing; and,
 - with absorbent and non-absorbent wall claddings installed over an 18 mm 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.
- 2.2 Tekton® Building 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 18 mm minimum drained cavity; and,
 - with masonry veneer subject to specific design; and,
 - situated in NZS 3604 Wind Zones up to, and including Very High.
- 2.3 Tekton® Building 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 with regards to building height and floor plan area; and,
 - with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
 - with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 for timber framed buildings or specific design for steel framed buildings; and,
 - situated in NZS 3604 Wind Zones up to and including Extra High.
- 2.4 Tekton® Building Wrap has also been appraised for use on buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of Tekton® Building Wrap into their design in accordance with the declared properties and the instructions of Marshall Innovations Limited.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Tekton® Building Wrap, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (a), not less than 50 years, B2.3.1 (b), 15 years and B2.3.2. Tekton® Building Wrap meets these requirements. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the cladding system, Tekton® Building Wrap will contribute to meeting this requirement. See Paragraphs 12.1 – 12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Tekton® Building Wrap meets this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 Tekton® Building Wrap is a 100 g/m² light grey sheet polypropylene membrane material approximately 0.6 mm thick.
- 4.2 The product is supplied in rolls 1.370 m x 37 m and 2.743 m x 37 m. The product is printed with the Tekton® logo repeated along the length of the roll. The rolls are wrapped with an instruction sticker.

Accessories

- 4.3 Accessories used with Tekton® Building Wrap which are supplied by the installer are:
- Fixings – staples, clouts, screws or proprietary wrap fixings, or other temporary fixings to attach the wall wrap to the framing.
 - Wall underlay support – polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens where required to support the wall wrap in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Handling and Storage

- 5.1 Handling and storage of the product, whether on or off site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Tekton® Building Wrap. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Timber and Steel Framing

- 7.1 Studs must be provided at maximum 600 mm centres. Dwarfs must be fitted flush between the studs at maximum 1200 mm centres.

General

- 7.2 Tekton® Building Wrap is intended for use as an alternative to conventional building papers which are fixed over timber and steel framed walls in order to limit the entry of wind into building cavities, and to act as a secondary barrier to wind-driven rain.
- 7.3 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed in. Hence, the building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.

- 7.4 Tekton® Building Wrap must not be exposed to the weather or ultra violet light for a total of more than 60 days before being covered by the wall cladding.
- 7.5 Tekton® Building Wrap is suitable for use under wall claddings as a wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23, except that it must not be used with non-absorbent wall claddings such as vinyl or metal based sidings or weatherboards in direct fixed installations. Tekton® is suitable for use under cavity based wall claddings as a non-absorbent synthetic wall underlay as called up in NZS 2295, Table 2.4 on steel framed buildings. Refer to Table 1.
- 7.6 Tekton® Building Wrap is also suitable for use as an air barrier to walls that are not lined, such as attic spaces at gable ends, as called up in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.4 [c]. Refer to Table 1.

Table 1: NZBC E2/AS1 Table 23 Requirements

NZBC E2/AS1 Table 23 Wall Wrap Properties	Property Performance Requirement	Actual Property Performance
Absorbency	$\geq 100 \text{ g/m}^2$	Classified as non-absorbent [see paragraph 7.5]
Vapour Resistance	$\leq 7 \text{ MN s/g}$	Pass
Water Resistance	$\geq 20 \text{ mm}$	Pass
pH of Extract	≥ 5.5 and ≤ 8	9.78 [Note 1]
Shrinkage	$\leq 0.5\%$	Pass
Mechanical	Edge tear and tensile strength	Edge tear: Machine direction = 228 N Cross direction = 186 N Tensile strength: Machine direction = 4.4 kN/m Cross direction = 3.9 kN/m
Air Barrier	Air resistance: $\geq 0.1 \text{ MN s/m}^3$	Pass

Note 1: Further testing of Tekton® Building Wrap was completed to determine the effect of the high pH level on the wall underlay and materials it is likely to come into contact with during its serviceable life. The testing confirmed that the high pH had no adverse effects on the wall underlay performance, or the performance of other materials.

- 7.7 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the wall underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Stucco Plaster

- 7.8 Tekton® Building Wrap is suitable for use as a non-rigid backing material for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.1. The wall underlay must be supported with 75 mm galvanised mesh or plastic tape or wire at 150 mm centres run across the cavity battens to limit deflection to a maximum of 5 mm.
- 7.9 Tekton® Building Wrap may also be used as a slip layer over rigid backings for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.3.1 [b].

Structure

- 8.1 Tekton® Building Wrap is suitable for use in all Wind Zones of NZS 3604 up to, and including, Very High when used as a flexible building underlay, and all Wind Zones of NZS 3604 up to, and including, Extra High when used as an overlay for rigid building underlays.

Durability

- 9.1 Tekton® Building Wrap 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, and code compliance with NZBC Clause B2.3.1 [b], 15 years for building wraps used where the cladding durability requirement is 15 years.

Serviceable Life

- 9.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 60 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, Tekton® Building Wrap is expected to have a serviceable life equal to that of the cladding.

Control of Internal Fire and Smoke Spread

- 10.1 Tekton® Building Wrap has an AS 1530 Part 2 flammability index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solutions C/AS2 to C/AS6, Paragraph 4.17.8 b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to Tekton® Building Wrap from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 12.1 Tekton® Building Wrap must be used behind claddings that meet the requirements of the NZBC, e.g. such as those covered by NZBC Acceptable Solution E2/AS1, or claddings covered by a valid BRANZ Appraisal.
- 12.2 Tekton® Building Wrap, when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding systems compliance with NZBC Clause E2.
- 12.3 When used as an air barrier, particular care must be taken to ensure an air tight barrier is achieved, and weather sealing at all openings and penetrations through the cladding meets the requirements of the NZBC.

Installation Information

Installation Skill Level Requirements

- 13.1 Installation must always be carried out in accordance with the Tekton® Building Wrap Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

Wrap Installation

- 14.1 Tekton® Building Wrap must be fixed to all framing members at maximum 300 mm centres with hot-dip galvanised, large-head clouts 20 mm long, zinc plated 6-8 mm staples, self-drilling screws, or proprietary wrap fixings. The membrane must be pulled taut over the framing before fixing.
- 14.2 Tekton® 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.
- 14.3 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 wall underlay may be cut off flush with the internal face of the wall frame.
- 14.4 Tekton® Building Wrap can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.3.
- 14.5 When fixing the product in windy conditions, care must be taken due to the large sail area created by wide roll widths.
- 14.6 Any damaged areas of Tekton® 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.

Inspections

- 14.7 The Technical Literature must be referred to during the inspection of Tekton® Building Wrap installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 15.1 The following tests have been carried out on Tekton® Building Wrap by Scion: Folding strength of paper in accordance with AS/NZS 1301.423; edge tear resistance and tensile strength in accordance with AS/NZS 4200.1 and air resistance in accordance with BS 6538-3.
- 15.2 The following tests have been carried out on Tekton® Building Wrap by BRANZ: Absorbency in accordance with AS/NZS 4201.6, Vapour transmission in accordance with ASTM E 96B, Shrinkage in accordance with AS/NZS 4201.3, Water barrier in accordance with AS/NZS 4201.4 and pH of extract in accordance with AS/NZS 1301.421. A range of these tests were completed before and after Tekton® Building Wrap was exposed to ultra-violet light.
- 15.3 The Flammability Index of Tekton® Building Wrap has been evaluated in accordance with AS 1530.2.

Other Investigations

- 16.1 A durability opinion was given by BRANZ technical experts.
- 16.2 Site inspections were carried out by BRANZ to assess methods used for the installation of Tekton® Building Wrap, and to examine completed installations.
- 16.3 The marketer's Technical Literature, including installation instructions, have been examined by BRANZ and found to be satisfactory.

Quality

- 17.1 The manufacture of Tekton® Building Wrap has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of product certification by ICC-ES and CCMC covering quality aspects associated with the product.
- 17.2 The quality of supply to the market is the responsibility of Marshall Innovations Limited.
- 17.3 Building designers are responsible for the design of the building, and for the incorporation of the wall wrap into their design in accordance with the instructions of Marshall Innovations Limited.
- 17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Marshall Innovations Limited.

Sources of Information

- AS 1530.2 – 1993 Test for flammability of materials.
- AS/NZS 1301.421s: 1998 Determination of the pH value of aqueous extracts of paper, board and pulp – cold extraction method.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays – materials.
- AS/NZS 4201.1: 1994 Pliable building membranes and underlays – Methods of test – Resistance to dry delamination.
- AS/NZS 4201.2: 1994 Pliable building membranes and underlays – Methods of test – Resistance to wet delamination.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays – Methods of test – Shrinkage.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays – Methods of test – Resistance to water penetration.
- AS/NZS 4201.6: 1994 Pliable building membranes and underlays – Methods of test – Surface water absorbency.
- BS 6538.3: 1987 Method for determination of air permeance using the Garley apparatus.
- NZS 2295: 2006 Pliable, Permeable Building Underlays.
- NZS 3604: 2011 Timber-framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 8, 30 November 2018].
- Ministry of Business, Innovation and Employment Record of amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



BRANZ Appraisal
Appraisal No. 548 [2019]
14 June 2019

TEKTON® BUILDING WRAP



In the opinion of BRANZ, **Tekton® Building Wrap** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Marshall Innovations Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Marshall Innovations Limited:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Marshall Innovations Limited**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Marshall Innovations Limited** or any third party.

For BRANZ

Chelydra Percy

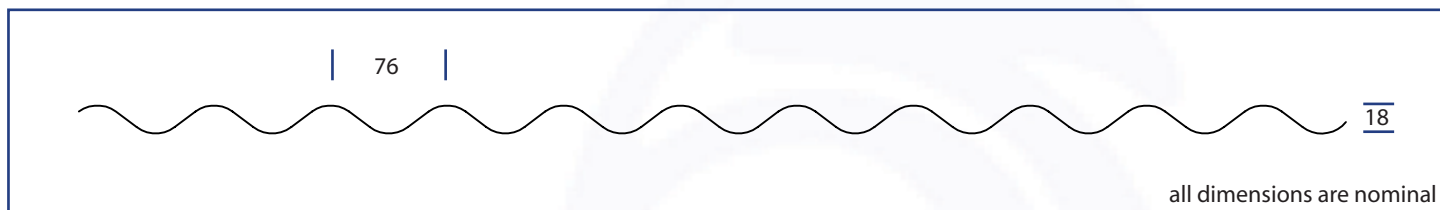
Chief Executive

Date of Issue:

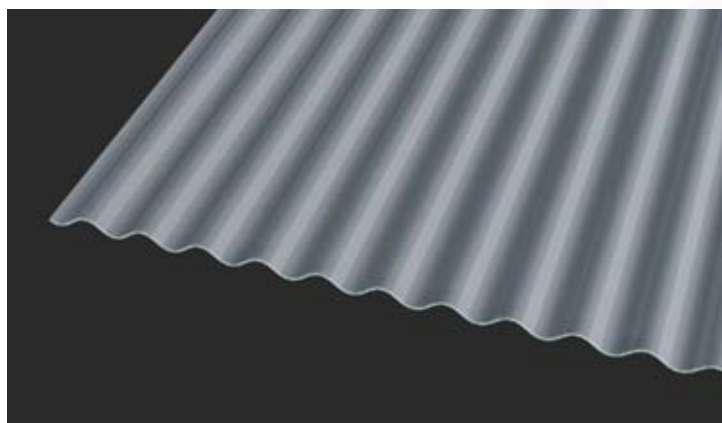
14 June 2019

Corrugate

A true icon of Kiwi culture and construction, the Corrugate profile is cost effective, versatile and able to handle a wide range of roofing and wall cladding applications. Corrugate is available in Zincalume, Galvsteel, Colorsteel Endura and Colorsteel Maxx.



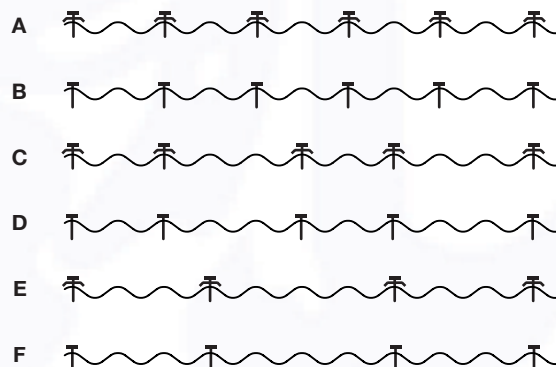
Cover: 760mm Sheet Width: 851mm Min Pitch: 8°



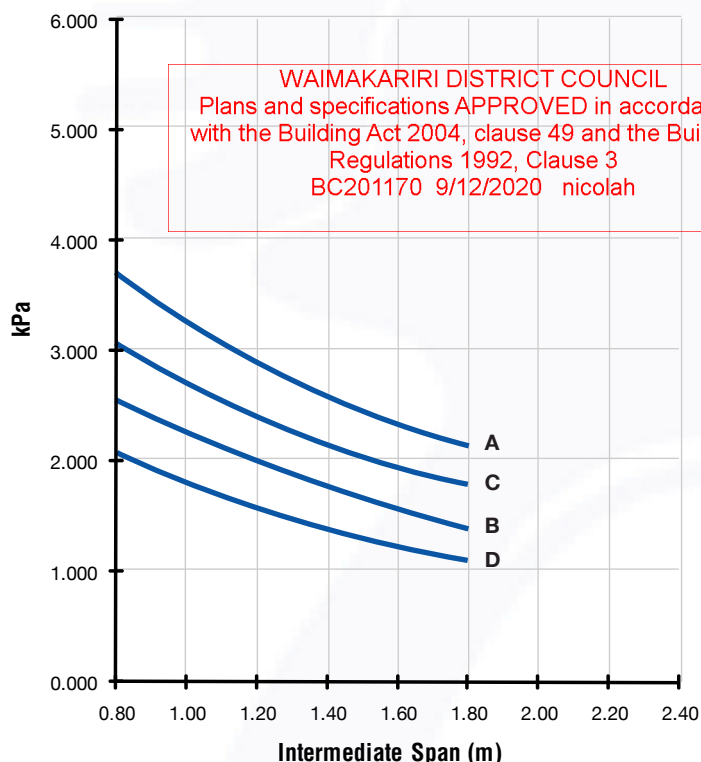
Recommended Fixings

Timber: 12G x 55mm or 12G x 65mm with load spreading washer
Steel: 12G x 45mm or 12G x 55mm with load spreading washer

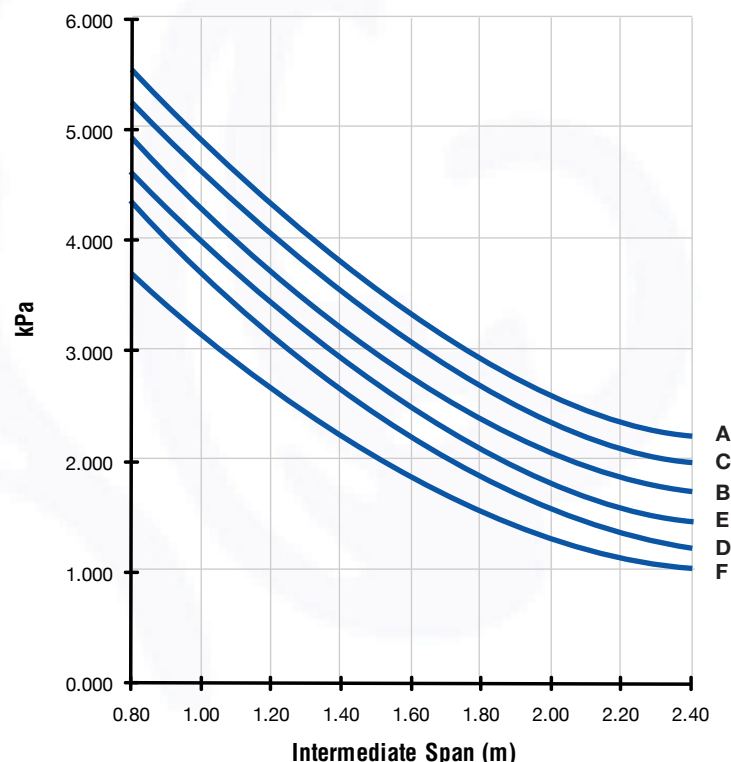
Fixing Patterns



Corrugate 0.40mm UDL



Corrugate 0.55mm UDL



Note: The intermediate spans shown in the graphs above are based on G550 Steel as the base metal. To calculate end spans please multiply the intermediate span calculated by 0.66. Spans are based on restricted access. For alternative metals please contact your local Metalcraft branch.

Manufacturing Locations Auckland, Whangarei, Hamilton, Palmerston North, Hastings,
Wellington, Christchurch, Cromwell, New Plymouth

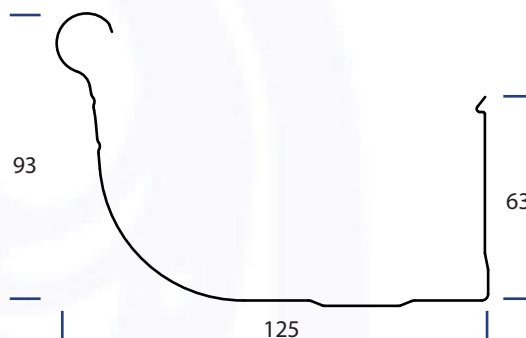
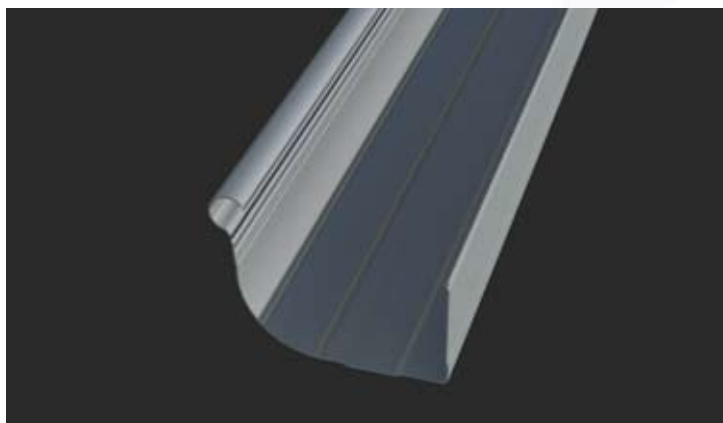
Corrugate is available for purchase from all Metalcraft branch locations

Metalline Quad Gutter

In Christchurch product is known as Colonial Quad Gutter

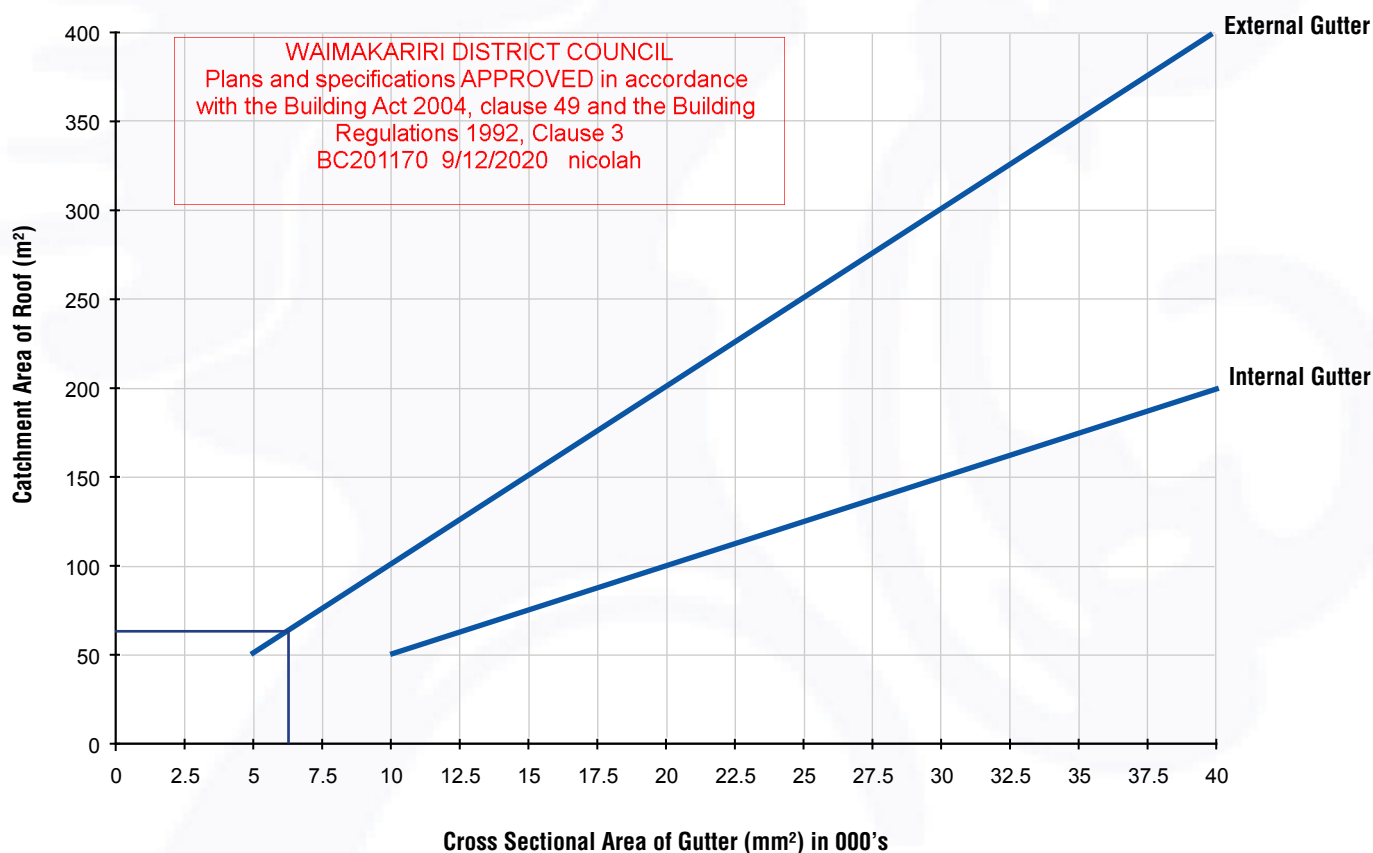
Metalline Quad Gutter is our most popular residential profile. Whether you are renovating or involved in a new build, this profile will enhance the appearance of your home. The Metalline system uses concealed brackets and is compatible with Metalcraft Metalline Fascia or timber fascia. Metalline Quad Gutter is available with overflow slots to prevent flooding from blockages, and snow straps are stocked to suit this profile if required. Metalline Quad Gutter is available in Zincalume, Galvsteel, Colorsteel Endura and Colorsteel Maxx.

Cross-sectional Area: 5550mm²



all dimensions are nominal

Catchment Area of Roof v Cross Sectional Area of Gutter



Note: The graph is based on a rainfall intensity of 100mm / hour and roof pitches less than 10 degrees.
For more information on roof catchment areas and the effect of gutter cross sectional areas download the document on Roof Drainage

Manufacturing Locations Auckland, Christchurch

Metalline Quad Gutter is available for purchase from all Metalcraft branch locations

www.metalcraftroofing.co.nz

Thermakraft™

Product Data Sheet

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

THERMAKRAFT 215

Self-supporting bituminous wall and roof underlay

Commonly referred to as "Building Paper" Thermakraft 215 is a self-supporting, kraft paper based, bituminous building underlay that is suitable for use on roofs and walls in residential buildings. It is vapour permeable, meaning that liquid water from the outside is prevented from penetrating but water vapour from the inside can pass through and escape the building envelope. Thermakraft 215 is easy to install.

Thermakraft 215 comes in two roll sizes:

1250mm wide	20m long	25m ² coverage*
1250mm wide	40m long	50m ² coverage*

* **Note:** m2 is the roll size for actual coverage, allow for laps and joins.

Smarter products. Better buildings.
thermakraft.co.nz



Thermakraft 215

Self-supporting bituminous wall and roof underlay

Scope of Use (Roof Application)

- Suitable with masonry tile, metal tile and profiled metal roof cladding.
- Direct fix or cavity fix.
- Can be used on roofs up to and including NZS 3604 'Extra High' wind zones.
- Refer to installation guide regarding underlay support requirements.
- Will provide temporary weather protection during construction (maximum 7 days), same day coverage recommended.

Scope of Use (Wall Application)

- Suitable for use with both timber and steel framing, either direct fix or in conjunction with an 18mm minimum drained cavity.
- Can be used with absorbent wall claddings (e.g. timber, brick or fibre cement) or non-absorbent wall claddings (e.g. metal or plastic).
- Can be used with masonry veneer in accordance with NZS 3604.
- Suitable for buildings situated in NZS3604 Building Wind Zones up to and including 'Very High'.
- Thermakraft 215 can be used as an air barrier to reduce wind entry and is highly water resistant.
- Will provide temporary weather protection during construction (maximum 28 days).

General

Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in well ventilated area. Recommended minimum 7 days.

Limitations

- In roofing applications must NOT be exposed to the weather or UV for more than 7 days.
- In wall applications must NOT be exposed to the weather or UV for more than 28 days.
- Must NOT be used under translucent sheeting.
- Is not fire retardant.
- Not suitable for School Property, please refer to Ministry of Education; Weather-Tightness & Durability requirements for School Property.

Compliance

Thermakraft 215 meets the requirements of NZBC Acceptable Solutions E2/AS1, Table 23 and NZS 2295:2006 for both wall & roof underlay.

Durability

Meets the Performance Requirements of NZBC Clause B2, Durability B2.3.1 (a) 50 years and B2.3.1 (b) 15 years, E2 External Moisture providing:

- It is installed in accordance to Thermakraft Installation Guide.
- Run length is no greater than 10 meters.
- Is NOT left exposed to the weather or UV for more than 7 days on roof.
- Is NOT left exposed to the weather or UV for more than 28 days on walls.
- Is installed by or under guidance of Licensed Building Practitioners.
- Is installed in accordance with the MRM Code of Practice.
- Is compatible with the cladding system used.*

* **Note:** roof cladding system compatibility testing must be done first before installation.

Property Performance

NZBC E2/AS1 Wall Underlay Requirements					
NZBC E2/AS1 Table 23 (NZS2295) Roof Underlay Properties	Absorbency	Vapour Resistance	pH of Extract	Shrinkage	Water Resistance
Property Performance Requirement	≥ 150gsm	≤ 7 MN.s/g	≥ 5.5 and ≤ 8	≤ 0.5%	100mm for 24 hrs
Property Performance	Pass	Pass	Pass	Pass	Pass

NZS2295:2006 Classification			
NZBC E2/AS1 Table 23 (NZS2295) Roof Underlay Properties	Flammability Index	Wind Zone	NZS2295:2006 Index
Property Performance Requirement		R2	R2
Property Performance	Non-Fire Retardant	Up to Extra High	Self - Support

Thermakraft 215

Self-supporting bituminous wall and roof underlay

Control of Condensation

In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation method to prevent moisture build-up in the roof cavities.

Factors which adversely affect the condensation risk in roofing systems include:

- Humid, and/or cold climatic regions.
- Warm/Skillion roof construction.
- Low roof cavity air volume and restricted air movement.
- Omitting Vapour Control Layers.
- Occupancy activities which have high moisture loading on conditioned spaces.
- Ceiling penetrations and entry of warm air into roof cavities.
- Low pitched roof.
- Bulk insulation.
- Building structures ability to naturally dry construction moisture.

Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer to MRM Code of Practice for details.

For passive ventilation of the roof space, it is recommended that all roof underlays are terminated at the ridge, and if not it should be slit or slotted to allow for passive ventilation. (For further information refer to the NZ MRM Roofing Code of Practice).

Product Warranty

Standard Thermakraft warranty applies. Refer to Thermakraft Warranty Statement for further details. This is available online at **thermakraft.co.nz** or call **0800 806 595**.

Thermakraft Limited / 0800 806 595

Smarter products. Better buildings.
thermakraft.co.nz



The recommendations contained in Thermakraft's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Thermakraft (for example quality of workmanship and design), Thermakraft shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards. Literature subject to change without notification. Latest documentation can be found on the website. E&OE.



GABLE END BRACING OVER ROOF SECTION OF END WALLS

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah



- ★ Covers bracing of the roof section on gable end construction.
- ★ Includes bracing on extra high gables.
- ★ All timber to be minimum grade SG8 as defined in NZS 3604:2011 apart from gable end webs which are either SG6 or SG8 (see Tables 1A & 1B).
- ★ Tables cover gable end truss installed as single component 45mm thick, double component 90mm thick, 45x70mm or 45x90mm webs on flat.
- ★ Design assumes restraints are provided at the ceiling and roof lines.
- ★ Bracing covers loading conditions as per NZS 3604:2011 up to Extra High wind and includes full height brick veneer gables.

TABLE 1A - STRONGBACK LOCATION FOR WEBS @ 600MM CRS.

WIND ZONE	MAXIMUM STRONGBACK HEIGHT (h)											
	70x45 Web		90x45 Web		Double Component Gable End Webs				45x70 on flat		45x90 on flat	
					2/ 70x45		2/ 90x45					
	SG6	SG8	SG6	SG8	SG6	SG8	SG6	SG8	SG6	SG8	SG6	SG8
LOW	1800	2000	2000	2200	2300	2550	2500	2750	2450	2700	3150	3450
MEDIUM	1650	1800	1800	2000	2100	2300	2250	2500	2150	2450	2800	3150
HIGH	1450	1600	1600	1750	1850	2050	2000	2200	1800	2150	2350	2800
VERY HIGH	1300	1500	1450	1600	1700	1850	1850	2050	1600	1900	2050	2450
EXTRA HIGH	1150	1350	1300	1500	1600*	1750*	1750*	1900*	1450	1700	1850*	2200*

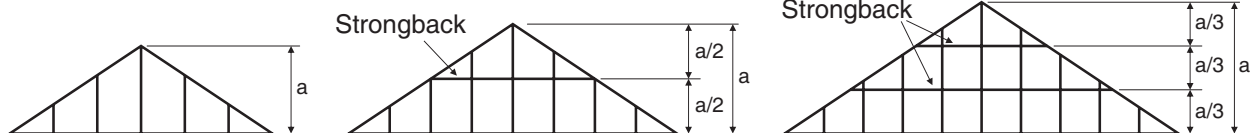
TABLE 1B - STRONGBACK LOCATION FOR WEBS @ 400MM CRS.

WIND ZONE	MAXIMUM STRONGBACK HEIGHT (h)											
	70x45 Web		90x45 Web		Double Component Gable End Webs				45x70 on flat		45x90 on flat	
					2/ 70x45		2/ 90x45					
	SG6	SG8	SG6	SG8	SG6	SG8	SG6	SG8	SG6	SG8	SG6	SG8
LOW	2100	2300	2250	2500	2650	2900	2850	3150	2800	3100	3600	3900
MEDIUM	1900	2100	2050	2250	2400	2650	2600	2850	2550	2800	3300	3600
HIGH	1700	1850	1850	2000	2100	2350	2300	2550	2250	2500	2850	3200
VERY HIGH	1550	1700	1700	1850	1950	2150	2100	2350	1950	2300	2550	2950
EXTRA HIGH	1400	1600	1550	1750	1850*	2000*	2000*	2200*	1800	2100	2300*	2700*

*Use these values for full height brick veneer attached to gable end.

Please note that the maximum height of brick veneer on a gable end wall is 5.5m.

SELECTION PROCESS



- Where (a) is less than or equal to (h) - no strongback required.
- Where (a) is greater than (h) but less than 2(h) - lower strongback is required.
• Locate the strongback at height of (a/2).
- Where (a) is greater than 2(h) but less than 3(h) - lower and upper strongbacks are required.
• Locate strongbacks at height increments of (a/3).

STRONGBACK OPTIONS

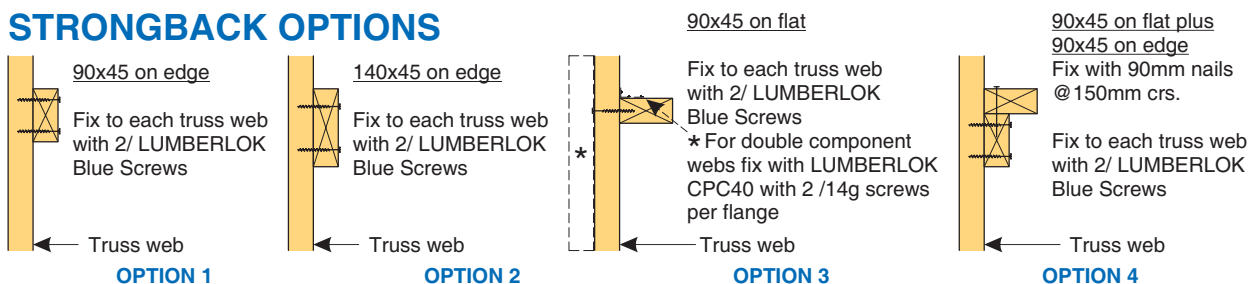
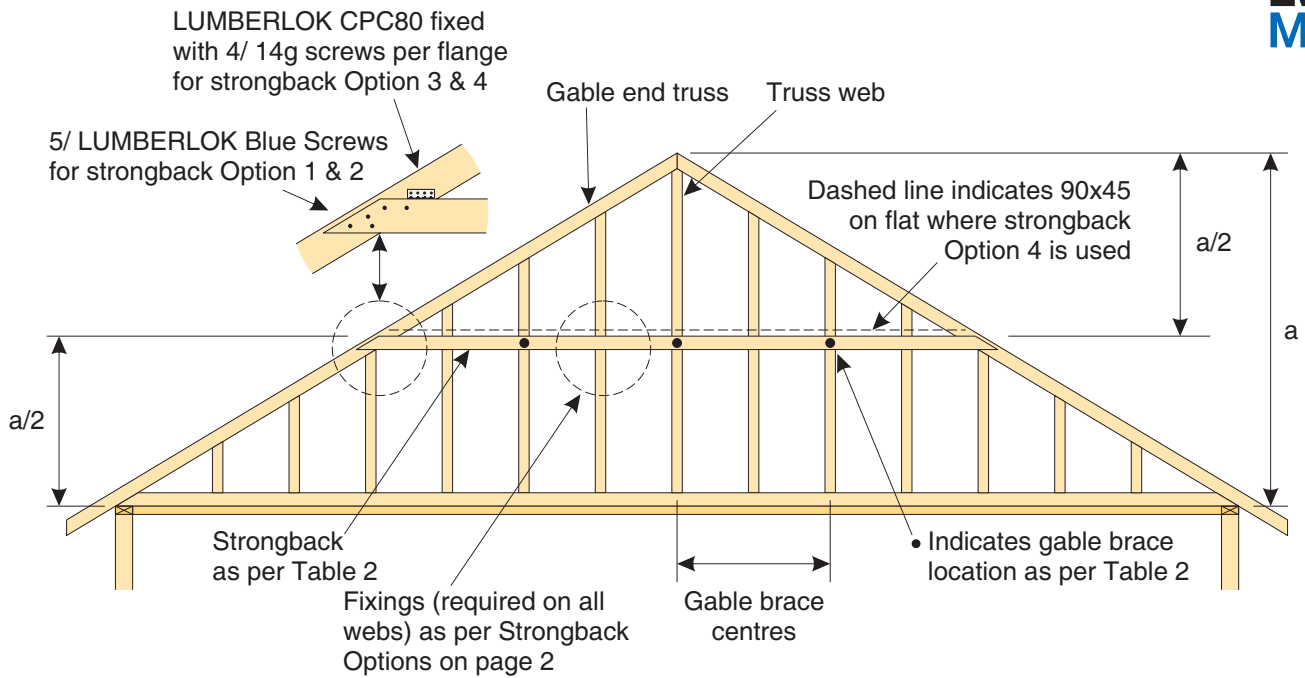
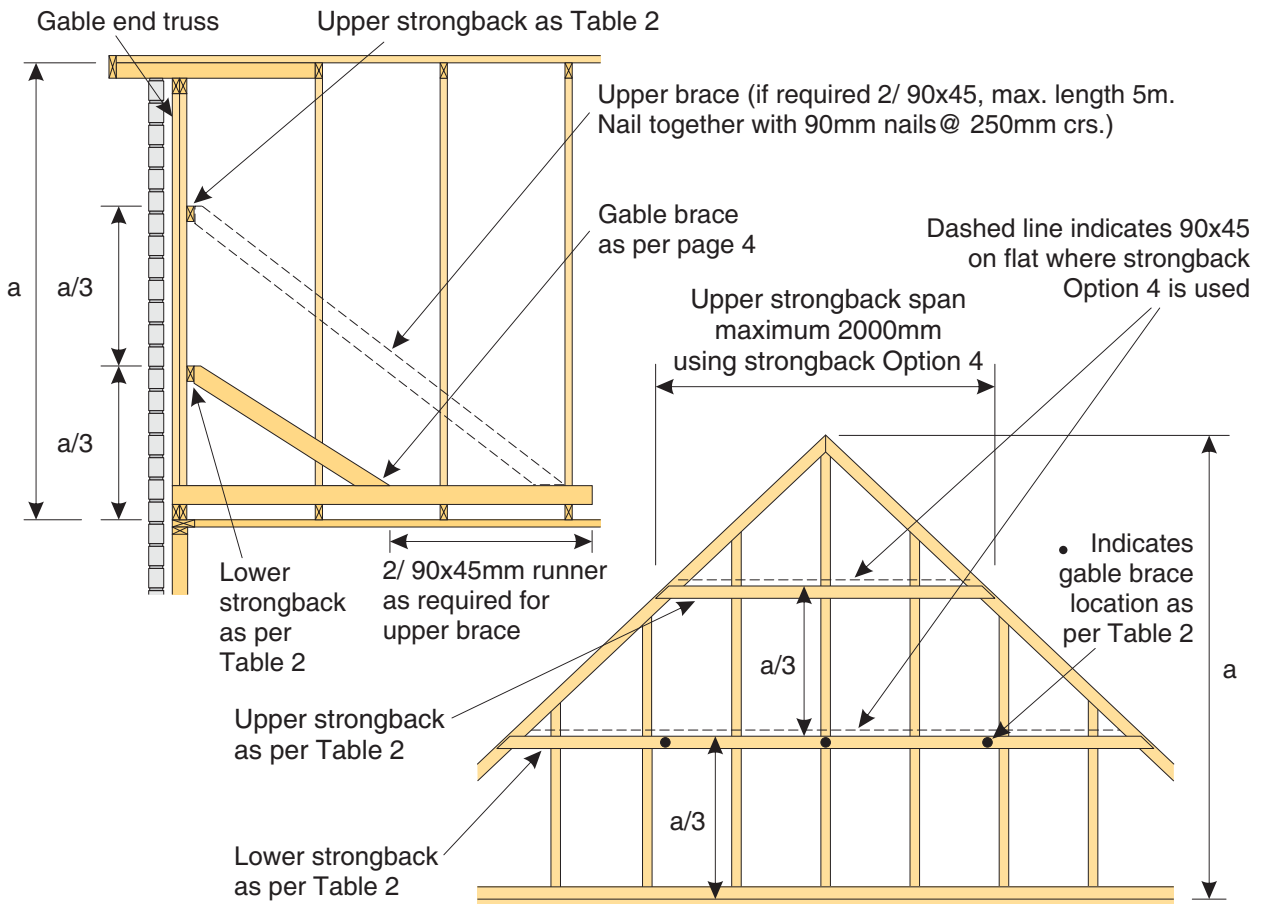


TABLE 2 - STRONGBACK SPAN AND GABLE BRACE LOCATION

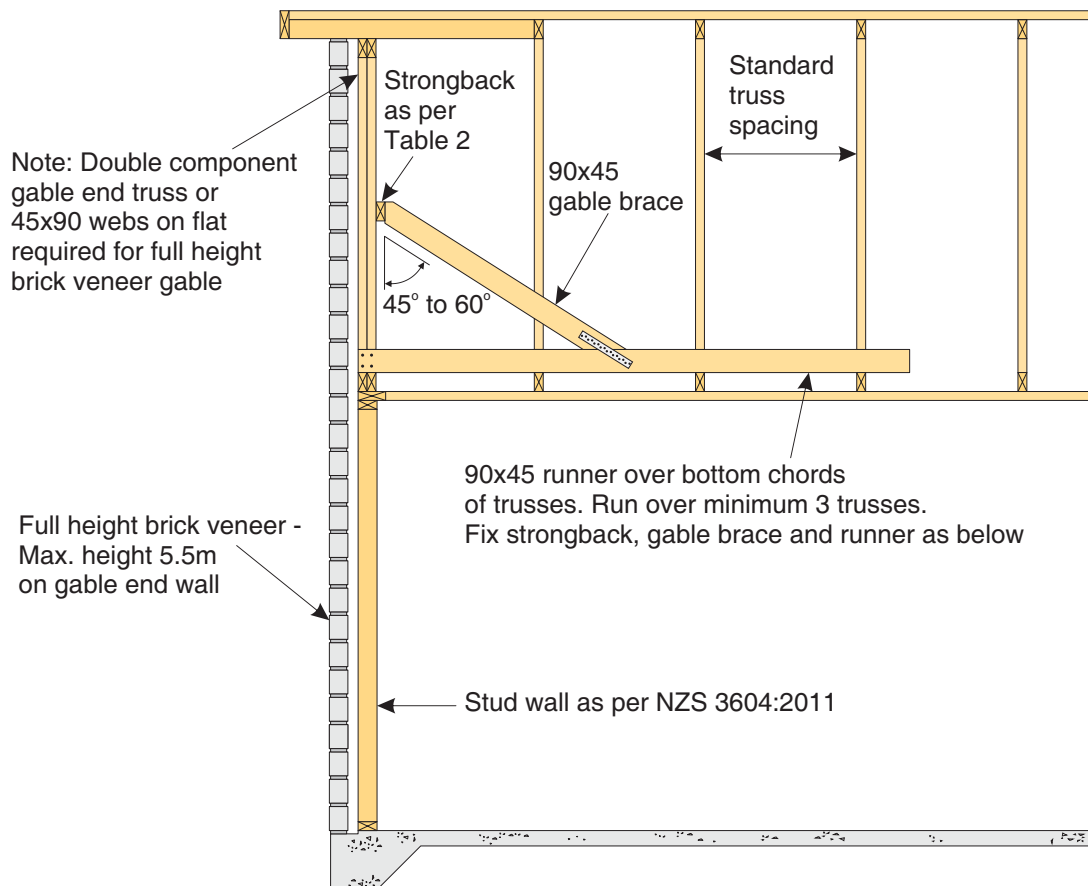
OPTION 1	OPTION 2	OPTION 3	OPTION 4
90x45 on edge	140x45 on edge	90x45 on flat	90x45 on flat plus 90x45 on edge
Max. span and/or gable brace location 1200mm	Max. span and/or gable brace location 1400mm	Max. span and/or gable brace location 1600mm	Max. span and/or gable brace location 2000mm



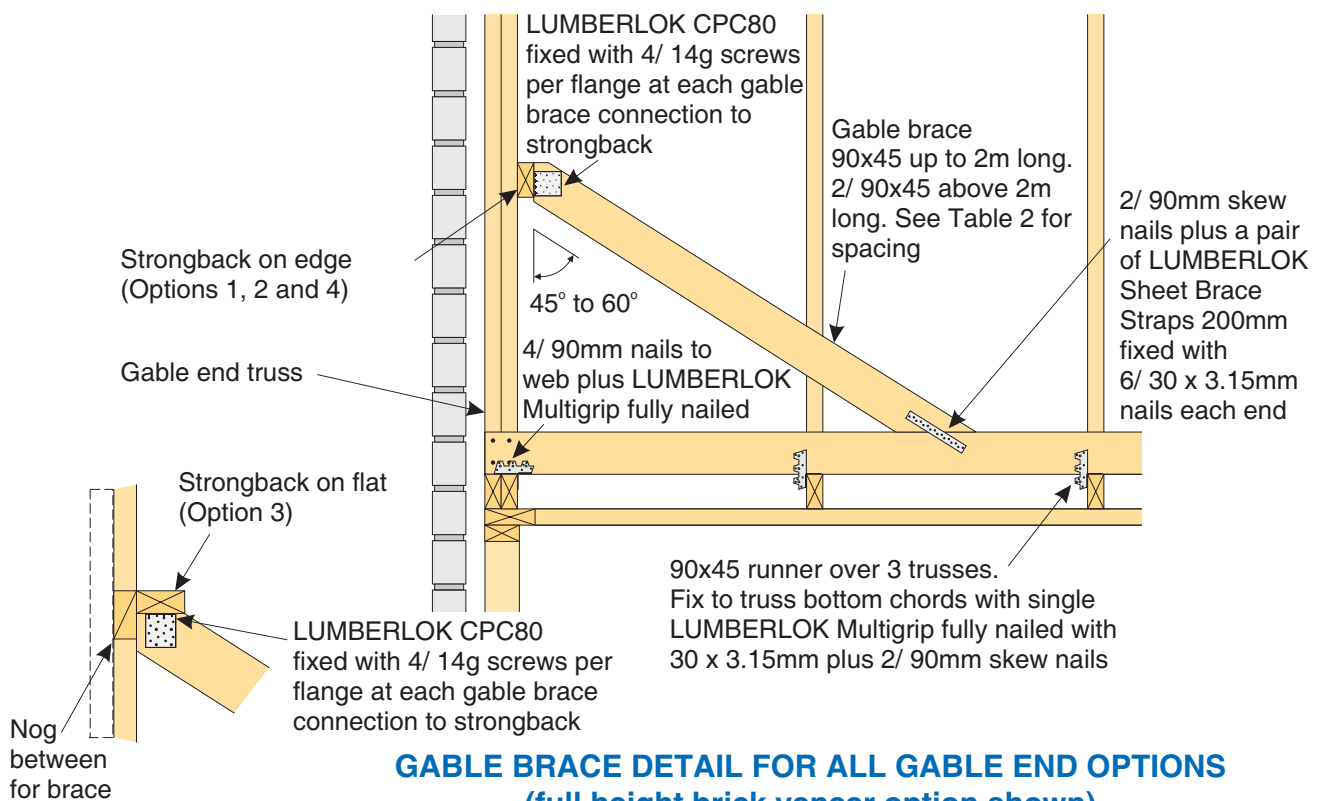
SINGLE STRONGBACK DETAILS



DOUBLE STRONGBACK DETAILS FOR ALL GABLE END OPTIONS (full height brick veneer option shown)



CROSS SECTION
(full height brick veneer option shown)



GABLE BRACE DETAIL FOR ALL GABLE END OPTIONS
(full height brick veneer option shown)



EXPIRES 31 MAY 2021



BEAL Appraisal Certificate

The Clad X NZ Ltd AAC Wall Panel System



Product

- 1.1 The Clad X NZ AAC Wall Panel System (CAWPS) is a drained and ventilated masonry veneer wall cladding with a plastered then painted / textured finish. It is designed to be used as an external wall cladding system for residential and light commercial type buildings where residential construction techniques are used.
- 1.2 The system consists of 50mm thick autoclaved aerated concrete (AAC) panels fixed over polystyrene battens to form a 20mm cavity. The coating system from Wattyl consists of 5 mm thick Grano Adhesive Mortar Coarse with fibre-glass mesh imbedded into it, followed by the application of a 2mm thick Grano Adhesive Mortar Coarse, followed by the application of a 1mm thick coat of Grano Sponge. A coat of Grano Prime primer/sealer is then applied followed with the application of 2 coats of Wattyl's Grano Impact coating system.
- 1.3 The system incorporates a drained and ventilated cavity by way of 40mm x 20mm EPS cavity battens .

Building Regulations

- 2.1 In the opinion of BEAL, the CAWPS, if designed, installed and maintained in accordance with the statements and conditions of this Appraisal Certificate, will meet the following provisions of the NZBC.
- 2.2 Clause B1 STRUCTURE
Performance B1.3.1 and B1.3.3. The CAWPS meets the requirements for loads arising from self weight, earthquake, wind, impact and creep [i.e. B1.3.3 (a), (f), (h), (j) and (q)]. See paragraphs 10.1-10.4
- 2.3 Clause B2 DURABILITY
Performance B2.3.1 (b), 15 years, B2.3.1 (c), 5 years, and B2.3.2. The CAWPS meets this requirement. See paragraphs 11.1-11.5
- 2.4 Clause E2 EXTERNAL MOISTURE
Performance E2.3.2. The CAWPS meets this requirement. See paragraph 13.1-13.7
- 2.5 Clause F2 HAZARDOUS BUILDING MATERIALS
Performance F2.3.1. The CAWPS meets this requirement and will not present a health hazard to people.
- 2.6 The CAWPS has been appraised as an **Alternative Solution** in terms of New Zealand Building Code Compliance.

Applicant:



Clad X NZ Ltd
115 Rossiters Road, Loburn RD2,
North Canterbury
Tel: 027 600 1234, mark@cladx.co.nz
Tel: 027 600 1238, james@cladx.co.nz
www.cladx.co.nz

Appraiser:



BEAL
2A Plimmerton Drive
Plimmerton, Porirua, NZ
Tel: +64 233 6661
E-Mail: sales@beal.co.nz
www.beal.co.nz

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
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Regulations 1992, Clause 3

BC201170-01/12/2020 nicolah



The most up to date version of this BEAL Appraisal Certificate can be viewed at www.beal.co.nz

Scope and Limitations

3.1 The CAWPS System has been appraised for use as an external wall cladding system for buildings within the following scope:

- Scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- Constructed with timber framing complying with the NZBC; and,
- Constructed with steel framing complying with the NZBC; and,
- With a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- Can be situated in up to and including Very High wind zones as described in NZS 3604 Building Wind Zones.

3.2 The CAWPS System must only be installed on vertical framing.

3.3 The system is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. (The Appraisal of the CAWPS System relies on joinery meeting the requirements of NZS 4211 for the relevant building wind zone or being specifically designed for use in specifically designed buildings).

3.4 Installation of components and accessories supplied by Clad X NZ Ltd must be carried out only by personnel trained and certified by Clad X NZ Ltd.

Technical Literature

4.1 Refer to the Clad-X Technical Manual. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the Technical Literature and scope of this Appraisal Certificate must be followed.

4.2 For a copy of this Technical Literature and any updates please refer to www.cladx.co.nz

Technical Specification

5.1 System components and accessories supplied by Clad X NZ Ltd as follows:

Cavity Battens

20mm EPS Cavity Battens

- Cavity battens are manufactured from very high density (Class VH) EPS with a density of no less than 28kg/m³. The battens are 40mm wide by 20mm thick and are supplied in 1200mm lengths.

Clad X AAC Panel

- The Clad X AAC Panel Panels are 50mm thick, manufactured from autoclaved aerated concrete with an approximate density of 520kg/m³. The panels are supplied in lengths of 2200mm long by 600mm wide and subject to the Clad X Building Product Quality Plan (BPQP).

Accessories

- MCB A20 cement based panel adhesive
- uPVC Components include:
 - Clad X PVC sill flashing
 - Powder coated aluminium head flashing (installed by the owner)
 - Clad X PVC jamb flashing
 - Clad X PVC base cap flashing

- PVC base cap moulding 50mm
- Vents - PVC vent 30mm x 30mm
- Bostik Safe-Tech sealant
- Zinc-rich primer compliant with AS/NZS 2311
- 14 -10 x 100mm long AS3566 corrosion class 3 or 4 Bugle head screws for use in NZS 3604 defined corrosion zones 1,2, 3 and 4. Grade 304 stainless steel shall be used in the sea spray zone.
- Reinforcing Mesh - High quality alkali resistant fibreglass mesh with a nominal size of approx. 4mm square and a weight of 150g/m² for use in domestic and light commercial situations.

Wattyl Granosite Plaster and Coating System

5.2 All Plaster components used for the protection and weatherproofing of the AAC Panels are to be supplied by Wattyl New Zealand Ltd. The Wattyl Granosite Plaster and Coating System has been assessed by BEAL.

Base Coat Plasters

- **Grano Adhesive Mortar Coarse** is a polymer-modified, cementitious rendering material specifically designed for thin section rendering over AAC. It is applied as a base coat, in a minimum 5mm layer followed by the embedment of high quality alkali resistant fibre glass mesh reinforcement, followed by a further 2mm layer.
- **Grano Sponge** is a pre-blended polymer-modified, cement-based texturing plaster designed to be applied 1-2mm over Grano Adhesive Mortar Coarse.

Finishing Coatings

- **Grano Prime** is an acrylic primer sealer applied over the Grano Sponge to enhance adhesion. Grano Prime can be applied by brush, roller, conventional or airless spray. The primer is applied over the levelling coat, and also used as a primer/adhesion promoter for flexible sealant application.
- **Grano Impact** is an is a high performance elastomeric coating able to be applied in a variety of styles over the sealed Grano Sponge plaster. A minimum of two coats of Wattyl Grano Impact must be used over the finishing plasters to make the system weathertight and produce the desired finish to exterior walls.
- Proprietary paint systems not supplied by Wattyl New Zealand Ltd have not been assessed and are therefore outside the scope of this Appraisal Certificate.

5.3 Accessories used with the system which are supplied by Clad X NZ Ltd certified installers are:

- VH grade 40mm x 20mm EPS cavity battens.
- Sika PB Nailbond adhesive to adhere the EPS battens to the Wall Wrap.
- MCB A20 AAC panel adhesive.
- Screws shall be 14-10 x 100mm Bugle head, Type 17, Class 3 or 4 galvanized screws, complying with Compliance document E2/AS1 Table 20.
- Flexible sealant shall be Bostik SAFE-TECH complying with NZBC Acceptable Solution E2/AS1 for use as a weather sealing sealant for exterior use.
- Anti-corrosion paint for exposed steel wire shall be a zinc-rich primer compliant with AS/NZS 2311.
- The range of Clad X flashings to suit the particular layout of the cladding
- The Clad X Vent is a proprietary product with an opening of 30mm x 30mm and is installed when the cladding sits into a rebate in the floor slab.

5.4 Accessories used with the system which are

- supplied by the building contractor are:
- Head flashing - Head flashing complying with NZBC Acceptable Solution E2/AS1 paragraph 4.6.1.6 and table 7 with a minimum stop end of 10mm, installed in accordance with the Technical Literature
- Foam tape to be installed under the head flashing onto the top of the Aluminium window or door joinery shall be Inseal 3259 single sided foam tape 3mm wide by 3mm thick length cut to suit.
- Building wrap - paper or wrap complying with the requirements of NZBC Acceptable Solution E2/AS1 Table 23.
- Flexible flashing sill and jamb tapes - flexible flashing tapes complying with AAMA 711-07, or a flexible flashing tape covered by a valid BEAL and/or BRANZ Appraisal for use around window and door joinery openings.
- Air seals around windows and doors - air seals complying with NZBC Acceptable Solution E2/AS1 9.1.6, or low foaming self expanding, moisture cure polyurethane foam air seals covered by a valid BEAL and/or BRANZ Appraisal for use around window, door and other wall penetration openings or manufactured to comply with AAMA 812-04.
- Building wrap strapping - Polypropylene tape for securing the building wrap in place and preventing bulging of the insulation into the drain cavity where cavity battens are installed at greater than 450mm centres as per NZBC Acceptable Solution E2/AS1 9.1.8.5 (b).

Handling and Storage

- 6.1 Handling and storage of all the materials supplied by Clad X NZ Ltd or the licensed contractor, both on and off site are under the control of Clad X NZ Ltd licensed contractors.
- 6.2 Dry storage must be provided on site for the AAC Cladding Panel, fibreglass mesh and bags of render with the AAC panels stored flat and protected from physical damage. EPS battens, uPVC flashing and mouldings must be protected from direct sunlight, physical damage and stored flat and under cover. All liquid components shall be stored in dry, frost free conditions.
- 6.3 Handling of the AAC panels require care to prevent damage to corners or excessive flexing.
- 6.4 Handling and storage of all the materials supplied by the building contractor, both on and off site is the responsibility of the building contractor. Materials must be handled and stored in accordance with the manufacturers instructions.

Design Information

Framing

Timber Framing

- 7.1 Timber used in timber framing shall be treated as required by NZS 3602
- 7.2 Timber framing must comply with NZS 3604 for both buildings or parts of buildings within the scope limitations of NZS 3604. Where buildings or parts of buildings are outside the scope of NZS 3604 then they must be to specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least the equivalent stiffness to the

framing provisions of NZS 3604. In all cases, studs must be at a maximum of 600mm centres.

7.3 Timber framing must have a maximum moisture content of 18% at the time of cladding application. *(Problems could arise later on due to timber shrinkage if over 18%)*

Steel Framing

7.4 Steel framing must be to a specific design meeting the requirements of the NZBC. (NASH Standard for Residential and Low-rise Steel Framing, Parts 1 and 2).

7.5 The minimum steel framing specification is 'C' section studs and nogs of overall section dimensions of 76mm web by 40mm flange. Steel thickness must be a minimum 0.75mm.

7.6 For steel framed buildings situated within NZS 3604 defined wind zones up to and including Very High, studs must be at maximum 600mm centres. All other buildings studs must be at maximum 400mm centres. Dwangs must be fitted flush with the stud.

AAC Panel Layout

7.7 AAC panels are installed horizontally in a stretch-bond pattern. Vertical panel edges may be jointed on stud or off stud. AAC Panels must be supported at fixing locations with vertical cavity battens or cavity spacers 100mm long maximum in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.8.2(f).

At the base of the wall the AAC Panel can be either rested on DPM on a concrete rebate (75mm below finished floor level) or hung 50mm below the finish floor level.

General

8.1 Openings in the slotted base cavity closer provide a minimum ventilation opening area of 1000mm² per lineal metre of wall as per the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.8.3 (b).

8.2 The Clad X Vents provide a minimum ventilation opening area of 1000mm² per lineal metre of wall, when fixed at 900mm centres respectively as per the requirements of NZBC Acceptable Solution E2/AS1 paragraph 9.1.8.3 (b).

8.3 The ground clearance between the finished floor level and ground level as outlined in NZS 3604 must be adhered to at all times. At ground level, paved surfaces must be kept clear from the bottom edge of the CAWPS System by a minimum of 100mm, and unpaved surfaces by 175mm in accordance with the requirements of NZBC Acceptable Solutions E2/AS1, Table 18.

8.4 At balcony, deck or roof to wall junctions, the bottom edge of the AAC panel must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.3.

8.5 Where the CAWPS System abuts other cladding systems, designers must detail the junction to meet their own requirements whilst meeting performance requirements of the NZBC.

The Technical Literature does provide some guidance. Details not included within the Technical Literature have not been assessed and are therefore outside the scope of this Appraisal.

8.6 All buildings must have barriers to airflow consisting of interior linings with all joints stopped, or where walls are not lined, such as attic spaces at gable end, a rigid sheathing or air barrier, complying with Acceptable

Solutions E2/AS1 Table 23, must be fixed to framing prior to fixing cladding or cavity battens in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.4.

8.7 PVC sheathed electrical cables must be prevented from direct contact with the EPS cavity battens. When cables must penetrate the EPS cavity battens for electrical connections, the cable must be directly supported by passing through an electrical conduit.

Control Joints

9.1 Control joints where AAC Panels are used must be constructed in accordance with the Technical Literature and as follows;

- Horizontal control joints - To be installed when intermediate floor joists are not seasoned and/or when the height of the wall exceeds 6m.
- Vertical Control Joints - at maximum 8m centres; aligned with any control joint within the structural framing, or where the system abuts other cladding systems. Located at both internal and external corners.

(Note: Where possible control joints shall not be located in line with window and door openings. Horizontal and vertical control joints must be located over structural supports. The Technical Literature provides some guidance for the design of vertical control joints where the system abuts different cladding types. Details not included within the Technical literature or those that are marked as 'Specific Design Only' are outside the scope of this Appraisal Certificate and are the responsibility of the designer.)

Structure - Clause B1

Mass

10.1 The mass of CAWPS System (panel and coating system) has a approximate mass of 32kg/m², considered a medium wall cladding in terms of NZS 3604.

Impact Resistance

10.2 The system has adequate resistance to impact loads that the cladding system is likely to be subjected to when used in a residential situation. The likelihood of impact damage to the system when used in light commercial situations should be considered at the design stage, with appropriate protection provided such as bollards or barriers where necessary.

Wind Zone

10.3 The CAWPS System is suitable for use in up to, and including 'Very High' wind zones as per NZS 3604, where buildings are designed to meet the performance requirements of NZBC Acceptable Solution E2/AS1

AAC Panel Fixing

10.4 Where a 20mm cavity is produced the respective cavity battens are fixed through to the wall framing at 600mm centres vertically. The AAC Panel must then be fixed through the cavity batten and/or cavity spacers and into the framing with a bugle head screw. (refer to 5.1) at 600mm centres.

Note: 600mm centres is applicable to both Low to Very High NZS 3604 defined building wind zones with studs at maximum 600mm centres, and;

- Fixings to be positioned minimum 50mm in from the edge of the panel giving an overall layout of 500mm centres per panel.
- Fixings are also required horizontally at 600mm centres.

- A minimum of 6 bugle head screws per full panel (2200 x 600mm) is required.
- Bugle head screws must be embedded a minimum of 5mm into the AAC Panel and a maximum of 10mm.

Durability- Clause B2

11.1 The CAWPS System when used in accordance with this Appraisal Certificate and subjected to normal conditions of environment and use will meet the performance requirements of NZBC B2.3.1 (b), 15 years for the cladding system and plaster finish, and the performance requirements of NZBC B2.3.1 (c), 5 years for the exterior paint system (the life of the product not being less than 5 years).

Maintenance

11.2 Regular maintenance is essential to ensure the performance requirements of the NZBC are met and to ensure the maximum serviceability of the CAWPS System.

11.3 Regular cleaning (at least annually) of the paint coating is required to remove grime, dirt and organic growth as per the Technical Literature in order to maximize the life and appearance of the acrylic paint coating. Paint coatings must be reapplied every 10 years in accordance with the paint manufacturers instructions. Re-coating colours shall have an LRV (light reflectance value) of 40% or greater.

11.4 Regular inspections (at least annually) must be made on the system to ensure that all aspects of the CAWPS System including the (textured) coating system, plasters, flashings and any sealed joints remain in a weatherproof condition. Any cracks, damaged areas or areas showing signs of deterioration that could allow water ingress, must be repaired immediately. The CAWPS System must be maintained and repaired in accordance with the instructions from Clad X NZ Ltd.

11.5 Minimum ground clearance as set out in this Appraisal and Technical Literature must be maintained at all times during the life of the system to maintain the durability and weathertightness of the system.

External Fire spread - Clause C3

12.1 The CAWPS System is considered to meet the performance requirements of NZBC C3.5 for use as an external wall cladding when restricted to:

- Building height ≤10m and up to 2 levels, and;
- Building importance levels 1, 2, & 3.

12.2 The CAWPS System is also considered to meet the performance requirement NZBC C3.7 (a) as a not combustible building material for use on external walls closer than 1m to the relevant boundary.

12.3 Clearance separations from chimneys and flues are not required for the AAC Panel. Where the panel is used with or attached to a heat sensitive material, the heat sensitive materials must be separated from chimneys and flues in accordance with the performance requirements of NZBC Acceptable solution C/AS1, part 7 for protection of combustible materials.

External Moisture - Clause E2

13.1 When installed in accordance with this Appraisal Certificate and Technical Literature, the CAWPS System will prevent the penetration of water that could cause



undue dampness and/or damage to building elements and will therefore comply with clause E2.3.2.

13.2 The cavity must be sealed off from the roof and subfloor space in order to meet the performance requirement of E2.3.5.

13.3 The CAWPS System allows any excess moisture present at the completion of construction to be dissipated without causing permanent damage to the building elements to meet the performance requirement of Clause E2.3.6.

13.4 The details provided within the Technical Literature for weather resistance are based on the design principle of employing both a first and second line of defence against moisture entry for joints, penetrations and junctions. Moisture ingress must be prevented by detailing any joinery or wall junctions as shown in the CAWPS System technical manual. Any weathertightness details developed by a designer are outside the scope of this Appraisal Certificate and are the responsibility of the designer.

13.5 The presence of a drained cavity does not reduce the requirement to ensure the cladding wall and all the relevant junctions, penetrations etc remain weather resistant in order to comply with Clause E2.3.6.

Water Vapour

13.6 The CAWPS System is not a barrier to the passage of water vapour, and when correctly installed in accordance with both this Appraisal and Technical Literature will not create or increase the risk of moisture damage resulting from condensation. When installed over steel frame please refer to 13.7.

13.7 When the CAWPS System is installed over a steel frame, 10mm (VH) expanded polystyrene thermal break sheeting with a R value of at least 0.3, must be installed over the steel frame (stud, nog, top and bottom plate) to provide a thermal break in accordance with the requirements of NZBC Acceptable Solution E3/AS1, Paragraph 1.1.4(d). Building wrap is then dressed over the top of the sheeting followed by the installation of the cavity battens.

The edges of the installed wall wrap shall also be sealed with tape to ensure the wall wrap provides a complete barrier to the ingress of air into the framing.

Care must be taken in the installation of the building wrap and flashing tape around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

15.2 Aluminium joinery must be installed by the building contractor in accordance with the Clad X Technical Literature. A 7.5 -10mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place. The joinery must be spaced approx 25mm in from the outside of the panel face.

Clad X AAC Wall Panel System

15.3 Must be installed in accordance with the Technical Literature by Clad X NZ Ltd trained contractors.

15.4 The Technical Literature must be referred to during the inspection of the CAWPS System installations.

Finishing System

15.5 The application of the Wattyl Plaster and Coating systems must be applied in accordance with the manufacturers instructions at all times. The plaster must be cured for a minimum of 2-3 days and must be dry before painting may commence.

Health and Safety

16.1 When cutting, drilling or grinding the AAC panel, this must be carried out in an open air or well ventilated area, and a dust mask, eye protection and gloves must be worn.

16.2 All aspects of cutting, drilling or grinding must comply with requirements of the Health and Safety at Work Act, and Worksafe, www.worksafe.govt.nz.

16.3 Refer to the Technical Literature from the relevant manufacturer for the safe use and handling of the components that make up the CAWPS System.

Installation Information

Installation Skill Level Requirement

14.1 Installation and finishing of the components and accessories supplied by Clad X NZ Ltd and the licensed contractors must be completed by trained installers / applicators, certified by Clad X NZ Ltd.

14.2 Installation of the accessories supplied by the building contractor must be completed by a tradesperson who has an understanding of cavity based cladding construction, in accordance with instructions given within the CAWPS System Technical Manual and this Appraisal Certificate.

System Installation

15.1 The selected building wrap and flexible flashing tape must be installed by the building contractor in accordance with the wrap and tape manufacturer's instructions, prior to the installation of the cavity battens and the rest of the CAWPS System.

The building wrap shall be run horizontally and be continuous around corners. The wrap must be lapped and sealed with a Clad X approved tape not less than 75mm at horizontal joints and not less than 100mm over studs at vertical joints.



Basis of Appraisal

BEAL use the compliance verification procedure to demonstrate compliance with the relevant clauses of the NZBC based on a risk analysis procedure. The following is a summary of the technical investigations carried out

Tests

17.1 The following testing of the CAWPS System and its respective components has been undertaken by BEAL unless otherwise noted:

- BEAL opinion on NZBC E2 code compliance was based on the evaluation of all details within the scope of this Appraisal and testing of the Clad X AAC Wall System to E2/VM1 Amendment 4, 2008. The testing assessed the performance of the window head, jamb and sill details, meter box head, jamb and sill details, vertical control joints, internal and external corners. BEAL have also reviewed the details contained within the Technical Manual, and an opinion has been given by BEAL that the system will meet the performance levels of E2/AS1 for a drained cavity system.
- Adhesion and compatibility testing of the Wattyl Granosite plaster products with the AAC panel in accordance with ASTM C297.
- The flexural ability of the Wattyl Granosite plaster products were also assessed to verify durability.
- Testing undertaken by BEAL in determining the compressive strength, dry bulk density and drying shrinkage of the AAC panel to verify the structural and durability performances of the system.

Other Investigations

18.1 Wind loadings, self weight, seismic loadings, shear force, panel capacity, fastener pull through testing and calculations for the system were determined by an independent Chartered Engineer in respect to the requirements of compliance document B1 Structure. Structural and durability opinions were provided.

18.2 Ease of application has been assessed.

18.3 The Technical Literature for the CAWPS System has been examined by BEAL and found to be satisfactory.

Quality

19.1 The manufacture of the renders has been assessed by BEAL, including quality control measures. Details regarding the quality and composition of the materials used were obtained by BEAL and found to be satisfactory.

19.2 The quality of materials, components and accessories supplied by Clad X NZ Ltd is managed through the use of the Building Product Quality Plan.

19.3 The Clad X NZ Ltd's Building Product Quality Plan ensures continuous conformance with the quality requirements from purchase to supply of components.

19.4 Clad X NZ Ltd's Building Product Quality Plan is reviewed at least annually by BEAL.

19.5 Quality on site is the responsibility of the Clad X NZ Ltd approved contractors.

19.6 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems, joinery, building wrap, flashing tapes, head flashings and air seals in

accordance with the instructions of Clad X NZ Ltd and this Appraisal Certificate.

19.7 For a copy of this Technical Literature and any subsequent updates please refer to www.cladx.co.nz.

19.8 Building owners are responsible for maintenance of the Clad X AAC Wall System in accordance with instructions of Clad X NZ Ltd and this Appraisal Certificate.

Sources of Information

- AS 3566 Self drilling screws for the building and construction industries.
- AS 3730 Guide to the properties of paints for buildings
- AS/NZS 1170:2002 Structural design actions
- ASTM B117 Standard practice for operating salt spray apparatus
- ASTM C 297: Standard test method for flatwise tensile strength of sandwich constructions.
- ASTM C 1386: Standard specification for precast autoclaved aerated concrete (AAC)
- NASH Standard for Residential and Low-rise Steel Framing, Parts 1 & 2.
- NZS 3602:2003 Timber and wood-based products for use in building.
- NZS 3603:1993 Timber structures standard
- NZS 3604:1999 Timber framed Buildings
- NZS 4211:1985 Specification for performance of windows
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third edition May 2008, incorporating amendments 1 to 4.
- New Zealand Building Code Handbook and Approved Documents, Building industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.

Concluding statement

20.1 In the opinion of BEAL, the Clad X AAC Wall Panel System is fit for purpose and will comply with the NZBC to the extent specified provided that it is used, designed, installed and maintained as set out in this Appraisal Certificate.

The Appraisal Certificate is issued only to Clad X NZ Ltd, and is valid until further notification, subject to the conditions of this Appraisal.



Conditions of Appraisal

1. This Appraisal Certificate :
 - A) Relates only to the Clad X AAC Panel Wall System as described herein;
 - B) Must be read, considered and used in full together with the Technical Literature
 - C) Does not address any legislation, regulations, codes or standards, not specifically named herein;
 - D) Is revalidated by BEAL on an annual basis;
 - E) Is copyright of BEAL.
2. The Appraisal Certificate holder continues to meet the quality requirements of the Clad X NZ Ltd's Building Product Quality Plan and has the plan audited by BEAL on an annual basis unless agreed otherwise.
3. Clad X NZ Ltd, shall notify BEAL and obtain approval of any changes in product specification or quality assurance prior to product being marketed including any trade literature, web site info or the like.
4. BEAL makes no representation as to:
 - A) The nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - B) The presence or absence of any patent or similar rights subsisting in the product or any other product;
 - C) Any guarantee or warranty offered by the Appraisal Certificate holder
5. BEAL's verification of the building product or system complying with one or more above-mentioned criteria is given on the basis that the criteria used were those that were appropriate to demonstrate compliance with the NZBC at the date of this Appraisal Certificate. In the event that the criteria is withdrawn or amended at a later date, this Appraisal may no longer remain valid.
6. Any reference in this Appraisal Certificate to any other publication shall be read as a reference to the version of publication specified in this Appraisal Certificate.

Authorised Signatory

C R Prouse - Director




BEAL Appraisal Certificate C1216 [JUN 2013] Clad X AAC Wall Panel System





TECHNICAL MANUAL

Wall System Descriptions and
Building Details

May 13, 2013

V1.3

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WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

TABLE OF CONTENTS	2
1 GENERAL DESCRIPTION	4
2 COMPLIANCE WITH BUILDING CODE	4
2.1 COMPLIANCE OF SCOPE	
2.2 CLAUSE B1 STRUCTURE	
2.3 CLAUSE B2 DURABILITY	
2.4 CLAUSE E2 EXTERNAL MOISTURE	
2.5 CLAUSE F2 HAZARDOUS BUILDING MATERIALS	
3 LIMITATIONS & CONSIDERATION	5
3.1 LIMITATIONS	
3.2 CONSIDERATIONS	
3.3 CONSTRUCTION REQUIREMENTS	
3.4 CONSTRUCTION GUIDANCE	
4 LIST OF COMPONENTS	7
5 MAINTENANCE AND WARRANTY	7
5.1 MAINTENANCE	
5.2 WARRANTY	
6 CHECKLISTS OF CLAD-X AAC PANEL WALL SYSTEM	9-12
6.1 PRE-CLADDING CHECKLIST	
6.2 PRE-PLASTERING CHECKLIST	
6.3 WATTYL GRANOSITE QUALITY ASSURANCE CHECKLIST	
7 CONSTRUCTION DETAILS	14-32
Drawing 01: Typical cavity batten layout	14
Drawing 02: Typical AAC panel layout	14
Drawing 03: Typical wall cross section detail	15
Drawing 04: Rebated concrete foundation detail	16
Drawing 05: Over-hang concrete foundation detail	16
Drawing 06: Timber subfloor foundation detail	17
Drawing 07: Vertical control joint detail	18
Drawing 08: Horizontal control joint detail	18
Drawing 09: Mid-floor horizontal control joint detail	19
Drawing 10: External corner detail (plan view)	20
Drawing 11: External corner detail (3D view)	20
Drawing 12: Internal corner detail (plan view)	21
Drawing 13: Internal corner detail (3D view)	21
Drawing 14: Window head detail	22
Drawing 15: Window head detail (3D view)	22
Drawing 16: Window sill detail	23
Drawing 17: Window jamb detail	23

Drawing 18:	Garage door jamb detail	24
Drawing 19:	Garage door head detail	24
Drawing 20:	Soffit Junction Detail	25
Drawing 21:	Sill detail at slab	25
Drawing 22:	Meter box detail (head/jamb/sill)	26
Drawing 23:	Pipe/cable penetration detail	26
Drawing 24:	Downpipe fixing detail	27
Drawing 25:	Outdoor light fixing detail	27
Drawing 26:	Timber post plan detail	28
Drawing 27:	Timber post ground connection detail	28
Drawing 28:	Roof/wall junction detail	29
Drawing 29:	Clad-X AAC panel parapet (metal capping) detail	30
Drawing 30:	AAC panel/weatherboard horizontal junction	30
Drawing 31:	AAC panel/weatherboard external corner junction	31
Drawing 32:	AAC panel/weatherboard internal corner junction	31
Drawing 33:	Sloping soffit detail	32
Drawing 34:	Weatherboard Vertical Junction	32

1 GENERAL DESCRIPTION

Clad-X AAC wall panel system is an exterior wall cladding system that provides light weight, high quality, and highly durable cladding solutions perfectly suited to the needs of residential housing and light commercial buildings. With the exterior coating solutions provided by the Wattyl Granosite reinforced exterior plaster system, Clad-X AAC wall panel system is a sensitive cladding system on the New Zealand market.

This technical manual document outlines the typical installation and application of the Clad-X AAC Wall Panel system, if specifiers require additional or modified details please contact Clad-X.

Clad-X AAC Wall Panel is an exterior wall panel which is made from 50mm Autoclaved Aerated Concrete (AAC) masonry panel with corrosion protected vertical/horizontal steel reinforcing suitable for exterior cladding of residential housing and light commercial buildings. AAC panels are coated with the Wattyl Granosite reinforced plaster system to produce the selected texture finish.

Clad-X AAC wall panel properties:

Dry Density:	520kg/m ³ *
Compressive Strength	4.0 MPa*
Dry Shrinkage Value:	0.015%*
Water Absorption:	up to 36% (by volume) *
Dry mass of 50mm Clad-x panel:	31 kg/m ² coating and substrate, considered a medium weight cladding in terms of NZS 3604
Windzone:	up to Very High wind zones defined in NZS 3604

*note: the information is supplied by manufacturer.

2 COMPLIANCE WITH THE BUILDING CODE

2.1 COMPLIANCE OF SCOPE

The Clad-X AAC Wall Panel System complies with the following clauses of the New Zealand Building Code:

- B1** - Structure
- B2** - Durability
- E2** - External Moisture
- F2** - Hazardous Building Materials

2.2 B1 STRUCTURE

Clad-X AAC wall panel system installed as per this manual is able to withstand up to VH wind zone described in NZS 3604:2011.

2.3 B2 DURABILITY

Clad-X wall panel fixing's used in accordance with this manual will meet the requirements of NZBC Clause B2.

The nominal 20mm or 40mm cavities are provided to:

- Allow moisture to run down the inside of the Clad-X AAC panel and escape through the vents/vermin tray without bridging the cavity.
- Provide sufficient air space permitting air to circulate within the cavity and dry the AAC wall panels.

2.4 E2 EXTERNAL MOISTURE

The Wattyl Granosite plaster system used on Clad-X AAC wall panel system contributes to the requirements of NZBC E2 relating to the resistance of water penetration, provides the integrity of the specified external system is maintained.

2.5 F2 HAZARDOUS BUILDING MATERIALS

In reference to NZBC Clause F2 regarding Hazardous Building Materials, Clad-X AAC wall panels are non-hazardous, all safety precautions adhered to are provided in this technical manual.

3 LIMITATIONS & CONSIDERATION

3.1 LIMITATIONS

Clad-X AAC wall panel cladding system is applied to residential housing and light commercial buildings complying with NZS 3604 or NASH 3405. If specifiers require additional or modified details please contact Clad-X.

3.2 CONSIDERATIONS

Clad-X AAC panels must be installed by trained installers as per the details shown in this manual to ensure the quality of the cladding system. They must not be installed in any situation where they will come into contact with the ground, and cannot be used as retaining walls.

Clad-X AAC panels are Autoclaved Aerated Concrete, same with all concrete and fiber cement products, the dust produced when cutting or grinding them contains crystalline silica, is irritating to the eyes, skin and respiratory system. Inhalation of this dust can cause irreversible damage to health. Wear suitable protective clothing and gloves at all times. When cutting, drilling or grinding panels do so in an open air environment or areas that are well ventilated and wear approved safety glasses and dust mask.

All aspects of cutting, drilling or grinding must comply with the latest regulations of the Occupational Safety and Health division of the labour department.

Clad-X AAC panels should be stored on site on the pallets which they were delivered on and kept covered & free of dampness until required. Care should be taken to limit damage to edges or corners when handling.

Any damage incurred to the coating or the AAC panels must be addressed immediately. The panel is not to be left exposed through damage to the coating.

The Watty Granosite plaster system must be maintained annually, to ensure the integrity of the whole system. (Refer to Watty Granosite Maintenance Schedule)

3.3 CONSTRUCTION REQUIREMENTS

Steel and timber framed wall studs should be placed at not more than 600mm crs. Framing strength must comply with relevant NZ Standards for general framing construction suitability for the building.

Steel and timber framed walls are to be braced in accordance with wall claddings shown in NZS 3604: 2011 and are to be based on the combined weight of the AAC panel and the coating system used.

Prior to installation of Clad-X AAC panels and battens. The wall underlay/ building paper compliant with NZBC E2/AS1 table 23 must be fixed to the exterior wall framing and dressed into all openings with flexible flashing tape. Ensure wrap is continuous around corners, installed horizontally, and has its edges and laps taped.

Internal and external corners as per details following, if the distance between corners exceeds 8.0 meters, then extra control joints at a maximum of 8.0m centers are formed as per details. Responsibility for the locations of these controls joints is with the designer.

3.4 CONSTRUCTION GUIDANCE

3.4.1 Pre-installation check: ensure the builder has completed items set out in the pre-cladding check list. (See section 7 for details)

3.4.2 Installation:

- Cavity battens: the EPS 20 x 40 (or 40 x 40) cavity battens are attached to the framing element using PB Nailbond adhesive or nails, the typical batten layout refer to the detail drawing 1.
- Cutting: AAC panels are cut using a metal cutting blade. Zinc rich primer compliant with AS/NZS 2311:2009 is to be applied to all exposed reinforcing in the panels.
- Fixing: AAC panels are fixed using min. 14x100 bugle head type 17 class 4 screws which are to be embedded 10mm max. A minimum of 6 screws are required per AAC panel. Where 40mm cavity is used, min. 14x120 bugle head type 17 class 4 screws shall be used.
- Laying: Once the cavity batten are fixed to the studs, fix the bottom row of Clad-X AAC panel, AAC panels are placed in a stretcher bond pattern as per the typical layout detail on drawing 2. Any imperfections on the face of the panels and the screws hole can be repaired and filled with the panel adhesive MCB A20, which is a rigid, high strength cement based adhesive.

- Corners: at this point check the level and alignment of the panels, all internal & external corners shall be installed as per detailed in drawing 10&11. Corners should be placed with an overhang to line up flush with the connecting corner panel while making sure the control joint can be achieved.
- Flashings: Ensure all flashings have been placed correctly as per the details in this manual, cut the panels to suit the openings.
- Plastering & coating: Ensure the panels are dry, clean and free of any dirt, dust or foreign matter before carrying out any plastering work, Watty Granosite plaster system is the only approved system for application over the Clad-X AAC panel system, and it must be applied by LBP. For more information, see the manufacturer's specifications.

