

Sharalyn Fraser *Agency*

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CODE COMPLIANCE CERTIFICATE

Section 95 Building Act 2004 [Form 7 – Building (forms) Regulations 2004]



Consent No(s): 230413

The Building			
Street address of building:	163 Karuhiruhi Street, Waikanae	Building name:	-
Current, Lawfully established, use:	Detached dwelling	Location of building within site/block number:	Central to the site
		Intended life of the building if 50 years or less:	-
Level/unit number:	-	Year first constructed:	2023
Legal description of land where building is located:	Lot 45 DP 582129		
The Owner			
Name of owner:	Glen Paterson	Street address /registered office:	163 Karuhiruhi Street, Waikanae
Contact person:	Glen Paterson	Phone numbers:	
Mailing address:	PO Box 493, Paraparaumu 5254	Landline:	-
		Mobile:	027 435 8828
		Daytime:	-
Email address:	sales@patersonhomes.co.nz	After hours:	-
Website:	-	Facsimile number:	-
First point of contact for communications with the Kapiti Coast District Council:			
As above			
Building Work			
Building Consent No(s):	230413	Issued by:	Kapiti Coast District Council

Code Compliance

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

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

Michelle Salmon
Building Inspections Team Leader
On behalf of **Kapiti Coast District Council**

Date: 7/10/2024

Aerial Photography

163 Karuhiruhi Street, Waikanae (Lot 45 DP 582129)



0 10 20 Metres

Scale @ A4 - 1:500

Date Printed: June 2, 2023

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Operative District Plan 2021 - Natural Hazards

163 Karuhiruhi Street, Waikanae (Lot 45 DP 582129)



Key to map symbols

- Stream Corridor
- Flood Storage Area
- Ponding Area

The 'Key to map symbols' column above will be empty if no relevant District Plan Features are present in the area shown on this map.



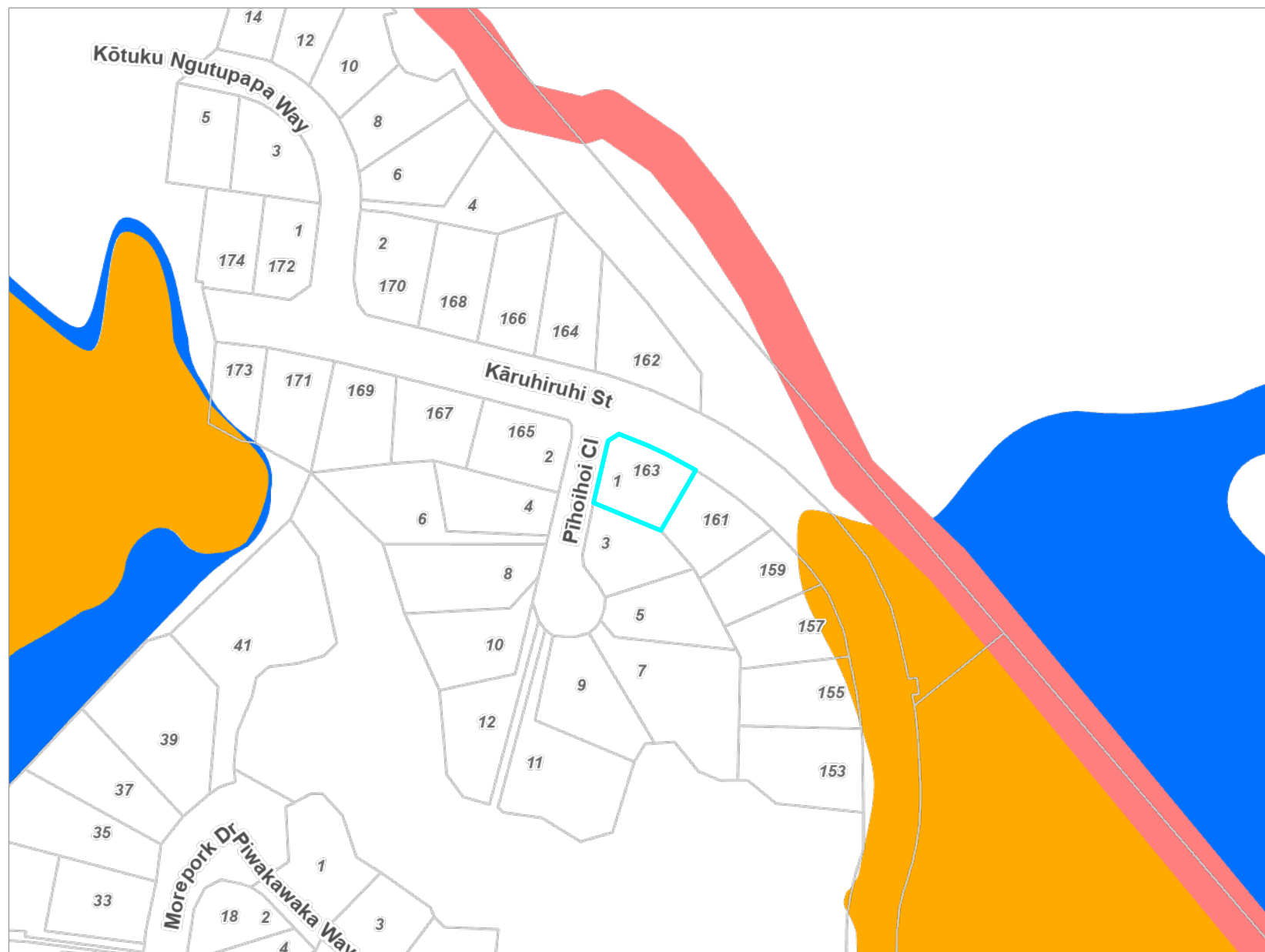
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Latest Flood Hazards

163 Karuhiruhi Street, Waikanae (Lot 45 DP 582129)



Key to map symbols

- Stream Corridor
- Storage
- Ponding

The 'Key to map symbols' column above will be empty if no Flood Hazards are present in the area shown on this map.



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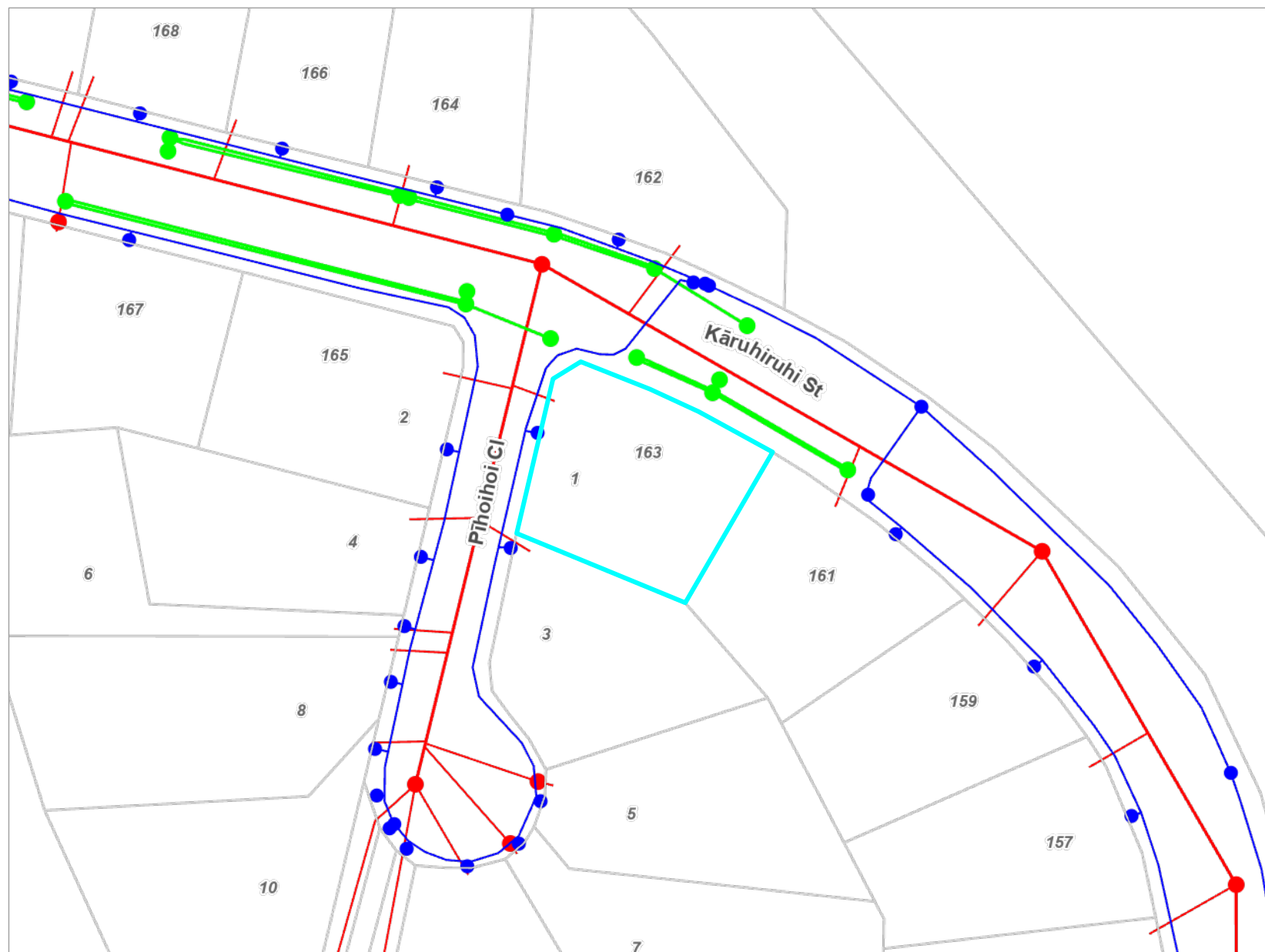
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Services Network

163 Karuhiruhi Street, Waikanae (Lot 45 DP 582129)



Key to map symbols

- WS Node
- WS Pipe
- SW Point
- SW Pipe
- WW Point
- WW Pipe
- WW Lateral

The 'Key to map symbols' column above will be empty if no Services are present in the area shown on this map.



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

**IN THE MATTER OF A PLAN LODGED FOR
DEPOSIT UNDER NUMBER 582129 AND RESOURCE CONSENTS RM160213 A-C**

(being the subdivision of Lot 4 DP 478686 & Lot 201 DP 546292)
At Waipunahau Road, Waikanae
For W North Ltd

The Regional Regulatory Titles Officer at Wellington

PURSUANT to Section 221 of the Resource Management Act 1991 the Kapiti Coast District Council hereby gives notice that it has consented to the subdivision and in respect to Lots 40-60, 65-75, 126, 128-130 & 200-203 the following conditions are to be complied with on a continuing basis:

1. **With respect to Lots 40-60, 65-75, 126, 128-130 and 200-203:** Foundation design and construction for any new building or additions/alterations to a building shall take into account the findings and recommendations within the Foundation Recommendations prepared by Miyamoto dated 28 September 2022, submitted to Council in relation to application RM160213. A copy of the Foundation recommendations report is available in Council's Office at any time the office is open to the public and is stored electronically under e-docs reference RESCON-243241487-105217.
2. **With respect to Lots 40-60, 65-75, 126 and 128-130:** Further subdivision is prohibited.
3. **With respect to Lots 45, 56, 69 and 130:** The vehicle crossings for these lots shall be formed, metalled and sealed between the carriageway edge and the road boundary at the entry to each corner lot. These lots shall not have vehicle access to the through road.
4. **With respect to Lots 40, 48-53, 55 and 58-60:** There shall be no close boarded fences higher than 0.7m or open type fences (more than 50% visually permeable) higher than 1.2m shall be constructed within 3m of the common boundaries between any reserve and these lots.
5. **With respect of Lots 40-43, 48-50, 65 and 72-75:** The construction of dwellings, accessory buildings and associated structures are authorised on these lots that have an underlying zoning of Open Space Precinct provided that they comply with any other conditions prescribed under this consent notice.
6. **With respect of Lots 41-47, 51, 52, 54-60, 65-74, 126 and 128-130:** – The maximum coverage area of all buildings on these lots are to be 250m². If the residential lot area exceeds 1000m² the maximum site coverage shall be 25%.

7. **With respect of Lots 40-49, 52-54, 56-60, 65-69, 71-75, 126 and 128-130:** - Any buildings on these lots that the District Plan requires to be 3m side yard setback from the boundary of the lot shall be reduced to 1.5m.

8. **With respect of Lots 40-49, 52-54, 56-60, 65-69, 71-75, 126 and 128-130:**

The front yard setback of these lots shall be:

- i. Any primary residential building (habitable rooms) shall be set back at least 3m from any road boundary.
- ii. Any accessory building (including attached garages and car ports) shall be setback at least 5m from any road boundary and at least 1m behind the front façade of the primary residential building; and
- iii. Any eave which intrudes the front yard as required by standard (i) and (ii) above by no greater than 0.6m shall be excluded, except where the eave would overhang any easement.

9. **With respect to Lots 40-60, 65-75, 126 and 128-130:** Any future dwelling on these lots shall comply with the Preserve Precinct standards as follows:

- a) Rainwater storage tanks with a minimum capacity of 10,000 litres for the supply of non-potable water for outdoor use and indoor toilets;
- b) Rainwater storage tanks with a minimum capacity of 4,500 litres for the supply of non-potable water for outdoor use and indoor toilets and a greywater re-use system for outdoor irrigation. The greywater re-use system shall take all water from bathrooms (with the exception of toilets) and the washing machine.
- c) Solar hot water heating shall be fitted to each household unit with a minimum of 2m² of solar panel per unit.
- d) Thermal insulation standard for habitable rooms shall be insulated to comply with the following minimums: Walls R2.6, Roof R4.6 and Floors R2.0.
- e) A design certificate signed by a registered architect, member of Architectural Designers of New Zealand, registered engineer or suitably qualified building inspector stating that the plans will achieve compliance with the above standards.

Note: Where there are no specific Waikanae North Zone standards, the permitted activity standards of the District Plan

10. **With respect to Lots 40, 48, 49, 51 and 52:** No earthworks, building, construction, planting (except for species native to the Foxton Ecological District), garden waste or rubbish dumping, or trimming, modification or removal of vegetation is permitted within the ecological site K133.
11. **With respect to Lots 40-60, 65-75, 126, 128-130 and 200-203:** The consent holder shall provide a stormwater attenuation/ disposal system for these Lots which shall comply with the requirements of Part 3 E(v) Performance Criteria of KCDC'S SDPR: 2012. The stormwater disposal design shall be in accordance with the requirements and intent of the Engineering Services Report entitled Proposed Waikanae North Subdivision of 177 new residential lots off Waipunahau Road, Waikanae prepared by Hamish Wells dated 21 September 2016 submitted to Council in relation to the application No. RM160213 and is stored electronically under e-docs reference RESCON-243241487-88199.

Issued in respect of application RM160213 on this 9th day of December 2022.



Sarah Nicole Banks
AUTHORISED OFFICER



Sophas Uch
AUTHORISED OFFICER

Hamish Wells

Civil Engineer

MIPENZ CPEng 186323

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P O Box 188, Otaki 5542

Hamish Wells - 0274 459 757
James Wineti - 0274 549 009
Steve Bright - 022 037 6315

Email: Engenr@xtra.co.nz

21th September 2016

For: Waikanae North
C/o Landmatters
20 Addington Road
Otaki

Attention: bryce@landmattersnz.com & sam@landmattersnz.com

Re: proposed Waikanae North subdivision of 177 new residential lots off Waipunahau Road Waikanae

This report is an over view of the servicing and development requirements for the subdivision as shown on the attached plans:

1) **General site conditions:**

- a) **Topography and soil types:** (refer to plans 1 & 4) the site is dominated by stable Aeolian formed sand dunes up to 20m high above the surrounding land form, interdunal flats and hollows contain peats and silts over relatively dense underlying sands silts and gravels. The depth of peat varies up to 3m depending on location. Shallow dunes run through the peat areas and site soil conditions can vary significantly over short distances. The low areas are the remains of ancient peat swamps formed in the interdunal hollows and subsequently drained to form the farmland as seen on the site today. The field observations made for this report confirm those made by Beca Consultants for their plan change report of August 2006 and Tonkin and Taylors report for the MOE dated May 2010.
- b) **Existing drainage:** (refer to plan 3) to enable the land to be farmed effectively the low areas of the land have been extensively modified with a series of open cut drains and realignments of existing streams. The eastern part of the site is drained to its northern boundary. Along that northern boundary is a more significant drain, fed also by farm land to the north east. This drain runs north west, crosses the north west corner of the property, turns south west and discharges into what appears to be the original natural drainage path for the area. This has been referred to as the Kakariki stream.
- c) **Existing catchment:** the catchment for the area extends beyond the site to the north east to, and possibly beyond Greenhill Road, east to the top of the Hemi Matenga reserve, and south to Martin Street west of the highway and Utauta Street east of the highway. Interconnections also appear to exist with adjacent catchments, which are likely to allow overflow from one catchment to another.
- d) **Inundation of the site:** (refer to plan 2) councils current data indicates the majority of the flat land on the site provides storage or is ponding for flood waters

in the Q100 event. For the development to proceed as proposed, appropriate mitigation measures are required to maintain that ponding capability and not compromise the existing drainage network running through the site, as the main stream channels are active stream corridors.

Extensive investigative work done by in part by myself and in the majority by AWA Environmental Limited (refer AWA report) has shown that appropriate mitigation methods can be incorporated into the earthworks design to ensure the current ponding and flow characteristics and storm water control capabilities of the site are maintained or enhanced.

2) **Site testing**

a) **Site testing**; has been limited to exploratory test pits dug by hydraulic excavator and shallow scala and hand probes, and hand auger bores.

b) **Site soil conditions are**: as per 1 b) above

3) **NZS 3604:2011 Section 3 Site requirements** part 3.3, Test Method for soil bearing capacity, part 3.3.7 Ultimate Bearing Capacity defines good ground as having 300kpa + Ultimate Bearing Capacity (UBC):

CL 3.3.7.1

The soil below the underside of the foundations shall be assumed to have an ultimate bearing capacity of not less than 300 kpa when:

- a) none of the following is encountered below the depth of the footing at any test site:
 - (i) organic topsoil
 - (ii) soft or very soft peat
 - (iii) soft or very soft clay
 - (iv) fill material, except where a certificate of suitability has been issued under NZS 4431
- b) Scala penetrometer tests conducted in accordance with 3.3.2(a), where the number of blows per 100mm depth of penetration below the underside of the proposed footing at each test site exceeds:
 - (i) Five down to a depth equal to twice the width of the widest footing
 - (ii) Three at greater depths; and
 - (iii) Providing the set blow is relatively uniform, the number of blows per 100mm may be obtained by averaging the number of blows for depths not exceeding 300mm; and
- c) Comparisons of the results at all test sites show that soil conditions are closely similar at each test site:

Based on a standard slab on ground foundation width of 240mm for a masonry veneer clad dwelling (either 1 or 2 storey) from Figure 7.15 NZS 3604:2011 section 7 Floors – Masonry veneer foundation edge details – in situ concrete and a

minimum in ground embedment of 300mm for the concrete foundation, the minimum requirements in terms of scale blows/100mm penetration are:

Existing ground level to -300mm	not applicable to the foundation but relevant to the slab see section 7.5. re granular base for slabs, minimum 5 blows/100mm penetration in the granular fill recommended
-300mm to -800mm below existing ground level	5 blows/100mm
-800mm + depth	3 blows /100mm

4) **Analysis of the preliminary soil investigations in terms of NZS 3604:2011 section 3.**

- a) Without any earthworks being carried out on the site as it is, virtually any location on it would likely require specific foundation design due to either soft sands or peats.
- b) The site post earthworks as currently proposed would yield almost all proposed building sites capable of utilizing standard foundations in accordance with NZS 3604:2011.

5) **General and services comments**

- a) **Annual rainfall:** Approx 1000 mm/annum
- b) **Exposure:** all sites are exposed in terms of NZS 3604:2011
- c) **Currently available water supply:** supply is available at the end of Waipunahau Road via a newly constructed 150d supply main, this is “ringed” back via a 100mm line to Pohe and Metapere Streets. In addition, there is a consent notice on the parent title (DP 478686 & RM 100229) which states in item 4

4. **With respect to Lots 4, 8, 9, 15, 16 & 17:** A water supply model for the concept plan of the Waikanae North Development has been prepared by MWH New Zealand Limited and a report prepared which was entitled “Waikanae North Water Modelling – Final Report” dated 30 May, 2012. This report verifies that mitigation measures are required on the existing reticulation to meet the requirements of the proposed complete development. The model concludes that an upgrade is required as a result of the demand imposed by the development, but that before the upgrade is required, the proposed retirement village, school and up to 318 residential units (or any development form of the same demand) can be developed within the Waikanae North Development Zone water catchment. The demand has been assessed as being able to be met up to this limit before an upgrade to the Hemi Street water main is required.

Where the model clearly indicates that the upgrade is required as a direct result of the demand imposed by the development in excess of the above limit, the cost of any upgrade to existing services shall be met by the consent holder for the development which creates that demand.

If any of the design parameters change as the staged development proceeds, the Water Model may need to be recalibrated to reflect these changes.

For the area referred to, there are currently 83 lots developed in Mahia Lane, Parata Street & Waipunahau Road, with another 60 proposed off Waipunahau Road (although the status of the consent for those proposed lots is unknown). Therefore $318 - 83 = 235$ residential “units” available. This application is for 177 residential units, and water supply is therefore available without any upgrades to the existing network. It should be noted that the above consent notice is based on MWH’s Waikanae North Water Modeling Report Rev 1 30/05/2012 Final report. All water reticulation for the proposed development will be typical NZS 4404 standard.

- d) **Sewerage reticulation:** is available at multiple locations along the entire southern boundary and council have indicated that there are no capacity issues with this line. The development will require network extensions at the end of Waipunahau Road (existing SS 300mm diameter invert 13.20m) and at MH KWWN004489 in the north west corner of 29 Manu Grove (existing SS 450 diameter MH invert 6.45m). The sewer extension off Waipunahau Road is straight forward, the extension off the Manu Grove MH will have to cross under the Kakariki Stream to service the site. This would be best achieved with the pipe being thrust bored under the stream from the south to minimize any adverse effects on the waterway and covenanted areas on the site. Sewer reticulation within the development will be typical NZS 4404 construction.
- e) **Storm water management for the proposed earthworks:** (refer plans 3 & 4) The site is drained by the Kakariki Stream and an unnamed drain on the northern boundary. The effective development of the site requires earthworks that will reduce the existing flood storage volumes on the site by 20,000m³. A detention structure already exists on the Kakariki Stream within the site, this was consented in 2011 and built shortly thereafter. It comprises an area of around 20,000m², banded off in two locations with 450 diameter culverts draining the detention area back to the Kakariki Stream and the farm drainage system to the north. It has a current capacity of around 20,000m³.

In order to fully mitigate any adverse effects from the earthworks proposed on storage, the existing detention structure requires an effective increase in available storage volume of an equivalent amount. The initial design approach was to raise the existing spillway and bund to provide the appropriate additional detention volume, with no other change to the existing system.

To verify that approach, AWA Environmental Ltd carried out a detailed analysis of this concept and have determined that when raising the available detention capacity is combined with implementation of the original stormwater “Masterplan” for Waikanae North (refer Pond 1 Zone # page 13 AWA report), creating the larger volume of detention, was indeed effective in mitigating any adverse effects from the proposed earthworks in terms of loss of flood storage volume (refer to AWA Environmental Ltd report 15, September 2016).

The proposed final design will lift the existing overflow spillway on the Kakariki Stream from RL 9.2m to RL 10.25m, and lift the existing detention bund height from RL 10.5m to RL 11.0. The existing 450 diameter culvert through the bund, which carries the normal flow of the Kakariki Stream will remain unaltered. The

northern bund and associated 450 culvert will be relocated to a new position and a new more natural channel formed to replace the drain.