4 LISTS OF NOMINATED COMPONENTS

Panel Size:	2200mm x 600mm x 50mm
Batten:	20 x 40mm EPS cavity batten, 40 x 40mm EPS cavity batten
Screws:	min. 14 x 100 bugle head galvanized screws; class 4 type 17 for 20mm cavity min. 14 x 120 bugle head galvanized screws; class 4 type 17 for 40mm cavity all screws shall comply with compliance document E2/AS1 table 20.
Panel adhesive:	MCB A20, high strength cement based adhesive
Sealants:	BOSTIK SAFE-TECH (BRANZ approved)
Anti-corrosion paint:	Zinc Rich primer compliant with AS/NZS 2311:2009
Vents:	30x30mm Clad-X vent
Tapes:	Approved flexible flashing tape (refer to a product that complies with the performance requirements of the NZBC)
Adhesive:	PB NailBond Sika
Flashings:	Clad-X PVC sill flashing Powder coated aluminum head flashing (installed by others) Clad-X PVC jamb flashing Clad-X PVC corner soaker Clad-X PVC base cap flashing
Plaster system:	First Coat: Grano Adhesive Mortar Coarse @ 5mm (mesh embedded) Second Coat: Grano Adhesive Mortar Coarse @ 2mm *Third Coat: GranoSponge 1mm @1mm Primer: GranoPrime Coatings: GranoImpact x 2 coats Others: Granobond Keycoat Notes: * Different textures are available, more details refer to Watty website: www.watty.co.nz .

5 MAINTENANCE AND WARRANTY

5.1 MAINTENANCE

The Wattyl Granosite plaster system should be regularly cleaned, at least annually, with chemical / detergent wash. Have the entire coated area inspected by a person with sufficient experience to identify any maintenance requirements to ensure weathertightness. Undertake all necessary repairs immediately. For more information, please refer to Wattyl Maintenance Schedule.

Inspections of the complete cladding surface must be carried out at least annually at the end of summer. Because of settling after disturbances to the ground during construction, and the slow moisture-loss shrinkage of concrete slabs, it is recommended that six-monthly inspections be made for the first three years.

Any cracks or damaged areas, including flashings and seals that have deteriorated, must be repaired immediately to ensure the integrity of the building envelope is maintained.

Any damage to the substrate must be repaired in accordance with the substrate manufacturer's instructions followed by re-plastering and recoating to the same standard as the original Granosite Plaster System installation.

If chemical free framing timber has been used, it is imperative that the maintenance of the cladding system is followed rigorously to ensure the minimum moisture ingress takes place to prevent expensive and extensive structural repair work.

As part of the Warranty conditions the finish coat(s) will need to be re-applied between years seven and eight as specified by Wattyl (NZ) Ltd. For exposed locations washing and re-painting may be required more frequently.

For hard to remove stains, refer to the Wattyl Granosite stain removal guide.

Failure to correctly maintain the system may void any long term warranties offered with the system

5.2 WARRANTY

Clad-X Panel and associate materials, when installed as per this manual, are guaranteed for a minimum life period of 15 years (from date of completion).

The Wattyl Granosite plaster system is guaranteed a period of 15 years (from date of completion) to perform and meet the requirements of NZBC, where all material components of the plaster system have been prepared and installed in accordance with this manual, technical specifications and carried out by trained contractor, and where the system has been properly maintained.

For more condition and details please refer to Wattyl website.

6 CHECKLISTS OF CLAD-X PANEL WALL SYSTEMS

6.1 PRE-CLADDING CHECKLIST

6.2 PRE-PLASTERING CHECKLIST

6.3 WATTYL GRANOSITE QUALITY ASSURANCE CHECKLIST

PRE-CLADDING CHECK LIST

For builders, trained installers and building inspectors

Consent No: _____
 Commence Date: _____
 Client Name: _____ phone: _____
 Builder: _____ phone: _____
 Architect: _____ phone: _____

Owner/Builder must have the framing and other components of the building correctly installed to enable the installation of the Clad-X AAC wall panel

Floor slab lay out

- In the case of over-hanging slab, the framing should be flush with the slab ☐ Yes or ☐ No
- In the case of rebated slab, ensure distance from outside of framing to outside of concrete footing is exactly 70mm or 90mm (when 40mm cavity system is designed) on all sides of building ☐ Yes or ☐ No
- Ensure approved DPC is installed as per manufacturer's specification ☐ Yes or ☐ No
- Ensure minimum 300mm out around the base to allow for plastering ☐ Yes or ☐ No
- Ensure the surface of rebated slab are smooth and level ☐ Yes or ☐ No

Framings

- All straight and level ☐ Yes or ☐ No
- Studs straightened for wall lining before Clad-X AAC panels are installed ☐ Yes or ☐ No
- Internal corners-supply and install 1 stud or full length H3.2 batten, 200 from internal corner. ☐ Yes or ☐ No

Wall underlay

- Exterior timber framed walls must be wrapped with wall underlay that complies compliance document E2/AS1 table 23. ☐ Yes or ☐ No
- Wall wrap must be fixed to the exterior wall framing and dressed into openings with flexible flashing tape, prior to installation of AAC panel battens. ☐ Yes or ☐ No
- Ensure wall wrap is continuous around corners and installed horizontally and has its edges and laps taped. ☐ Yes or ☐ No
- Ensure that all penetrations such as waste water pipes and the like have been flashed to the building wrap using flexible flashing tape. ☐ Yes or ☐ No

Windows

- Window distance from framing –5 mm from outside of framing to inside flange of windows. ☐ Yes or ☐ No
- The manual states throughout that continuous support bars are to be used on all windows, however if for any reason there is a requirement to use short support bars then approved DPC must be placed underneath the bottom of the windows. ☐ Yes or ☐ No

Joinery:

- All joinery must be set into openings minimum 30mm from outside of framing to inside flange of window. These allow 10mm of the joinery bearing over the AAC panels. Where the 40mm cavity batten system is designed, 50mm offset shall be set. ☐ Yes or ☐ No
- The builder is also responsible for the application of approved flexible flashing tape around openings and all other penetrations prior to the installation of any joinery. ☐ Yes or ☐ No

Plumbing

- All plumbing including gas lines need to be pressure tested prior to installation of internal and external linings. ☐ Yes or ☐ No

Variables/ Concerns/ Comments:

Builder/ Owner: _____

Signature: _____

PRE-PLASTERING CHECK LIST

For trained installers and building inspectors

Consent No: _____
 Commence Date: _____
 Client Name: _____ phone: _____
 Builder: _____ phone: _____
 Architect: _____ phone: _____

Clad-X recommends an inspection by Building Inspector prior to plastering

- Panels must be flat and straight with min. 6 screws per sheet, countersunk 10mm and no closer than 50mm from edge of panel ☐ Yes ☐ or ☐ No
- Ensure all exposed steel ends are treated with CRC zinc it anti corrosion paint ☐ Yes ☐ or ☐ No
- All external and internal corners and vertical control joints are installed as required in this technical manual ☐ Yes ☐ or ☐ No
- Ensure that sill and jamb flashings are in place and sealed with corner soakers as required in this technical manual ☐ Yes ☐ or ☐ No
- Ensure window head flashing is fixed in place, level and straight ☐ Yes ☐ or ☐ No
- Cavity closer should be adhered with BOSTIK sealant and fixed in a straight line to bottom edge of panel where required ☐ Yes ☐ or ☐ No
- Sill and base shoe flashings keycoated with Wattyl products ☐ Yes ☐ or ☐ No
- Ensure roof lashing are in place and checked by builder and building inspector prior to plastering where relevant ☐ Yes ☐ or ☐ No
- All pipe work/penetrations through cladding are filled with low expandable foam and sealed flush with surface nominated sealant ☐ Yes ☐ or ☐ No

Variables/ Concerns/ Comments:

TRAINED INSTALLER: _____ Signature: _____
 Approved by: _____ signature: _____

Wattyl Granosite Plaster Quality Assurance Checklist

Specification No.: _____ Building Consent No.: _____
 Site Address: _____ Area: _____
 Owner: _____ Phone: _____
 Builder: _____ Phone: _____
 Architect: _____ Phone: _____
 Applicator/Co: _____ Phone: _____
 Project Start Date: _____ Project Finish Date: _____ Area Mz: _____
 Rep: _____

PRE INSTALLATION

	YES	NO	COMMENTS
Has building paper been installed correctly	<input type="checkbox"/>	<input type="checkbox"/>	_____
Flashing tape used at edges, laps and openings	<input type="checkbox"/>	<input type="checkbox"/>	_____
Penetration flashed	<input type="checkbox"/>	<input type="checkbox"/>	_____
Windows head flashing installed correctly	<input type="checkbox"/>	<input type="checkbox"/>	_____
Has a 25mm gap been left for windows flashing	<input type="checkbox"/>	<input type="checkbox"/>	_____
Is the base of cladding 50mm below the bottom plate	<input type="checkbox"/>	<input type="checkbox"/>	_____
Is there ground clearance for foot flashings	<input type="checkbox"/>	<input type="checkbox"/>	_____
All ground clearance meet building requirements	<input type="checkbox"/>	<input type="checkbox"/>	_____
Is wall framing within tolerance	<input type="checkbox"/>	<input type="checkbox"/>	_____
Control joints installed where specified	<input type="checkbox"/>	<input type="checkbox"/>	_____
	<input type="checkbox"/>	<input type="checkbox"/>	_____

Framing type: _____ Moisture content: _____ %
 Builders Signature: _____ Territorial Authorities Signature: _____

SYSTEM TO BE APPLIED : Granosite

SUBSTRATE: AAC ☐

1st coat: _____ Batch No. _____ 2nd coat: _____ Batch No. _____
 3rd coat: _____ Batch No. _____ 4th coat: _____ Batch No. _____
 5th coat: _____ Batch No. _____
 Type of Batten used: cavitybat: ☐ Polystyrene ☐ other, please state: _____

APPLICATORS CHECKLIST

	YES	NO	COMMENTS
Battens installed correctly	<input type="checkbox"/>	<input type="checkbox"/>	_____
Flashings installed correctly	<input type="checkbox"/>	<input type="checkbox"/>	_____
Flashing keycoated	<input type="checkbox"/>	<input type="checkbox"/>	_____
Control joint installed where specified	<input type="checkbox"/>	<input type="checkbox"/>	_____
Colour specified with LRV restrictions	<input type="checkbox"/>	<input type="checkbox"/>	_____

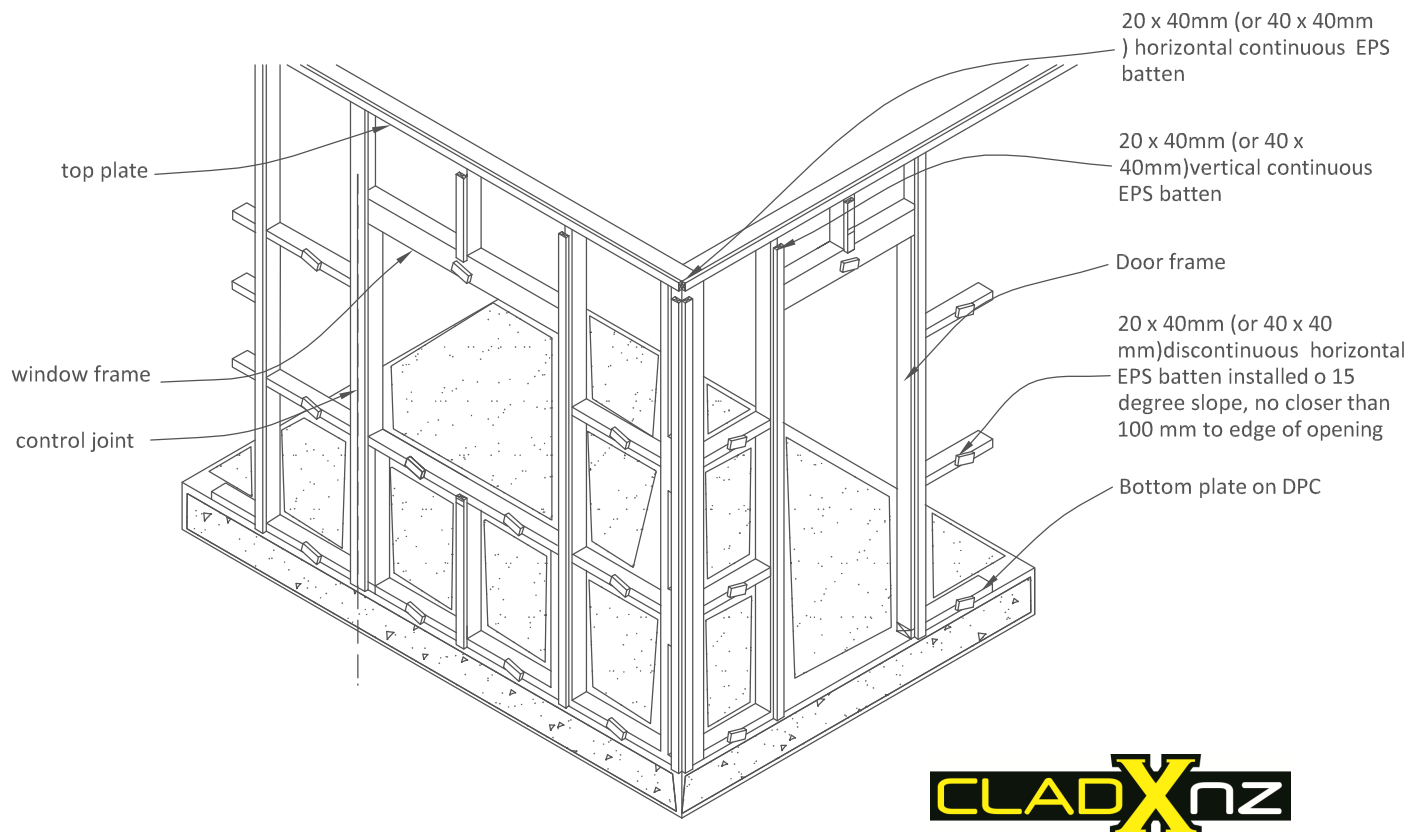
Application Method: Pump ☐ Trowel ☐ Roller ☐ spray ☐
 Texture Type: _____ Paint/Colour _____ LRV % _____
 Paint Contractor: _____ Phone: _____ Rep: _____

TYPE OF WARRANTY REQUIRED

Ten Years over Solid Substrate ☐ Fifteen years renewable ☐
 Product Producer Statement only ☐ other: Please state: _____

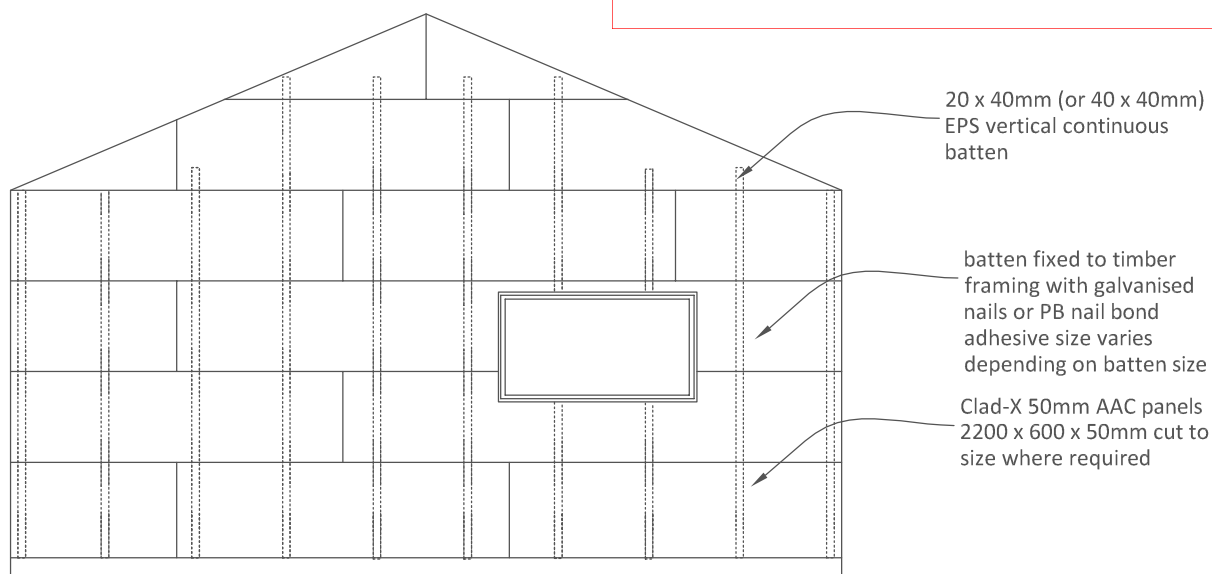
Applicator: _____ Signed: _____
 Painter: _____ Signed: _____
 License # _____ Signed: _____

7 CONSTRUCTION GUIDANCE AND DETAIL DRAWINGS

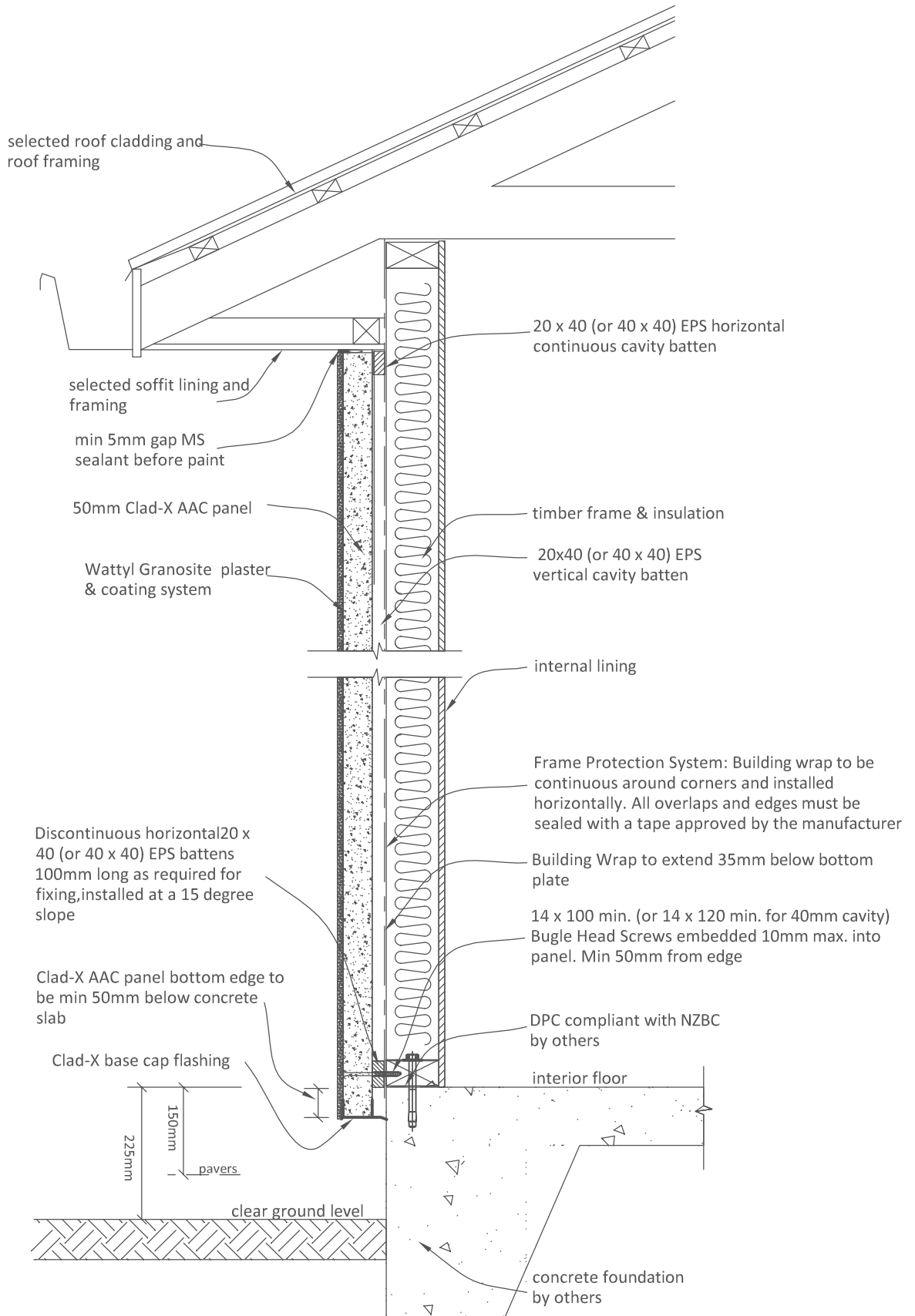


Typical Clad-X AAC Cavity Batten Layout			Scale	NTS
Dwg No. 01	Date	April 2013	www.cladx.co.nz	

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Regulations 1992, Clause 3
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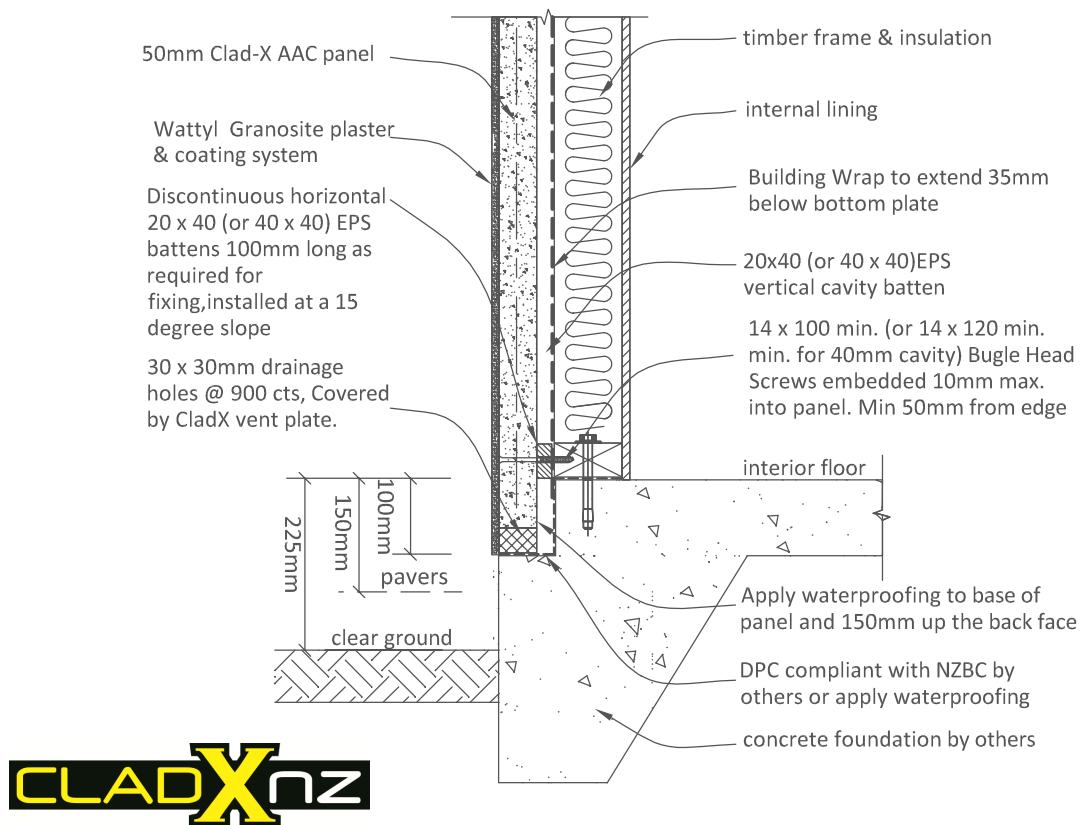


Typical Clad-X AAC Panel layout			Scale	NTS
Dwg No. 02	Date	April 2013	www.cladx.co.nz	

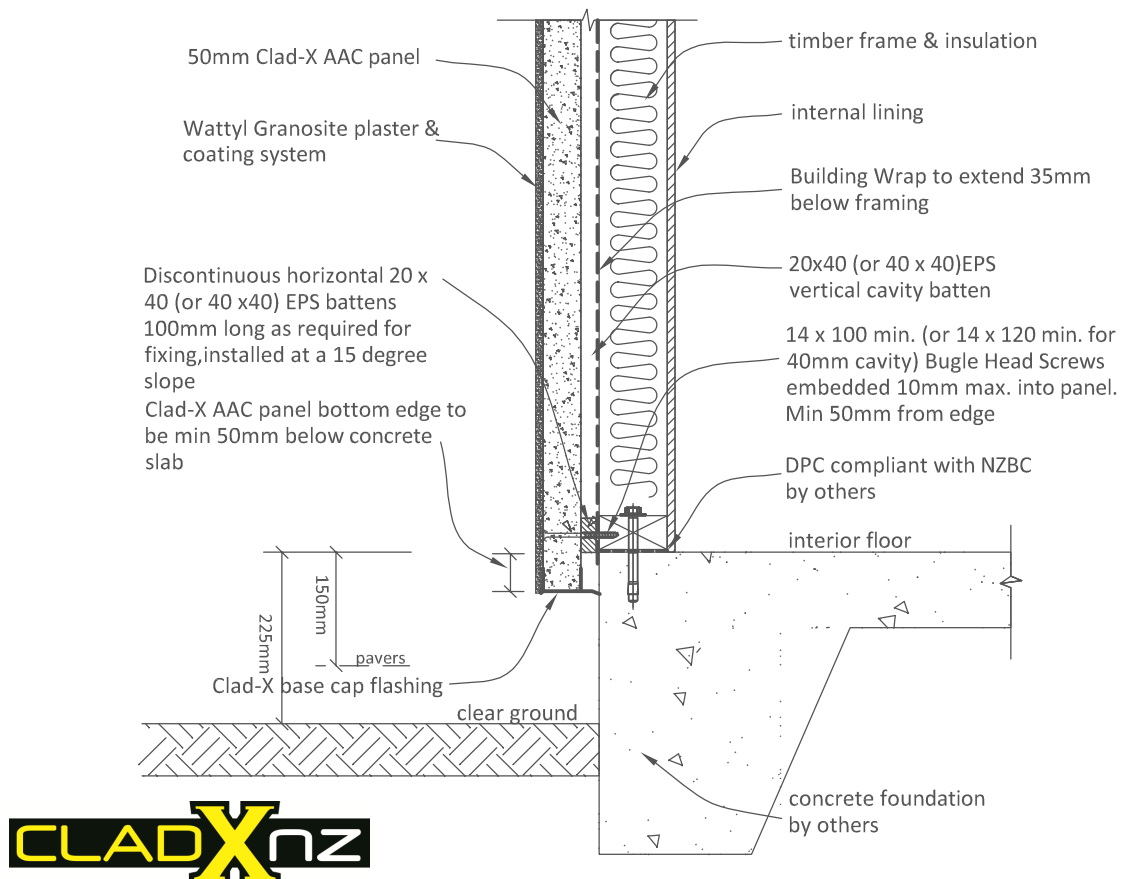


CLADXnz

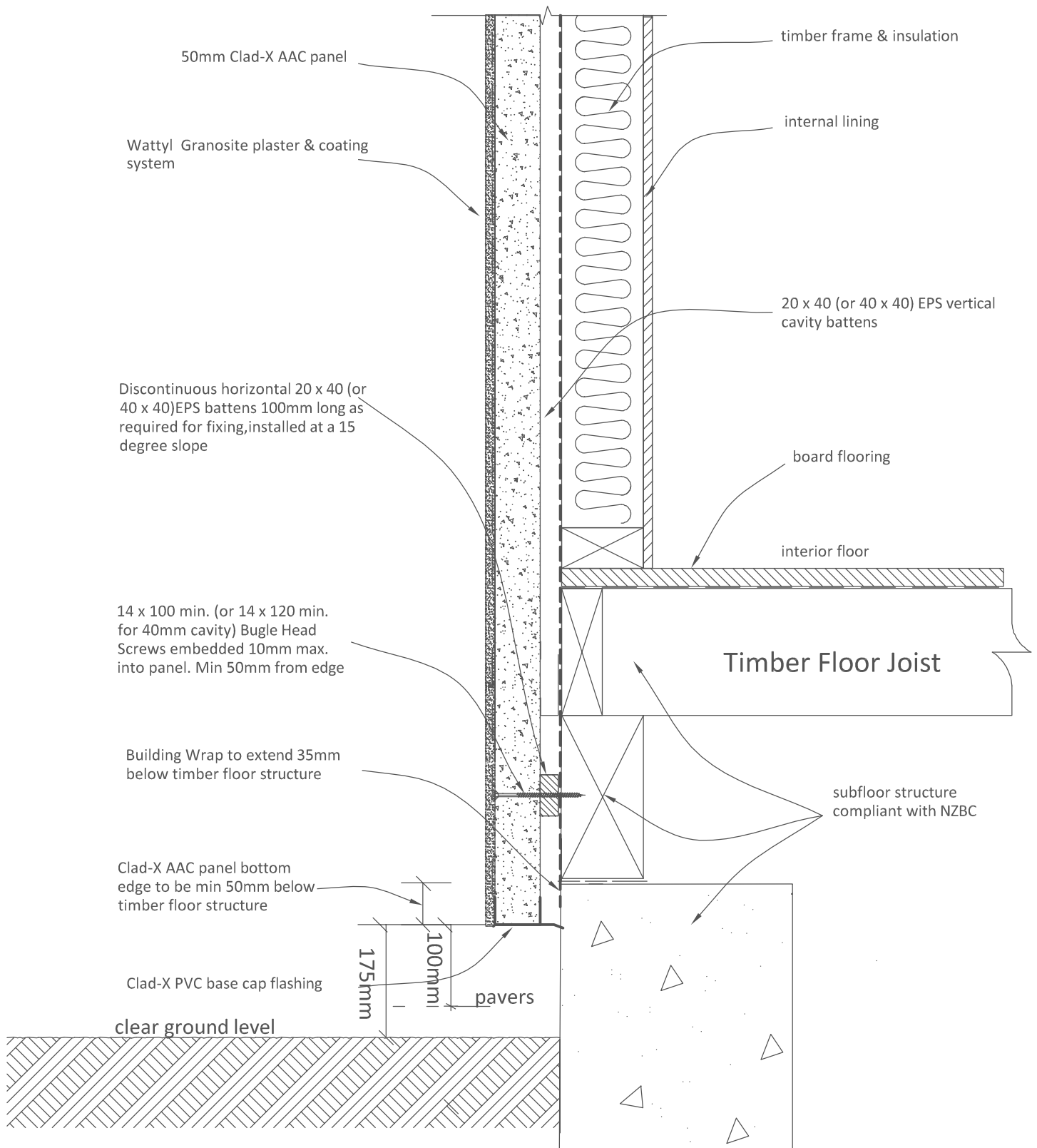
Typical Clad-X AAC wall cross section			Scale	1:10
Dwg No. 03	Date	April 2013	www.cladx.co.nz	



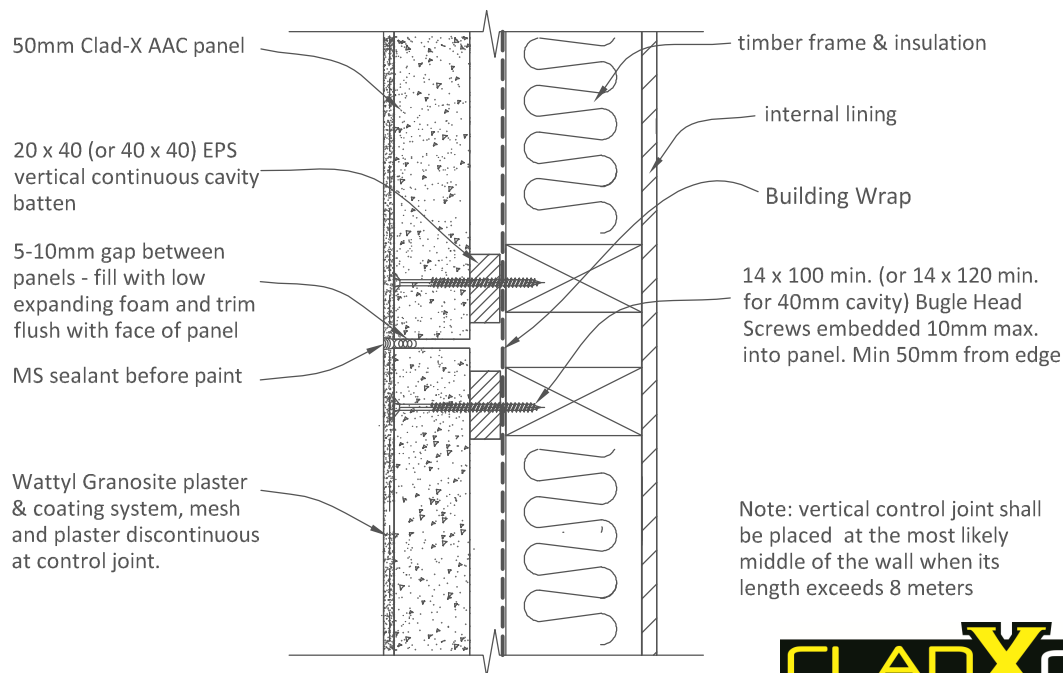
Rebated Concrete foundation detail			Scale	1:10
Dwg No. 04	Date	April 2013	www.cladx.co.nz	



Over-hang concrete foundation detail			Scale	1:10
Dwg No. 05	Date	April 2013	www.cladx.co.nz	

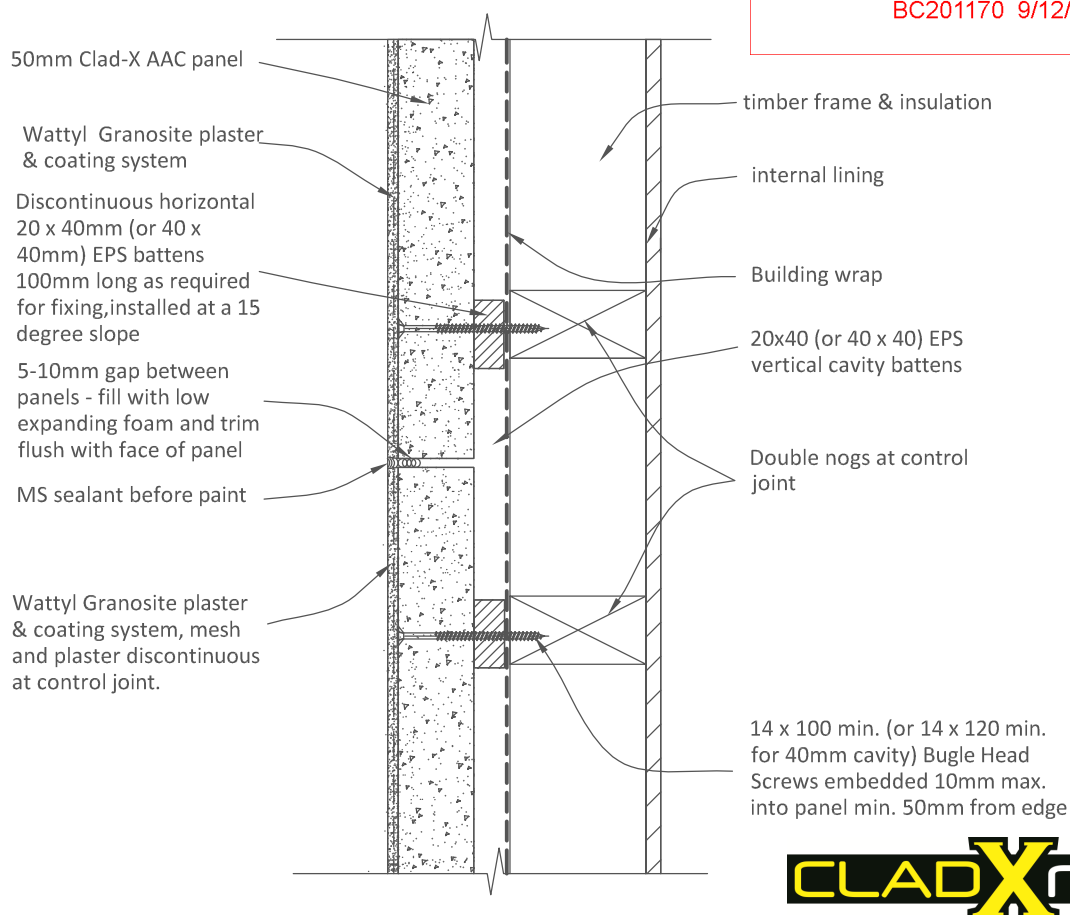


Timber subfloor foundation detail			Scale	1:6
Dwg No. 06	Date	April 2013	www.cladx.co.nz	

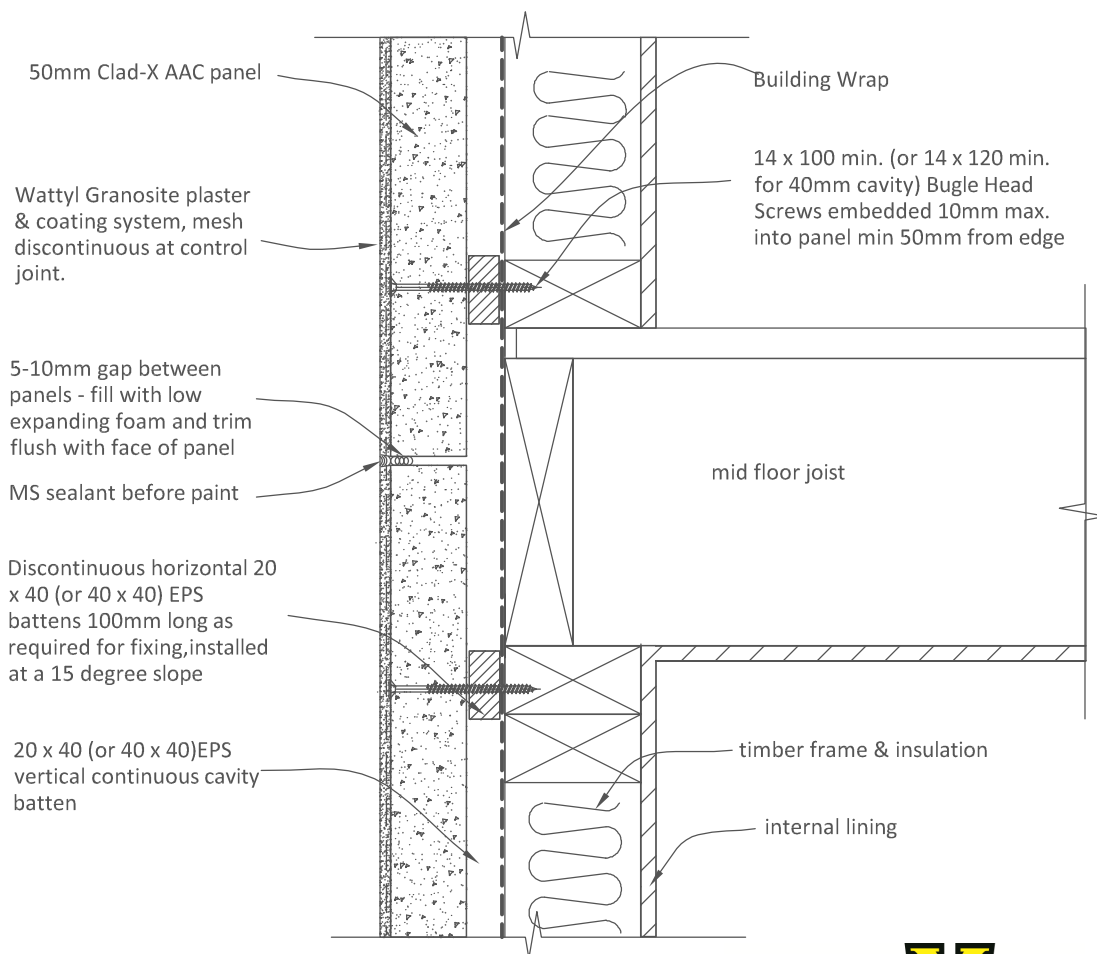
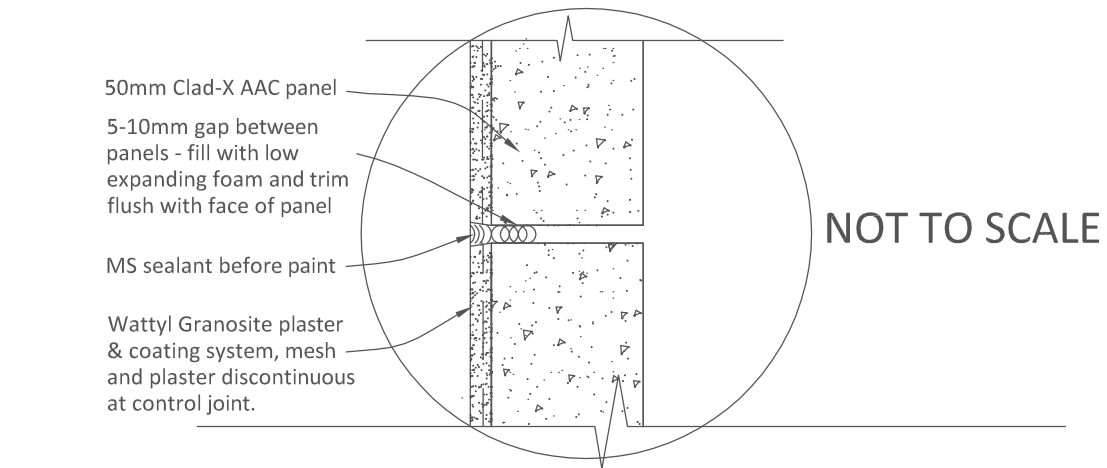


Vertical control Joint detail			Scale	1:5
Dwg No. 07	Date	April 2013	www.cladx.co.nz	

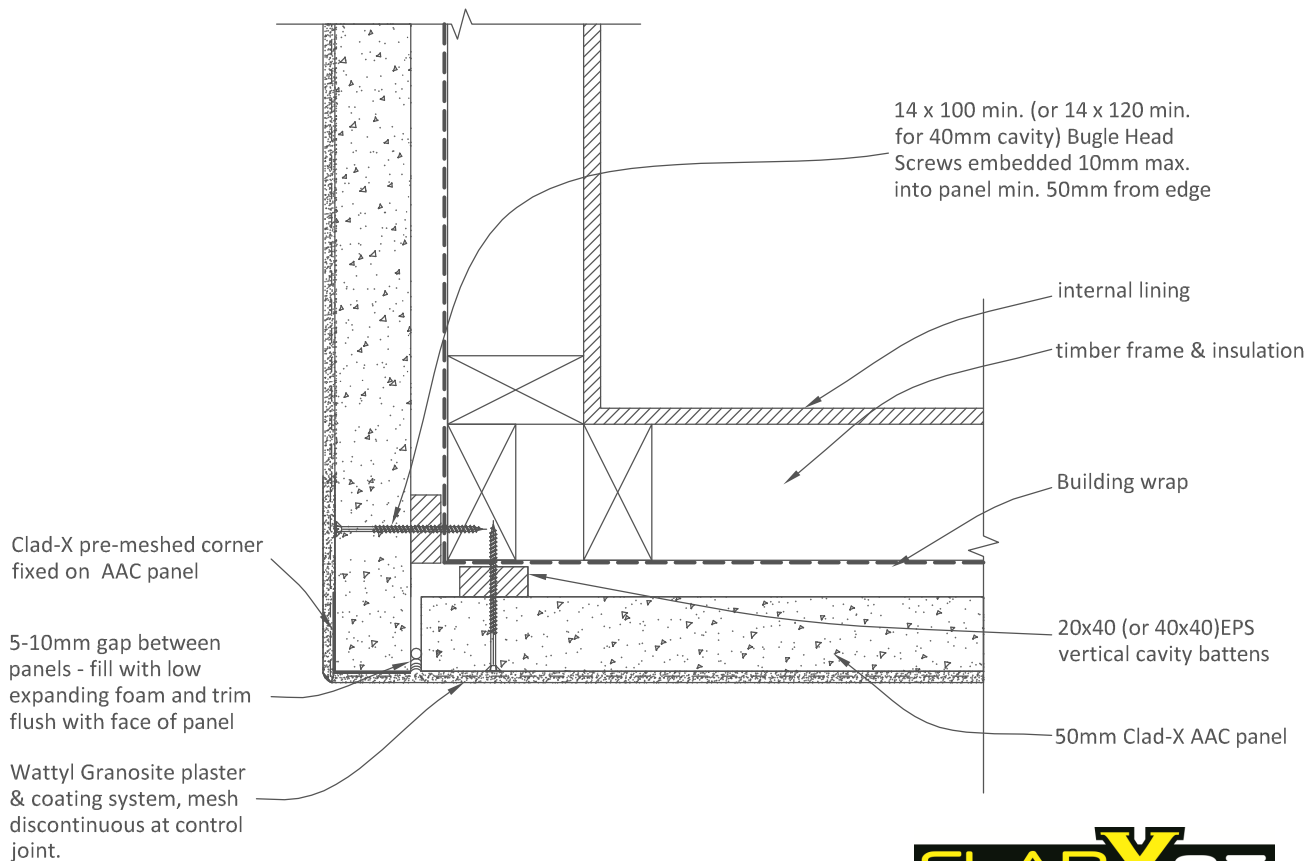
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Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah



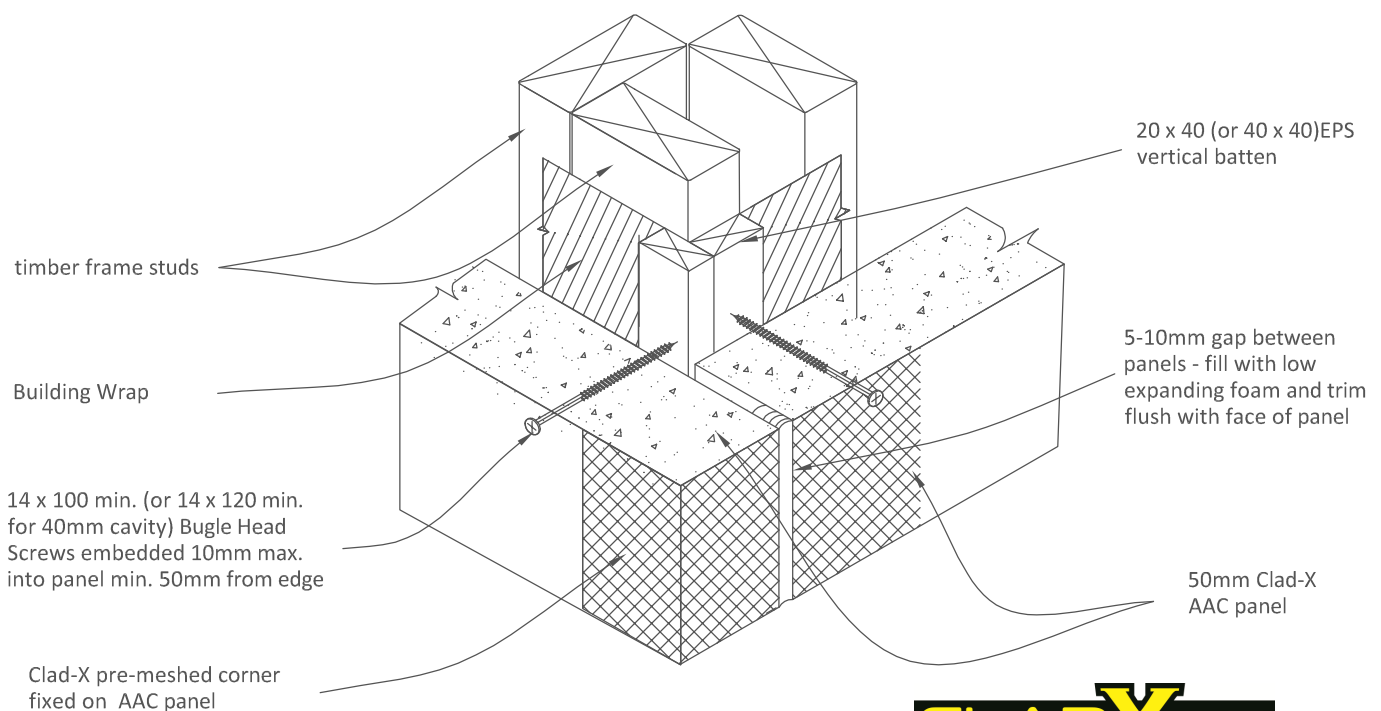
Horizontal control joint detail			Scale	1:5
Dwg No. 08	Date	April 2013	www.cladx.co.nz	



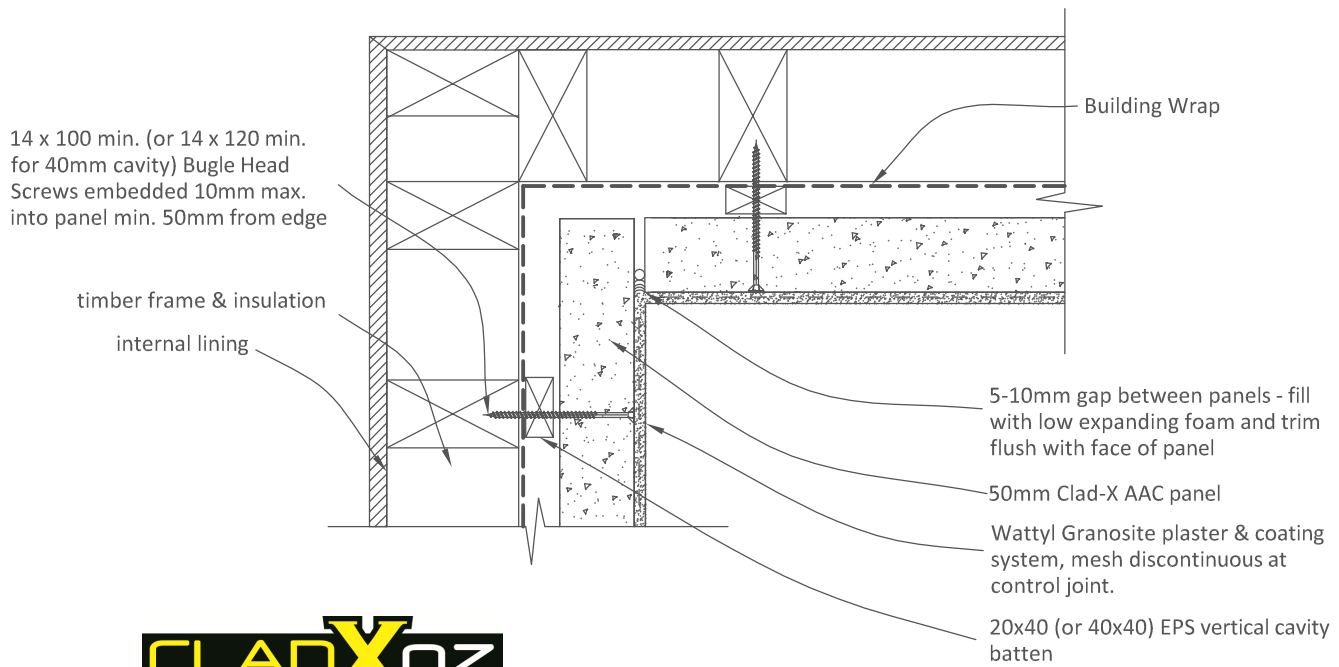
Mid-floor horizontal control joint detail			Scale	1:5
Dwg No. 09	Date	April 2013	www.cladx.co.nz	



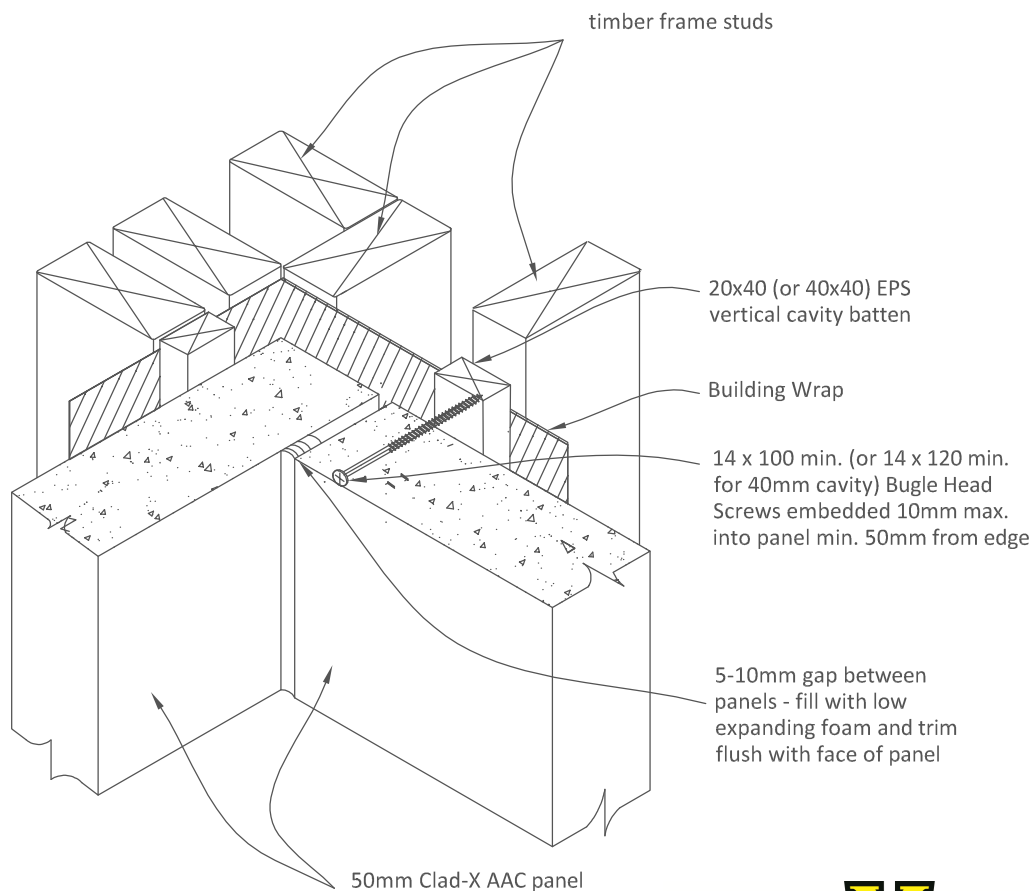
External corner detail - plan view			Scale	1:5
Dwg No. 10	Date	April 2013	www.cladx.co.nz	



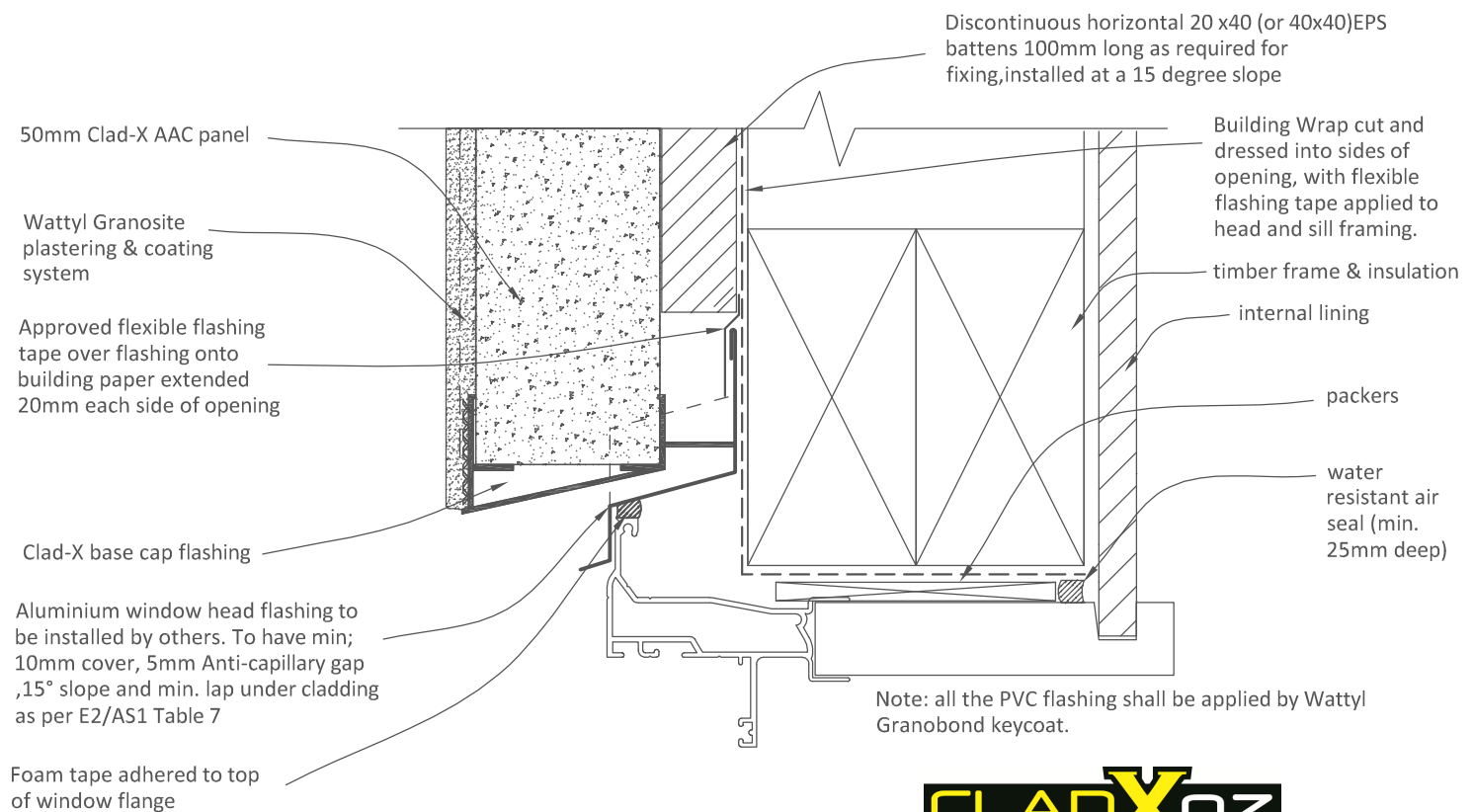
External corner detail - 3D view			Scale	NTS
Dwg No. 11	Date	April 2013	www.cladx.co.nz	



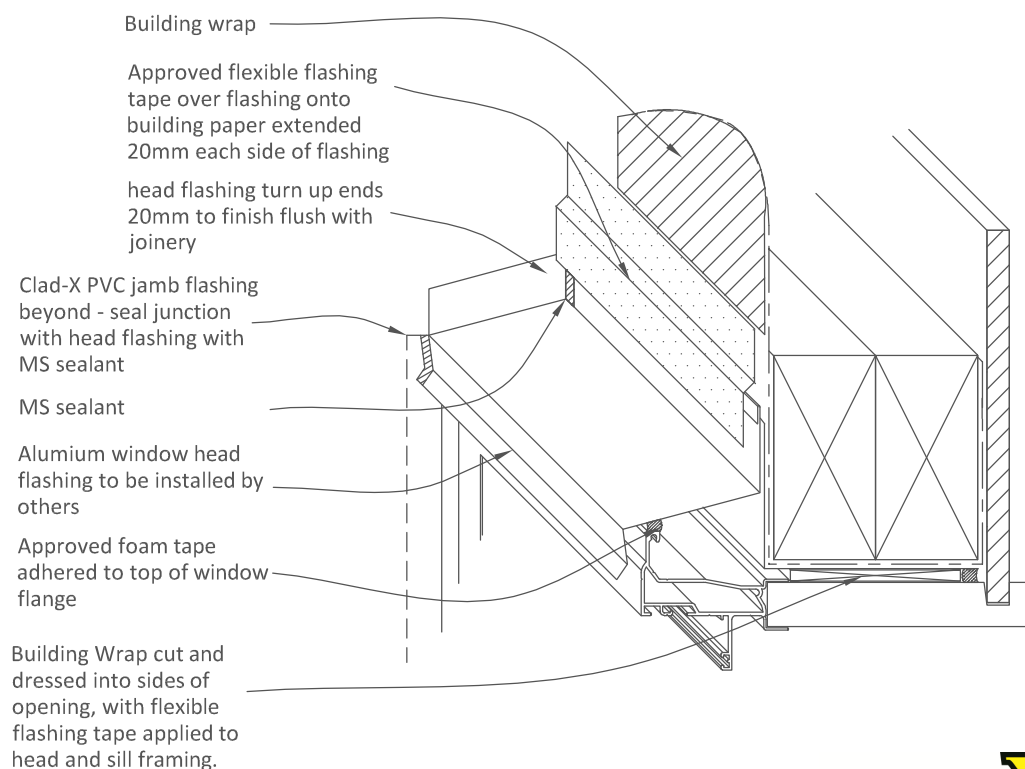
Internal corner detail - plan view			Scale	1:5
Dwg No. 12	Date	April 2013	www.cladx.co.nz	



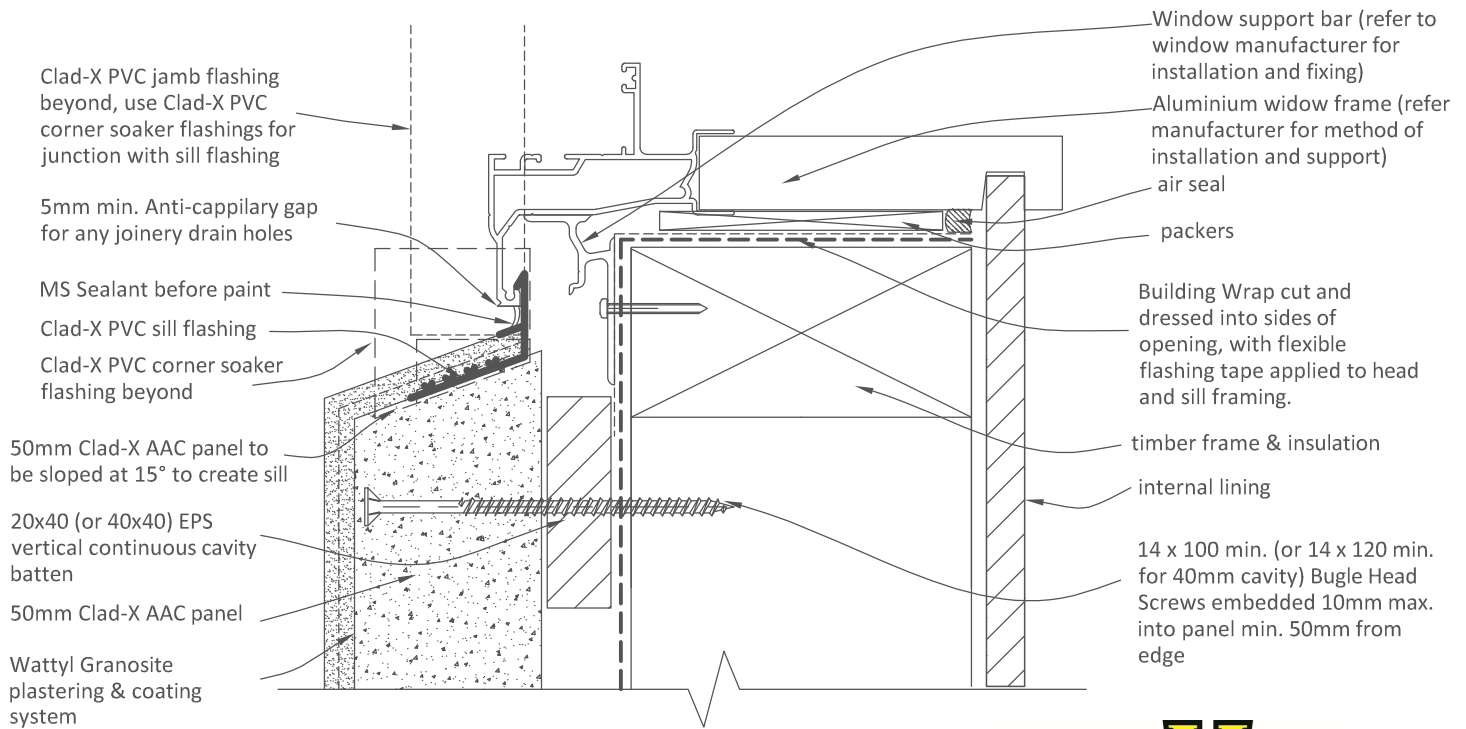
Internal corner detail - 3D view			Scale	NTS
Dwg No. 13	Date	April 2013	www.cladx.co.nz	



Window head detail			Scale	1:2
Dwg No. 14	Date	April 2013	www.cladx.co.nz	



Window head flashing 3D detail			Scale	NTS
Dwg No. 15	Date	April 2013	www.cladx.co.nz	

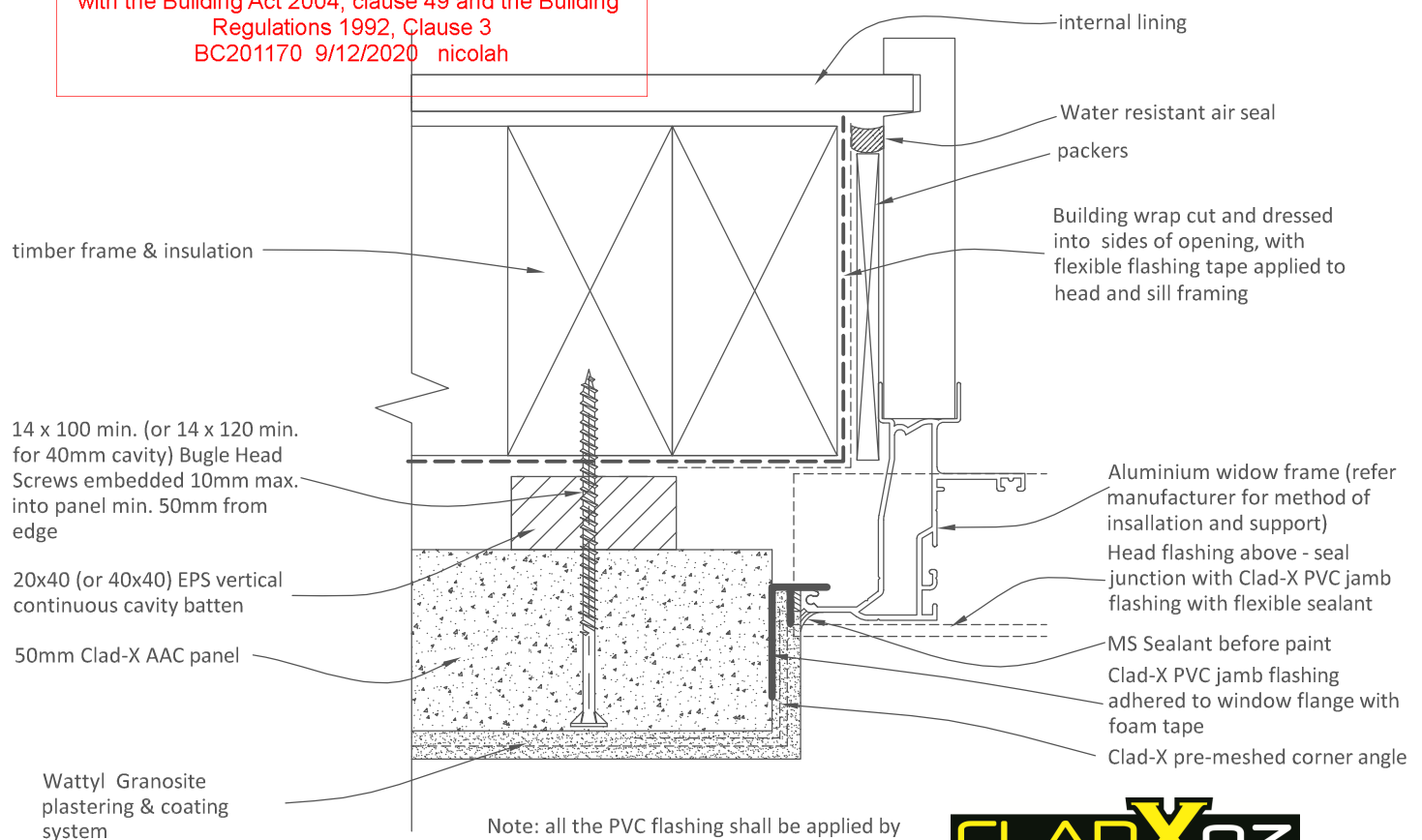


Note: all the PVC flashing shall be applied by Wattyl Granobond keycoat.



Window sill detail			Scale	1:2
Dwg No. 16	Date	April 2013	www.cladx.co.nz	

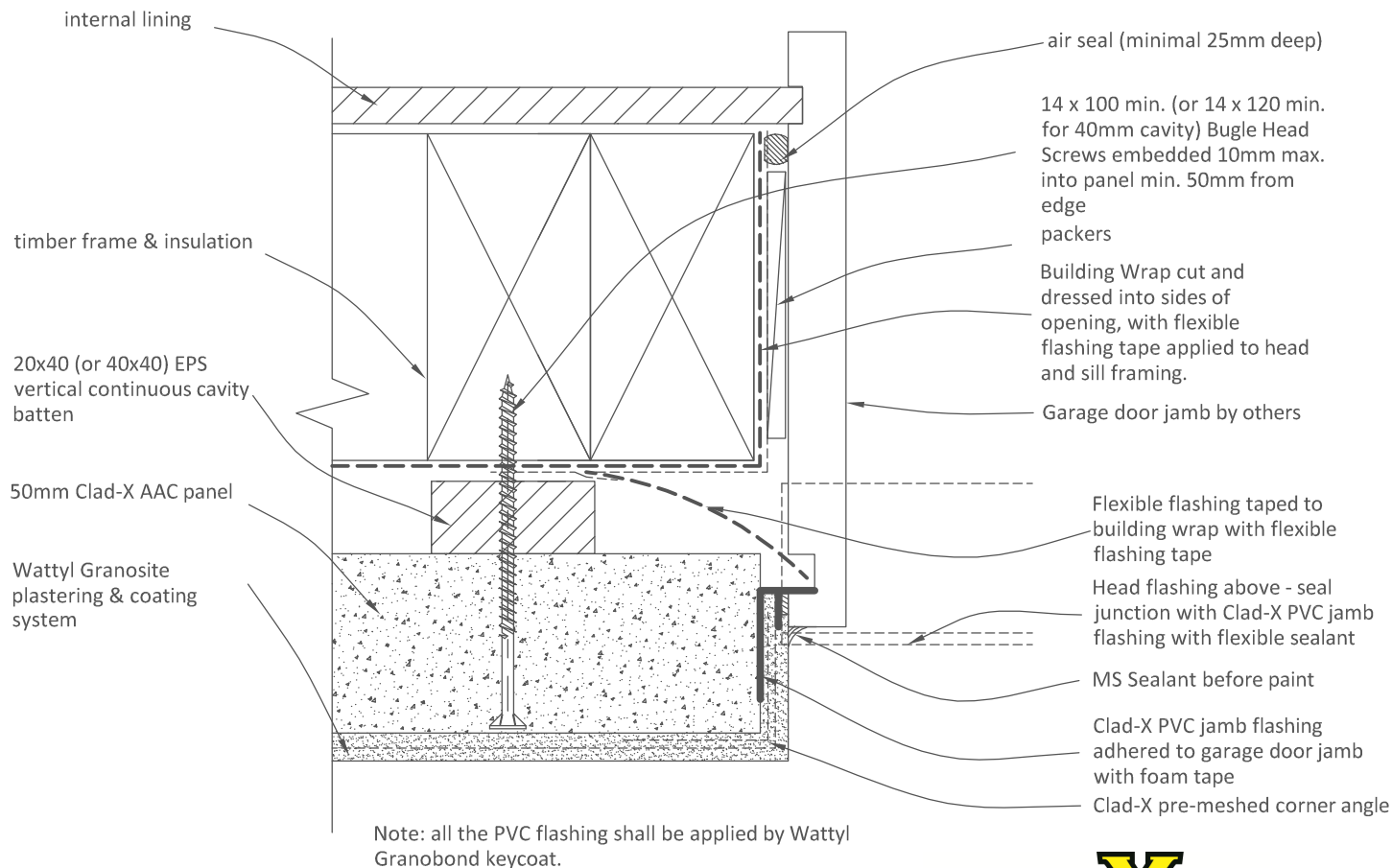
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Note: all the PVC flashing shall be applied by Wattyl Granobond keycoat.

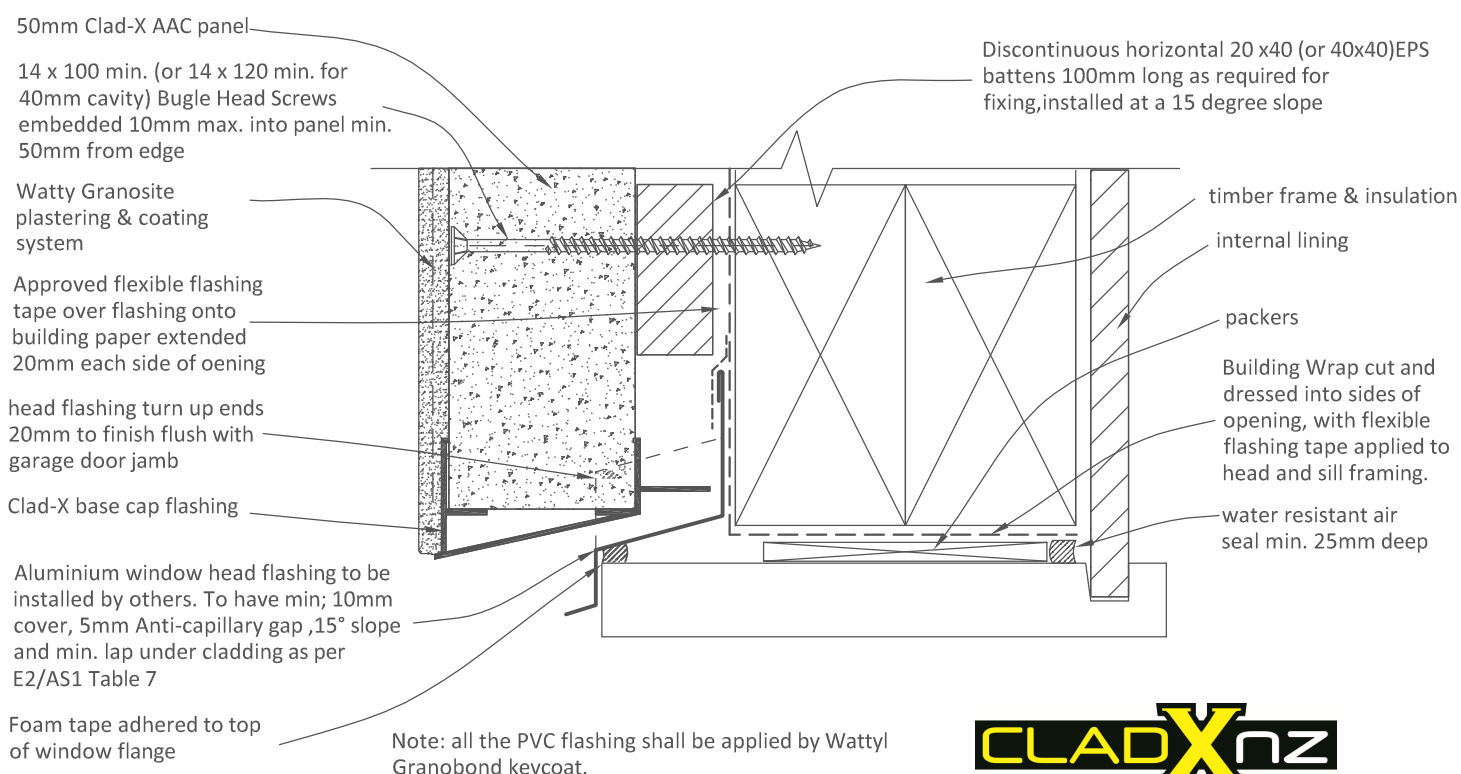


Window jamb detail			Scale	NTS
Dwg No. 17	Date	April 2013	www.cladx.co.nz	



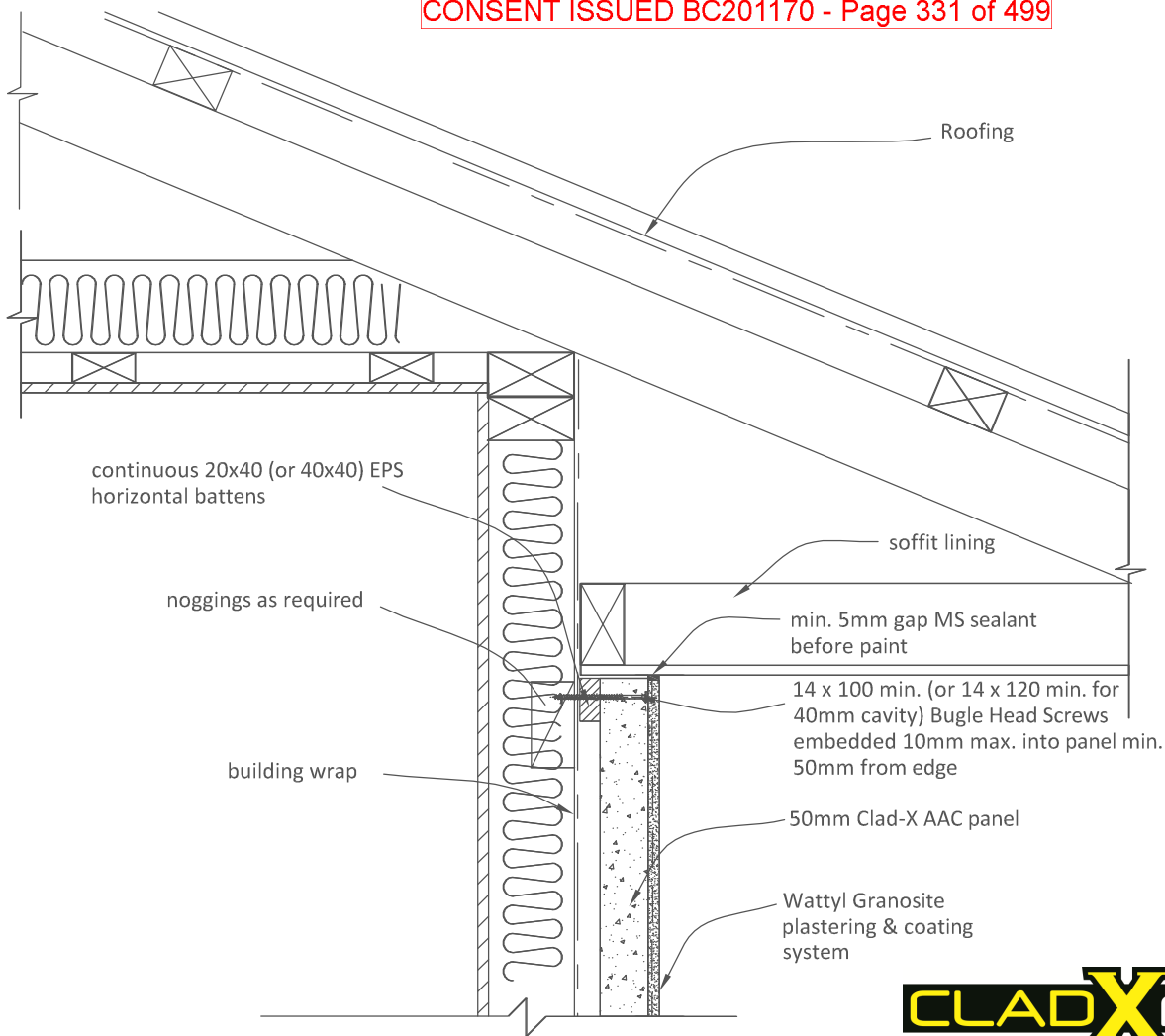
CLADXnz

Garage door jamb detail			Scale	1:2
Dwg No. 18	Date	April 2013	www.cladx.co.nz	



CLADXnz

Garage door head detail			Scale	1:2
Dwg No. 19	Date	April 2013	www.cladx.co.nz	



CLADXnz

Soffit junction detail			Scale	1:8
Dwg No. 20	Date	April 2013	www.cladx.co.nz	

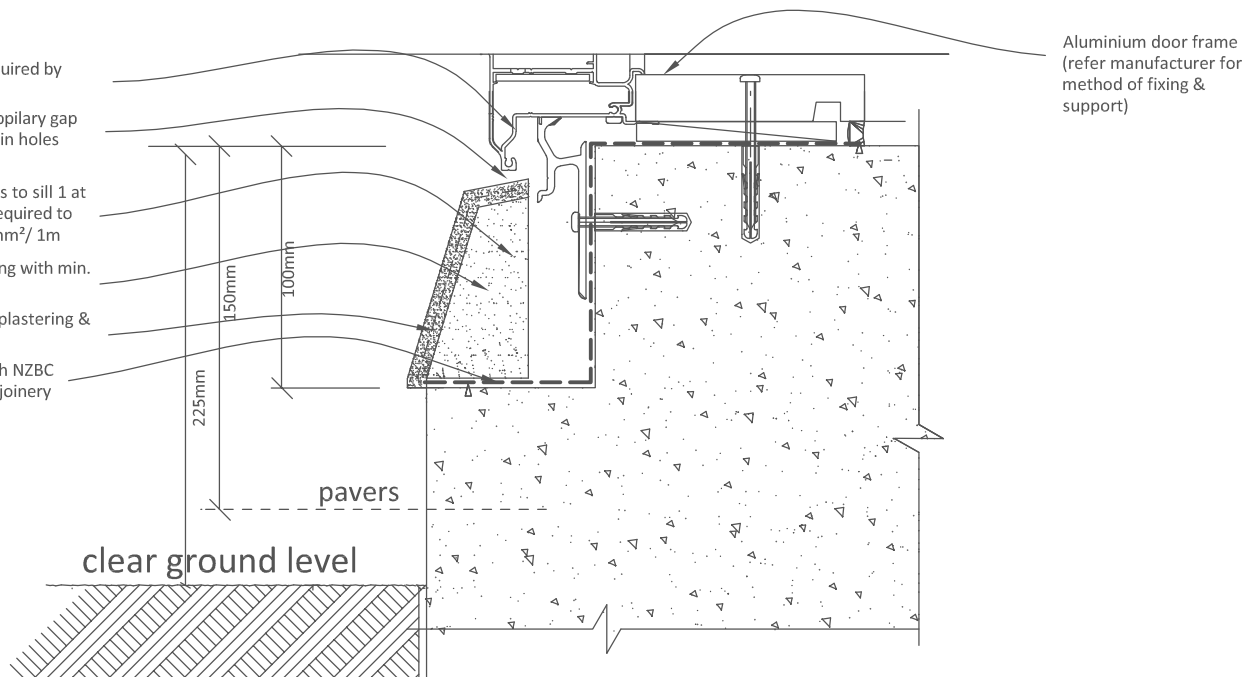
support bar as required by manufacturer
5mm min. anti-cappillary gap for any joinery drain holes

Provide weep holes to sill 1 at each end and as required to achieve min. 100mm²/ 1m

Clad X EPS moulding with min. 15° sloping sill

Watty! Granosite plastering & coating system

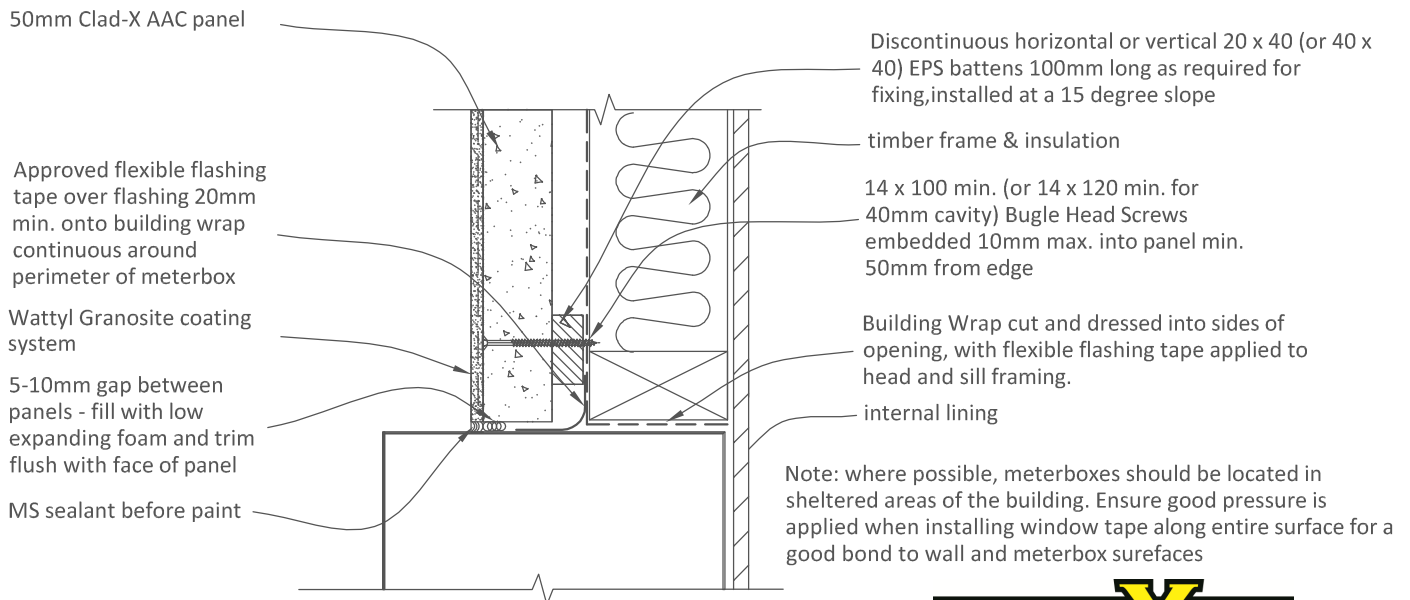
DPC compliant with NZBC continuous under joinery



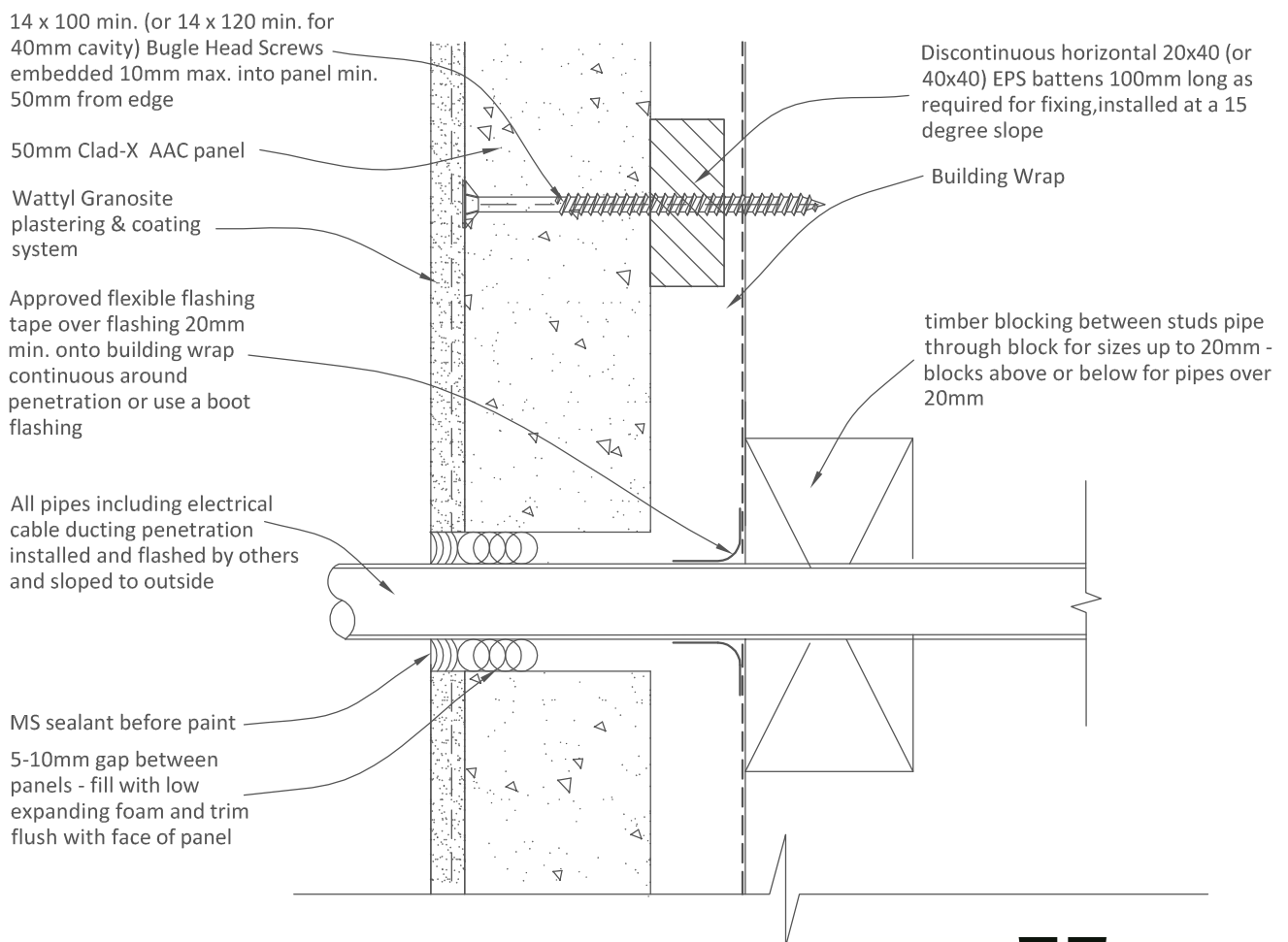
Note: Ensure a weep hole is placed either side of door openings

CLADXnz

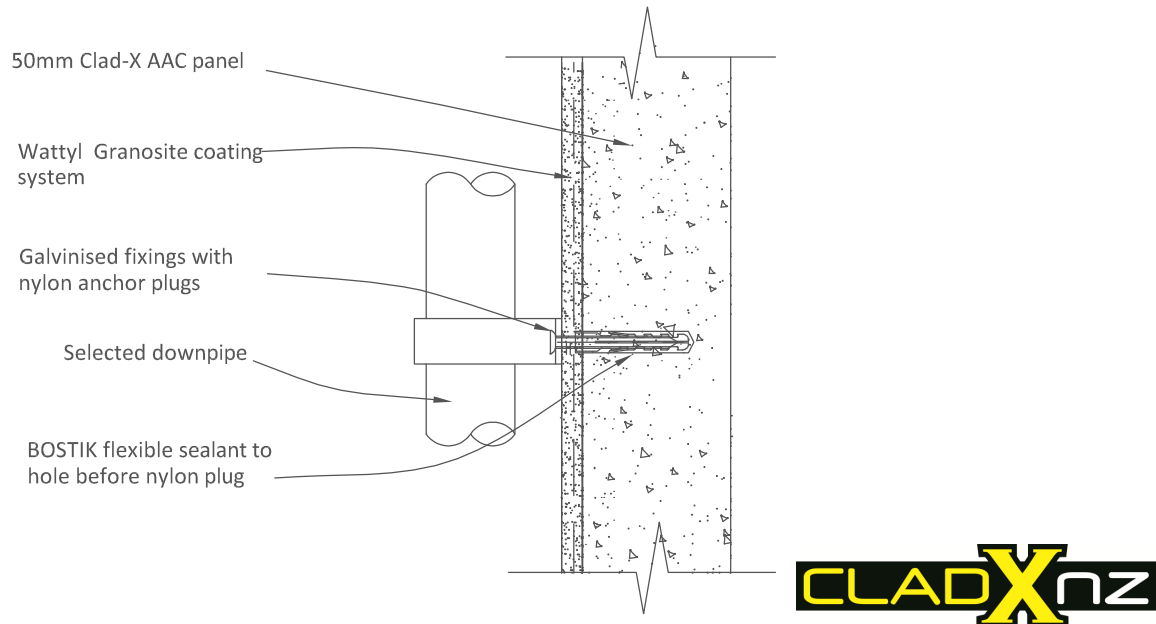
Sill detail @ slab			Scale	1:3
Dwg No. 21	Date	April 2013	www.cladx.co.nz	



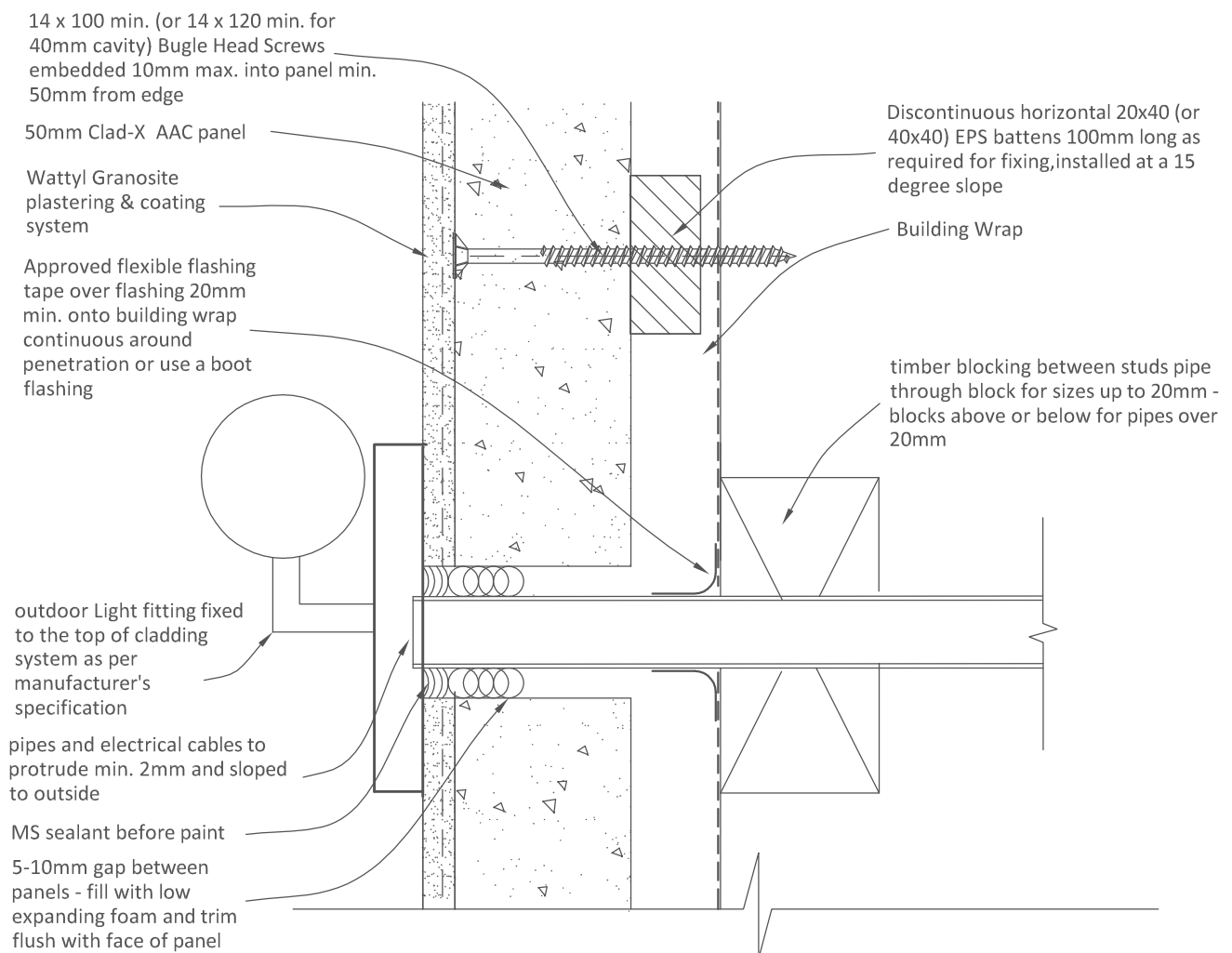
Meterbox (head/jamb/sill) detail			Scale	1:5
Dwg No. 22	Date	April 2013	www.cladx.co.nz	



Penetration (pipe/cable) details			Scale	1:2
Dwg No. 23	Date	April 2013	www.cladx.co.nz	



Down Pipe Fixing Details			Scale	NTS
Dwg No. 24	Date	April 2013	www.cladx.co.nz	



outdoor lighting fixing detail			Scale	1:2
Dwg No. 25	Date	April 2013	www.cladx.co.nz	

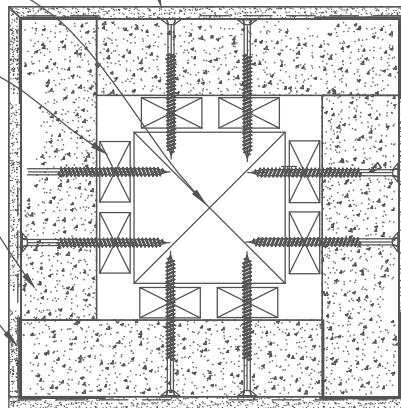
14 x 100 min. (or 14 x 120 min. for 40mm cavity) Bugle Head Screws embedded 10mm max. into panel min. 50mm from edge

100 x 100 H4 Timber post

20 x 40mm (or 40 x 40) EPS vertical continuous cavity batten

50mm Clad-X AAC panel fixed through cavity battens into post

Premeshed corner embedded in plaster



Note: 100mm x 50 min. vent should be installed at the back side of the post



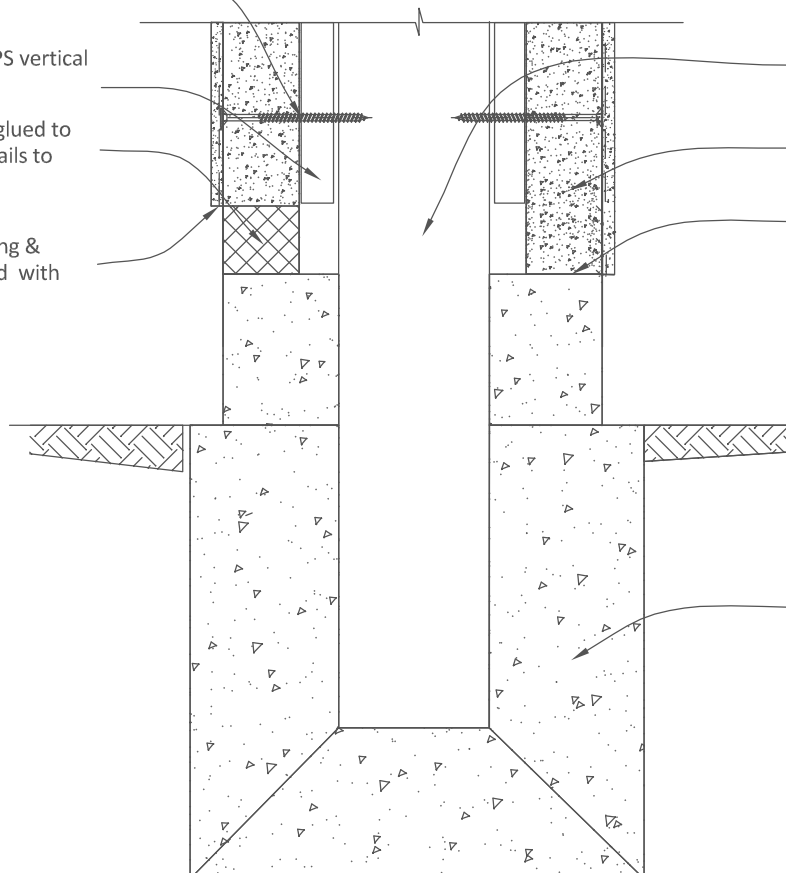
Timber post plan detail			Scale	1:5
Dwg No. 26	Date	April 2013	www.cladx.co.nz	

14 x 100 min. (or 14 x 120 min. for 40mm cavity) Bugle Head Screws embedded 10mm max. into panel min. 50mm from edge

20 x 40mm (or 40 x 40) EPS vertical continuous cavity batten

Clad-X 30 x 30 mm vents glued to panel with BOSTIK Zero Nails to cover holes

Wattyl Granosite plastering & coating system terminated with 6mm render stop



100 x 100 H4 Timber post

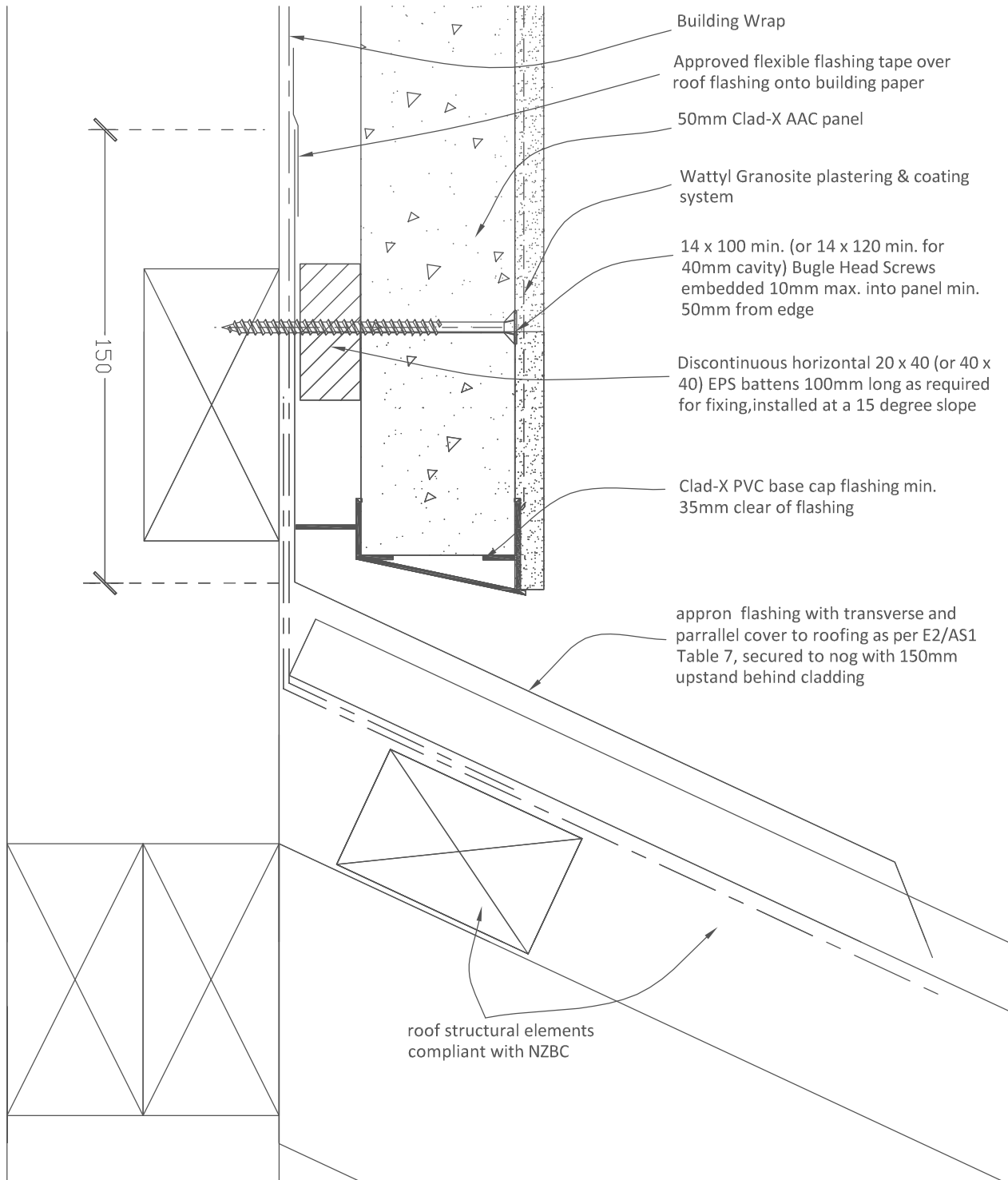
50mm Clad-X AAC panel fixed through cavity battens into post

Approved DPM as required by NZBC

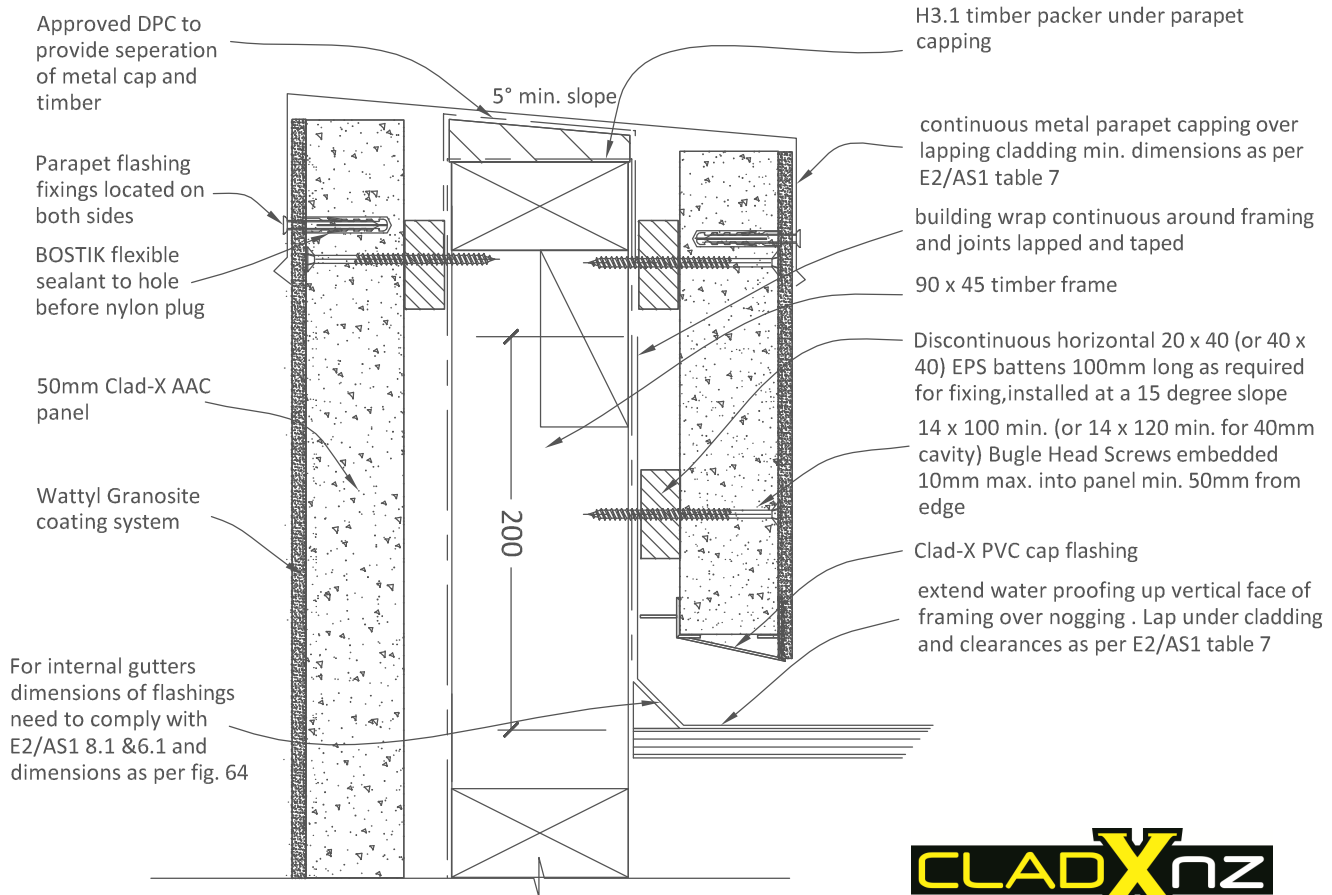
post footing compliant with NZBC or specific to design



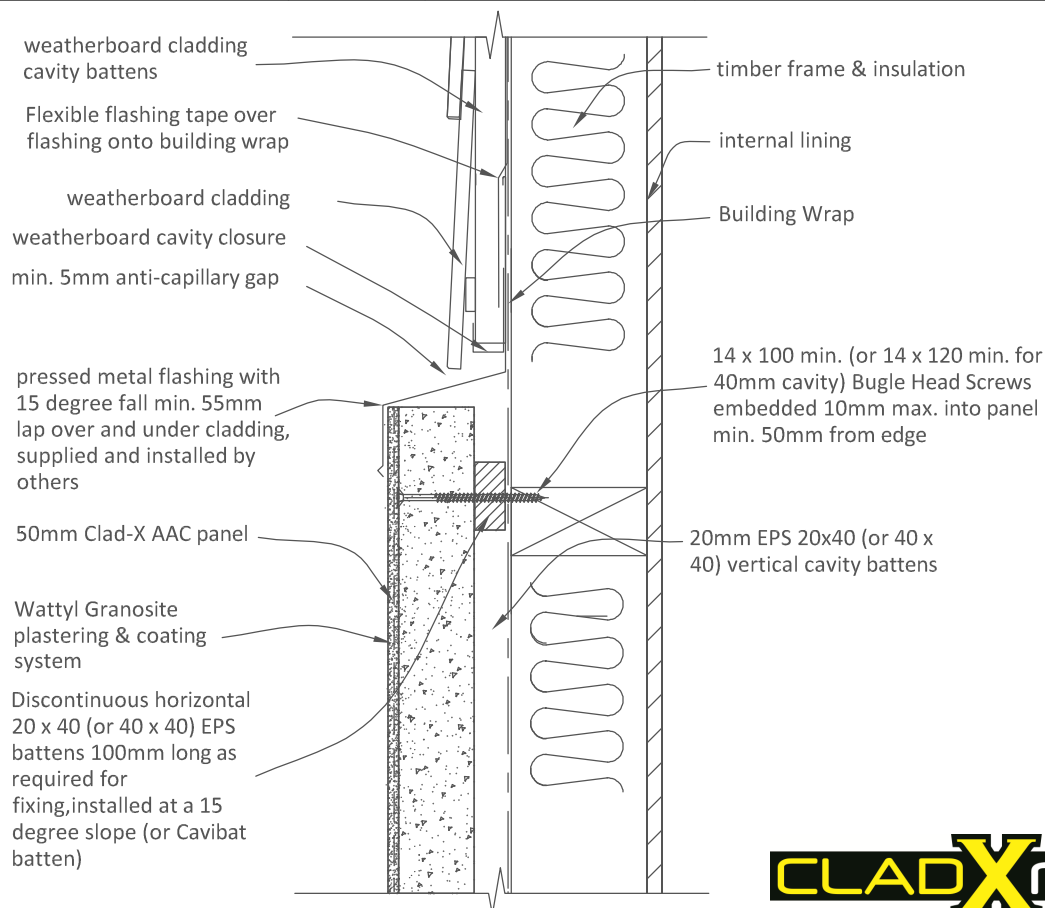
Timber post ground connection detail			Scale	1:5
Dwg No. 27	Date	April 2013	www.cladx.co.nz	



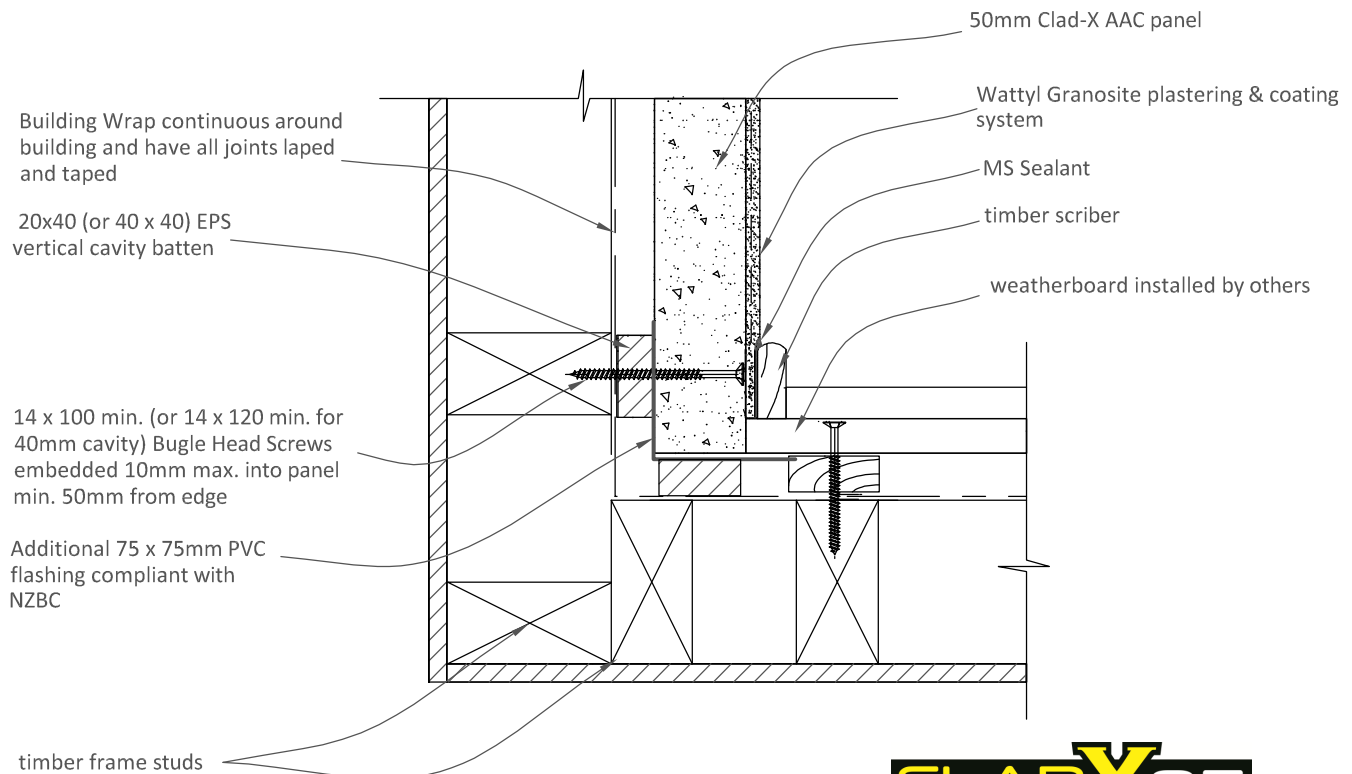
Roof/wall Junction detail				Scale	1:2
Dwg No. 28	Date	April 2013		www.cladx.co.nz	



AAC panel parapet (metal capping) detail			Scale	1:4
Dwg No. 29	Date	April 2013	www.cladx.co.nz	

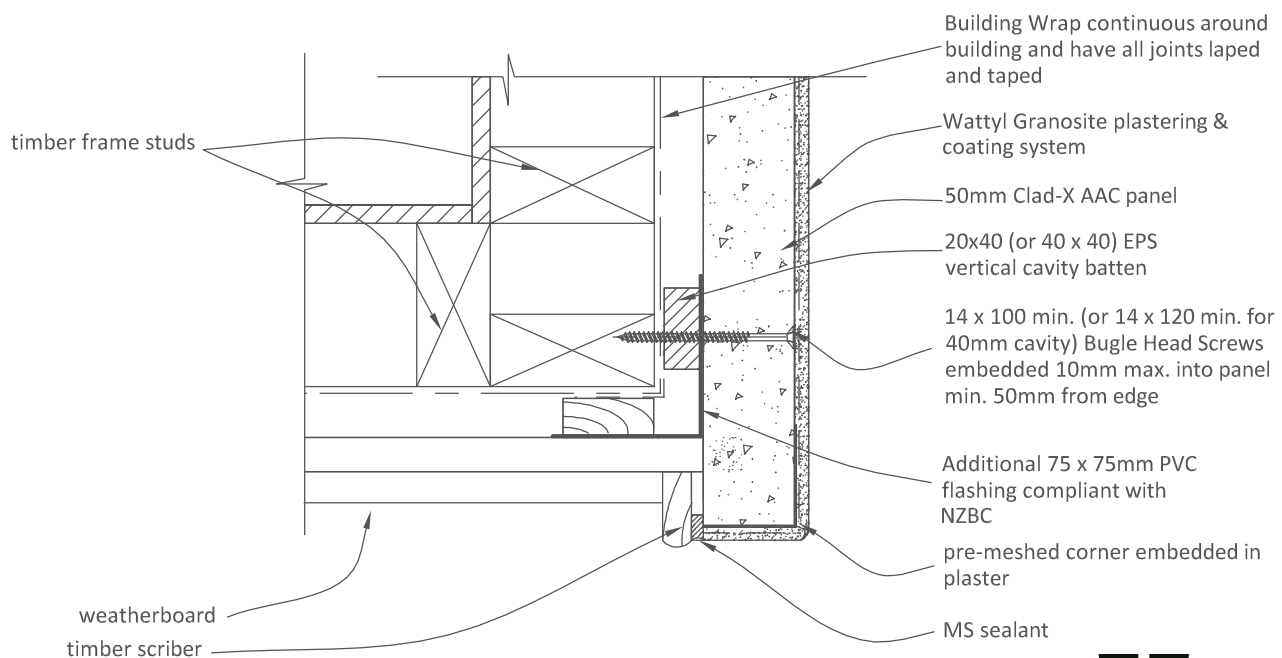


AAC panel/weatherboard junction detail			Scale	1:5
Dwg No. 30	Date	April 2013	www.cladx.co.nz	



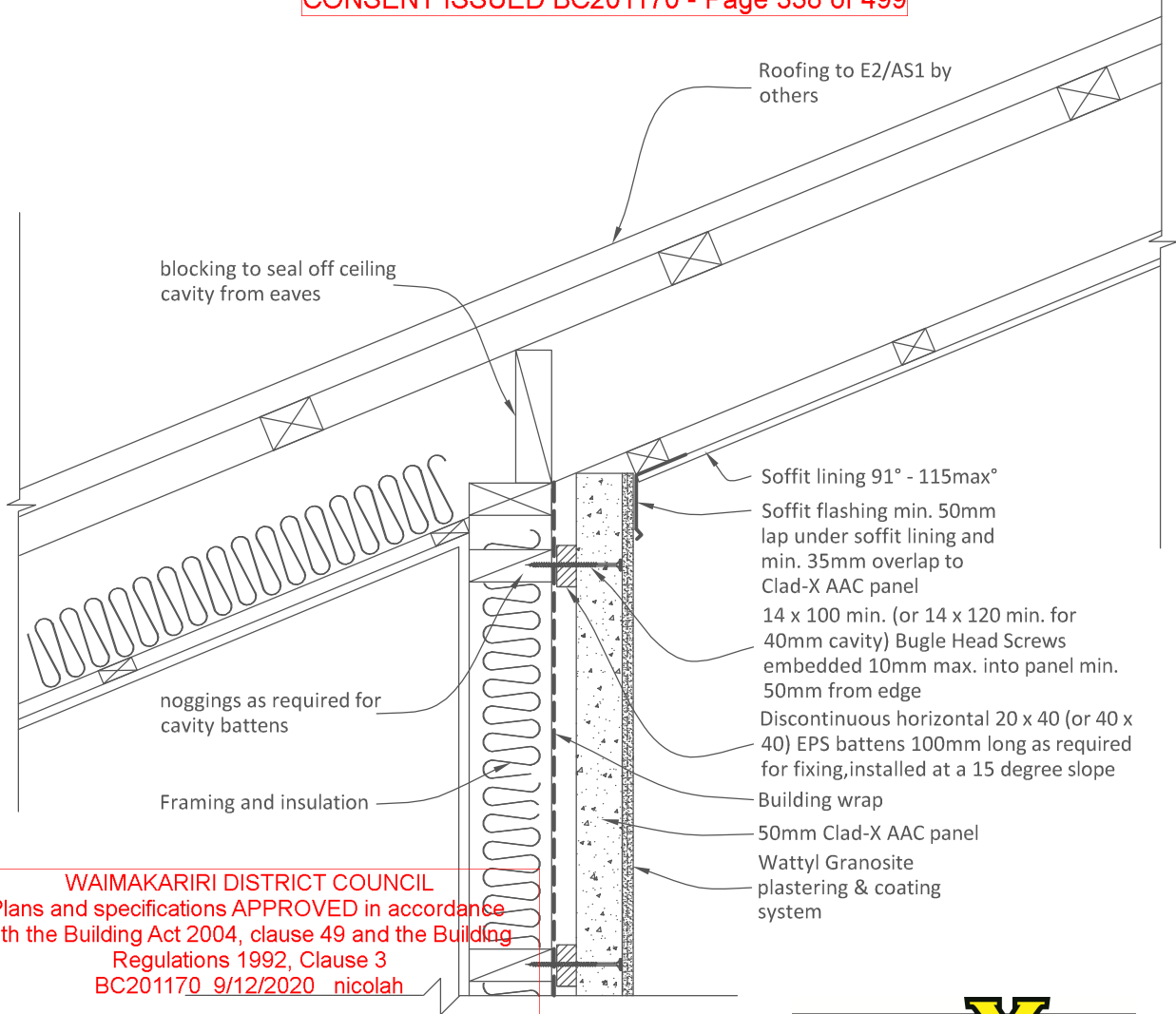
CLADXnz

weatherboard internal corner junction			Scale	1:4
Dwg No. 31	Date	April 2013	www.cladx.co.nz	



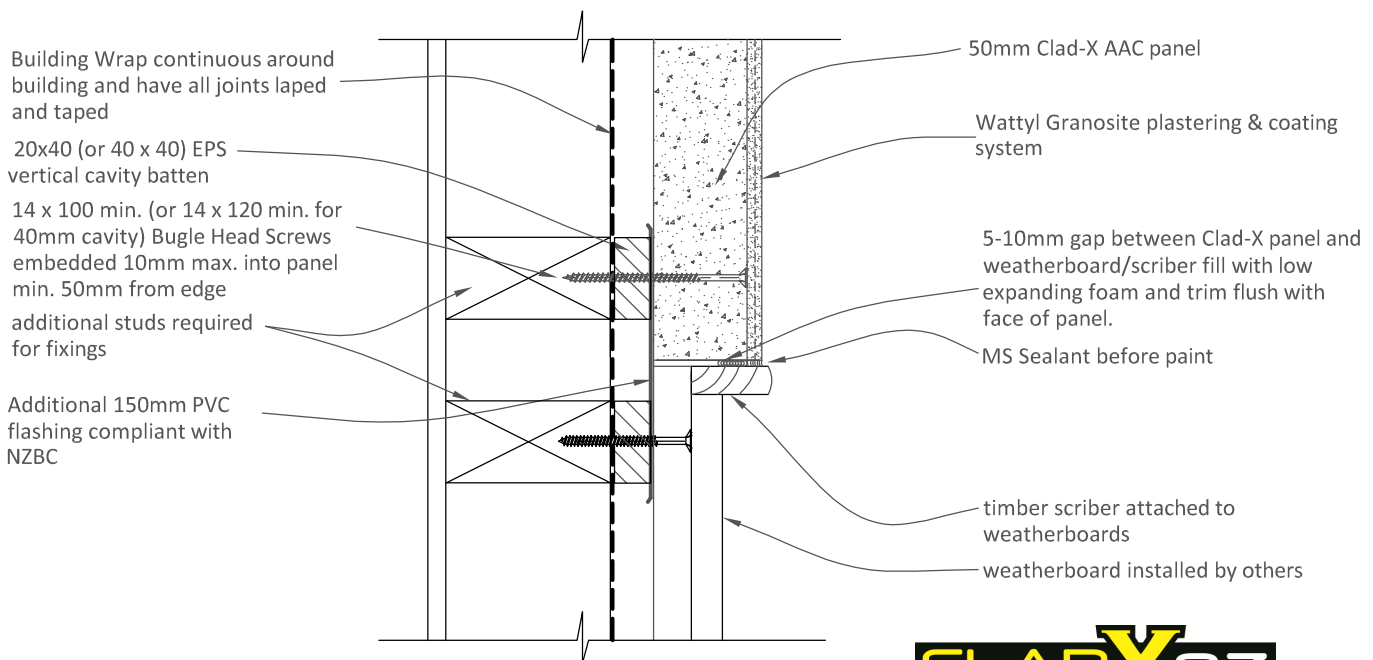
CLADXnz

Weatherboard external corner junction			Scale	1:4
Dwg No. 32	Date	April 2013	www.cladx.co.nz	



CLADXnz

Sloping Soffit Detail			Scale	1:8
Dwg No. 33	Date	April 2013	www.cladx.co.nz	



CLADXnz

Weatherboard Vertical Junction			Scale	1:4
Dwg No. 34	Date	April 2013	www.cladx.co.nz	



BRANZ Appraised
Appraisal No. 436 [2017]

BUTYNOL® AND BUTYSEAL ROOFING MEMBRANE SYSTEMS

Appraisal No. 436 [2017]

This Appraisal replaces BRANZ
Appraisal No. 436 [2011]

**Amendment Dated 7 January
2019**

BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Porirua 5240,

New Zealand

Tel: 04 237 1170

branz.co.nz



Christchurch International Airport 4500 m² of 1.5 mm Grey Butynol used for flat roof areas and gutters.
Completed in 2013.

Product

- 1.1 Butynol® and Butyseal Roofing Membrane Systems are synthetic rubber waterproofing membranes designed to be used on roofs and decks.
- 1.2 The membranes are supplied as single-ply, flexible synthetic rubber sheet in roll form. The products are installed as single layer systems.

Scope

- 2.1 Butynol® and Butyseal Roofing Membrane Systems have been appraised for use as roof and deck waterproofing membranes for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; or,
 - the scope limitations of NZBC Acceptable Solution E2/AS1 with regards to building height and floor plan area when subject to specific engineering design; and,
 - with substrates of plywood sheet, Strandsarking (roofs only) or suspended concrete slab; and,
 - with deck size limited to 40 m²; and,
 - situated within NZS 3604 Wind Zones up to, and including Extra High; or,
 - situated in specific design wind pressures up to a maximum design differential Ultimate Limit State [ULS] of 6.0 kPa with the weathertightness detailing subject to specific design.
- 2.2 Roofs and decks must be designed and constructed with no steps within the deck level, no integral roof gardens, and no downpipe discharging directly onto the deck.
- 2.3 The design and construction of the substrate and movement and control joints is specific to each building, and is therefore the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.
- 2.4 The membranes must be installed by trained applicators, approved by ARDEX New Zealand Limited.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
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Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Butynol® and Butyseal Roofing Membrane Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years. Butynol® and Butyseal Roofing Membrane Systems meet this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Roofs and decks incorporating Butynol® and Butyseal Roofing Membrane Systems meet these requirements. See Paragraphs 13.1 – 13.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Butynol® and Butyseal Roofing Membrane Systems meet this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 Materials supplied by ARDEX New Zealand Limited are as follows:

- **Butynol® Membranes** - All membranes are single-ply, flexible synthetic rubber membranes. They are supplied in rolls nominally 1.4 m wide by 17.86 m long. Each roll is packed in polythene wrapper trademarked 'Butynol®' with the thickness identified. Thicknesses available are 1.0, 1.5 and 2.25 mm in black; 1.2 mm in dove grey; and 1.5 mm in various colours.
- **Butyseal Membrane** - The membrane is a single-ply, flexible synthetic rubber membrane with polypropylene filaments welded to the underside. It is supplied in rolls nominally 1.4 m wide by 17.86 m long. The total thickness of the membrane is 1.5 mm.
- **Adhesive WA 98** - A specially formulated solvent-based adhesive for all Butynol® applications. Supplied in 1, 4 and 20 litre containers.
- **Solvent WA 98** - A clean up solvent for WA 98 Adhesive.
- **Seam Primer** - A water resistant primer adhesive, used with seam tape for all Butynol laps.
- **Seam Tape** - Uncured cold gum tape used for all Butynol laps. Supplied in 50 mm x 30.5 m rolls.
- **Flashing Tape** - A malleable tape for moulding gussets, pipe flashings and awkward situations. Supplied in rolls 50-100 mm wide x 5 m long.
- **Butynol Sealant CA20P** - A specially designed and formulated sealant for sealing Butynol® flashings into chases. Supplied in 375 mm tubes.
- **ARDEX Release Tape** - This is a pressure sensitive tape between two silicone release backings. One release backing is removed to allow the tape to be applied over all plywood joints. The other release backing is left in place to provide an unbonded area under the membrane which allows for substrate movement.
- **Detail Tape** - A semi-cured detail/flashing tape supplied in rolls 150 mm wide x 30.4 m long.
- **Overlay Tape** - A cured self-adhesive joint tape supplied in rolls 150 mm wide x 30.4 m long.

Handling and Storage

- 5.1 Handling and storage of all materials whether on or off site is under the control of the ARDEX New Zealand Limited approved applicators. Dry storage must be provided for all products and the rolls of membrane must be stored in a horizontal position.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Butynol® and Butyseal Roofing Membrane Systems. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 When Butynol and Butyseal Roofing Membrane Systems are used for specifically designed buildings up to design differential 6.0 kPa ULS wind pressure, only the adhesion of the membrane to the substrate is covered within the scope of this Appraisal. All other aspects of the building, including weathertightness detailing, need to be specifically designed and are outside the scope of this Appraisal.
- 7.2 Butynol® and Butyseal Roofing Membrane Systems are for use on roofs, decks and balconies where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.
- 7.3 The 1.0 and 1.2 mm thick Butynol® products are designed for use on roofs, gutters and decks with protection, and will accommodate light traffic. The 1.5 mm thick product is designed for walk out decks and high maintenance areas, and the 2.25 mm thick product is designed for heavy duty areas and is custom made on request. The 1.5 mm thick Butyseal is available for use on roofs.
- 7.4 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to the BRANZ publication Good Practice Guide - Membrane Roofing.
- 7.5 Timber framing systems must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and that all sheet edges are fully supported.

Building to NZBC Acceptable Solution E2/AS1

- 7.6 NZBC Acceptable Solution E2/AS1 limits the size of decks to 40 m² as covered by the scope of this Appraisal. Butynol® and Butyseal Roofing Membrane Systems are suitable for use on decks larger than 40 m². These decks are the subject of specific design and are outside the scope of this Appraisal.

Structure

- 8.1 Butynol® and Butyseal Roofing Membrane Systems are fully bonded to the substrate and are suitable for use in areas subject to maximum wind pressure of design differential 6 kPa ULS subject to the limitations of the substrate.

Substrates

Plywood

- 9.1 Plywood must be treated to H3 [CCA treated]. LQSP treated plywood must not be used. Plywood must comply with NZBC Acceptable Solution E2/AS1, Paragraph 8.5.3 and 8.5.5. Where specific design is used [i.e. outside the scope of E2/AS1], the plywood thickness and fixing size may increase and centres may decrease to meet specific wind loadings.

Strandsarking

- 9.2 Strandsarking must be installed in accordance with the manufacturer's instructions and BRANZ Appraisal No. 946 [2016].

Concrete

- 9.2 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101.

Durability

Serviceable Life

- 10.1 Butynol® and Butyseal Roofing Membrane Systems when subjected to normal conditions of environment and with proper maintenance can expect to have a serviceable life of at least 20 years.

Maintenance

- 11.1 No maintenance of the membrane is normally required provided significant substrate movement does not occur.
- 11.2 In the event of damage to the membrane, the membrane must be repaired by removing the damaged portion and applying a patch as for new work.
- 11.3 Drainage outlets must be maintained to operate effectively.

Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to Butynol® and Butyseal Roofing Membrane Systems from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 13.1 Roofs and decks must be designed and constructed to shed precipitated moisture. They must also take account of snowfalls in snow prone areas. A means of meeting code compliance with NZBC Clause E2.3.1 for buildings within the scope of NZBC Acceptable Solution E2/AS1 is given by the Technical Literature which matches details in NZBC Acceptable Solution E2/AS1.
- 13.2 When installed in accordance with this Appraisal and the Technical Literature, Butynol® and Butyseal Roofing Membrane Systems will prevent the penetration of water, and will therefore meet code compliance with NZBC Clause E2.3.2. The membranes are impervious to water and will give a weathertight roof or deck.
- 13.3 Butynol® and Butyseal Roofing Membrane Systems are impermeable, therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with NZBC Clause E2.3.6.
- 13.4 The minimum fall to roofs is 1 in 30, plywood decks 1 in 40, suspended concrete slab 1 in 60 and gutters 1 in 100 with no cross seams allowed in the gutter in accordance with NZBC Acceptable Solution E2/AS1 Paragraph 8.5.1. All falls must slope to an outlet. Inadequate falls will allow moisture to collect and may increase the risk of deterioration of the membranes. *[Note: Where possible, a minimum fall of 1 in 60 in gutters is preferred.]*
- 13.5 Roof and deck falls must be built into the substrate and not created with mortar screeds applied over the membranes.
- 13.6 Allowance for deflection and settlement of the substrate must be made in the design of the roof or deck to ensure falls are maintained and no ponding of water can occur.
- 13.7 Drainage flanges must be used for any outlet and must be fitted with a grate or cage to reduce potential sources of blockages. An overflow must be provided where the deck or balcony does not drain to an external gutter or spouting.
- 13.8 Penetrations and upstands of the membrane must be raised above the level of any possible flooding caused by blockage of deck and balcony drainage.
- 13.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Appraisal.

Water Supplies

- 14.1 Water is not contaminated by Butynol® and Butyseal Roofing Membrane Systems. The first 25 mm of rainfall from a newly installed Butynol® and Butyseal Roofing Membrane Systems roof must be discarded before drinking water collection starts. This is to remove residues which may have developed in the processes involved in the production of Butynol® and Butyseal Roofing Membrane Systems.
- 14.2 Note that all water collected off roof surfaces made from any material is considered to be non-potable due to possible contamination from other sources. Water collection in this way can only be considered potable if it has been passed through a suitable sterilization system. Sterilization systems have not been assessed and are outside the scope of this Appraisal.

Installation Information

Installation Skill Level Requirement

- 15.1 Installation of substrates must always be carried out by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class, in accordance with the Butynol® and Butyseal Roofing Membrane Systems Technical Literature and this Appraisal
- 15.2 Installation and finishing of components and accessories supplied by ARDEX New Zealand Limited and its approved applicators must be carried out in accordance with the Butynol® and Butyseal Roofing Membrane Systems Technical Literature and this Appraisal by trained applicators, approved by ARDEX New Zealand Limited.

Preparation of Substrates

- 16.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be smooth and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents. All surface defects must be filled to achieve an even and uniform surface.
- 16.2 Concrete substrates can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 585. The relative humidity of the concrete must be 75% or less before membrane application.
- 16.3 The moisture content of a timber substructure must be a maximum of 20% and plywood or Strandsarking sheets must be dry at the time of membrane application. This will generally require plywood or Strandsarking sheets to be covered until just before the membrane is laid, to prevent rain wetting.
- 16.4 In cases of extreme absorbency a priming coat of 50/50 solution of WA98 and adhesive solvent may be required. Consult with ARDEX New Zealand Limited if in doubt.

Membrane Installation

- 17.1 The membranes must be installed in accordance with the Technical Literature.
- 17.2 All joints in the plywood and Strandsarking substrate, and junctions of plywood and Strandsarking with other materials must have 25 mm wide ARDEX Release Tape applied before installation of the membrane.
- 17.3 The membranes must be unrolled without tension onto the prepared substrate and allowed to 'relax' for at least 20 minutes prior to installation.
- 17.4 Adhesive must be applied to both the membrane and the substrate, one half at a time. When the adhesive is tack dry, the sheet is rolled onto the substrate. The process is then repeated for the other half of the sheet. Joints in all membrane laps must be completed using ARDEX Seam Tape and Seam Primer.

Inspections

- 18.1 Critical areas of inspection for waterproofing systems are:
 - Construction of substrates, including crack control and installation of bond breakers and movement control joints.
 - Moisture content of the substrate prior to the application of the membrane.
 - Acceptance of the substrate by the membrane installer prior to application of the membrane.
 - Installation of the membrane to the manufacturer's instructions.

Health and Safety

- 19.1 Safe use and handling procedures for the membrane system is provided in the Technical Literature. The products must be used in conjunction with the relevant Materials Safety Data Sheet for each membrane.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 20.1 Tests have been carried out on the membranes by Materials and Quality Consultancy Ltd. This testing covered specific gravity, shore hardness, tensile strength, modulus of elongation, elongation at break, tensile and elongation retention after heat aging, tear strength, ozone resistance and water absorption as detailed in NZBC Acceptable Solution E2/AS1, Paragraph 8.5.4 [b]. Results and test methods have been reviewed by BRANZ and found to be satisfactory.
- 20.2 Water vapour permeability tests have been undertaken by BRANZ in accordance with ASTM E96.
- 20.3 The adhesives, primers and seam tapes used with Butynol® and Butyseal Roofing Membrane Systems meet the performance requirements of NZBC Acceptable Solution E2/AS1, Paragraph 8.5.4 [c]. Results and test methods have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 21.1 An assessment was made of the durability of the Butynol® and Butyseal Roofing Membrane Systems by BRANZ technical experts using NZBC B2/VM1 History of Use.
- 21.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.
- 21.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 22.1 The manufacture of the Butynol® and Butyseal Roofing Membrane Systems has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. The membrane manufacturer is the subject of AS/NZS ISO 9001: 2008 Certification by Telarc Limited.
- 22.2 The quality of supply of the products to the market is the responsibility of ARDEX New Zealand Limited.
- 22.3 Quality on site is the responsibility of trained applicators, approved by ARDEX New Zealand Limited.
- 22.4 Designers are responsible for the building design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of the substrate manufacturer, ARDEX New Zealand Limited and this Appraisal.
- 22.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of ARDEX New Zealand Limited and this Appraisal.

Sources of Information

- AS/NZS 2269: 2012 Plywood – Structural.
- ASTM E 96-02 Water vapour transmission of materials in sheet form, American Society of Testing Materials, Philadelphia, 1992.
- BRANZ Appraisal No. 946 [2016] Strandsarking for Low Slope Membrane Roofs.
- BRANZ Bulletin 585 – Measuring moisture in timber and concrete.
- Good Practice Guide – Membrane Roofing, BRANZ, October 2015.
- NZS 3101: 2006 Concrete structures standard.
- NZS 3604: 2011 Timber-framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code, External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 7, 01 January 2017].
- Ministry of Business, Innovation and Employment Record of amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



BRANZ Appraised
Appraisal No. 436 [2017]

BRANZ Appraisal
Appraisal No. 436 [2017]
05 December 2017

BUTYNOL® AND BUTYSEAL
ROOFING MEMBRANE SYSTEMS

Amendments

Amendment No. 1, dated 7 January 2019.

This Appraisal has been amended to increase the ultimate limit state to 6 kPa.



BRANZ Appraisal
Appraisal No. 436 [2017]
05 December 2017

BUTYNOL® AND BUTYSEAL
ROOFING MEMBRANE SYSTEMS



In the opinion of BRANZ, **Butynol® and Butyseal Roofing Membrane Systems** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **ARDEX New Zealand Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **ARDEX New Zealand Limited:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **ARDEX New Zealand Limited**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **ARDEX New Zealand Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

05 December 2017

BUTYNOL & EPDM MEMBRANES



WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1982, Clause 3
BC201170 9/12/2020 nicolah



About ARDEX

ARDEX specialises in high-quality construction materials for substrate preparation, levelling floors, waterproofing, the fixing of natural stones & ceramic tiles and other surfacing materials. ARDEX offers innovative products of outstanding quality and optimal environmental friendliness, as well as providing training and support services for their application. The ARDEX Group comprises of 28 subsidiaries and some 1,400 employees active in offices and branches in more than 50 countries.

The history of ARDEX can be traced back over 50 years to Witten, Germany where ARDEX Chemie GmbH was founded by Herr and Frau Fortmann and Dr. Kraft. Products such as **Ardurit Z8** and **Ardur K15** are firmly established as benchmarks for flooring products worldwide.

In December 2001 ARDEX acquired Norcros Building Products (NBP). The latter has a similar heritage in the Australasian market with **Butynol waterproofing membranes, ABA tile adhesives** – renowned for their quality and technical excellence, a reputation built over 30 years. Innovations such as Abaflex are unique in the market until this day. Other brands offered by NBP include **Superflex** under-tile waterproofing systems, **Shelter (previously Dunlop)** sheet membrane systems and **HydrEpoxy** coatings. In 2002 **Vibro Products Pty Ltd**, manufacturers under licence of ARDEX floor levelling and adhesives, was acquired and integrated into ARDEX.

These brands, leaders in their respective fields, come together under the ARDEX umbrella, offering you expert solutions. In addition, sharing of resources and technology within our extensive network enables us to provide you with a broader range of world benchmarked products and services.

Make ARDEX your single point of contact for all your waterproofing, flooring and tiling needs.

The Ardex Vision

The vision of the ARDEX Group is to be one of the world's leading solution providers of high-performance speciality building materials.



THIS PRODUCT MANUAL TAKES EFFECT FROM 1ST MARCH 2008 AND REPLACES ALL PREVIOUS PRODUCT MANUALS ISSUED BY ARDEX NEW ZEALAND LTD

® Butynol, Shelterbit, Shelterseal, Sheltercoat, Episeal and Fibrepol are registered tradenames.

ALSO AVAILABLE FROM ARDEX



Technical data on Ardex Bituminous Membranes - torch-on, self adhesive and accessories.



Technical data on the extensive range of Ardex Liquid Membranes.



Comprehensive range of tiling solutions for various internal and external applications including: kitchens, bathrooms, floors, walls, balconies etc. Encompasses adhesives, grouts, soundproofing and silicones.



Comprehensive range of specialist, fast track substrate preparation solutions with a focus on patch and repair mortars and self levelling compounds including ARDEX K15.



A dual-format CD-ROM of Ardex Waterproofing Solutions for on-screen viewing and for cutting and pasting into your specification documents.

ARDEX Butynol Colour Range



Colours shown may vary from actual material samples.
Please check actual colour of material before ordering.



ARDEX Butynol

**BRANZ Appraised,
E2/AS1 Acceptable Solution**

WAIMAKARIRI DISTRICT COUNCIL

Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

ARDEX Butynol

BRANZ Appraised, E2/AS1 Acceptable Solution



Copy available on request.

BUTYNOL SYSTEM SPECIFICATION

A synthetic rubber with properties which resist ageing from heat, sunlight and ozone. It has excellent gas impermeability and toughness and remains flexible at low temperatures.

Butynol is manufactured by combining the petroleum gases isobutylene and isoprene at the extremely low temperature of -100°C . (Rubber Technology-Morton)

Butynol is marketed by Ardex as a warranted roofing and tanking product and fixed by their trained and experienced approved Applicators.

BUTYNOL MATERIAL SPECIFICATIONS

Our requirements for long term warranty necessitate that Butynol meets these typical technical requirements:

Specific Gravity to ASTM D297	1.20 \pm 0.05
Hardness IRHD to ASTM D1415	65 \pm 5
Tensile Strength to ASTM D412	8.3 MPa min
Modulus at 300% elongation to ASTM D412	4.15 MPa min
Elongation at break to ASTM D412	300% min
Heat Ageing (7 days at 115°C)	
Tensile Retention to ASTM D412	70% min
Elongation Retention to ASTM D412	70% min
Tear Strength to ASTM D624	26kN/m
Ozone Resistance to ASTM D1149 (7 days at 40°C in 50pphm ozone)	No visible cracks
Water Absorption to ASTM D471	
1.65% (by mass)	0.72% (by volume)
Water Permeability to ASTM E96-92	
Vapour Flow Resistance (MNs/g)	12414
Vapour Flow Rate ($\text{g}/\text{m}^2\text{d}$)	0.013

Note: Interesting comparable figures for water permeability are –

Polythene 156, Asphalt 1830, P.V.C. 4900.

K Values on 1mm Butynol sheeting

K Value (Thermal Conductivity) 7.4×10^3
Cal/cm/sec/deg C.

Conductivity Data on 1mm Butynol sheeting

Resistance/ m^2 $\Omega/\text{m}^2 = 0.6816$ on 9.3 volts.

SEAM TAPE PERFORMANCE

Tests on the seam tape bonding method, by an independent testing laboratory, have shown average

values equivalent to 90% of unwelded material. It is considered impossible for the test methods used to be duplicated in normal service ie. 400% elongation.

BUTYNOL PROTECTION

Butynol protects against water, moisture vapour, gases, sun, ozone, frost, acids, chemicals and bacteria.

BUTYNOL RESISTANCE

Butynol resists tearing, flex cracking, bubbling and abrasion. It is extremely strong, has a long life and is versatile.

STAINING OF LIGHT COLOURED BUTYNOL

To avoid staining care must be taken during design stage to ensure that water running off unpainted treated timber and some metals (eg copper) do not run over light coloured Butynol.

BUTYNOL GAUGES

Standard 1.0mm–For roofs, gutters and decks with protection.

1.2mm–For roofs.

1.5mm–For roofs and walk out decks.

2.25mm Heavy Duty

Factory welded panels in all gauges can be custom made.

BUTYNOL IS PACKAGED

In rolls of nominal 1.4m width and 17.86m long. Each roll is packed in polythene wrapper trademarked Butynol with thickness identified. Coverage 25m^2 except 2.25mm gauge which is 12m^2

Gauges available are:

1.0mm black.	Weight: nominal 30kg
1.5mm black.	Weight: nominal 45kg
2.25mm black.	Weight: nominal 32kg
1.2mm dove grey.	Weight: nominal 32kg
1.5mm all colours.	Weight: nominal 47kg

ADHESIVES AND SOLVENTS

Specially formulated for all Butynol applications. Supplied in 20L steel/plastic pails (approx. 20kg). 4 and 1 litre cans.

BUTYNOL SEALANT

Available in tubes for caulking guns.

SEAM PRIMER

Seam Primer is specially formulated for use with Seam Tape. Applied with scrubber pads. Available in 4 and 1 litre cans.

SEAM TAPE

Supplied by Ardex in 50mm x 30.5m rolls (6 to a carton). Roofs with a pitch of less than 5°, all coloured membranes and all guttering and areas subjected to periodic ponding require special lap bonding. All coloured membranes, irrespective of pitch require special lap bonding.

DETAIL TAPE (uncured)

A malleable exterior tape for flashing exterior corners etc. 150mm x 30.5m rolls.

FLASHING TAPE

A malleable tape for moulding in gussets, pipe flashings and awkward situations. Supplied in 100mm x 5m rolls. Flashing tape must not be left exposed. A cover strip of Butynol or detail tape must be applied over flashing tape to finish.

SUBSTRATE VENTILATION

Substrate ventilation should be used to release moisture trapped under the Butynol on concrete surfaces. Substrate ventilators are used in conjunction with vent tapes. Tapes should be laid in a grid pattern spaced at 600mm venting to the roof perimeter. On plywood substrates ventilators are used at the junction of the ply. Ventilators are not required in most applications for cavity ventilation - seek advice from an Ardex Representative. One way substrate ventilators prevent moisture vapour build up and if required can be installed every 90 square metres. Not designed to ventilate roof cavities. (Refer Diagram page 23).

PLYWOOD TREATMENT

To be in accordance with Acceptable Solution E2/AS1 plywood substrate must be treated to H3.2 with Waterborne CCA treatment and kiln dried after treatment.

Plywood must not be LOSP treated.

DURABILITY

Butynol when fixed according to Ardex instruction will meet the NZBC requirements of B2.3.1(b) 15 years. Refer BRANZ Appraisal Certificate No 436 (2005).

EXTERNAL MOISTURE

New Zealand Building Code Acceptable Solution E2/AS1 requirements recommend membrane clad roofs have a minimum pitch of 1.5°.

BUILDING TO NZBC ACCEPTABLE SOLUTION E2/AS1

NZBC Acceptable Solution E2/AS1 limits the size of decks to 40m² as covered by the scope of Appraisal No. 436 (2005). Butynol Roofing Membrane is suitable for use on decks larger than 40m². These decks are the subject of specific design and are outside the scope of the Appraisal.

CLEANING WEATHERED BUTYNOL

Use sugar soap to remove oxidation and restore surface.

DAMP AND WEATHERPROOFING

The Building Code of Australia Deemed-to-Satisfy Provisions F1.9 and F1.10 are met by Butynol as an acceptable damp-proof course.

Butynol when used as described in ABSAC Technical Opinion 188 August 1994 complies with the Building Code of Australia Deemed-to-Satisfy Provision F1.7(b) and Acceptable Construction Manual Part 3.8.1.0, or AS 3740 for "Water Proofing of Wet Areas in Buildings".

PAINTING OVER BUTYNOL

Use Roof Acrylic paint with Ardex Seam Primer on non ponding areas. Wash with Sugar Soap. Beware of using non Ardex primers as this may effect your Butynol Warranty.

FIRE RATING

The Butynol roofing system must be considered combustible but may be used on buildings for all purpose groups, subject to the requirements of NZBC Acceptable Solution C/AS1 Part 7, Paragraph 7.11.1.

When used for roofs in Purpose Groups SC and SD a non-combustible substrate or timber 18mm thick is acceptable. Refer 7.11.1.

Building Code of Australia allows use in all building types under Specification C1.10, Clause 7(e), except in bush fire prone areas.

PRODUCT WARRANTY

When laid by an approved Applicator in accordance with Ardex's specifications, a material warranty for up to 20 years (covering the Membrane, adhesive and tape) is available. Ardex is not responsible for any costs arising from installation of the Membrane and does not provide any warranty other than where a written Ardex material warranty has been issued.

WORKMANSHIP

A warranty for workmanship shall be provided directly by the approved Applicator. The period and terms of the workmanship warranty shall be determined by the conditions of contract or the approved Applicator.

ARDEX Butynol

BRANZ Appraised, E2/AS1 Acceptable Solution

ADHESIVES AND SOLVENTS FOR USE WITH BUTYNOL

WA98 - The Standard contact brushing, spray grade and rolling adhesive for fixing to the substrate and for laps not subject to periodic ponding.
(Pitch 5° and above)

Seam Primer - A water resistant primer, used with seam tape for general lap bonding.

Roofs with a pitch of less than 5°, all coloured membranes and all guttering and areas subjected to periodic ponding require special lap bonding. All coloured membranes, irrespective of pitch require special lap bonding.

Note: Temperature and Humidity

The evaporation of any solvent adhesive system causes a drop in temperature at the interface. At times of high humidity this can result in a micro molecular water layer at the interface which will result in a failure to bond, falsely attributed to Adhesive failure. Fixing should not proceed under these circumstances.

NOTES

1. In cases of extreme absorbency, a priming coat of 50/50 WA98 adhesive and solvent may assist water shedding and absorption. However, a follow up of full strength adhesive for full bonding should not be proceeded with under four hours, thus allowing full evaporation of solvents absorbed into the substrate. Primers must be time dried not touch dried.
2. As new substrate materials continually appear on the market, consult Ardex for approval of their use with Butynol.
3. Where periodic ponding is likely and on roofs with a slope of less than 5°, Ardex Seam Tape and Seam Primer must be used on all joints.
4. Black Butynol and roofs with pitch of 5° or greater and sufficient fall to prevent periodic ponding may be formed using the sheet bonding adhesive WA98. All laps must be wiped with WA98 solvent prior to bonding.

Roofs with a pitch of less than 5°, all **coloured membranes** and all guttering and areas subjected to periodic ponding require special lap bonding.

Refer Acceptable Solution E2/AS1 8.5.5.2a.

All **coloured membranes**, irrespective of pitch require special lap bonding.

5. Do not use in temperatures less than 6°C.

CAUTION

All Adhesives and Solvents are

HIGHLY FLAMMABLE

SUBSTRATE SPECIFICATION (Plywood)

To conform with Acceptable Solution E2/AS1 plywood shall be:

A minimum of 17mm complying with AS/NZS 2269, at least CD Structural Grade plywood with the sanded C face upwards, and H3.2 with Waterborne CCA treatment and kiln dried after treatment.

Substrates must be dry when Butynol is applied. The plywood and the timber substructure shall have a maximum moisture content of 20% when Butynol is adhered.

Plywood panels shall be laid with staggered joints (brick bond), the edge of sheets shall be supported with dwangs or framing, unless a structurally tested tongue-in-groove edge provides equivalent support. The maximum recommended span in E2/AS1 is 400mm in each direction. However specific design may allow 17.5mm plywood or greater to be laid on 400mm purlins with nogs or dwangs at 600mm or even 1200mm centres. Plywood shall be laid with the face grain at right angles to the supports. A 20mm triangular fillet shall be used at the base of any 90° upstand. External edges shall be chamfered with a minimum radius of 5mm.

Plywood shall be fixed with 10 gauge x 50mm stainless steel countersunk head screws eg Hylton Parker No 24639 or No 12923 for Steel Purlins, with 3mm gaps between all sheets, at 150mm centres on edges, and 200mm in the body of the sheets.

All joints in the plywood and junctions of plywood with other materials shall have 25mm polyethylene release tape applied before application of Butynol.

Closed-in construction spaces under Butynol roofs and decks shall have adequate ventilation to prevent the accumulation of moisture under Butynol. There should be a minimum gap of 20mm between the underside of the substrate and any insulation.

NOTE: The use of LOSP (Light Organic Solvent Preservative) treated plywood must NOT be used under Butynol in any circumstances or conditions.

SUBSTRATE SPECIFICATION (Concrete)

New concrete

Must be cured for a minimum of 28 days and all curing compounds removed prior to application.

A reduction in cure time can be achieved by utilising the Ardex HydrEpoxy System (consult Ardex Technical Department for details).

Old concrete

Must be clean from any contaminants prior to application.

For further substrate types please consult Ardex Technical Department.

ARDEX Butynol

BRANZ Appraised, E2/AS1 Acceptable Solution

TYPICAL ARCHITECTURAL BUTYNOL RUBBER ROOFING SPECIFICATION

1. Preliminary

Refer to the Preliminary and General Clauses of this specification and to the General Conditions of Contract which are equally binding on all trades. This section of the specification shall be read in conjunction with all other sections.

2. Scope

This section of the contract consists in general of the provision and laying of all the Butynol rubber, for the roofs, decks, gutters and flashings on the buildings. Refer to Clause 12 hereafter for Extent of Work.

3. Workmanship

The whole of the work shall be carried out by skilled tradesmen using adequate and proper equipment and methods in accordance with best trade practice, and following the specifications methods and recommendations as laid down by the manufacturers.

4. Sub-contractors

The work included in this section of the contract shall be carried out by a firm of roofing experts conversant with and specialising in the supply and fixing of this material and shall be a firm approved by Ardex.

5. Warranty

When laid by an approved Applicator in accordance with Ardex's specifications, a written material warranty of up to 20 years is available. It is the responsibility of the approved Applicator to confirm proper installation and to request Ardex to issue a material warranty on behalf of the customer following completion of installation. Ardex is not responsible for any costs arising from installation and does not provide any warranty other than where a written Ardex material warranty has been issued.

6. Materials

6.1 Butynol Rubber

(a) Shall be 1.0mm thick standard Black Butynol rubber to all roof surfaces, gutters and fascias and walk out decks where membrane is to be overlaid with tiles.

(b) Shall be 1.5mm thick Butynol to all walk out decks.

6.2 Adhesives

Shall be as recommended by Ardex specially formulated for Butynol rubber and suitable for the particular application and the relevant temperature and conditions applicable.

Generally Ardex WA98 adhesive is used for substrate and lap bonding (5° and above).

Ardex seam primer shall be used in conjunction with Ardex seam tapes.

When conditions are experienced that are outside the temperature and/or moisture ranges recom-

mended by the manufacturers for the above standard adhesives work will cease.

6.3 Seam Tapes

Shall be 50mm wide seam tape provided by Ardex.

6.4 Substrate Joint Tape

All Plywood joints shall be taped with a 25mm wide pressure sensitive Ardex approved self adhesive tape.

7. Roof Deckings

Shall be 1.5mm Butynol or 1mm with a protective covering for all deck surfaces.

All decks to which Butynol is to be fixed shall be clean, smooth, dry and free from dirt, grit or sharp objects.

Deck substrates may be primed with 50/50 WA98 adhesive/solvent.

The Butynol roofer shall co-operate with the other trades laying the decking to ensure that the final surface is in first class condition for the laying of the Butynol rubber roofing.

The Butynol roofer shall check the deck before laying any Butynol to ensure that the surface is completely sound, screw fixed to specifications: screw heads flush, sheets spaced to provide for thermal movement or shock.

NZBC Acceptable Solution E2/AS1 limits the size of decks to 40m² as covered by the scope of Appraisal No. 436 (2005). Butynol Roofing Membrane is suitable for use on decks larger than 40m². These decks are the subject of specific design and are outside the scope of the Appraisal.

8. Laying of Butynol Roofing

It is the responsibility of the Applicator to ensure that the substrate surface to be covered by the Butynol is in fit and proper condition, suitable for the laying of the material.

Tape all joins in substrate sheets with 25mm wide pressure sensitive tape approved by Ardex.

All Butynol sheeting shall be laid out on the roof to "relax" the sheeting before fixing. A period of at least 20 minutes is usually required. Do not finally position sheeting with a tension exceeding 2%.

Apply adhesive to the substrate and the underside of the Butynol rubber sheeting by brush, spray or an approved type roller at a spreading rate of generally not less than 2.5 square metres per litre. Leave to tack dry before bonding the two surfaces together.

Lay sheeting by drawing back halfway either longitudinally or transversely. Thoroughly roll or work over the surface of the sheet to exclude all air and to obtain a full bond.

All Butynol shall be "lap bonded" as detailed below.

Bonding Laps with Ardex Seam Tape and Seam Primer

Following laying of the Butynol the laps must be sealed. Roofs with a pitch of less than 5°, all coloured membranes irrespective of pitch and all guttering and areas subjected to periodic ponding require special lap bonding using Ardex seam primer and Ardex seam tape. Laps with pitch 5° and above (on black Butynol only) can be sealed using WA98 adhesive. (Lap areas must be wiped using WA98 solvent prior to applying adhesive.)

1. The top lap is positioned and the bottom sheet marked to indicate the edge of the top sheet.
2. The top sheet is folded back.
3. The Ardex Seam Primer is then applied to the Butynol in the area marked on the bottom sheet and 50mm in from the edge on the top sheet. The Ardex Seam Primer is applied to the mating surfaces using a synthetic scrubbing pad. Scrubbing pads should be replaced as they become dirty. Allow the primer to become 'dry to the touch'.
4. Position and unroll the 50mm Ardex Seam Tape along the seam. The edge of the release paper should be aligned to the mark on the bottom membrane sheet.
5. Roll the length of the seam with the release paper still in place.
6. Remove the release paper from the Ardex Seam Tape by pulling at a 45° angle away from the seam. Keep the release paper low to the roof surface as it is removed.

7. Fold into place the primed edge of the top sheet.

8. Roll the completed seam.

9. Tiling Over Butynol

To direct fix tiles to Butynol, ABA Optima two part adhesive should be used. Ensure the Butynol surface is clean and dry before applying the adhesive. All laps must have seam tape.

(Refer Optima page 43)

10. Protection of Laid Butynol Sheeting

The Butynol roofing contractor shall ensure that his fixers only work on the Butynol roofing with soft sole shoes.

The Butynol roofer shall co-ordinate with the main contractor who shall ensure that any other trades who work over the completed roof wear soft sole shoes.

Upon completion of each area the roofer shall get the main contractor to inspect the area and the main contractor will sign off that the area was free from any defects or damage. It is then the responsibility of the main contractor to ensure the Butynol roofing is in no way damaged by other trades.

11. Completion

On completion carefully and thoroughly clean off and remove all scraps and other rubbish from finished surfaces and leave in tidy order.

12. Extent of Work

Observe the foregoing specification and supply and lay Butynol rubber sheeting to all roofs, decks, gutters and flashings as shown and detailed in the Ardex specification.

Failure to comply with the above specifications will result in all warranties being null and void.

ARDEX Butynol

BRANZ Appraised, E2/AS1 Acceptable Solution

LAYING SPECIFICATION

The Sub contractor for the work called for in this trade will be a Company or Person approved by Ardex.

The approved Applicator (hereafter called the Applicator) shall examine all drawings and provide for the flashing, caulking and sealing of all vents, stacks and pipes penetrating the roofing membrane. Also all flashings at walls, parapets, verges, gutters etc., unless otherwise instructed in the specifications.

The surface to which Butynol is to be fixed shall be clean, smooth, dry and free from sawdust, grit or sharp objects. Membrane laying shall not start until defects have been corrected.

To avoid staining care should be taken to avoid water runoff from copper downpipes or guttering on to light coloured Butynol.

When CCA plywood is used in conjunction with a light coloured membrane it is advisable to prime any plywood that will not be covered the same day.

It is the responsibility of the Applicator to ensure that the surface to be covered by the Butynol is in fit and proper condition, suitable in all respects for the laying of the material.

On completion the Applicator will provide the owner with a Workmanship Warranty and obtain from Ardex a Materials Warranty.

Failure to comply with the above specifications will result in all warranties being null and void.

LAYING THE BUTYNOL

Before applying the Butynol, it shall be unrolled for twenty minutes to relieve stresses induced by manufacture and storage. The Butynol sheet shall be set out in the exact position in which it will be finally required and while it is held in place, it shall be folded back lengthwise to expose half the underside. To the now exposed underside and the area of roof also left exposed, apply an even coat of WA98 Adhesive. When the adhesive has become touch dry, work the sheet back into its original position avoiding wrinkles and the inclusion of air bubbles.

Repeat the process with the other half of the sheet and when completed, roll the whole sheet with hand press rollers or the like.

When applying the next sheet, it shall be lapped over the first sheet by 50mm. All turn ups and downs shall be neatly formed and cut to a straight line if required.

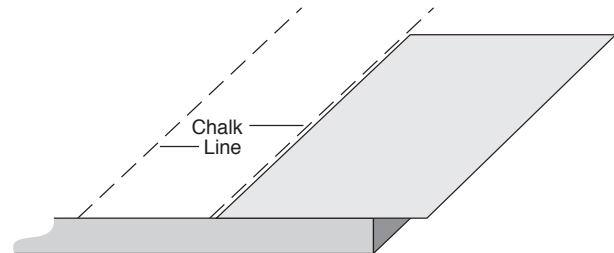
Butynol shall not be laid under tension.

When the whole area has been covered or as work progresses, the applicator has to seal the laps.

BUTYNOL LAYING METHOD

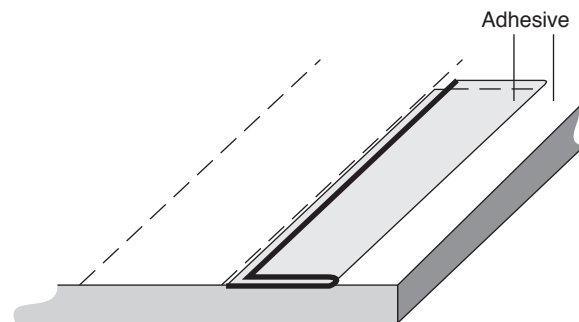
STEP 1

Accurately place sheet. Mark spacing with chalk line.