Effectively the only change to the detention area will be to provide more storage and construct part of “Pond 1” in Zone 3.

- f) **Stormwater management for each site:** a hydrologically neutral site development solution will be required for each residential lot when it is built on. The receiving ground on the new sites will be porous sand and the typical techniques currently used across the district on new builds, such as effective ground soakage and on site detention combined with porous paving where appropriate, will ensure that increased runoff from site development will be managed on site. Typical sizing for ground soakage devices are indicated in paragraph 6 below.
 - g) **Stormwater management for the new roads:** (refer sheets 5, 6 & 7) The new roads will conform to traditional cross section and form, with one significant difference, the stormwater reticulation within the road reserve will be a continuous ground soakage trench sized to take all surface water collected within the road reserve area to ground under the road. This design has proven particularly effective at Miro Street and Riverbank Road Otaki on gravels and Kelsi Street and Attrill Place in Wanganui on medium to low porosity sands. Variations of the basic design function effectively at other developments in Waikanae and at the large Waitarere Rise subdivision at Waitarere Beach. The same methods have also been successfully applied on pumice soils in Taupo and the Turangi area. The basic principle of operation is well proven and complies with KCDC design requirements.
 - h) **Seasonal ground water variation** is not significant on the site as it is relatively well drained by the existing drains and streams.
- 6) **Preliminary soil percolation values for on site disposal to ground**

Test depth		0 – 1000mm
Soil category	sands	Cat 2 / 3
Soil infiltration value for design (Si) (ie field test value/4)		1 - 3 ltr/m ² /min

Note: the Si value above is an indicative averaged value from observations on the site and comparison with equivalent soils post earthworks in the immediate area.

Calculations based on 300m² of house and paved area using an Si value of 1.4l/m²/min indicate a soakage trench system of 19m length x 1.2m wide x 1.2m effective depth and backfilled with rail ballast or clean no fines river run is suitable for the soil type on the site and the predicted range of 100 year storm events.

If rainwater “crates” such as Rainsmart modular tanks are used, the higher void ratio allows for a more compact install of 11m long by the same dimensions as above.

If on site detention is combined with ground soakage techniques, the required footprint for the soakage system can be potentially reduced further.

It should be noted that any system used to provide total on site disposal of stormwater runoff on a residential site, is site specific for the dwelling, out buildings and hard stand areas proposed for that site. Specific engineering design is required and multiple solutions are available. The systems detailed above are basic, simple proven solutions to on site stormwater management for individual lots.

The same principals are applied to the paved road areas to address increased runoff from the roads. A continuous soakage trench is to be used. This will underlie all the paved roads, the trench as shown on the plans is sized to handle Q100 flows from the road pavement and provide appropriate storage.

The road carriageway geometric design is similar to that used in Waterstone Avenue in Paraparaumu, and is to provide both a pleasing appearance and practical traffic lanes and parking for the development.

The main access road has a carriageway width of 10m and reserve of 18m, and is sized for future extension to the west. Side roads are 15m reserve width with 6m carriageway. Right of ways as per KCDC requirements.

7) **Specific environmental, public health and other constraints:** there are none apparent.

8) **Earthworks and earthworks management:** in order to construct the building platforms and roads for the 177 new lots proposed the following earthworks will be required.

- a) 99,640m² cut area
- b) 66,600m² fill area
- c) Raising the existing spill way and bund
- d) Relocation of the "northern bund" and culvert
- e) Reinstatement of all ground cover

The principal issue to be addressed with sites composed of predominantly Aeolian deposited sands is the potential for dust and sand movement by wind, it is after all, the mechanism that put the sand on the site, and if vegetative cover is lost or removed for significant time frames, it will most certainly move it on to other places.

Appendix A of this report is an Earthworks Management Plan, the main thrust of which is prevention of uncontrolled wind generated transportation of the on site soils within and beyond the site.

9) **In conclusion:** the site presents two engineering challenges over a standard green field development:

- a) Maintaining the existing flood storage and ponding volumes with no change in effects beyond the site boundaries. This can be addressed by full implementation of the overall developments stormwater "masterplan" and an additional 20,000m³ detention capacity to the existing detention structure.
- b) Providing hydrological neutrality for both new residential sites and new roading which can be dealt with by appropriate proven application of sound engineering design.

There are thus no insurmountable engineering issues that would prevent the proposed development being approved for construction.

Should you require any further information please contact me directly.

Yours faithfully



Hamish Wells

Digitally signed by Hamish Wells
DN: cn=Hamish Wells, o=K2
email=engent@k2.co.nz, c=New
Zealand, givenName=Hamish Wells,
Date: 2015.09.21 09:58:47 +1200

Hamish Wells

Attached/appended

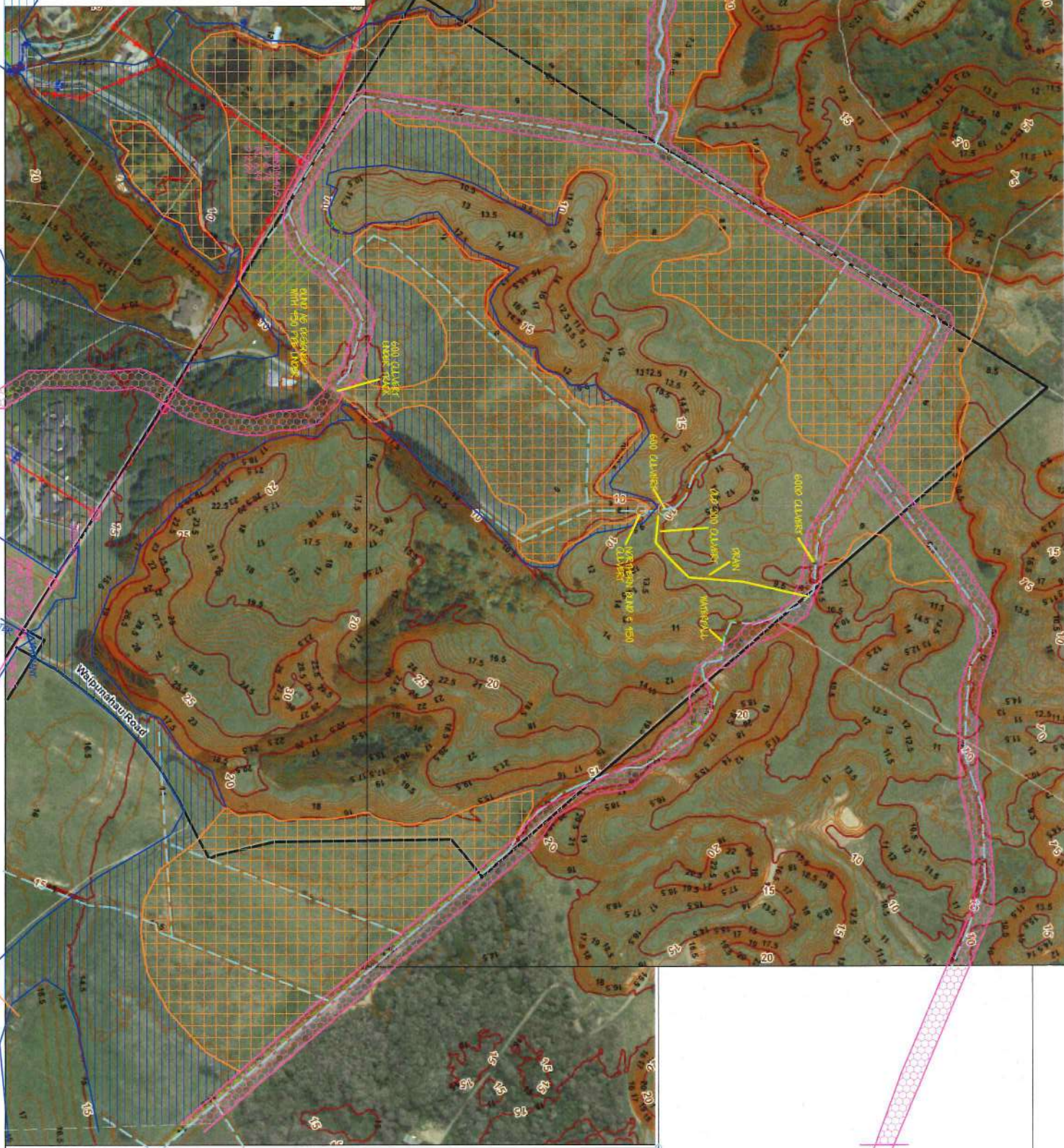
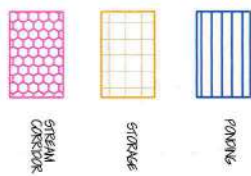
- 1) Plans 1 – 8
- 2) Appendix A - EMP
- 3) Copy of GWRC “Small Earthworks”
- 4) Bund drawings
- 5) SW trial calculations

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LANDMATTERS
WAIKANAЕ NORTH

HAMISH WELLS
CONSULTING CIVIL ENGINEER
MIPENZ CPENG * 186323

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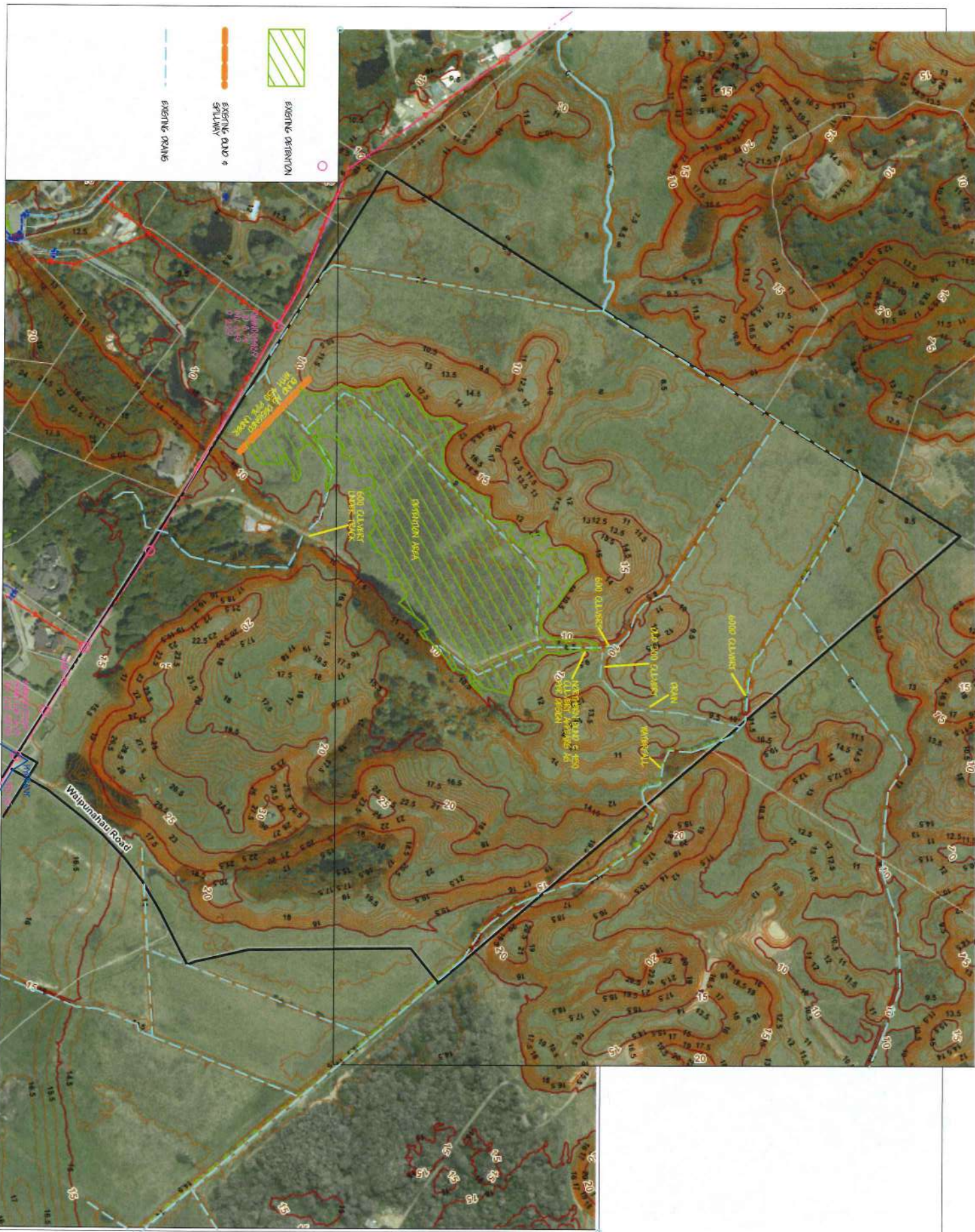
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STREET TITLE
CURRENT FLOODING
SCENARIO

LANDMATTERS
WAIKANAЕ NORTH

HAMISH WELLS 202 OTAKI GORGE
ROAD RD2 OTAKI
5582 NZ
0274 459 757
CONSULTING CIVIL ENGINEER
MIPENZ CPENG # 186323 engnr@xtra.co.nz



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WAIKANAЕ NORTH

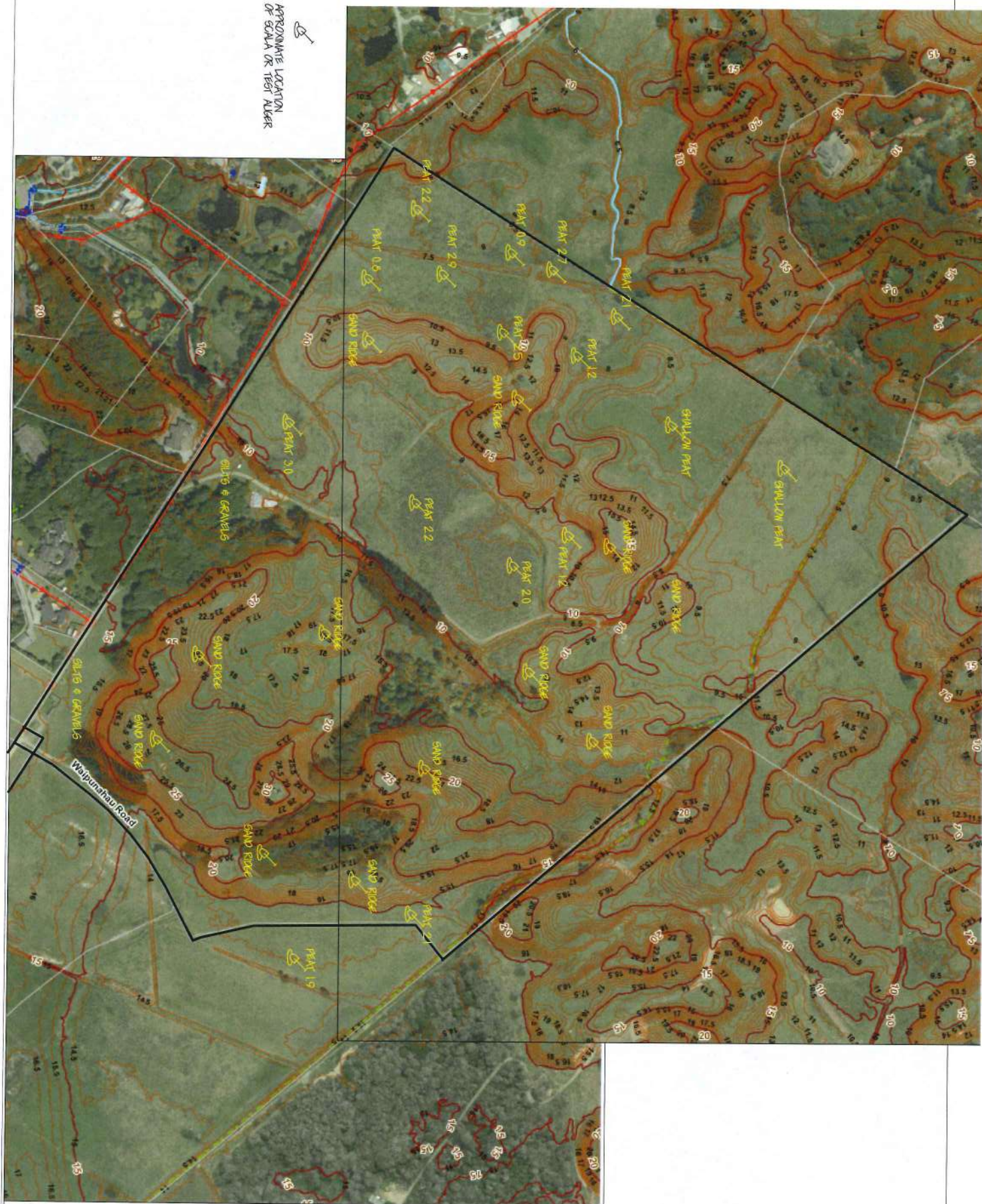
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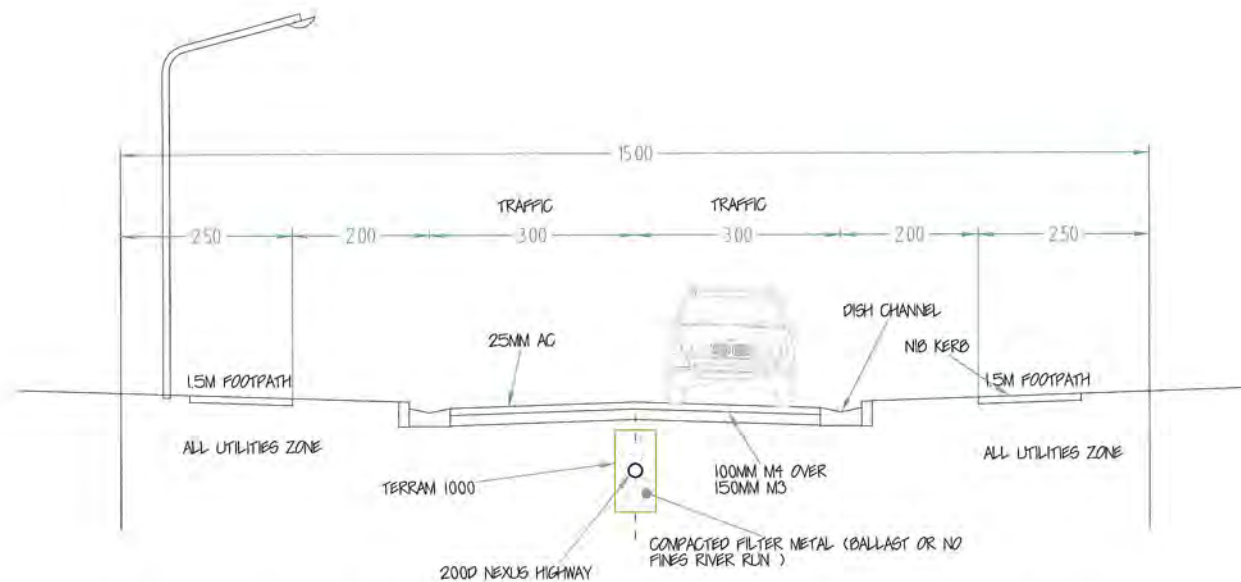
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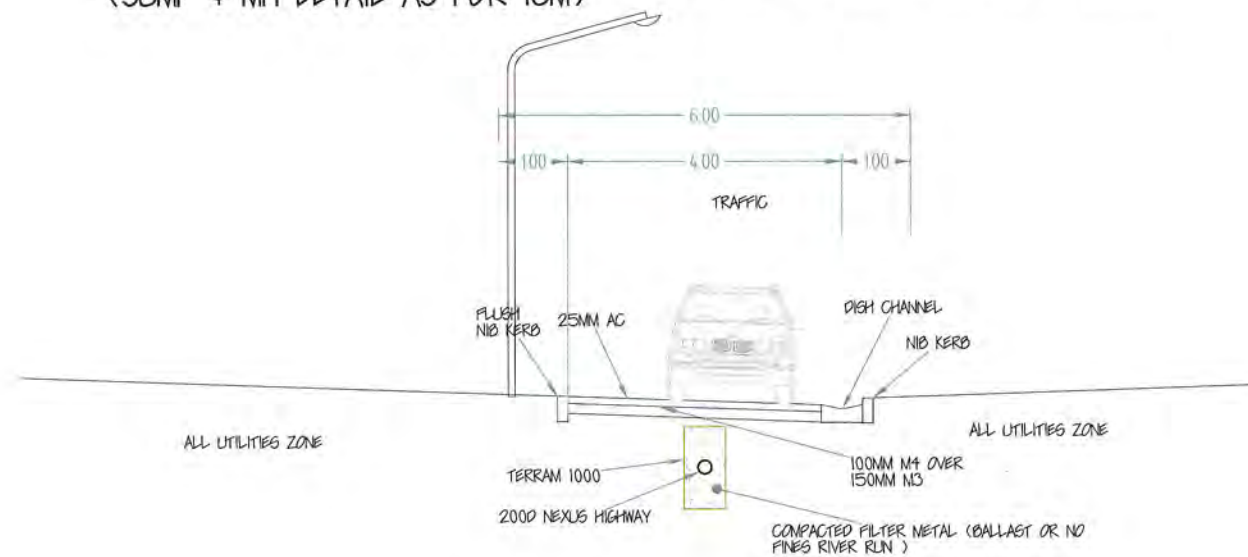
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TYPICAL ROAD CROSS SECTION BETWEEN PARKING BAYS 15M ROAD RESERVE
(SUMP & MH DETAIL AS FOR 18M)



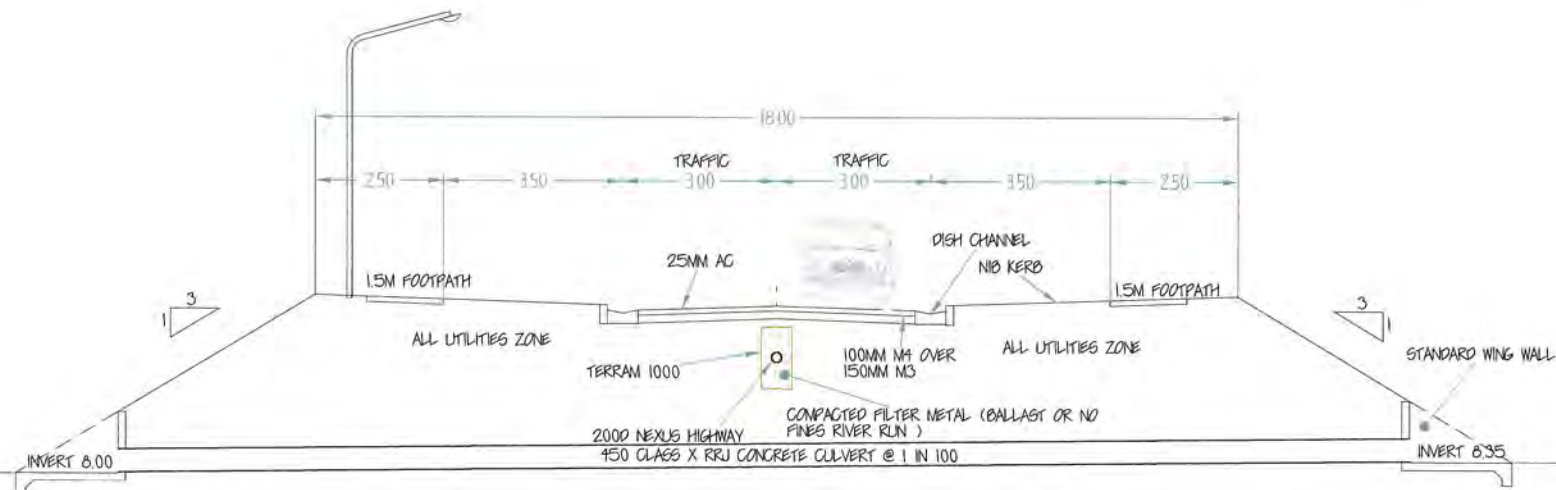
TYPICAL ROAD CROSS SECTION PRIVATE WAY

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2000 R02 OTAKI
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CONVEYING CIVIL ENGINEER
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WV-001
DRAWN BY HW
CHK'D BY HW
DRAWING SCALE
1:75 @A3
SHEET TITLE
X SECTIONS
SHEET 7 OF 8



TYPICAL ROAD CROSS SECTION AT NEW / RELOCATED 450 CULVERT

HAMISH WELLS
CONSULTING CIVIL ENGINEER
202 OTAKI GORGE
KIAHO RD2 OTAKI
5502 NZ
0274 459 757
mipenz@xtra.co.nz

LANDMATTERS
WAIKANAЕ NORTH

DATE	DESCRIPTION
19/09/2006	1
21/09/2006	2

NOV
WN-001
CASH B/P PW
PAIR & SCALE PW
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EMBED OF 8

Appendix A: WAIKANAE NORTH – EARTHWORKS MANAGEMENT PLAN

Preamble

On sites where the predominant soil type is Aeolian deposited sand, dust and wind blown sand are the principal problem encountered during earthworks operations.