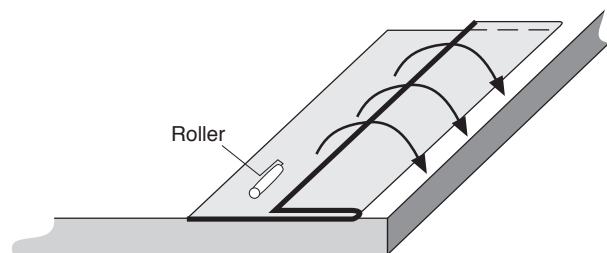
STEP 2

Fold back half sheet. Apply adhesive to both faces.



STEP 3

After flash off, fold membrane into place. Roll thoroughly.



STEP 4

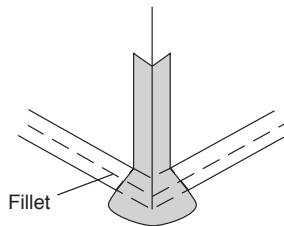
Treat 2nd half of Butynol similarly.

EXTERNAL CORNERS

To comply with Acceptable Solution E2/AS1 Figure 57.

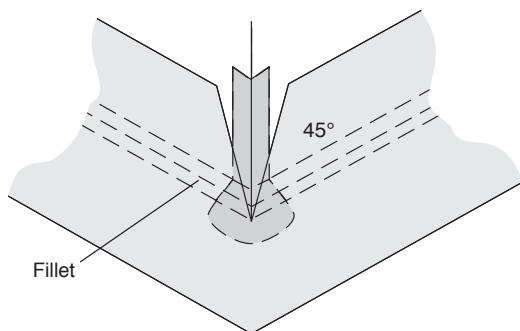
STEP 1

Bond 100mm flashing to corner as shown.



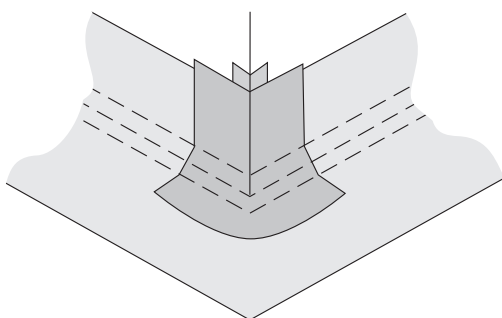
STEP 2

Bond Butynol to deck and up wall 150mm minimum. Cut sheet from corner at 45° as shown.



STEP 3

Cover corner point with layer of detail tape.

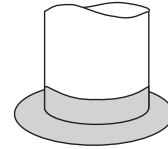


NOTE: Fillets must be used on all internal corners.

FLASHING - EXISTING PIPE

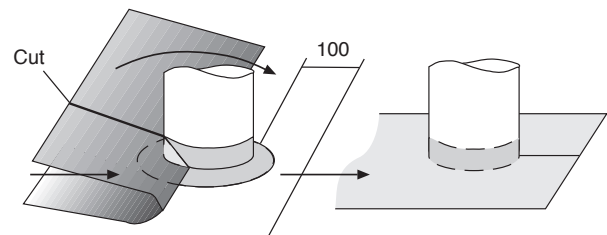
STEP 1

Under flash pipe with 100mm Butynol flashing tape.



STEP 2

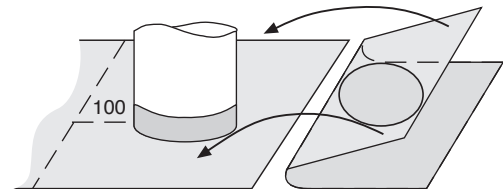
Bond Butynol to 100mm past pipe. N.B. When flashing black Butynol use Butynol or detail tape.



STEP 3

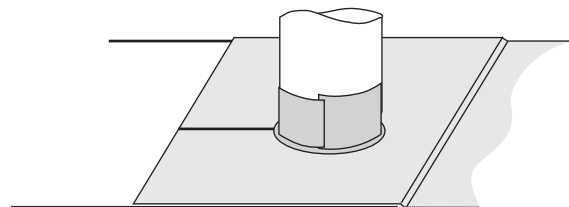
Bond continuation of Butynol to overlap base sheet and beyond pipe 100mm.

Cut a smooth round hole 20mm smaller than diameter of penetration.



STEP 4

Apply collar of detail tape or Butynol cover strip. DO NOT STRETCH STRIP.



N.B. Flashing tape MUST NOT be left exposed. Cover strip must be Butynol. When detail tape is used a cover strip of Butynol is not required.

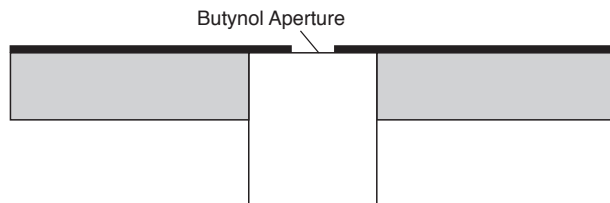
ARDEX Butynol

BRANZ Appraised, E2/AS1 Acceptable Solution

FLASHING - NEW PIPE

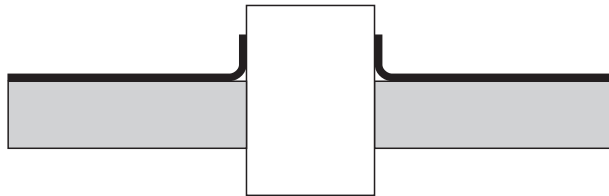
STEP 1

Cut smaller diameter hole than pipe.



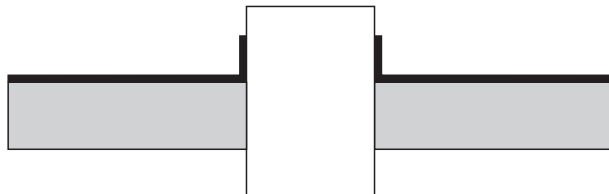
STEP 2

Pipe is raised through smaller diameter hole in Butynol, forcing edge upwards to create upstand.



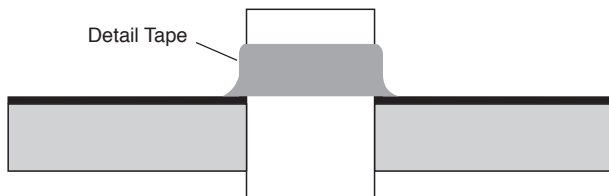
STEP 3

Pull pipe down to eliminate void.



STEP 4

After pulling pipe down approximately 1cm to sharpen corner, tape upstanding Butynol to pipe using WA98 adhesive and detail tape.



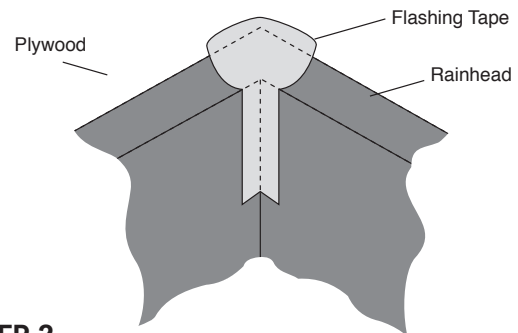
N.B. If flashing tape is used it MUST NOT be left exposed. A cover strip of Butynol must be applied over the flashing tape to finish.

INTERNAL CORNERS FOR RAINHEADS

and areas where a pig's ear cannot be used.

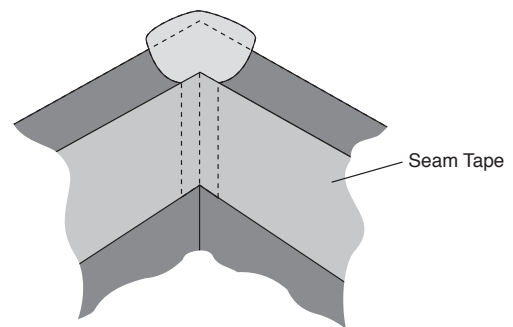
STEP 1

Apply Flashing Tape over Rainhead and Plywood.



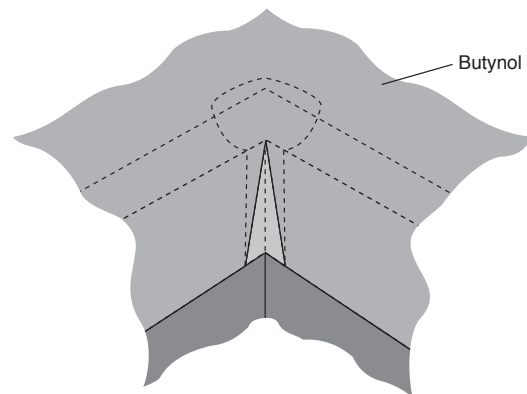
STEP 2

Run Seam Tape along all four vertical sides of Rainhead.



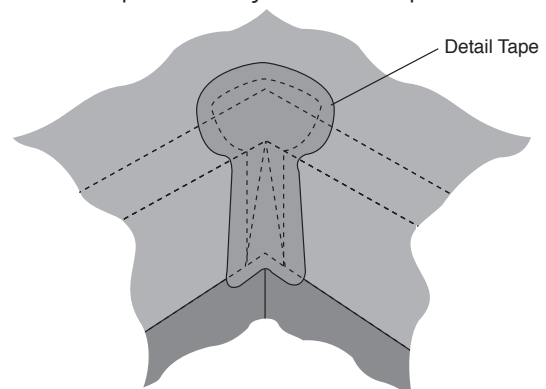
STEP 3

Cut Butynol sheet to fit into corners.



STEP 4

Cover corner point with layer of detail tape.

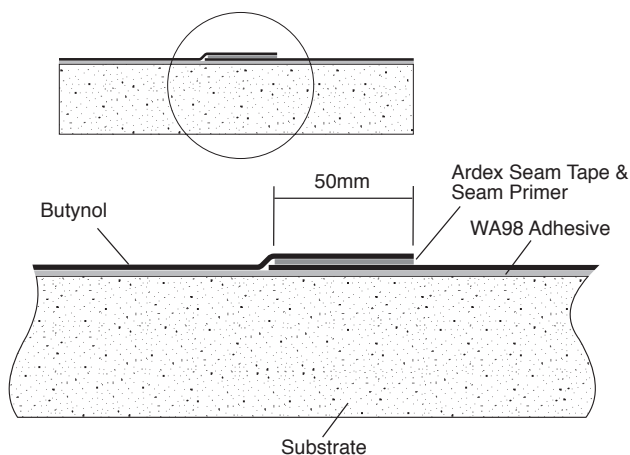


BONDING THE LAPS

Roofs with a pitch of less than 5°, all **coloured membranes** and all guttering and areas subjected to periodic ponding require special lap bonding.

Refer Acceptable Solution E2/AS1 8.5.5.2a.

All **coloured membranes**, irrespective of pitch require special lap bonding.



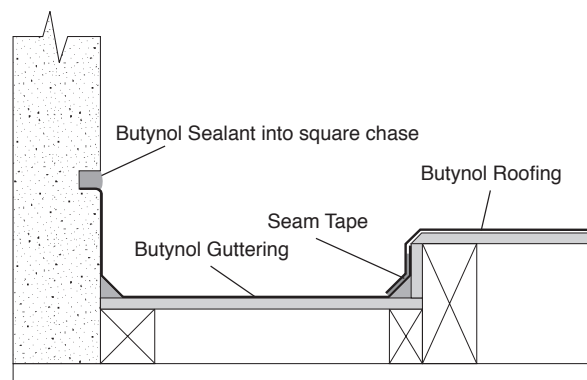
1. The top lap is positioned and the bottom sheet marked to indicate the edge of the top sheet.
2. The top sheet is folded back.
3. The Ardex Seam Primer is then applied to the Butynol in the area marked on the bottom sheet and 50mm in from the edge on the top sheet. The Ardex Seam Primer is applied to the mating surfaces using a synthetic scrubbing pad. Scrubbing pads should be replaced as they become dirty. Allow the primer to become 'touch dry'.
4. Position and unroll the 50mm Ardex Seam Tape along the seam. The edge of the seam tape should be aligned to the mark on the bottom membrane sheet. The see-through backing film makes this very simple.
5. Roll the length of the seam with backing film still in place.
6. Remove the backing film from the Ardex Seam Tape by pulling at a 45° angle away from the seam. Keep the backing film low to the roof surface as it is removed.
7. Fold into place the primed edge of the top sheet.
8. Roll the completed seam.

Black Butynol and roofs with minimum pitch of 5° and sufficient fall to prevent periodic ponding may be formed using the sheet bonding adhesive WA98. All laps must be wiped with WA98 solvent prior to bonding.

FORMING LAPS FOR GUTTERS

Laps are most important in gutter work and should be formed using Ardex seam tape and seam primer.

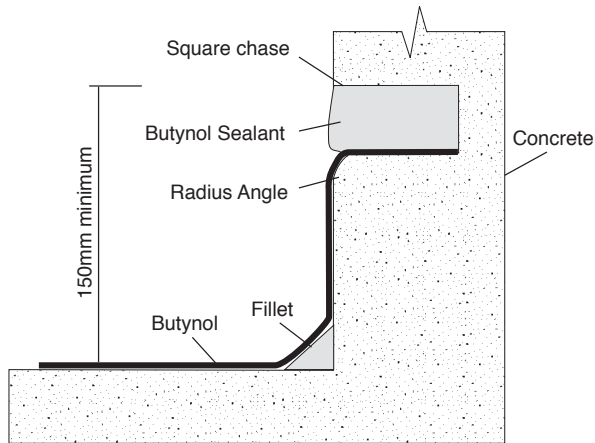
All internal boxed gutters can be easily formed to any shape or size using Butynol over any specified substrate.



ARDEX Butynol

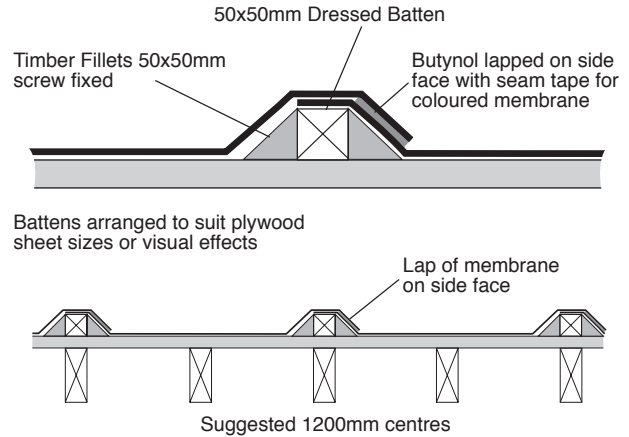
BRANZ Appraised, E2/AS1 Acceptable Solution

FLASHING INTO CONCRETE WALLS



Butynol is glued into square chase and finished with Butynol Sealant.

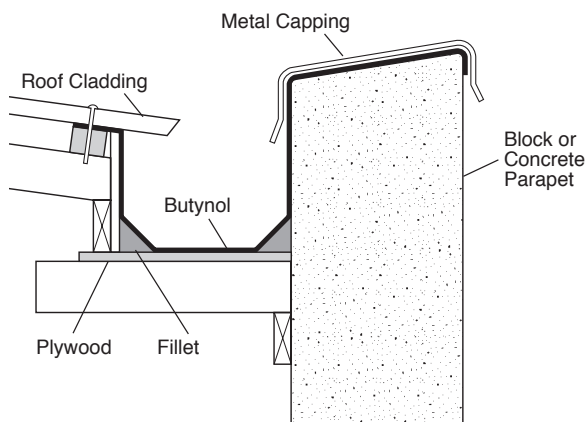
RECOMMENDED BATTEN PROFILE DETAIL



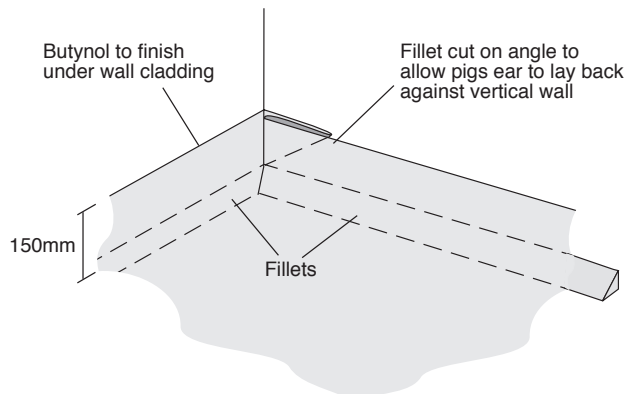
Example of a 1400mm sheet of Ardex Butynol dressed over battens at 1200mm centres

Note: Treatment for battens must be H3.2 (CCA) only. Not LOSP treated.

BOXED GUTTER AND PARAPET DOWNTURN



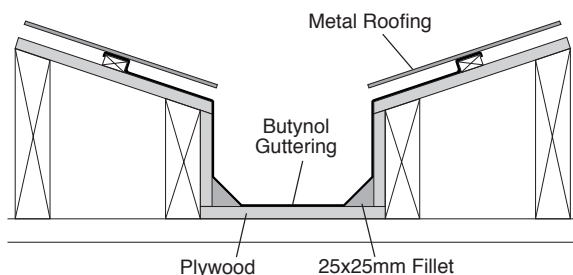
INTERNAL CORNERS



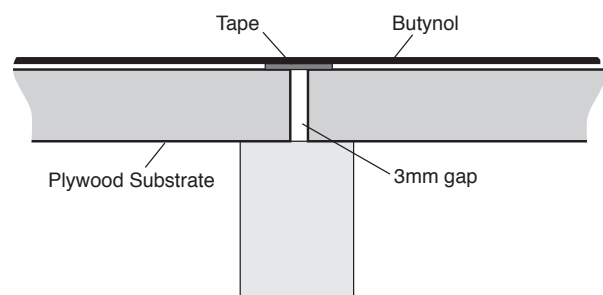
Without cutting Butynol simply fold a 'pig's ear' corner as shown. The angle fold should be behind the main sheet.

NOTE: Fillets must be used on all internal corners.

INTERNAL GUTTER



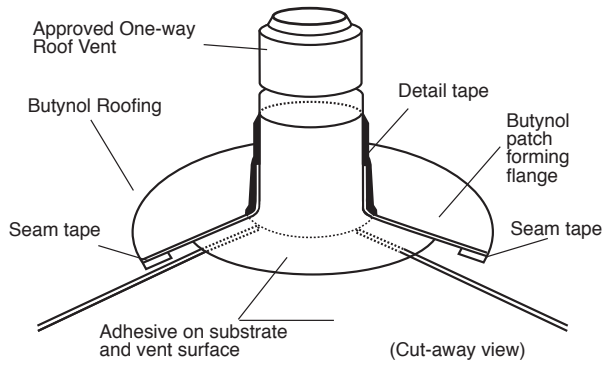
TAPING SUBSTRATE SHEETS



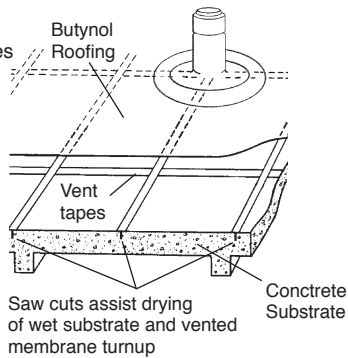
All joints between substrate sheets of Ply should be taped to prevent stressing of the Butynol in case of marked timber movement.

ONE WAY SUBSTRATE VENTILATOR

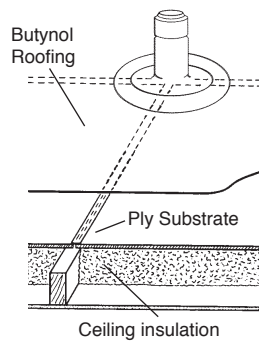
PVC or Aluminium



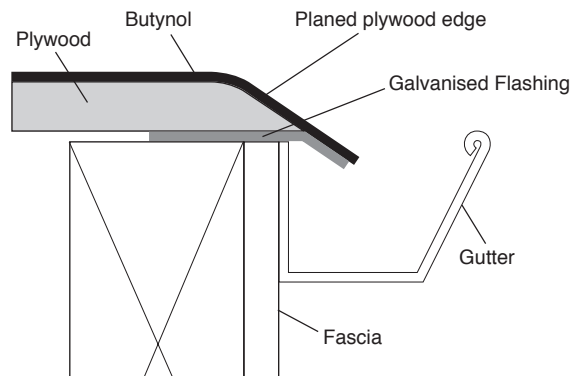
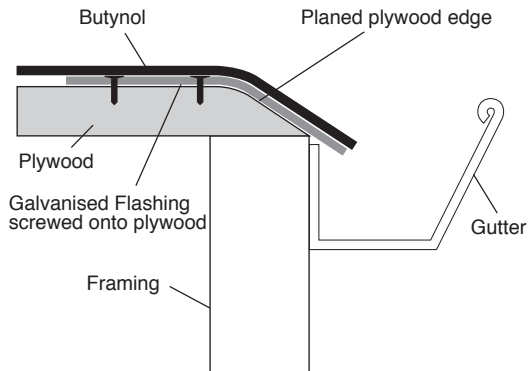
Vent installed over intersection of vent tapes on concrete substrate



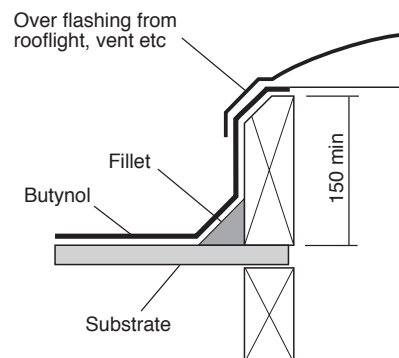
Vent installed over intersection of 3mm gap between Ply substrate sheets.



TWO METHODS FOR FINISHING OVER A GUTTER



ROOFING PENETRATION IN MEMBRANE

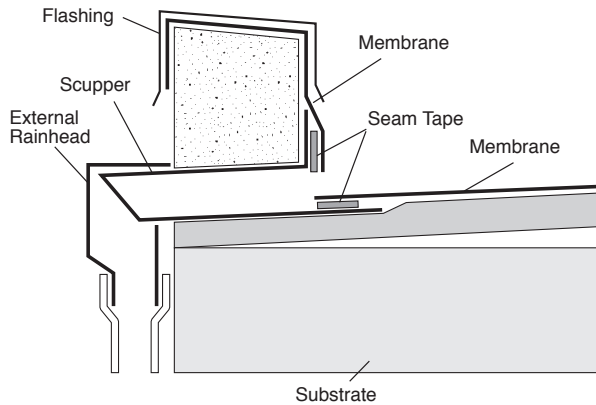


NOTE: 1 For maximum penetration size of 1200x1200mm
2 External corners to be formed as shown

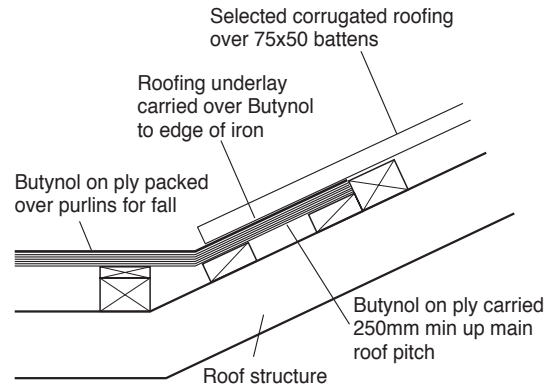
ARDEX Butynol

BRANZ Appraised, E2/AS1 Acceptable Solution

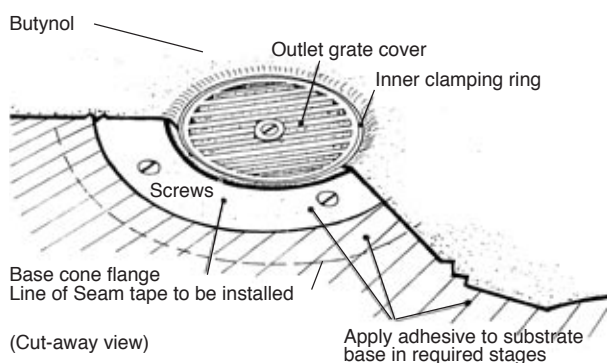
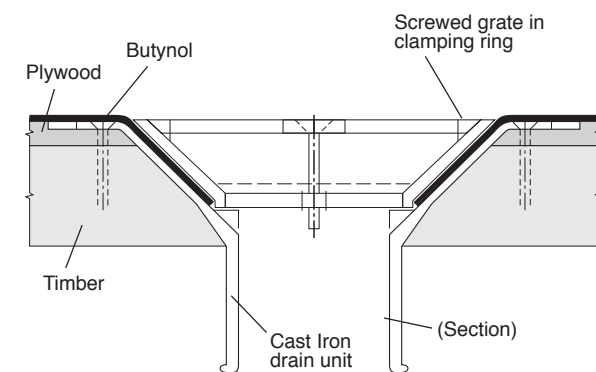
SCUPPER OUTLET



BUTYNOL/CORRUGATE PITCH CHANGE JUNCTION

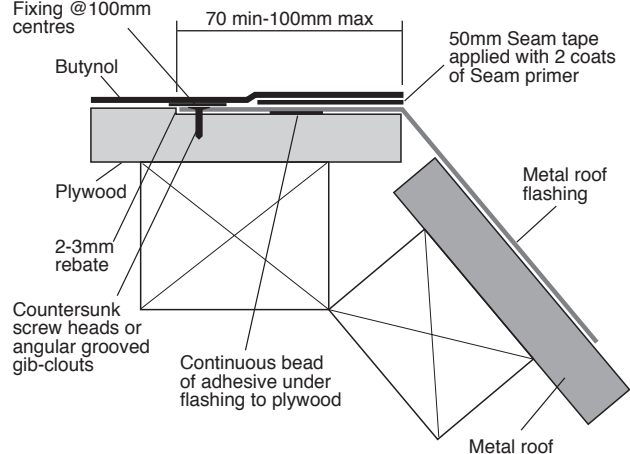


INTERNAL ROOF DRAIN (NZBC E2/AS1 Approved)



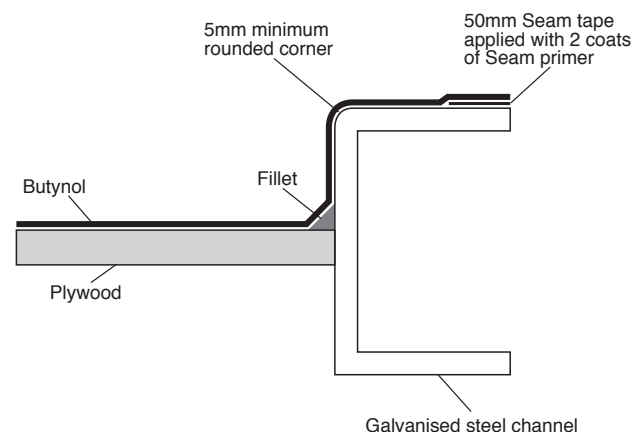
BUTYNOL LAPPING OVER METAL FLASHING

25mm polyethylene release tape over metal edge and screw/clout heads. Fixing @ 100mm centres



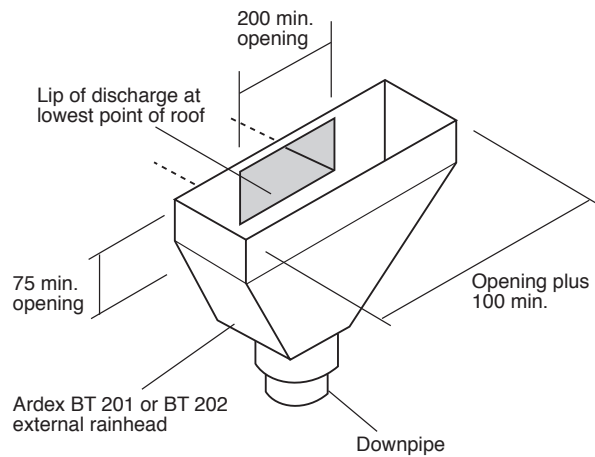
Where Seam tape is to be used **no** silicone sealant should be used when installing flashing. If silicone is present remove completely with solvent.

BUTYNOL FLUSH FINISH TO METAL EDGE

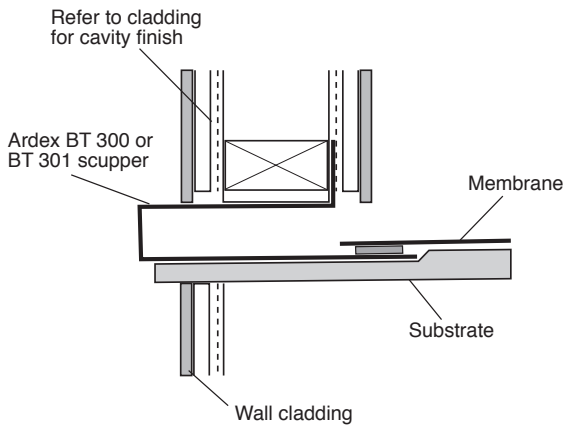


RAINWATER HEAD AND SCUPPER OPENING IN MEMBRANE USING ARDEX BT 300 OR BT 301 SCUPPER

Deck outlet

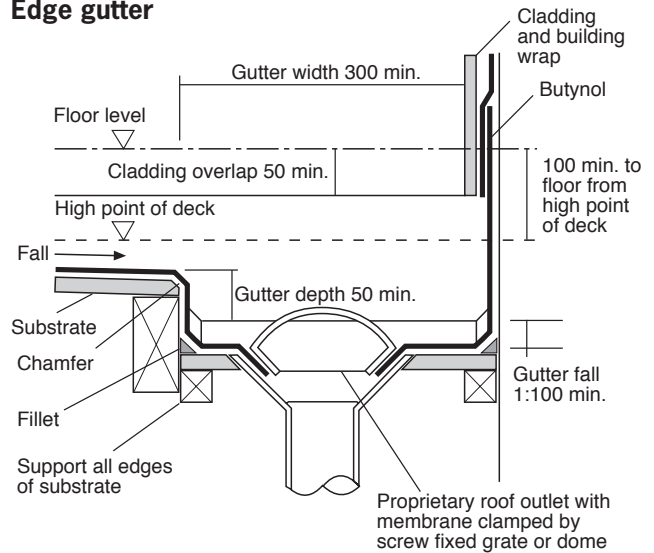


Overflow

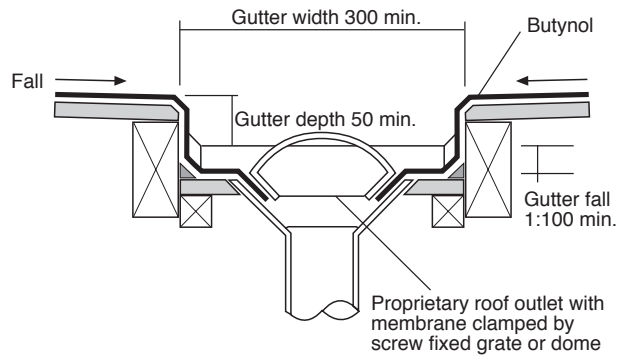


GUTTERS AND OUTLETS IN MEMBRANE

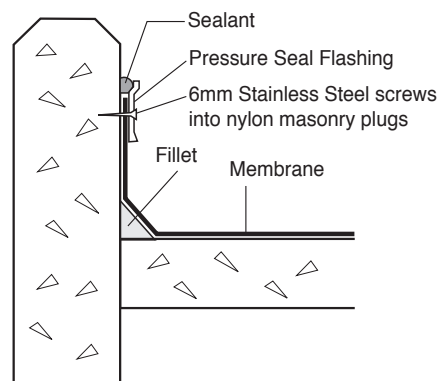
Edge gutter



Central gutter



Aluminium Pressure Bar Seal

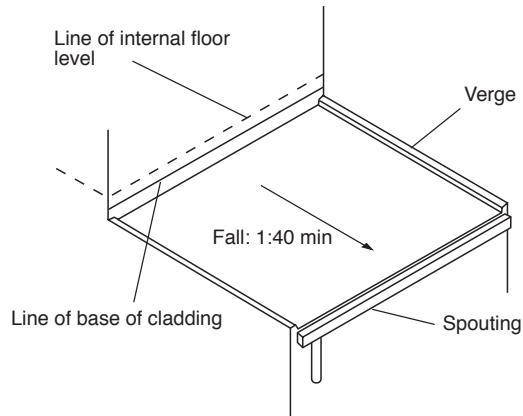


ARDEX Butynol

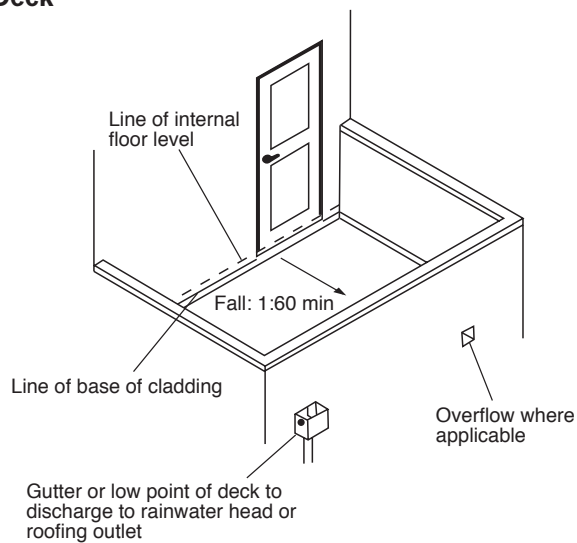
BRANZ Appraised, E2/AS1 Acceptable Solution

FALLS IN BUTYNOL ROOFS AND DECKS

Roof

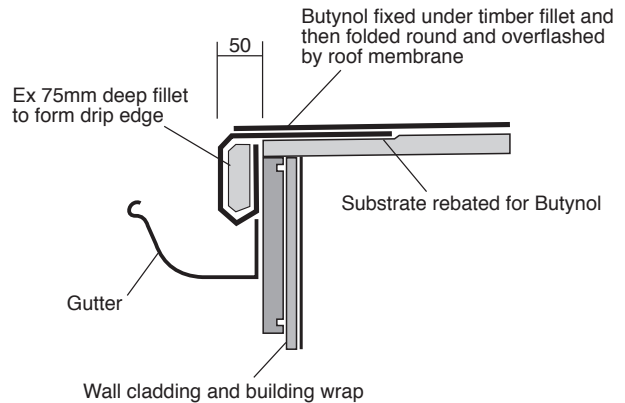


Deck

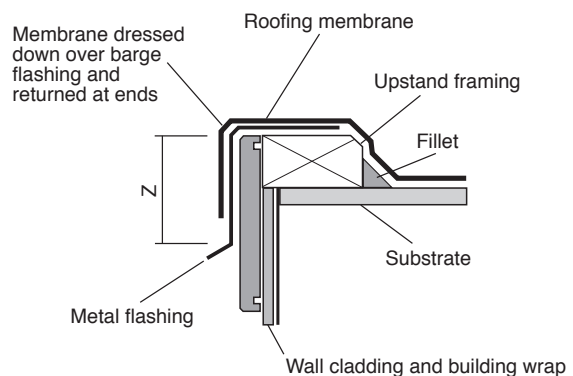
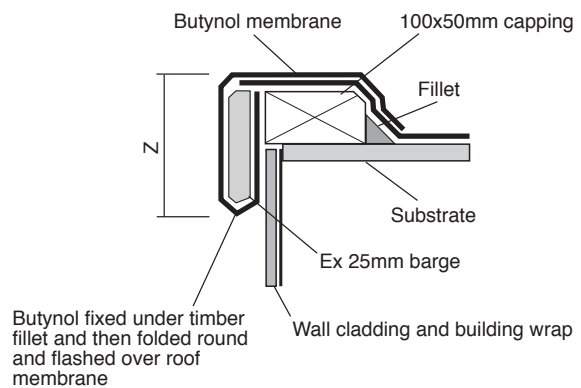


EAVE AND VERGES IN BUTYNOL

Eave



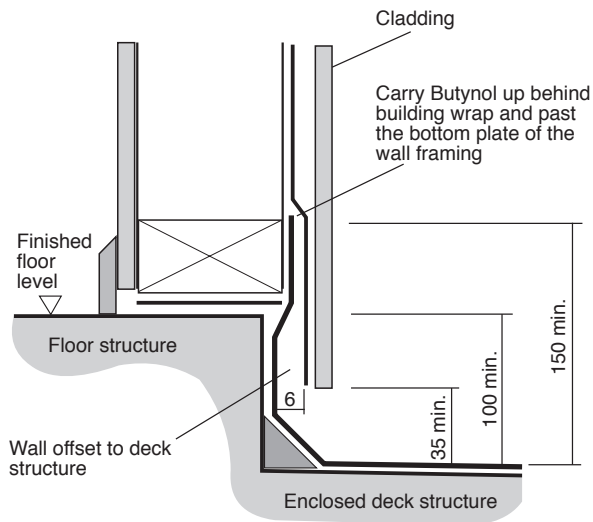
Verges



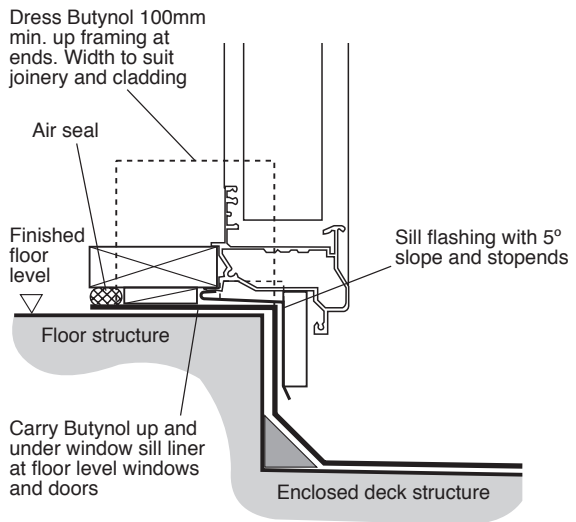
NOTE: Z = variable according to wind zone

JUNCTIONS WITH WALLS FOR BUTYNOL

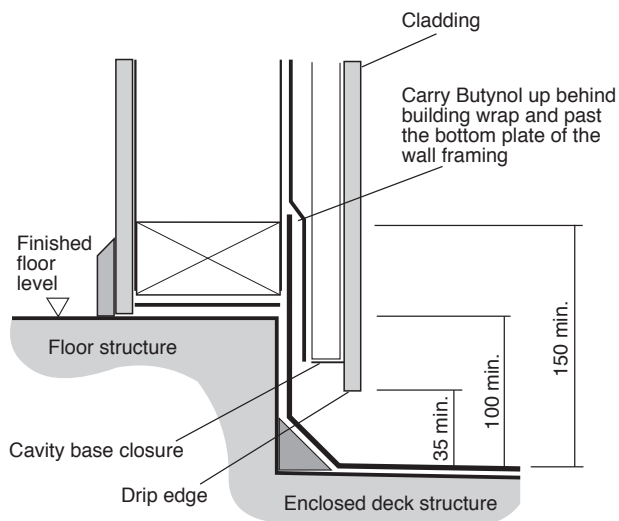
Direct fix threshold at wall



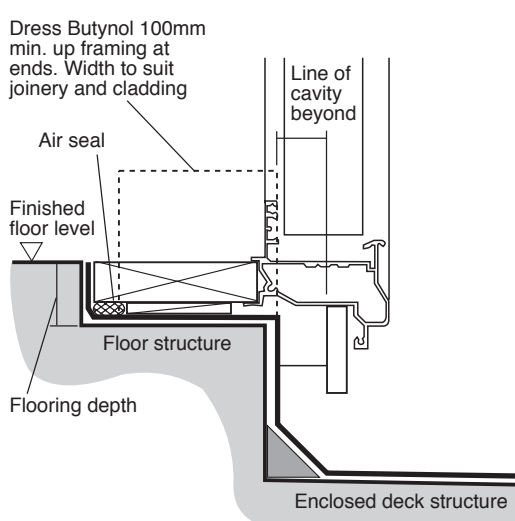
Direct fix threshold at opening



Cavity threshold at wall



Alternative threshold at opening



- NOTE: 1 Internal corners to be formed as shown on page 26
- 2 Dimensions are shown to Butynol. However, where there is an additional material applied over the Butynol all dimensions shall apply to the highest level of the wearing surface

LOOSE LAID APPLICATION OF BUTYNOL ROOFING

Materials used shall be as previously specified. When the surface is suitably prepared a large fully vulcanised Butynol sheet or sheets can be unrolled and spread over the prepared area and allowed to remain in this position for approximately one hour to relieve stresses induced by manufacture and storage. If necessary for ease of handling, these sheets can be supplied in varying sizes and vulcanised on site using an Ardex vulcanising machine or using seam tape with seam primer.

The Butynol sheet shall be set out in the exact position in which it will be finally required and whilst it is held firmly in place it shall be folded back at least one metre from the roof's surrounding parapet or wall to allow the application of adhesive to that area of the exposed substrate.

WA98 adhesive may be applied to the substrate and the corresponding area of Butynol sheeting which may then, when the adhesive is touch dry, be worked back into its required position avoiding wrinkles and the inclusion of air bubbles.

Upon completion of the detail work, parapets, drains and rainheads etc a layer of rounded gravel 30-40mm should be applied up to 50mm deep, over a layer of Geo Textile Fabric for protection of the Butynol sheet.

Care must be taken at outlets to ensure the ballast cannot enter or cause a blockage that prevents rainwater from leaving the roof area. Maintenance paths should be created to air-conditioning or roof plant with concrete tiles.

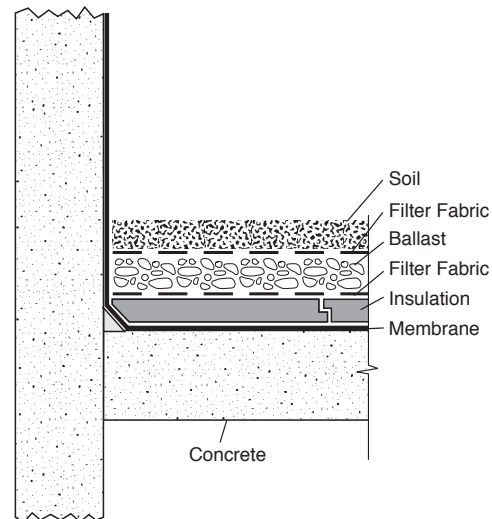
Effects on the membrane in areas of high wind can be eliminated by stabilising the ballast with cement. Dry cement should be broadcast over the 30-40mm gravel with a broad mouth shovel and left to hydrate or lightly sprayed with water to set off.

If possible a water test should be carried out prior to the application of ballast.

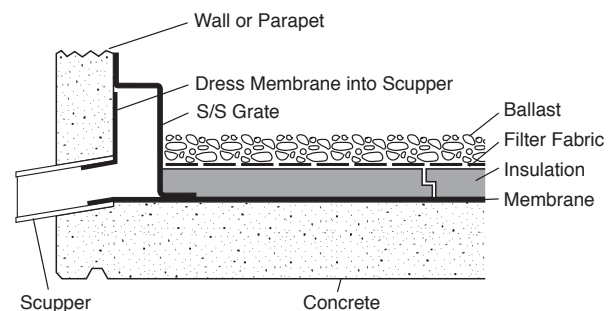
Note: Minimum pitch 1.5° to comply.

Refer NZBC Clause E@/AS1 External Moisture 8.5.1 (a).

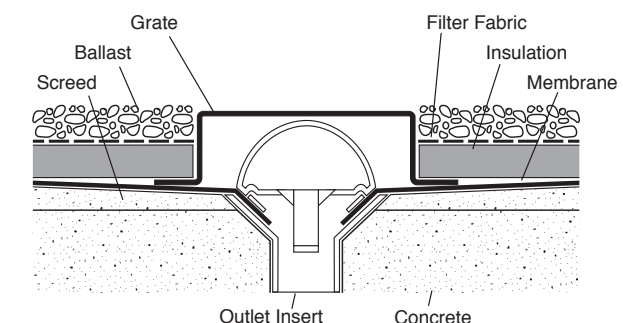
TYPICAL BALLASTED/GARDEN ROOF DETAIL



SCUPPER ROOF OUTLET



SCUPPER ROOF OUTLET & GRAVEL RETAINER





ARDEX Butynol Shingles

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

ARDEX Butynol Shingles

LAYING ARDEX BUTYNOL DIAMOND SHINGLES

Setting Out

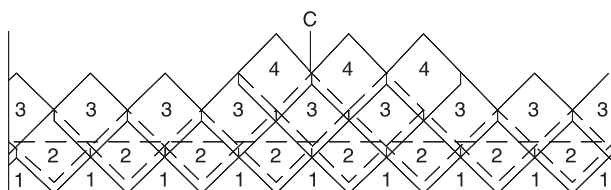
1. Mark the substrate horizontally with a chalk line 350mm up from bottom.
2. Mark a vertical line, top to bottom, and centre of the roof.
3. Mark off 300mm vertical spacings from the centre vertical line (both sides).

Laying

1. Cut a starter flashing wide enough to cover the first 350mm at the bottom edge of the roof, up to the horizontal chalk line, allowing extra in width for gutter or fascia flashing.
2. Apply adhesive, and lay when ready.
3. Starting from the centre vertical chalk line, loose lay the first shingles, making sure that the top and bottom are in line with the vertical marking. Now loose lay the entire bottom row, making sure each shingle is butted up to each other.
4. With chalk, mark the starter flashing where the adhesive should be applied using the loose laid shingles to mark around. This is to eliminate over brushing of adhesive.
5. Remove loose laid shingles and apply adhesive to substrate and shingles which are to be laid (up to 5 shingles are manageable at one time).
6. Lay when ready, starting with centre shingle and making sure each shingle aligns with vertical markings and is well butted together.
7. Lay entire bottom row first.
8. Following rows are laid identically, but are staggered and overlap row below by 25mm.
9. Each shingle must be carefully rolled, paying special attention to lapped edges.
10. The top row of shingles may be cut to suit the specifications and a Butynol overflashing used to finish the ridge.

Any excess adhesive should be cleaned off as you go with WA98 solvent.

Roof area coverage of 50 shingles is approximately 8.82m².



After doing 350mm bottom flashing #1, then start laying full shingles #2, #3, #4 etc.

Always start from centre on first row.

LAYING ARDEX BUTYNOL STANDARD SHINGLES

Priming Substrate

In areas where rain could interrupt work, it is recommended that a primer coat of WA98 adhesive be applied to substrate to prevent penetration of moisture.

Underflashings

Glue and fix Butynol 380mm underflashing down barges, valleys, hips etc. and also along the bottom of the roof allowing an overhang into the gutter.

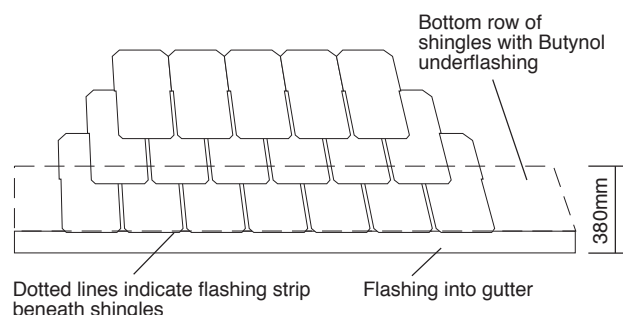
Laying

1. Make a chalk line horizontally along the roof, one shingle height up. This line marks the top of the first row of shingles. Apply adhesive by brush or roller to substrate and shingle - approximately five at a time for one person - pulling off plastic backing before doing so. After flashing off time locate the top of the shingle on the chalk line and smooth down.
2. To locate the next row, mark a horizontal chalk line up one shingle height minus the overlap onto the lower shingle.
3. Each shingle must now be carefully rolled, paying special attention to lapped edges.
4. The top row of shingles may be cut to suit the apex and a Butynol overflashing used to finish at the ridge.

Any excess adhesive should be cleaned off as you go, with WA98 solvent.

Roof area coverage of 50 shingles is approximately 3.57m².

Note: Ardex Shingles have a forty-five degree cut on outside edges.





ARDEX WPM 2000EP

Episeal EPDM Roofing E2/AS1 Acceptable Solution

Perimeter fixings normally required for solid EPDM membranes are not required for Ardex Episeal due to the Fibre Backing which allows the membrane to relax after manufacture and prevents shrinkage normally encountered after installation of EPDM sheeting

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

ARDEX WPM 2000EP

Episeal EPDM Roofing E2/AS1 Acceptable Solution

SPECIFICATION

Ardex Episeal is a high performance synthetic rubber membrane based on the polymer Ethylene Propylene Diene-Monomer (EPDM) combined with a Polyester Fibre Mat backing.

Ardex Episeal has properties which resist ageing from heat, sunlight and ozone. It has excellent gas impermeability and toughness and remains flexible at low temperatures.

Ardex Episeal is marketed by Ardex as a warranted roofing product and fixed by approved Applicators.

EPISEAL MATERIAL SPECIFICATIONS

Our requirements for long term warranty necessitate that Ardex Episeal meets these typical technical requirements:

Testings as per ASTM

Tensile Strength (D412 Die C)	1305 psi min
Ultimate Elongation (D412)	300% min
Tear Resistance (D624 Die C)	400 lbs/in min
Linear Dimensional Change	±2% max
(168 hrs @ 240°F) (D1204)	
Ozone Resistance	No cracks at 7x
(168 hrs/100PPHM/104°F/40°C	magnification
50% ext.) (D1149)	
Water Absorption	+2/-2% max
(168 hrs @ 70°C) (D471)	
Heat Ageing (28 days @ 240°F)	
Tensile Strength (D573)	1205 psi min
Ultimate Elongation (D573)	200% min
Tear Resistance (D573)	125 lbs/in min

SPECIAL FEATURES OF EPISEAL

- Cost effective - The fibre backing provides a protective underside barrier that allows application over a wide range of surfaces, including some existing membranes and bitumen.
- Extra strength, high puncture, tear and impact resistance.
- Retains flexibility and is not stressed in any way by the backing or inhibited to compensate for building movement.
- Ability to be laid over surfaces with moisture content. No delays with uncured slabs, water vapour can dissipate without causing stress to the membrane.
- Quick Application - The system is fully bonded using Ardex WA98 contact adhesive. Ardex Episeal can also be loose laid and ballasted.
- Ardex Episeal is unaffected by thermal shock and UV rays.

EPISEAL IS PACKAGED

In rolls 3.050m wide and 15.250m long. (Tolerance 40mm on width and length). Each roll covers 46.5m² (Approx. 77kg per roll).

Gauges: Ardex Episeal	1.2mm nominal
Uncompressed Fibre	1.5mm

ADHESIVES AND SOLVENTS

Specially formulated for all Ardex Episeal applications. Supplied in 20L pails (approx. 20kg).

OVERLAY TAPE

Cured silicone backed joint tape. Supplied in 150mm x 30.4m rolls.

DETAIL TAPE

Semi-cured silicone backed detail/finishing tape. Supplied in 150mm x 30.4m rolls.

EPISEAL SEALANT

Polyurethane 600ml.

EXTERNAL MOISTURE

New Zealand Building Code requirements recommend membrane clad roofs have a minimum pitch of 1.5°.

Australian Building Code Section F1.9(c) is met by Ardex Episeal as an acceptable damp-proof course.

FIRE RATING

The Ardex Episeal roofing system must be considered combustible but may be used on buildings for all purpose groups, subject to the requirements of NZBIA Acceptable Solution C3/AS1 4.8 and 4.9.

When used for roofs in Purpose Groups SC and SD a non combustible substrate or timber 18mm thick is acceptable.

Australian Building Code allows use in all building types under Section C1.10 Page C-47 Part 7(e).

PRODUCT WARRANTY

Ardex Episeal is covered by a fifteen year material warranty available from Ardex following installation by an approved Applicator. Ardex is not responsible for any costs arising out of installation and does not provide any warranty other than where a written Ardex material warranty has been issued.

SUBSTRATE SPECIFICATION (Plywood)

To conform with Acceptable Solution E2/AS1 plywood shall be:

A minimum of 17 mm complying with AS/NZS 2269, at least CD Structural Grade plywood with the sanded C face upwards, and H3.2 with Waterborne CCA treatment and kiln dried after treatment.

Substrates must be dry when Episeal is applied. The plywood and the timber substructure shall have a maximum moisture content of 20% when Episeal is adhered.

Plywood panels shall be laid with staggered joints (brick bond), the edge of sheets shall be supported with dwangs or framing, unless a structurally tested tongue-in-groove edge provides equivalent support. The maximum recommended span in E2/AS1 is 400mm in each direction. However specific design may allow 17.5mm plywood or greater to be laid on 400mm purlins with nogs or dwangs at 600mm or even 1200mm centres. Plywood shall be laid with the face grain at right angles to the supports. A 20mm triangular fillet shall be used at the base of any 90° upstand. External edges shall be chamfered with a minimum radius of 5mm.

Plywood shall be fixed with 10g x 50mm stainless steel countersunk head screws, eg Hylton Parker No 24639 or No 12923 for Steel Purlins, with 3mm gaps between all sheets, at 150mm centres on edges, and 200mm in the body of the sheets.

All joints in the plywood and junctions of plywood with other materials shall have 25mm polyethylene release tape applied before application of Episeal.

Closed-in construction spaces under Episeal roofs and decks shall have adequate ventilation to prevent the accumulation of moisture under Episeal. There should be a minimum gap of 20mm between the underside of the substrate and any insulation.

For roof or deck areas over 40m², roof vents will be required.

NOTE: The use of LOSP (Light Organic Solvent Preservative) treated plywood must NOT be used under Episeal in any circumstances or conditions.

SUBSTRATE SPECIFICATION (Concrete)

New concrete

Must be cured for a minimum of 28 days and all curing compounds removed prior to application.

A reduction in cure time can be achieved by utilising the Ardex HydrEpoxy System (consult Ardex Technical Department for details).

Old concrete

Must be clean from any contaminants prior to application.

For further substrate types please consult Ardex Technical Department.

Ardex Episeal gives the Designer or Specifier of Membrane Systems the opportunity to provide clients with a time proven waterproofing system that acts as permanent venting of the substrate, and most importantly can be applied to new substrates or over existing membrane systems, avoiding excessive cost and disruption to the client normally associated with such an exercise.

Ardex Episeal assists in ventilating substrates permanently by allowing moisture drawn from the substrate to dissipate through the fibre backing of the membrane to perimeter flashings, or to strategically positioned Vapour Release Vents.

Ardex Episeal with its fibre backing has high resistance to mechanical damage, puncture and tear. The fibre backing allows the membrane to take up minor undulations in the substrate, particularly useful when applied over existing membrane systems.

Ardex Episeal may be applied over various substrates such as built-up roof systems, malthoid, liquid membranes and earth formed dams. Substrate bonding is achieved with a variety of specially developed adhesives.

Ardex Episeal can be applied to XPS using suitable adhesives. Contact Ardex for details.

Ardex Episeal can be applied onto Polyurethane Foams, providing an instantly suitable substrate with insulation properties. Consult Ardex for details.

ARDEX WPM 2000EP

Episeal EPDM Roofing E2/AS1 Acceptable Solution

ARCHITECTURAL SPECIFICATIONS

1. Introduction

Ardex Episeal is a roofing system designed primarily for the retrofit of existing bitumen, malthoid, concrete or tongue and groove sarking. The membrane incorporates a polyester fleece which is laminated to the underside of the sheet membrane. This fleece provides an excellent means of ventilation for the membrane as well as increasing the puncture resistance of the membrane.

2. Scope

This rubber roofing specification consists of the provision and fixing of all the rubber roofing and flashings referred elsewhere in the manual.

3. Contractors

The rubber roofing shall be fixed by roofing contractors specially skilled in this work and approved by the manufacturer or distributors of the material selected.

4. Workmanship

The roofing contractors shall supply the main contractor when requested, written warranties covering the waterproofing properties of the rubber membrane and joining tapes etc., along with his own workmanship warranty covering the fixing of the membrane. It will include making good any defects which are covered by the said warranties.

Should the architect raise any queries on any aspect of this work, the roofing contractor shall attend a site inspection and if required, the manufacturer or his appointed agent may also be called to attend.

5. Materials

Rubber membrane - For the purpose of this specification the approved single ply membrane system shall be:

Ardex Episeal fibre-backed

colour - Black

gauge - 1.2mm, 1.5mm

Lap tapes and other accessories as specified by the manufacturer for use with the selected membrane. Adhesives shall be as detailed in the accessories section of the manual.

6. Acceptable Substrates

- Structural concrete
- Plywood
- Modified bitumen roofs
- Malthoid
- Tongue and grooved or butt joined sarking
- Polyurethane foams
- Nuralite
- Nuraply

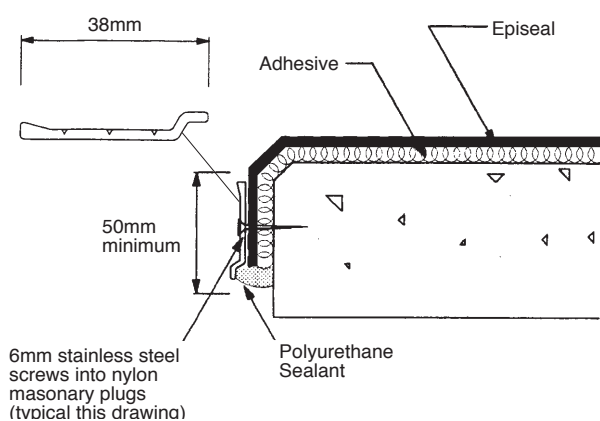
Before applying Ardex Episeal the substrate should be cleared of any sharp protrusions or penetrations that may risk the integrity of the rubber membrane in application.

7. Membrane Application

1. Check that substrate is in a suitable condition as stated above. If in doubt contact your local Ardex representative.
2. Tape any large cracks or voids with suitable width self adhesive tape. Ensure the existing membrane is fixed securely to the substrate. Any large areas that have separated from the substrate should be either removed or nailed back into place.
3. Prime the substrate if required with the selected adhesive cut back 50% with its solvent.
4. Position the membrane and allow to relax where it is to be laid, allowing for the side laps to be in the correct position for adhesive application. See diagram page 40.
5. Fold back half the sheet that is to be applied.
6. Apply Ardex Episeal adhesive to the substrate surface and if a contact adhesive is used to the Ardex Episeal membrane as well.
7. Fold over and adhere working progressively towards the edge of the sheet. Wrinkles can be smoothed out with a soft bristle broom, but do not stretch the sheet.
8. Fold back other edge, adhering the other half of the sheet in the same manner as the first half.
9. Bonding the laps
 - 9.1 The top lap is positioned and the bottom sheet marked to indicate the edge of the top sheet.
 - 9.2 The top sheet is folded back.
 - 9.3 The Ardex Seam Primer is then applied to the Ardex Episeal in the area marked on the bottom sheet and 50mm in from the edge on the top sheet. The Ardex Seam Primer is applied to the mating surfaces using a synthetic scrubbing pad. Scrubbing pads should be replaced as they become dirty. Allow the primer to become 'touch dry'.
 - 9.4 Position and unroll the 50mm Ardex Seam Tape along the seam. The edge of the seam tape should be aligned to the mark on the bottom membrane sheet. The see-through film makes this very simple.
 - 9.5 Roll the length of the seam with backing film still in place.
 - 9.6 Remove the backing film from the Ardex Seam Tape by pulling at a 45° angle away from the seam. Keep the release paper low to the roof surface as it is removed.

- 9.7 Fold into place the primed edge of the top sheet.
- 9.8 Roll the completed seam.
10. Place the roll of overlay tape on roof a metre ahead of the application start point. Position the roll so that the release paper unrolls from the top of the roll. The release paper will be on top. Peel the release paper up and back from the overlay tape. Unroll the overlay tape along the seam taking care not to stretch the overlay tape during its application. Take care to avoid wrinkles. Smooth the tape down into contact with the membranes.
11. Roll the sheet membrane and the seams with a heavy roller to ensure a good uniform bond is achieved.
12. End laps must be primed with seam primer and 150mm overlay tape. See diagram page 40.
13. Detail work and roof penetrations can be flashed with 150mm wide detail tape.
14. Seal all cross joints and T-joints in overlay tapes with Butynol sealant.
15. Edge sealing must be carried out when laying is halted due to rain in time to prevent moisture getting under the fibre backing.

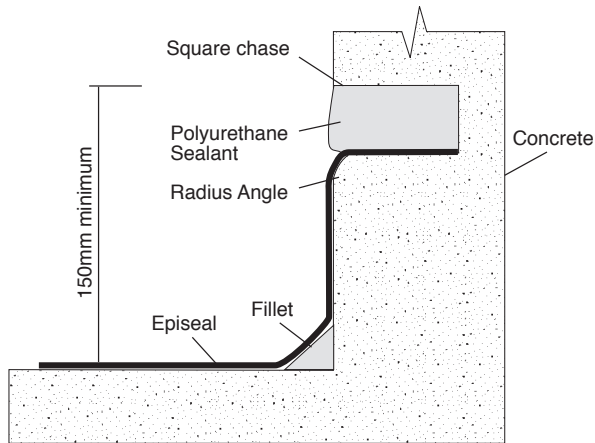
ALUMINIUM PRESSURE SEAL DETAILS



ARDEX WPM 2000EP

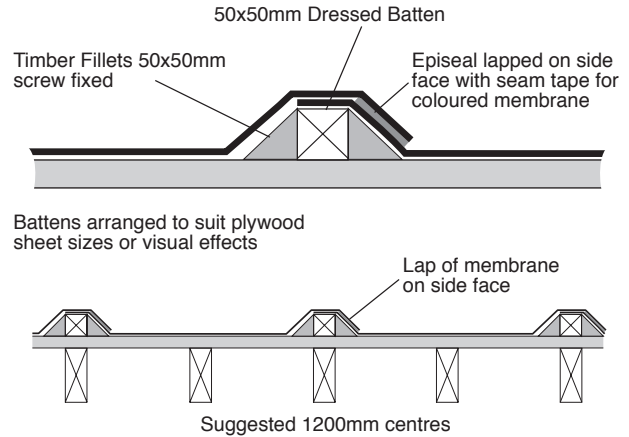
Episeal EPDM Roofing E2/AS1 Acceptable Solution

FLASHING INTO CONCRETE WALLS



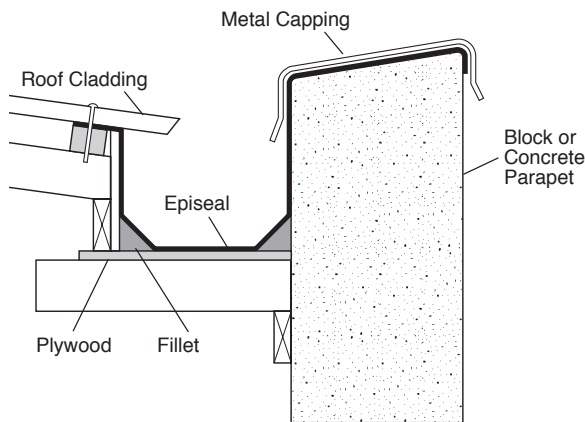
Episeal is glued into square chase and finished with Polyurethane Sealant.

RECOMMENDED BATTEN PROFILE DETAIL

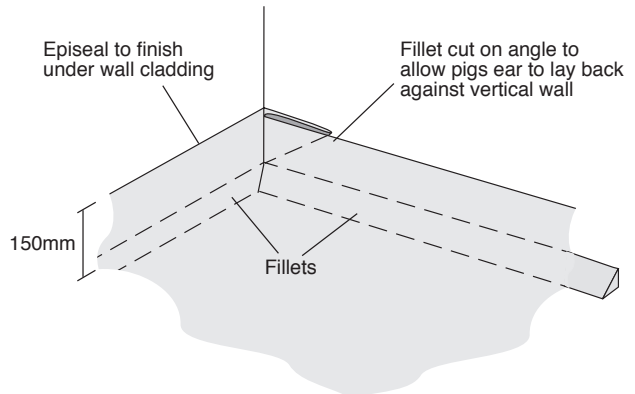


Example of a 1400mm sheet of Episeal dressed over battens at 1200mm centres

BOXED GUTTER AND PARAPET DOWNTURN



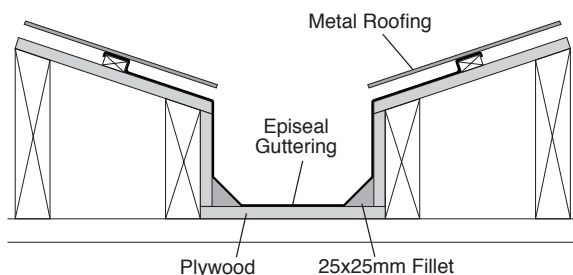
INTERNAL CORNERS



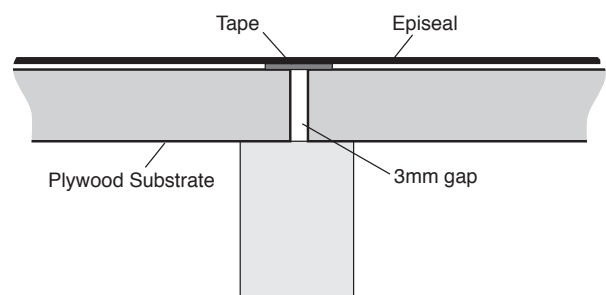
Without cutting Episeal simply fold a 'pig's ear' corner as shown. The angle fold should be behind the main sheet.

NOTE: Fillets must be used on all internal corners.

INTERNAL GUTTER



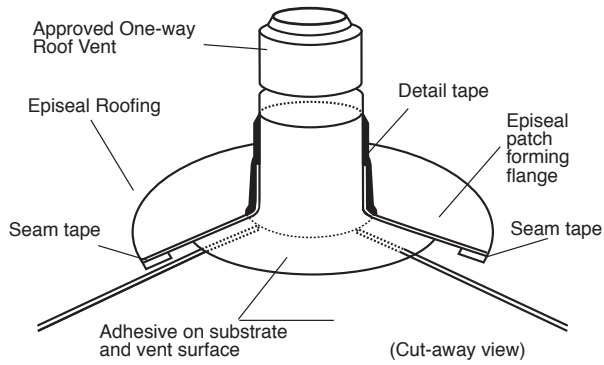
TAPING SUBSTRATE SHEETS



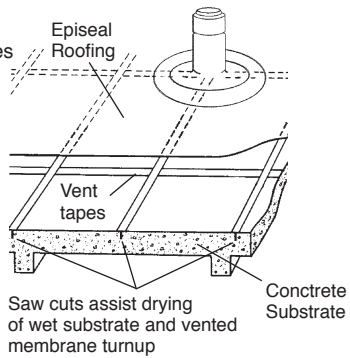
All joints between substrate sheets of Ply should be taped to prevent stressing of the Episeal in case of marked timber movement.

ONE WAY SUBSTRATE VENTILATOR

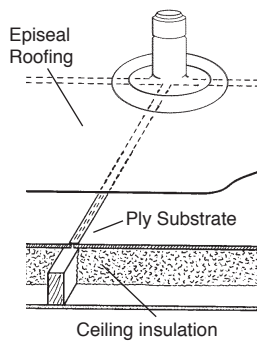
PVC or Aluminium



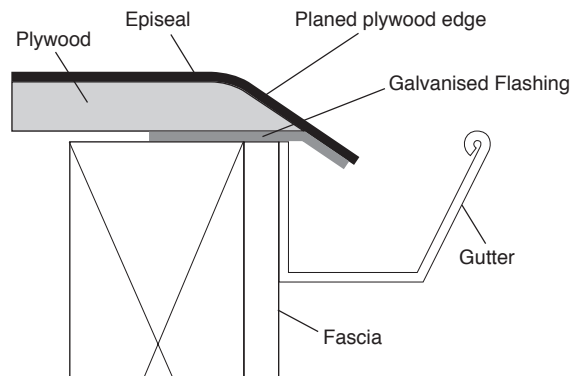
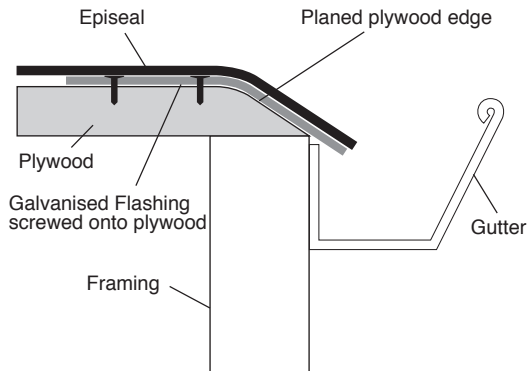
Vent installed over intersection of vent tapes on concrete substrate



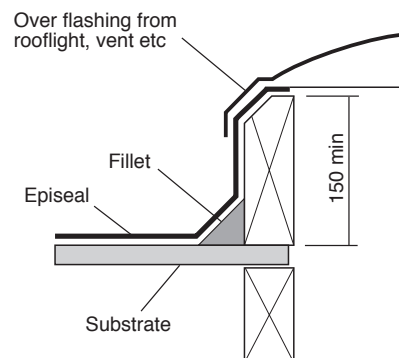
Vent installed over intersection of 3mm gap between Ply substrate sheets.



TWO METHODS FOR FINISHING OVER A GUTTER



ROOFING PENETRATION IN MEMBRANE

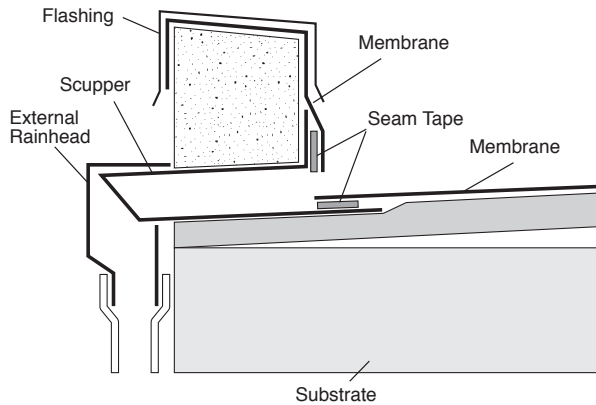


- NOTE: 1 For maximum penetration size of 1200x1200mm
2 External corners to be formed as shown

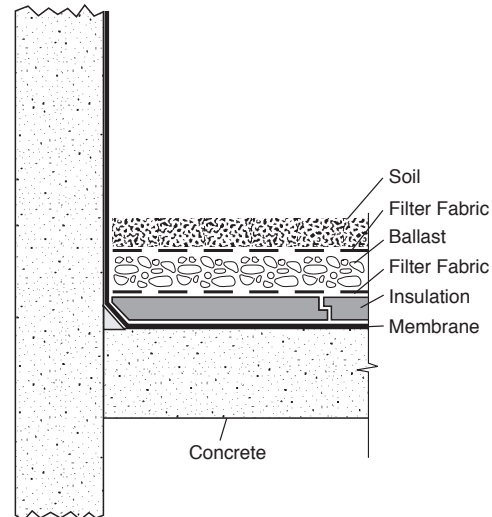
ARDEX WPM 2000EP

Episeal EPDM Roofing E2/AS1 Acceptable Solution

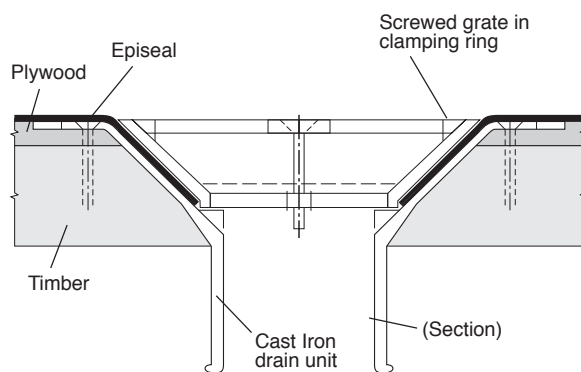
SCUPPER OUTLET



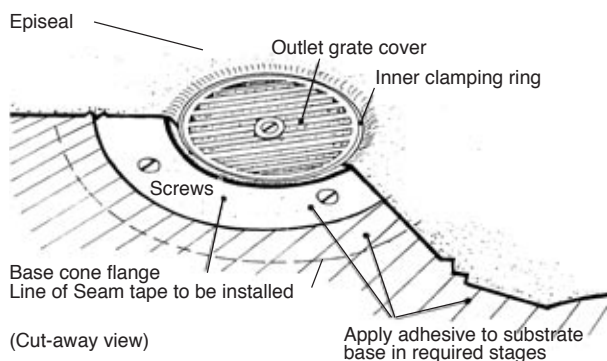
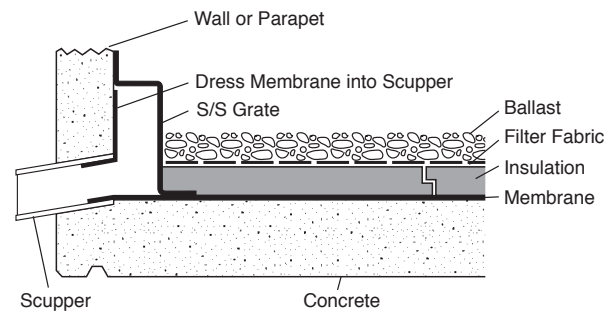
TYPICAL BALLASTED/GARDEN ROOF DETAIL



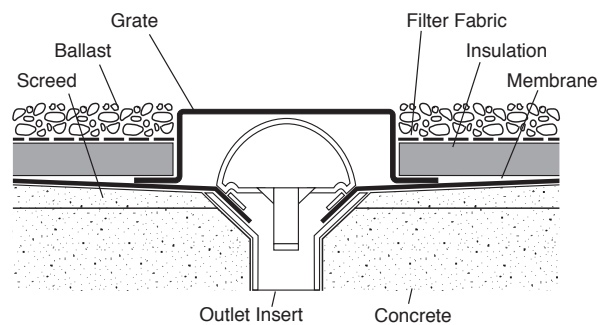
INTERNAL ROOF DRAIN (NZBC E2/AS1 Approved)



SCUPPER ROOF OUTLET

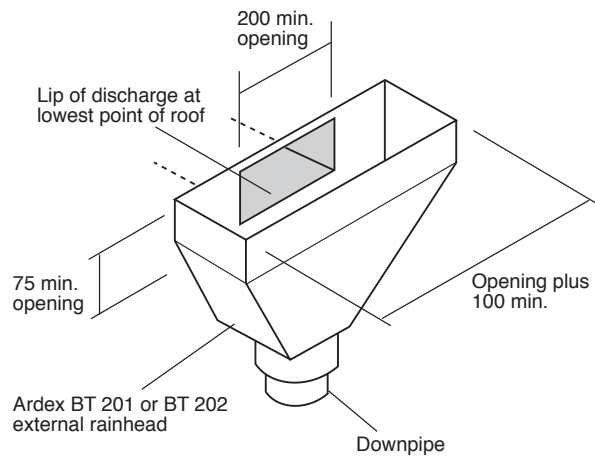


SCUPPER ROOF OUTLET & GRAVEL RETAINER

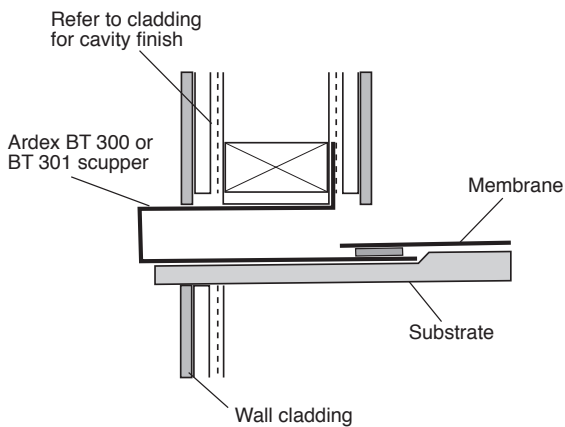


RAINWATER HEAD AND SCUPPER OPENING IN MEMBRANE USING ARDEX BT 300 OR BT 301 SCUPPER

Deck outlet

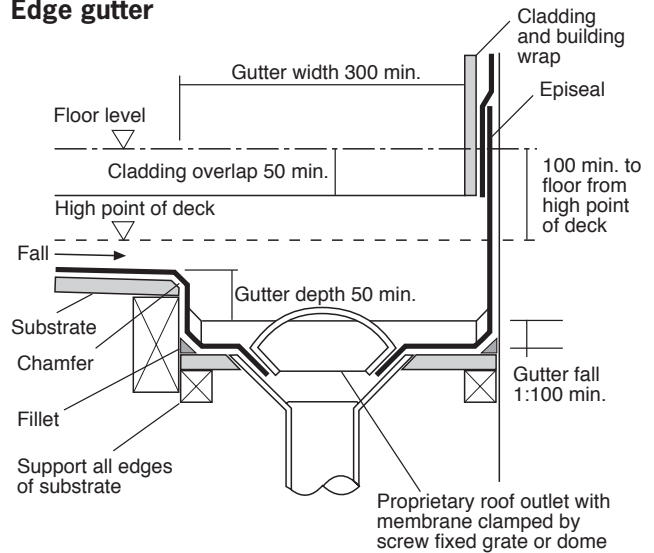


Overflow

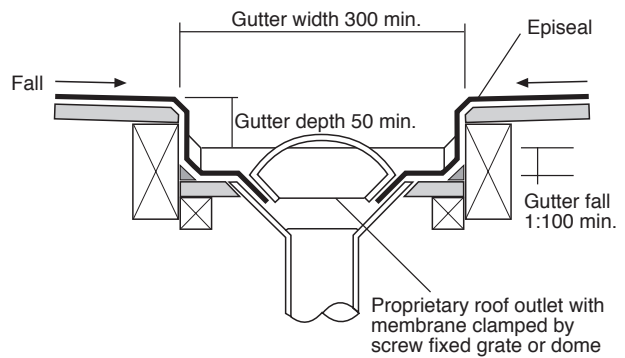


GUTTERS AND OUTLETS IN MEMBRANE

Edge gutter



Central gutter

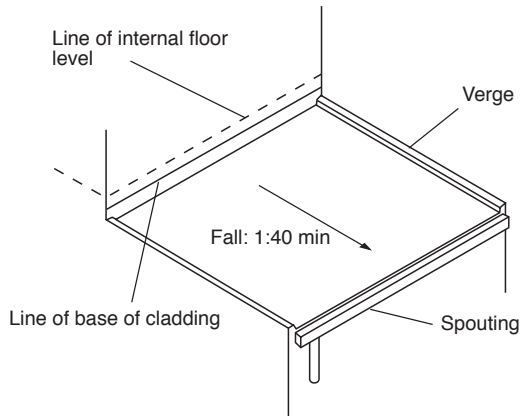


ARDEX WPM 2000EP

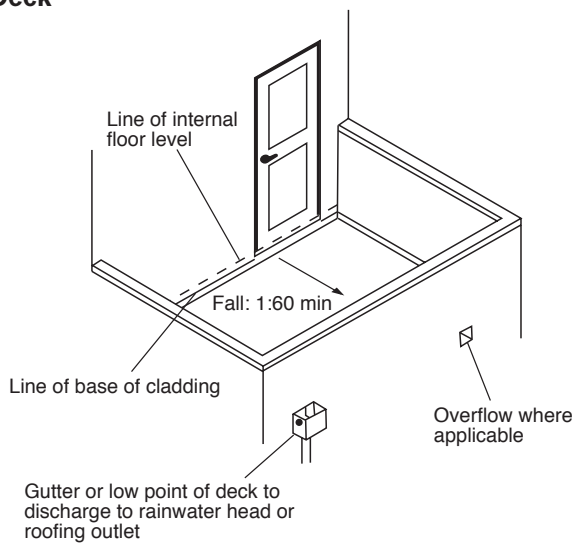
Episeal EPDM Roofing E2/AS1 Acceptable Solution

FALLS IN EPISEAL ROOFS AND DECKS

Roof

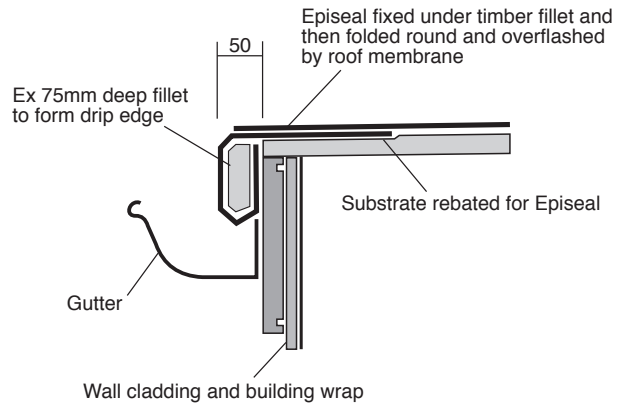


Deck

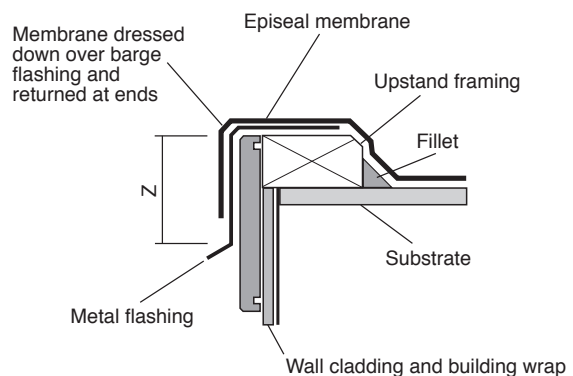
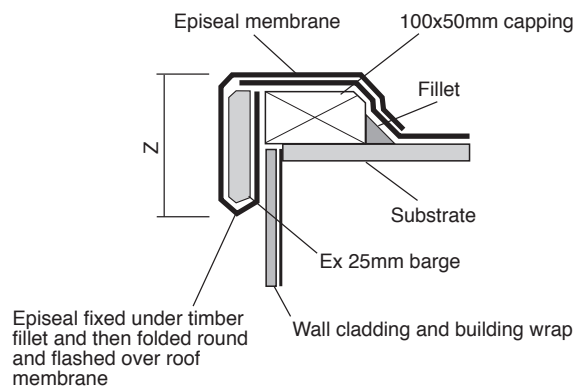


EAVE AND VERGES IN EPISEAL

Eave



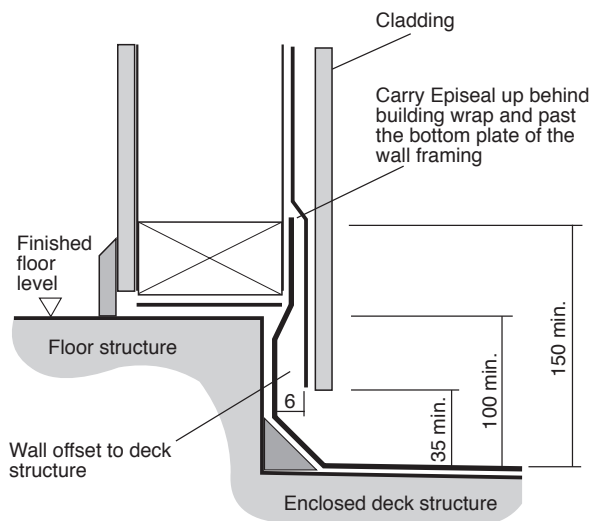
Verges



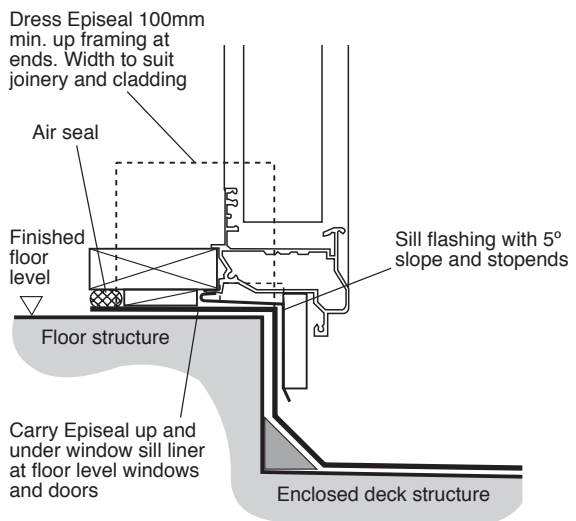
NOTE: Z = variable according to wind zone

JUNCTIONS WITH WALLS FOR EPISEAL

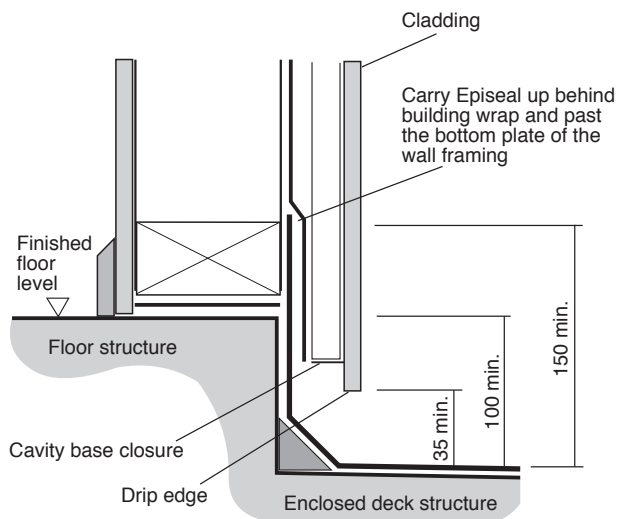
Direct fix threshold at wall



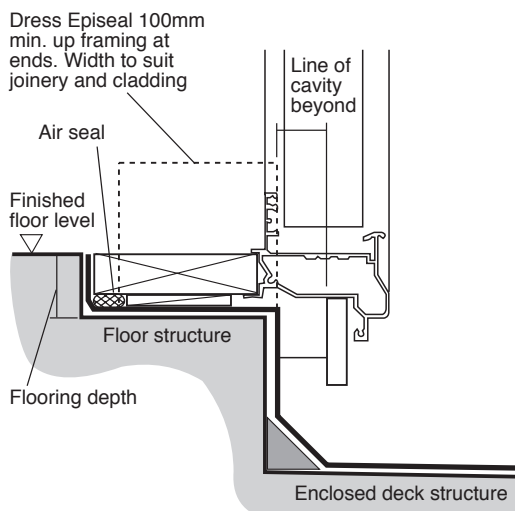
Direct fix threshold at opening



Cavity threshold at wall



Alternative threshold at opening



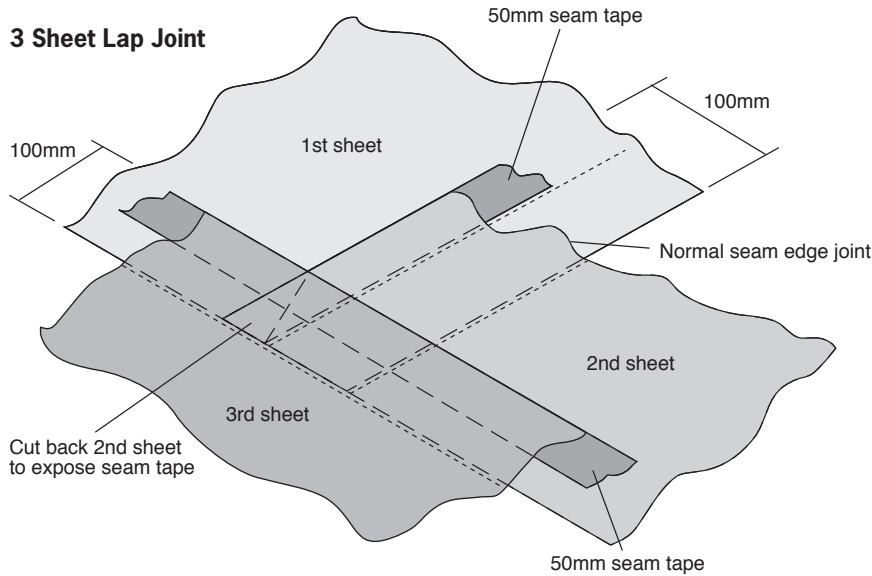
- NOTE: 1 Internal corners to be formed as shown on page 24
- 2 Dimensions are shown to Episeal. However, where there is an additional material applied over the Episeal all dimensions shall apply to the highest level of the wearing surface

ARDEX WPM 2000EP

Episeal EPDM Roofing E2/AS1 Acceptable Solution

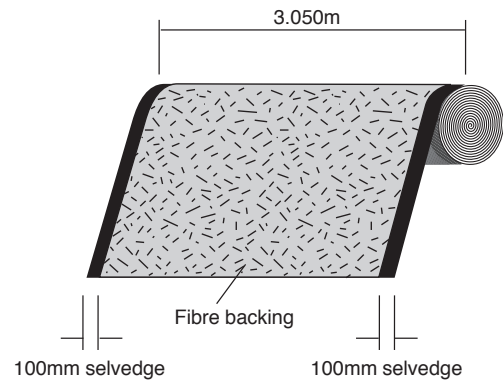
LAP AND BUTT JOINTING

3 Sheet Lap Joint

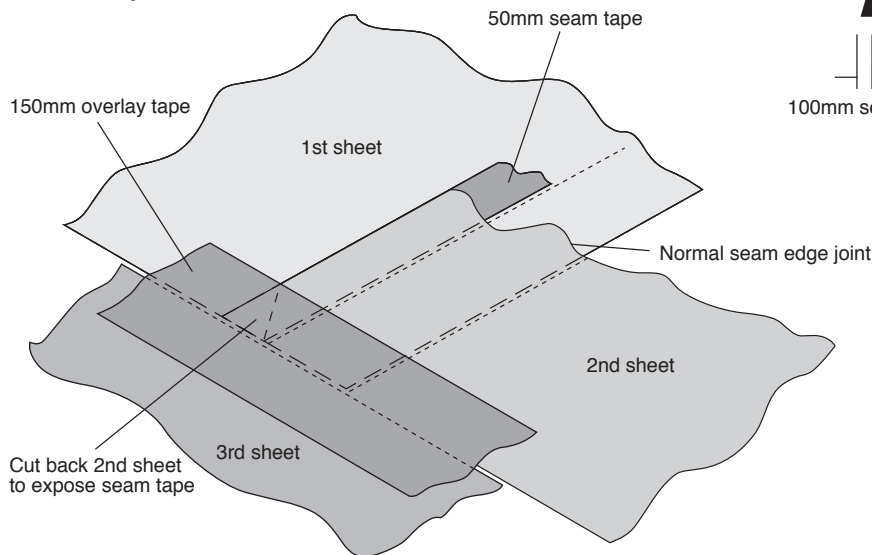


IMPORTANT NOTE

The new construction of Ardex Episeal sheet is 3.050m wide with a 100mm selvedge on both sides.

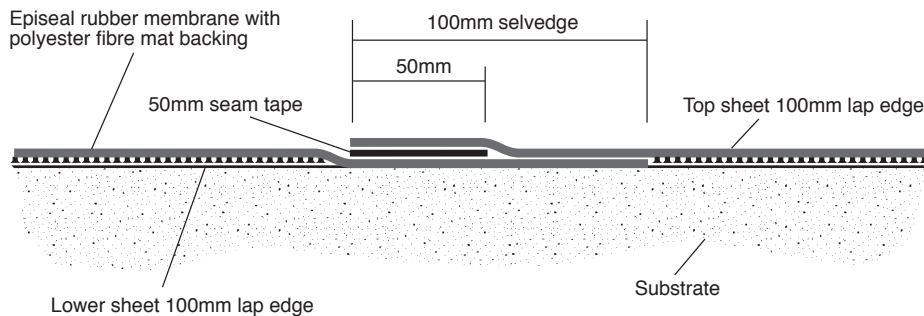


3 Sheet Lap and Butt Joint



Edge Seam

Episeal rubber membrane with polyester fibre mat backing





ARDEX Optima

ARDEX Optima

DESCRIPTION

Ardex Optima is a two component cementitious acrylic modified white adhesive. When mixed in the recommended portions Ardex Optima produces a resilient water resistant adhesive for bonding most ceramic tiles to Butynol Synthetic Rubber and other substrates (see below).

APPLICATION RANGE

Location

Internal, external and water immersion.

Performance Levels

Residential, commercial and industrial.

Surfaces

Walls, floors and decks.

Tiles

Natural stone, porcelain, mosaics, fully vitrified & ceramic tiles.

Uses

Particularly suited for adhering ceramic and clay tiles to Butynol decking and facings as per the Ardex recommended direct-stick system described below.

Other suitable substrates

- Brick and blockwork
- Fibre cement sheets, plaster boards
- Tilt up and pre-cast concrete
- Cement render, concrete, aerated concrete
- Powder coated cladding, galvanised, stainless steel (degreased), brass
- Existing tiles (thoroughly cleaned)
- Superflex and Shelter acrylic waterproofing membranes
- Particleboard
- Roughened fibreglass

SUBSTRATE PREPARATION

Butynol

Butynol must be cleaned to remove any dust or contaminants. This can usually be accomplished by using sugar soap and water, but if more stubborn soils remain, contact your local Ardex representative for instruction. Allow surface to dry before applying adhesive.

MIXING

Mixing ratio three parts of powder by weight to one part of liquid (weight or volume).

Mix adhesive by mechanical means until a homogeneous creamy paste is achieved, do not over mix. Allow mix to stand for 2 minutes prior to use.

APPLICATION

Tile installation must conform to the requirements of the Australian Standard 4992-2003.

Lay the tiles using Ardex Optima applied to the membrane surface using a 12mm notched trowel to achieve a dry bed thickness of not less than 2.5 - 3mm. Place the tiles in position and work into the adhesive to ensure a 100% coverage to the reverse side of the tiles. Only spread the adhesive to an area of approximately 1m² at a time to ensure that the tiles can be placed before the adhesive forms a surface skin which will inhibit the bond strength.

Allow the Ardex Optima to cure for at least 24 hours before proceeding with the next stage. Low absorbency tile can extend the cure time.

GROUTING OF TILES

All joints should be grouted using Ardex Grouts with Grout Booster (80:20) after the adhesive has fully cured. After mixing the grout in accordance with the instructions work it well into the joints ensuring there are no voids under the grout. Apply the grout to a small area of approximately 1m² at a time and clean excess grout from that area prior to proceeding. Only mix small quantities of grout at a time to enable workability within the pot life of the product.

Finishing Ardex Grouts should be carried out in the normal fashion by allowing the residual grout film to dry and polish off to totally remove.

Abapoxy

When using Ardex Abapoxy, cleaning the excess grout from the surface should be carried out using a wet cloth wrapped around a firm rectangular item such as a block of wood to remove the bulk of the excess. Surface should be finally cleaned using a clean wet scourer to remove all excess material from the joints and the tile surfaces.

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COVERAGE

One 30kg/10L unit will cover 6m² using a 12mm notched trowel at the specified dry bed thickness of 2.5 - 3mm.

PACKAGING

Mini Kit (1.7L liquid/5kg powder)

Large Kit (10L liquid/6x5kg powder)

DRYING

Approximately 24 hrs at 23°C, 50% RH, allow longer for colder conditions.

STORAGE AND SHELF LIFE

12 months when stored at 5°C - 25°C in airtight, sealed container.

CAUTION

High temperatures caused by heat absorption by black Butynol will accelerate drying time.

TECHNICAL DATA

Type	Two Part
Colour	White
Specific Gravity of liquid	1.02
pH	7.5
Application Properties (@ 23°C, 50% RH)	
Mixing Ratio	Powder/Liquid 30kg/10kg
Specific Gravity of Mix	1.67kg/litre
Viscosity of Mix	148,000 cps
Open Time	25 minutes
Adjustability Time	20 minutes
Pot Life	45 minutes
Water Absorption	1.18%
Mechanical Properties	
Shear Bond Strength (MPa)	
7 days dry	2.7
14 days dry	3.56
7 days water immersion	2.86
8 month immersion in fresh water concrete pool	3.1
Tensile Strength (MPa)	
7 days	2.3



ARDEX Bonding/ Seam Primer

Solvent Based Primer

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ARDEX Bonding/Seam Primer

Solvent Based Primer

DESCRIPTION

Bonding Primer solvent based primer is designed to lock particles on the substrate to achieve maximum adhesion. It has excellent durability and is a low viscosity binder that seals absorbent substrates and penetrates dust.

TYPICAL APPLICATIONS

- New and old concrete
- Timber
- Compressed fibreboards
- Primer for acrylic coatings

APPLICATION REQUIREMENTS

General

Do not apply Bonding Primer if the temperature is below 5°C or above 35°C.

Substrate preparation

The surface to be coated should be dry, clean, sound and free from oil, grease and flaking paint. New concrete should be left a minimum of 28 days before application commences. All cracks or holes exceeding 2mm are to be repaired before application commences.

APPLICATION SPECIFICATION

Apply with brush, long nap roller or conventional spray. Ensure that the coating is applied evenly at the recommended coverage rates. Allow a drying time of at least one hour.

COVERAGE

Approximately 5-8m²/litre on horizontal and vertical surfaces.

PACKAGING

4 litre and 1 litre cans.

CLEAN UP

Clean all equipment in general purpose thinners immediately after use.

STORAGE

Bonding Primer must be stored above 6°C.

SHELF LIFE

One year in unopened containers stored at 20°C.

SAFETY DIRECTIONS

Avoid contact with skin and inhalation of the vapour. Provide adequate ventilation. Keep out of reach of children. If swallowed contact a doctor or Poisons Information Centre.

Contact Ardex for specific applications and material safety data sheet.



ARDEX Butynol Sealant

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ARDEX Butynol Sealant

BUTYNOL SEALANT

Description

Butynol Sealant has been specially designed and formulated for sealing Butynol flashings into chases. Butynol Sealant has excellent sealing and adhesive properties to Butynol and a variety of building components.

DANGER

Gives off highly flammable vapour. Keep well away from heat, sparks and open flame. Keep closed when not in use.

AVOID BREATHING VAPOUR

Use with adequate air flow.

DIRECTIONS

Once the Butynol Membrane has been fixed into place, prepare the chase to ensure it is clean dry and sound. Cut the cartridge nozzle to give the desired aperture and angle. For best results the sealant should be gunned by pushing the cartridge nozzle forward during application. Tool the sealant bead to ensure there are no voids, gaps or air pockets and that the bead has a neat and flush finish.

TACK FREE TIME

Approx. 24 hours, depending on temperature conditions, can be painted within 4 to 6 days.

FULL CURE TIME

4-6 days depending on temperature conditions.

CLEAN UP

Clean tools, etc., with mineral turps.

COLOUR

Black in 375ml tubes

Also available for Butynol

Seal 'n' Flex Polyurethane

600ml sausages

Colours - black and grey

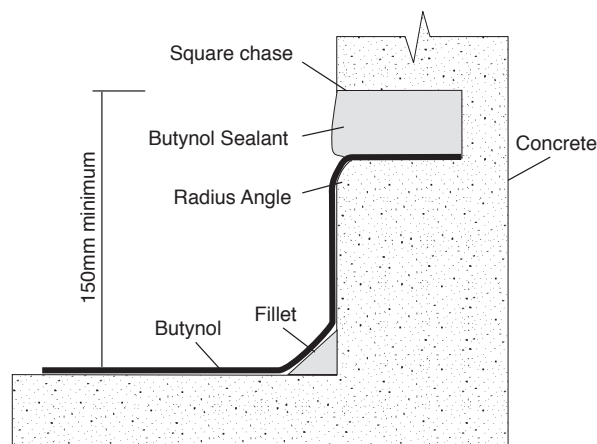
Silaflex MS

300ml tubes

Colour - grey

Refer to respective tubes for their material warranty.

FLASHING INTO CONCRETE WALLS



Butynol is glued into square chase and finished with Butynol Sealant.



Drainage & Substrate Ventilation

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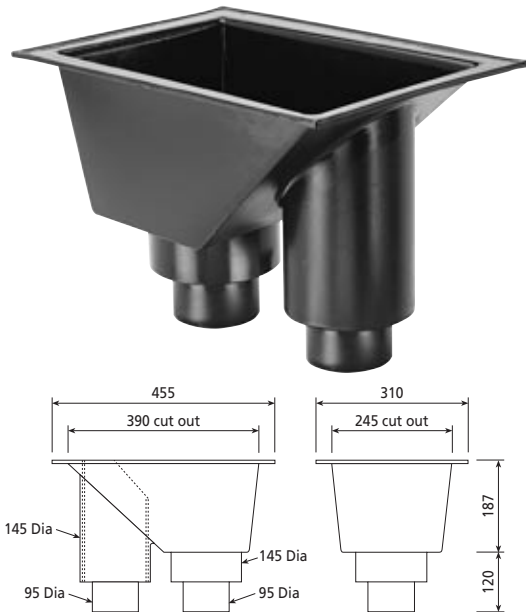
Drainage & Substrate Ventilation

BT 200 RAINHEAD (illustrated)

Moulded rainhead with overflow.
To suit 100mm or 150mm downpipe.

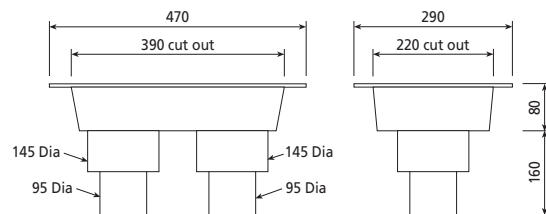
Complies with E1/AS1 5.5.1

An internal gutter overflow outlet should be located to give an early, conspicuous warning to the building occupier that maintenance is required.



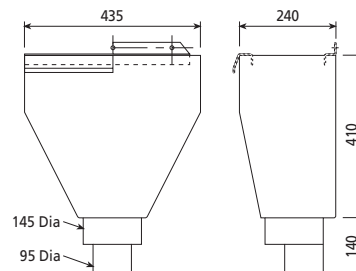
BT 205 RAINHEAD

Moulded rainhead with overflow.
To suit 100mm or 150mm downpipe.



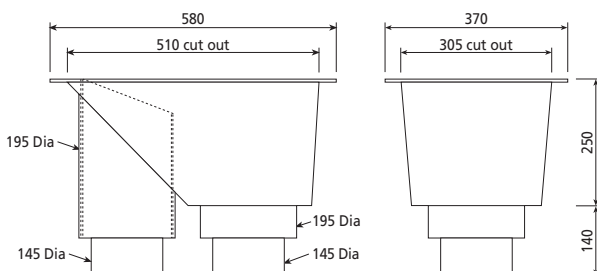
BT 202 EXTERNAL RAINHEAD

Moulded rainhead with metal fixing strip.
To suit 100mm or 150mm downpipe.
Can be used in conjunction with BT 301 Scupper.



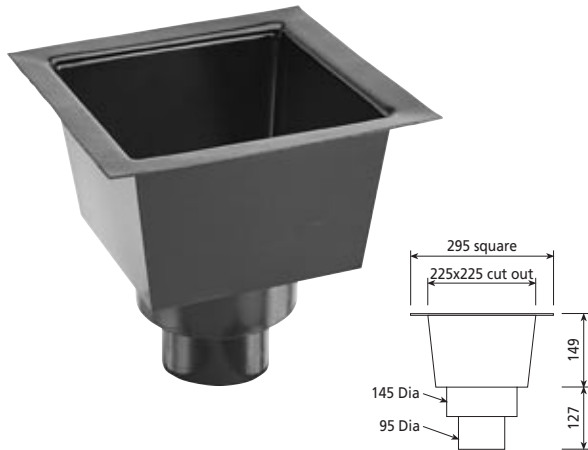
BT 204 RAINHEAD

Moulded rainhead with overflow.
To suit 150mm or 200mm downpipe.



BT 203 SQUARE RAINHEAD

Moulded rainhead 295mm square.
To suit 100mm or 150mm downpipe.



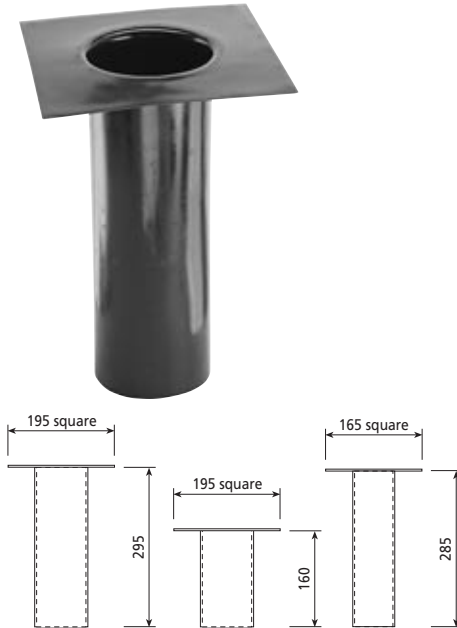
BT 700, BT 701 KICKOUT FLASHING

Available in Black (BT 700) or Grey (BT 701).



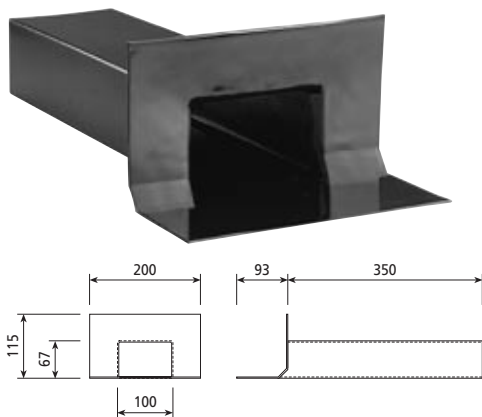
BT 100, BT 101, 102 DROPPERS

To suit 100mm (BT 100), 80mm (BT 101),
150mm (BT 102) downpipes.



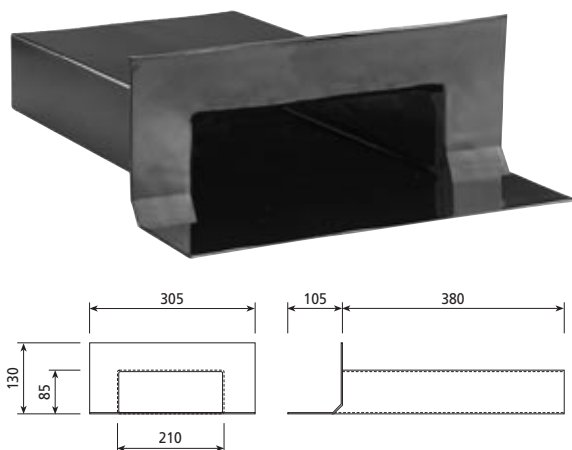
BT 300 SCUPPER

For all types of single ply membrane roofing.



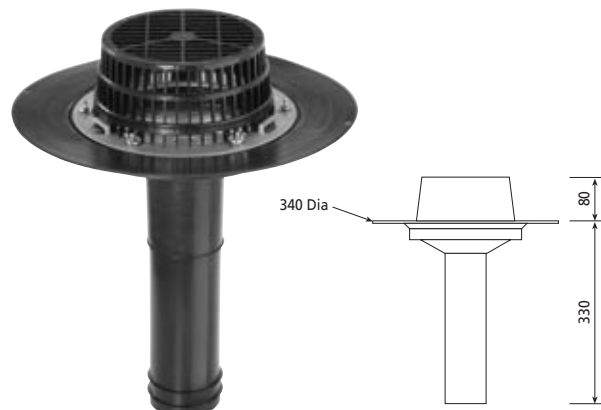
BT 301 SCUPPER

For all types of single ply membrane roofing.



BT 608, BT 609, BT 610 DRAIN

3 piece unit with clamp.
BT 608 - 80mm, BT 609 - 100mm, BT 610 - 150mm.



Drainage & Substrate Ventilation

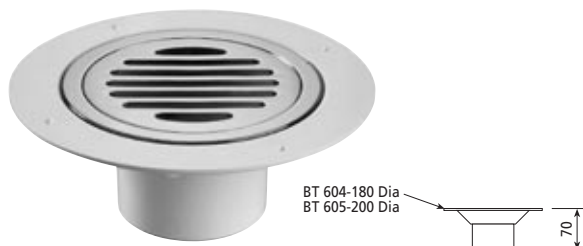
BT 602, BT 603 PLASTIC DECK DRAIN

Flat white plastic.
BT 602 - 80mm, BT 603 - 100mm.



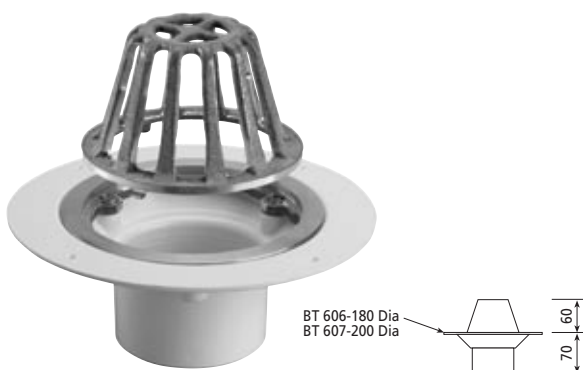
BT 604, BT 605 CHROME DECK DRAIN

Flat chrome insert.
BT 604 - 80mm, BT 605 - 100mm.



BT 606, BT 607 DOME DECK DRAIN

Bronze cast dome and insert.
BT 606 - 80mm, BT 607 - 100mm.



BT 500 LEAFGUARD

Moulded from tough PVC to suit 80-140mm outlets such as the BT 100 Dropper.



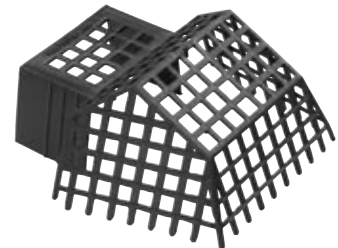
BT 501 LEAFGUARD

Moulded from tough PVC to suit 100-180mm outlets.



BT 502 LEAFGUARD

Moulded from tough PVC. Fits into BT 300 and 302 Scuppers.



BT 400, BT 401, BT 402 ROOF VENTS

These one-way ventilators are available in spun aluminium (BT 400) or moulded polyethylene Black (BT 401), Grey (BT 402) for use on concrete or plywood substrates.



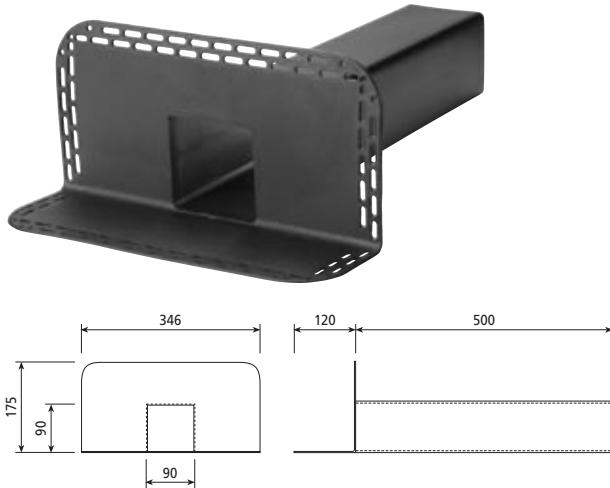
IMPORTANT NOTE

Ardex vents are designed only for venting substrate - ie plywood, joists etc.

If venting roof or ceiling cavities a ventilation engineer should be contracted to advise on requirement especially for skillion roof construction.

Whilst predominately torch-on these accessories can be used with Butynol and EPDM membranes where by-laws permit.

BT 302 SCUPPER

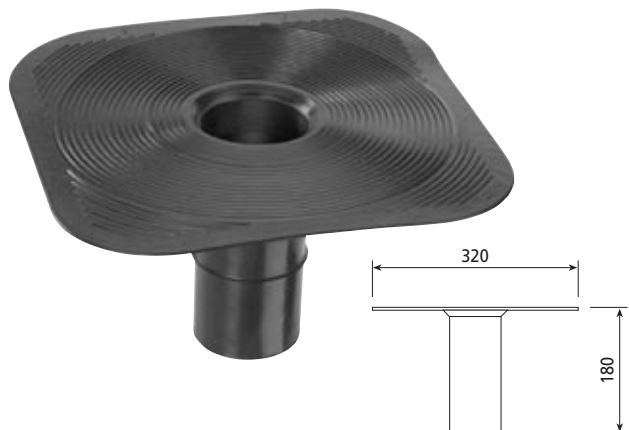


BT 103 DROPPER

To suit 100mm downpipe.

BT 104 DROPPER

To suit 80mm downpipe.



BT 420 PAVER SUPPORT

Protects membrane against damage from heavy paving slabs. For use over external membrane.



BT 355, BT 360 SCUPPER DOWNPIPE CONNECTOR

Connects to BT 302 80mm or 100mm Scuppers.

BT 355 - 100mm

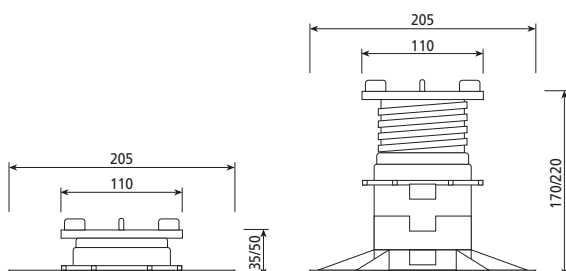
BT 360 - 80mm.

MAXI ADJUSTABLE SUPPORT

An adjustable paving support for floating paving systems.

Adjustable height from 35-220mm.

Available on indent order.





New Zealand

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Western Australia

Phone 08-9455 1644, Fax 08-9455 1227

www.butynol.co.nz

www.ardex.com

Certificate of Conformity

This is to Certify **Butynol® Roofing Membranes**

Product Description

Butynol®, Butynol HD® and ECO Butynol® Roofing Membranes are synthetic rubber waterproofing membranes. The products are supplied as single-ply, flexible synthetic rubber sheets in roll form. Butynol Butyseal has a polypropylene filament welded to the underside to give a separation layer to failed membranes that may have an adverse effect on the butyl.

Ancillary Components

Adhesive WPM 09A	Adhesive WPM 09C Catalyst
Adhesive WA98	Seam Primer
Seam Tape	Flashing Tape
Butynol Sealant	Ardex Release Tape

Complies with the Building Code of New Zealand:

If installed and maintained in accordance with the conditions of this certificate, Butynol® Roofing Membranes will comply with;

B2 Durability - B2.3.1 (b)

E2 External Moisture - E2.3.2

F2 Hazardous Building Materials - F2.3.1

If installed and maintained in accordance with the conditions of this certificate, Butynol® Roofing Membranes will contribute to compliance with;

E2 External Moisture - E2.3.1

Subject to the following conditions and limitations:

Conditions

- Butynol® Roofing Membranes must be designed and installed in accordance with the Ardex Waterproofing Systems Manual (March 2013).
- Butynol® Roofing Membranes must be installed by Ardex New Zealand Limited approved applicators.
- The substrate structure must be designed to comply with E2.3.1 i.e. designed to shed precipitated moisture. Specific design is required where:
 - a deck is more than 40m², or
 - a deck is constructed to a fall less than 1.5 degrees (1:40) or
 - a roof is constructed to a fall less than 2 degrees (1:30)
- Allowance for deflection and settlement of the substrate must be made in the design to ensure falls are maintained and no ponding of water can occur.
- Ardex New Zealand Ltd will notify AsureQuality Ltd in accordance with Regulation 15 of the Building (Product Certification) Regulations 2008.

Limitations

- The design and construction of the substrate and movement and control joints is specific to each building and is outside the scope of this certificate.
- The weather tightness design of all junctions on specifically designed buildings is outside the scope of this certificate.


John McKay, Chief Executive Officer, AsureQuality Limited

Date of Issue

19th May 2016

Certificate Number

AQ-050516-CMNZ



CODEMARK™

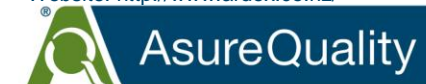
Product Use and Scope

Butynol®, Butynol HD® and ECO Butynol® Roofing Membranes are waterproofing membranes for roofs, pedestrian decks and balconies constructed to drain water to gutters and drain outlets

- on buildings
 - complying with the structural requirements of the NZ Building Code, and
 - in all wind zones up to and including extra high for buildings designed to NZS3604:2011 or up to 3.0 kPa ULS pressure differential for buildings specifically designed
- where the membrane is applied to a plywood or reinforced concrete substrate
- and where, for decks and balconies, there are
 - no steps within the deck level, and
 - no integral roof gardens, and
 - no downpipe discharging directly onto the deck

Certificate Holder

Ardex New Zealand Limited
32 Lane Street
Woolston
Christchurch
Ph: 03 3736909
Website: <http://www.ardex.co.nz/>



JAS-ANZ



www.jas-anz.org/register

CodeMark Certification Body

AsureQuality, 11 Hull Road,
Mt Maunganui
New Zealand
Tel. 0508 00 11 22
www.asurequality.com

Stria™
CLADDING



Stria

CLADDING

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Regulations 1992, Clause 3
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Stria

CLADDING

MAKE IT YOURS WITH STRIA

Stria Cladding is an ultra-sleek cladding option that plays with definitive lines and shadows to instantly transform home designs into an extension of your own personal style.

Find inspiration in the versatile elements Stria Cladding brings to external walls for dynamic and unique residential and commercial facades that really stand out. Stria Cladding has distinctive deep grooved lines and can be laid horizontally or vertically, introducing an interesting design feature to the walls of your home.

Imagine a house that's completely wrapped in Stria Cladding where every wall is different, where it's not just the wall style but the colour being changed, and you'll start to see the playful element it brings to your design.

It can be used to create colourful feature walls, full cladding for new builds, cladding for additions and renovations and internal feature walls. Stria Cladding is lightweight and durable, making it ideal for overhangs, protective cantilevers and other striking architectural features.

Made from premium fibre cement, Stria Cladding is a durable, low maintenance cladding that can be painted any colour you like. Stria Cladding is designed to withstand our harsh weather and coastal conditions.

What is Fibre Cement?

Engineered for durability fibre cement is resistant to fire and damage from moisture and rotting, making it the ideal low maintenance alternative to traditional cladding materials. Fibre Cement offers both contemporary and flexible design options and is used by many New Zealanders to create stunning facades.

The simple combination of wood cellulose fibre, sand, cement and water, give the product its strength to stand the test of time.

Profiles

HORIZONTAL APPLICATION

The clean, horizontal lines of Stria Cladding establish a look of modern simplicity on the outside, while its versatility can make it a great option as an internal feature wall too.



VERTICAL APPLICATION

Need to go up? Laid vertically, Stria Cladding is ideal for upper story extensions and additions. Its modern architectural style makes a bold statement, connecting the existing and new parts of the home.

MIXED APPLICATION

Stria Cladding really comes into its own when you mix the different styles, orient them vertically instead of horizontally and vary the colour.



LENGTH (MM)	WIDTH (MM)	THICKNESS (MM)
4200	405	14

Stria Cladding is a panel with a shiplap joint and is available in one profile.



Features

& BENEFITS



WEATHER RESISTANT

Engineered to stand up to harsh conditions, including coastal conditions



COST EFFECTIVE

Cost effective and long-lasting



EASY TO PAINT

Can be painted any colour, even the darker shades



RESISTANT TO DAMAGE FROM MOISTURE

Resistant to damage from moisture and rotting



LIGHT WEIGHT

Classified as a lightweight cladding under NZ Building Code



EASY TO INSTALL

Wide panels, combined with interlocking edges allows for quick and easy installation



FIRE RESISTANT

Fire protection with up to 60 minute fire resistance when used as part of a fire rated system



EASY TO CLEAN

Fast and effective using low pressure water and a brush



15 YEAR WARRANTY

Backed with a 15 year product warranty

Corner

OPTIONS



ALUMINIUM TRIM

Use the aluminium trim to achieve a sleek modern corner. The trim comes ready to paint, allowing you to create an almost seamless finish to your final design.

ALUMINIUM TRIM WITH A NEGATIVE DETAIL

Mimic the grooves of the Stria Cladding with a negative detail and create an architectural, modern, feature corner for a truly unique look.





Care

& MAINTENANCE

With minimal maintenance you can keep your home looking like new. The following are the best practices for this product to improve its longevity and performance.

- Washing down your exterior every 6-12 months using low pressure water and a brush, and every 3-4 months in extreme coastal conditions (such as high winds and sea spray)
- Clean out your gutters, downpipes and overflow pipes as required
- Cut back vegetation and landscaping which is too close to or touching the Stria Cladding
- Re-applying exterior protective finishes. Always refer to the paint manufacturer for re-coating requirements
- Maintaining the exterior envelope and connections including joints, penetrations, flashings and sealants
- The clearances between the bottom edge of Stria Cladding and the ground must always be maintained



Stria

CLADDING

jameshardie.co.nz



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Vertical Installation Technical Specification

Contents

1	APPLICATION AND SCOPE	3	5	STRIA CLADDING INSTALLATION	6
1.1	Application	3	5.1	General	6
1.2	Scope	3	5.2	Fastener durability	6
1.3	Details	3	5.3	Fastener – size and layout	7
1.4	Specific design	3	6	JOINTS	7
2	DESIGN	3	6.1	Vertical joint	7
2.1	Compliance	3	6.2	Horizontal joint	7
2.2	Responsibility	3	6.3	Drainage joint	7
2.3	Site and foundation	3	6.4	External corner	7
2.4	Surface clearances	3	6.5	Internal corner	7
2.5	Moisture management	4	7	FINISHES	8
2.6	Structure	4	7.1	Preparation	8
2.7	Fire rated walls	4	7.2	Painting	8
2.8	Structural bracing	4	7.3	Flexible sealant	8
2.9	Energy efficiency	4	8	STORAGE AND HANDLING	8
3	FRAMING	5	9	MAINTENANCE	9
3.1	General	5	10	PRODUCT INFORMATION	9
3.2	Timber framing	5	10.1	Manufacturing and classification	9
3.3	Special framing requirements	5	10.2	Product mass	9
3.4	Tolerances	5	10.3	Durability	9
4	PREPARATION	5	11	SAFE WORKING PRACTICES	10
4.1	Flexible underlay/HomeRAB™ Pre-Cladding	5	11.1	Stay healthy when working with building products containing crystalline silica	10
4.2	RAB™ Board	5	11.2	Avoid breathing in crystalline silica dust	10
4.3	Cavity closure/vent strip	6	11.3	Store and delivery	11
4.4	Cavity battens	6	11.4	Tips for safe and easy handling	11
4.5	Intermediate support	6	12	PRODUCT AND ACCESSORIES	12
4.6	Flashings	6	13	DETAILS	14
4.7	Junctions and penetrations	6		PRODUCT WARRANTY	37

WE VALUE YOUR FEEDBACK

To continue with the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

Ask James Hardie™
literaturefeedback@jameshardie.co.nz

1 Application and scope

1.1 APPLICATION

Stria™ Cladding installed as per this specification gives a vertical panelised masonry appearance. Stria Cladding can be fixed to timber-framed external walls. A wide range of colours can be used, varying from light to dark. Stria Cladding is available in 405mm wide x 4200mm lengths and is 14mm thick.

Specifiers

If you are a specifier or other responsible party for a project ensure that the information in this document is appropriate for the application you are planning and that you undertake specific design and detailing for areas which fall outside the scope of these specifications.

Installers

If you are an installer ensure that you follow the design, moisture management principles, associated figures and material selection provided by the designer and this James Hardie Technical Specification. All of the details provided in this document must be read in conjunction with the project specification.

Make sure your information is up to date

When specifying or installing James Hardie products, ensure that you have the current manual. Additional installation information, warranties and warnings are available at www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

1.2 SCOPE

This specification covers the installation of Stria Cladding fixed vertically over James Hardie horizontal cavity battens on buildings that fall within the scope limitation of NZS 3604 and E2/AS1 of the New Zealand Building Code (NZBC).

This specification also covers the installation of Stria Cladding on projects, which are subject to specific engineering design (SED) up to a wind pressure of 2.5kPa (ULS).

1.3 DETAILS

Various typical Stria Cladding vertical construction details are provided in the Details section of this document. These details are available in dwg, dxf, jpg and pdf file format and can be downloaded from our website at www.jameshardie.co.nz.

All dimensions shown are in millimetres unless noted otherwise.

1.4 SPECIFIC DESIGN

For use of Stria Cladding on a specific design project that is outside the scope of this literature, the designer, architect or engineer must ensure that applicable clauses of the NZBC have been considered and a specific design has been undertaken.

2 Design

2.1 COMPLIANCE

Stria Cladding installed vertically in accordance with this specification has been tested to demonstrate compliance with clauses E2, B1 and B2 of the NZBC.

2.2 RESPONSIBILITY

The specifier or other party responsible for the project must ensure that the information and details in this specification are appropriate for the intended application and that additional detailing is performed for specific design or any areas that fall outside the scope of this technical specification. For applications outside the scope of this literature and details, which are not provided herein, the architect, designer or engineer must undertake specific design and it should be ensured that the intent of their design meets the requirements of the NZBC.

All New Zealand Standards referenced in this document are current editions and must be complied with.

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

2.3 SITE AND FOUNDATION

The site on which the building is situated must comply with the NZBC Acceptable Solution E1/AS1 'Surface Water'. Foundation design must comply with the requirements of NZS 3604 'Timber-framed Buildings' or be as per specific engineering design. The grade of adjacent finished ground must slope away from the building to avoid any possibility of water accumulation in accordance with the NZBC requirements.

2.4 SURFACE CLEARANCES

The clearance between the bottom edge of the cladding and paved/unpaved ground must comply with section 9.1.3 of E2/AS1. The finished floor level must also comply with these requirements. These clearances must be maintained throughout the life of the building.

Stria Cladding must overhang the bottom plate by a minimum of 50mm, as required by E2/AS1.

Stria Cladding must maintain a minimum clearance of 100mm from paved ground, and 175mm from unpaved ground.

On roofs and decks, the minimum clearance must be 50mm.

Do not install external cladding such that it may remain in contact with water or ground. Refer to Figure 3.

2.5 MOISTURE MANAGEMENT

It is the responsibility of the specifier to identify moisture related risks associated with any particular building design.

Wall construction design must effectively manage moisture, considering both interior and exterior environments of the building, particularly in buildings that have a higher risk of wind driven rain penetration. The building should also be ventilated sufficiently to control moisture accumulation due to condensation, especially in artificially cooled/heated buildings.

Walls must include those provisions as required by the NZBC Acceptable Solution Clause E2/AS1. In addition, all wall openings, penetrations, junctions, connections, window sills, heads and jambs must incorporate appropriate flashings for waterproofing. The other materials, components and installation methods used to manage moisture in external walls, must comply with the requirements of relevant standards and the NZBC. For further guidance on designing for weathertightness, refer to BRANZ Ltd. and the Ministry of Business Innovation and Employment (MBIE) updates on the following websites respectively, www.branz.co.nz and www.building.govt.nz.

In addition, the following issues must also be considered:

- Sealant must be installed where detailed in this literature
- Where the walls are higher than two storeys, it is necessary to provide a horizontal flashing at the second floor level to drain the cavity
- The installation of smoke chimneys, pipe penetrations and other fixtures etc. must not track moisture into the wall or restrict the drainage of moisture to the exterior

2.6 STRUCTURE

2.6.1 Timber Framing

Timber-framed buildings must either be in accordance with NZS 3604 (Timber-framed Buildings) or designed as per specific engineering design. For a building requiring a specific engineering design, the framing stiffness must be equivalent to, or more than, the stiffness requirements of NZS 3604.

For specific design projects, the timber framing must be designed in accordance with the requirements of NZS 3603 and AS/NZS 1170.

For timber frame walls longer than 12m, it is best practice to allow for construction joints to accommodate movements generated due to timber shrinkage or deflections generated by loadings etc.

2.6.2 Wind Pressures

Stria Cladding is suitable for use in wind zones up to and including EH as defined in NZS 3604.

Stria Cladding is also suitable in specific design projects up to design wind pressures of 2.5kPa ULS.

2.7 FIRE RATED WALLS

Stria Cladding when fixed over timber cavity battens to external walls can achieve fire ratings up to 60/60/60 to comply with Clause C of the NZBC, when the walls are constructed in accordance with the current James Hardie 'Fire and Acoustic' Design Manual.

Stria Cladding is classified as a 'non-combustible' material suitable for use on walls close to a boundary.

2.8 STRUCTURAL BRACING

Stria Cladding installed as per this specification cannot be used to achieve any structural bracing. However, bracing can be achieved by using a James Hardie rigid air barrier board (RAB™ Board or HomeRAB™ Pre-Cladding) installed direct to framing instead of a flexible underlay or by using the Villaboard™ Lining bracing system on the internal face of the wall. Refer to the James Hardie Bracing Design Manual for further information.

2.9 ENERGY EFFICIENCY

External walls constructed as per this technical specification using Stria Cladding and bulk insulation, where the area of glazing is 30% or less of the total wall area, comply with the insulation requirements for walls in the NZBC Acceptable Solution H1/AS1 (Energy Efficiency Clause H1), Replacement Table 1. To meet thermal insulation requirements for the construction, the bulk insulation as specified in Table 1 must be used. This insulation may be substituted with insulations having higher R-values. The thermal insulation of a wall changes when the size or spacing of timber framing is increased or decreased. The calculation used in Table 1 is based on a timber framing size 90 x 45mm and using an internal lining material such as James Hardie Villaboard Lining or a 10mm plasterboard.

Table 1

Insulation capability		
Climate Zone	R-Value Requirement	Minimum Cavity Insulation Infill Requirement
1 and 2	1.9 m ² °C/W	#R2.0
3	2.0 m ² °C/W	#R2.2
<p>Total construction R-Value depends on the insulation material used and the framing ratio. The insulation material R-Values specified in this table are for studs spaced at 600mm c/c and nogs spaced at 600mm c/c.</p> <p># To achieve higher R-Values of construction the wall insulation material must be replaced with an insulation material having higher R-Values to suit the requirements.</p> <p>For further guidance on insulation requirements refer to the current edition of 'House Insulation Guide' published by BRANZ.</p>		

3 Framing

3.1 GENERAL

Stria Cladding can be fixed either to a timber-frame or steel-frame.

For fixing to a steel frame. Ask James Hardie on 0800 808 868 for specific requirements.

- Studs must be provided at 600mm centres maximum
- Nogs must be provided at 600mm centres maximum

Note: For fixing Stria Cladding, fastener spacing is provided in Section 5.

3.2 TIMBER FRAMING

3.2.1 Dimensions

A 90 x 45mm minimum framing size is required.

3.2.2 Structural Grade

Timber grade used must be in accordance with timber grades specified in NZS 3604.

3.2.3 Durability

The external framing timber must be treated to a minimum H1.2 treatment. Higher treatment levels may be used, but check for the compatibility of treatment chemicals with other materials. Refer to the NZBC Acceptable Solution B2/AS1 Durability for further information about the durability requirements.

For timber treatment and allowable moisture content information refer to NZS 3602 (Timber and Wood-Based Products for use in Buildings) and NZS 3640 (Chemical Preservation of Round Sawn Timber) for minimum timber treatment selection and treatment requirements.

Also refer to the framing manufacturer's literature for further guidance on timber selection. Framing must be protected from moisture at the site in accordance with the framing manufacturer's recommendations.

3.2.4 Frame Construction

Use of timber framing must be in accordance with NZS 3604 and the framing manufacturer's specifications. The framing must be rigid and must not rely on the cladding for stability. Timber framing sizes and its set-out must comply with NZS 3604 and as specified in this technical specification.

The following framing is required:

- Studs must be provided at 600mm centres maximum
- Nogs must be provided at 600mm centres maximum
- An extra stud is required in internal corners
- For specific design projects exposed to wind speeds higher than 55m/sec, the stud size and spacing must be as per the project specific engineering design requirements.

In case of gable end trusses sitting on top plates of the external wall frame, the frame size must be in accordance with truss design and specification supplied by the frame and truss manufacturer/supplier supported by independent design producer statement.

3.3 STEEL FRAME

Refer to James Hardie Steel Frame Technical Specification about the installation of Stria Cladding to steel frame.

3.4 SPECIAL FRAMING REQUIREMENTS

The following are special framing requirements for both timber and steel framing:

- Double studs are required at internal corners, refer to Figure 7
- Extra packers may be required at external corners

3.5 TOLERANCES

In order to achieve the required performance and an acceptable wall finish, it is imperative that framing is straight and true. Framing tolerances must comply with Table 2.1 of NZS 3604 and the manufacturer's specifications. All framing shall be made flush.

4 Preparation

4.1 FLEXIBLE UNDERLAY / HOMERAB PRE-CLADDING

Flexible underlay / HomeRAB Pre-Cladding must be provided as per the requirements of External Moisture Clause E2 of the NZBC. The flexible underlay selected for use must comply with Table 23 of E2/AS1.

The flexible underlay must be fixed in accordance with section 9.1.7 of E2/AS1 and the underlay manufacturer's recommendations.

Walls which are not lined on the inside face (e.g. garage walls or gable ends), must include a rigid sheathing or an air barrier behind the cladding which complies with Table 23 of E2/AS1. For attached garages, flexible underlays must be selected in accordance with the NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. James Hardie HomeRAB Pre-Cladding complies with these requirements and is suitable for use in this situation. It must be installed in accordance with the James Hardie Rigid Air Barriers installation manual.

4.2 RAB BOARD

For EH wind zone or for specific design projects where the wind pressure is higher than 1.5kPa, James Hardie RAB Board must be used instead of flexible underlay.

To achieve temporary weathertightness using James Hardie rigid air barrier boards, windows/doors need to be temporarily installed. Refer to the James Hardie Rigid Air Barriers installation manual for information regarding its installation.

4.3 CAVITY CLOSURE / VENT STRIP

The James Hardie uPVC cavity vent strip must be installed at the bottom of all walls and above all openings constructed using the drained and ventilated cavity construction method. It is important that the openings in the cavity closure/vent strip are kept clear and unobstructed to allow free drainage and ventilation of cavities. James Hardie cavity closure / vent strip has an opening area of 1000mm²/m length.

4.4 CAVITY BATTENS

Stria Cladding is to be installed on horizontal cavity battens. The battens provide ventilation and drainage between the frame and the weatherboard and are considered a "packer" only in this specification.

The James Hardie horizontal cavity battens are H3.1 treated in accordance with NZS 3640 (Chemical preservation of rough and sawn timber) to comply with the durability requirements of B2/AS1.

James Hardie horizontal cavity battens meet the requirements of E2/AS1 and:

- are minimum 20mm thick and 45mm wide;
- fixed horizontally to noggs;
- fixed vertically to studs at corners and openings;
- must be fixed by the cladding fixings to the main framing over the flexible underlay. Therefore until claddings are fixed the battens only need to be tacked to framing by 40 x 2.8mm or longer nails at 800mm c/c;
- permit air circulation and water drainage.

4.5 INTERMEDIATE SUPPORT

Where studs are at 600mm centres an intermediate means of restraining the flexible underlay and insulation from bulging into the cavity shall be installed. An acceptable method to achieve this is using one of the following options:

- 75mm galvanised mesh; or
- polypropylene tape at 300mm centres fixed horizontally and drawn taut

No intermediate supports are required:

- when studs are spaced at 400mm centres; or
- when rigid air barriers instead of flexible underlays are used

4.6 FLASHINGS

All wall openings, penetrations, intersections, connections, window sills, heads and jambs must be flashed prior to Stria Cladding installation. Refer to moisture management requirements in Clause 2.5. The flexible underlay/rigid air barrier must be appropriately incorporated with penetration and junction flashings using flashing tapes. Materials must be lapped in such a way that water tracks down to the exterior on the face of the flexible underlay or rigid air barrier board.

The selected flashing materials must comply with the durability requirements of the NZBC. For information refer to Table 20 of E2/AS1.

When using James Hardie rigid air barrier boards the entire framing around openings must be protected with a flashing tape. The tape must be finished over the face of the rigid air barrier. Ensure to check the compatibility of flashing tapes and sealants with their manufacturers. Refer to the James Hardie Rigid Air Barriers installation manual for further information.

4.7 JUNCTIONS AND PENETRATIONS

Refer to Clause 2.5 of this specification for moisture management requirements. All windows and doors must be detailed as per the requirements of this specification. For an example of window details for Stria Cladding which meet the performance requirements of E2 External Moisture, an approved document of the NZBC, refer to Figures 9 to 15.

5 Stria Cladding Installation

5.1 GENERAL

Stria Cladding is installed vertically using the cavity construction method as per the details and information published in this manual. Stria Cladding panels are 405mm wide and are installed with a 25mm nominal lap over the panel below. Considering the installation and machining variations the effective cover for Stria Cladding can vary between 380 - 382mm.

Stria Cladding must be kept under cover whilst in storage or at sites and they must be dry at the time of their installation. All site-cut board edges must be sealed with Dulux 1 Step, Resene Quick Dry, Taubmans Underproof Acrylic Primer Undercoat or a similar sealer compatible with the finish coat before installation.

Stria Cladding must be fully supported and fixed through James Hardie horizontal cavity battens. Ensure that cladding is hard against the battens to avoid drumminess before fixing.

This technical specification only covers the vertical installation of Stria Cladding. For horizontal installation refer to the Stria Cladding timber cavity batten technical specification.

5.2 FASTENER DURABILITY

Fasteners must meet the minimum durability requirements of the NZBC. NZS 3604 specifies the requirements for fixing materials to be used in relation to exposure conditions and are summarised in Table 2.

Fasteners must be fully compatible with the other materials that they are to be in contact with, to ensure the durability of the complete assembly.

Table 2

Exposure conditions and nail selection prescribed by NZS 3604		
ZONE	APPLICATION	
D (Sea Spray) *	General	Stainless Steel 304/316
	Fire	
	Bracing	
C and B and Geothermal hot spots	General	Hot Dip Galvanised**
	Fire	
	Bracing	

*(Zone C areas where local knowledge dictates that increased durability is required, appropriate selection shall be made). Microclimate conditions as detailed in NZS 3604, Paragraph 4.2.4 require SED.

Also refer to the NZBC Acceptable Solution E2/AS1 Table 20 and 21 for information regarding the selection of suitable fixing materials and their compatibility with other materials.

5.3 FASTENER – SIZE AND LAYOUT

Stria Cladding must be fixed vertically to framing using fixings as specified in Table 3 below and follow the edge distance required for nails as shown in the details.

Table 3

Fixing up to and including VH wind zone	
CAVITY CONSTRUCTION OVER FLEXIBLE UNDERLAY	
65 x 2.87mm D head or 65 x 2.87mm RounDrive ring shank nails	Fix a nail at 100mm from top edge and 100mm from bottom edge/per board/per nog/plate. Refer to Figure 5

Fixing up to and including VH wind zone	
CAVITY CONSTRUCTION OVER HOMERAB PRE-CLADDING/RAB BOARD	
75 x 3.06mm D head or 75 x 3.15mm RounDrive ring shank nails	Fix a nail at 100mm from top edge and 100mm from bottom edge/per board/per nog/plate. Refer to Figure 5

Fixing EH wind zone and SED projects	
CAVITY CONSTRUCTION OVER RAB BOARD	
75 x 3.06mm D head nails or 75 x 3.15mm RounDrive ring shank nails	Fix a nail at 100mm from top edge and 100mm from bottom edge/per board/per nog/plate. Refer to Figure 5

For other fixing options Ask James Hardie on 0800 808 868.

- When fixing the Stria Cladding using nail guns, refer to the nail gun manufacturer for information about nails and the type of nail gun to be used
- D head nails - finish nails 2mm below weatherboard surface
- RounDrive nails - finish nails flush with weatherboard surface

6 Joints

6.1 VERTICAL JOINT

Stria Cladding vertical joint shall be formed using the ship lap edge of the Stria Cladding. Ensure that the Stria Claddings are securely interlocked before nailing. Refer to Figures 5 and 6.

6.2 HORIZONTAL JOINT

Stria Cladding can run continuously over floor joists without a flashed horizontal joint when LVL timber floor joists or engineered joist are used. Refer to Figure 16.

When using a solid timber joist, a horizontal joint or a movement joint must be formed at floor joist, refer to Figure 18.

6.3 DRAINAGE JOINT

After every two floors a horizontal drainage joint flashing is required as per E2/AS1. Refer to Figure 21.

6.4 EXTERNAL CORNER

An external box corner flashing is used to fix the external corners, refer to Figure 8. Alternatively an Axent™ Trim external boxed corner can also be formed.

6.5 INTERNAL CORNER

An internal corner flashing is to be used to form an internal corner joint, refer to Figure 7.

An extra stud is required in internal corners.

Note: All joint mouldings to be fixed at 400mm centres both sides.

7 Finishes

7.1 PREPARATION

The D head nail must be finished 2mm below the cladding surface. The nail holes must be filled with an exterior grade two part builders fill, ie. CRC ADOS Builders Fill or similar two part external grade filler. The RounDrive nail heads must finish flush with cladding surface.

7.2 PAINTING

Stria Cladding is pre-primed and is suitable for site applied acrylic paints.

In order to seal cut edges or sanded patches, Dulux 1 Step, Resene Quick Dry, Taubmans Underproof Acrylic Primer Undercoat or a similar product should be applied. The primer should be compatible with the paint to be used.

Painting of Stria Cladding is mandatory to meet the durability requirements of the NZBC and 15 year James Hardie product warranty. Stria Cladding must be dry and free of any dust or grime before painting. The cladding must be painted within 90 days of installation. There is no restriction on the LRV of paint to be applied on the Stria Cladding.

James Hardie recommends a minimum of two coats of exterior grade acrylic paint. Follow the paint manufacturer's recommendations to prepare the surface and to adequately cover and conceal the cladding fixings.

7.3 FLEXIBLE SEALANT

Sealant used must comply with the relevant requirements of the NZBC. Their application and usage must be in accordance with the manufacturer's instructions. Check with the sealant manufacturer prior to coating over sealant. Some sealant manufacturers do not recommend coating over their product.

8 Storage and handling

When storing Stria Cladding, they must be laid flat on a smooth level surface. Edges and corners must be protected from chipping.

To ensure optimum performance, store cladding under cover and keep dry prior to fixing. If the cladding becomes wet, allow them to dry thoroughly before fixing.

Do not carry cladding on the flat, carry on edge to avoid excessive bending.

9 Maintenance

The extent and nature of maintenance required will depend on the geographical location and exposure of the building. It is the responsibility of the specifier to determine normal maintenance requirements to maintain the effectiveness of the cladding.

As a guide, it is recommended that the basic normal maintenance tasks shall include, but not be limited to:

- Washing down exterior surfaces every 6-12 months*
- Re-coating exterior protective finishes**
- Regular inspection and repair if necessary of the cladding joints, sealants, nail head fillers
- Cleaning out gutters, down pipes and overflow pipes as required
- Pruning back vegetation which is close to or touching the building as well as ensuring the NZBC ground clearance requirements are maintained, especially where gardens are concerned
- The clearance between the bottom edge of the Stria Cladding and the finished/unfinished ground must always be maintained

**Do not use a water blaster to wash down the cladding*

**In extreme coastal conditions or sea spray zones, wash every 3-4 months*

***Refer to your paint manufacturer for washing down and recoating requirements related to paint performance*

10 Product information

10.1 MANUFACTURING AND CLASSIFICATION

Stria Cladding is an advanced lightweight cement composite cladding, manufactured using James Hardie formulation. Basic composition is Portland cement, ground sand, cellulose fibre and water. The product is easily identified by the name 'Stria Cladding'.

Stria Cladding is manufactured to Australian/New Zealand Standard AS/NZS 2908.2 'Cellulose-Cement Products' (ISO 8336 'Fibre-Cement Flat Sheet').

Stria Cladding is classified Type A, Category 2 in accordance with AS/NZS 2908.2 "Cellulose-Cement Products".

For Safety Data Sheets (SDS) visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

10.2 PRODUCT MASS

Stria Cladding is manufactured in 14.0mm thickness and has a mass of 13.8kg/m² at EMC.

Stria Cladding is defined as a Light Weight Wall Cladding (not exceeding 30kg/m²) as per NZS 3604.

10.3 DURABILITY

Stria Cladding and James Hardie rigid air barrier installed and maintained as per this technical specification will meet the durability requirement for cladding as per the NZBC clause B2 Durability.

10.3.1 Resistance to Moisture/Rotting

Stria Cladding is resistant to permanent moisture induced deterioration (rotting) and meets the requirements of the following tests in accordance with the AS/NZS 2908.2:

- Heat Rain (Clause 6.5)
- Water Permeability (Clause 8.2.2)
- Warm Water (Clause 8.2.4)
- Soak Dry (Clause 8.2.5)

10.3.2 Control of External Fire Spread

Stria Cladding meets the requirements of Appendix C C7.1.1 and is classified as 'Non-Combustible Material' which is suitable for use as external wall cladding and complies with the requirements of Paragraph 5.4 of the NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of Acceptable Solutions C/AS2 to C/AS6 of the NZBC.

10.3.3 Alpine Regions

In regions subject to freeze/thaw conditions, Stria Cladding and James Hardie rigid air barrier must not be in direct contact with snow or ice build up for extended periods, e.g. external walls in alpine regions must be protected where snowdrifts over winter are expected.

These products meet the requirements of the AS/NZS 2908.2 Clause 8.2.3.

11 Safe working practices

11.1 STAY HEALTHY WHEN WORKING WITH BUILDING PRODUCTS CONTAINING CRYSTALLINE SILICA

Crystalline Silica

What is it? Why and when is it a health hazard?

Crystalline Silica is

Commonly known as sand or quartz

Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?

Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust

Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks

The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?









It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica

Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS AND INSTALLATION INSTRUCTIONS WHEN WORKING WITH JAMES HARDIE PRODUCTS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

11.2 AVOID BREATHING IN CRYSTALLINE SILICA DUST!

Safe working practices

-  NEVER use a power saw indoors or in a poorly ventilated area
-  NEVER dry sweep
-  ALWAYS use M Class extractor unit as a minimum and always hose down with water/wet wipe for clean up
-  NEVER use grinders
-  ALWAYS use a circular sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the HardieBlade™ logo or one with at least equivalent performance
-  ALWAYS follow tool manufacturers' safety recommendations
-  ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
-  ALWAYS wear an approved properly-fitted, approved dust mask (P1 or P2) or respirator

Use one of the following methods based on the required cutting rate:

BEST

HardieKnife™





Hand guillotine

Fibreshear





BETTER

Dust reducing circular saw equipped with HardieBlade™ Saw Blade and M Class extractor unit.

Working outdoors

-  Make sure you work in a well ventilated area
-  Position cutting station so wind will blow dust away from yourself and others in the working area
-  Cut products with either a HardieKnife™ or fibre cement shears or, when not feasible, use a HardieBlade™ Saw Blade (or equivalent) and a dust-reducing circular saw attached to a M Class extractor unit
-  When sawing, sanding, rebating, drilling or machining fibre cement products, always:
 - Wear your P1 or P2 mask (correctly fitted in accordance with manufacturers' instructions) and when others are close by, ask them to do the same
 - If you are not clean shaven, then use a powered air respirator with a loose fitting head top
 - Wear safety glasses
 - Wear hearing protection
 - When others are close by, ask them to do the same

Working indoors

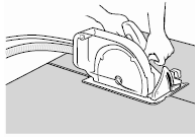
-  Never cut using a circular saw indoors
-  Position cutting station in a well ventilated area
-  Cut ONLY using a HardieKnife™, hand guillotine or fibreshears (manual, electric or pneumatic)
-  Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class extractor unit

IF CONCERN STILL EXISTS ABOUT EXPOSURE LEVELS OR YOU DO NOT COMPLY WITH THE ABOVE PRACTICES, YOU SHOULD ALWAYS CONSULT A QUALIFIED INDUSTRIAL HYGIENIST.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

Working Instructions

Refer to Recommended Safe Working Practices before starting any cutting or machining of product



HardieBlade™ Saw Blade

The HardieBlade™ Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust deflector or a dust collector connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut

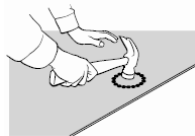
Hole-Forming

For smooth clean cut circular holes:

Mark the centre of the hole on the sheet

Pre-drill a 'pilot' hole

Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill



For irregular holes:

Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face

Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported

11.4 TIPS FOR SAFE AND EASY HANDLING

Weatherboard products

- 👍 Do not lift planked products flat and in the middle
- 👍 Carry the products on the edge
- 👍 If only one person is carrying the product, hold it in the middle and spread arms apart to better support the product
- 👍 If two people are carrying the plank, hold it near each end and on edge
- 👍 Exercise care when handling weatherboard products to avoid damaging the edges/corners

Sheet products

- 👍 Carry with two people
- 👍 Hold near each end and on edge
- 👍 Exercise care when handling sheet products to avoid damaging the edges/corners

11.3 STORAGE AND DELIVERY

Keeping products and people safe

Off loading

- 👍 James Hardie products should be off-loaded carefully by hand or by forklift
- 👍 James Hardie products should not be rolled or dumped off a truck during the delivery to the jobsite

Storage

James Hardie products should be stored:

- 👍 In their original packaging
- 👍 Under cover where possible or otherwise protected with a waterproof covering to keep products dry
- 👍 Off the ground – either on a pallet or adequately supported on timber or other spacers
- 👍 Flat so as to minimise bending


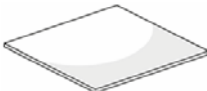
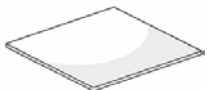
James Hardie products must not be stored:

- 👎 Directly on the ground
- 👎 In the open air exposed to the elements










JAMES HARDIE IS NOT RESPONSIBLE FOR DAMAGE DUE TO IMPROPER STORAGE AND HANDLING.

12 Product and accessories

Table 4

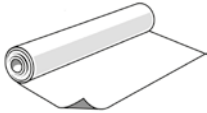



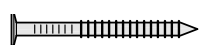
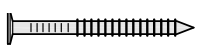


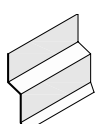
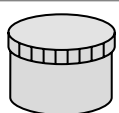
Stria Cladding information					
Product	Description	Size (mm)			Code
		Thickness	Length	Width	
	Stria Cladding A 14mm profiled panel for expressed jointed residential facades. Factory sealed on all six sides. Each panel has a manila white colour primer applied on its face, which accepts a wide range of paint finishes.	14	4200	405	404263
	RAB Board Used as a rigid air barrier. It has green colour sealer applied over one face. Installed with green side facing out.	6	2450	1200	402980
		6	3000	1200	402981
	HomeRAB Pre-Cladding Used as a rigid air barrier. It has green colour sealer applied over one face. Installed with green side facing out.	4.5	2450	1200	404766
		4.5	2750	1200	404768

Note: All dimensions and masses provided are approximate only and are subject to manufacturing tolerances.

Accessories/tools supplied by James Hardie			
Accessories	Description	Size	Code
	James Hardie Horizontal Cavity Batten 20mm H3.1 Timber treated batten the cladding is fixed over	2700mm long	305862
	Stria Trimline Joint Flashing Aluminium extrusion used behind cladding at horizontal joints.	3000mm long	305827
	JH Weatherboard Internal 'W' Corner Anodised aluminium extrusion used to create internal corners.	2700mm long	300386
	Stria Cladding External Box Corner Anodised aluminium extrusion used to create external corners.	2700mm long 4000mm long	305824 305823
	uPVC Vent Strip PVC moulding used as vermin proofing.	3000mm long	302490
	Trimline Horizontal Jointer A jointer to cover the butt joint of Stria Trimline Joint Flashing	100mm long	305871
	Trimline External Corner Jointer Joins Trimline Joint Flashing at an external corner		305870
	Trimline Internal Corner Jointer Joins Trimline Joint Flashing at an internal corner		305872
Tools			
	HardieBlade™ Saw Blade Diamond tip fibre cement circular saw blade. Spacers not included.	184mm 254mm	300660 303375

Accessories/tools not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with Stria Cladding and James Hardie rigid air barrier. James Hardie does not supply these products and does not provide a warranty for their use. Please contact component manufacturer for information on their warranties and further information on their products.

Product	Description
	Flexible underlay Must comply with Table 23 of E2/AS1.
	Flexible window opening flashing tape A flexible self-adhesive tape used in preparation of a window. Refer to the window installation section in this manual for more information. e.g. Protecto or SUPER-STICK by Protecto Wrap or 3M™ All Weather Flashing Tape 8067 by 3M™ Protecto: 0800 776 9727 3M™: 0800 474 787
	James Hardie rigid air barrier vertical joint sealing tape The tape to be used to seal James Hardie rigid air barrier vertical joints. SUPER-STICK by Protecto Wrap or 3M™ All Weather Flashing Tape 8067 by 3M™ Protecto: 0800 776 9727 3M™: 0800 474 787
	Flexible sealant Bostik Seal N Flex-1, Sikaflex AT Facade, Sikaflex MS or similar.
	65 x 2.87mm 'D' head nail or 65 x 2.87 RoundDrive nail (ring shank hot dipped galvanised/stainless steel) For fixing Stria Cladding.
	75 x 3.06mm 'D' head nail or 75 x 3.15 RoundDrive nail (hot dipped galvanised or ring shank stainless steel) For fixing Stria Cladding.
	40 x 2.8mm or longer HardieFlex™ nail. For fixing timber cavity battens and aluminium flashings.
	Meter box Refer Electrical Suppliers.
	Head flashing Required over window heads to be supplied by window installer. Material must comply with Table 20 and 21 of E2/AS1.
	Exterior grade filler CRC ADOS Builders Fill or similar two part filler to fill over nail holes

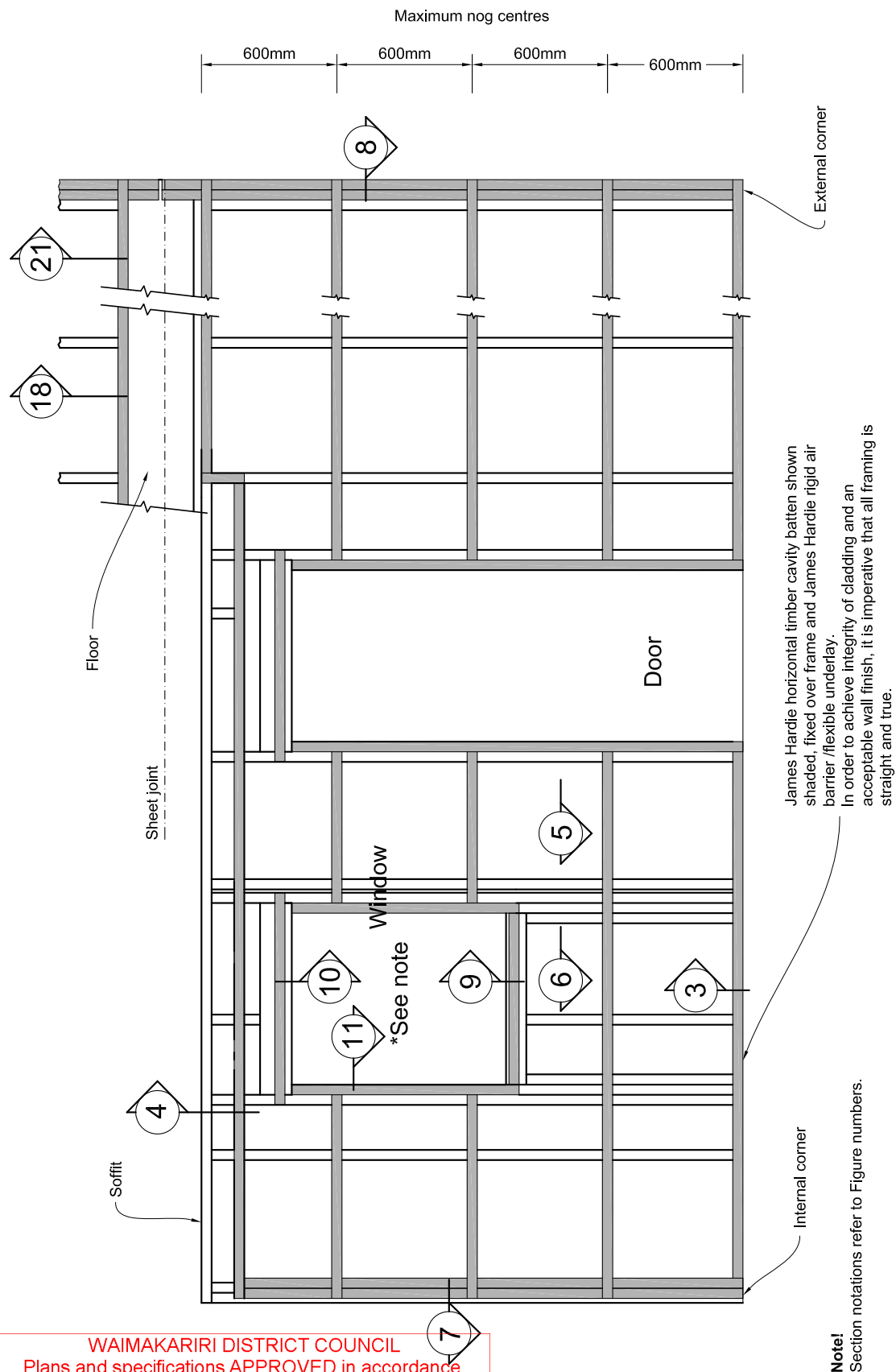
13 Details

The following generic details have been provided in this document for cavity construction methods.