Dust can be generated when soil that is repeatedly disturbed and broken down into finer particle size is then subjected to dry windy conditions.

Sands, are susceptible to transport by wind if the vegetative cover is lost and water content of the soil is reduced.

This can create a severe nuisance problem to adjoining properties, and can be difficult to control.

The problem is directly related to soil particle size, moisture content, vegetative cover and wind velocity, frequency and direction.

It is similar in principle to sediment control where finer particles are more difficult to settle out. Particle sizes of less than 0.15 mm (fine sand and smaller) are susceptible to saltation and suspension by wind, and capable of causing dust problems off site.

It should be noted that the saltation process in sands generates static electricity in the mobilized sand particles which loosens un-mobilized dry particles on the ground surface, this effectively reduces the required impact wind velocity to mobilize the soil. Thus the wind velocity required to maintain saltation of sand is less than that required to start it, and it is much easier to prevent the process starting than to attempt to arrest it once it has begun.

As the strength of the wind increases, the potential for dust problems increases exponentially, (The rate of soil movement is proportional to the cube of the wind velocity). On high-risk sites that have had no dust management, the fine soil on the ground can be very dry and aerated, particularly on haul roads, and roll in waves as machines pass even when there is no wind to exacerbate the problem.

Once the site is subject to any wind, if not adequately managed, the resulting dust problem can be very difficult to control. Dust from problem sites can travel significant distances beyond the site and cause a range of problems to health and property.

While most sites have a prevailing wind from a particular quarter, the wind can blow from any direction. In that respect, dust can be more difficult to control than soil erosion from stormwater runoff.

Dust Management Plan description

Dust management should be considered in the planning stages of any earthworks project. Forward planning and management to minimize dust problems provide the best options for control.

If dust management is only addressed after it has become a problem on-site, it is almost impossible to bring under effective control.

The main practices used to control dust on sand soil earthworks sites are as follows in order of importance and practical effectiveness:

- 1) Whenever practical, carry out the works during winter and early spring to ensure adequate soil moisture is present to eliminate dust generation issues.
- 2) Minimize the area of site exposed to wind at any one time.
- 3) Re-topsoil and re-vegetate areas affected as rapidly as practicable.
- 4) Maintain suitable water applying machinery on site at all times to ensure surface soil moisture levels are maintained at the required level to keep soil moisture high enough to prevent dust generation.

A Dust Management Plan should address the following:

- 1) The potential impact of any dust problems if dust causes a nuisance off site. (which for this site are public inconvenience and potential minor damage to buildings both exterior or interior, and the deposition of sand on properties and buildings.
- 2) The soil characteristics of the site and whether the timing of operations will help or hinder dust control.
- 3) Any considerations that have been given to operational methodology to reduce the dust problems e.g. restricting the amount of bare ground exposed, staging of works etc. (all of which has already been done)

Type of controls to be used:

Timing of the works

The plan should detail the seasonal timing for carrying out the works which should, where possible, coincide with the period of maximum reliable rainfall required to maintain the required site soil moisture levels to prevent wind mobilization of the soil particles.

In addition, the works should be carried out when optimum soil moisture content for re-compaction of the material is available. This allows for completion of works running into the ideal growing conditions for optimal re establishment of vegetative cover on the ground disturbed by the earthworks operation.

To sum up, best practice for large volume earth works on sand sites above the existing ground water level is to carry out the earthworks during winter, completed in early spring and sown down for summer.

Staging of the works

The works should be carried out to minimize the amount of raw earth exposed at any one time and thereby minimize the area exposed to wind and any other form of erosion.

- 3) Application of mulch – effective.
- 4) Other methods that may be used rely on surface protection, surface roughening or reducing wind velocity. Surface roughening is not commonly used in sand as the soils are generally not well suited to this method of control. Reducing wind velocity can be accomplished using small windbreaks (similar to silt fences), and may be appropriate for small areas.
- 5) Temporary irrigation using agricultural/horticultural irrigators.

Signage shall be provided at an earthworks site giving a 24 hour contact number for dealing with dust complaints that may arise from the operations. The provision of this 24-hour contact number ensures that the contractor has a management plan in operation to deal with dust control.

Maintenance

A high degree of vigilance is required where sand sites are sown down in spring to ensure that the vegetation is not killed by desiccation as summer proceeds and soil moisture content lowers. New grass is particularly susceptible to this and vegetative die off as summer proceeds and can be the cause of dust problems arising well after the major works on site are complete, and can be difficult to address unless careful observation of grass growth is maintained during the post construction maintenance phase through to the following winter.

The best methods of ensure continued vegetative cover site are in order of effectiveness are:

- 1) Occupation of the sites. (the sooner the sites are built on and occupied the sooner a home owner will be maintaining his or her lawns or the development company produce a saleable product complete with lawns).
- 2) Temporary irrigation to undeveloped sites, either by water cart or temporary reticulation.

Management Measures

The following steps will also be used as part of the Earthworks Management Plan:

- 1) Establish an on site water supply.
- 2) Limit the amount of ground opened up at any one time to areas easily managed by the equipment available on site.
- 3) Use water carts regularly during dry weather to dampen unsealed roads and other exposed areas at the construction site.
- 4) Assess soil moisture requirements on a daily basis once operations have commenced.
- 5) In dry conditions, limit vehicle speeds along any unsealed site access road to below 5 km/h
- 6) The main construction access areas will either be sealed or will be constructed with large roading aggregate to minimize dust.
- 7) Vegetation clearance will be avoided in excessively dry conditions, or vegetation removal areas will be dampened down with sprinklers.

- 8) The area of the site which is exposed at any one time will be staged. This will avoid exposing large areas before they are needed for construction.
- 9) Areas not needed for any site development purpose will be grassed or secured as far as practicable.
- 10) There will be a water supply available on site which is enough to apply up to 1 litre/m²/hour during dry periods (ie on a 5 hour per day basis, this is equivalent to 50 m³/hectare).
- 11) Dust generation from temporary stockpiles will be minimized by one of the following measures:
 - Watering
 - covering with suitable membrane cover/s
 - grass seeding/hydro-seeding
 - dust suppressant application
- 12) Semi permanent stockpiles will be topsoiled and sown.
- 13) The general principles of the Ministry for the Environment "Good practice guide for assessing and management the environmental effects of dust emissions" will also be followed.
- 14) The site shall be monitored for the full maintenance period to ensure that dust generated problems do not occur.
- 15) The procedures of this dust management plan shall be maintained for the duration of the maintenance period.

Working next to streams and drains

There are a number of streams and drains on the site, some of which are close to or part of the earthworks. It is not envisaged that the on site materials will produce any significant amounts of sediment that would have any adverse affects on the streams and drains and the practices and methods for erosion and sediment control outlined in the GWRC “Small Earthworks – Erosion and sediment control for small sites” will be adequate for earthworks carried out on this site.

Complaints Management

The following procedure shall be followed:

- 1) A public notice will be posted at the site entrance and any other site boundary that the KCDC considers to be sensitive to dust emissions.
- 2) This notice will outline site contacts for complaints, including an after hours complaints phone number.
- 3) Every complaint will be recorded in a site environmental log, noting the time and nature of complaint, complainant details and the weather conditions at the time .
- 4) The Site Manager will investigate the cause of the complaint (within one hour of the complaint being made) and take appropriate action and advise the complainant of the action taken.
- 5) Complaints and any action taken will be reported to the KCDC development engineer.
- 6) That report shall detail how the action taken on site resolved the problem.

28 September 2022

Waikanae North Ltd c/o LandMatters
Attention: Phillip Mitchell

Manu Park Subdivision, Waikanae - Stage 2: Foundation Recommendations

MINZ Ref: 210292.02-TM-001[B]

1. Introduction

Miyamoto International NZ Ltd (Miyamoto) has been engaged by Waikanae North Ltd c/o LandMatters, the Client, to undertake a 'post-earthworks' geotechnical assessment and provide recommendations for new building foundations within Stage 2 of the Manu Park Subdivision. This memorandum may be used in support of building consent application for the lot specific developments.

The Stage 2 Manu Park Subdivision comprises 36No. new residential lots (Lot Nos. 40 to 60, 65 to 75, 126 & 128 to 130). The site location and layout are shown in Figure 1 and the Cuttriss Consultants (Cuttriss) Engineering Plans included in Appendix A.

At the time of writing, the earthworks for Stage 2 were complete. The design, monitoring, verification and certification of the Stage 2 earthworks (already complete) has been undertaken by Cuttriss with the earthworks completion report provided under separate heading.

To assess the 'post-earthworks' liquefaction risk across Stage 2 and to inform appropriate foundation recommendations, Miyamoto directed a deep ground investigation and have undertaken a liquefaction assessment for Stage 2, the results of which are included within this technical memorandum (TM).



Figure 1: Site Location & Layout

2. Stage 2 Earthworks

As detailed above, the design, monitoring, verification and certification of the Stage 2 earthworks has been undertaken by Cuttriss with the earthworks completion report provided under separate heading. In summary, the earthworks comprised a balanced cut / fill operation to create a level grade for the residential lots, with unsuitable materials (topsoil, organics etc.) removed and site won sand material used as engineered fill. Cuttriss have certified the earthworks in accordance with NZS4431 and NZS4404.

3. Ground Investigation

To facilitate a 'post-earthworks' liquefaction assessment, a deep ground investigation comprising 6No. cone penetration tests (CPT) was undertaken by Griffiths on behalf of Miyamoto in September 2022. The locations of the tests are shown in Figure 2 and the CPT plots are provided in Appendix B.

In addition to the stage specific CPTs, the following ground investigation information has been used to inform our understanding of the ground conditions:

- Subgrade and fill inspections along with a number of scala penetrometer tests undertaken by Cuttriss as part of the Stage 2 earthworks monitoring and verification (selected results are included in Appendix B, a full set of results are covered under separate heading by Cuttriss).
- Shallow and deep ground investigations undertaken for the wider subdivision (the results of which are discussed in the various Stage reports).

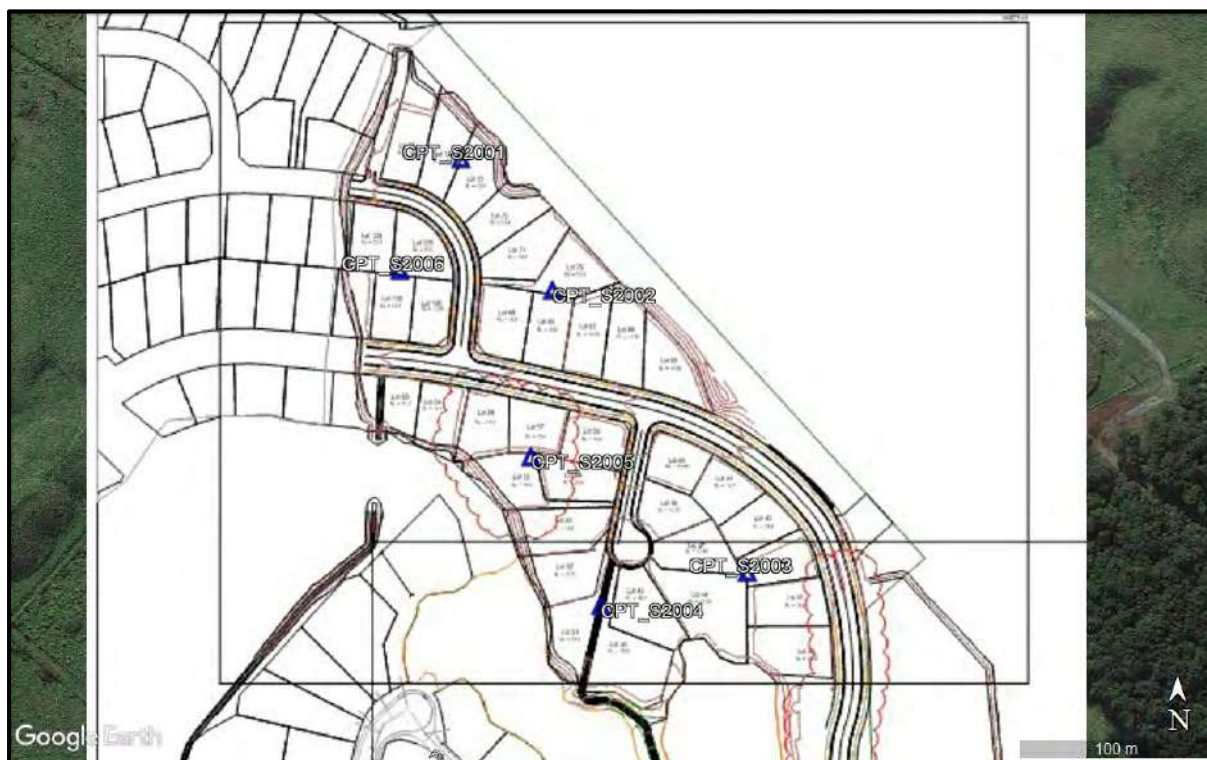


Figure 2: Geotechnical Investigation Location Plan

4. Liquefaction Assessment

Ground Motion Parameters

The ground motion parameters for geotechnical analysis including liquefaction hazard assessment have been assessed using the MBIE – NZGS Earthquake Geotechnical Engineering Practice Module 1 (November 2021) with:

- Recommended interim seismic hazard of New Zealand for geotechnical assessments as presented in Table A1 (Appendix A) for Peak Ground Acceleration (a_{max}) and Earthquake Magnitude (M_w) values for Site Classes A, B, C, D and E, for level ground conditions.

The derived ground motion parameters for the design events are summarised in Table 1 following the interim NZ seismic hazard.

Table 1: Design Ground Motion Parameters for Geotechnical Evaluation

Earthquake scenario / return period*	Magnitude	Peak horizontal ground acceleration a_{max}
Recommended interim seismic hazard of New Zealand for geotechnical assessments		
<i>Table A1 (Appendix A): Peak Ground Acceleration (a_{max}) and Earthquake Magnitude (M_w) values recommended for Geotechnical Assessment, for Site Classes A, B, C, D and E, for level ground conditions</i>		
1/25-year SLS event	6.5	0.13g
1/100-year Intermediate Event	7.1	0.28g
1/500-year ULS event	7.7	0.68g

* Importance level 2 (IL2) buildings with 50-year design life.

It should be noted that the above parameters are for geotechnical design purposes only. Ground motion parameters for purposes of structural analysis and design should be derived in accordance with NZS 1170.5:2004.

Liquefaction Susceptibility and Triggering

A liquefaction triggering assessment has been carried out using proprietary liquefaction assessment software (Cliq by GeoLogismiki), in general accordance with MBIE - NZGS Earthquake Geotechnical Engineering Practice Module 3 and the latest technical publications. The design criteria adopted are as follows:

- Boulanger and Idriss (2014) simplified CPT-based methods for liquefaction triggering.
- Zhang et al. (2002) post-liquefaction volumetric strain calculation for estimating the free-field settlements (it should be noted that these settlement estimates only account for the free-field component of the expected settlement. Actual total settlements under design earthquake loading may be greater or less).
- Liquefaction assessment, including evaluation of vulnerability indicators (free-field settlement values, Liquefaction Severity Number (LSN) and Liquefaction Potential Index (LPI) damaging criteria) based on the CPT data.

The results of our analysis are summarised in Table 2 and presented in Appendix C.

Table 2: Estimated “Free-Field” Ground Surface Settlements & Performance Levels

Earthquake scenario	Total Estimated Ground Surface Settlements (full depth tested)	Performance Level (as per Table 5.1 of MBIE – NZGS Module 3)
Interim NZ Seismic Hazard Model		
1/25-year SLS event	-	Insignificant effects - L0
1/100-year IE	<40 mm	LSN 0 to 5 LPI 0 to 2 Mild to moderate effects - L1 / L2
1/500-year ULS event	<60 mm	LSN 0 to 8 LPI 0 to 11 Moderate effects - L2

* **LSN = Liquefaction Severity Number.** LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

The liquefaction assessment indicates that liquefaction is unlikely to be triggered under SLS loading conditions with moderate effects anticipated under ULS loading conditions. Furthermore, the presence of a thick non-liquefiable crust (2.5 m to 6.5 m in thickness) provides additional resilience and significantly reduces the severity of liquefaction induced damage (demonstrated by the low values of LSN).

5. Foundation Recommendations

With consideration of the assessment presented herein, NZS3604 foundation systems are considered feasible for NZS3604 compliant structures, with consideration of the available bearing capacity.

The following geotechnical ultimate bearing capacities (GUBC) may be assumed for typical foundations:

- Min. 300 mm wide strip footing / ground beam / slab thickening:
 - 200 kPa at 0.3 mbgl.
 - 300 kPa at 0.5 mbgl.
- Min. 400 mm square pad footing / pile base:
 - 300 kPa at 0.4 mbgl.

The subgrade should be inspected by a suitably experienced geo-professional during construction and compacted / proof rolled prior to foundation construction. Any material identified as being soft or unsuitable should be removed and replaced with compacted hardfill (or site materials suitable for backfill and compaction).

6. Limitations

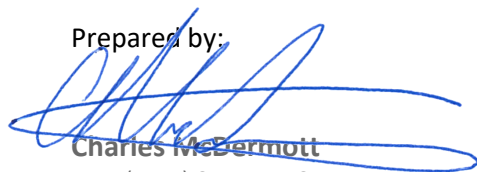
This memorandum is subject to the following limitations:

- This memorandum has been prepared by Miyamoto for the Client for the purpose/s agreed with the Client (Purpose). Miyamoto accepts no responsibility for the validity, appropriateness, sufficiency or consequences of the Client using the memorandum for purposes other than for the Purpose.
- The sub surface information has been obtained from investigation carried out at discrete locations, which by their nature only provide information about a relatively small volume of subsoils. While Miyamoto has taken reasonable skill and care in carrying out the investigation to determine the subsoil condition, the subsoil condition could differ substantially from the results of any sampling investigation. Miyamoto is not responsible for and does not accept any liability in respect of any difference between the actual subsoil conditions and the results of our investigation.
- Any susceptibility analysis carried out in respect of liquefaction is based on Miyamoto's current understanding as an experienced professional engineering consultant of the data, methods etc. Future seismic events may change our understanding of liquefaction and its affects, which may affect the content of this report. Miyamoto is not responsible for and does not accept any liability where the content of this report is changed due to a change in industry knowledge of matters relating to liquefaction.
- Where the Client provides information to Miyamoto, including design calculations and drawings of the as-built structure, or where the memorandum indicates that we have obtained and/or relied upon information provided from a third party, Miyamoto has not made any independent verification of this information except as expressly stated in the memorandum. Miyamoto assumes no responsibility for any inaccuracies in, or omissions to, that information.
- A change in circumstances, facts, information after the memorandum has been provided may affect the adequacy or accuracy of the memorandum. Miyamoto is not responsible for the adequacy or accuracy of the memorandum as a result of any such changes.

7. Closure

If you have any queries or you require any further clarification on any aspects of this memorandum, please do not hesitate to contact Miyamoto International (NZ) Ltd.