Table 5

Details		
Description	Cavity Construction	
	Figure No.	Page No.
Framing set out	Figure 1	15
Cladding and James Hardie horizontal batten setout	Figure 2	16
Ground clearance	Figure 3	17
Soffit detail	Figure 4	17
Vertical joint up to VH wind zone	Figure 5	18
Vertical joint EH wind zone and SED	Figure 6	18
Internal corner	Figure 7	19
External aluminium box corner	Figure 8	19
Window sill	Figure 9	20
Window head	Figure 10	20
Window jamb	Figure 11	21
Window jamb	Figure 12	21
Window sill with facings	Figure 13	22
Window head with facings	Figure 14	22
Window jamb with facings	Figure 15	23
Over joist at floor level	Figure 16	23
Butt jointing of Stria Cladding	Figure 17	24
Trimline flashing joint at floor level	Figure 18	25
Trimline flashing joint external corner	Figure 19	26
Trimline joint	Figure 20	27
Drained flashing joint at floor level	Figure 21	28
Drained flashing joint at floor joist	Figure 22	29
Apron flashing detail	Figure 23	30
Parapet flashing	Figure 24	30
Roof to wall junction detail	Figure 25	31
Meter box at sill	Figure 26	31
Meter box at jamb	Figure 27	32
Meter box at head	Figure 28	32
Enclosed deck	Figure 29	33
Pipe penetration	Figure 30	33
Cladding installed	Figure 31	34
Garage head	Figure 32	35
Garage jamb	Figure 33	35

Figure 1: Framing set out



WALL ELEVATION

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Figure 2: Cladding and James Hardie horizontal batten setout

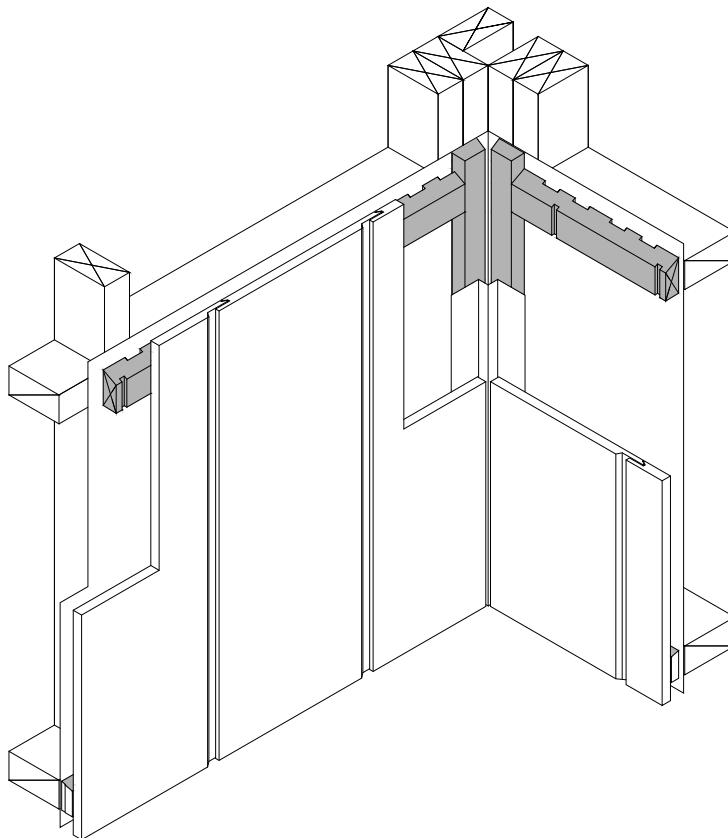
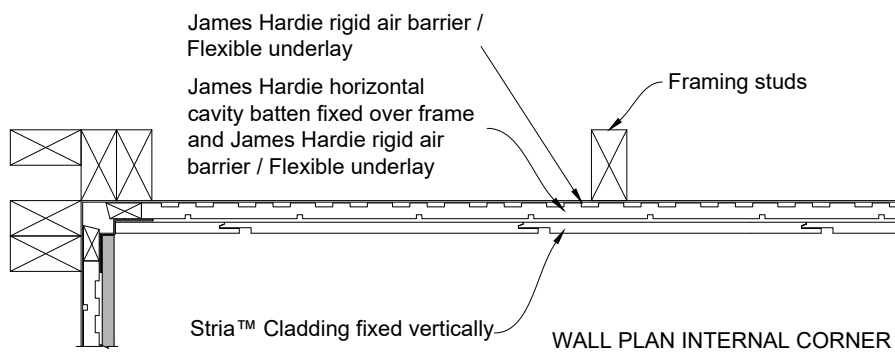
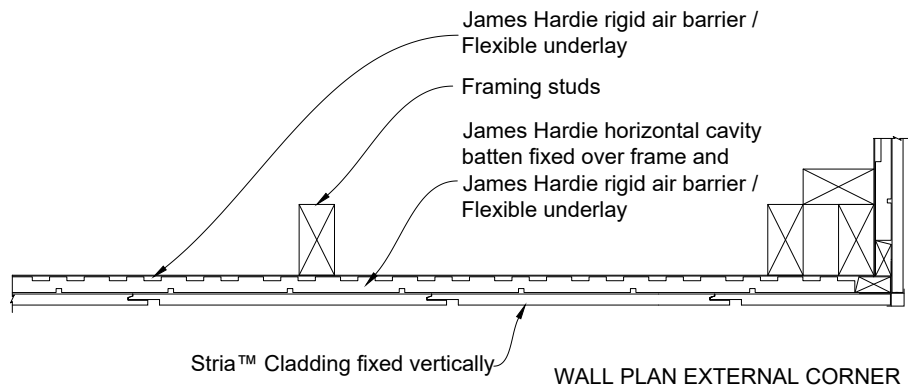


Figure 3: Ground clearance

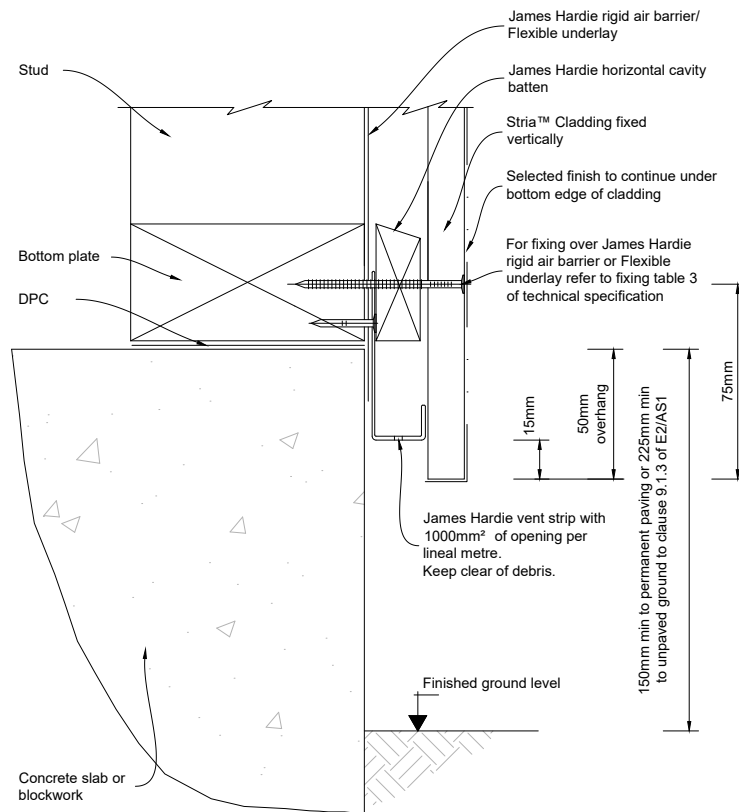


Figure 4: Soffit detail

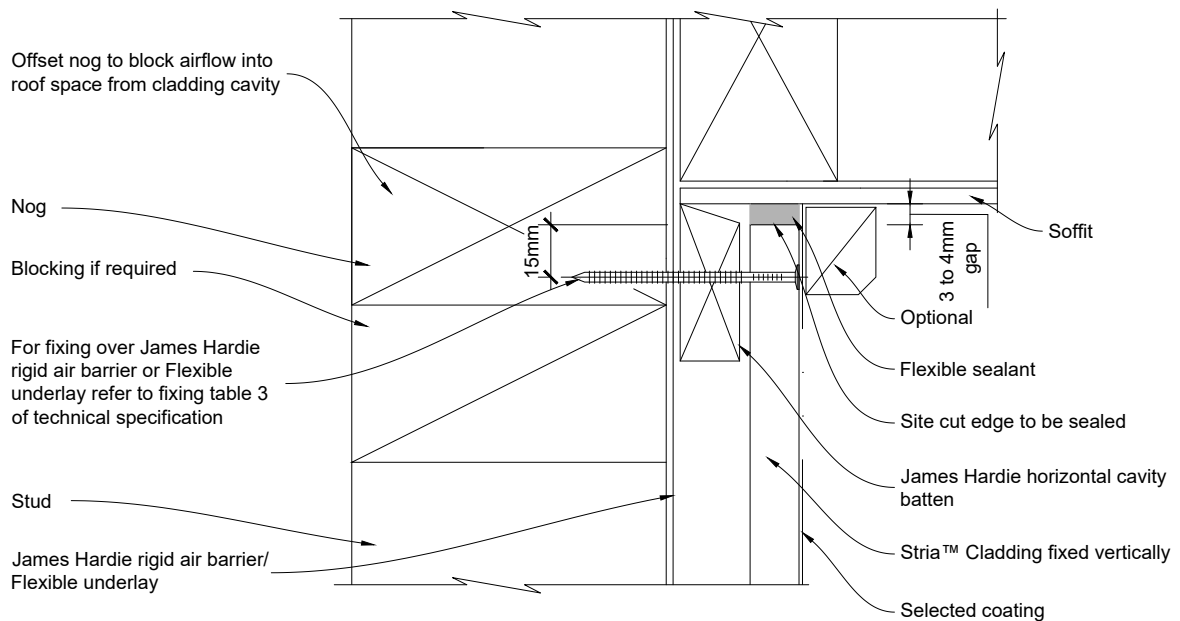


Figure 5: Vertical joint up to VH wind zone

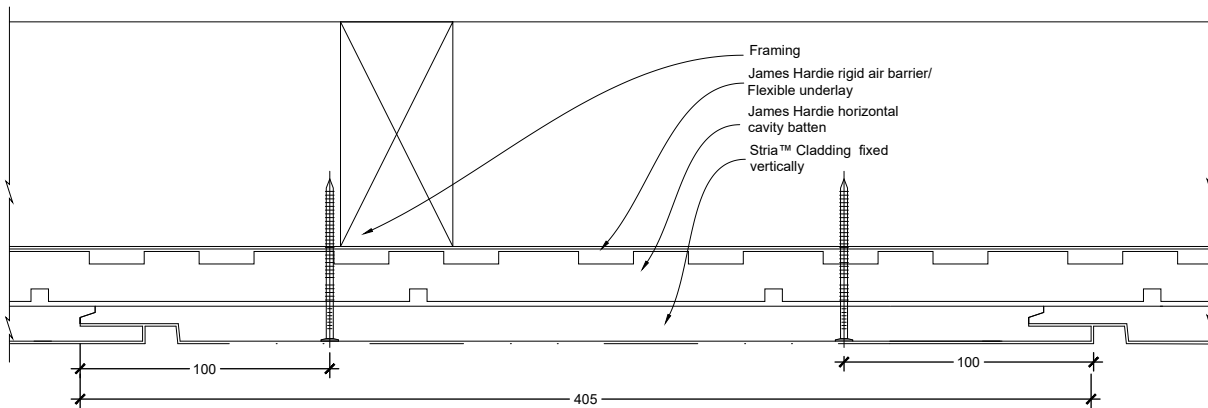


Figure 6: Vertical joint EH wind zone and SED

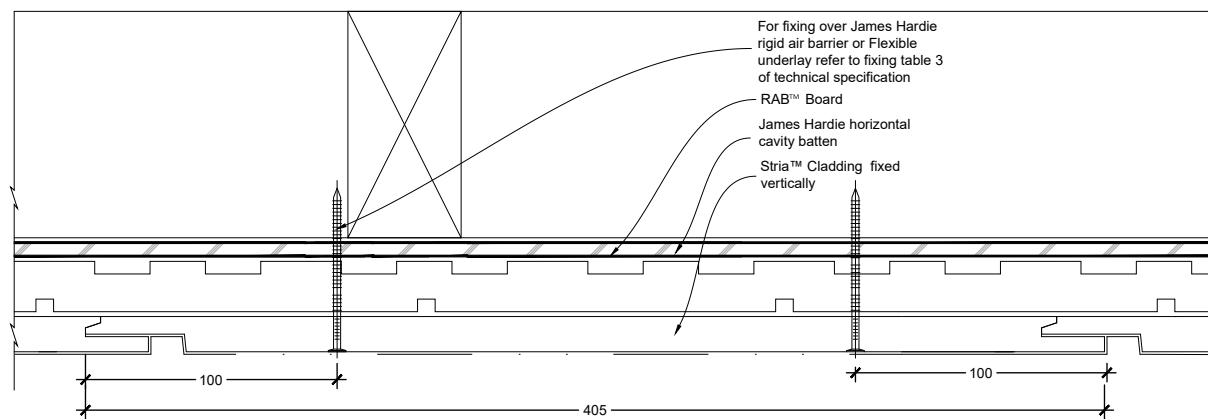


Figure 7: Internal corner

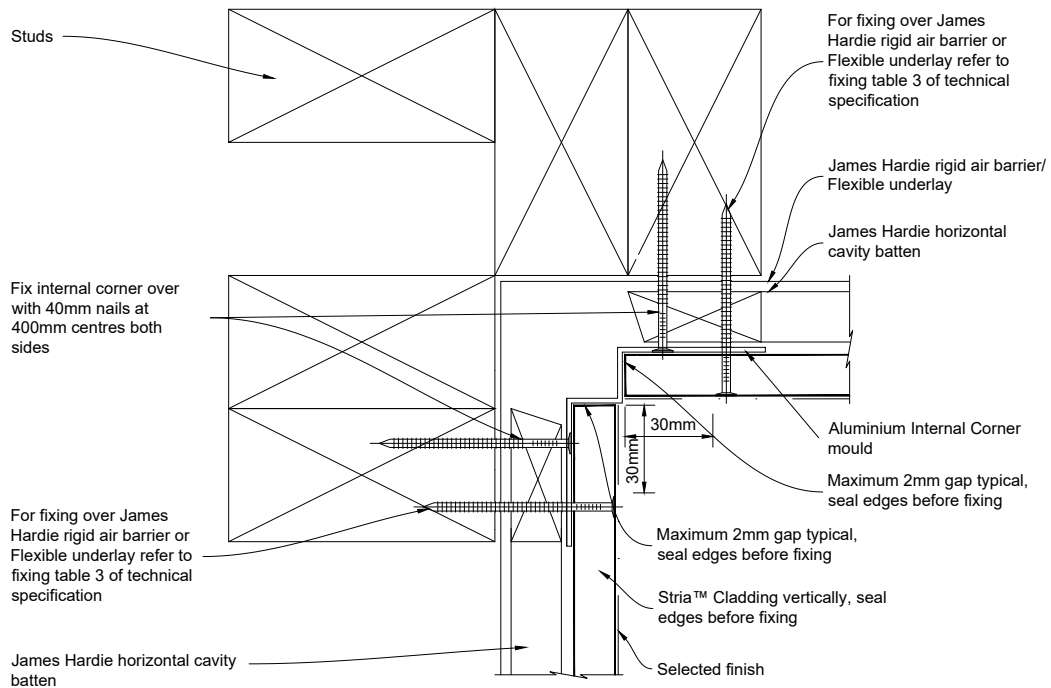


Figure 8: External aluminium box corner

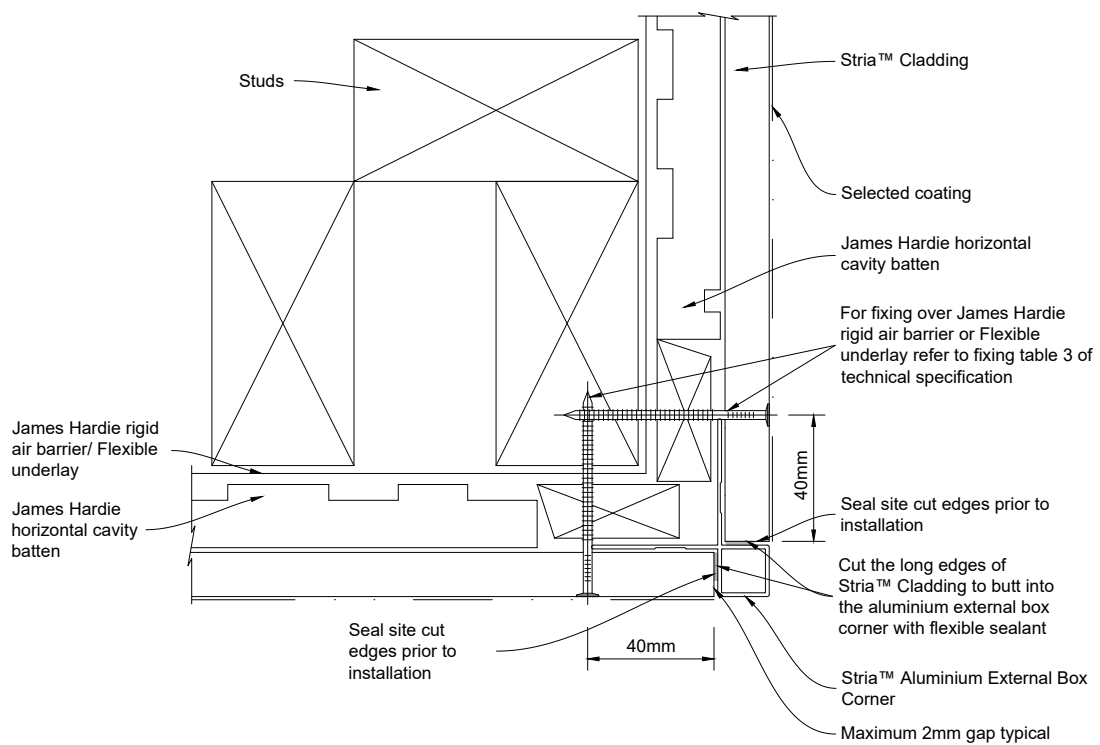
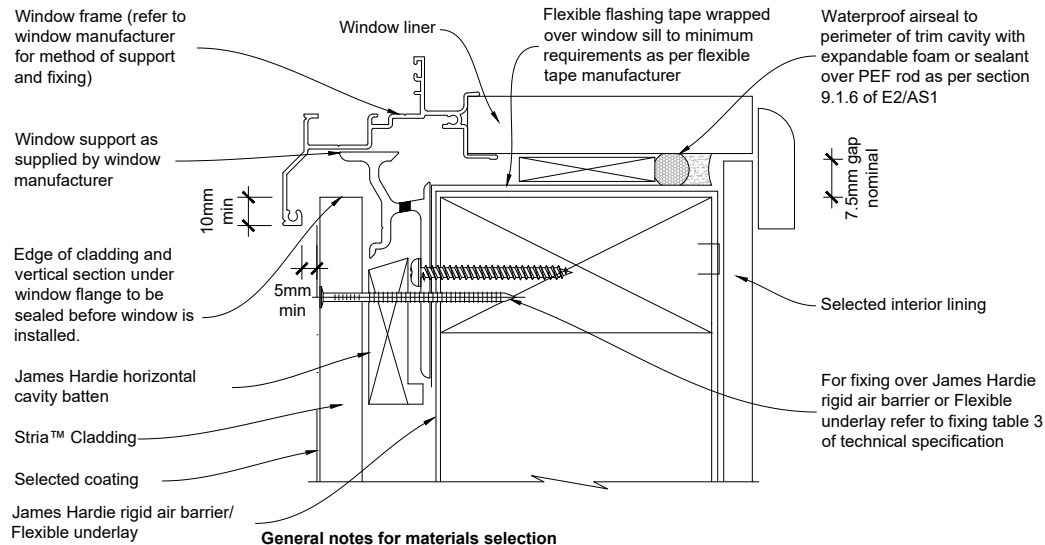


Figure 9: Window sill

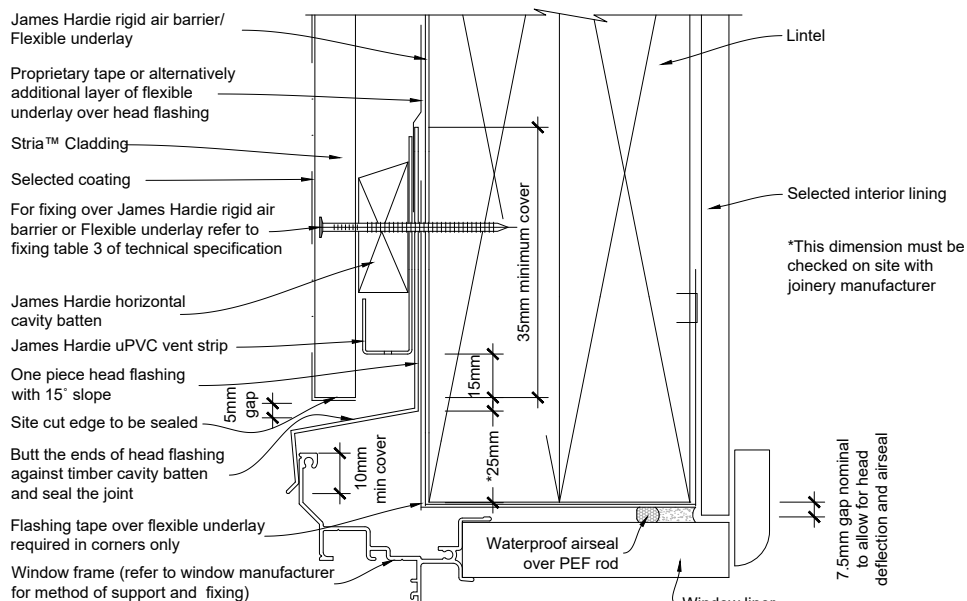


General notes for materials selection

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of NZBC E2/AS1.
2. Flexible underlay must comply with acceptable solution E2/AS1.
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact.
4. When James Hardie rigid air barriers are used flashing tape to be applied to the entire opening.

Refer to the manufacturer or supplier for technical information for these materials.

Figure 10: Window head



Note:

- When James Hardie rigid air barriers are used the window opening to be flashed as per James Haride rigid air barrier installation manual.
- Sealant must be installed between head flashing and window flange in VH and EH wind zones and SED projects.
- Alternatively, the head flashings can be formed with stop ends as per E2/AS1

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Figure 11: Window jamb

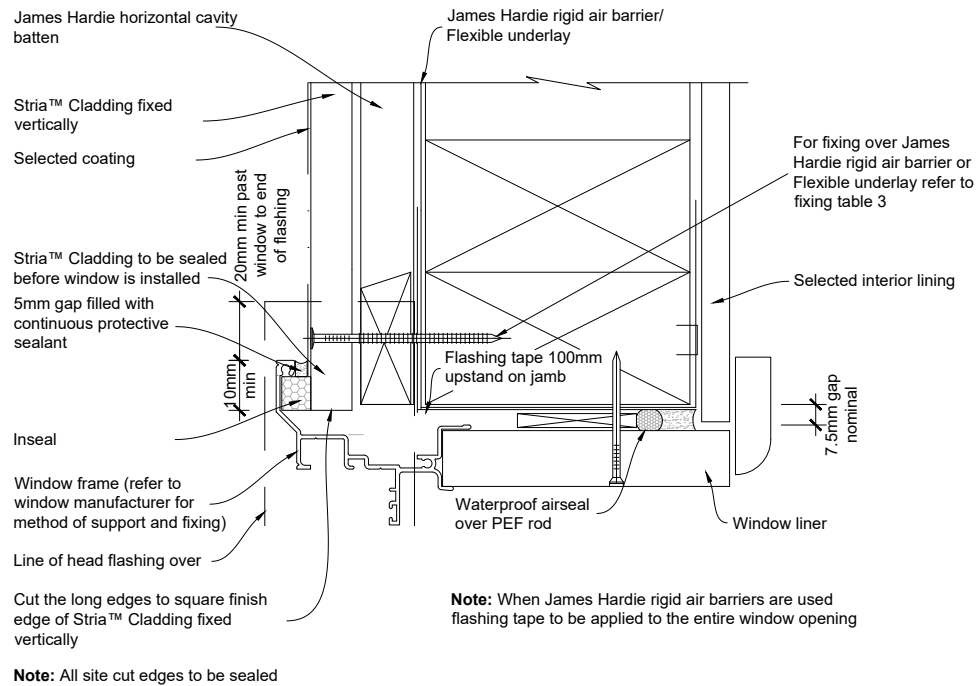


Figure 12: Window jamb

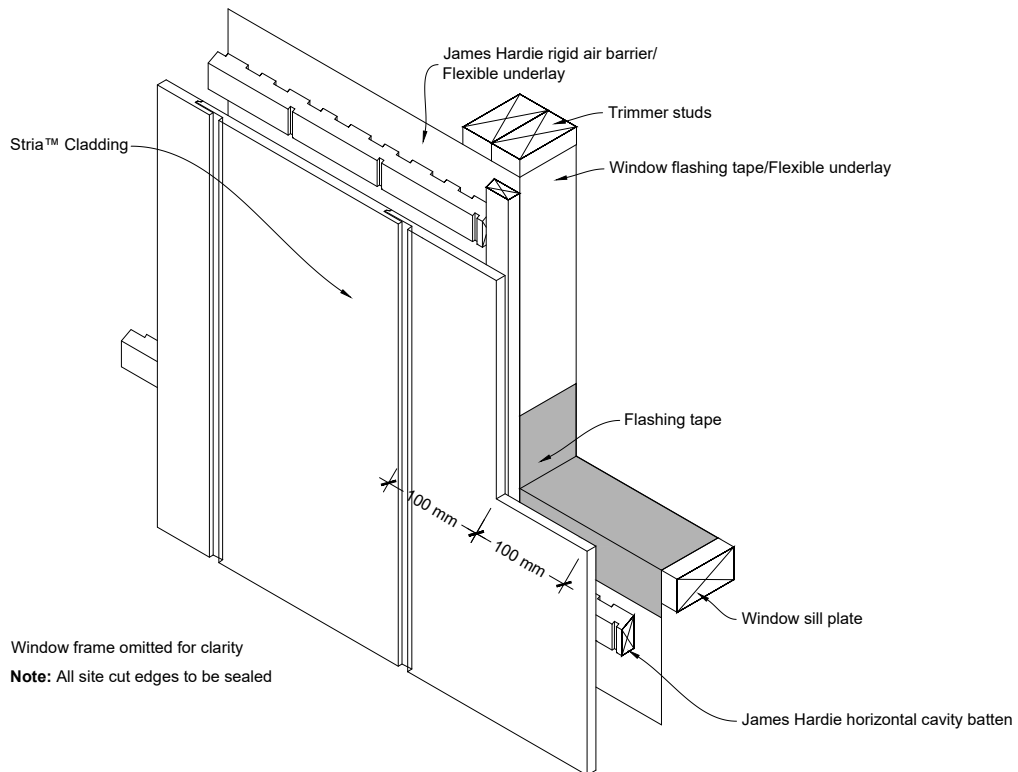


Figure 13: Window sill with facings

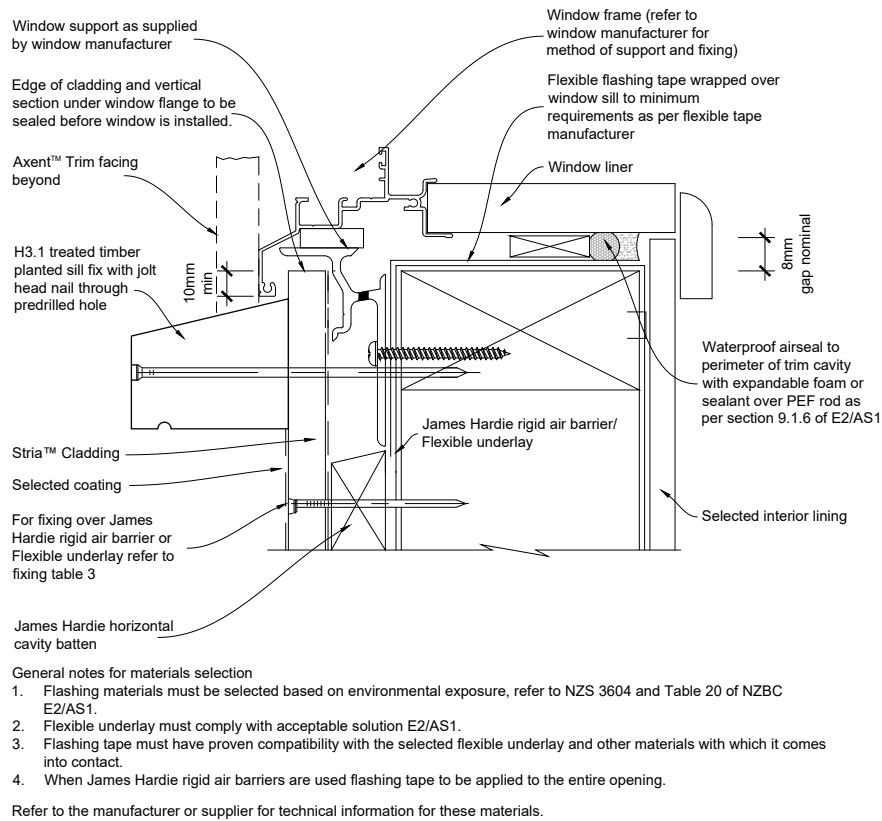


Figure 14: Window head with facings

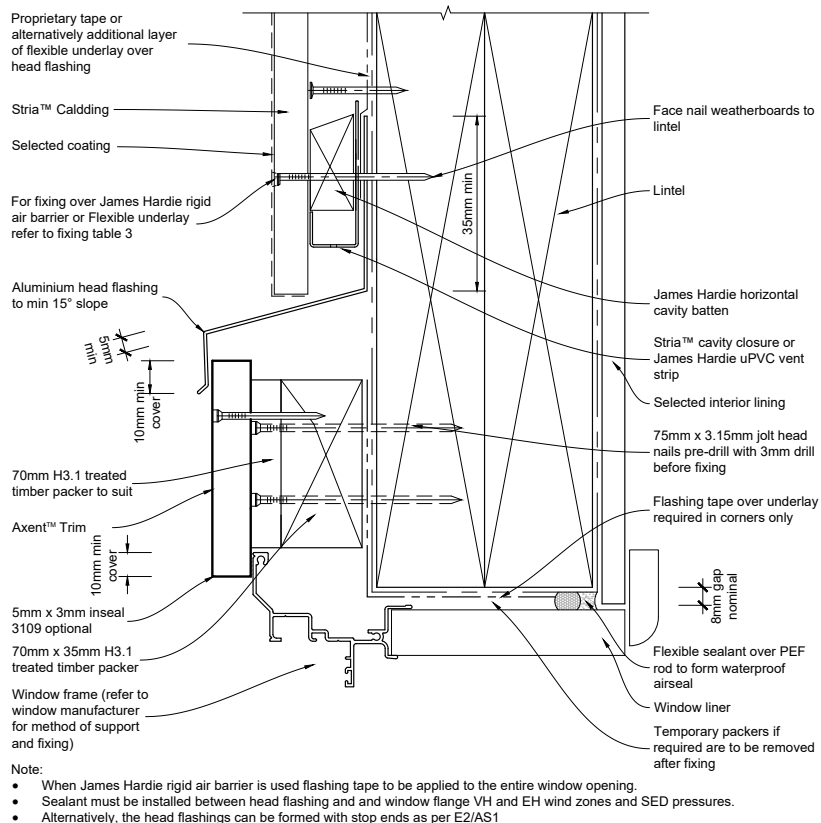


Figure 15: Window jamb with facings

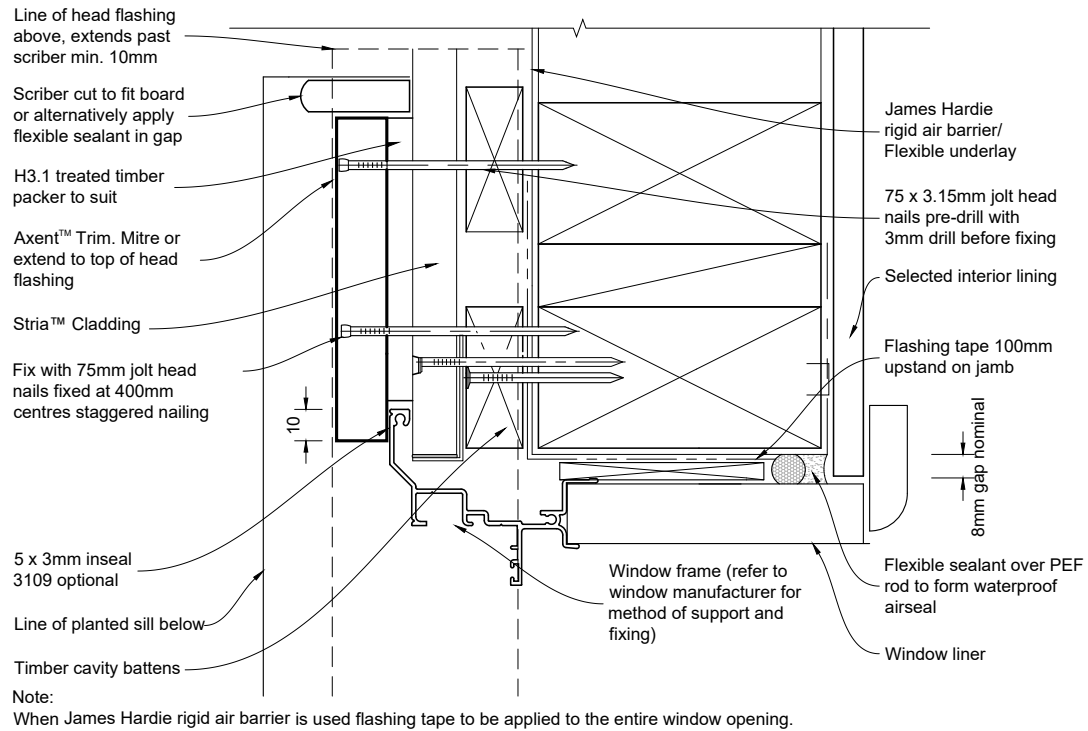


Figure 16: Over joist at floor level

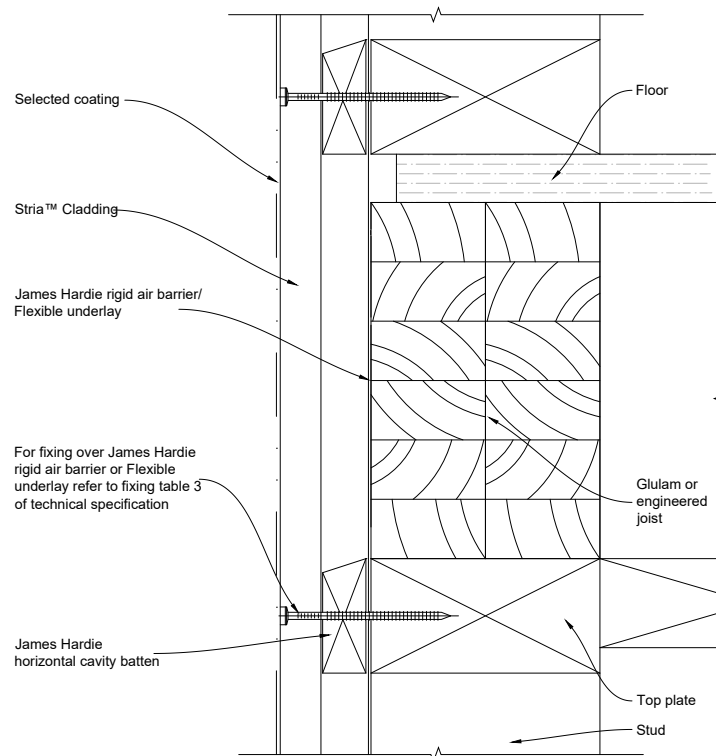


Figure 17: Butt jointing of Stria Cladding

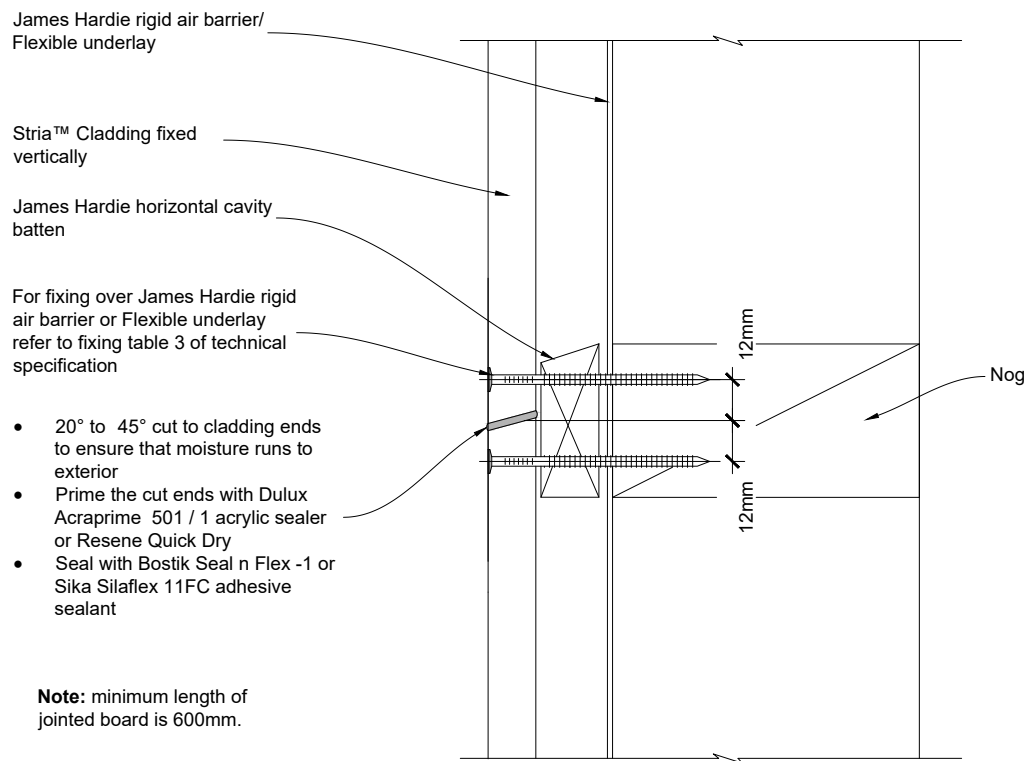
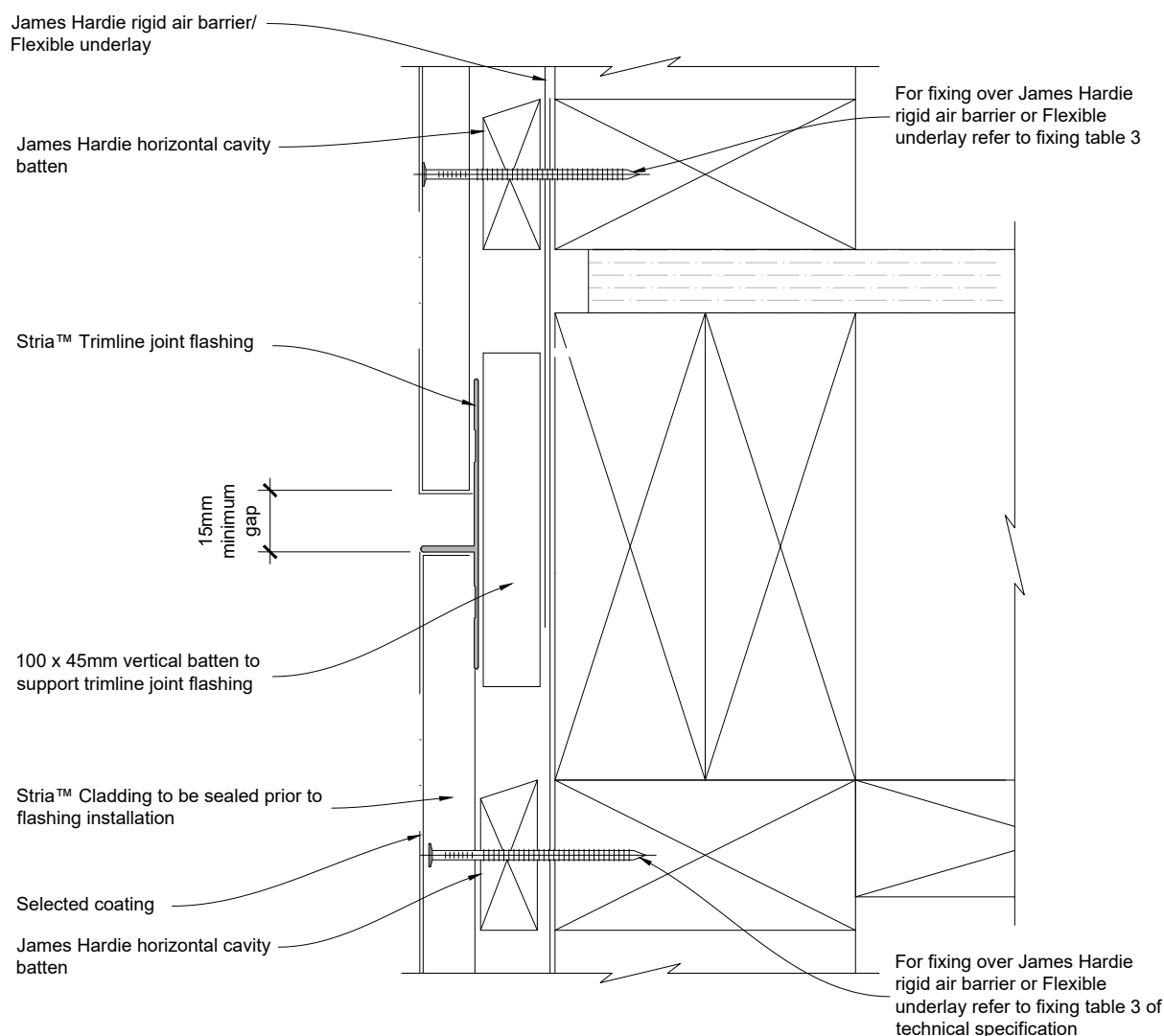


Figure 18: Trimline flashing joint at floor level



STEP 1

- Ensure flat James Hardie rigid air barrier / Flexible underlay is in place.

STEP 2

- James Hardie horizontal cavity batten to be installed over the studs and nogs. - Nylon strapping intermediate support to hold insulation in place between studs.

STEP 3

- Install the lower cladding with aluminium trimline flashing.
- Install the upper cladding keeping a 15mm gap.

Notes:

- Apply two 6mm thick lines of adhesive sealant on the bottom portion of aluminium trimline flashing to seal. Take care to ensure continuous seal is formed between cladding and aluminium trimline flashing.
- The sealant must continue between flashing flange and cladding edge.
- For butt jointing the two trimline flashing, install a purpose-made jointer 50mm over butt joint of trimline flashing and seal with flexible sealant to prevent water ingress.

Figure 19: Trimline flashing joint external corner

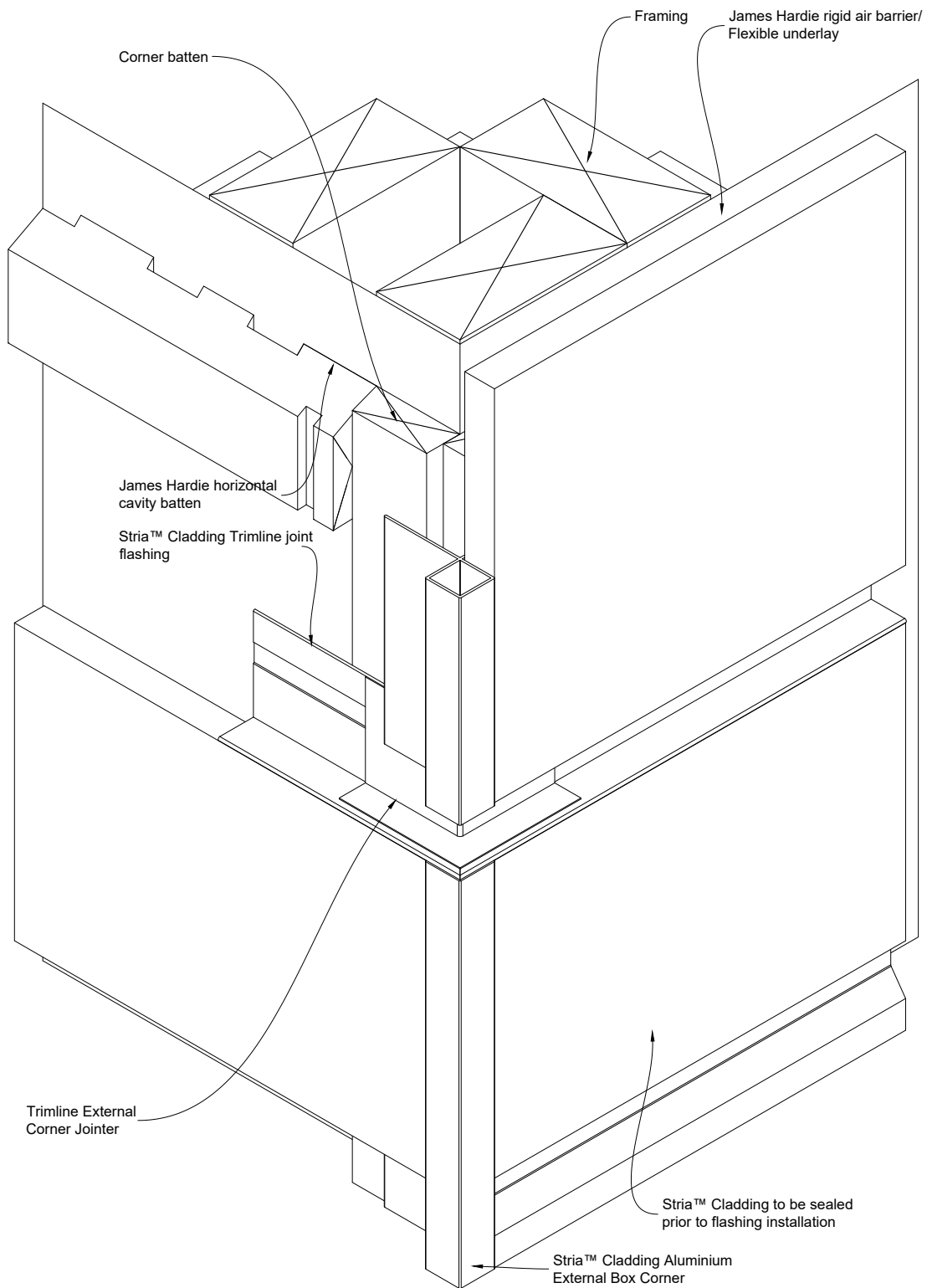


Figure 20: Trimline joint

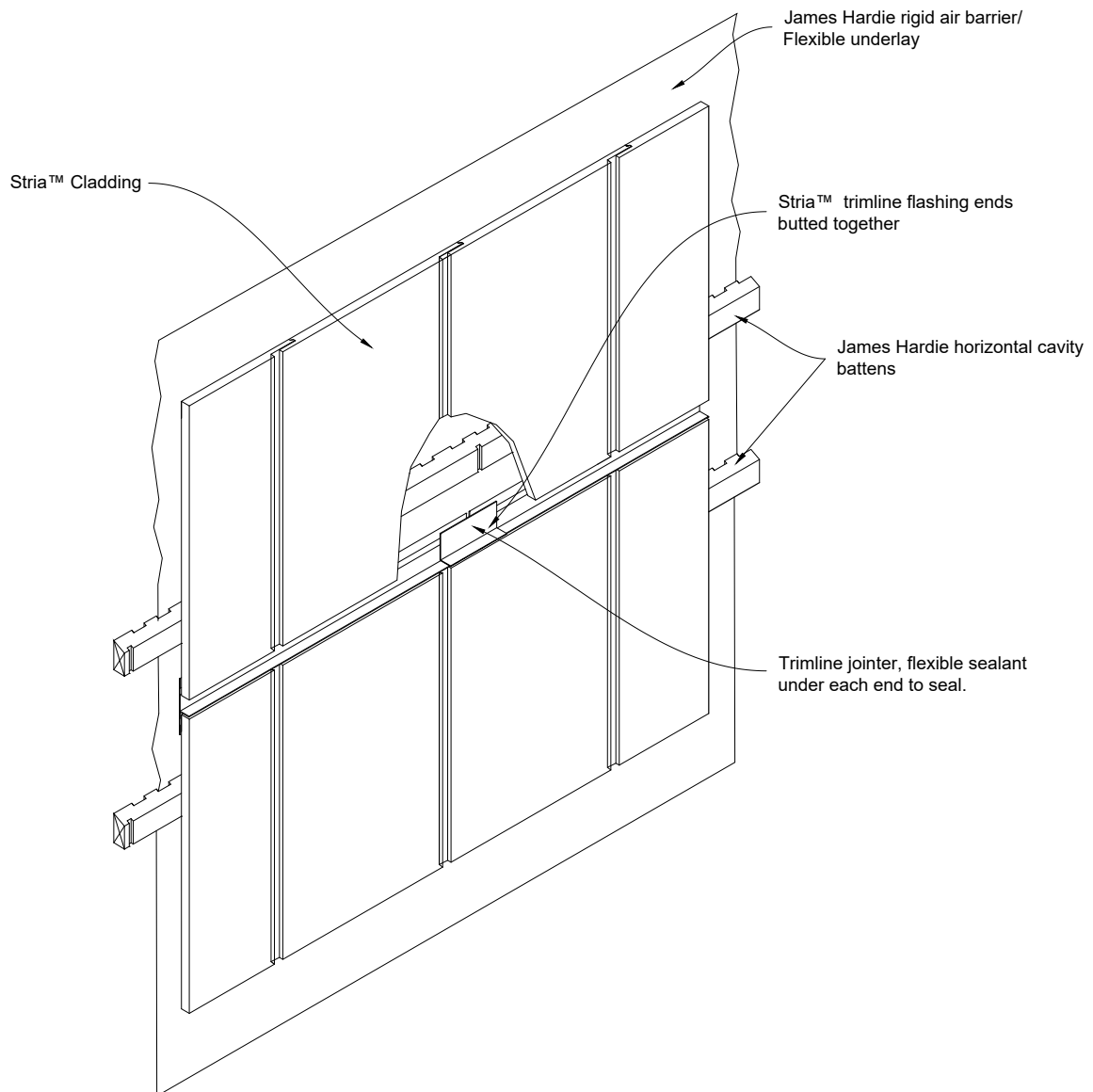
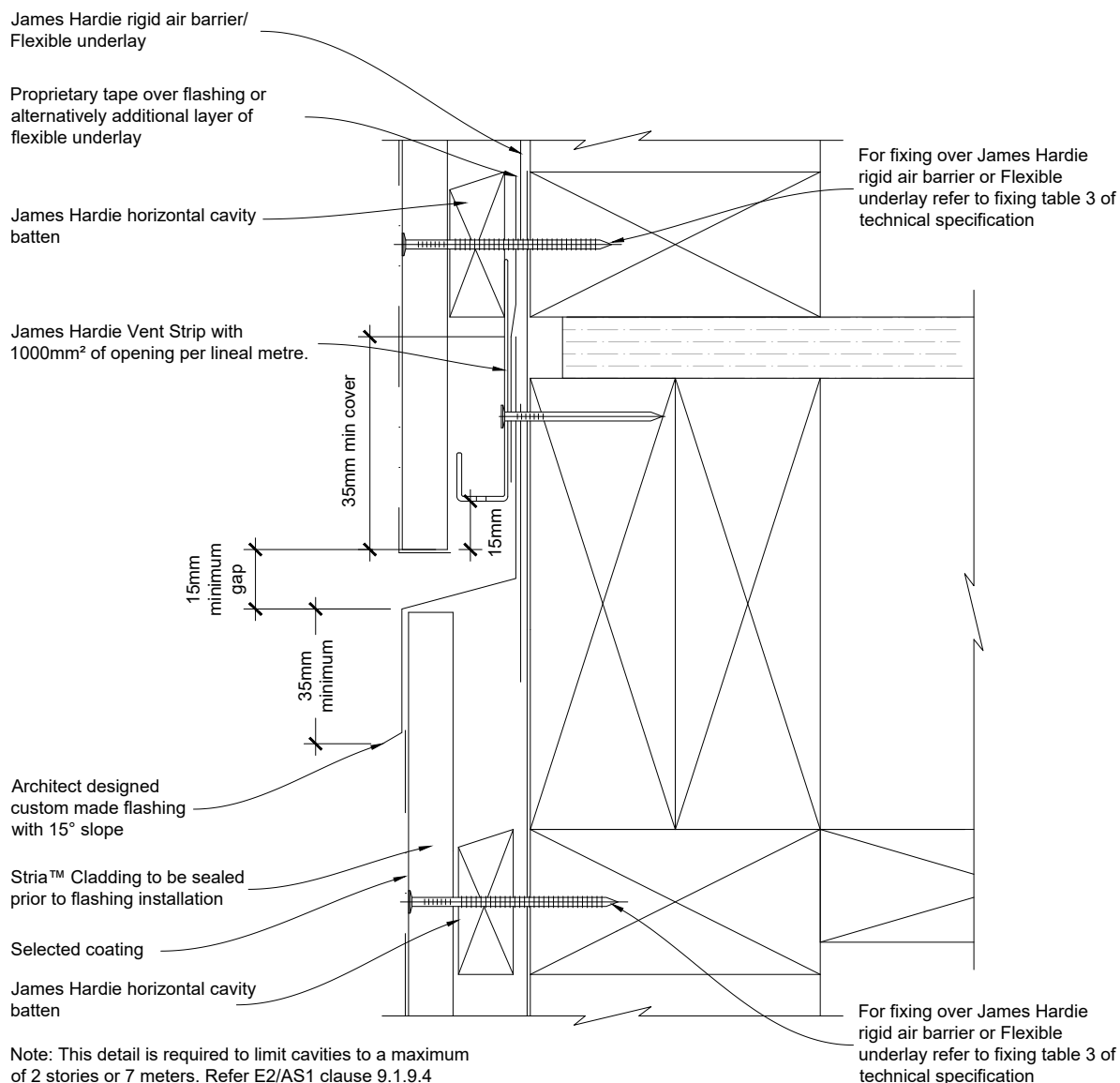


Figure 21: Drained flashing joint at floor level



STEP 1

- Check architect's plans for the type of flashing to be used.

STEP 2

- Check fixing centres and edge distances.
- If top fixings are to be hidden by the Z flashing they will need to be fixed and sealed before the Z flashing is installed.
- Cut edges need to be primed with Acraprime sealer or similar.

STEP 3

- When 50 year durability is required refer Table 20 E2/AS1.

STEP 4

- The flashing to be placed in the centre of the floor joists. Do not fix James Hardie horizontal cavity batten or cladding into floor joists.

Figure 22: Drained flashing joint at floor joist

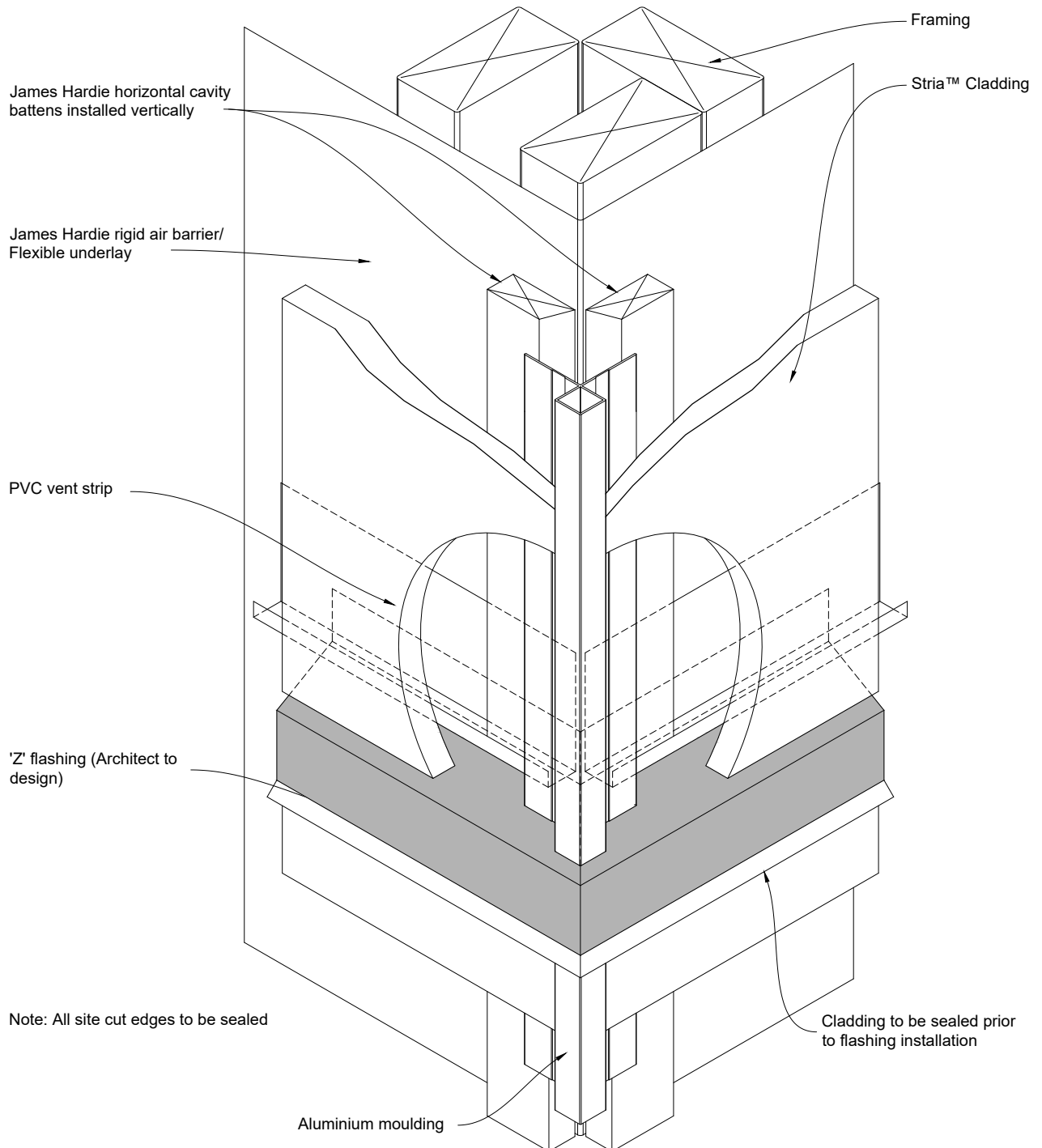


Figure 23: Apron flashing detail

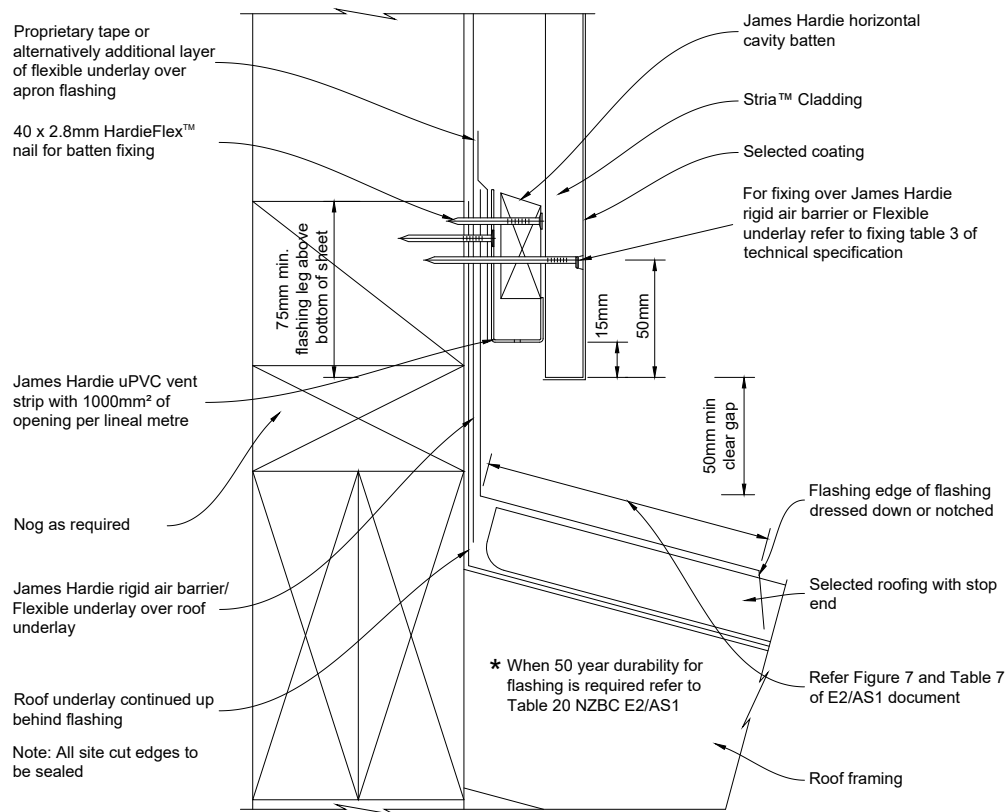
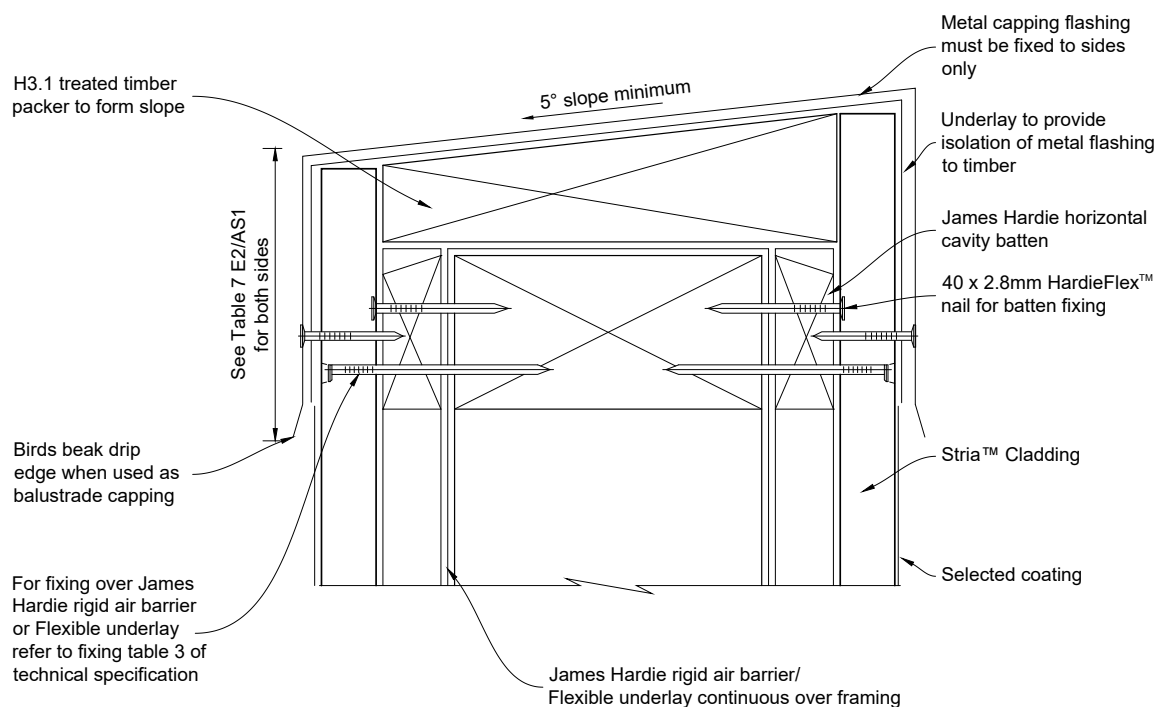


Figure 24: Parapet flashing



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Figure 25: Roof to wall junction detail

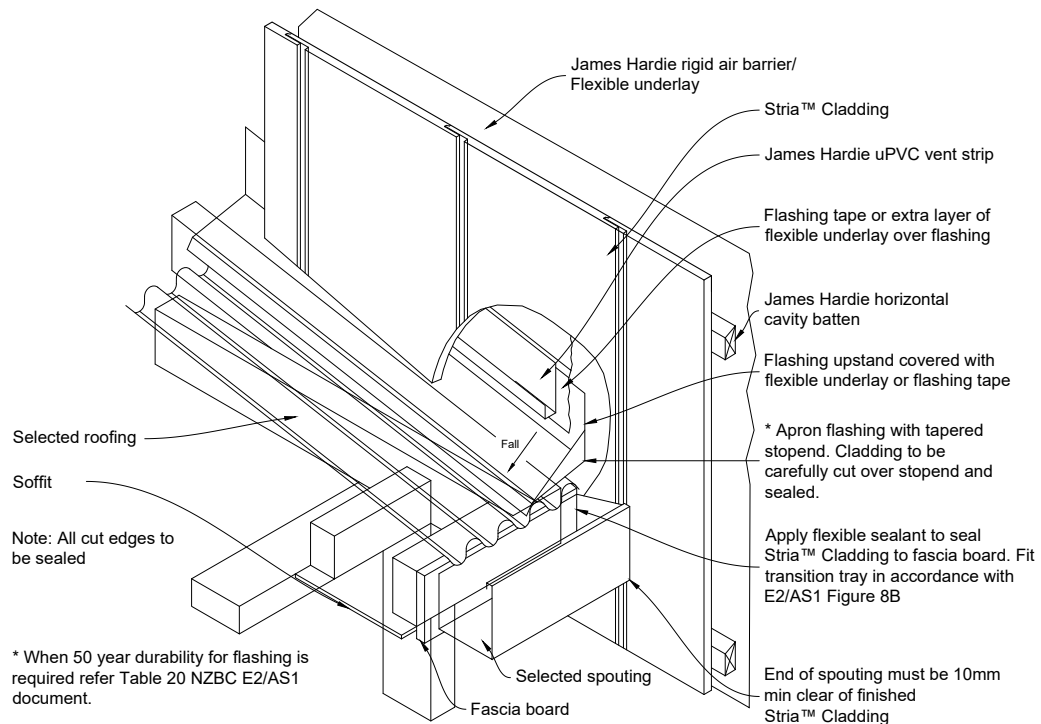


Figure 26: Meter box at sill

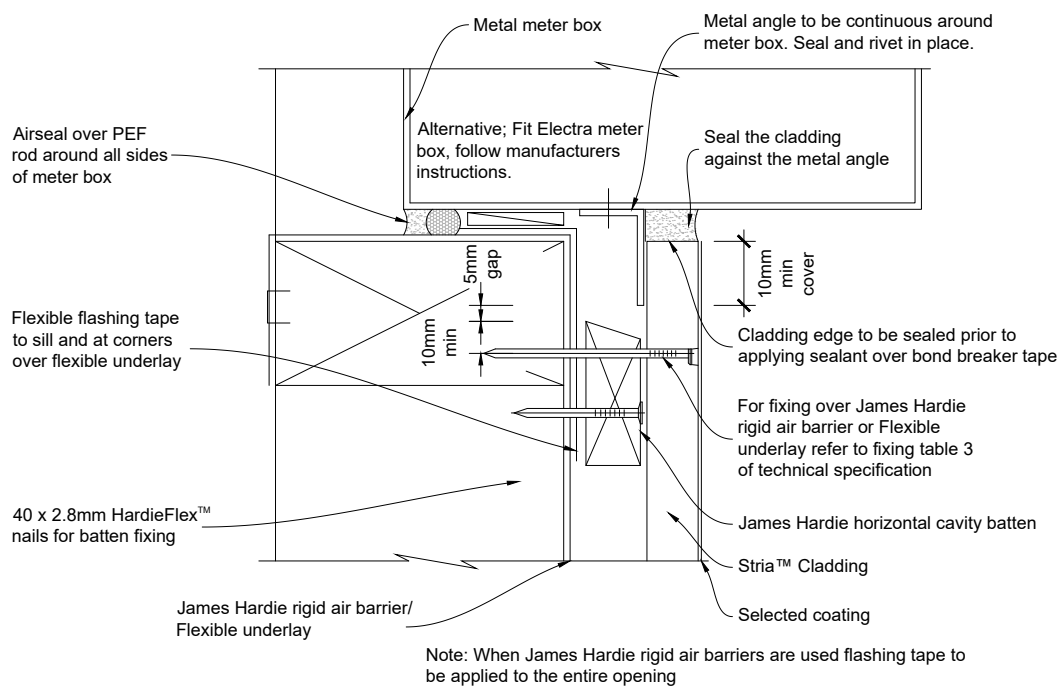


Figure 27: Meter box at jamb

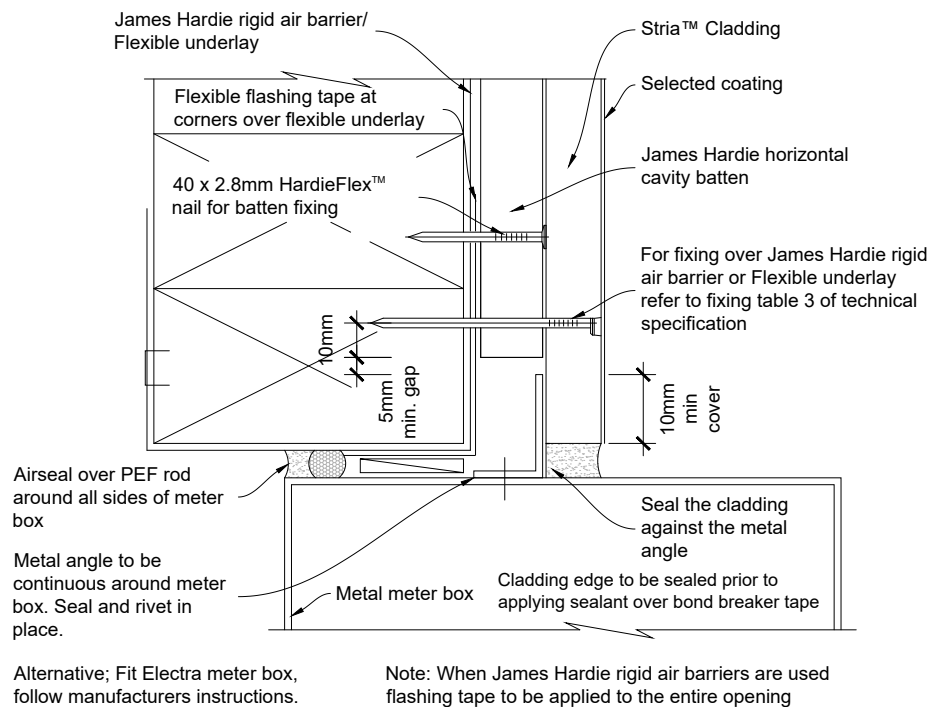


Figure 28: Meter box at head

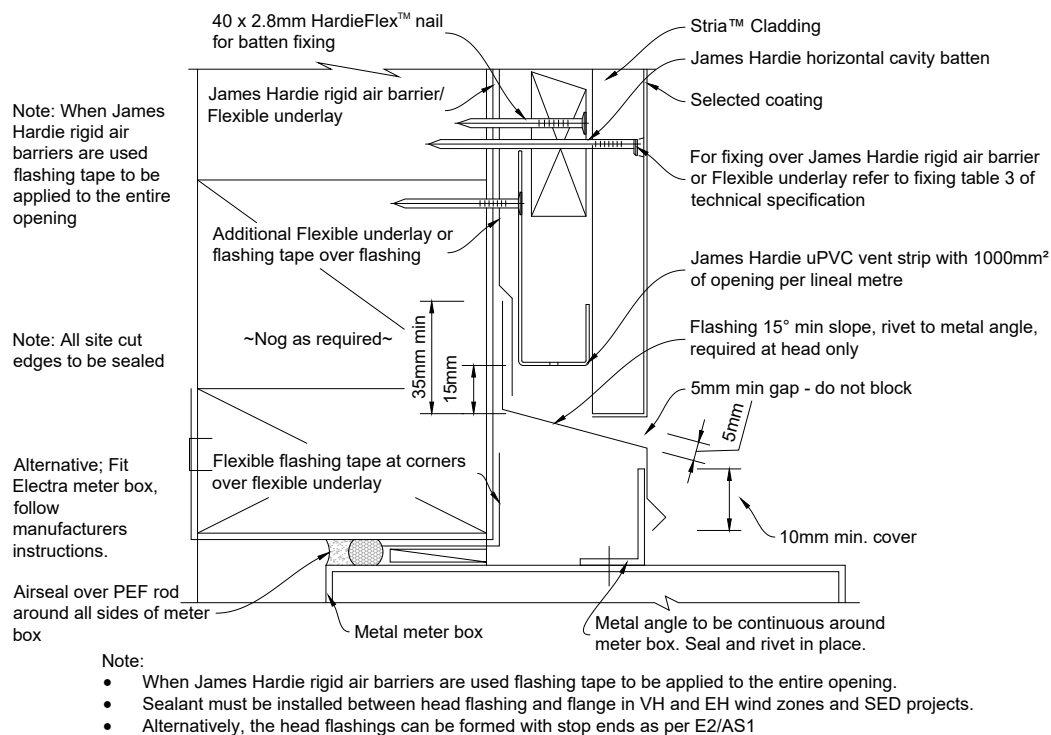


Figure 29: Enclosed deck

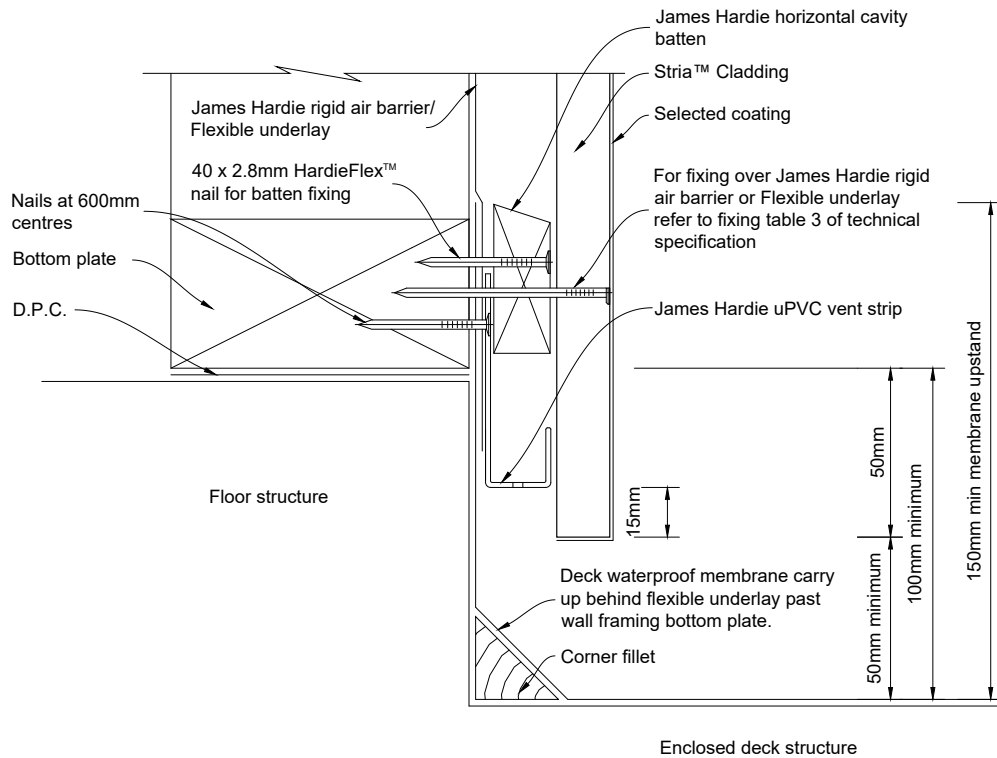


Figure 30: Pipe penetration

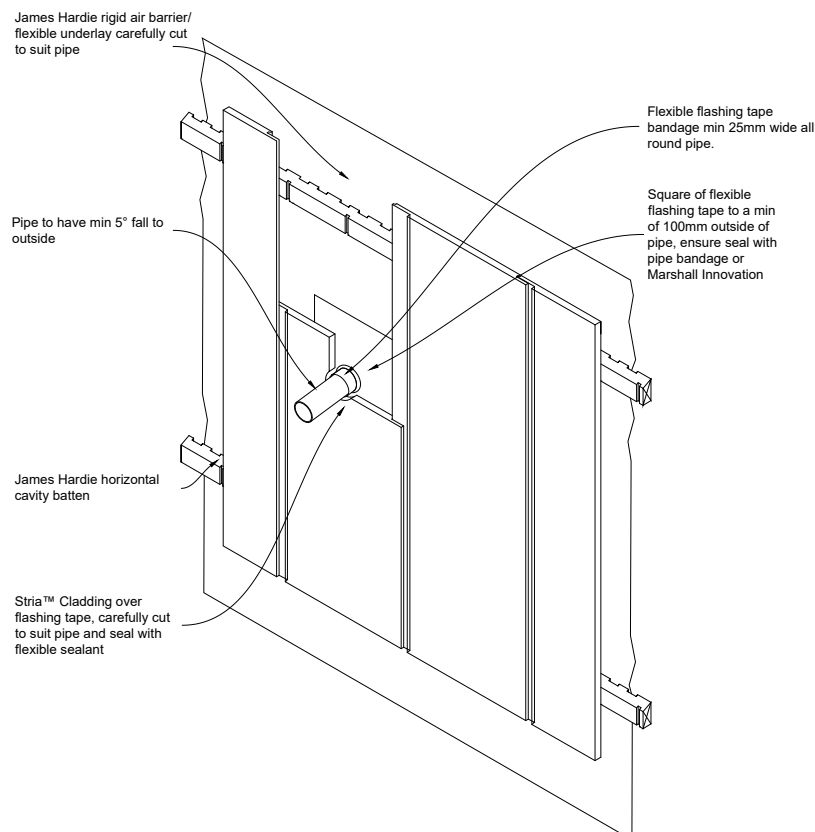
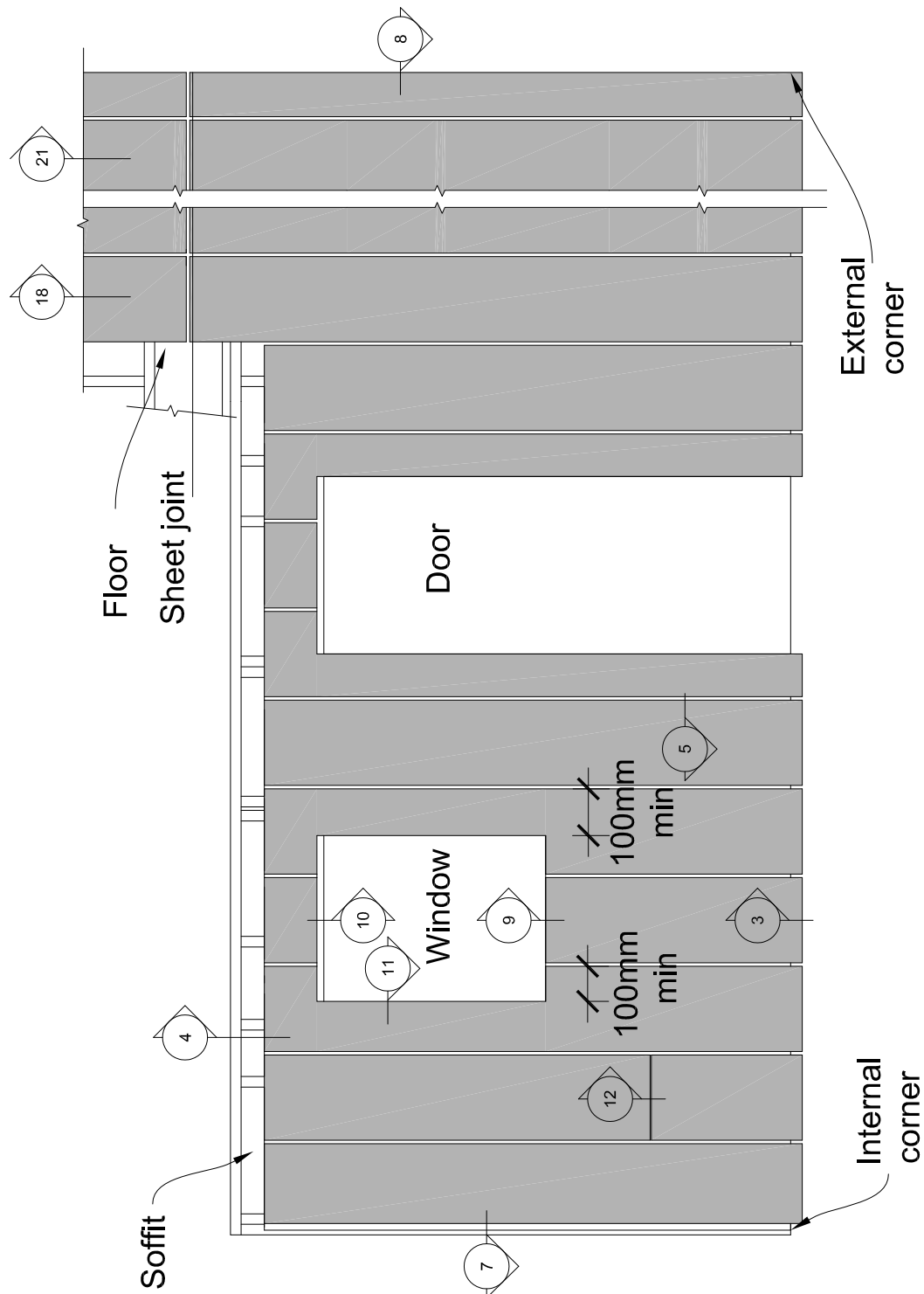


Figure 31: Cladding installed



Note!
Section notations refer to Figure

Figure 32: Garage head

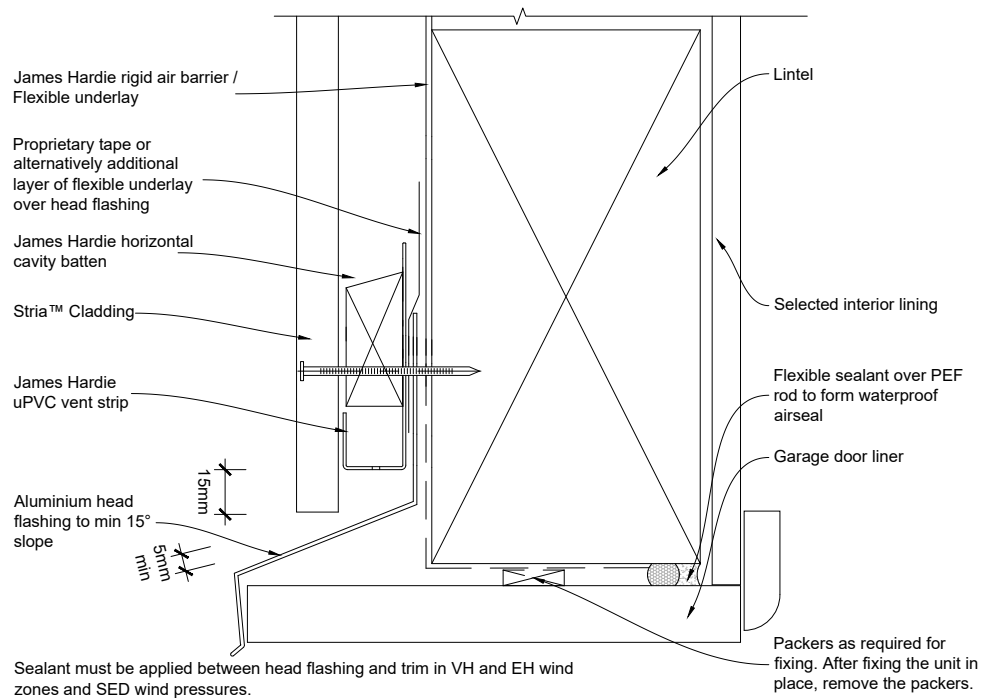
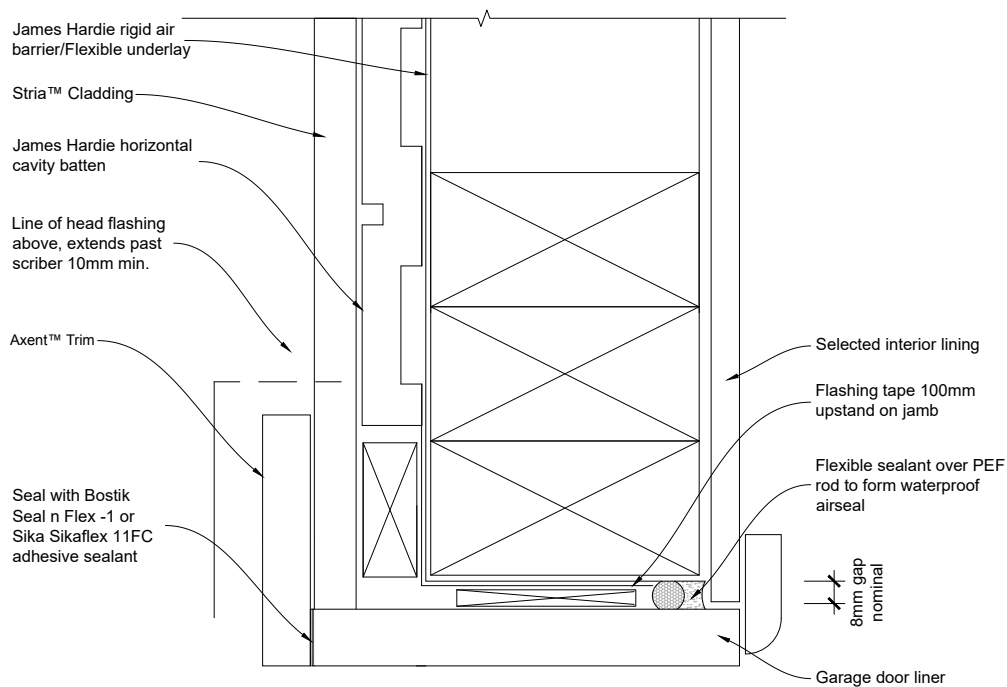


Figure 33: Garage jamb



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Product Warranty



James Hardie New Zealand Limited ("James Hardie") warrants for a period of 15 years from the date of purchase that the Stria™ Cladding (the "Product"), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie's relevant published literature current at the time of installation. James Hardie warrants for a period of 15 years from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

- a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation;
- b) this warranty is not transferable;
- c) the Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice;
- d) the project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code ("NZBC"), regulations and standards;
- e) the claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product;
- f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces);
- g) all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law;
- h) if meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. James Hardie has tested/assessed the performance of the Stria™ Cladding when installed in accordance with the Stria™ Cladding Vertical Installation technical specification, in accordance with the standards and verification methods required by the NZBC and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

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CERTIFICATE OF CONFORMITY

This product Certificate is issued under Section 269 of the Building Act 2004 for:

Stria Cladding & CLD Batten System



Page 1 of 2



Product Description

1. The Stria® Cladding & CLD Batten System (the system) consists of fibre cement weatherboards horizontally installed over vertical fibre cement battens with RAB™ board or flexible building wrap with aluminium flashings and uPVC strips. It is designed to be used as part of an external cavity-based cladding system.
2. Stria® Cladding profiled weatherboards are 14mm thick; the CLD battens are 19mm x 70mm.
3. All installation componentry is supplied by James Hardie.
4. Each weatherboard has a factory applied, manila white colour primer on the face. The cut edges and sanded patches need to be sealed and the weatherboards finished with an acrylic paint system. The battens are supplied uncoated.