Prepared by:



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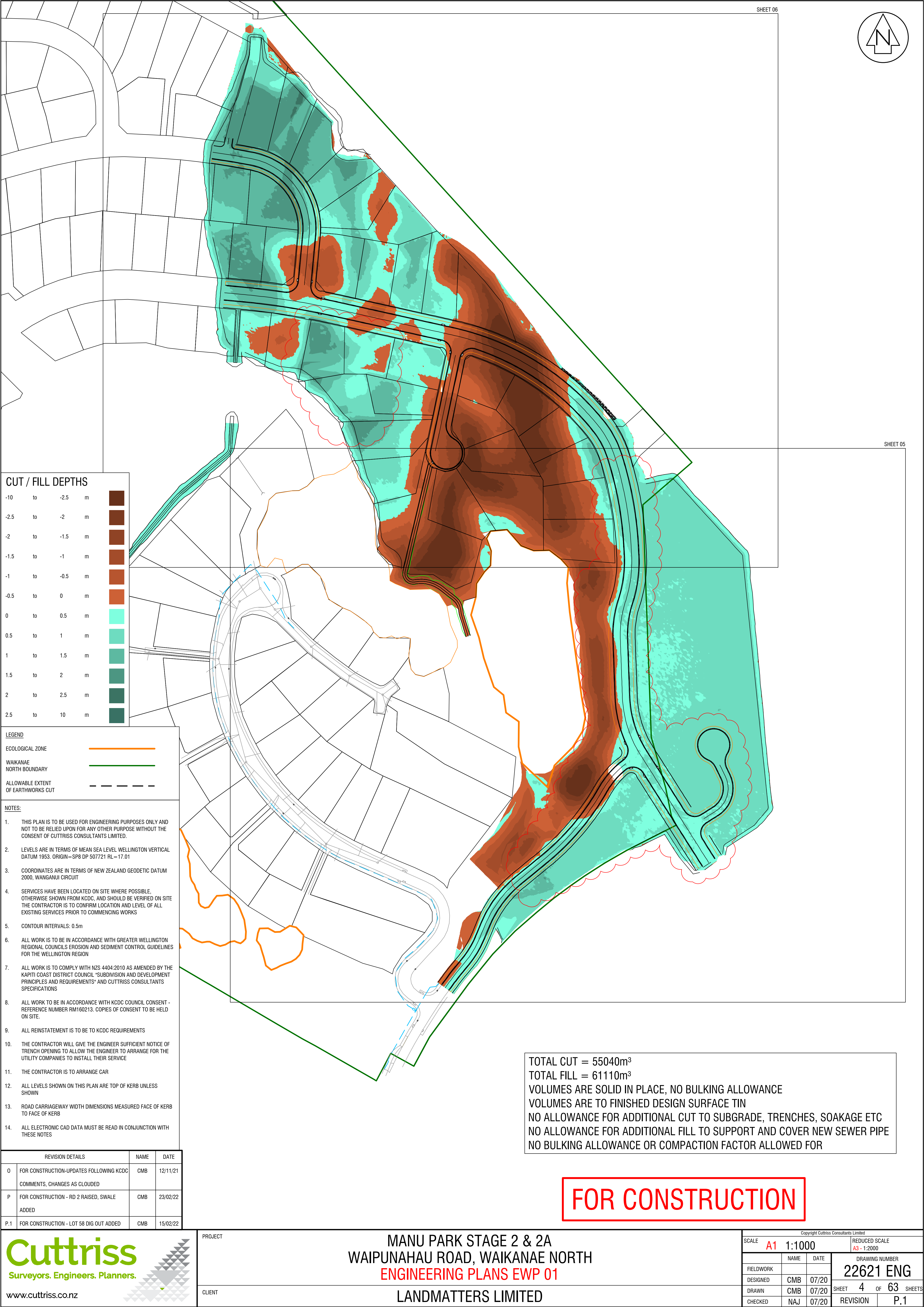
miyamoto.nz

References

- Boulanger, R.W. and Idriss, I.M., 2014. CPT and SPT based liquefaction triggering procedures. Rep. No. UCD/CGM-14, 1. Center for Geotechnical Modeling, Department of Civil and Environmental Engineering, University of California, Davis, CA, 134 pp.
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- New Zealand Geotechnical Society and Ministry of Business, Innovation and Employment, November 2021. Earthquake geotechnical engineering practice Module 3: Identification, assessment and mitigation of liquefaction hazards
- New Zealand Geotechnical Society and Ministry of Business, Innovation and Employment, November 2021. Earthquake geotechnical engineering practice Module 4: Earthquake resistant foundation design
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- New Zealand Standard NZS3604:2011. Timber-framed buildings – Standards New Zealand, 2011
- New Zealand Standard NZS4404:2010. Land development and subdivision infrastructure – Standards New Zealand, 2010.
- New Zealand Standard NZS4431:2022. Engineered fill construction for lightweight structures – Standards New Zealand, 2022.
- Zhang, G., Robertson, P.K. and Brachman, R.W., 2002. Estimating liquefaction-induced ground settlements from CPT for level ground. Canadian Geotechnical Journal, 39(5), pp.1168-1180

Appendix A: Cuttriss Engineering Plans (Selected)





CUT / FILL DEPTHS

-10	to	-2.5	m	
-2.5	to	-2	m	
-2	to	-1.5	m	
-1.5	to	-1	m	
-1	to	-0.5	m	
-0.5	to	0	m	
0	to	0.5	m	
0.5	to	1	m	
1	to	1.5	m	
1.5	to	2	m	
2	to	2.5	m	
2.5	to	10	m	

LEGEND

ECOLOGICAL ZONE	
WAIKANA NORTH BOUNDARY	
ALLOWABLE EXTENT OF EARTHWORKS CUT	

NOTES:

- THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
- LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON VERTICAL DATUM 1953. ORIGIN=SP8 DP 507721 RL=17.01
- COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 2000, WANGANUI CIRCUIT
- SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE, OTHERWISE SHOWN FROM KCDC, AND SHOULD BE VERIFIED ON SITE. THE CONTRACTOR IS TO CONFIRM LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORKS
- CONTOUR INTERVALS: 0.5m
- ALL WORK IS TO BE IN ACCORDANCE WITH GREATER WELLINGTON REGIONAL COUNCILS EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION
- ALL WORK IS TO COMPLY WITH NZS 4404:2010 AS AMENDED BY THE KAPITI COAST DISTRICT COUNCIL "SUBDIVISION AND DEVELOPMENT PRINCIPLES AND REQUIREMENTS" AND CUTTRISS CONSULTANTS SPECIFICATIONS
- ALL WORK TO BE IN ACCORDANCE WITH KCDC COUNCIL CONSENT - REFERENCE NUMBER RM160213. COPIES OF CONSENT TO BE HELD ON SITE.
- ALL REINSTATEMENT IS TO BE TO KCDC REQUIREMENTS
- THE CONTRACTOR WILL GIVE THE ENGINEER SUFFICIENT NOTICE OF TRENCH OPENING TO ALLOW THE ENGINEER TO ARRANGE FOR THE UTILITY COMPANIES TO INSTALL THEIR SERVICE
- THE CONTRACTOR IS TO ARRANGE CAR
- ALL LEVELS SHOWN ON THIS PLAN ARE TOP OF KERB UNLESS SHOWN
- ROAD CARRIAGEWAY WIDTH DIMENSIONS MEASURED FACE OF KERB TO FACE OF KERB
- ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

REVISION DETAILS		NAME	DATE
O	FOR CONSTRUCTION-UPDATES FOLLOWING KCDC COMMENTS, CHANGES AS CLOUDED	CMB	12/11/21
P	FOR CONSTRUCTION - RD 2 RAISED, SWALE ADDED	CMB	23/02/22
P.1	FOR CONSTRUCTION - LOT 58 DIG OUT ADDED	CMB	15/02/22

TOTAL CUT = 55040m³
TOTAL FILL = 61110m³
VOLUMES ARE SOLID IN PLACE, NO BULKING ALLOWANCE
VOLUMES ARE TO FINISHED DESIGN SURFACE TIN
NO ALLOWANCE FOR ADDITIONAL CUT TO SUBGRADE, TRENCHES, SOAKAGE ETC
NO ALLOWANCE FOR ADDITIONAL FILL TO SUPPORT AND COVER NEW SEWER PIPE
NO BULKING ALLOWANCE OR COMPACTION FACTOR ALLOWED FOR

FOR CONSTRUCTION

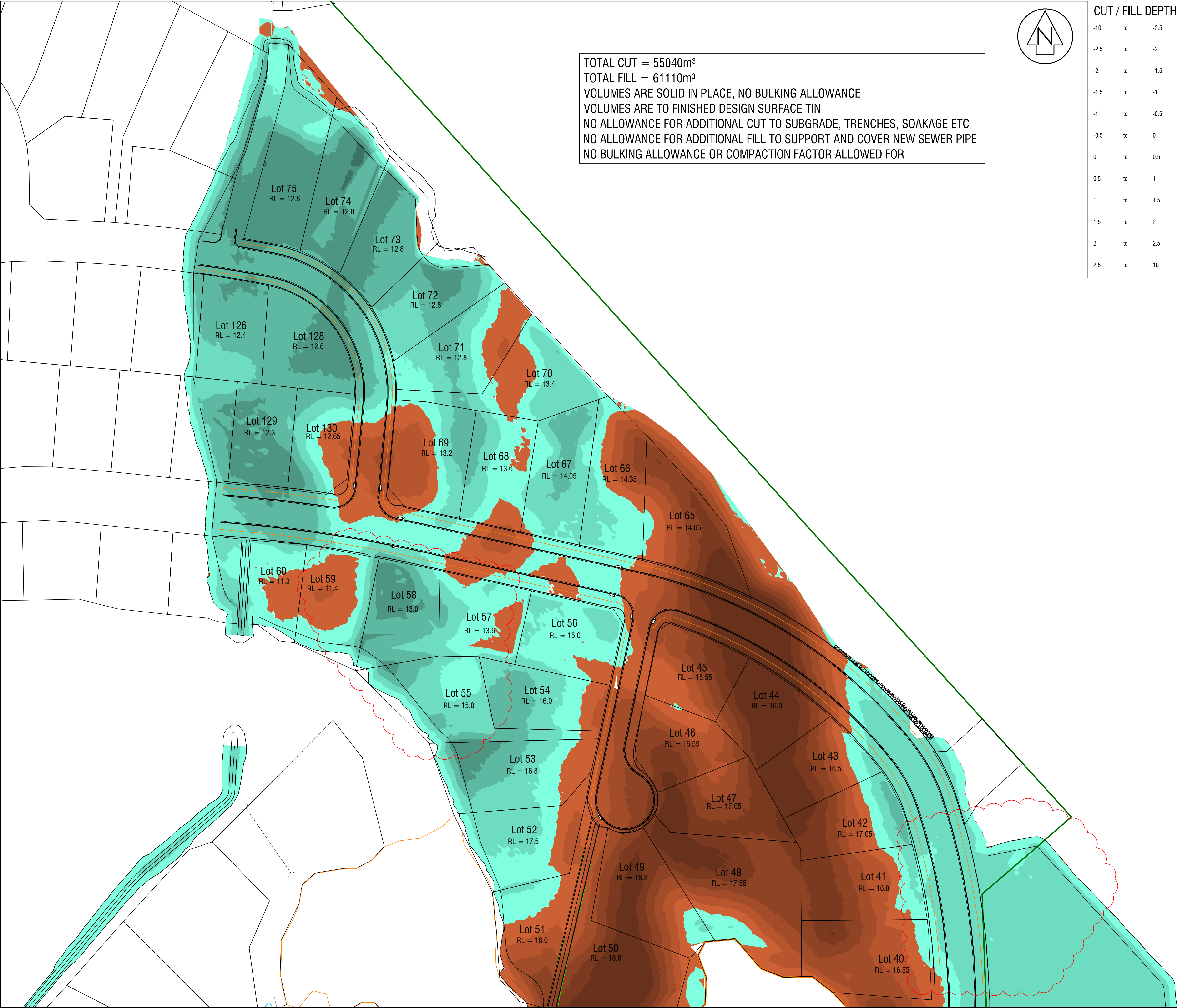
PROJECT

MANU PARK STAGE 2 & 2A
WAIPUNAHAU ROAD, WAIKANA
ENGINEERING PLANS EWP 01

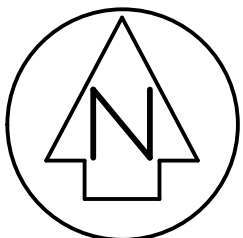
CLIENT

LANDMATTERS LIMITED

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SCALE		A1 1:1000	REDUCED SCALE A3 - 1:2000
FIELDWORK	NAME	DATE	DRAWING NUMBER
DESIGNED	CMB	07/20	22621 ENG
DRAWN	CMB	07/20	SHEET 4 OF 63 SHEETS
CHECKED	NAJ	07/20	REVISION P.1



TOTAL CUT = 55040m³
TOTAL FILL = 61110m³
VOLUMES ARE SOLID IN PLACE, NO BULKING ALLOWANCE
VOLUMES ARE TO FINISHED DESIGN SURFACE TIN
NO ALLOWANCE FOR ADDITIONAL CUT TO SUBGRADE, TRENCHES, SOAKAGE ETC
NO ALLOWANCE FOR ADDITIONAL FILL TO SUPPORT AND COVER NEW SEWER PIPE
NO BULKING ALLOWANCE OR COMPACTION FACTOR ALLOWED FOR



CUT / FILL DEPTHS

-10	to	-2.5	m
-2.5	to	-2	m
-2	to	-1.5	m
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-1	to	-0.5	m
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0	to	0.5	m
0.5	to	1	m
1	to	1.5	m
1.5	to	2	m
2	to	2.5	m
2.5	to	10	m



REVISION DETAILS		NAME	DATE
0	FOR CONSTRUCTION-UPDATES FOLLOWING KCDC COMMENTS, CHANGES AS CLOUDED	CMB	12/11/21
P	FOR CONSTRUCTION - RD 2 RAISED, SWALE ADDED	CMB	23/02/22
P.1	FOR CONSTRUCTION - LOT 58 DIGOUT ADDED	CMB	15/03/22

- LEGEND
- ECOLOGICAL ZONE 10m BUFFER
- WAIKANAЕ NORTH BOUNDARY
- NOTES:
- THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
 - LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON VERTICAL DATUM 1953. ORIGIN=SP8 DP 507721 RL=17.01
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 - SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE, OTHERWISE SHOWN FROM KCDC, AND SHOULD BE VERIFIED ON SITE THE CONTRACTOR IS TO CONFIRM LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORKS
 - CONTOUR INTERVALS: 0.5m
 - ALL WORK IS TO BE IN ACCORDANCE WITH GREATER WELLINGTON REGIONAL COUNCILS EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION
 - ALL WORK IS TO COMPLY WITH NZS 4404:2010 AS AMENDED BY THE KAPITI COAST DISTRICT COUNCIL "SUBDIVISION AND DEVELOPMENT PRINCIPLES AND REQUIREMENTS" AND CUTTRISS CONSULTANTS SPECIFICATIONS
 - ALL WORK TO BE IN ACCORDANCE WITH KCDC COUNCIL CONSENT - REFERENCE NUMBER RM160213. COPIES OF CONSENT TO BE HELD ON SITE.
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 - THE CONTRACTOR IS TO ARRANGE CAR
 - ALL LEVELS SHOWN ON THIS PLAN ARE TOP OF KERB UNLESS SHOWN
 - ROAD CARRIAGEWAY WIDTH DIMENSIONS MEASURED FACE OF KERB TO FACE OF KERB
 - ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

FOR CONSTRUCTION

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CLIENT
LANDMATTERS LIMITED

PROJECT
MANU PARK STAGE 2 & 2A
WAI-PUNAHAU ROAD
WAIKANAЕ NORTH

ENGINEERING PLANS
EWP 03

SCALE A1 1:600		REDUCED SCALE A3 - 1:1200	
FIELDWORK	NAME	DATE	DRAWING NUMBER
DESIGNED	CMB	19/05/21	22621 ENG
DRAWN	CMB	19/05/21	SHEET 6 OF 64 SHEETS
CHECKED	NAJ	19/05/21	REVISION P.1

Appendix B: Ground Investigation Data



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

1

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

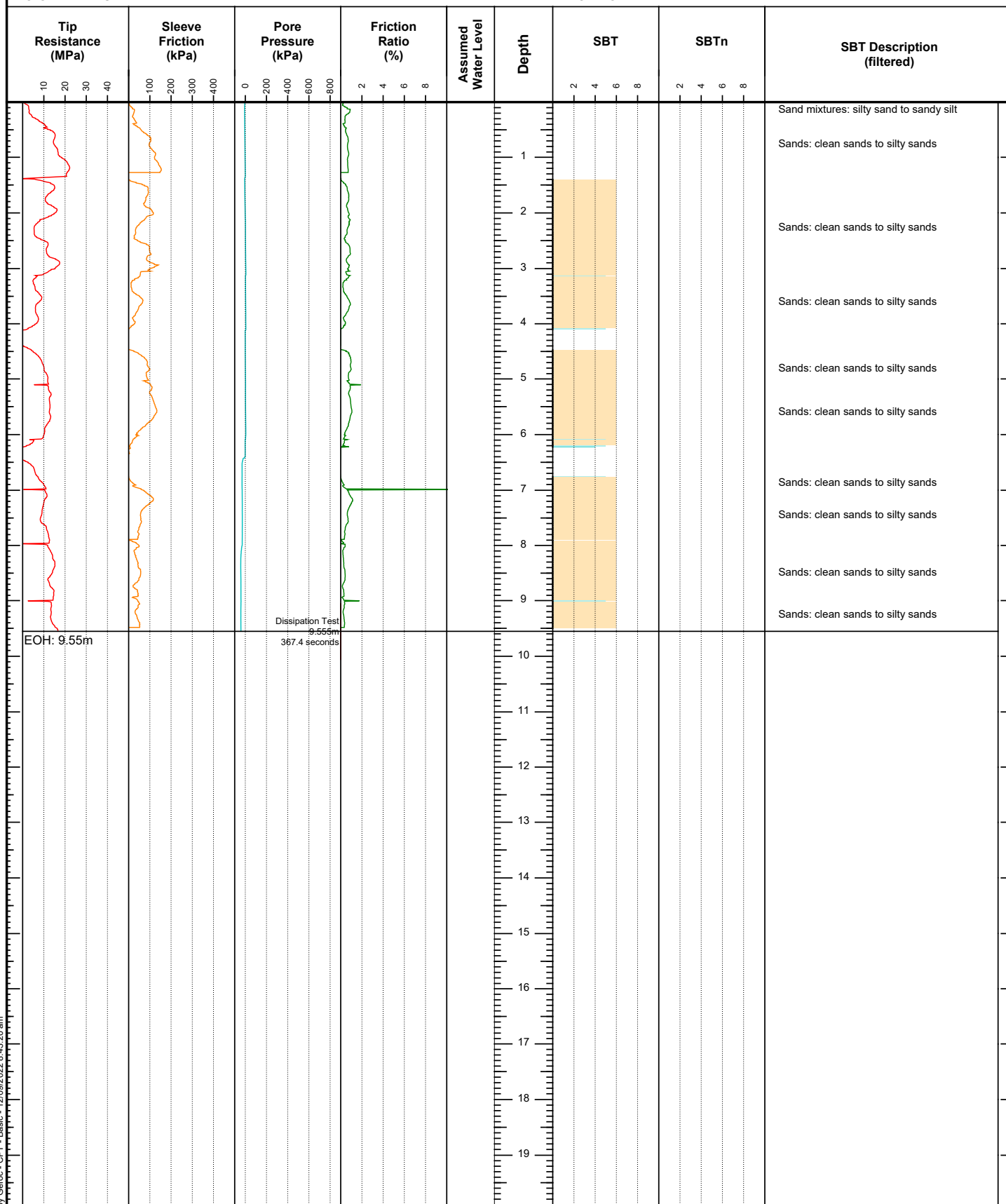
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



REMARKS:

NOTES:

CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

2

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

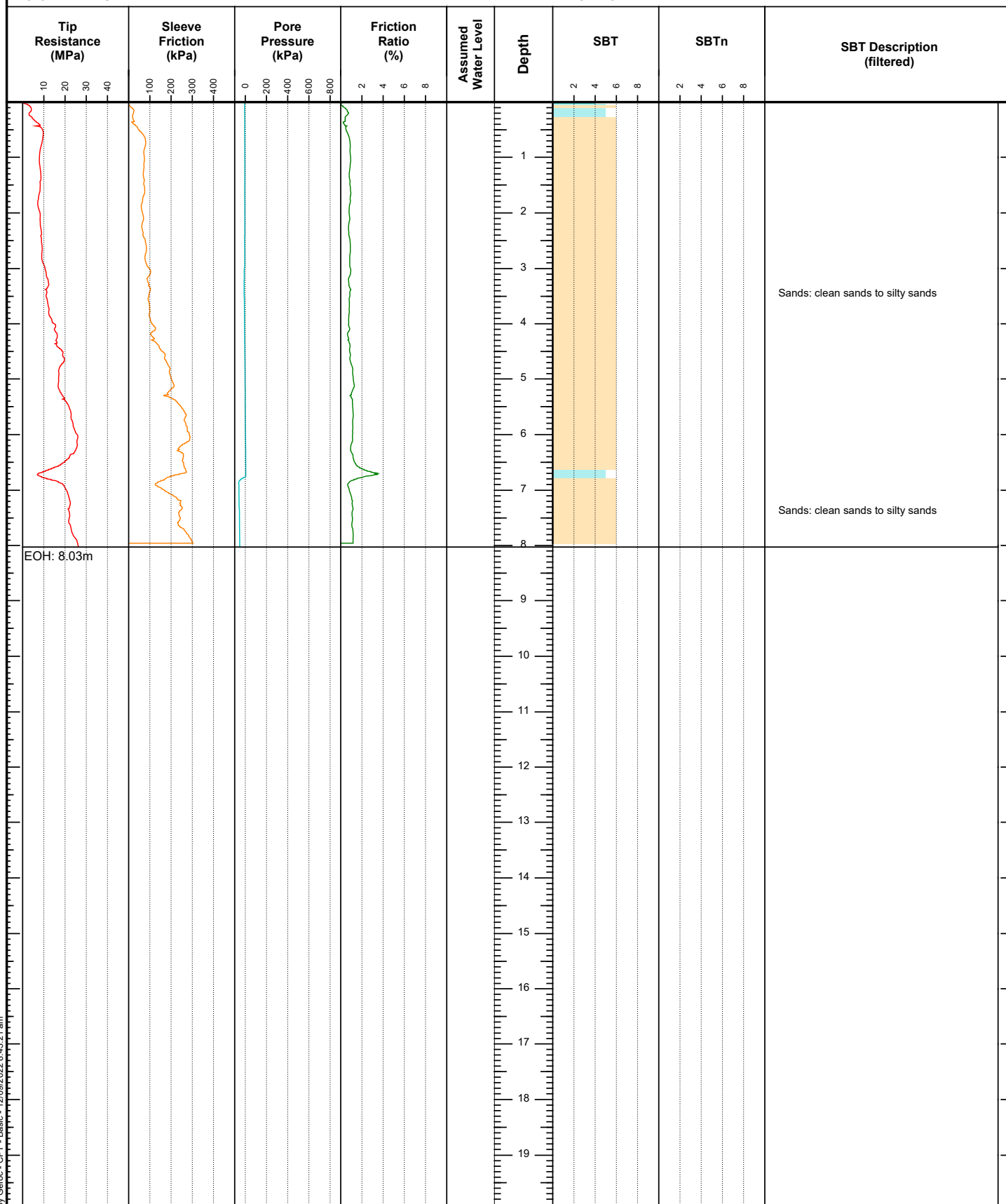
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



REMARKS:

NOTES:

CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

4

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

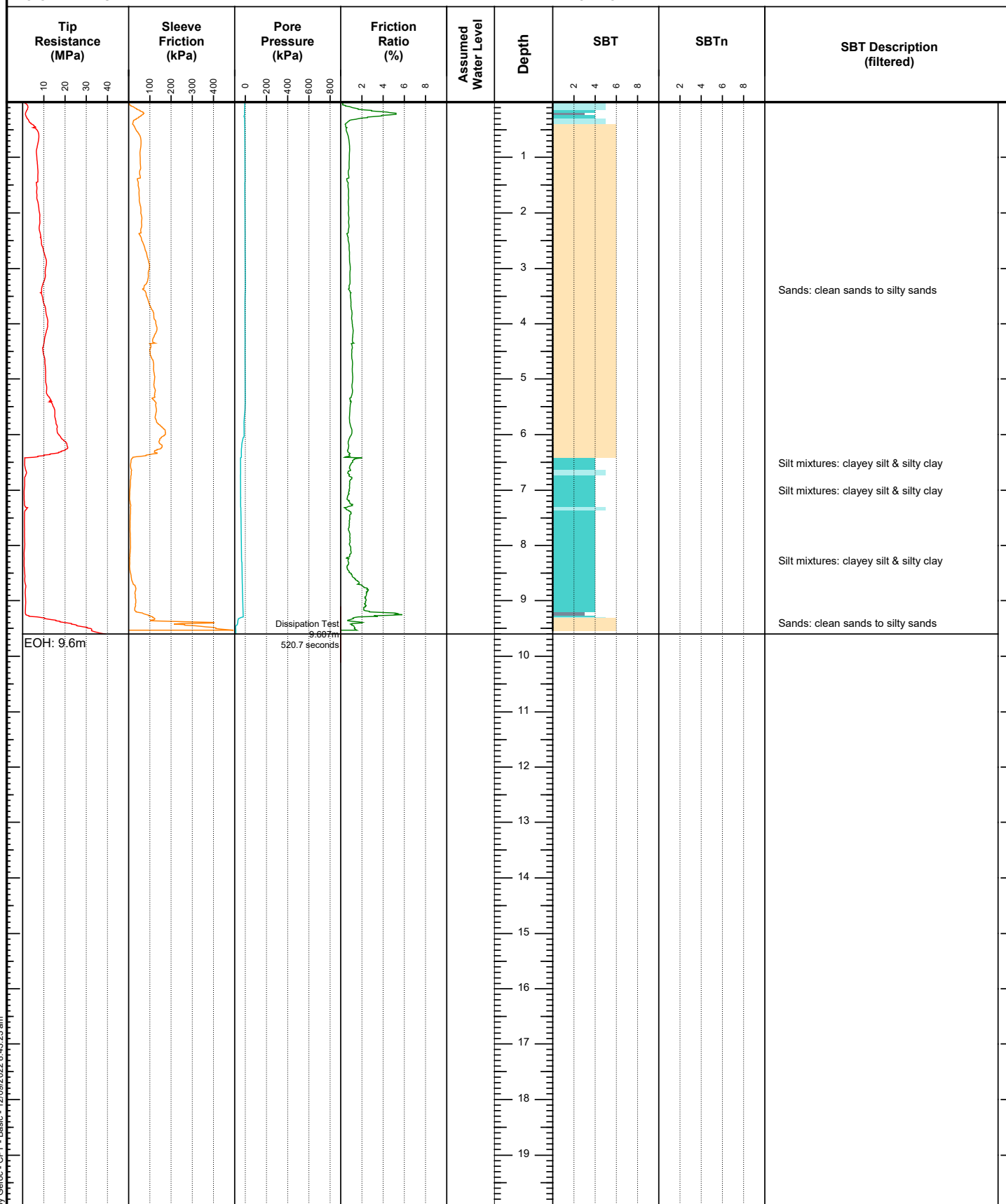
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