Product purpose and use

1. The system has been assessed as an external wall cladding for buildings within the following scope:
 - timber-framed construction complying with the NZBC; or an existing external timber wall structure, where the designer and/or installer has established that it is suitable for the intended building work; and
 - with the stud spacing no more than 600mm centered, and
 - in all corrosion zones as defined in NZS3604:2011, excluding where adverse macroclimatic conditions apply as set out in Paragraph 4.2.4 NZS3604:2011 and
 - Situated:
 - in NZS 3604:2011 Wind Zones up to, and including Extra High for buildings within the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, with a risk score of up to 20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; or,
 - where the design ultimate limit state (ULS) differential wind pressure does not exceed 2.5 kPa for specific engineering design (SED) buildings of any height; and
 - anywhere with respect to a relevant boundary (including within 1m)
2. Joinery used in conjunction with the system must
 - be installed with vertical jambs and horizontal heads and sills; and,
 - meet the requirements of NZS 4211:2008 including amendment 1 for the relevant Wind Zone or design wind pressure or have a current CodeMark.
3. The weatherboards must only be installed horizontally on vertical surfaces.

Certificate holder

James Hardie New Zealand,
50 O'Rorke Road, Penrose, Auckland 1006, New Zealand, Tel: 0800 808 868, www.jameshardies.co.nz

CodeMark Certification Body		20/08/2019		20/08/2022	GM-CM30109-RevA
Global-Mark Pty Ltd, Suite 4.07, 32 Delhi Road, North Ryde NSW 2113, Australia Tel: +61 (0)2 9886 0222 www.Global-Mark.com.au	Herve Michoux Managing Director	Date of issue	Last update	Date of next re-certification	Certificate Number

The purpose of construction site audits is to confirm the practicability of installing the product; and to confirm the appropriateness and accuracy of installation instructions. In issuing this certificate, Global-Mark has relied on the independent expert and/or laboratory advice or reports. This certificate is issued by Global-Mark Pty Limited, an independent certification body accredited by the product certification accreditation body (JAS-ANZ) appointed by the Chief Executive of the Ministry of Business Innovation and Employment under the Building Act 2004. The Ministry of Business Innovation and Employment does not in any way warrant, guarantee, or represent that the building method or product the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product. The Ministry of Business Innovation and Employment disclaims, to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate. This Certificate may only be reproduced in its entirety.

It is advised to check that this Certificate of Conformity is currently valid and not withdrawn, suspended or superseded by a later issue by referring to the Ministry of Business Innovation and Employment website, <http://www.mbie.govt.nz/>

New Zealand Building Code (NZBC) references the Building Code in force at the time of issuing the product certificate.

Certificate holder will notify Global-Mark Pty Ltd in accordance with Regulation 15 of the Building (Product Certification) Regulations 2008

CERTIFICATE OF CONFORMITY

This product Certificate is issued under Section 269 of the Building Act 2004 for:

Stria Cladding & CLD Batten System



Page 2 of 2



Compliance with the New Zealand Building Code (NZBC):

The Stria® Cladding & CLD Batten system, if designed, used, installed and maintained in accordance with the conditions of this Certificate, will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4 (b) (c) (d) and (e) for the relevant physical conditions of B1.3.3 (a), (h), (j) and (q). The system meets these requirements.

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years and B2.3.2(a). The system meets these requirements.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.5 and C3.7 (b & c) The system meets these requirements

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The system meets this requirement.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The system meets this requirement and will not present a health hazard to people.

Subject to the following conditions and limitations:

1. Specification, installation, inspection and maintenance in accordance with the following sets of documents collectively referenced as the Applicable Technical Specification:
 - James Hardie Stria® Cladding Technical Specification, CLD Structural Cavity Batten (August 2019)
 - James Hardie Stria® Cladding, Installation Manual, Rigid Air Barriers (March 2019)

(Note: Provisions within the documents above related to the use of the system with steel-frame construction are outside the scope of this certification).

2. Where the external wall is located within 1.0m of a relevant boundary, RAB™ must be used;
3. An horizontal fire separation joint must be installed at intervals of no greater than 3.5m vertical height where the following applies-
 - on buildings where the building height is greater than 10.0m; and
 - upper floors containing sleeping uses or “other property” (as defined by the Building Code).
4. In wind zones greater than Very High, the system must be installed over RAB™.
5. Where C3.5 and C3.7 applies the building must fall within the scope of:
 - a. C/AS1 amendment 4, or
 - b. C/AS2 1st edition June 2019

Design Considerations:

1. Product specification and incorporation of the system in to a building design shall be carried out by a designer / Architect / Engineer or building professional who:
 - Is qualified to design the buildings covered under the “Scope” of use of the product.
 - Has ready access to the relevant Applicable Technical Specification.

Product Installation Conditions:

2. Installation shall be carried out or supervised by a Licensed Building Practitioner with the appropriate carpentry class
3. Installation shall be undertaken in accordance with all relevant Applicable Technical Specifications

End of the record



LUMBERLOK

LINTEL FIXING SCHEDULE

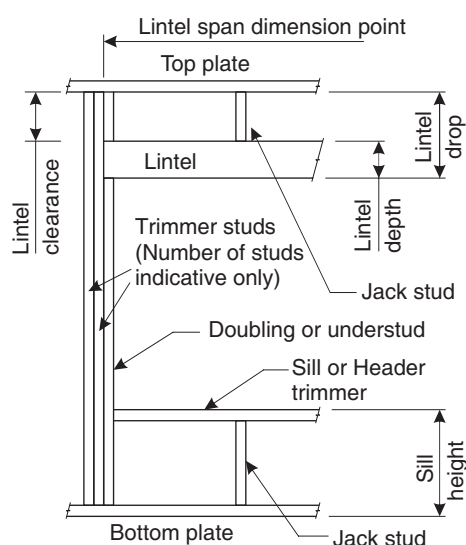
ALTERNATIVE TO TABLE 8.14 & FIGURE 8.12

NZS 3604:2011

NOTE:

- ★ All fixings are designed for vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20 kPa.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist horizontal loads.
- ★ These fixings assume the correct choice of rafter/truss to top plate connections have been made.
- ★ All fixings assume bottom plate thickness of 45mm maximum. Note: TYLOK options on timber species.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011.

DEFINITIONS



Lintel Supporting Girder Trusses:

Roof Tributary Area	Light Roof				Heavy Roof			
	Wind Zone				Wind Zone			
	L, M, H	VH	EH		L, M, H	VH	EH	
8.6 m ²	G	G	H		G	G	H	
11.6 m ²	G	H	H		G	G	H	
12.1 m ²	G	H	H		G	H	H	
15.3 m ²	H	H	-		G	H	H	
19.1 m ²	H	-	-		G	H	-	
20.9 m ²	H	-	-		H	H	-	
21.8 m ²	H	-	-		H	-	-	
34.3 m ²	-	-	-		H	-	-	

Notes:

- 1) Roof Tributary Area = approx. 1/2 x (Total roof area on girder and rafter trusses supported by lintel)
- 2) Assumed girder truss is at mid-span or middle third span of lintel
- 3) Use similar fixings for both ends of lintel
- 4) All other cases require specific engineering design

SELECTION CHART FOR LINTEL FIXING

Lintel Span	Loaded Dimension (See Fig. 1.3 NZS 3604:2011)	Light Roof					Heavy Roof				
		Wind Zone					Wind Zone				
		L	M	H	VH	EH	L	M	H	VH	EH
0.7	2.0	E	E	E	E	F	E	E	E	E	E
	3.0	E	E	E	F	F	E	E	E	E	F
	4.0	E	E	F	F	F	E	E	E	F	F
	5.0	E	F	F	F	G	E	E	F	F	F
	6.0	E	F	F	G	G	E	E	F	F	G
0.9	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	E	F	F	F	E	E	F	F	F
	5.0	E	F	F	F	G	E	E	F	F	F
	6.0	E	F	F	G	G	E	E	F	F	G
1.0	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F	F
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	E	F	F	G	G	E	E	F	F	G
1.2	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	E	F	F	F	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	F	F	G	G	H	E	E	F	G	G
1.5	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	F	F	G	G	H	E	E	F	G	G
	6.0	F	F	G	H	H	E	E	F	G	H
2.0	2.0	E	F	F	F	G	E	E	F	F	F
	3.0	E	F	F	G	G	E	E	F	F	G
	4.0	F	F	G	G	H	E	E	F	G	G
	5.0	F	F	G	H	H	E	E	F	G	H
	6.0	F	G	G	H	H	E	F	G	H	H
2.4	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	G	H	E	E	F	G	G
	4.0	F	F	G	H	H	E	E	F	G	H
	5.0	F	G	G	H	H	E	F	G	H	H
	6.0	F	G	H	H	-	E	F	G	H	H
3.0	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	H	H	E	E	F	G	H
	4.0	F	G	G	H	H	E	F	G	H	H
	5.0	F	G	H	H	-	E	F	G	H	H
	6.0	F	G	H	-	-	E	F	G	H	-
3.6	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	F	G	H	H	E	F	G	G	H
	4.0	F	G	H	H	-	E	F	G	H	H
	5.0	F	G	H	-	-	E	F	G	H	-
	6.0	G	H	H	-	-	E	F	H	-	-
4.2	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	H	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.5	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.4	F	G	H	H	-	E	F	G	H	-
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
4.8	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.2	F	G	H	H	-	F	F	G	H	-
	4.0	F	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-

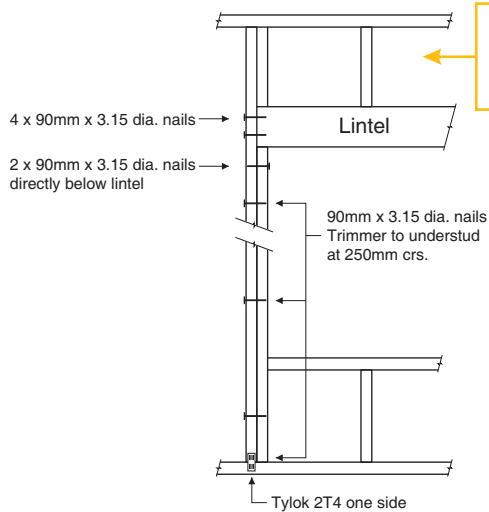


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with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

LINTEL FIXING OPTIONS

TYPE E

1.4 kN

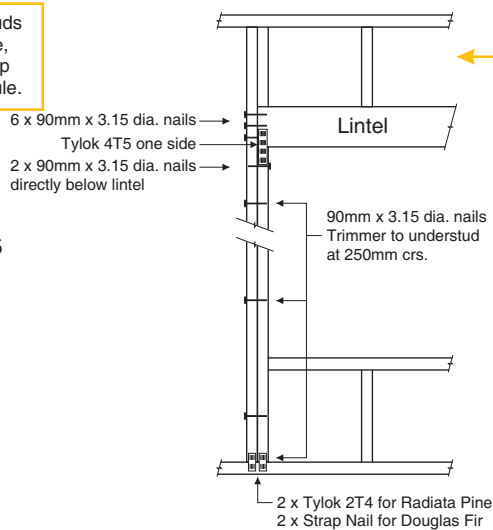


For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule.

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE F

4.0 kN

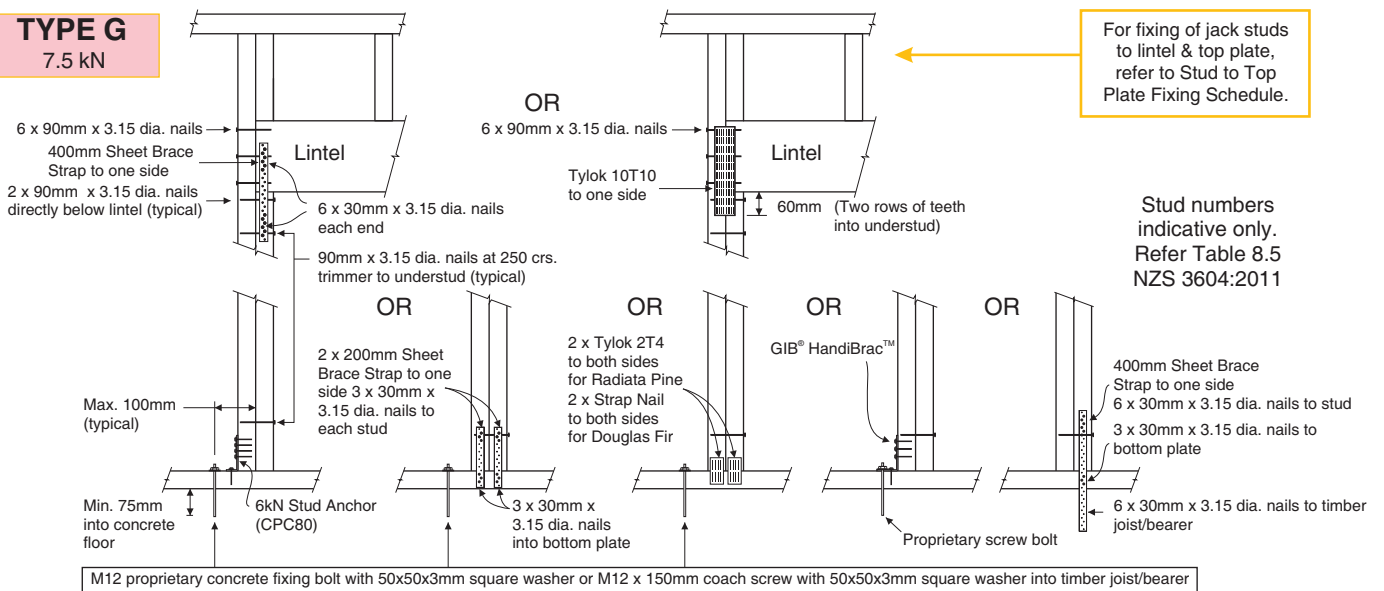


For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule.

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE G

7.5 kN

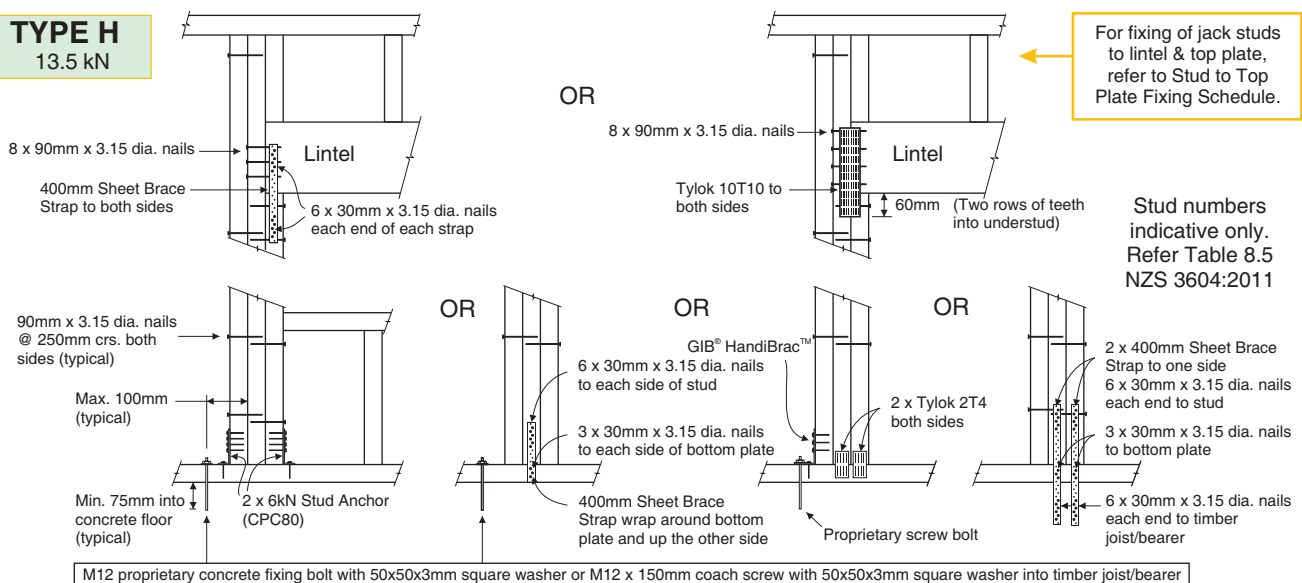


For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule.

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE H

13.5 kN



For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule.

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

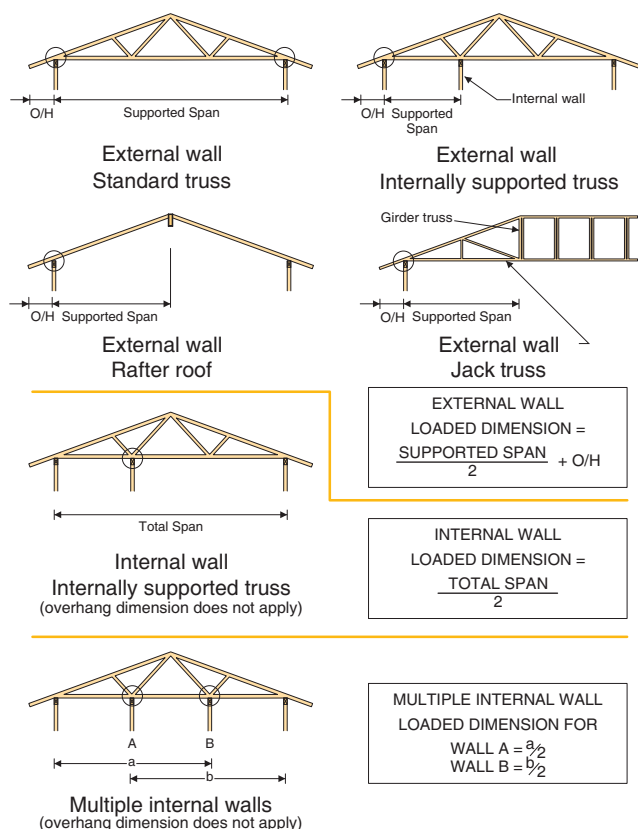


STUD TO TOP PLATE FIXING SCHEDULE ALTERNATIVE TO TABLE 8.18 NZS 3604:2011

NOTE:

- ★ All fixings are designed to resist vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20 kPa.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist lateral loads.
- ★ These fixings assume the correct choice of rafter/truss to top plate connections have been made.
- ★ Gable end wall top plate/stud connections where the adjacent rafter/truss is located within 1200mm of gable end wall with a maximum verge overhang of 750mm, requires fixing type A as shown below.
- ★ All fixings assume top plate thickness of 45mm maximum.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011.

LOADED DIMENSION DEFINITION



FIXING SELECTION CHART

(Suitable for walls supporting roof members at 600, 900 or 1200mm crs.)

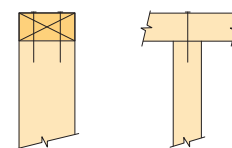
Wind Zones L, M, H, VH, EH, as per NZS 3604:2011

Loaded Dimension (m)			Light Roof Wind Zone					Heavy Roof Wind Zone				
Stud Centres			L	M	H	VH	EH	L	M	H	VH	EH
300mm	400mm	600mm										
3.0	2.3	1.5	A	A	B	B	B	A	A	B	B	B
4.0	3.0	2.0	A	A	B	B	B	A	A	B	B	B
5.0	3.8	2.5	A	B	B	B	B	A	A	B	B	B
6.0	4.5	3.0	A	B	B	B	B	A	A	B	B	B
7.0	5.3	3.5	A	B	B	B	B	A	A	B	B	B
8.0	6.0	4.0	A	B	B	B	B	A	A	B	B	B
9.0	6.8	4.5	B	B	B	B	B	A	A	B	B	B
10.0	7.5	5.0	B	B	B	B	B	A	A	B	B	B
11.0	8.3	5.5	B	B	B	B	B	A	A	B	B	B
12.0	9.0	6.0	B	B	B	B	B	A	A	B	B	B

FIXING OPTIONS

FIXING TYPE A 0.7 kN

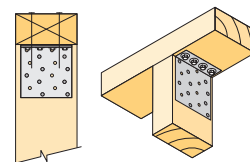
2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.



FIXING TYPE B 4.7 kN

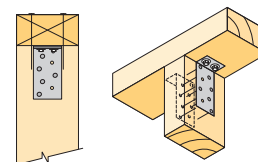
CHOOSE ANY OF THE 3 OPTIONS BELOW

2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.



Plus
LUMBERLOK
6kN Stud Anchor
(CPC80)

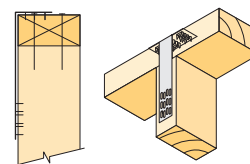
2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.



Plus
2 x LUMBERLOK
CPC40

Recommended for internal wall options to avoid lining issues

2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.



Plus
LUMBERLOK
Stud Strap
(one face only)

Note:

To calculate the number of B type fixings required, divide the wall length by the stud centres, add 1 to this figure and locate this number of fixings as evenly as possible along the wall length. This figure includes the start and end studs in each wall length.



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GANG-NAIL® LUMBERLOK® BOWMAC®

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GIB Aqualine[®] Wet Area Systems



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BC201170 9/12/2020 nicolah

GIB Aqualine® Wet Area Systems Specification and Construction Guide



Residential and non-residential applications.



Bathrooms, laundries, toilets and kitchens.

GIB Aqualine® Wet Area Systems, March 2007

Winstone Wallboards Ltd accepts no liability if the GIB Aqualine® Wet Area System is not designed and installed in strict accordance with instructions contained in this publication.

Use only the Current Specification

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. Before proceeding, you should check that this is the current version of the publication. Simply call the GIB® Helpline on 0800 100 442 or visit www.gib.co.nz

Beware of Substitution

The performance of GIB® Systems is very sensitive to design detailing, product specifications and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. Therefore for GIB® Systems

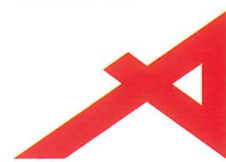
it is important to use only GIB® branded components where specified and closely follow the specified design details and construction practices, so you can be confident that the required level of performance and quality is achieved on site.

Customised Design Solutions

The systems detailed in this book should cover most common wet area situations. However, for projects where specific performance is necessary, GIB® Technical Services can assist you to develop customised solutions. Simply contact us through the GIB® Helpline on 0800 100 442.

This publication supersedes the following publication:

GIB Aqualine® Wet Area Systems, October 2002 (v2).



BRANZ Appraised
Appraisal No.427 [2007]

GIB Aqualine® Wet Area Systems, March 2007.

GIB AQUALINE® WET AREA SYSTEMS



Table of Contents

MARCH 2007

	Page
Introduction	3
This Publication	3
What is a Wet Area?	3
GIB Aqualine®	3-4
DESIGN	
Design Considerations	4
Appraisal	4
Compliance with the New Zealand Building Code (NZBC)	4-5
Limitations	5
Bracing in Wet Areas	5
New Zealand Building Code	6
Wall Surfaces in Areas Likely to be Splashed	6
Surfaces in Showers and Around Baths	6
Wall Surfaces Surrounding Cooktops	7
Penetrations and Sealants	7
Waterproof Membranes	7
Tiling	7
Flexible Sheet Vinyl – Showers and Other Wet Areas	8
Rigid Sheet Shower Linings	8
Renovations	8
Maintenance	8
Non-residential and Apartments	9
High-rise Apartments and Intertenancy	9
Office, Workplace and Schools	9
Healthcare and Hospitals	9
Public Amenities and Sports Clubs	9
FRAMING AND LINING INSTALLATION	
Non-tiled Walls – Timber Framing	10
Non-tiled Walls – Steel Framing	11
Tiled Walls	12
Ceilings	13
TYPICAL DETAILS	
Shower Over Bath – Tiled Walls	14-15
Shower Over Bath Acrylic Liner	16
Bath – Tiled Upstand	17
Shower – Tiled Walls and Base	18-19
Shower – Tiled Walls and Acrylic Base	20
Shower – Acrylic Liner and Base	21
Kitchen and Laundry	22
Office, Workplace or School Bathroom	23
Healthcare and Hospital Bathroom	24
Fire Rated and Noise Control	25
Reference Documents	26
Sustainability and the Environment	26
Specification and Installation Checklist	27

GIB AQUALINE® WET AREA SYSTEMS



Introduction

MARCH 2007

THIS PUBLICATION

This publication is not intended as the definitive guide on wet area construction and wet area systems, but rather as a helpful guide to best practice around areas where there is intermittent water exposure and splash zones within residential and non-residential buildings – in particular, areas covered by the New Zealand Building Code (NZBC), Clause E3 Internal Moisture. The information herein is designed to be helpful to designers, contractors and home-owners wishing to achieve a result that is easy to incorporate into modern design, simple and clear to construct, and that will satisfy the needs, requirements and expectations of both the NZBC and the end user.

Wet areas in the home often require relatively frequent and expensive renovation or repair, often because of the ingress of water to the structure of the building.

It is important to introduce materials and systems which have been specially designed to cope with the conditions that are common in wet areas, and to ensure they are installed correctly, using best practice, and are compatible to form a complete wet area system.

The code numbers shown with each “typical detail”, e.g. GAW-D030, match the code numbers for drawings available as downloads on the GIB® website at www.gib.co.nz

The reference numbers (e.g. GAW-D030) stand for:



WHAT IS A WET AREA?

Generally, wet areas are described as spaces to where fresh water is reticulated, such as bathrooms, toilets, laundries and kitchens. Wet areas fall into two categories; these are well explained and documented in the NZBC, Clause E3.

1. Water splash areas – These are areas subject to intermittent splash of liquid water around sanitary fittings and appliances such as baths, vanities, laundry tubs, sinks, etc. These areas are required to have an impervious, easily cleaned surface.
2. Shower enclosures – These are areas subject to more frequent, larger quantities of water, and include shower enclosures and shower over bath areas. The NZBC E3/AS1 requires these areas to be impervious, and specifically excludes any paint and wallpaper finishes. Where ceramic tile or stone finishes are applied, E3/AS1 requires that they “shall be laid on a continuous impervious substrate or membrane”.

The requirements of these wet areas are described on page 6 of this publication and in full in Clause E3 of the NZBC. Clause E3 also refers to other requirements not covered in this publication, such as ventilation, condensation control and overflow management, which will require separate consideration. Ongoing maintenance of wet areas is also important to maximise the life of the wet area.

GIB AQUALINE®

Although able to cope with infrequent short-term exposure, standard gypsum plasterboard will have a shortened life expectancy when frequently exposed to water or moisture.

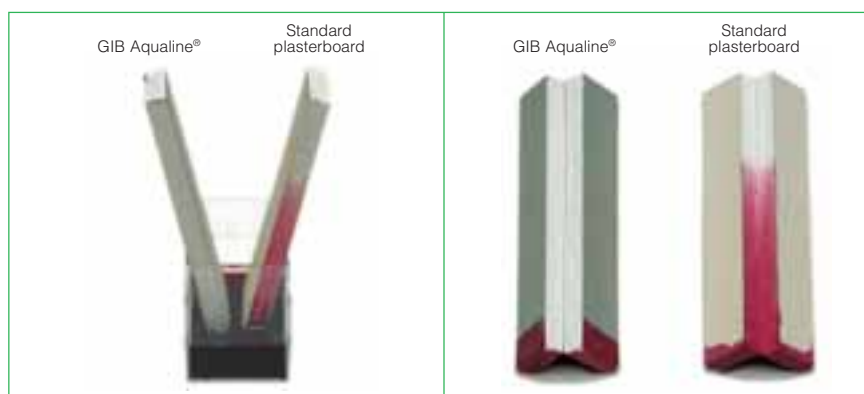
The NZBC does not call for water resistant linings in wet areas but it is highly desirable to incorporate lining materials which will maintain their integrity longer when exposed more frequently to water or steam and particularly to one-off events such as leakages or flooding of a room.

GIB Aqualine® is ideal in such situations because it features a water resistant wax polymer impregnated core.

Unlike other commonly used substrates, the GIB Aqualine® core not only resists penetration of water through the lining into the framing behind, but also resists water “wicking” up the core, a common cause of long-term damage where a water resistant lining has not been used.

GIB Aqualine® will maintain its integrity for extended periods, particularly where wicking over large areas can destroy the integrity of the interface between the lining and paint or wallpaper surfaces or between the lining and the tile adhesive.

The illustrations below graphically show the difference between GIB Aqualine® and standard plasterboard after a two-hour soak test in red dye.



GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Introduction/Design Considerations

GIB AQUALINE® *continued*

Where to Use GIB Aqualine®

Though not required by NZBC, it is highly desirable to include GIB Aqualine® in all areas at risk of water or moisture damage, in order to prolong the life expectancy of that space.

They include:

	WALLS	CEILINGS
BATHROOMS	✓	✓
SHOWERS	✓	✓
LAUNDRY	✓	✓
KITCHEN	✓	
TOILET	✓	

Benefits

- Water resistant and durable to help protect against water damage
- Proven substrate for paint, wallpaper, tiles, sheet vinyl and rigid sheet shower linings with installations in over 300,000 bathrooms in New Zealand
- Suitable for both residential and non-residential applications
- Dimensionally stable, will not buckle or warp, hence an excellent substrate for ceramic tiles
- Conventional jointing methods
- Easy to cut and form openings
- Contains fibreglass and other additives for strength and fire resistance
- May be used in GIB® Bracing, GIB® Fire Rated and GIB® Noise Control Systems (see Compliance with the NZBC, Clauses B1, C3 and G6). Consult the appropriate GIB® literature for installation details
- Green face paper for ease of recognition.

Sheet Dimensions and Weights

SHEET DIMENSIONS (ALL SHEETS 1200mm WIDE AND TE/TE)		MAXIMUM WEIGHT/m ²
Thickness (mm)	Length (mm)	
10	2400, 2700, 3000, 3600	7.8kg
13	2400, 2700, 3000, 3600	10.2kg

Handling and Storage

- GIB Aqualine® must be stored under cover, stacked flat and clear of the floor with sufficient support to avoid sagging
- GIB Aqualine® must be handled as a finishing material.

APPRAISAL

The document entitled *GIB Aqualine® Wet Area Systems* 2007 has been appraised by BRANZ, Appraisal Certificate, No. 427 (2007).

COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC)

Structure – Clause B1

The design and material specification for steel and timber framing used in GIB Aqualine® systems must be in accordance with the performance requirements of NZBC Clause B1 (Structure). See Bracing in Wet Areas on page 5.

Durability – Clause B2

When installed and maintained in accordance with this literature, GIB Aqualine® tiled or vinyl covered systems have a serviceable life of at least 15 years. They comply with the requirements of NZBC Clause B2 (Durability) for use in wet areas directly exposed to liquid water, e.g. showers, showers over baths and splash-backs.

When used as a general wet area lining and maintained under normal dry internal conditions, GIB Aqualine® systems have a serviceable life of at least 50 years and comply with NZBC Clause B2 (Durability) for use within toilets, kitchens, bathrooms and laundries not directly exposed to liquid water.

Spread of Fire – Clause C3

GIB® Fire Rated Systems provide passive fire protection in accordance with the requirements of NZBC Clause C3 (Spread of Fire). When GIB Aqualine® is substituted into fire rated systems in place of the equivalent thickness GIB Fyrelite®, the Fire Resistance Rating (FRR) of that system will be maintained.

GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Design Considerations

MARCH 2007

COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC) *continued*

Internal Moisture – Clause E3

When installed in accordance with this literature, tiled or vinyl covered GIB Aqualine® systems may be used in areas directly exposed to liquid water, such as showers, to provide an impervious and easily cleaned wall surface. These systems comply with the requirements of NZBC Clause E3 (Internal Moisture).

Hazardous Building Materials – Clause F2

At no stage during handling, installation, or serviceable life does GIB Aqualine® constitute a health hazard. It therefore meets the provisions of NZBC Clause F2 (Hazardous Building Materials). Dust resulting from the sanding of stopping compounds may be a respiratory irritant and the use of a suitable facemask is recommended.

Ventilation – Clause G4

NZBC Clause G4 (Ventilation) requires buildings to have a means of collecting or otherwise removing steam generated from laundering, utensil washing, bathing or showering. To prolong the life of interior linings and surface finishes and to minimise the risk of moisture related problems such as condensation and mould growth, adequate heating and mechanical ventilation must be provided in kitchens, bathrooms and laundries.

Airborne and Impact Sound – Clause G6

GIB® Noise Control Systems can be used to provide ratings for Sound Transmission Class (STC) and Impact Insulation Class (IIC) in accordance with the requirements of NZBC Clause G6 (Airborne and Impact Sound). When GIB Aqualine® is substituted into GIB® Noise Control systems in place of the equivalent thickness GIB® Standard plasterboard or GIB Fyrelite®, the STC and IIC rating of that system will be maintained. When GIB Aqualine® is substituted in place of the equivalent thickness GIB Noiseline®, a small performance loss may occur. For further information contact the GIB® Helpline 0800 100 442.

LIMITATIONS

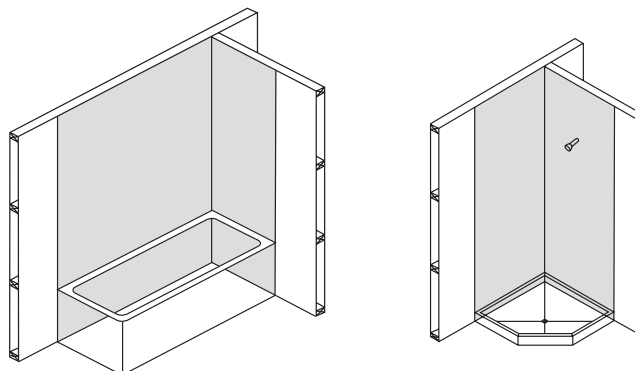
- GIB Aqualine® must not be used for bracing purposes in shower cubicles or above baths (see Bracing in Wet Areas below)
- Do not use GIB Aqualine® where it may be exposed for extended periods to humidities of 90% RH and above. Such areas include group shower or steam rooms as well as moisture and chlorine rich environments such as indoor swimming pools
- GIB Aqualine® must not be directly applied to solid plaster (gypsum or cement), wood based sheet linings or similar materials, masonry or concrete. GIB Aqualine® may only be applied to these materials where timber strapping or steel furring channels are installed
- GIB Aqualine® must not be installed over a vapour barrier or a wall acting as a vapour barrier
- Cracked or damaged sheets must never be used
- GIB Aqualine® must not be used in external applications
- GIB® plasterboard must not be exposed to temperatures in excess of 52°C for prolonged periods. Heat-generating devices may include halogen lighting, cooking elements, radiant heating, solid fuel exhausts and fire surrounds. Consult the appliance manufacturer for installation details.

BRACING IN WET AREAS

Bracing elements are required to have a durability of 50 years. GIB® bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members.

Otherwise, GIB® Bracing Systems can be used in water-splash areas as defined by NZBC Clause E3/AS1, provided these are maintained impervious for the life of the building.

GIB Aqualine® can be used in place of GIB® Standard plasterboard in GIB® bracing elements. GIB Aqualine® can be used in place of GIB Braceline® in GIB® bracing elements 900mm or longer, provided the perimeter of the element is fixed with GIB Braceline® Nails or GIB Braceline® screws at 100mm centres, using the GIB Braceline® corner fixing pattern.



No bracing in the shaded areas.

GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Design Considerations

MARCH 2007

NEW ZEALAND BUILDING CODE

E3.3.4 requires impervious and easily cleaned surfaces to all surfaces adjacent to sanitary fixtures or laundering facilities.

E3.3.5 requires that surfaces of building elements likely to be splashed or contaminated in the course of the intended use of the building must also be impervious and easily cleaned.

E3.3.6 requires that surfaces of building elements likely to be splashed must be constructed in a way that prevents water from penetrating behind linings or into concealed spaces (e.g. wall cavities).

Walls in wet areas therefore need to be addressed according to whether they fall within the scope of one of the following descriptions:

1. Wall surface likely to be splashed
2. Shower walls. Although not a requirement of NZBC it is highly recommended that the wall surfaces within 150mm of the top edge of a bath, and the vertical faces immediately under the edge of a bath, are treated in the same way as for a shower wall.

WALL SURFACES IN AREAS LIKELY TO BE SPLASHED

Suitable linings include:

- a. Integrally waterproof sheet material (e.g. polyvinylchloride) with sealed joints
- b. Ceramic or stone tiles having 6% maximum water absorption, waterproof grouted joints, and bedded with an adhesive specified by the tile manufacturer as being suitable for the tiles, substrate material and the environment of use
- c. Cement based solid plaster or concrete having a steel trowel or polished finish (semi-gloss or gloss paint must be used if a paint finish is required)
- d. Cork tile or sheet sealed with waterproof applied coatings
- e. Monolithic applied coatings having a polished, non-absorbent finish (e.g. terrazzo)
- f. Sheet linings finished with vinyl coated wallpaper, or semi-gloss or gloss coating
- g. Water resistant sheet linings finished with decorative high pressure laminate or factory applied polyurethane or resin
- h. Modular or multiple lining units which are themselves *impervious* and easily cleaned, and are installed with *impervious* joints
- i. Timber or timber-based products such as particleboard sealed with waterproof applied coatings.

NB: Floor surfaces and floor/wall junctions are required by E3 to be impervious.

SURFACES IN SHOWERS AND AROUND BATHS

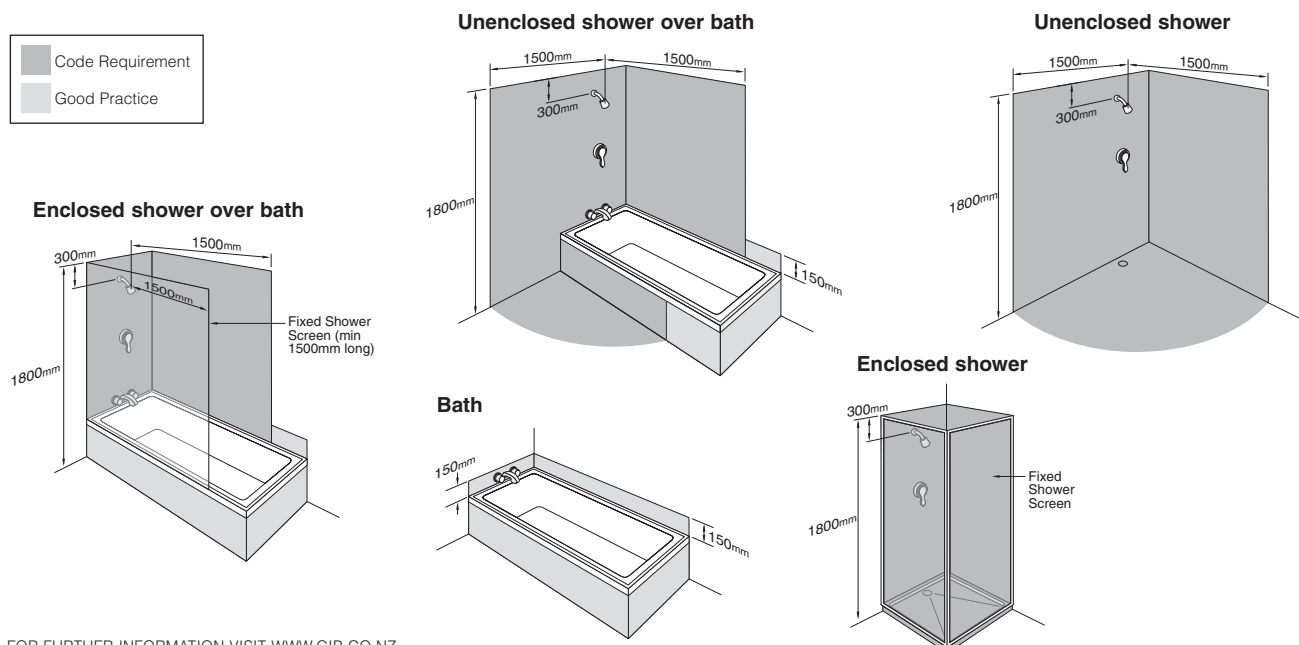
Suitable linings include all of the above, but **NOT including items (d) and (f) from the above list.**

Note that a waterproof membrane complying with AS/NZS 4858: 2004 **MUST** be applied to all lining materials used under ceramic tiles in these areas.

The waterproof membrane must extend to a 1500mm horizontal radius from a shower rose unless the shower is contained within a fixed enclosure. A shower curtain does not constitute a fixed enclosure.

Particleboard manufacturers recommend that in wet areas, panels should be protected with a suitable wet area membrane or an integrally waterproof sheet material. Some local authorities call for this treatment on all timber based floors. Local requirements should be checked before proceeding.

Dark grey shaded areas in the diagrams below represent the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membranes prior to tiling. Light grey shaded areas represent good practice.



GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Design Considerations

MARCH 2007

WALL SURFACES SURROUNDING COOKTOPS

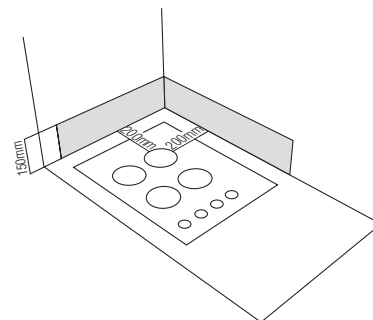
The protection of combustible surfaces surrounding gas cooking appliances is covered by NZS 5261. Consult the current version of this standard to ensure compliance.

However, as a guide the following options are acceptable for wall surfaces within 200mm of the periphery of a gas element to a height of 150mm above the element for the full dimension (width and depth) of the cooktop surface area:

- 5mm ceramic tiles on GIB® plasterboard
- 5mm toughened glass on GIB® plasterboard
- or any system that can be demonstrated to meet the requirements of Clause 2.6.2.6 of NZS5261.

Because of the moisture generated by cooking, it is highly recommended that GIB Aqualine® is used in kitchen areas.

GIB® plasterboard products must not be exposed to temperatures in excess of 52°C for sustained periods. Check with the appliance manufacturer that this requirement will be met. However, it would be unusual for surfaces outside 200mm to exceed 52°C for sustained periods.



PENETRATIONS AND SEALANTS

As leaks and water ingress typically occur at junctions between building elements and at penetrations, it is essential that particular attention is given to these details at the time of installation. Lack of attention to detail can result in water damage that could remain undetected for a long time.

- Ensure that all cut-outs for pipe penetrations are made neatly, and slightly oversize, with a hole saw. These penetrations should be of a diameter no more than 12mm greater than that of the pipe
- Sealants should be of a mould inhibiting type and be neutral cure. Neutral cure silicones will generally meet these requirements
- Surfaces should be dry and free from dust before application, a minimum of a 4mm joint width provided and the depth should not exceed the width
- Gun a bead of silicone sealant to the full depth of the GIB Aqualine® in the following locations:
 - Around all tap/pipe bodies
 - The gap between the bath rim and the bottom edge of the GIB Aqualine®
 - Between the upstand of preformed shower bases and the bottom edge of the lining
 - Where an impervious junction is required at the floor/wall line, carefully seal the gap between the bottom edge of the board and the finished floor. Leave a 5-10mm gap at the bottom of the GIB Aqualine® wall lining for this purpose, ensuring the gap is free from dirt and dust
- Do not locate shower heads or taps on fire rated or intertenancy walls. Should this be unavoidable then refer to the publication *Penetrations in GIB® Fire Rated Systems*. Always use tested and approved proprietary solutions.

WATERPROOF MEMBRANES

- A waterproof membrane must be applied to **all** lining materials used as a substrate for ceramic tiles in a shower or shower over bath situation
- The wall surface in a shower or shower over bath situation is not complete and ready for tiling until coated with a waterproof membrane over the lining and the jointed areas shown shaded on page 6
- Only in-situ waterproofing materials which are manufactured to AS/NZS 4858:2004 "Wet Area Membranes" are recommended and applied to manufacturer's recommendations. Typically, these types of membranes are not suitable for paint and wallpaper finishes
- Waterproof membranes must be fully cured and dry prior to application of tiling adhesives
- Embed reinforcing mats in the membrane at all internal corners of the shower (including floor/wall junctions)
- Preformed sheet membranes are also available and may be more suitable where curing times or specialist skills are an issue
- The details shown in this technical literature are generic in nature. For accurate detailing, follow the specifications provided by the supplier of the proprietary waterproof membrane.

TILING

GIB Aqualine® is suitable as a substrate for tiling up to the following weights:

- 10mm GIB Aqualine® up to 20kg/m²
- 13mm GIB Aqualine® up to 32kg/m².

Note: Most ceramic and porcelain tiles weigh less than 20kg/m².

For further information on tiling consult the BRANZ *Good Practice Guide – Tiling*.

GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Design Considerations

MARCH 2007

FLEXIBLE SHEET VINYL – SHOWERS AND OTHER WET AREAS

- GIB Aqualine® is a suitable substrate for flexible vinyl wall finishes in wet areas of residential, commercial or institutional buildings
- Framing requirements and installation procedures for the GIB Aqualine® substrate shall be as per page 10 or 11, except that the lining gap at the floor should be reduced to 5mm when a pencil cove detail is used
- The installation of galvanised steel reinforcing angles (32 x 32 x 0.55mm) behind internal GIB Aqualine® corners is recommended for sheet vinyl applications in showers or shower over bath situations (see illustration page 14)
- The GIB Aqualine® lining must be jointed and stopped to a paint quality finish (Level 4) – trowel marks can telegraph through even a commercial grade 2mm vinyl
- A commercial grade vinyl is recommended for the wall finish in commercial or institutional bathrooms and showers
- In areas directly exposed to liquid water, all joints in flexible sheet vinyl must be heat welded
- Installation of the flexible vinyl must be carried out strictly in accordance with the specifications provided by the suppliers/manufacturers of the vinyl.

RIGID SHEET SHOWER LININGS

- The manufacturers/suppliers of thin (usually 2-3mm) and rigid acrylic shower linings commonly recommend direct adhesive fixing to wall linings using solvent-based adhesives
- Water temperature changes will cause movement of the thin acrylic sheet, which in turn will stress the adhesive and wall lining substrate
- **Do not preseal or paint** areas which are to be covered by the rigid shower linings
- The wall surface must be free of dust before installation of the lining
- Suppliers of rigid sheet acrylic shower linings recommend a minimum of 24 hours for the adhesive to cure fully prior to the shower being put into service
- Care must be taken to ensure that rooms are adequately ventilated and the adhesive is fully cured before the shower is used
- Consult the manufacturer/supplier of the shower lining for full installation details.

RENOVATIONS

Bathrooms, kitchens and laundries are the most renovated rooms in the house, partly due to fashion considerations and partly because of damage sustained by ingress of water and moisture within those spaces.

In most cases when renovating these rooms it is often easier and more cost-effective to remove the existing linings and replace them with GIB Aqualine®. This allows for a completely new start in the room and offers sound substrates for new surfaces such as tiling and painting, where otherwise flaking paint or damaged plasterboard may compromise good and sound finish or practice. At the very least re-lining will:

- Allow for inspection of framing where damage may have occurred and provide the opportunity to repair such damage
- Allow plumbing and electrics to be checked and altered or replaced where required
- Provide the opportunity to install thermal and acoustic insulation and water resistant linings where appropriate
- Make the job easier.

MAINTENANCE

Lack of maintenance is frequently the cause of premature and often very expensive failure of components and building elements within wet areas.

It is important to regularly inspect and repair any potential problem before it becomes a major problem and expensive to reinstate. Good maintenance should include:

- Ongoing ventilation. At the very least, good passive ventilation (e.g. window vents); but good active ventilation (e.g. extraction fans) of an appropriate size for the room is recommended
- Impervious coatings and surfaces should be checked for wear and damage and maintained and recoated before ingress of water to the substrate occurs
- Regular cleaning with appropriate cleaners so that build-up of matter, such as mould, is well controlled
- Sealants at junctions and penetrations should be checked for adhesion on a regular basis and replaced where adhesion failure to substrates occurs
- Where pipe leaks have become evident, however small, they should be repaired promptly and any area around such leaks dried out completely before any other repairs are carried out.

GIB AQUALINE® WET AREA SYSTEMS – DESIGN



Non-residential and Apartments

MARCH 2007

High-rise and commercial wet areas can generally be divided into four separate categories:

HIGH-RISE APARTMENTS AND INTERTENANCY

Wet areas in apartment complexes are generally covered by Clause E3 of the NZBC and will have the same requirements as shown for residential applications. However, apartment buildings will also involve intertenancy walls requiring noise control and fire resistance.

Generally, noise control and fire resistance are the first consideration and then the water resistance is added to those systems.

For noise control, GIB Aqualine® can substitute for the equivalent thickness GIB® Standard plasterboard or GIB Fyrelite®.

For fire resistance, GIB Aqualine® can substitute for GIB Fyrelite® of equivalent thickness.

In all cases the prescribed noise control or fire resistance system specifications must be followed completely as presented in the GIB® publications *GIB® Noise Control Systems* and *GIB® Fire Rated Systems*.

Refer to typical details on page 25.

The NZBC for intertenancy calls for special consideration to be given to preventing water from travelling from one tenancy to another. This calls for a waterproof membrane to all wet area floors with upstands to walls and the inclusion of floor wastes.

It is important to avoid penetrations such as taps, shower roses, etc. in intertenancy walls as this will compromise fire and noise ratings.

OFFICE, WORKPLACE AND SCHOOLS

These wet areas are generally no different in requirements to those shown in this publication or those of high-rise apartments, and are treated in the same manner.

As there is often a higher impact requirement in commercial applications, 13mm GIB Aqualine® is the minimum thickness recommended.

These areas are often finished in sheet vinyl or ceramic tiles and GIB Aqualine® is an ideal substrate, particularly in the case of sheet vinyl where a high quality finish is required to minimise telegraphing of imperfections in the substrate.

HEALTHCARE AND HOSPITALS

This industry will generally have special requirements for wet areas. GIB Aqualine® will generally satisfy specific design needs in healthcare facilities and in particular is an ideal substrate for the preferred finish of sheet vinyl.

PUBLIC AMENITIES AND SPORTS CLUBS

Public amenities and sports clubs often have a high demand for impact resistance, therefore 13mm GIB Aqualine® should be used, and suitable impact resistant wall coverings considered, such as heavy duty sheet vinyl or ceramic tiles over waterproof membrane to 1200mm high.

Also full consideration should be given to the usage of the amenity and whether high pressure or chemical cleaners will be used or if the amenity may be subject to vandalism.

Because of extreme humidity and presence of chemicals, GIB Aqualine® is not suitable for enclosed swimming pool areas.

Contact the GIB® Helpline on 0800 100 442 for further assistance.

GIB AQUALINE® WET AREA SYSTEMS – FRAMING AND LINING INSTALLATION



Non-tiled Walls – Timber Framing

MARCH 2007

If bracing, noise control or fire rating considerations exist, consult the relevant GIB® technical publication, e.g. *GIB® Fire Rated Systems*, *GIB® Noise Control Systems*, *GIB® Bracing Systems*, for the appropriate information.

Wall Framing

Framing dimensions must comply with the requirements of NZS 3604:1999.

- The moisture content of timber framing shall be 18% or less at the time of lining
- Studs shall be spaced at 600mm centres maximum for both 10mm and 13mm GIB® plasterboard
- Nogs to be evenly spaced with a maximum spacing of 1350mm. Alternatively, nogs may be staggered 150mm maximum either side of a horizontal joint line
- Nogs are not required behind horizontal joints except in shower situations or specific fire or noise control systems.

Fasteners

- 10mm GIB Aqualine® – minimum 25mm x 6g GIB® Grabber® High Thread Drywall Screws or 30mm x 2.8mm GIB® Nails
- 13mm GIB Aqualine® – minimum 32mm x 6g GIB® Grabber® High Thread Drywall Screws or 30mm x 2.8mm GIB® Nails.

Fastener Centres

- 300mm centres to top and bottom plates and to perimeter studs
- Single fasteners to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges
- Daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element.

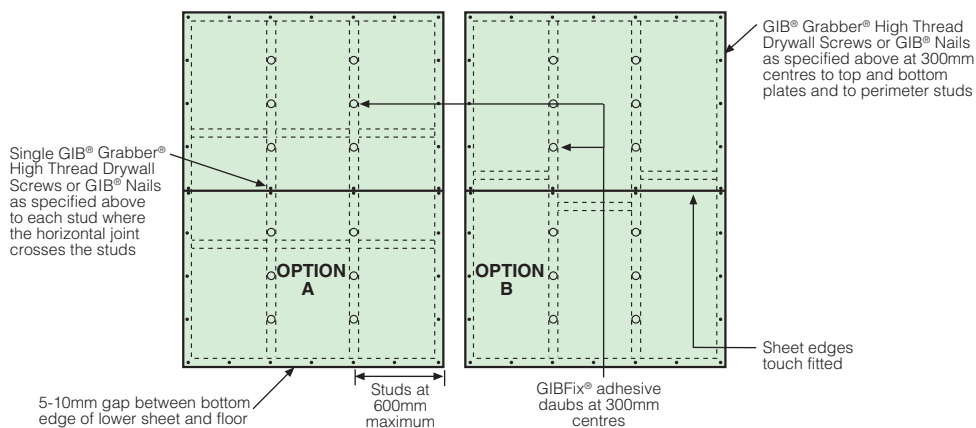
Lining

- Install the sheets leaving a 5-10mm gap at the floor line to allow for movement of the framing members and to allow for cleaning dirt and rubbish before sealing
- Sheets to be touch fitted.

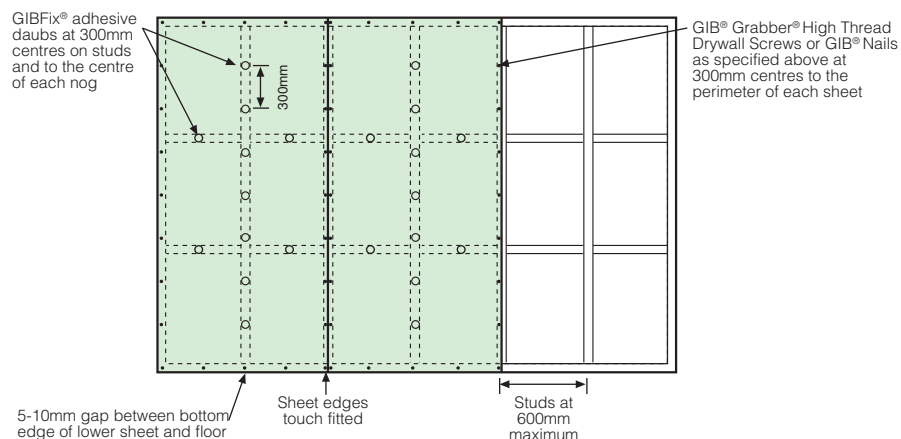
Jointing

- Jointing shall be carried out in accordance with the instructions in the *GIB® Site Guide*; GIB® AquaMix is recommended for the first two coats.

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



GIB AQUALINE® WET AREA SYSTEMS – FRAMING AND LINING INSTALLATION



Non-tiled Walls – Steel Framing

MARCH 2007

The minimum sheet thickness for fixing on light gauge steel framing is 13mm GIB® plasterboard.

Steel framing for residential construction is by specific design.

If noise control or fire rating considerations exist, consult the relevant GIB® technical publication (e.g. *GIB® Fire Rated Systems* or *GIB® Noise Control Systems*) for the appropriate information.

Wall Framing

- Steel stud dimensions to be minimum 63 x 34 x 0.55mm nominal with a 6mm return
- Steel channel dimensions to be minimum 63 x 30 x 0.55mm nominal
- Studs shall be spaced at 600mm centres maximum
- Ensure that the studs are placed with the open side facing in the same direction (see *GIB® Site Guide*).

Fasteners

- 25mm x 6g GIB® Grabber® Self Tapping Drywall Screws.

Fastener Centres

- 300mm centres to top and bottom channels and to end studs
- Single screws to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges
- Daubs of GIBFix® All-Bond adhesive OR screws at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed.

Lining

- Lay the sheets, leaving a 5-10mm gap at the floor line.

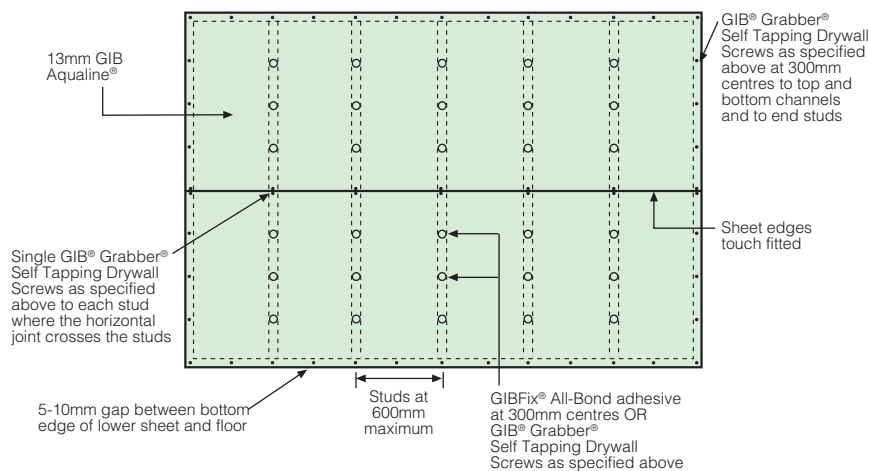
Note: If friction fitted steel studs have been used, sheets must be fitted hard to the floor. Ensure floor is cured and dry

- Sheets to be touch fitted.

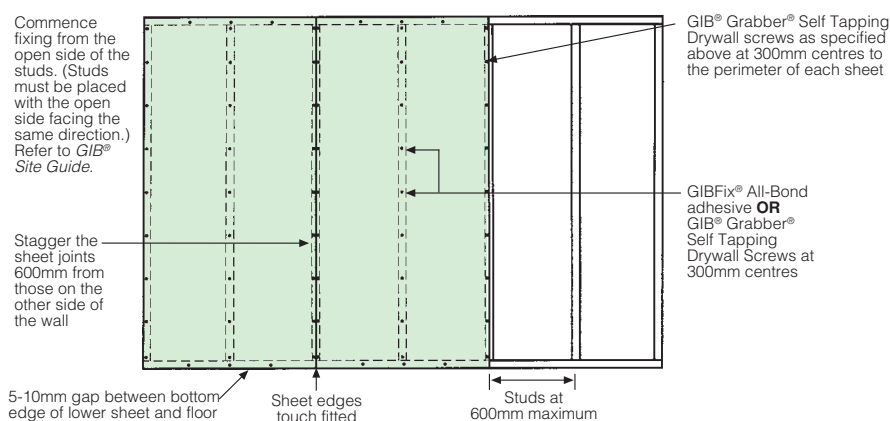
Jointing

- Jointing shall be carried out in accordance with the instructions in the *GIB® Site Guide*. GIB® AquaMix is recommended for the first two coats.

Fastening and Jointing the Linings – Horizontal Fixing



Fastening and Jointing the Linings – Vertical Fixing



GIB AQUALINE® WET AREA SYSTEMS – FRAMING AND LINING INSTALLATION



Tiled Walls

MARCH 2007

Important: See page 6 and 7 for waterproof membrane requirements.

Wall Framing

Framing dimensions and spacing must comply with the requirements of NZS 3604:1999 or relevant NZ Standard.

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum 32 x 32 x 0.55mm galvanised metal angle. Each side of the angle shall be fastened to the framing with 30mm galvanised clouts at 300mm centres
- Steel stud systems do not generally require nogs except as below:
 - Adjacent to each pipe penetration and behind sink and tub flashings
 - Between all studs above bath flanges and preformed shower bases
- For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid framing. This may require either vertical fixing of the GIB Aqualine® or the installation of some additional nogs.

Fasteners

- For 10mm GIB Aqualine® use minimum 25mm x 6g GIB® Grabber® Drywall Screws
- For 13mm GIB Aqualine® use minimum 32mm x 6g GIB® Grabber® Drywall Screws.

Fastener Centres

- GIB® Grabber® Drywall Screws at 100mm centres to perimeter of wall and to all intermediate studs
- Adhesive is not to be used in place of mechanical fastenings.

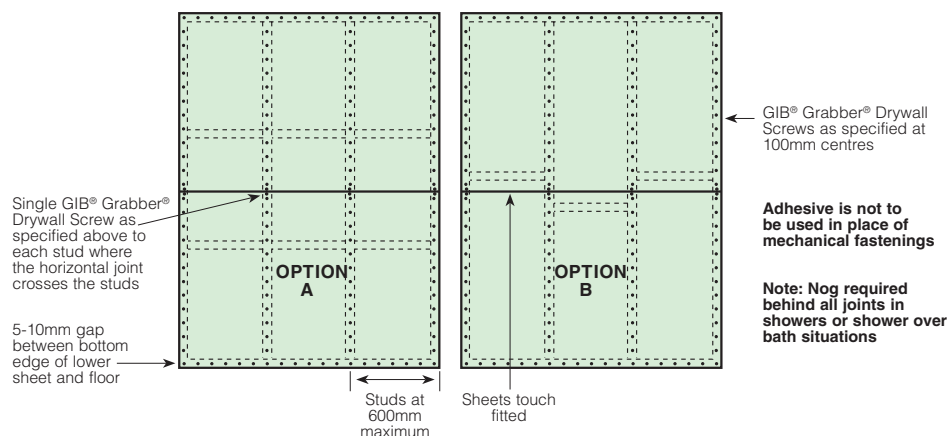
Lining

- 10mm or 13mm GIB Aqualine® is suitable for use on timber framing and for tile weights up to 20kg/m²
- 13mm GIB Aqualine® must be used for tile weights between 20 and 32kg/m² and when light steel framing has been used
- GIB Aqualine® may be fixed vertically or horizontally
- Provide a 5-10mm gap at the wall/floor junction
- Provide a 5-10mm gap between the bottom edge of the GIB Aqualine® and any bath rim or preformed shower base to allow for placement of sealant
- GIB Aqualine® sheets shall be touch fitted
- Where the framing or fastener centres required for tiled areas are closer than those specified for GIB® Fire Rated and GIB® Noise Control Systems, the tiling specification shall prevail. Where relevant, check that fastener lengths comply with the requirements of GIB® Fire Rated Systems or GIB® Noise Control Systems.

Jointing

- Jointing shall be carried out in accordance with instructions in the *GIB® Site Guide*
- Water resistant GIB® AquaMix is recommended for the first two coats
- No top coat is required.

Fastening the Linings – Horizontal Fixing in Tiled Areas



Note:

GIB Aqualine® is suitable for tiling to full height of walls, but if a wall is to be partially tiled (i.e. half high), only the area of wall under the tiles needs to be fixed as above. The remainder of the wall may be fixed as for non-tiled area (see page 10 & 11).

GIB AQUALINE® WET AREA SYSTEMS – FRAMING AND LINING INSTALLATION



Ceilings

MARCH 2007

Ceiling Framing

Framing dimensions and spacing must comply with the requirements of NZS 3604:1999 or relevant NZ Standard. If bracing, noise control, fire rating considerations exist consult the relevant GIB® publication for appropriate information.

Fasteners

- Steel battens – 25mm x 6g GIB® Grabber® Self Tapping Drywall screws
- Timber battens or Joists – 32mm x 6g GIB® Grabber High Thread Drywall screws.

Adhesives

- Steel battens – GIBFix® All-Bond
- Timber battens – GIBFix® Wood Bond (not suitable for LOSP treated timber).

Fasteners Centres

- Single screws to the edges and centre of the sheets across each batten
- Screws to be 12mm from sheet edges
- Daubs of adhesive at 200mm centres between the screws
- Do not place adhesive at sheet edges or under fasteners, this may lead to screw or nail pops.

Lining

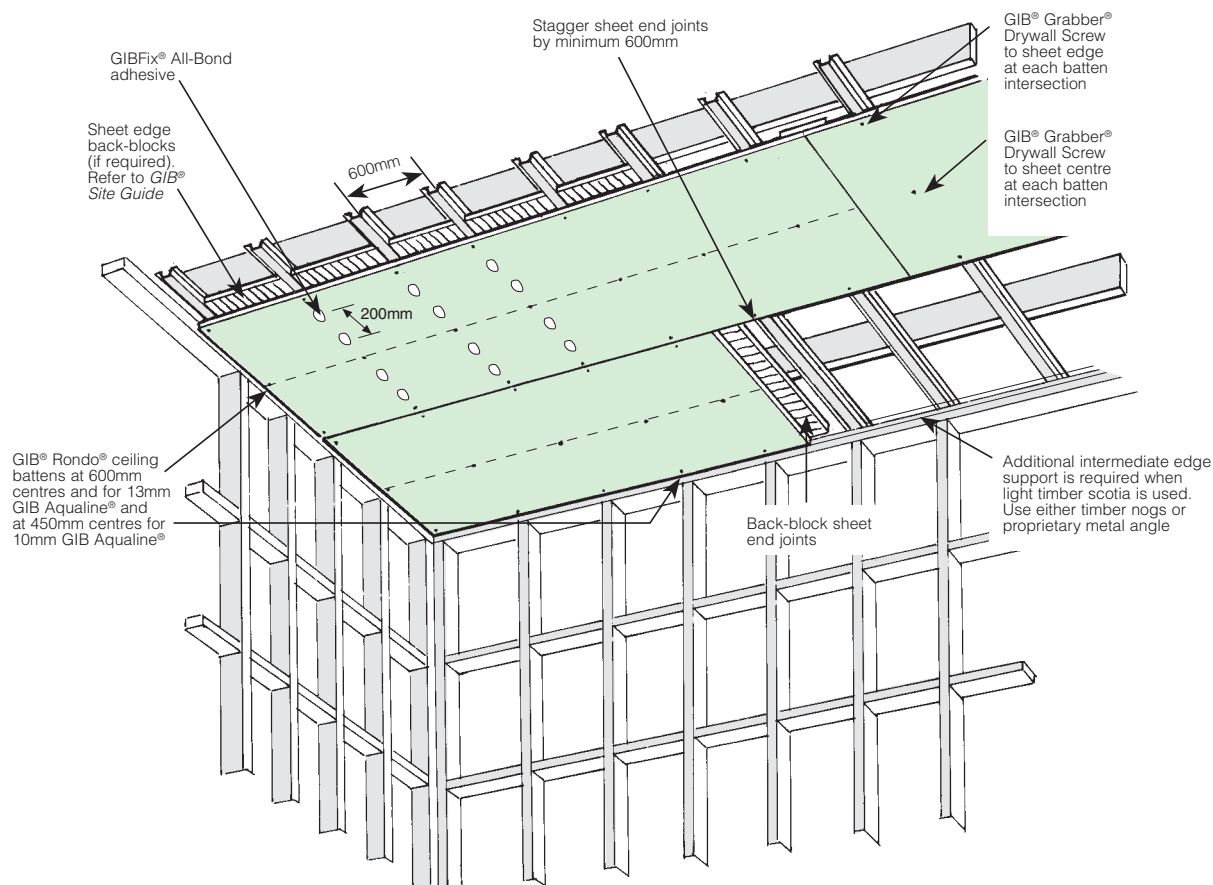
- The lining shall be fixed at right angles to the battens or joists
- Commence fixing from the centre of the sheets outwards
- Sheets to be touch fitted
- Use long length sheets to minimise sheet end butt joints
- Back-block sheet end butt joints
- See GIB® Site Guide for sheet edge backblocking requirements.

Batten Spacings

- 13mm GIB Aqualine® plasterboard – 600mm centres max
- 10mm GIB Aqualine® plasterboard – 450mm centres max.

Jointing

- All sheet joints must be paper tape reinforced and stopped in accordance with instructions in the *GIB® Site Guide*. Water resistant GIB® AquaMix is recommended for the first two coats.
- Do not fix tiles to GIB® plasterboard ceilings.

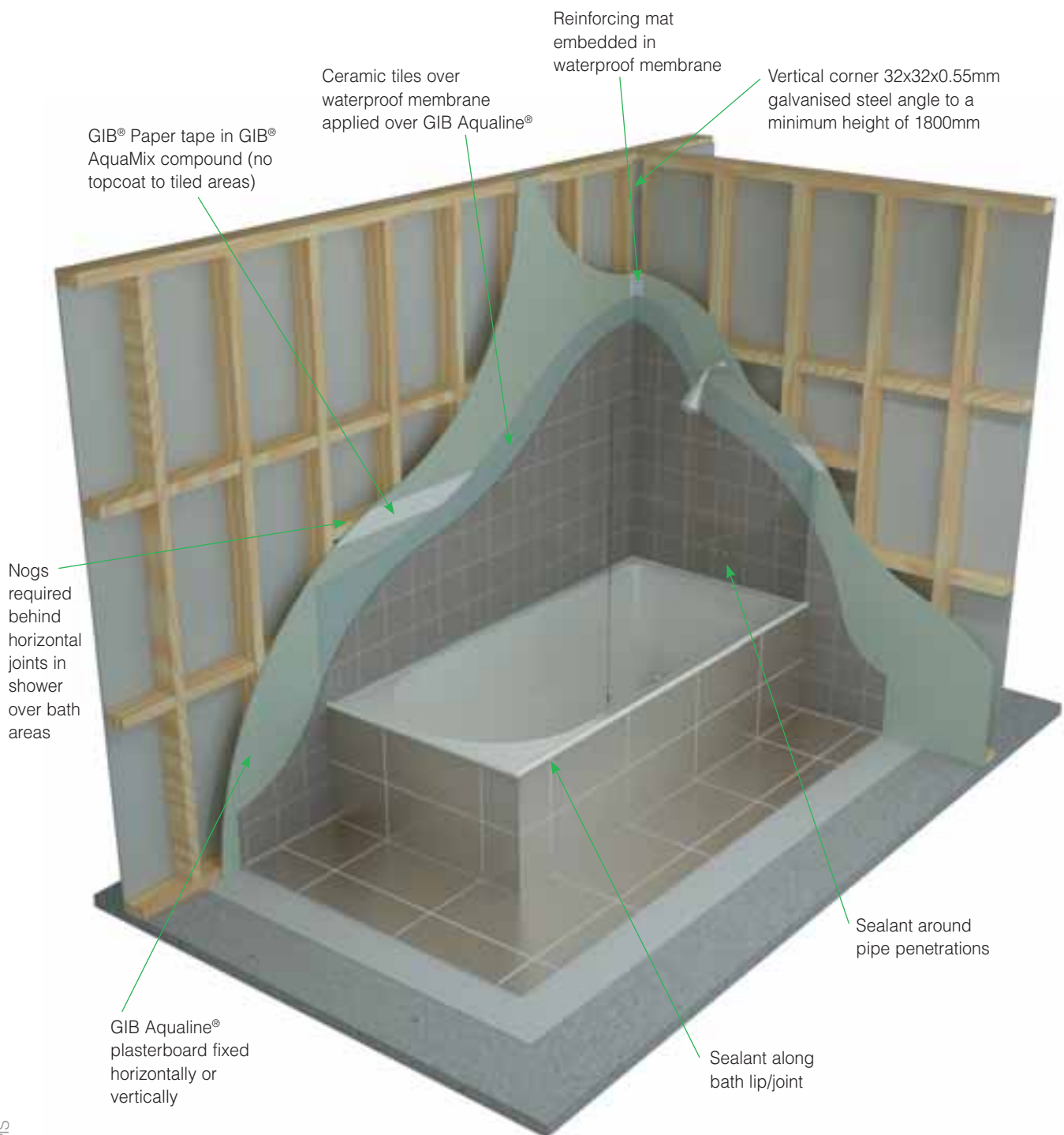


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Shower Over Bath – Tiled Walls

MARCH 2007



Run a bead of silicone sealant around the mixer unit on the tiles extending below the bottom of the pipe aperture.

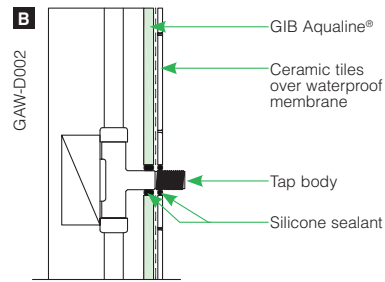
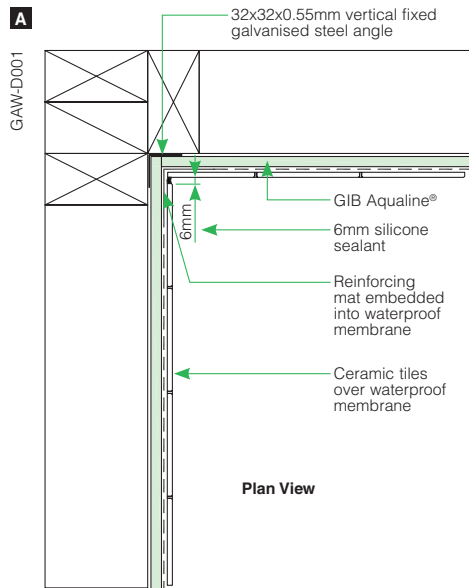
For typical details, see the following pages.

GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS

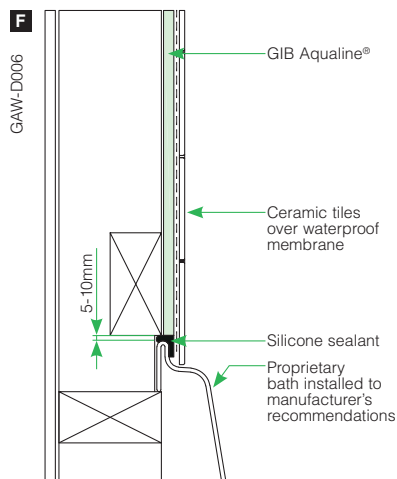
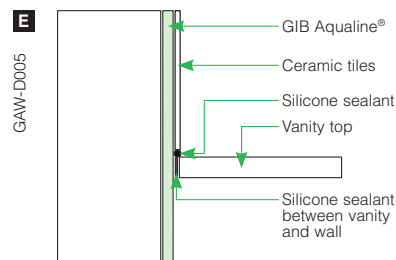
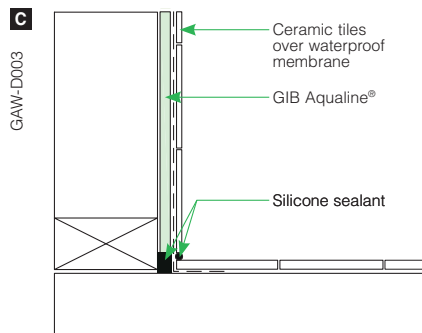
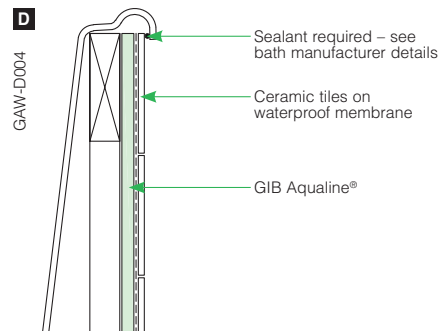


Shower Over Bath – Tiled Walls

MARCH 2007



Note:
Where impact noise from pipes is an issue, fix all pipes on resilient brackets.

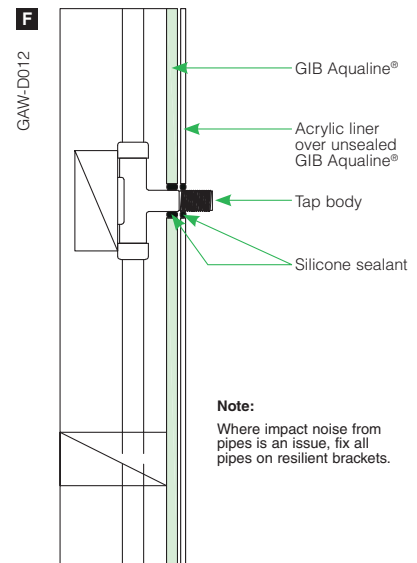
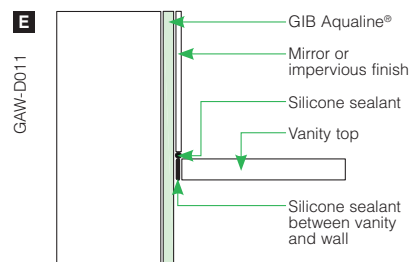
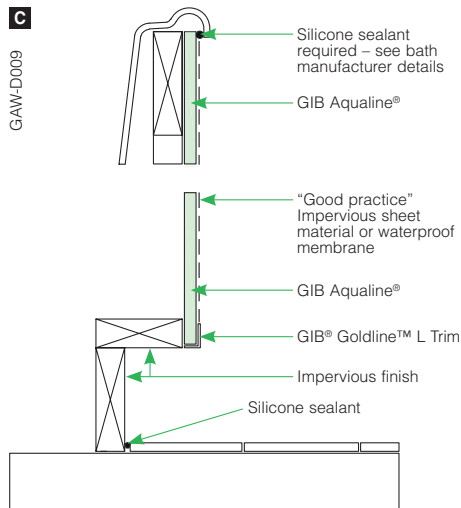
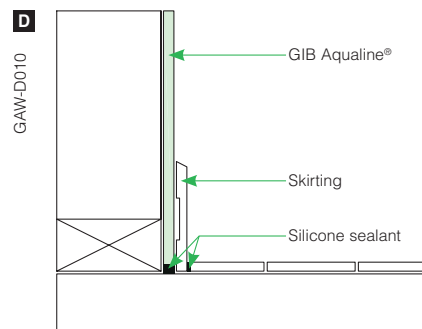
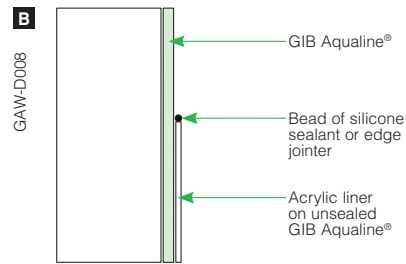
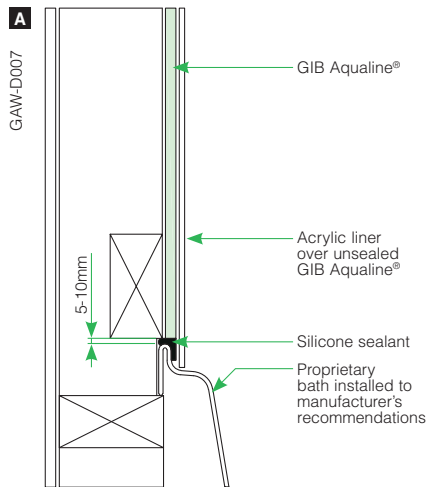


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Shower Over Bath – Acrylic Liner

MARCH 2007

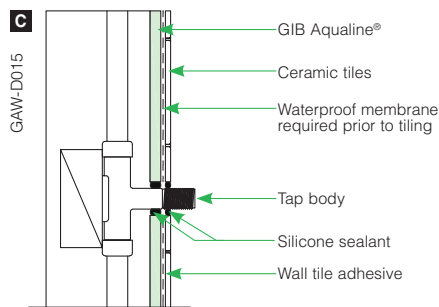
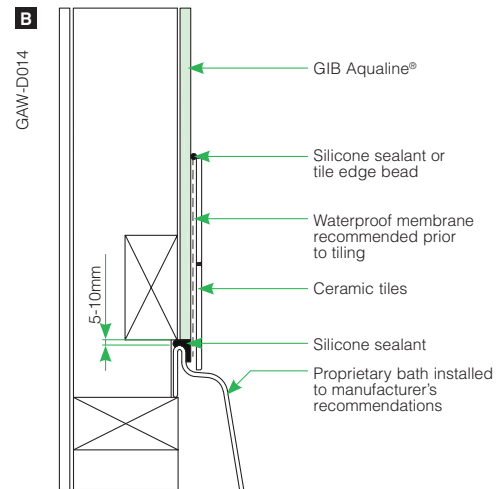
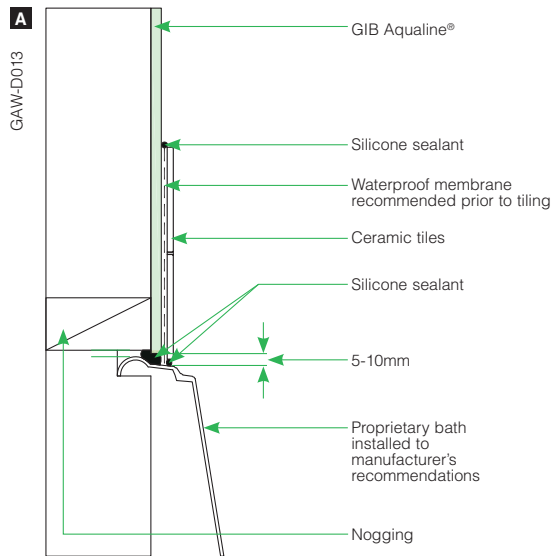


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS

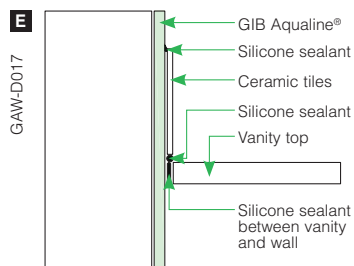
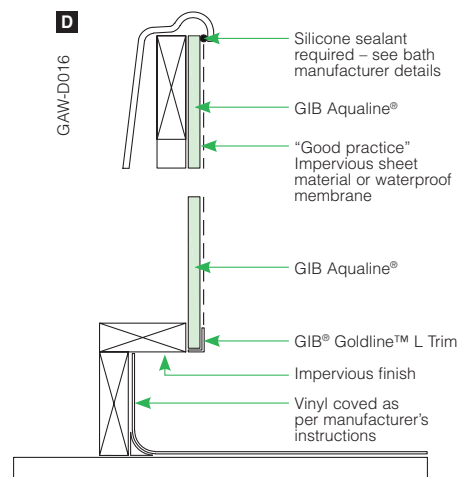


Bath – Tiled Upstand

MARCH 2007



Note:
Where impact noise from pipes is an issue, fix all pipes on resilient brackets.