REMARKS:

NOTES:

CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

5

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

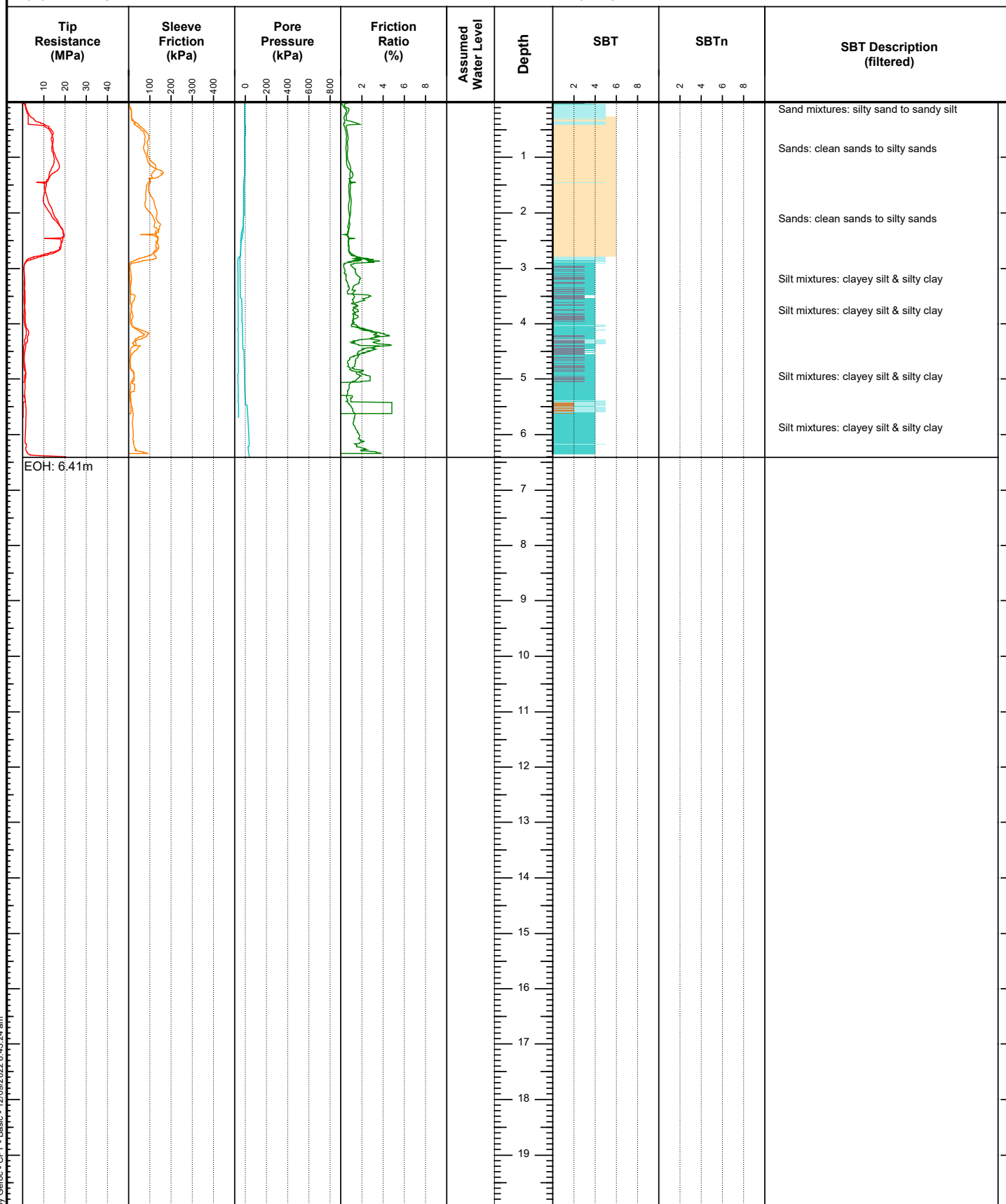
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



REMARKS:

NOTES:

CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

6

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

CONTRACTOR:

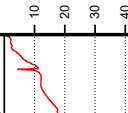
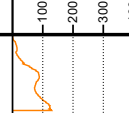
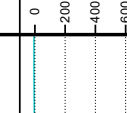
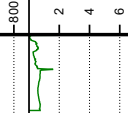
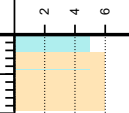
START DATE:

SITE LOCATION: Manu Park, Waikanae

ELEVATION: Ground

END DATE:

CO-ORDINATES:

Tip Resistance (MPa)	Sleeve Friction (kPa)	Pore Pressure (kPa)	Friction Ratio (%)	Assumed Water Level	Depth	SBT	SBTn	SBT Description (filtered)
10 20 30 40	100 200 300 400	0 200 400 600 800	2 4 6 8			2 4 6 8	2 4 6 8	
								Sand mixtures: silty sand to sandy silt Sands: clean sands to silty sands Sands: clean sands to silty sands
EOH: 1.03m					1			
					2			
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			

REMARKS:

NOTES:

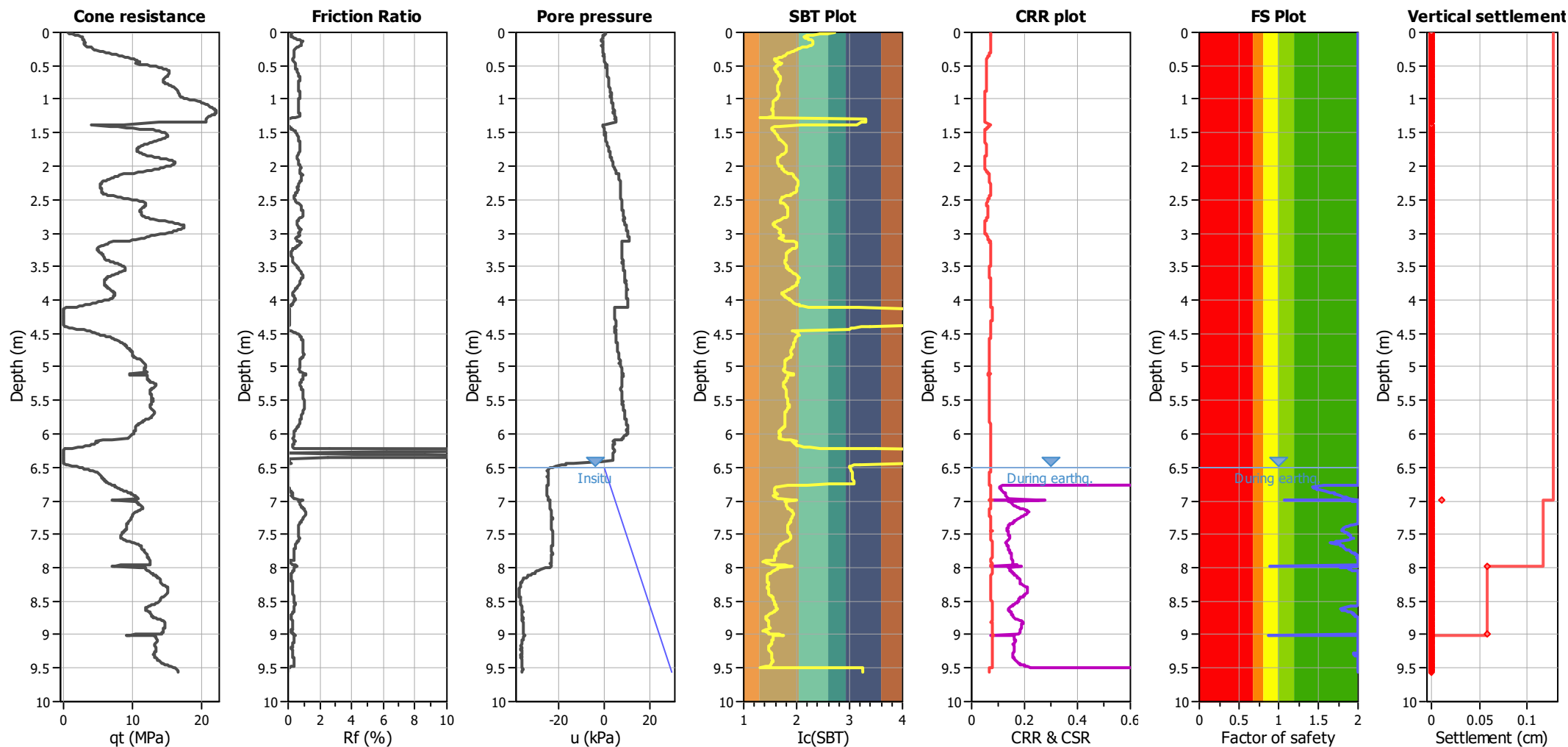
Appendix C: Liquefaction Assessment Results

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2001 SLS_ISH

Total depth: 9.55 m



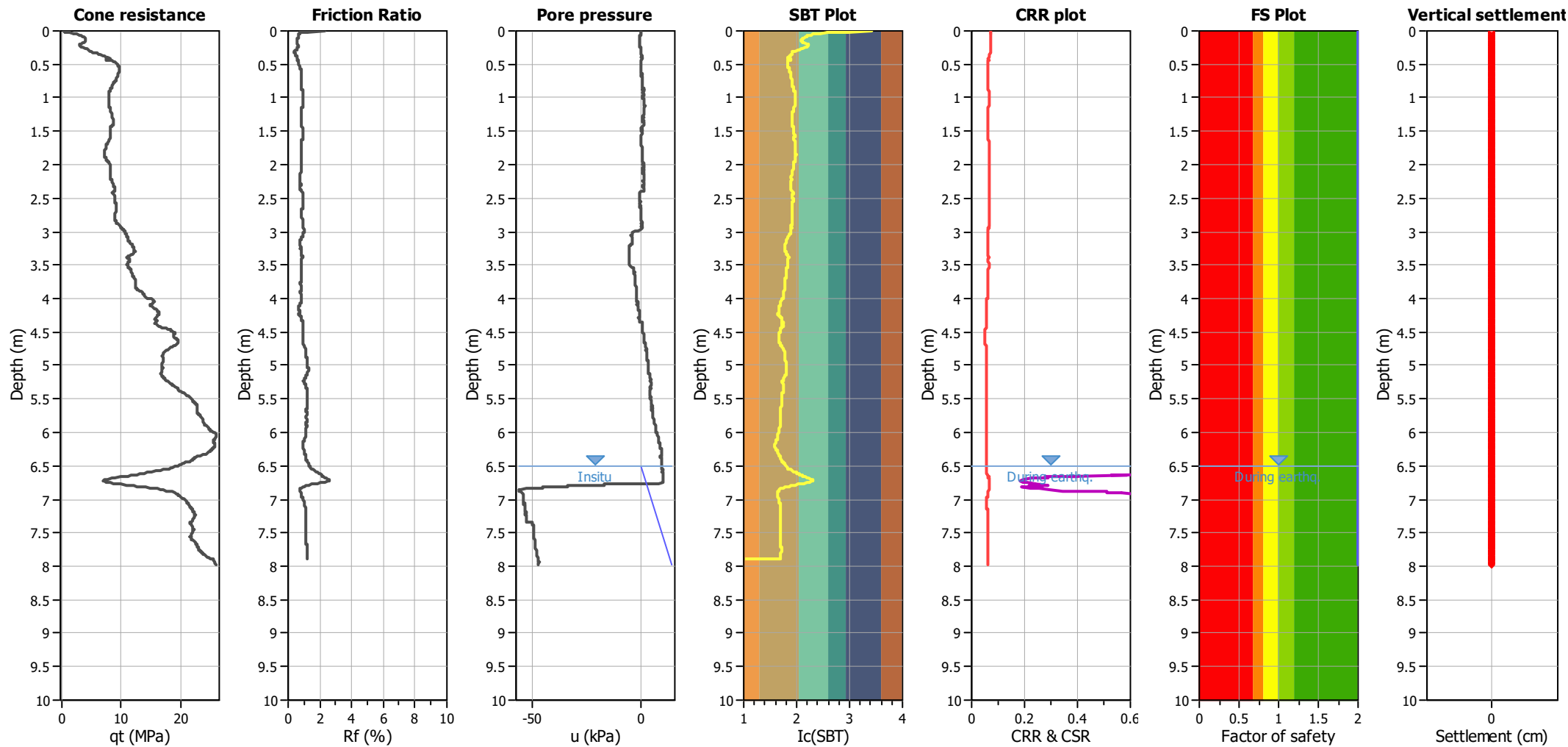
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2002 SLS_ISH

Total depth: 7.97 m



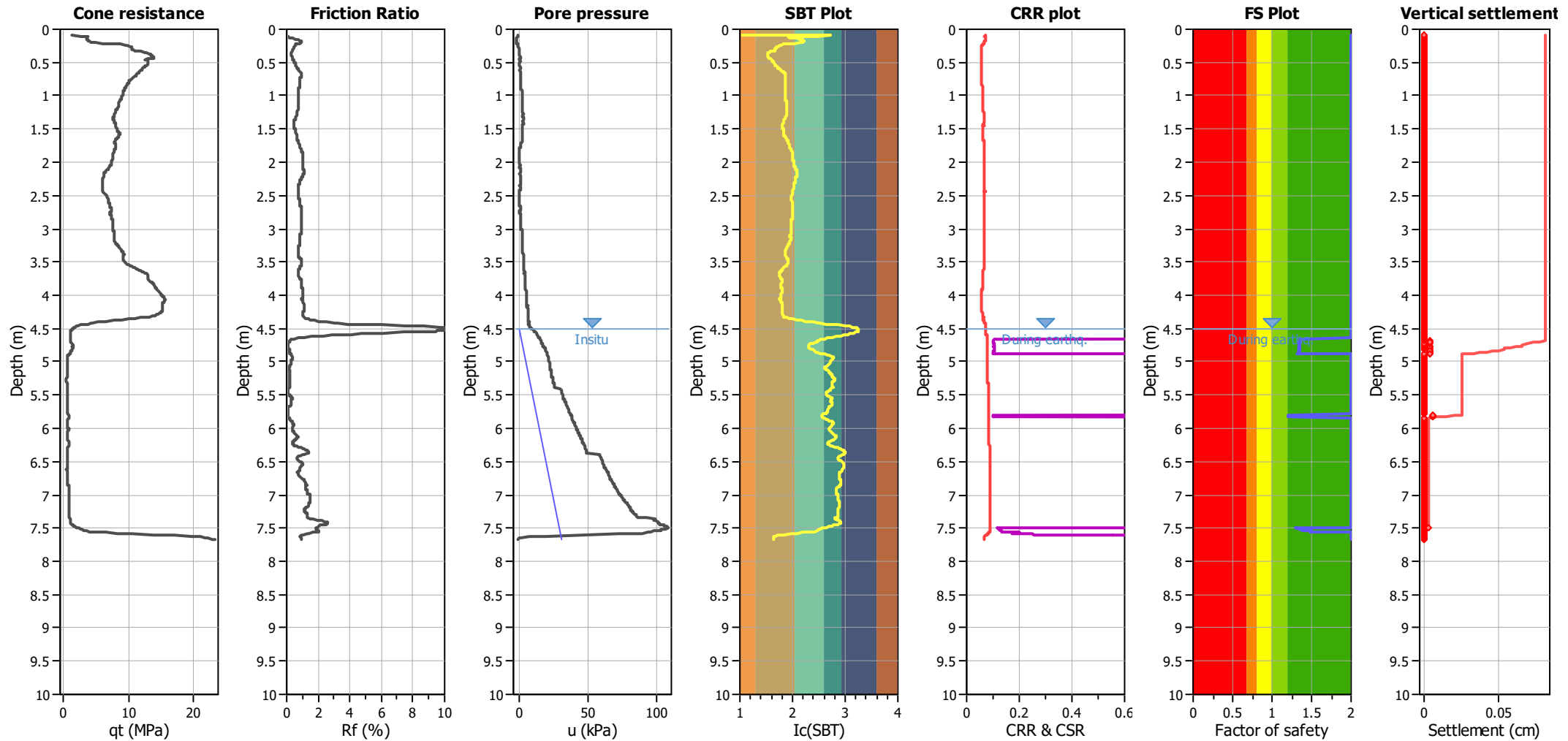
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2003 SLS_ISH

Total depth: 7.67 m



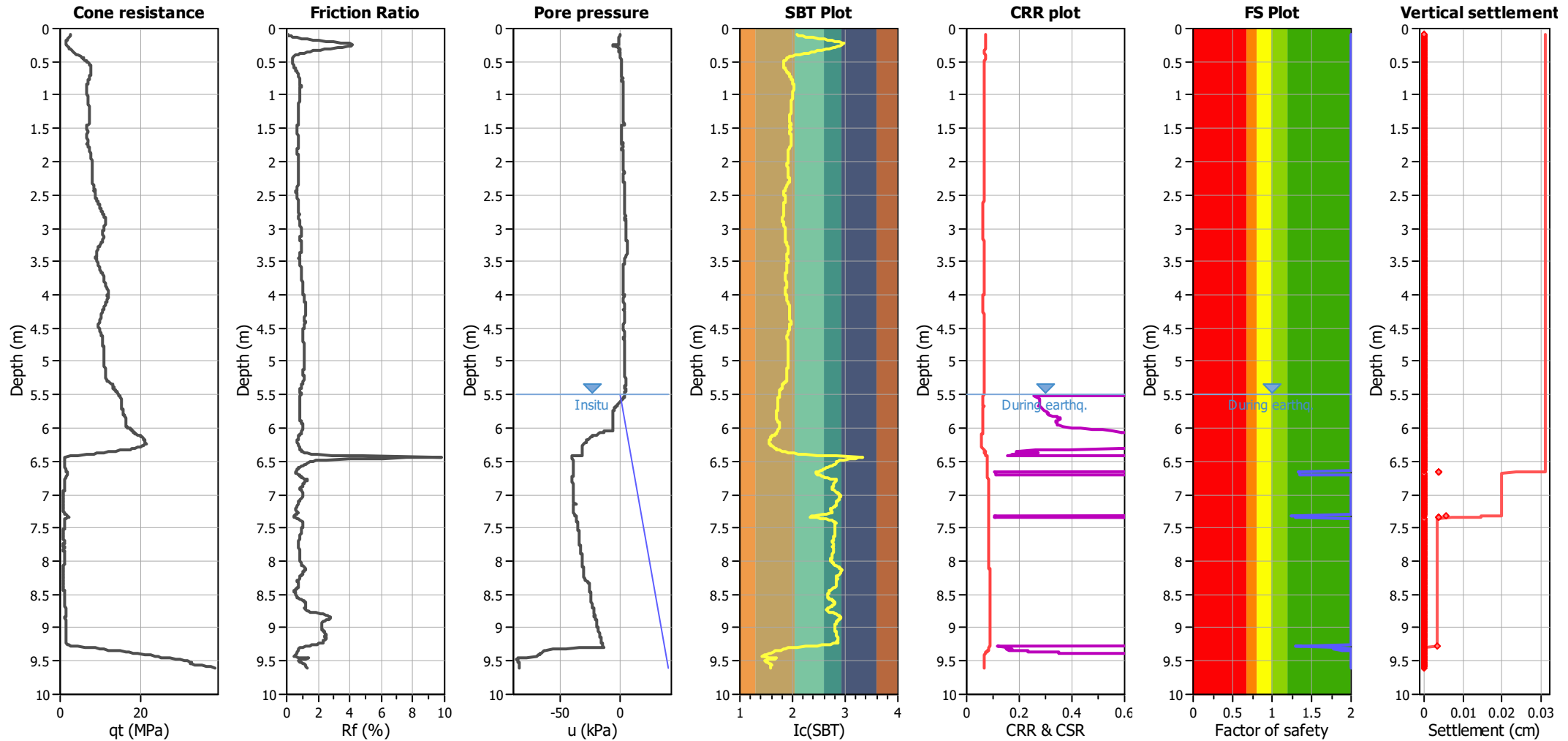
Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2004 SLS_ISH

Total depth: 9.60 m



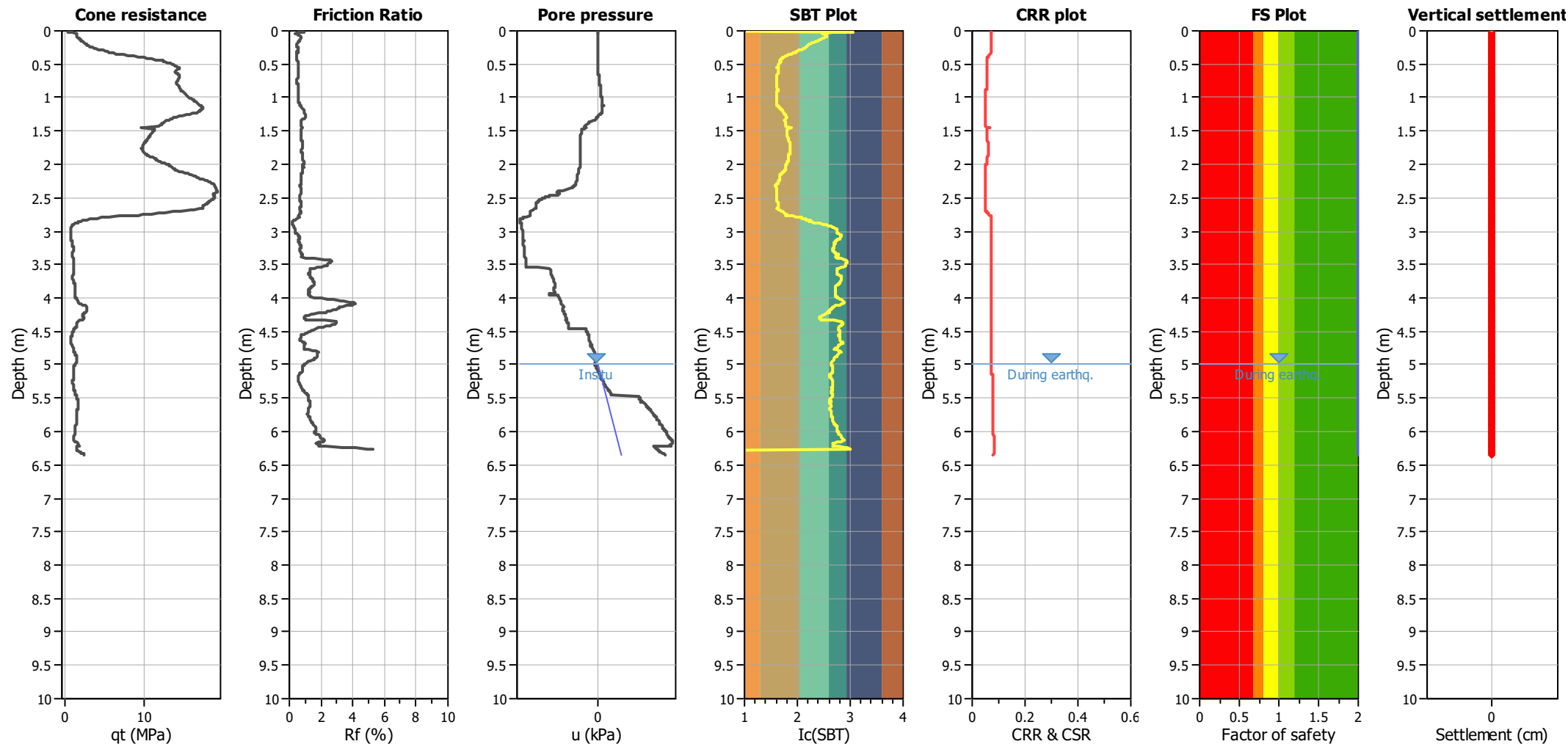
Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.50 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.50 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2005 SLS_ISH

Total depth: 6.35 m



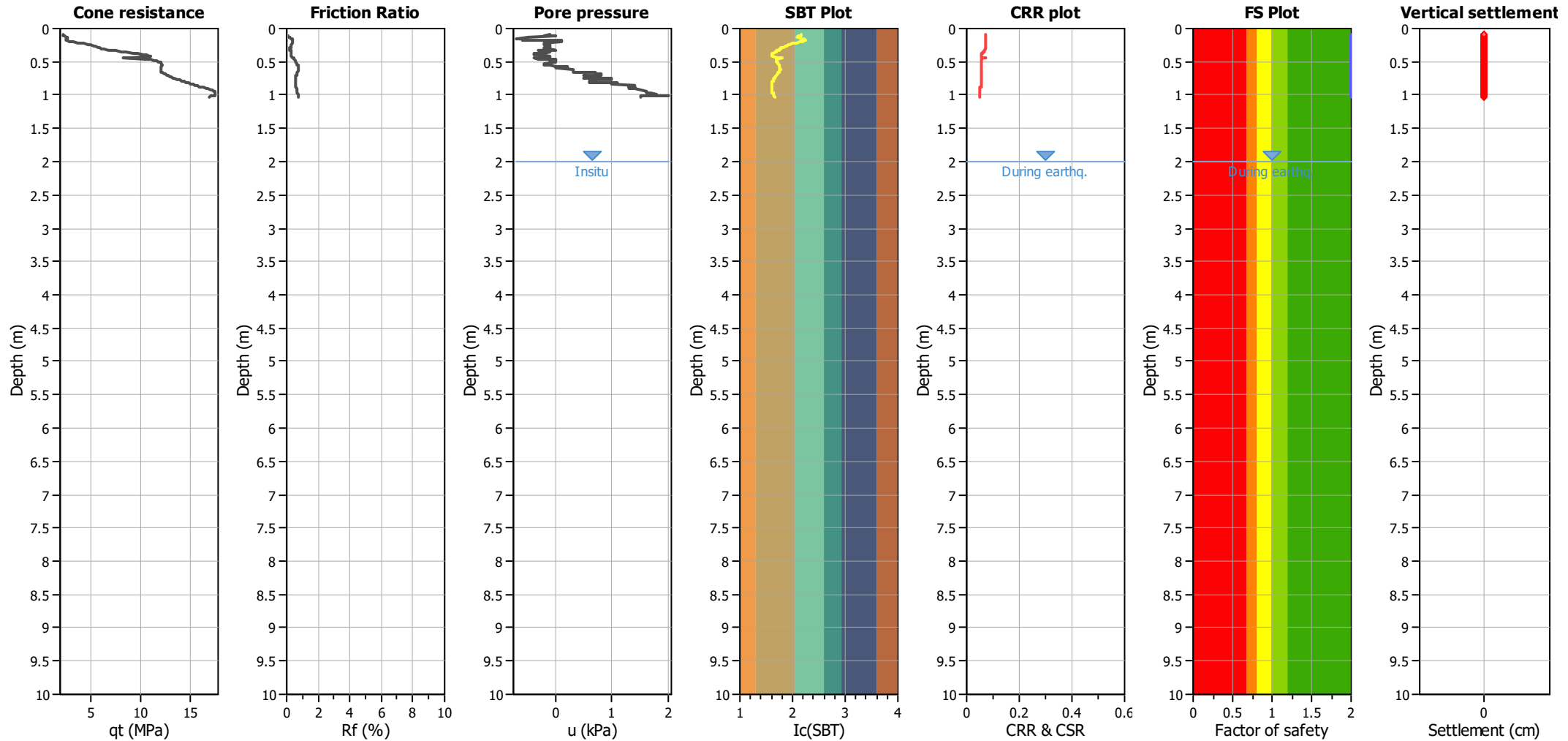
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.00 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2006 SLS_ISH

Total depth: 1.03 m



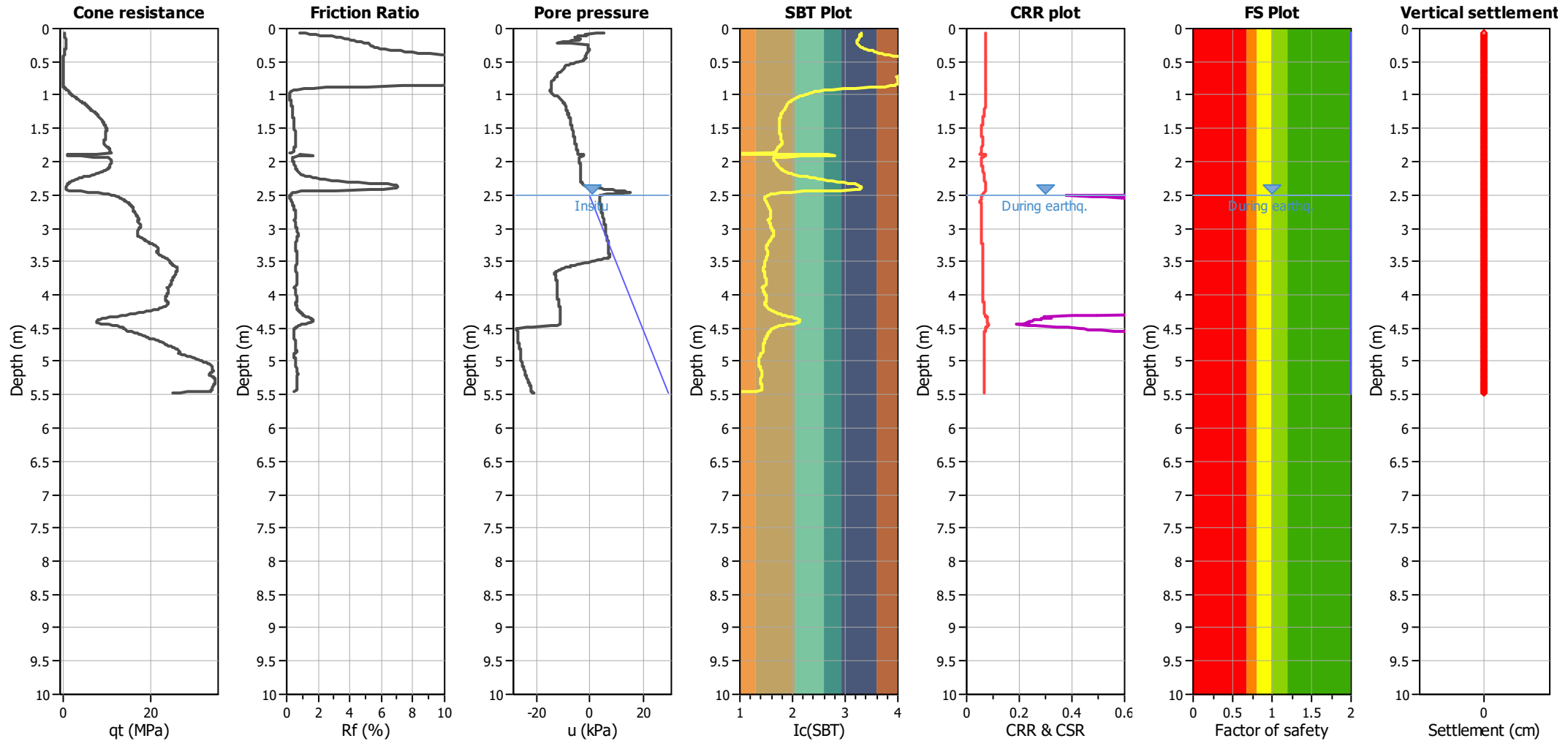
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S5007 SLS_ISH

Total depth: 5.48 m



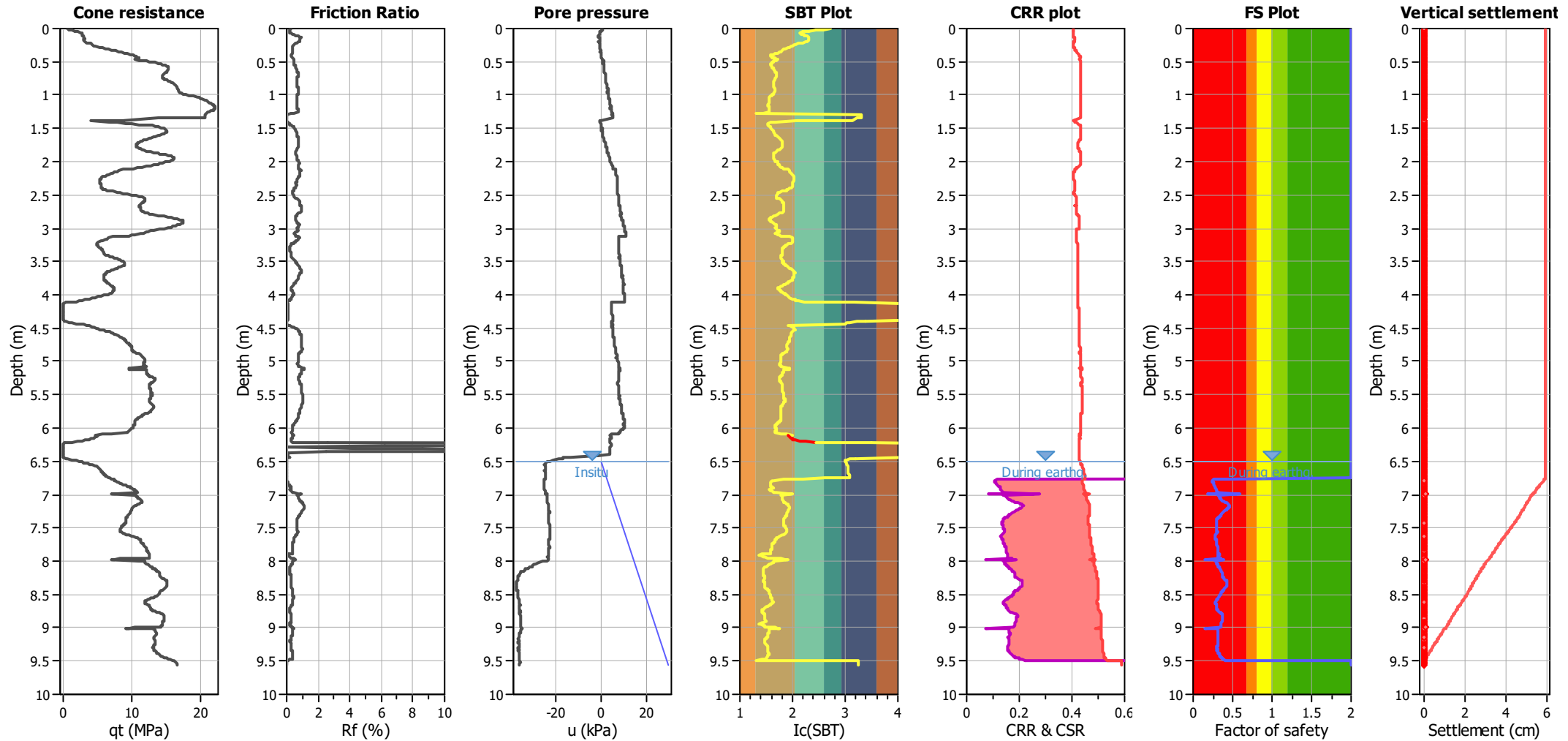
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2001 ULS_ISH

Total depth: 9.55 m



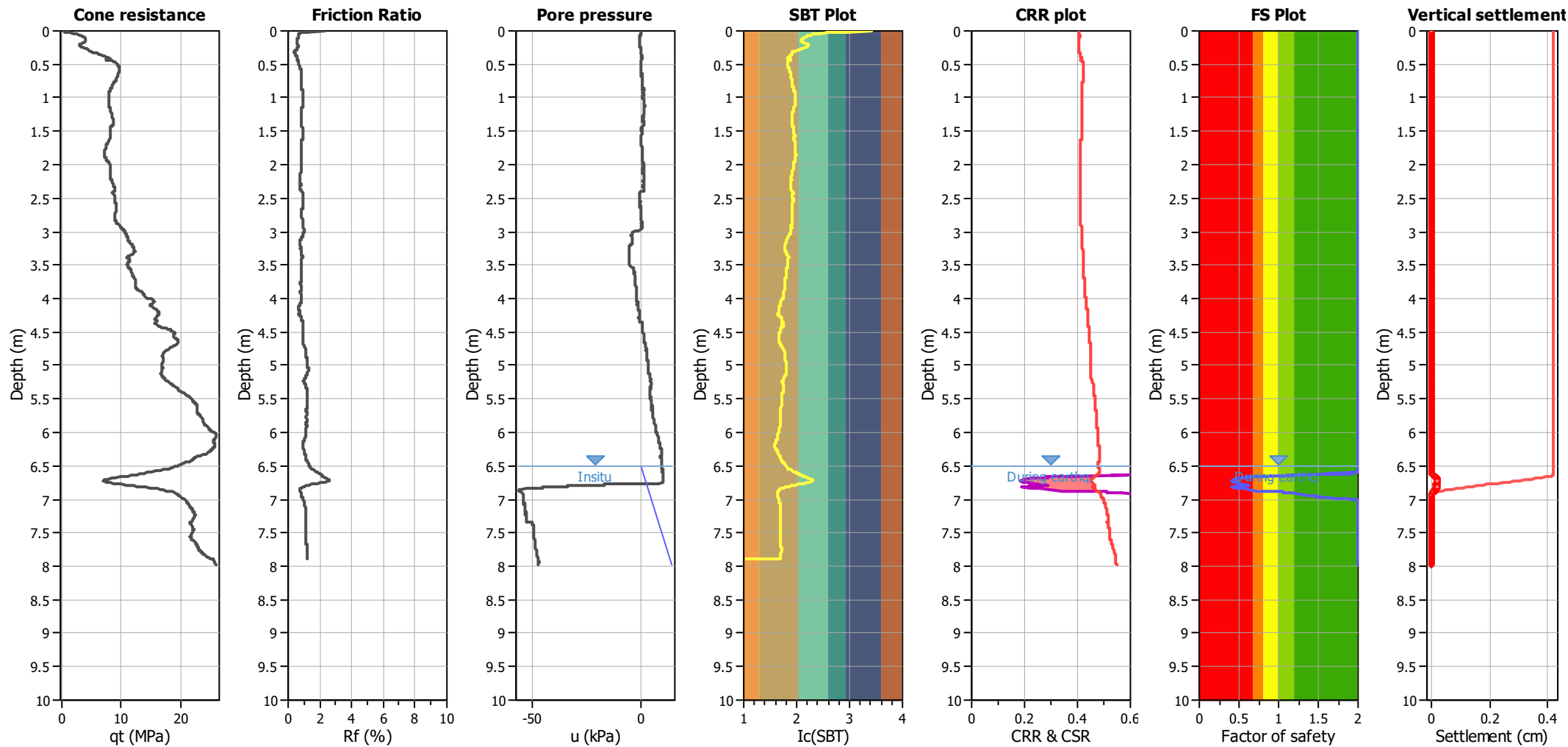
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2002 ULS_ISH

Total depth: 7.97 m



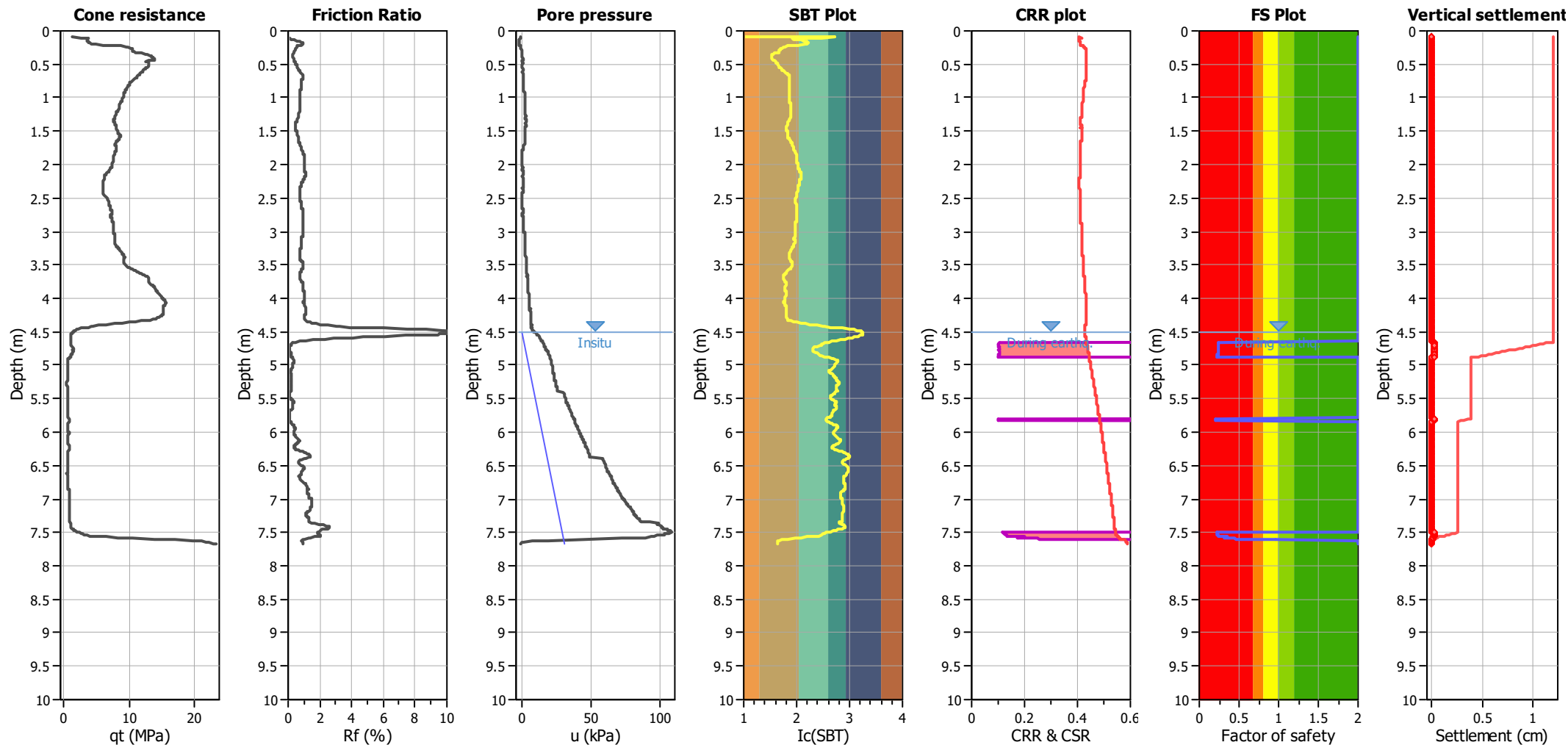
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2003 ULS ISH

Total depth: 7.67 m



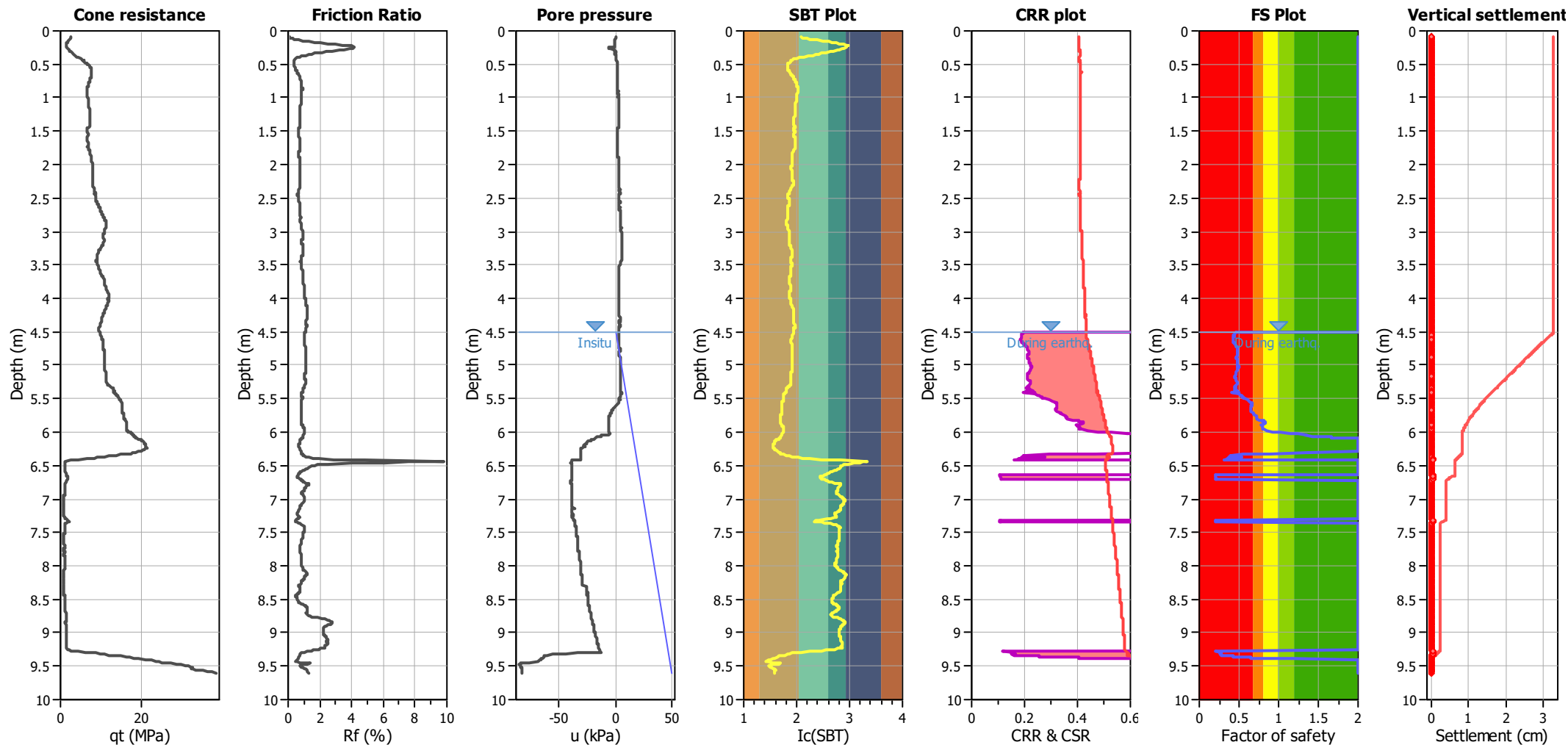
Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2004 ULS_ISH