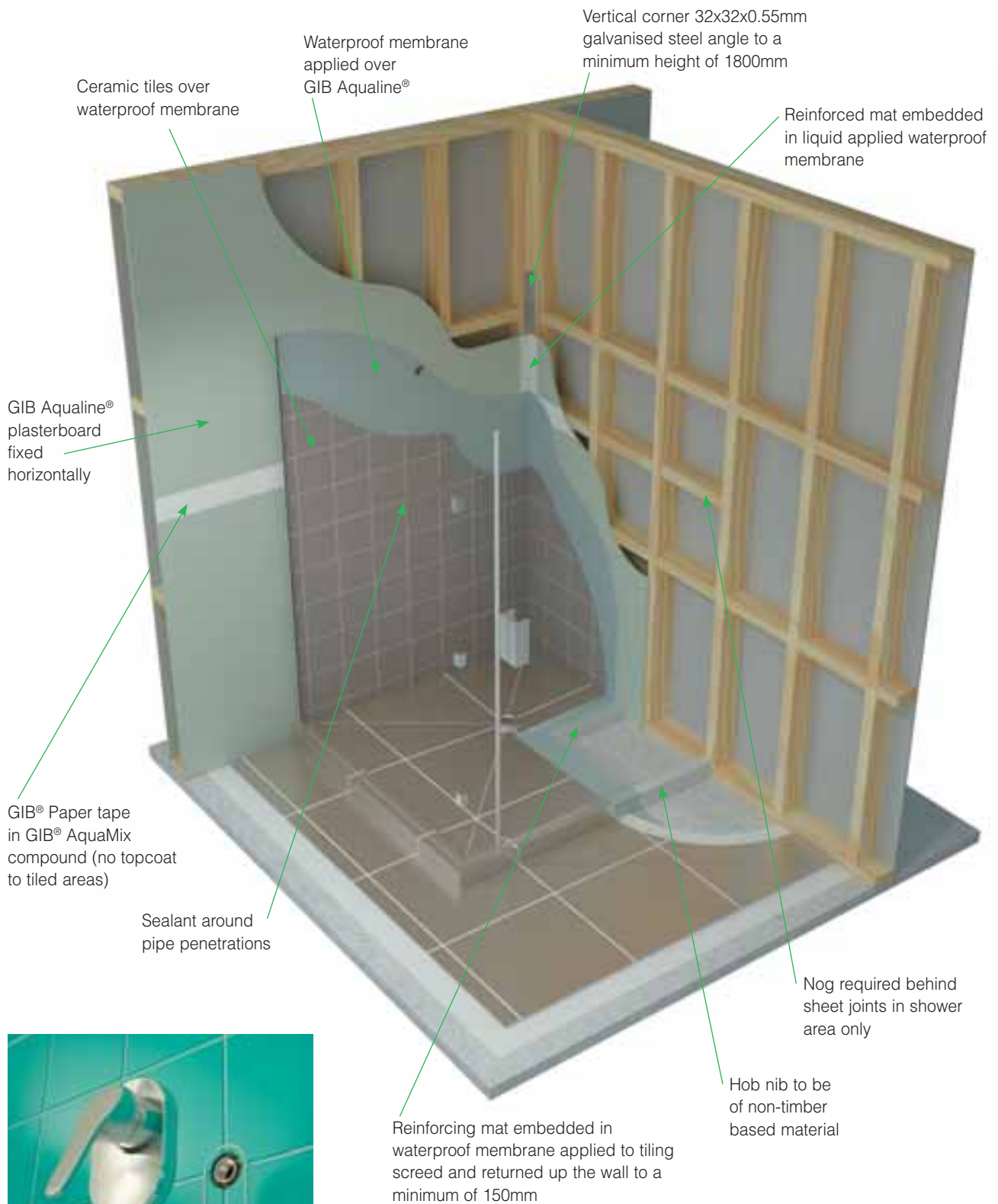


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Shower – Tiled Walls and Base

MARCH 2007



Run a bead of silicone sealant around the mixer unit on the tiles extending below the bottom of the pipe aperture.

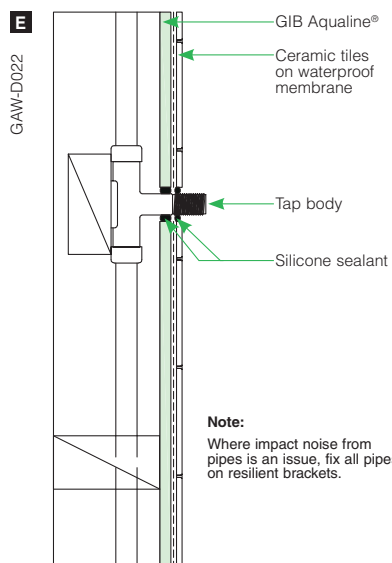
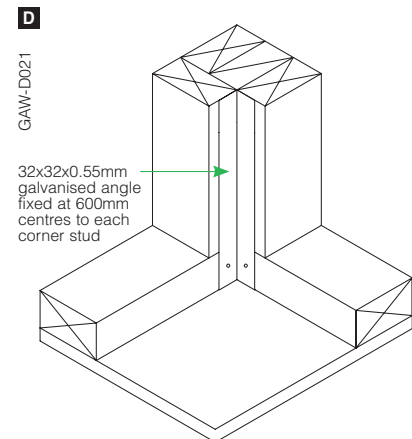
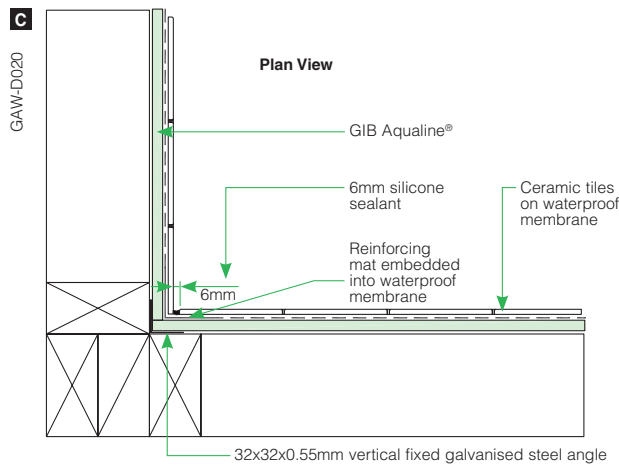
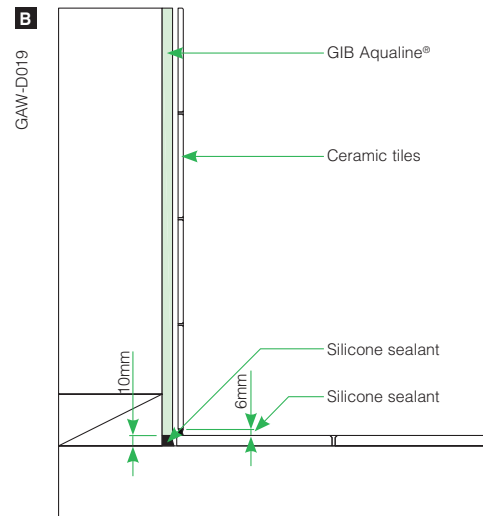
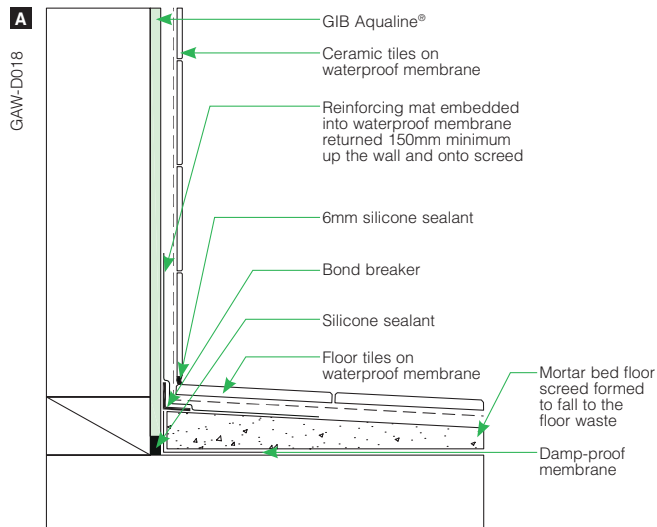
For typical details, see the following pages.

GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Shower – Tiled Walls and Base

MARCH 2007

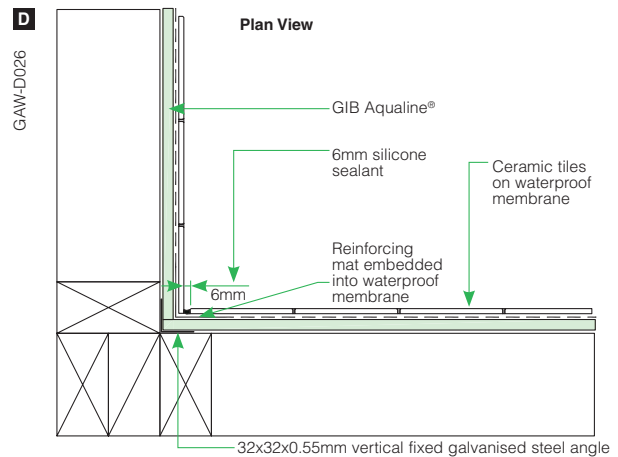
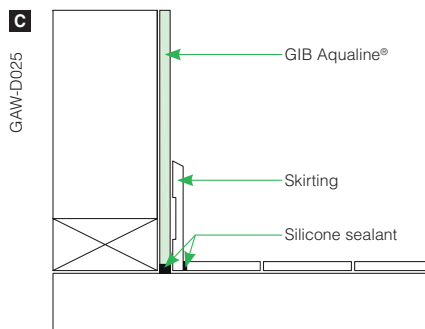
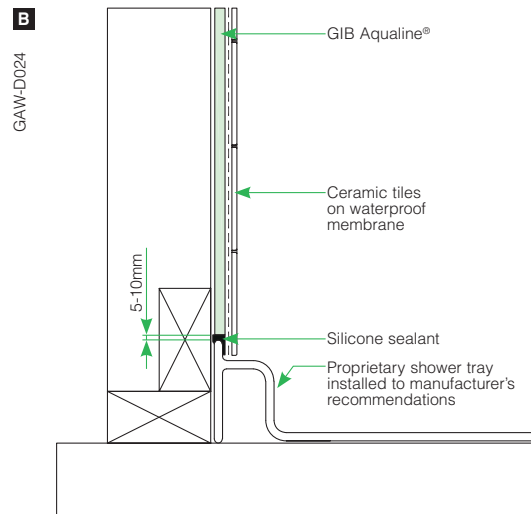
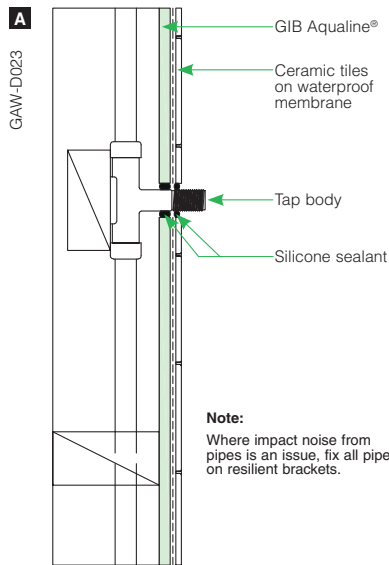


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Shower – Tiled Walls and Acrylic Base

MARCH 2007

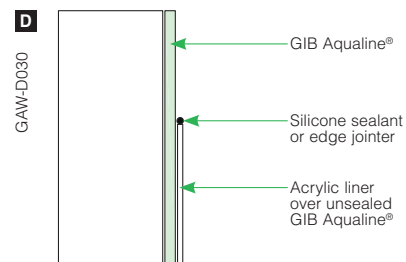
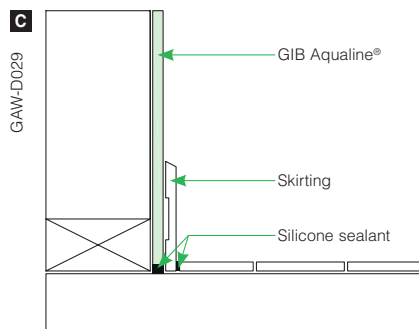
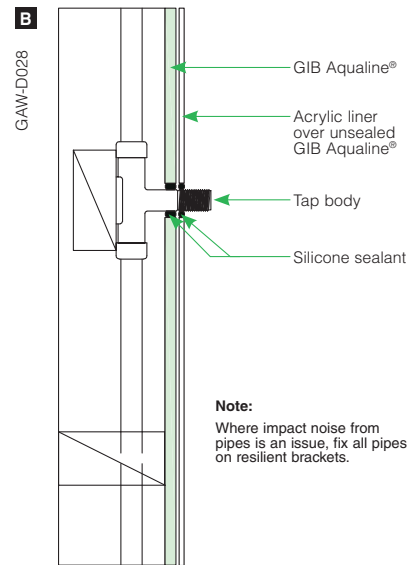
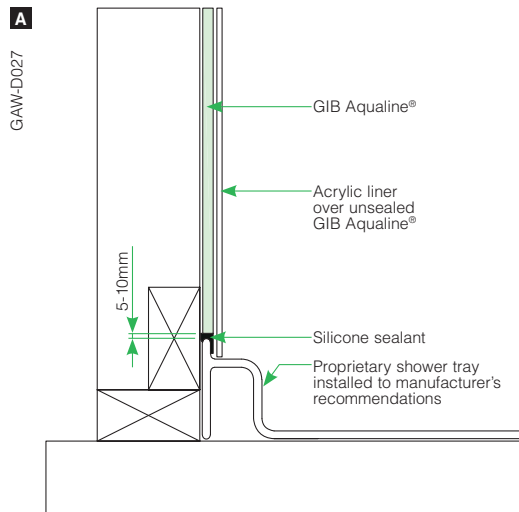


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Shower – Acrylic Liner and Base

MARCH 2007

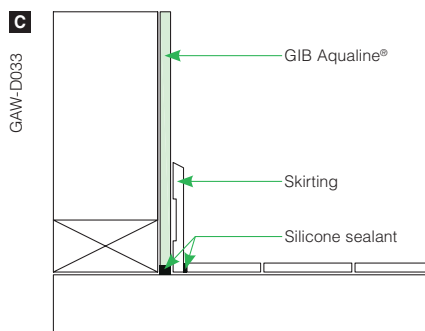
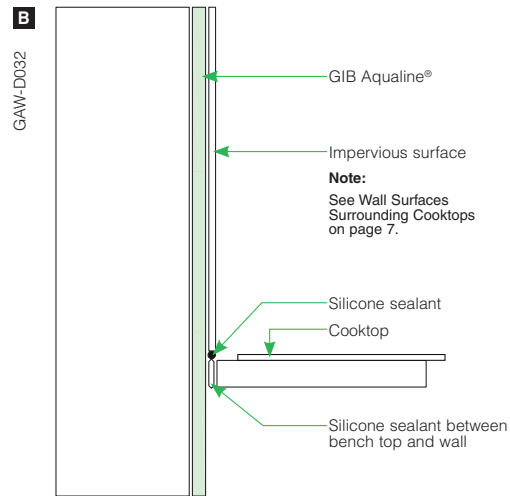
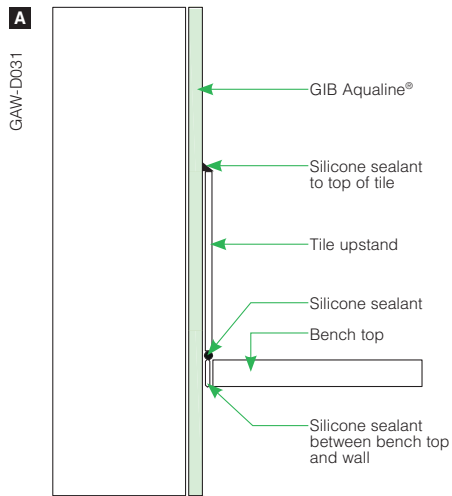


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Kitchen and Laundry

MARCH 2007



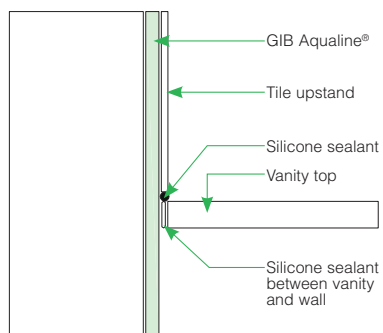
GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



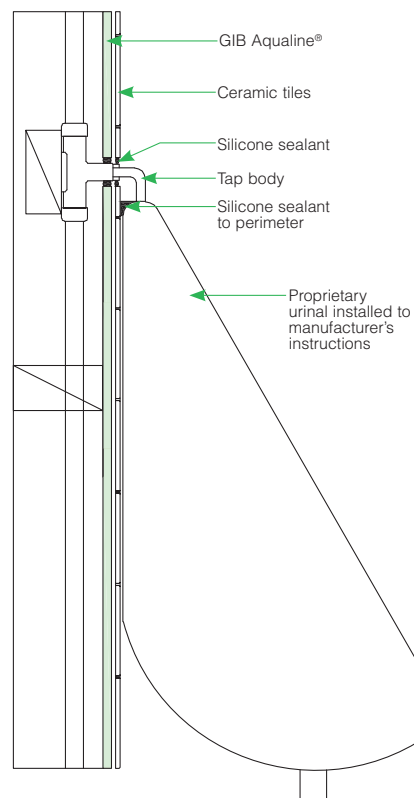
Office, Workplace or School Bathroom

MARCH 2007

A
GAW-D034



B
GAW-D035

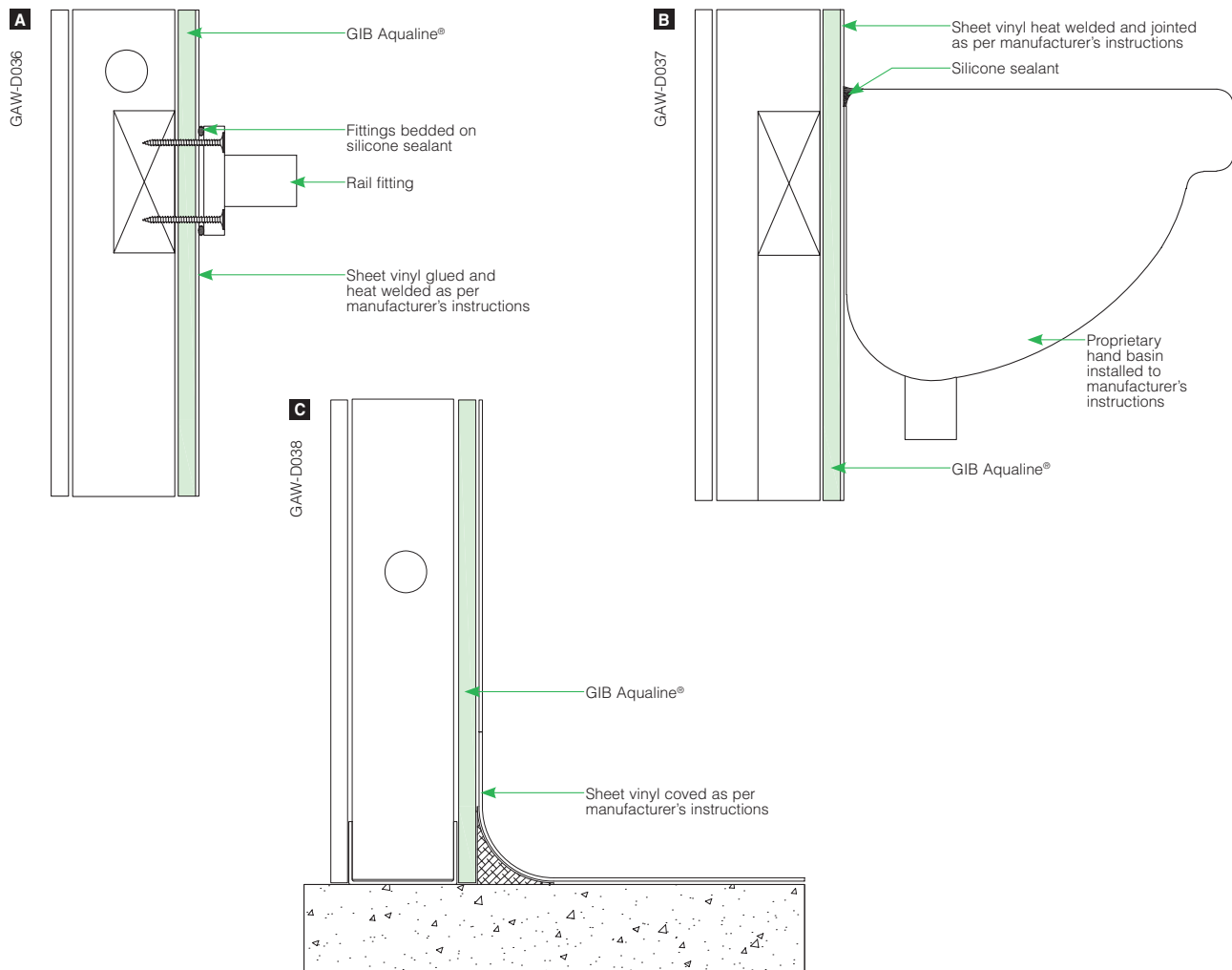


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Healthcare and Hospital Bathroom

MARCH 2007



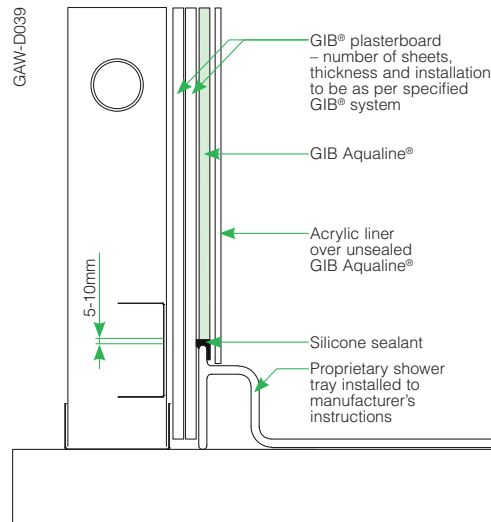
GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



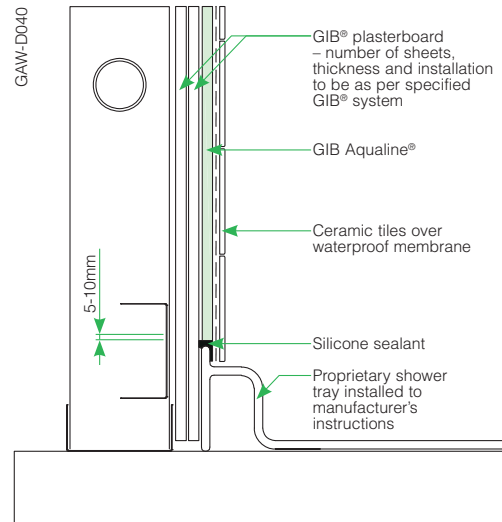
Fire Rated and Noise Control

MARCH 2007

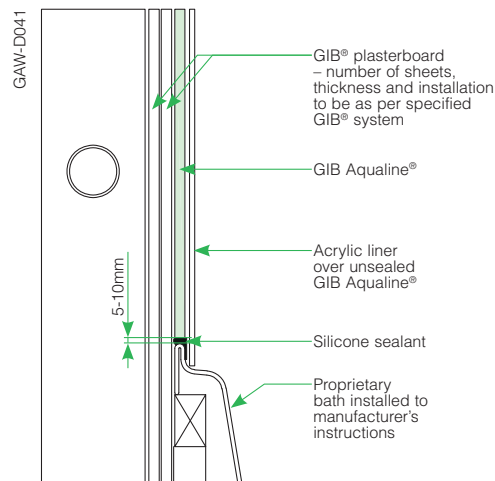
Shower – Acrylic Liner



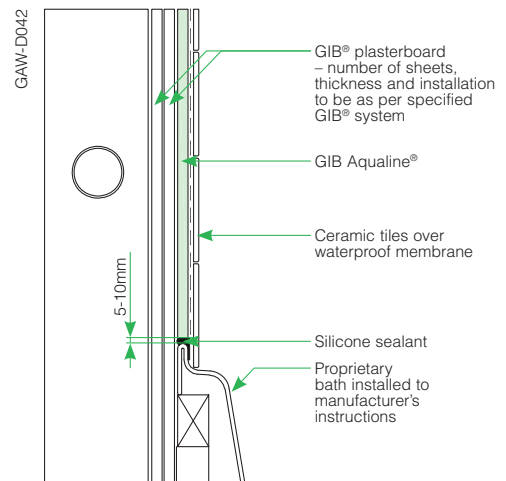
Shower – Tiled Walls



Shower Over Bath – Acrylic Liner



Shower Over Bath – Tiled Walls



GIB Aqualine® Fire Resistance and Noise Control Performance

When GIB Aqualine® is substituted into GIB® Fire Rated systems in place of the equivalent thickness GIB Fyrelite®, the Fire Resistance Rating (FRR) of that system will be maintained.

When GIB Aqualine® is substituted into GIB® Noise Control systems in place of the equivalent thickness GIB® Standard plasterboard or GIB Fyrelite®, the STC and IIC rating of that system will be maintained. When GIB Aqualine® is substituted in place of the equivalent thickness GIB Noiseline®, a small performance loss may occur. For further information contact the GIB® Helpline on 0800 100 442.

GIB AQUALINE® WET AREA SYSTEMS

	Specification and Installation Checklist	MARCH 2007
-----------------------------------------------------------------------------------	-------------------------------------------------	------------

Contract ID	
Site Address	
Client Name	
Designer	
Builder	
Plasterboard Installer	
Plasterboard Supplier	
Tiler	
Shower Installer	

DESIGNER	YES	NO	CHECKED BY	DATE
GIB Aqualine® specified for wet areas and appropriate details included on plans?				
Are tiled areas clearly shown on plans?				
Is area requiring waterproof membrane clearly shown on plan?				
Is the waterproof membrane required to be installed by a licensed applicator? If so, is this noted on the documentation?				
No bracing behind shower or bath?				
BUILDER	YES	NO	CHECKED BY	DATE
Galvanised steel angle installed to the internal corners of tiled shower?				
All sheet joints in showers to be made on solid timber. This may require some additional dwangs for horizontal board installation.				
PLASTERBOARD INSTALLER	YES	NO	CHECKED BY	DATE
10mm GIB Aqualine® for tiles up to 20kg per m²?				
13mm GIB Aqualine® for tiles up to 32kg per m²?				
GIB Aqualine® mechanically fastened at 100mm centres when tiles are to be installed?				
All junctions between GIB Aqualine® and walls, floors, baths, showers and other elements are correctly sealed with appropriate sealant?				
Pipe penetrations sealed?				
PLASTERBOARD STOPPER	YES	NO	CHECKED BY	DATE
Air drying compound (e.g. GIB ProMix® or GIB Plus 4®) not to be used on areas to be tiled.				
Recommended that GIB® AquaMix is used in wet areas.				
TILER	YES	NO	CHECKED BY	DATE
Waterproof membrane applied to shower areas prior to tiling?				
SHOWER INSTALLER	YES	NO	CHECKED BY	DATE
GIB Aqualine® walls must not be sealed or painted under where acrylic linings are to be installed.				
Ensure GIB Aqualine® is free from dust before installation of acrylic liners.				
Sealant applied to top edge of acrylic shower linings?				
BUILDER/PLUMBER	YES	NO	CHECKED BY	DATE
Sealant applied under penetration face covers?				

6812WI WET-SEAL INTERNAL WATERPROOFING MEMBRANE

1. GENERAL

This section relates to the application of **Wet-seal** Enviro-coat IS 511 system, a single part liquid applied fully reinforced waterproofing membrane for internal wet areas;
 - under ceramic tile finishes
 - under stone tile finishes

1.1 RELATED WORK

Refer to the appropriate Sanitary System section for floor wastes, water outlets, etc.
 Refer to ~ for ~

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

DFT Dry Film Thickness

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E3/AS1	Internal moisture
AS/NZS 2269.0	Plywood - Structural - Specifications
AS 3958	Ceramic tiles - Guide to the installation of ceramic tiles
NZS 4121	Design for access and mobility - Buildings and associated facilities
AS/NZS 4858	Wet area membranes
AS ISO 13007.1	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for adhesives
BRANZ	Good practice guide: Tiling

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
 Wet-seal New Zealand Technical Data booklet
 Installation Procedures Manual
 Ardex Technical Bulletins:
 TB277 033: Bonding Ceramic Tile to Wet-seal Waterproofing Membrane Systems
 TB141: Application of smoothing cements or screeds over Wet-seal polyester-fibreglass-epoxy topcoat waterproofing system
 TB 087: RLA Unibond and RLA Flex 1 Part Tile Adhesive application to Wet-seal Enviro Coat IS 511 Waterproofing Membrane
 Parexgroup TSR-1192t: Suitable bonding ceramic tiles to Wet-seal Enviro-coat membranes
 Davco Technical Services Report: Reference P1040
 BRANZ Appraisal 655 - Wet-seal Enviro-coat IS 511 Internal Waterproofing Membrane

Manufacturer/supplier contact details

Company:	Wet-seal New Zealand Ltd
Web:	www.wet-seal.co.nz
Telephone:	0800 436 000
Email:	technical@wet-seal.co.nz

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide warranty for materials and installation:
 15 years For material - Wet-seal Enviro-coat IS 511
 7 years Installation/application

- Provide the warranty in the Wet-seal New Zealand Ltd standard form.
- Commence the warranty from the date of completion of this part of the work.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

- 1.6 NO SUBSTITUTIONS
Substitutions are not permitted to any specified Wet-seal New Zealand Ltd system, or associated components and products.
- 1.7 QUALIFICATIONS
Installation of the membrane to be carried out by Wet-seal New Zealand Ltd trained and approved applicators. Approved applicators may be found at:
Web: www.wet-seal.co.nz
Telephone: 0800 436 000
- 1.8 PROJECT REGISTRATION
Contact Wet-seal New Zealand Ltd to confirm that the project has been registered. If the project has not been registered, telephone and provide all required details.

Compliance information

- 1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE
Provide the following compliance documentation:
- Manufacturer's warranty
 - Installer's/applicator's warranty
 - Producer Statement - Construction from the applicator/installer
 - Other information required by the BCA in the Building Consent Approval documents.

Performance

- 1.10 PERFORMANCE
To [AS/NZS 4858](#) for wet area membranes. Accept responsibility for the water-tight performance of the completed membrane system.
- 1.11 HEALTH AND SAFETY
All areas where the system is being installed to be well ventilated and not occupied until the system has cured. Personal protection apparel and equipment to be worn in accordance with the Installation Procedures Manual.
- 1.12 PRE INSTALLATION MEETING
Convene a meeting between the applicator, contractor and all associated consultants to ensure all parties know what is required for effective performance of the system.
- 1.13 SPECIAL DETAILS
Where a standard detail does not exist, or if a standard detail cannot be applied, an approved alternative must be obtained from Wet-seal New Zealand Ltd before proceeding with the installation.
- 1.14 QUALITY ASSURANCE
Maintain quality necessary to assure that work is performed in accordance with this specification and the qualifying requirements of Wet-seal New Zealand Ltd.

2. PRODUCTS

Materials

- 2.1 WATERPROOFING MEMBRANE
Wet-seal Enviro-coat IS 511, one component elastomeric water based co-polymer waterproofing membrane; coloured Jade.

- 2.2 **REINFORCING FABRIC**
Wet-seal Enviro-coat IS 511 fabric is high strength, polyester reinforcement for reinforcing any changes in plane and the body of membrane, coloured White.
- 2.3 **PRIMER - CONCRETE SUBSTRATES**
Wet-seal Prime-coat 200, two component water based primer for concrete or timber substrates, Light Grey in colour.
- 2.4 **PRIMER - MOIST/DAMP CONCRETE OR TIMBER**
Top-coat 300, two component water based primer for moist or damp concrete or timber substrates, Jade in colour.
- 2.5 **CAULKING COMPOUND**
Caulking Compound, high strength one component hybrid moisture curing adhesive sealant used as a gap sealant.

Components

- 2.6 **TAPE**
A masking and detailing tape.

Accessories - by others

- 2.7 **FLOOR WASTE FITTINGS**
Allproof proprietary fittings or similar flange based fittings. Refer to the Sanitary Systems section for details of floor wastes and water outlets.
- 2.8 **TILE ADHESIVE**
To AS ISO 13007.1. High polymer tile adhesive, refer to Tiling section(s) for details.

3. EXECUTION

Conditions

- 3.1 **GENERALLY**
Comply with the requirements and instructions of Wet-seal New Zealand Ltd and the manufacturer's requirements.
- 3.2 **STORAGE**
Take delivery of pails of liquid membrane and accessories undamaged. Include for site handling facilities where required. Store, on a level surface, off concrete floors, out of direct sunlight and freezing conditions, in a well ventilated area and with the required accessories under conditions that ensure no deterioration or damage.
- 3.3 **CHECK SUBSTRATE**
Check that the substrate will allow work of the required standard and will comply with the requirements of the NZBC. Complete any remedial work identified before commencing any work. All linings to be fixed in accordance with the manufacturer's instructions. All water outlets and other services in place and suitable for membrane installation.
- 3.4 **CURING OF NEW CONCRETE**
Allow concrete to fully cure before applying membranes. Maximum moisture content of concrete 75% RH.
- 3.5 **FALLS**
Unless stated otherwise minimum fall gradients to wastes to be provided to BRANZ Good Practice Guide - Tiling, clause 6.5 Falls in floors.
- | | |
|----------------|------------------------------------------------------------------------------------------|
| 1 : 50 minimum | unenclosed shower bases (to NZBC E3/AS1 , 3.3.5) |
| 1 : 60 minimum | enclosed shower bases |
| 1 : 50 minimum | shower bases for people with disabilities (to NZS 4121 , 10.5.11.3 (b).) |
| 1 : 60 minimum | commercial kitchens or similar |

- 3.6 UNDERFLOOR HEATING
Co-ordinate with underfloor heating installation. Wet-seal membrane to be completely dry before under floor heating is applied, refer to Wet-seal underfloor heating requirements. Refer to 7553 UNDERFLOOR HEATING MAT SYSTEM section for underfloor heating.

- 3.7 FILM THICKNESS
Ensure that the dry film thickness specified in the Wet-seal New Zealand Ltd installation documents is achieved. Film thickness is an important factor to the waterproofing performance of the membrane and its long term durability.

Application - Preparation

- 3.8 SUBSTRATE CONDITION
Ensure that the substrate is in a suitable condition to allow work of the required standard and will comply with the requirements of the [NZBC E3/AS1](#) for the relevant substrate and Wet-seal New Zealand Ltd requirements.

Ensure that the substrate is well braced against movement and deflection and structurally sound. Ensure that the substrate falls to the water outlets and water must not pond. Ensure all surfaces are clean, dry and free from dust and dirt, oils or grease with no projections of sharp materials and make substrate smooth.

Acid etch and/or diamond grid concrete surfaces as required to achieve a suitable surface.

- 3.9 SUBSTRATE PREPARATION
Remove projections and all debris, leaving the surface dust-free, oil-free and clean, with nothing that could diminish the adhesion of primers. Grind off steps or sharp protrusions caused by formwork joints and make substrate smooth if uneven.

- 3.10 PLYWOOD SUBSTRATE
Plywood sheets laid with staggered joints (brick bond), and laid tight-butted, with all edges fully supported. Ensure sheets are rigid, with joints flush, no lumps or hollows, smooth, clean, dry (18% maximum moisture content) and free of debris. Plywood to be minimum 17mm, H3 CCA treated (conforming to [AS/NZS 2269.0](#)). Do not use LOSP treated plywood. Sheets to be fixed with glue and stainless steel screws counter sunk, chamfered edges, coving fillets to all up-stands and installed to Wet-seal New Zealand Ltd specification.

- 3.11 WALL LININGS
Fix wall linings in accordance with the manufacturers specifications. Install flashings to internal corners of showers, with a bond breaker at wall / floor junctions.

- 3.12 PRIME PLYWOOD SUBSTRATES
Priming is only required if the substrate moisture is high, greater than 350 using the Survey Master. Prime plywood thoroughly with Top-coat 300. Check moisture reading is below 50 Relativity after 24 hours, then proceed as per the Wet-seal installation manual.

- 3.13 PRIME CONCRETE SUBSTRATES
Priming is required using Prime-Coat 200 or if the substrate moisture is high, greater than 350 using the Survey Master. Then prime concrete /screed thoroughly with Top-coat 300. Check moisture reading is below 50 Relativity after 24 hours, and then proceed as per the Wet-seal installation manual.

- 3.14 PRIME METAL SUBSTRATES
Prime metal substrates thoroughly with metal primer ensuring a good even coverage as recommended by Wet-seal New Zealand Ltd.

- 3.15 ALLOW PRIMER TO DRY
Allow the primer to fully dry as recommended. Prevent contamination of the primed surface prior to application of the membrane.

Installation - membrane

- 3.16 **TEMPERATURE CONDITIONS**
Install Wet-seal Enviro-coat IS 511 system only if protected from weather and with surface temperature above 5°C and below 35°C
- 3.17 **INSTALL DEBONDING**
Install Wet-seal bond breaker tape, at junctions or substrate abutments before the application of Wet-seal Enviro-coat IS 511 membrane reinforcement fabric.
- 3.18 **REINFORCEMENT TO SHOWERS**
Tailor Wet-seal Enviro-coat IS 511 fabric 25-30 mm into waste pipe and 100 mm minimum up the shower wall. Provide single layer of Wet-seal Enviro-coat IS 511 Fabric to all wall and floor junctions and internal angles up to 1800mm high or above shower rose if higher, to Wet-seal New Zealand Ltd specifications.
- 3.19 **JUNCTIONS IN SUBSTRATE**
Ensure the use the Wet-seal Bond Breaker tape at substrate junction i.e. wall/floor and if not stopped out use Caulking Compound at wall/wall internal junctions. If membrane is to go over any small cracks up to 2mm maximum use Caulking Compound. Seal and reinforce around penetrations and pipes.
- 3.20 **APPLY WET-SEAL ENVIRO-COAT IS 511 SYSTEM**
Install the Wet-seal Enviro-coat IS 511 membrane to the substrate in accordance with Wet-seal New Zealand Ltd installation specifications. Apply membrane wet on wet at rates set out in the technical literature. The total finished system thickness to be a minimum of 0.95mm.
- 3.21 **LAY FABRIC REINFORCEMENT**
Lay the Wet-seal Enviro-coat IS 511 fabric reinforcement wet on wet to provide a robust membrane over the entire area including floor to wall junctions or any other areas such as joints in the flooring substrate, floor cracks or around penetrations in the membrane. In all situations refer to Wet-seal New Zealand Ltd installation specifications.
- 3.22 **PROTECTION**
Do not leave membrane exposed for prolonged periods to UV light and the possibility of mechanical damage. Cover with protection sheeting if required. Apply tiling and/or surface toppings once membrane is fully cured according to Wet-seal New Zealand Ltd specifications.

Installation - tiling

- 3.23 **TILING**
Tiling to AS 3958 and BRANZ Good Practice Guide - Tiling. Confirm the compatibility of the tile adhesive with the adhesive manufacturer or Wet-seal New Zealand Ltd.

Completion

- 3.24 **ROUTINE CLEANING**
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.
- 3.25 **DEFECTIVE OR DAMAGED WORK**
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave this work in a sound and waterproof condition and free of any defect. Leave work to the standard required for following procedures.
- 3.26 **ACCEPTANCE**
- If required arrange for an inspection of the completed work.
- Issue a Wet-seal installation certificate on completion of work - certifying that work has been carried out to the Wet-seal installation manual and the relevant Building Code requirements.

Commissioning

- 3.27 FLOOD TEST
Conduct a flood test before tiling commences, to ensure membrane is watertight and suitable for use as a waterproofing membrane for internal wet areas. Meet the BCA compliance requirements for the test and documentation of the test.

4. SELECTIONS

For further details on selections go to www.wet-seal.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

- 4.1 WET-SEAL WATERPROOFING MEMBRANE
Location: ~
Supplier: Wet-seal New Zealand Ltd
Substrate: ~
System: Wet-seal Enviro-coat IS 511
DFT: 0.95mm+



BRANZ Appraised
Appraisal No. 372 [2016]

WET-SEAL FIBRECOAT WET AREA WATERPROOFING MEMBRANE

Appraisal No. 372 [2016]

This Appraisal replaces BRANZ
Appraisal No. 372 [2000].



BRANZ Appraisals

Technical Assessments of products for
building and construction.



Wet-seal New Zealand Ltd

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Auckland

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Wet-seal Management Pty Ltd

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Australia

Tel: +61 2 6650 8600

Fax: +61 2 6650 8699

Email: enquiry@wet-seal.ws

Product

- 1.1 Wet-seal Fibrecoat Waterproofing Membrane is a reinforced, liquid-applied, resin based waterproofing membrane for use under ceramic or stone tile finishes in internal wet areas.

Scope

- 2.1 Wet-seal Fibrecoat Waterproofing Membrane has been appraised for use as a waterproofing membrane for internal wet areas of buildings, within the following scope:
 - on floor substrates of concrete, flooring grade particleboard, plywood, compressed fibre cement sheet and fibre cement sheet tile underlay, and on wall substrates of concrete, concrete masonry, wet area fibre cement sheet lining systems and wet area plasterboard lining systems; and,
 - when protected from physical damage by ceramic or stone tile finishes; and,
 - where floors are designed and constructed such that deflections do not exceed 1/360th of the span.
- 2.2 The use of Wet-seal Fibrecoat Waterproofing Membrane on concrete slabs where hydrostatic or vapour pressure is present is outside the scope of this Appraisal.
- 2.3 Building structural movement and control joints in the substrate must be carried through to the tile finish. The design and construction of the substrate and movement and control joints are specific to each building, and therefore the responsibility of the building designer and building contractor and are outside the scope of this Appraisal.
- 2.4 Ceramic or stone tile finishes are outside the scope of this Appraisal.
- 2.5 The membranes must be installed by Wet-seal Trained and Approved Applicators.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Wet-seal Fibrecoat Waterproofing Membrane if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 [b] 15 years. Wet-seal Fibrecoat Waterproofing Membrane meets this requirement. See Paragraph 9.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.6. Interior wet area floors and walls incorporating Wet-seal Fibrecoat Waterproofing Membrane will meet this requirement. See Paragraphs 11.1-11.7.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Wet-seal Fibrecoat Waterproofing Membrane meets this requirement and will not present a health hazard to people.



BRANZ

BRANZ

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Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz



Technical Specification

4.1 Materials supplied by Wet-seal are as follows:

- **Wet-seal Fibrecoat Waterproofing Membrane** – is a fibre glass reinforced, polyester resin based waterproofing membrane. It is coloured amber and supplied in 20 litre pails.
- **Topcoat 300** – is a two-part epoxy topcoat used to complete the Wet-seal Fibrecoat Waterproofing Membrane system. It is supplied as a Part A and B, in 10 litre containers, coloured jade green.

Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and out of freezing conditions. The membrane products have a shelf life of 12 months from date of manufacture in the original unopened packaging. Once opened, the products must be used within 3 months.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Wet-seal Fibrecoat Waterproofing Membrane. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 Wet-seal Fibrecoat Waterproofing Membrane is for use in buildings where an impervious waterproof membrane is required to floors and walls to prevent damage to building elements and adjoining areas.
- 7.2 The membrane must be protected from physical damage by the application of ceramic or stone tile finishes.
- 7.3 Movement and control joints may be required depending on the shape and size of the building or room, and the tile finish specified. Design guidelines can be found in the BRANZ "Good Practice Guide Tiling".
- 7.4 Timber framing systems must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and all sheet edges are fully supported. Timber framing systems supporting the substrates must be constructed such that deflections do not exceed 1/360th of the span. Where NZS 3604 is used, the allowable joist spans given in Table 7.1 shall be reduced by 20%.

Substrates

Plywood

- 8.1 Plywood must be a minimum of 17 mm thick complying with AS/NZS 2269, CD Grade Structural with the sanded C face upwards and treated to H3 [CCA treated]. LOSP treated plywood must not be used.
- 8.2 The plywood must be laid with the face grain at right angles to the floor joists. Joists must be at 400 mm centres maximum and the edges of the sheets must be supported with blocking or framing. The Plywood must be fixed with 10 g x 50 mm stainless steel countersunk head screws at 150 mm centres on the edges and 200 mm through the body of the sheets.

Fibre Cement Compressed Sheet/ Fibre Cement Sheet Tile Underlay

- 8.3 Fibre cement compressed sheet and tile underlay must be manufactured to comply with the requirements of AS/NZS 2908.2 and must be specified by the manufacturer as being suitable for use as a wet area membrane substrate. Installation must be carried out in accordance with the instructions of the manufacturer.

Particleboard

- 8.4 Particleboard must be specified for the end use in accordance with NZS 3602. Installation must be carried out in accordance with the instructions of the manufacturer.

Concrete and Concrete Masonry

- 8.5 Concrete and concrete masonry substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101, concrete slab-on-ground to NZS 3604 or NZS 4229, and concrete masonry to NZS 4229 and NZS 4230.

Wet Area Wall Linings

- 8.6 Plasterboard wall linings must be manufactured to comply with AS/NZS 2588 and be suitable for use in internal wet areas.
- 8.7 Fibre cement sheet must be suitable for use in wet areas and comply with AS/NZS 2908.2.
- 8.8 Installation of plasterboard or fibre cement wall linings must be carried out in accordance with the instructions of the manufacturer.

Durability

Serviceable Life

- 9.1 The Wet-seal Fibrecoat Waterproofing Membrane, when subjected to normal conditions of environment and use, is expected to have a serviceable life of at least 15 years and be compatible with ceramic or stone tile finishes with a design service life of 15-25 years.

Maintenance

- 10.1 No maintenance of the membrane will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiled areas to ensure they are sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiles, grouts and sealants.
- 10.2 In the event of damage to the membrane, the tiling must be removed and the membrane repaired by removing the damaged portion and applying a patch as for new work.
- 10.3 Drainage outlets must be maintained to operate effectively, and ceramic or stone tile finishes must be kept clean.

Internal Moisture

- 11.1 Wet-seal Fibrecoat Waterproofing Membrane is impervious to water and when appropriately designed and installed will avoid the likelihood of water penetrating behind linings or entering concealed spaces.
- 11.2 Wet-seal Fibrecoat Waterproofing Membrane is suitable for use to contain accidental overflow to meet NZBC Clause E3.3.2. A means of Code Compliance for overflow is given in NZBC Acceptable Solution E3/AS1, Paragraph 2.
- 11.3 Surfaces must be finished with ceramic or stone tile finishes. A means of Code Compliance to NZBC Clause E3.3.3 and E3.3.4 is given in NZBC Acceptable Solution E3/AS1, Paragraph 3.1.1 [b], 3.1.2 [b] and 3.3.1 [b].
- 11.4 Falls in showers and shower areas must be a minimum of 1 in 50. In unenclosed showers, falls must extend a minimum of 1500 mm out from the shower rose. Floor wastes must be provided and the floor must fall to the outlet.
- 11.5 The waterproofing membrane must completely cover shower bases, and for unenclosed showers it must extend a minimum of 1500 mm out from the shower rose. Further design guidance on waterproofing wet areas, including waterproofing walls and junctions can be obtained from AS 3740, BRANZ "Good Practice Guide Tiling", and flooring and wallboard manufacturers.
- 11.6 Where water resistant wall finishes such as prefinished sheet materials are used; they must flash over the membrane a minimum of 30 mm.
- 11.7 BRANZ recommends the entire floor be covered by a waterproof membrane for bath, shower and spa rooms where timber, plywood or particleboard floors are used. This is also a requirement of particleboard manufacturers.

Installation Information

Installation Skill Level Requirement

- 12.1 Installation must always be carried out in accordance with Wet-seal Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.
- 12.2 Installation and finishing of components and accessories supplied by Wet-seal New Zealand Ltd and its approved applicators must be completed by trained applicators, approved by Wet-seal New Zealand Ltd.
- 12.3 Installation of the accessories supplied by the building contractor must be carried out in accordance with the Wet-seal Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

Preparation of Substrates

- 13.1 Substrates must be dry, clean and stable before installation commences. With surfaces that are even and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents.
- 13.2 The relative humidity of the concrete must be 75% or less before membrane application. Concrete substrates can be checked for dryness by using a hygrometer as set out in BRANZ Bulletin No. 585.
- 13.3 All voids, cracks, holes, joints and excessively rough areas must be filled to achieve an even and uniform surface. Junctions of substrate abutments, such as at wall/floor and wall/wall junctions must have Idrobuilt Rinforzo installed as set out in the Technical Literature.
- 13.4 Substrates when required must be primed with Top Coat 300 primer and allowed to cure before the membrane is installed.

Membrane Installation

- 14.1 Installation must not be undertaken where the substrate surface temperature is below 5°C or above 35°C.
- 14.2 Wet-seal Fibrecoat Waterproofing Membrane must be thoroughly stirred and catalyzed before application.
- 14.3 The fibreglass reinforcement is laid onto the substrate prior to the membrane being applied
- 14.4 The membrane is applied in one coat over the fibre glass reinforcement at the rates set out in the Technical Literature. The total finished system thickness of the Wet-seal Fibrecoat Waterproofing Membrane must be a minimum of 1.0 mm.
- 14.5 Application can be made by roller or brush [long bristle].
- 14.6 Once the resin coat has cured, the Top Coat 300 is applied as per the Technical Literature.
- 14.7 The Technical Literature should be consulted for the cleanup procedures.

Tiling

- 15.1 The membrane must be fully cured before tiling. The cured membrane must be protected at all times to prevent mechanical damage, so may require temporary covers until the finishing is completed.
- 15.2 Tiling must be undertaken in accordance with AS 3958.1 and BRANZ "Good Practice Guide Tiling". The compatibility of the tile adhesive must be confirmed with the adhesive manufacturer or Wet-seal Pty Ltd.

Inspections

16.1 Critical areas of inspection are:

- Construction of substrates, including crack control and installation of bond breakers and movement control joints.
- Moisture content of the substrate prior to the application of the membrane.
- Acceptance of the substrate by the membrane installer prior to application of the membrane.
- Installation of the membrane to the manufacturer's instructions, particularly installation to the correct thickness and use of reinforcement.
- Membrane curing and integrity prior to the installation of tiles including protection from mechanical damage during curing and prior to tile installation.

Health and Safety

17.1 Safe use and handling procedures for the membranes are provided in the Technical Literature. The materials must be used in conjunction with the relevant Material Safety Data Sheet.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

18.1 The following testing of Wet-seal Fibrecoat Waterproofing Membrane has been undertaken:

- AS/NZS 4858 Appendix A including effect of heat ageing, bleach, detergent and water on tensile and elongation, water vapour transmission, cyclic movement resistance requirements of AS/NZS 4858: 2004, Appendix B, water absorption, peel adhesion, dry pull-off / tensile adhesive test on plywood, dry pull-off / tensile adhesive test on fibre cement, puncture resistance and low temperature flexibility.

The above test methods and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 19.1 An assessment was made of the durability of the Wet-seal Fibrecoat Waterproofing Membrane by BRANZ technical experts.
- 19.2 Site visits have been carried out by BRANZ to assess the practicability of installation and to examine completed installations.
- 19.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 20.1 The manufacture of the membrane has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 21.1 The quality of supply of the membrane system materials to the market is the responsibility of Wet-seal New Zealand Ltd.
- 21.2 Quality on site is the responsibility of the Wet-seal Approved and Trained Applicators.
- 21.3 Designers are responsible for the substrate design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of the substrate manufacturer, Wet-seal and this Appraisal.
- 21.4 Building owners are responsible for the maintenance of the tiling or stone finishing systems in accordance with the instructions of Wet-seal.

Sources of Information

- AS 2908.2: 2000 Cellulose-cement products - flat sheet.
- AS 3740 - 2010 Waterproofing of domestic wet areas.
- AS 3958.1: 2007 Ceramic Tiles - Guide to the installation of ceramic tiles.
- AS/NZS 4858 - 2004 Wet area membranes.
- AS/NZS 1170: Structural Design Actions
- AS/NZS 2269: 2012 Plywood - Structural.
- NZS 3101: 2006 Concrete Structures Standard.
- NZS 3602: 2003 Timber and wood-based products for use in buildings.
- NZS 3604: 2011 Timber framed buildings.
- NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230: 2004 Design of reinforced concrete masonry structures.
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.
- Good Practice Guide Tiling, BRANZ, April 2015.





BRANZ Appraisal
Appraisal No. 372 [2016]
01 July 2016

WET-SEAL FIBRECOAT WET AREA
WATERPROOFING MEMBRANE



In the opinion of BRANZ, the **Wet-seal Fibrecoat Wet Area Waterproofing Membrane** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Wet-seal New Zealand Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Wet-seal New Zealand Ltd:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions.
 - d) Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Wet-seal New Zealand Ltd**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Wet-seal New Zealand Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

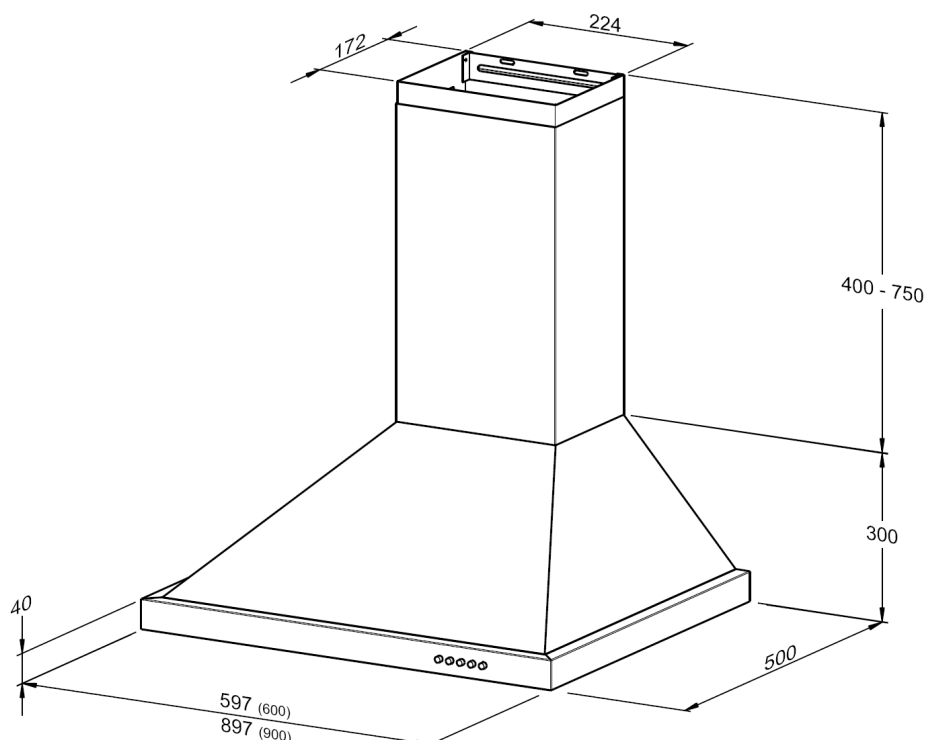
01 July 2016

Product and Technical Sheet

RWC
Issue: B

Description: **ROBINHOOD WALL CANOPY**
Model Number: **RWC3CH6SS, RWC3CH9SS**

Typical design



Features and benefits

High performance extraction fan

High performance extraction fan rapidly removes steam, smoke and cooking smells from your kitchen. Three-speed switch lets you select the fan strength you need – half strength for steamed vegetables; full strength for stir fries.

Halogen lamps

2x20 watt halogen lamps illuminate the entire cooking surface. Lamps are quick and easy to replace.

Multi-layered micromesh filters

Multi-layered micromesh filters effectively trap grease. They're simple to remove and are easily maintained with a regular clean in the dishwasher.

Rectilinear design

Simple styling makes cleaning easy. High quality stainless or powder coated steel and the fingertip controls are easy to clean with a damp cloth.

Thermal overload switch

Thermal overload function that senses extreme heat and disconnects power to the motor temporarily. If you have a cooking disaster, and something catches fire, the rangehood automatically switches off to prevent flames and sparks being sucked into the ducting or ceiling. *

Recirculation option

In situations where ducting isn't possible, your rangehood can be fitted with charcoal filters that effectively cleanse the air before returning it to the kitchen.

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

Specifications

Technical data:

- 3 speed centrifugal motor
- 2 x 20 Watt halogen lamps
- Maximum power consumption: 280 watts
- Gauge of steel: 0.6mm
- Type of steel: 430 stainless steel
- Finish of steel : brush number 4
- 240 Volt. 50 Hertz. 280 Watt Max.
- Tested to EMC AS/NZS – CISPR14:2001
- Electrical approval AS/NZS 3350.2.31.2001
- Performance tested to IEC61591 (replaces AS2682-1984)
- Filter specifications: Three layered micro mesh
- Length of power cord: 1500mm
- Ducting outlet: 150mm diameter round outlet – top ducting
- Recirculation option through top duct outlet

Gross weight: RWC3CH6SS 12.2kg. RWC3CH9SS 15.4kg

Carton volume: 0.132m³ (600 model), 0.194m³ (900 model)

Carton dimensions : 650 x 370 x 550mm (600 model), 955 x 370 x 550mm (900 model)

Rangehood dimensions: 597 x 500 x 300mm (600 model), 897 x 500 x 300mm (900 model)

Performance data:

○ RWC3CH6SS

○ RWC3CH9SS

Fan speed 1	460m ³ /hr	Fan speed 1	460m ³ /hr
Fan speed 2	560m ³ /hr	Fan speed 2	560m ³ /hr
Fan speed 3	650m ³ /hr	Fan speed 3	650m ³ /hr
Noise speed 1	58.5dB	Noise speed 1	58.2dB
Noise speed 2	63.3dB	Noise speed 2	63.1dB
Noise speed 3	67.7dB	Noise speed 3	67.6dB

New Zealand

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Marshall
Innovations
Construction Solutions

SUPER-STICK Building Tape SPECIFICATION

SUPER-STICK INSTALLATION

PRODUCT DESCRIPTION

Marshall Innovations SUPER-STICK Building Tape® is a high performance window and door flashing tape designed to be installed down to -6 C. It is a flexible flashing tape used around framed joinery openings as a secondary weather resistant barrier. No more issues regarding adhesion in the cool of winter or heat of summer. SUPER-STICK Building Tape utilizes a high tack pressure sensitive adhesive (PSA) combined with a high performance toughened film.

Available in 75mm, 150mm & 200mm x 23m rolls

FEATURES AND BENEFITS

- Can be installed in extremely cold conditions to -6 Deg.C *
- Easy to install peel-and-stick application
- UV resistant for 90 days
- Will not react with sealants & no plasticizer migration. Marshall Innovations recommend checking with sealant manufacturers for suitability.
- Can be used with RAB systems – Plywood, fibre cement sheet
- Split back liner for easy install
- Can be installed in very hot conditions
- Extremely high puncture resistance & Tensile strength
- Residential & Commercial applications
- Very thin & no build up & won't affect cavity battens or window installation
- Clean & green tape. Contains no VOC's, HFCC's or CFC's.
- BRANZ Appraised # 846 (2013)
- CODEMARK Certified AQ-010116-CMNZ
- Also forms part of The Tekton Weatherization System BRANZ # 621 (2014)

Note: Protecto SUPER-STICK Tape can be applied in extremely cold weather; however Marshall Innovations do not recommend applying tapes below 0°C due to health and safety reasons.

100mm Framing Install - 150mm SUPER-STICK

The selected wall underlay must be installed in accordance with the Manufacturer's instructions. It must completely cover the joinery opening. The wrap is cut on a 45° angle away from each corner of the opening and secured to the inside of the opening. Before SUPER-STICK is applied, all substrates must be clean, dry & free from any surface contaminants such as dust & grease that may affect adhesion.

- Cut 4 - 75 mm wide by 150 mm long sealing tape 'butterfly' pieces. Apply 2 strips on the bottom corners at a 45 degree angle.
- Overlap the corner by 3 mm to create a seal at the sill/jamb junction.
- Measure and cut a length of SUPER-STICK tape to the length of the sill + 300 mm. The tape is installed flush with interior face of the opening & is applied along the entire length of the sill & 150 mm up the jambs.
- Measure and mark 150mm up the jambs
- Remove 100mm of the release film off the inside back edge of the SUPER-STICK.
- Align this with the 150mm mark up the jamb and flush with the inside edge of the frame.
- Press the tape firmly onto the wrap and apply down the frame into the corner. Ensure the tape is formed tightly into the corner.
- Continue peeling the release film as you move along being careful to keep the tape aligned to the inside edge. Run tape up the opposite jamb 150 mm.
- The overhanging tape is cut at the corners of the opening to allow the tape to be folded onto the face of the wall underlay & butterfly tapes that are already in place. Peel off the release backing film & fold down & apply to wall underlay face & over butterfly tapes.



- ***Sill & Nail sealability** – Apply a layer of 75 mm SUPER-STICK over the top of the original flashing tape along the entire length of the sill. Align the tape to the inside face of the sill. This is a BRANZ requirement for horizontal surfaces with SUPER-STICK where water may pool & to ensure nail penetrations self-seal.* Alternatively apply 150 mm by 150 mm squares of Super Stick on top of the original flashing tape on the sill where a nail will penetrate.
- **Jamb/head application** – Cut 2 pieces of SUPER-STICK at 300 mm. The tape is installed 150 mm down the jamb & 150 mm along the lintel at each of the top corners of the window or joinery opening. A 75 mm by 150 mm long sealing butterfly tape must be installed at 45 degrees across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.
- 75 mm wide SUPER-STICK is used at joinery heads to seal flashing up stands to the wall underlay. This piece is cut 100 mm longer than the flashing & is to run past each end of the flashing by 50 mm.
- As SUPER-STICK is a pressure sensitive tape, after application ensure all the tape is pressed firmly onto the substrate
- **150 mm Framing Install with 200 mm wide Super Stick**
Cut 4 strips of 75mm x 200mm Super Stick. Apply 2 butterfly strips at a 45 degree angle to the 2 bottom corners only. Overlap the corner by 3mm to create a seal at the sill/jamb junction.
- Measure the length of the sill and cut a piece of SUPER-STICK 400mm longer than the length of the sill. Measure and mark 200mm up the jamb.
- Peel 100mm off the inside release film and apply the SUPER-STICK at the 200mm mark up the jamb. Continue to remove the release film as the SUPER-STICK is applied; ensuring tape is aligned with the inside of the joinery opening and care to ensure SUPER-STICK is formed tightly into the corners at the sill/jamb junction. Continue removing release film as SUPER-STICK is applied along the length of the sill and 200mm up the other jamb. Remove the remaining release film. Cut the SUPER-STICK at the corners away

from the frame and the overhanging SUPER-STICK can be folded over the face of the wall underlay and over the butterfly tapes at the corners.

- Cut another piece of SUPER-STICK the length of the sill. Overlay this onto the sill only. This is to ensure BRANZ requirements are met for nail sealability.
- Cut 2 pieces of at 400mm SUPER-STICK long. The tape is to be installed 200mm down the jamb & 200mm along the underside of the lintel. The install process is the same as for the sill except the two remaining 200 x 75mm butterfly pieces are applied last over the top at a 45 deg angle across the corner of the head/jamb junction overlapping by 3mm to create a seal at the corner junction.
- SUPER-STICK must not be stretched. When joining 2 sections of tape, the overlap must be 100 mm minimum
- **RAB INSTALLATION with no flexible wall underlay**
- **Tape must be installed continuously around the perimeter of the window / joinery opening.**
- The RAB system must be installed in accordance with the Manufacturer's specifications.
- Before SUPER-STICK is applied, all substrates must be clean & free from any surface contaminants such as dust & grease that may affect adhesion.
- Cut 4 - 75 mm wide by 150 mm long sealing tape 'butterfly' pieces. Apply 2 strips on the bottom corners at a 45 degree angle. Overlap the corner by 3mm to create a seal at the sill/jamb junction.
- Mark a line on the jamb 100mm above the midpoint between the sill and head.
- Measure and cut a length of SUPER-STICK tape to the length of the sill & jamb + 200mm this will ensure sufficient lap of 100mm half way up the jamb.
- The tape is installed flush with interior face of the opening & is applied along the entire length of the sill & 100mm above the midpoint up each jamb.



- Start by peeling 100 mm of the wider inside release film back & starting on the marked line 100mm above midpoint of the window/door jamb. Continue peeling the release film as you move along being careful to keep the tape aligned to the inside edge of the sill and forming tight into the corners at the sill and jamb junction. Run tape up opposite jamb 100 mm above the halfway point up the opposite jamb.
- The overhanging tape is cut at the corners of the opening to allow the tape to be folded onto the face of the RAB & over the butterfly tapes that are already in place.
- ***Sill & Nail sealability** –Apply a layer of 75 mm SUPER-STICK over the top of the original flashing tape along the entire length of the sill. Align the tape to the inside face of the sill. This is a BRANZ requirement for horizontal surfaces with SUPER-STICK where water may pool & to ensure nail penetrations self-seal.* Alternatively apply a 150 mm by 150 mm square of Super Stick on top of the original flashing tape on the sill where a nail will penetrate.
- **Completing Install to Head & Jambs**
- Cut a length of SUPER-STICK to the length of the head + the length of a jamb. This will allow for a 100mm lap halfway up either jamb.
- Mark a line 100mm below where the SUPER-STICK terminates up either jamb.
- Start by peeling 100 mm of the wider inside release film back & starting on the marked line align the SUPER-STICK flush with the inside edge of the jamb. Continue peeling the release film as you apply the tape being careful to keep the tape aligned to the inside edge of the sill and forming tight into the corners at the head and jamb junction. Run tape along the underside of the lintel and down the opposite jamb. The SUPER-STICK will lap the previously installed tape by 100mm.
- The overhanging tape is cut at the corners of the opening to allow the tape to be folded onto the face of the RAB.

- The two remaining 75mm x 150mm ‘butterfly’ pieces are installed at 45 degrees across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.
- 75 mm wide SUPER-STICK is used at joinery heads to seal flashing up stands to the building wrap. This piece is cut 100 mm longer than the flashing & is to run past each end of the flashing by 50 mm.
- 75mm SUPER-STICK can be used to seal vertical sheet joins in RAB systems to prevent moisture ingress. The split liner allows for ease of install to all corners and sheet joins. Ensure all tapes are pressed firmly to achieve adequate adhesion

DURABILITY

Provided it is not exposed to the weather or UV light for a total of more than 90 days & provided the exterior cladding is maintained in accordance with the cladding manufacturer’s instructions and the cladding remains weather resistant, SUPER-STICK is expected to have a serviceable life equal to that of the cladding.

SUPER-STICK meets NZBC Clause B2 Durability performance B2.3.1 (b) 15 years & Clause E2 External Moisture performance E2.3.2. SUPER-STICK also complies with NZBC E2/AS1 9.1.5 (b)

***Check suitability of all sealants when used over SUPER-STICK with the sealant manufacturer.**

***Check suitability of SUPER-STICK when applied over membrane decks.**

MAINTENANCE

No maintenance is required for SUPER-STICK. However regular checks of the joinery between the joinery & wall cladding have to be made at least annually to check that they remain weather tight.

HANDLING & STORAGE

SUPER-STICK rolls must be stored under cover in clean dry conditions & away from direct exposure to sunlight.

SUPER-STICK Building Tape

CERTIFICATE OF CONFORMITY

This product Certificate is issued under Section 269 of the Building Act 2004 for:

Stria Cladding & CLD Batten System



Page 1 of 2



Product Description

1. The Stria® Cladding & CLD Batten System (the system) consists of fibre cement weatherboards horizontally installed over vertical fibre cement battens with RAB™ board or flexible building wrap with aluminium flashings and uPVC strips. It is designed to be used as part of an external cavity-based cladding system.
2. Stria® Cladding profiled weatherboards are 14mm thick; the CLD battens are 19mm x 70mm.
3. All installation componentry is supplied by James Hardie.
4. Each weatherboard has a factory applied, manila white colour primer on the face. The cut edges and sanded patches need to be sealed and the weatherboards finished with an acrylic paint system. The battens are supplied uncoated.

Product purpose and use

1. The system has been assessed as an external wall cladding for buildings within the following scope:
 - timber-framed construction complying with the NZBC; or an existing external timber wall structure, where the designer and/or installer has established that it is suitable for the intended building work; and
 - with the stud spacing no more than 600mm centered, and
 - in all corrosion zones as defined in NZS3604:2011, excluding where adverse macroclimatic conditions apply as set out in Paragraph 4.2.4 NZS3604:2011 and
 - Situated:
 - in NZS 3604:2011 Wind Zones up to, and including Extra High for buildings within the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, with a risk score of up to 20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; or,
 - where the design ultimate limit state (ULS) differential wind pressure does not exceed 2.5 kPa for specific engineering design (SED) buildings of any height; and
 - anywhere with respect to a relevant boundary (including within 1m)
2. Joinery used in conjunction with the system must
 - be installed with vertical jambs and horizontal heads and sills; and,
 - meet the requirements of NZS 4211:2008 including amendment 1 for the relevant Wind Zone or design wind pressure or have a current CodeMark.
3. The weatherboards must only be installed horizontally on vertical surfaces.

Certificate holder

James Hardie New Zealand,
50 O'Rorke Road, Penrose, Auckland 1006, New Zealand, Tel: 0800 808 868, www.jameshardies.co.nz

CodeMark Certification Body		20/08/2019		20/08/2022	GM-CM30109-RevA
Global-Mark Pty Ltd, Suite 4.07, 32 Delhi Road, North Ryde NSW 2113, Australia Tel: +61 (0)2 9886 0222 www.Global-Mark.com.au	Herve Michoux Managing Director	Date of issue	Last update	Date of next re-certification	Certificate Number

The purpose of construction site audits is to confirm the practicability of installing the product; and to confirm the appropriateness and accuracy of installation instructions. In issuing this certificate, Global-Mark has relied on the independent expert and/or laboratory advice or reports. This certificate is issued by Global-Mark Pty Limited, an independent certification body accredited by the product certification accreditation body (JAS-ANZ) appointed by the Chief Executive of the Ministry of Business Innovation and Employment under the Building Act 2004. The Ministry of Business Innovation and Employment does not in any way warrant, guarantee, or represent that the building method or product the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product. The Ministry of Business Innovation and Employment disclaims, to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate. This Certificate may only be reproduced in its entirety.

It is advised to check that this Certificate of Conformity is currently valid and not withdrawn, suspended or superseded by a later issue by referring to the Ministry of Business Innovation and Employment website, <http://www.mbie.govt.nz/>
New Zealand Building Code (NZBC) references the Building Code in force at the time of issuing the product certificate.
Certificate holder will notify Global-Mark Pty Ltd in accordance with Regulation 15 of the Building (Product Certification) Regulations 2006

WAIMAKARIRI DISTRICT COUNCIL
Plans and specifications APPROVED in accordance
with the Building Act 2004, clause 49 and the Building
Regulations 1992, Clause 3
BC201170 9/12/2020 nicolah

CERTIFICATE OF CONFORMITY

This product Certificate is issued under Section 269 of the Building Act 2004 for:

Stria Cladding & CLD Batten System



Page 2 of 2



Compliance with the New Zealand Building Code (NZBC):

The Stria® Cladding & CLD Batten system, if designed, used, installed and maintained in accordance with the conditions of this Certificate, will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4 (b) (c) (d) and (e) for the relevant physical conditions of B1.3.3 (a), (h), (j) and (q). The system meets these requirements.

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years and B2.3.2(a). The system meets these requirements.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.5 and C3.7 (b & c) The system meets these requirements

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The system meets this requirement.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The system meets this requirement and will not present a health hazard to people.

Subject to the following conditions and limitations:

1. Specification, installation, inspection and maintenance in accordance with the following sets of documents collectively referenced as the Applicable Technical Specification:
 - James Hardie Stria® Cladding Technical Specification, CLD Structural Cavity Batten (August 2019)
 - James Hardie Stria® Cladding, Installation Manual, Rigid Air Barriers (March 2019)

(Note: Provisions within the documents above related to the use of the system with steel-frame construction are outside the scope of this certification).

2. Where the external wall is located within 1.0m of a relevant boundary, RAB™ must be used;
3. An horizontal fire separation joint must be installed at intervals of no greater than 3.5m vertical height where the following applies-
 - on buildings where the building height is greater than 10.0m; and
 - upper floors containing sleeping uses or “other property” (as defined by the Building Code).
4. In wind zones greater than Very High, the system must be installed over RAB™.
5. Where C3.5 and C3.7 applies the building must fall within the scope of:
 - a. C/AS1 amendment 4, or
 - b. C/AS2 1st edition June 2019

Design Considerations:

1. Product specification and incorporation of the system in to a building design shall be carried out by a designer / Architect / Engineer or building professional who:
 - Is qualified to design the buildings covered under the “Scope” of use of the product.
 - Has ready access to the relevant Applicable Technical Specification.

Product Installation Conditions:

2. Installation shall be carried out or supervised by a Licensed Building Practitioner with the appropriate carpentry class
3. Installation shall be undertaken in accordance with all relevant Applicable Technical Specifications

End of the record



BRANZ Appraised
Appraisal No. 846 [2019]

SUPER-STICK FLEXIBLE FLASHING TAPE

Appraisal No. 846 [2019]

This Appraisal replaces BRANZ
Appraisal No. 846 [2013].



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 SUPER-STICK is a flexible flashing tape used around framed joinery openings as a secondary weather resistant barrier.
- 1.2 SUPER-STICK is installed into and around the framed joinery opening over the building wrap and exposed frame to cover both the face and edge of the opening framing. SUPER-STICK is also used at joinery heads to seal flashing upstands to the building wrap.

Scope

- 2.1 SUPER-STICK has been appraised as a flexible flashing system for use around window and door joinery openings for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
 - with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
 - with wall cladding systems complying with NZBC Acceptable Solution E2/AS1 or a valid BRANZ Appraisal that specifies a flexible flashing tape system; and,
 - with wall underlays compatible with the flexible flashing tape; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.
- 2.2 SUPER-STICK has also been appraised as a flexible flashing system for use around window and door joinery openings for steel framed buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, with regards to building height and floor plan area; and,
 - constructed with steel framing complying with the NZBC; and,
 - with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
 - with wall cladding systems covered by a valid BRANZ Appraisal that specifies a flexible flashing system; and,
 - with wall underlays compatible with the flashing tape and steel frame; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.

Note: Marshall Innovations Ltd offer SUPER-STICK as a jointing and flashing tape for use with rigid air barrier systems that do not require a flexible wall underlay, but this aspect is outside the scope of this Appraisal. Contact the rigid air barrier system proprietor for system details including recommended jointing and flashing tapes.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, SUPER-STICK, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 [b], 15 years and B2.3.2. SUPER-STICK meets these requirements. See Paragraphs 8.1 and 8.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. SUPER-STICK contributes to meeting this requirement. See Paragraphs 7.1 - 7.4 and 11.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. SUPER-STICK meets this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 SUPER-STICK is a multi-layered silver polyester faced, copolymer, self-adhesive tape. The tape is supplied in rolls of 75 mm x 22.86 m, 150 mm x 22.86 m and 200 mm x 22.86 m.

Handling and Storage

- 5.1 Handling and storage of all materials supplied by Marshall Innovations Ltd, whether on or off site, is under the control of the installer. Rolls must be stored under cover, in clean, dry conditions away from direct exposure to sunlight.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for SUPER-STICK. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 SUPER-STICK meets the requirements of AC148: 2001 which is an alternative solution to the version of AC148 referenced by NZBC Acceptable Solution E2/AS1, Paragraph 9.1.5 [b]. The installation method for SUPER-STICK is an alternative solution to the installation method shown within NZBC Acceptable Solution E2/AS1, Figure 72A and 72B.
- 7.2 The use of flexible flashing tape systems around window and door joinery openings is critical to assist the overall weathertightness performance of window and door joinery installations.
- 7.3 SUPER-STICK is suitable for use over flexible wall underlays compatible with the flashing tape in NZS 3604 Wind Zones up to and including Extra High. In the Extra High Wind Zone, the flexible underlay must be installed over a rigid underlay complying with NZBC Acceptable Solution E2/AS1, Table 23.
- 7.4 SUPER-STICK is designed to prevent air leakage and water penetration around window and door openings at framing junctions [e.g. at the sill trimmer and opening stud junction], and to keep any water that gets past the cladding, or through the joinery, from direct contact with the framing timber.
- 7.5 SUPER-STICK is not designed to overcome poor detailing and workmanship of the window or door joinery installation. The system must not be considered in isolation, but be considered as part of the wall cladding system. SUPER-STICK flashing tape is designed to be used in conjunction with air seals and joinery flashing systems, not as a substitute.

- 7.6 When SUPER-STICK is used in conjunction with LOSP [light organic solvent preservative] treated timber, the solvent from the timber treatment must be allowed to evaporate [generally at least one week] prior to the installation of the system.

Durability

- 8.1 Assessment of durability to meet the NZBC is based on difficulty of access and replacement, and the ability to detect failure of SUPER-STICK both during normal use and maintenance of the building.

Serviceable Life

- 8.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 90 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, SUPER-STICK is expected to have a serviceable life equal to that of the cladding. The maximum exposure period may however be limited by the requirements of the substrate supplier.

Maintenance

- 9.1 No maintenance is required for SUPER-STICK. Regular checks, at least annually, must be made of the junctions between the joinery and wall cladding to ensure that they are maintained weathertight and that the primary means of weather resistance for the junction e.g. flashing, sealant, etc continues to perform its function, to ensure that water will not penetrate the cladding.

Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to SUPER-STICK from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 11.1 Where a cladding manufacturer specifies the use of generic flashing tapes around window and door joinery openings at framing junctions as part of their system, or they specify the use of flexible flashing tapes that comply with NZBC E2/AS1, Paragraph 9.1.5 [b], SUPER-STICK may be used.

Installation Information

Installation Skill Level Requirements

- 12.1 Installation must always be carried out in accordance with the SUPER-STICK Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

General

- 13.1 The selected building wrap must be installed in accordance with the manufacturer's instructions, and must completely cover the joinery opening. The wrap is then cut on a 45° angle away from each corner of the opening so the flaps can be folded into the opening and secured to the interior face of the timber framing.
- 13.2 Before SUPER-STICK is applied, the substrate surfaces must be clean, dry and free from any surface contaminants such as dust and grease that may cause loss of adhesion.
- 13.3 A 75 mm wide x 150 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the jamb/sill junction overlapping the corner by 3 mm to create a seal at the corner junction. A length of SUPER-STICK is then cut to the length of the sill plus 300 mm. The tape is installed flush with the interior face of the opening and is applied along the entire length of the sill and 150 mm up each jamb. The overhanging tape is cut at the corner of the opening to allow the tape to be folded onto the face of the building wrap and "butterfly" installed across the corner. Cut another length of SUPER-STICK the exact length of the sill and overlay onto the already installed Tape to ensure nail sealability requirements are met.

- 13.4 A 300 mm length of SUPER-STICK must be installed 150 mm down the jamb and 150 mm along the lintel at each of the top corners of the window or door joinery opening. A 75 mm wide x 150 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.
- 13.5 SUPER-STICK must not be stretched. When joining two sections of tape, the overlap must be 100 mm minimum.
- 13.6 If SUPER-STICK is exposed to the weather or UV light for more than 90 days, it must be replaced with new material.

Installation Temperature

- 13.7 SUPER-STICK must not be installed where temperatures are less than -5°C [Note: Marshall Innovations Ltd approve the installation of SUPER-STICK down to -20°C. This has not been addressed by this Appraisal and is outside its scope.]

Inspections

- 13.8 The Technical Literature must be referred to during the inspection of SUPER-STICK installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 14.1 Testing of SUPER-STICK has been completed by BRANZ to the requirements of ICC Evaluation Service Acceptance Criteria for Flashing Materials AC148. The adhesion of SUPER-STICK to black bituminous Kraft building paper complying with the requirements of NZBC Acceptable Solution E2/AS1, Table 23 and selected other synthetic wall underlays have been tested and found to be satisfactory.

Other Investigations

- 15.1 An assessment was made of the durability of SUPER-STICK by BRANZ technical experts.
- 15.2 Site inspections were carried out by BRANZ to examine the practicability of installation.
- 15.3 The Technical Literature has been reviewed by BRANZ and found to be satisfactory.

Quality

- 16.1 The manufacture of SUPER-STICK has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ undertakes an ongoing review of product quality on an inwards goods basis.
- 16.2 The quality of supply to the market is the responsibility of Marshall Innovations Ltd.
- 16.3 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and building wraps in accordance with the instructions of the designer.
- 16.4 The quality of installation, handling and storage on site is the responsibility of the installer in accordance with the instructions of Marshall Innovations Ltd.

Sources of Information

- ICC Evaluation Service, Inc, AC148 Acceptable Criteria for Flexible Flashing Materials, July 2001.
- NZS 3604: 2011 Timber-framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 8, 30 November 2018].
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



BRANZ Appraisal
Appraisal No. 846 [2019]
7 June 2019

SUPER-STICK FLEXIBLE
FLASHING TAPE



In the opinion of BRANZ, **SUPER-STICK** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Marshall Innovations Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Marshall Innovations Limited:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Marshall Innovations Limited**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Marshall Innovations Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

7 June 2019