Total depth: 9.60 m



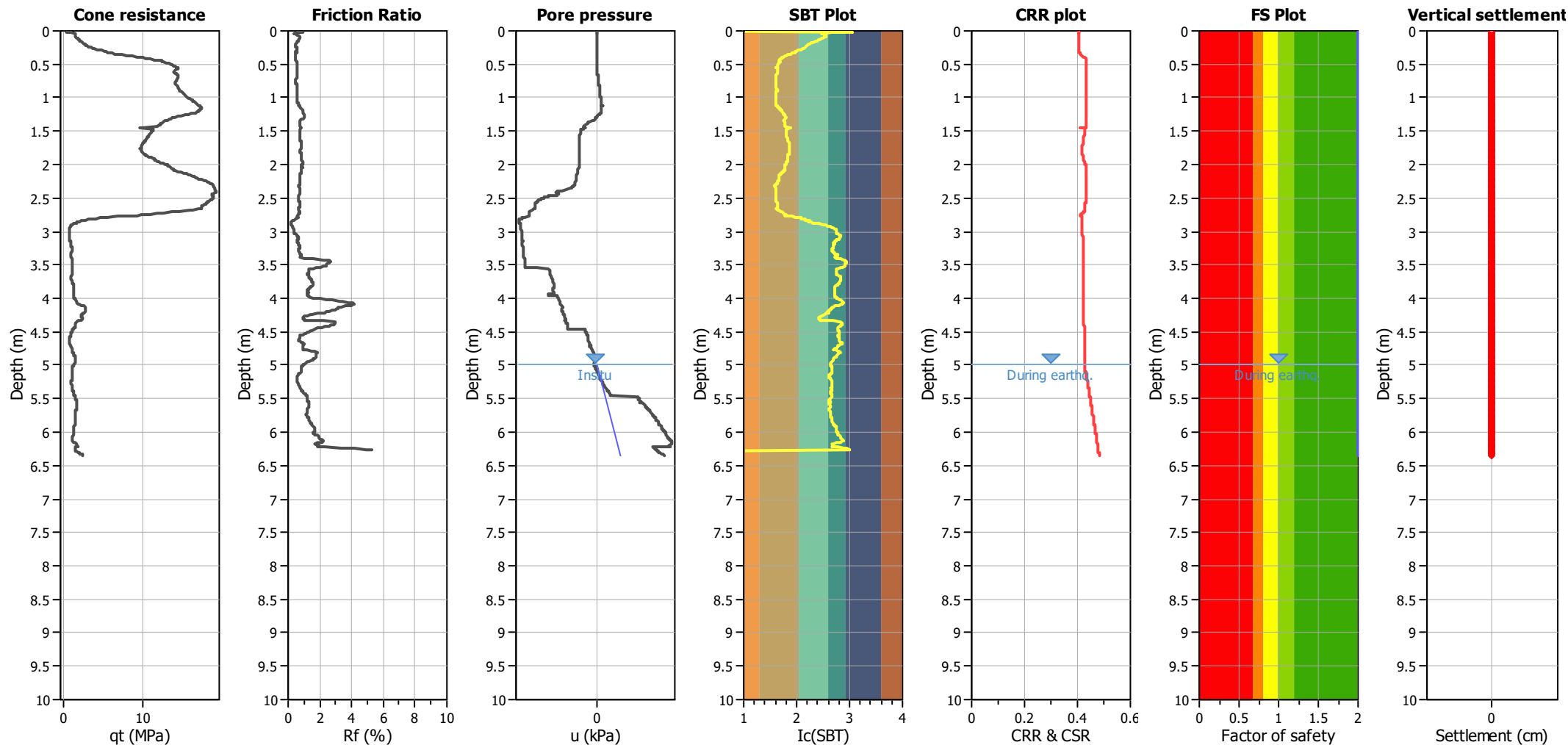
Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2005 ULS_ISH

Total depth: 6.35 m



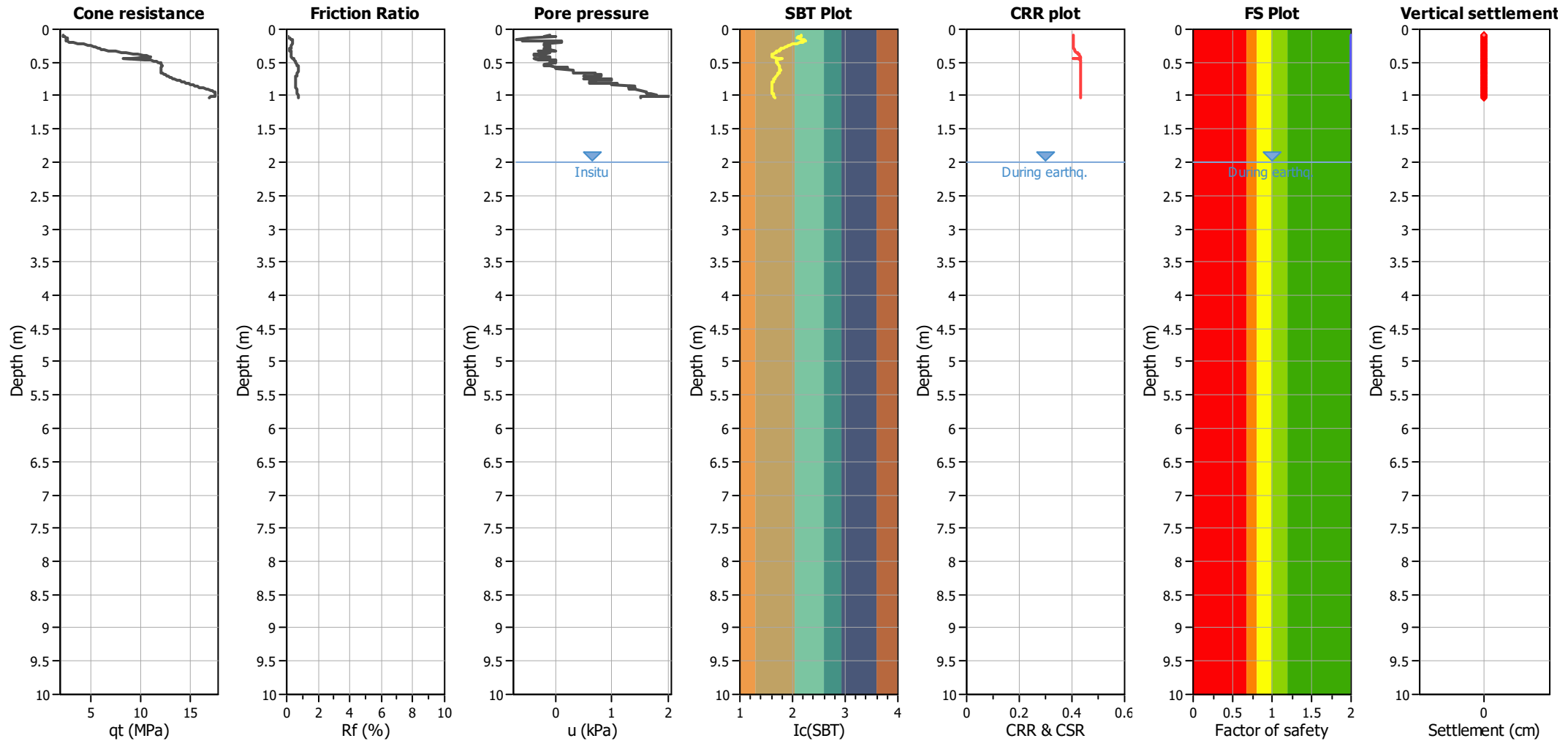
Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.00 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.00 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2006 ULS_ISH

Total depth: 1.03 m



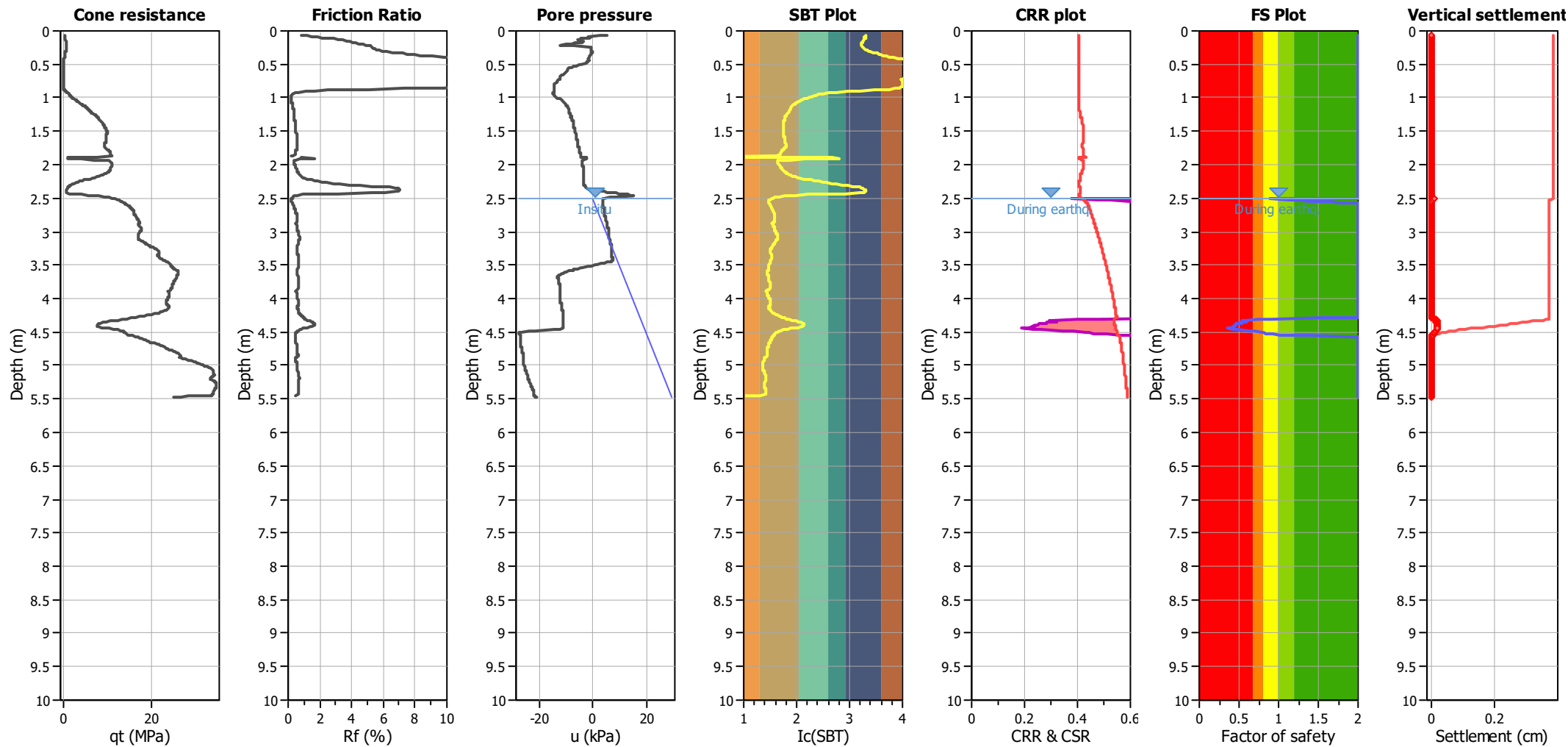
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S5007 ULS_ISH

Total depth: 5.48 m



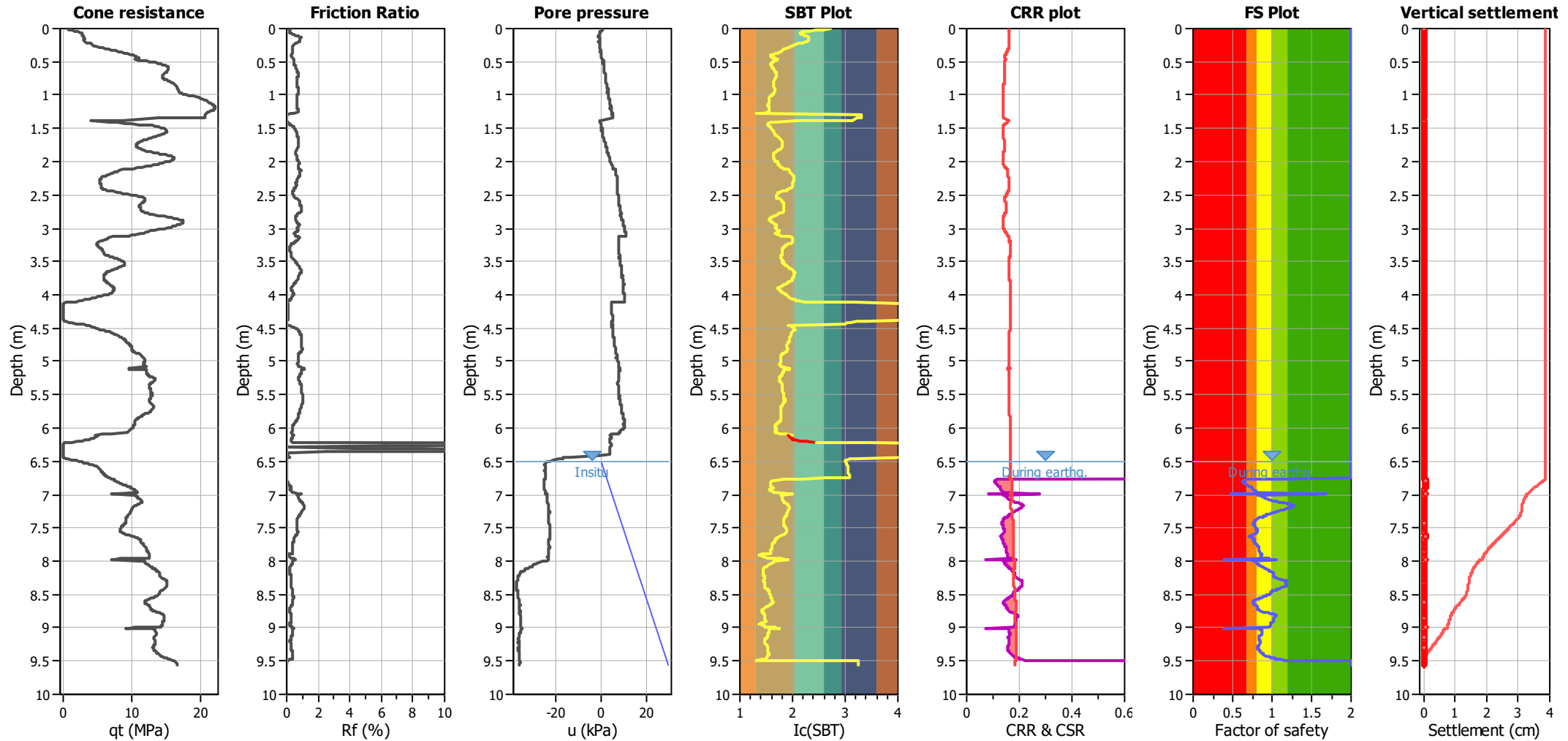
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2001 IE_ISH

Total depth: 9.55 m



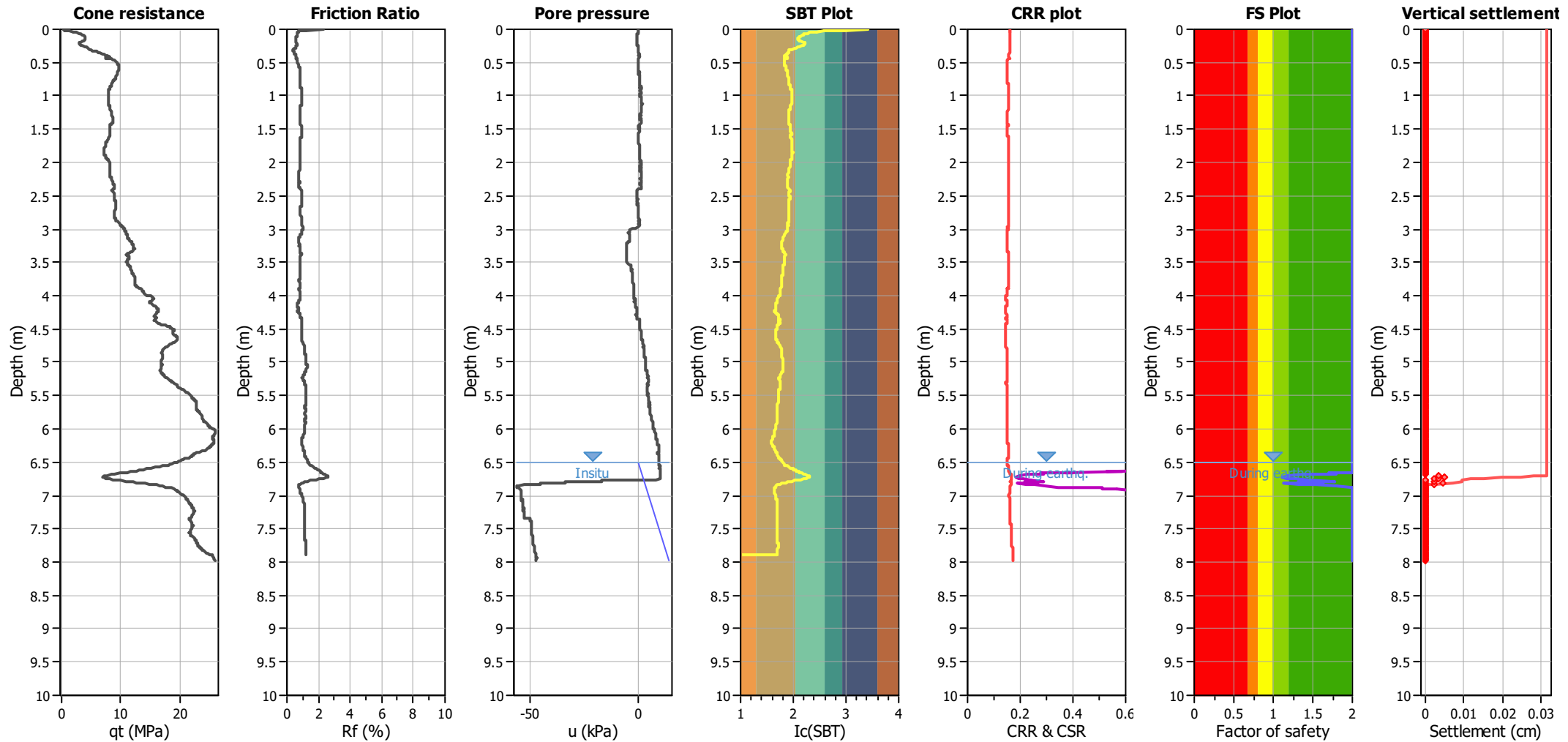
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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2002 IE_ISH

Total depth: 7.97 m



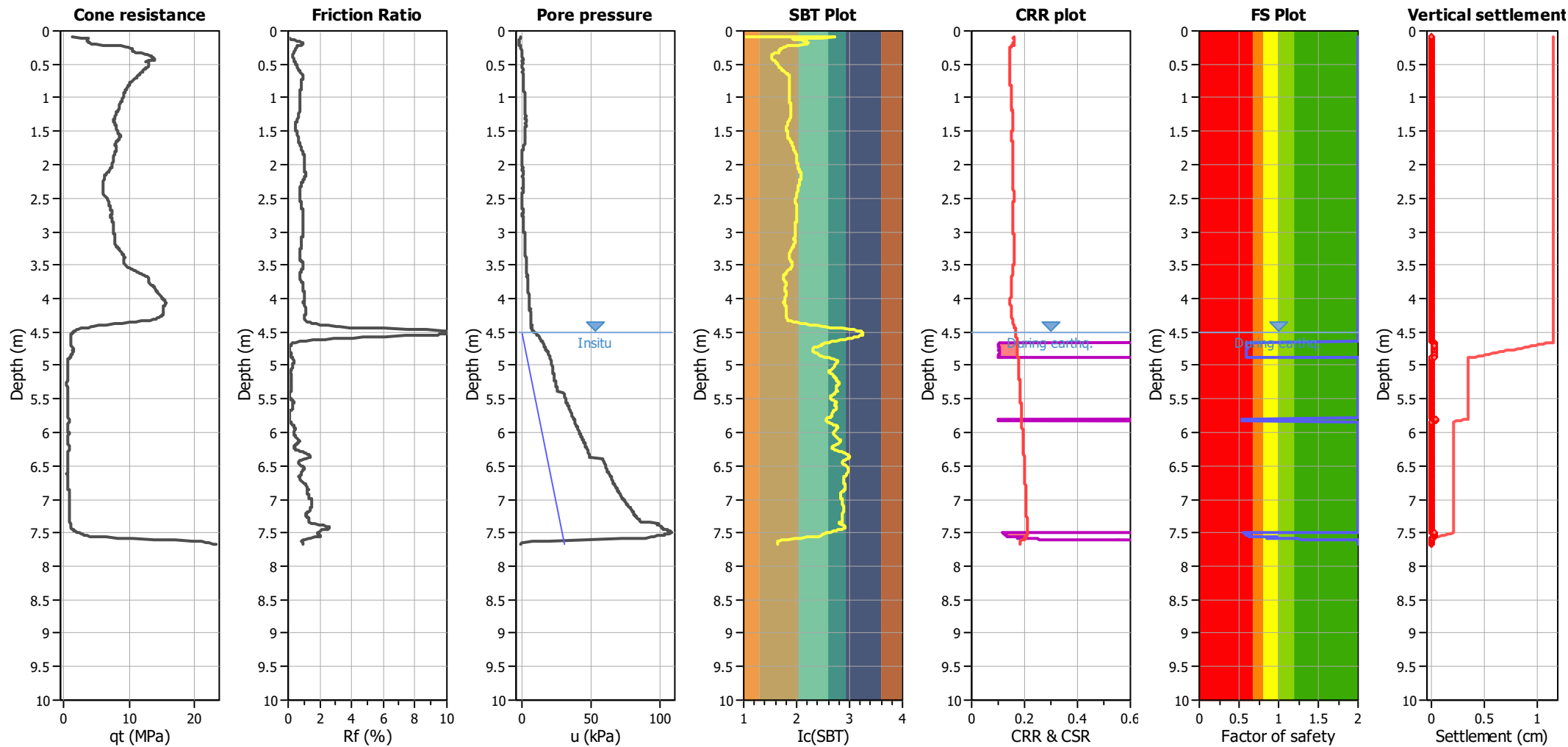
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2003 IE_ISH

Total depth: 7.67 m



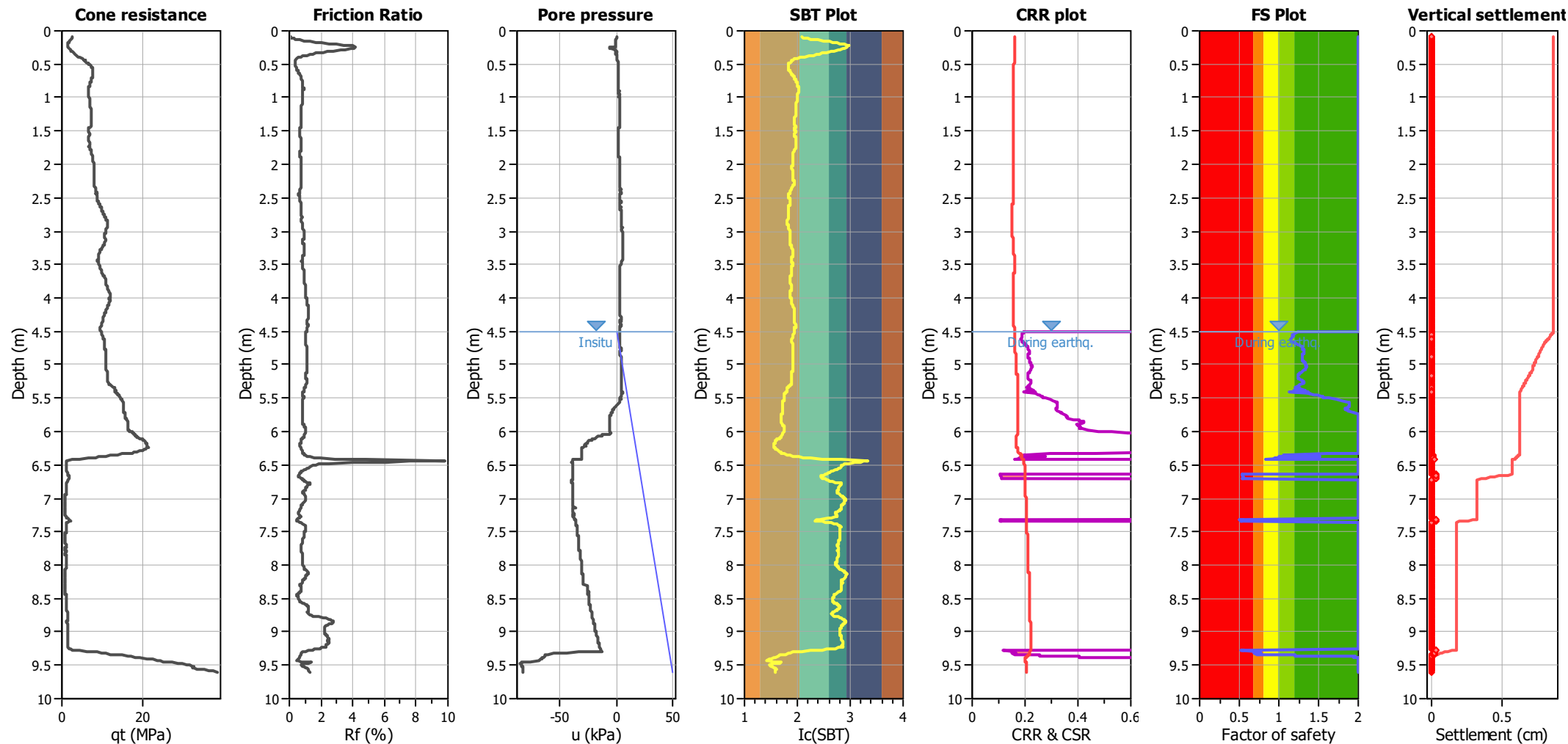
Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2004 IE_ISH

Total depth: 9.60 m



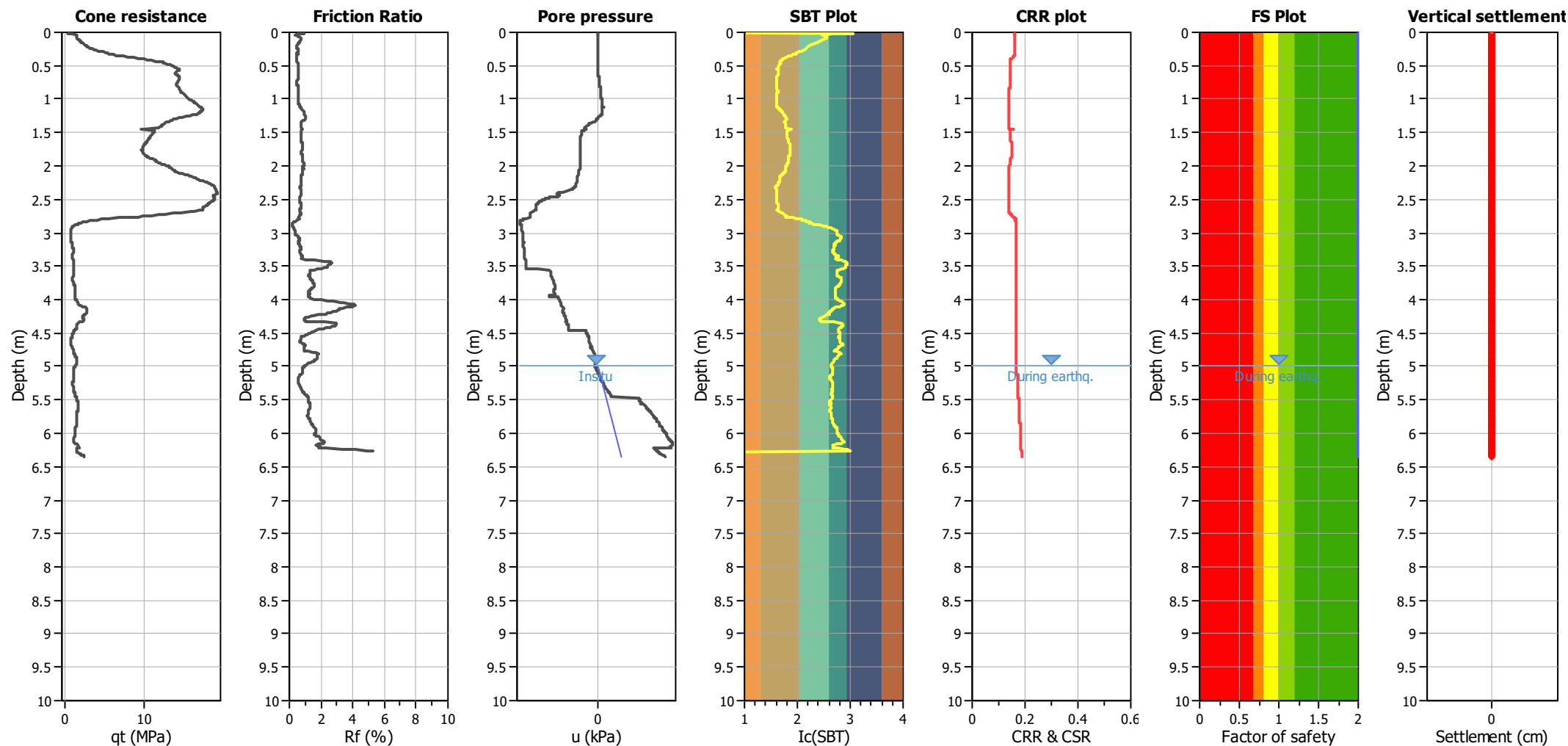
Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2005 IE_ISH

Total depth: 6.35 m



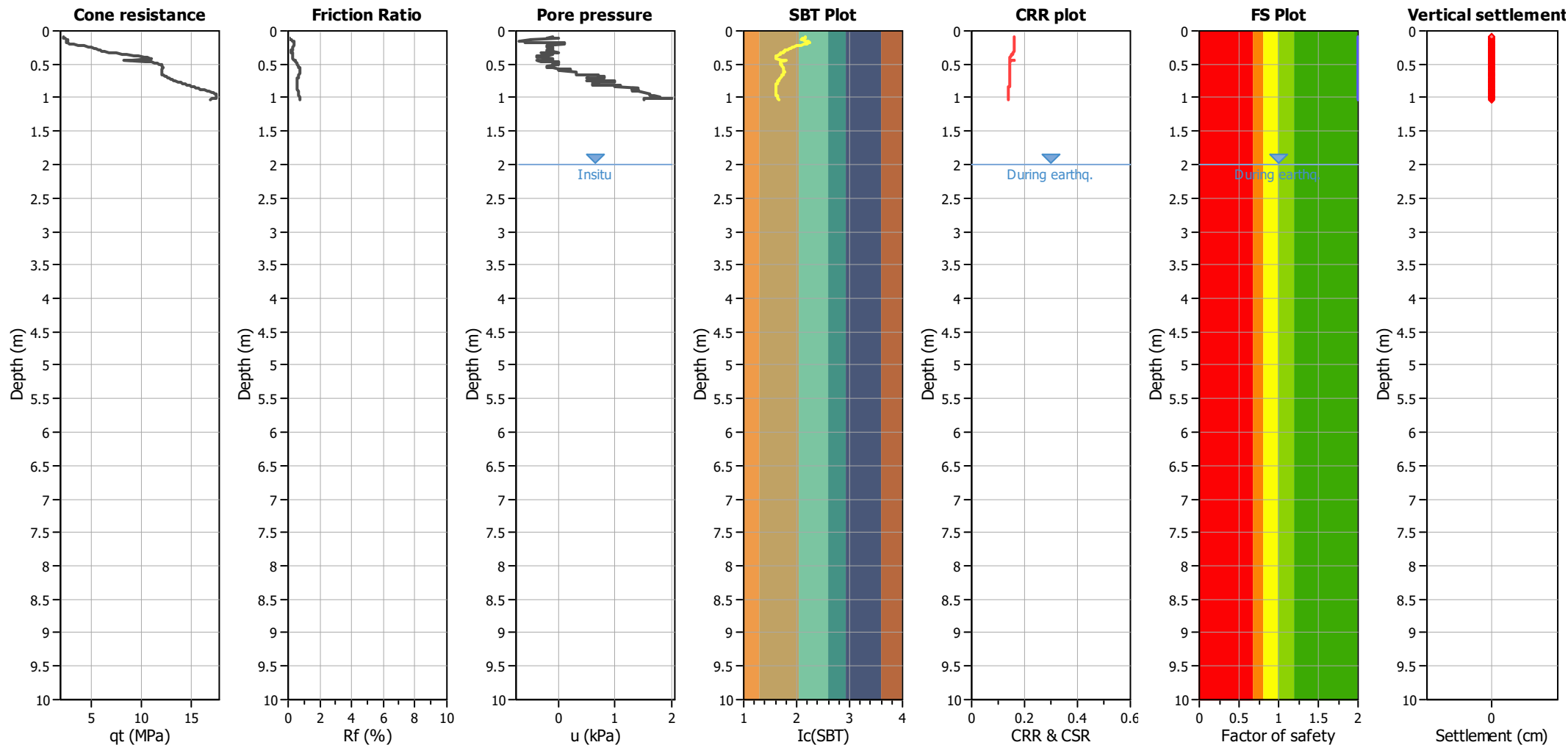
Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.00 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.00 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2006 IE_ISH

Total depth: 1.03 m



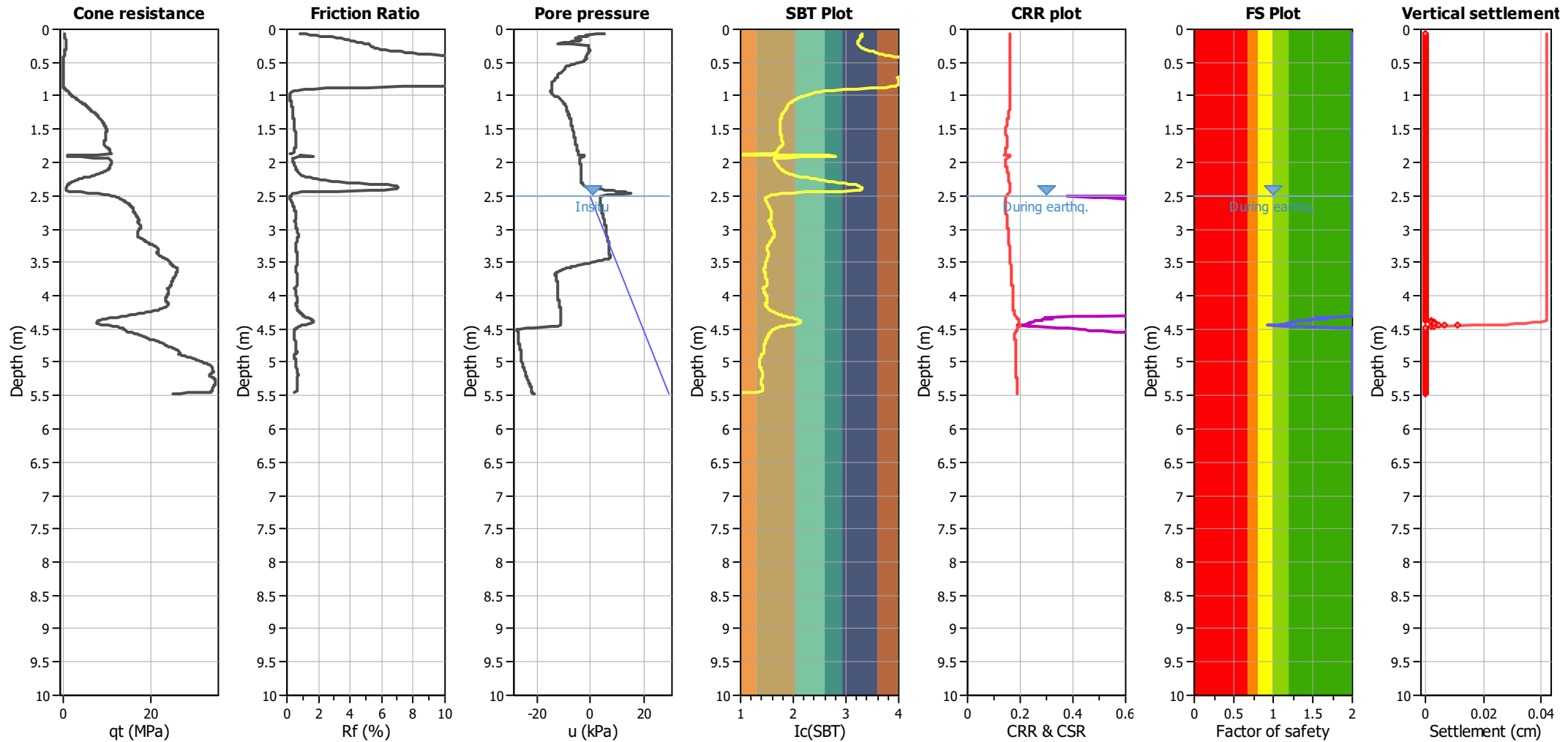
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S5007 IE_ISH

Total depth: 5.48 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based

APPROVED
BY BUILDING
Craig Rogerson
20/06/2023

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CAUTION
Plans have been digitally
reproduced and may not
be to scale.

PROPOSED NEW DWELLING FOR:

Lot 45 709m²

(34.8% & 36.4% (incl covered areas) site coverage)

1 Pihoihoi Close, Manu Park (Stage II)

WAIKANAE

1/. Title Sheet/Locality Plan

2/. Site Plan

3/. Floor Plan

4/. Foundation Plan

5/. Dimension Plan

6/. Plumbing/Roof/Drainage Plan

7/. Roof Plan

8a/. Front/Rear Elevations

8b/. Side1/Side2 Elevations

9/. Cross Section AA

10/. Bracing/Lintel Plan

11/. Construction Details

12a/. Truss Layout

12b/. Wall Fix Layout

12c/. Lintel/Slab Layout

Included Addendum:

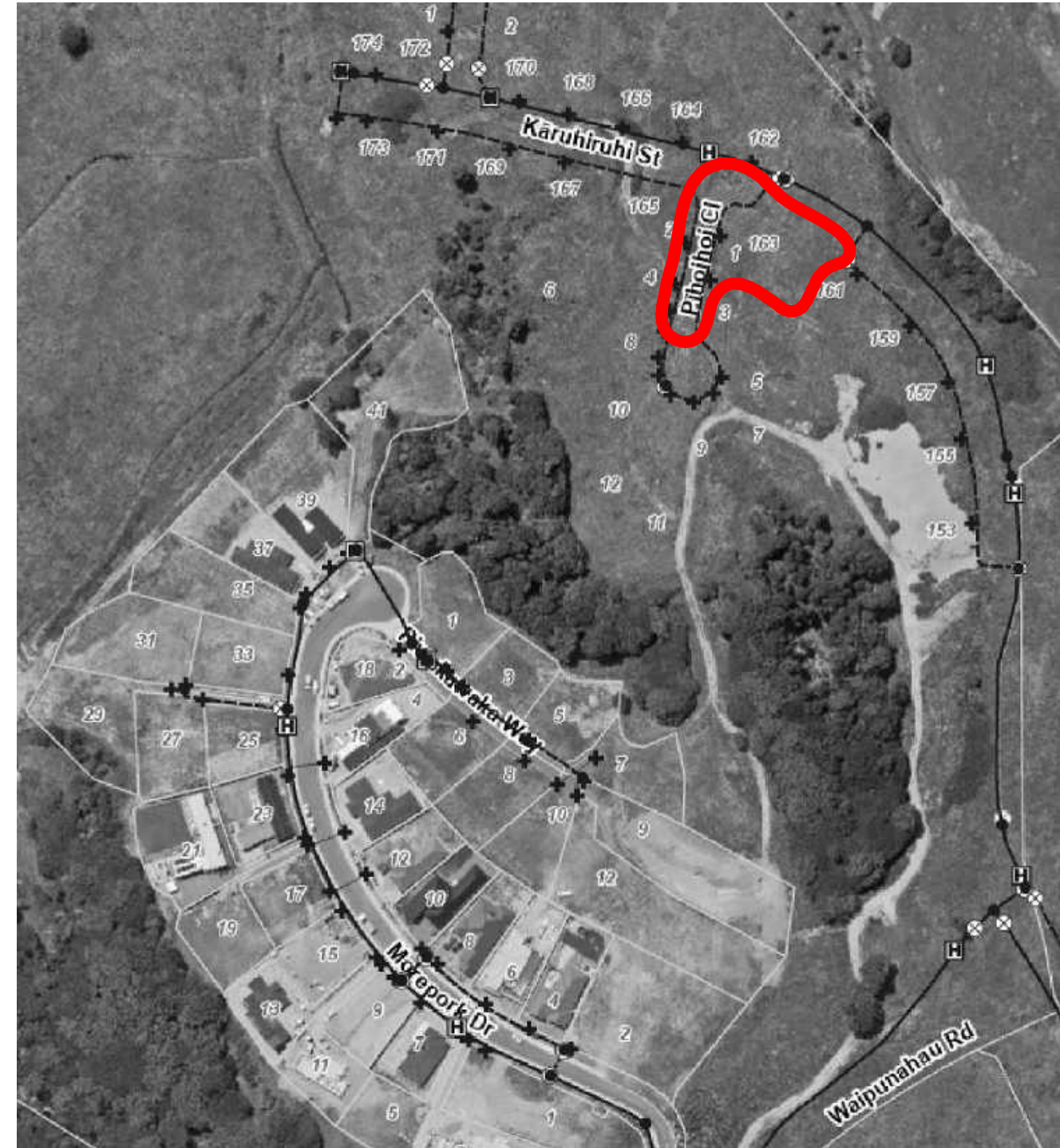
Frame & Truss Design & Plan

GIB EzyBrace Systems

Ecoply Specification & Installation Guide

H1 Compliance Assessment Sheet

Certificate of Design Work



ENGINEERS DESIGN

This project contains elements specifically designed by an engineer. The owner/builder is required to ensure the engineer inspects the work and provides KCDC with written evidence of the inspection.

ENGINEER STRUCTURAL DESIGN
TAKES PRECEDENCE

Noisy Equipment

It is the responsibility of the owner to ensure that no work with noisy equipment shall be carried out before 7:30 a.m. or after 6 p.m. Monday to Saturday. During the week there may be workers on site from 6:30 a.m. quietly preparing for work. Work with noisy equipment is not permitted on Sundays or public Holidays.

Proposed New Dwelling for:
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: 

Drawn: S. Neale
Date: 03-10-22

Issue: **A**
05-05-23

Job Number
WA 45MP

Design Plans Ltd - via The Plan Workz
Serving Clients New Zealand Wide
Email: steve@theplanworkz.co.nz

BOUNDARY LINES
The Owner/Builder is responsible for clearly defining the site boundary lines and pegs. This may require a survey.
NOTE: established fences are not necessarily on the site boundary.

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PLANNING
kirsties
21/06/2023

All works to be
in accordance
with BC230413

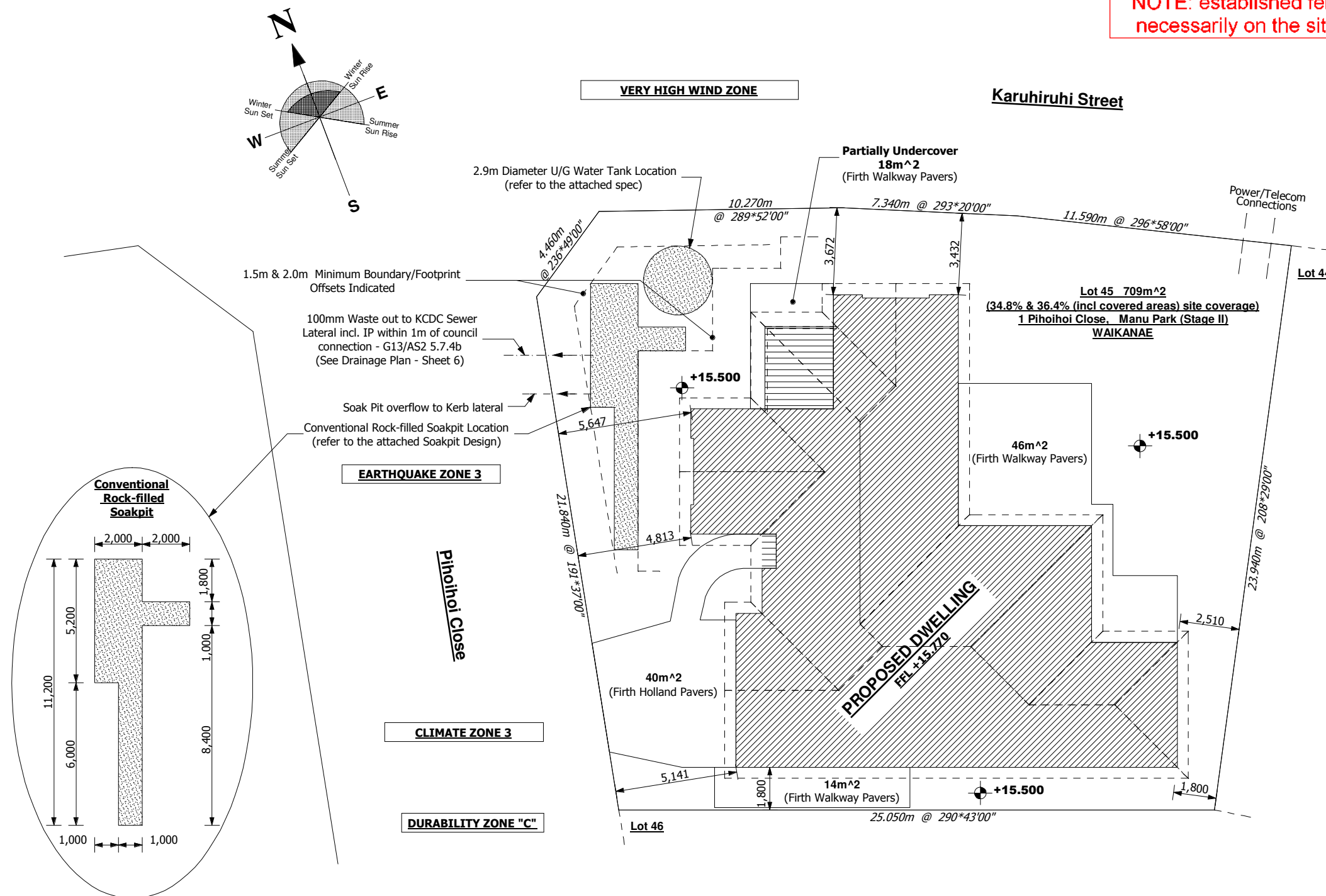
SITE PERMEABILITY
Refer to attached Stormwater Disposal
Design Report

E2 FLASHINGS - SITUATION 2
(all roof pitch angles in Very High Wind Zone)

STANDARDS/CODES
All references to standards and codes etc
shall be taken as reference to latest
version including amendments

NOTE:
HAZARD MANAGEMENT TEMPORARY FENCING
If a worksite is not completely enclosed and unauthorised entry by children is likely, it is acceptable for specific hazards to be fenced only when workers are absent from the immediate vicinity where potential hazard at a work site makes a safety barrier necessary, a barrier complying with Table 1, NZBC F5/AS1 is an acceptable solution.

SITE PLAN - Scale 1:200
Sheet 2



Proposed New Dwelling for:
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: **the PlanWorkz**
Drawn: S. Neale
Date: 03-10-22
Issue: **A**
Job Number: **WA 45MP**
05-05-23

Design Plans Ltd - via The PlanWorkz
Serving Clients New Zealand Wide
Email: steve@theplanworkz.co.nz

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GLAZING CONFORM NZS 4223 PARTS 1, 2, 3.

FIT SUITABLE FLASHINGS, ETC.

JOINERY

HIGH WIND 1100pa DWP

VERY HIGH WIND 1550pa DWP

All habitable/service rooms to have 5% of their floor area as opening windows or approved alternative, to achieve ventilation requirements. See Ventilation Chart adjacent

Install approved smoke alarm system for detection and warning of fire NZBC / F7

H1 DWELLING INSULATION:

Specified product R values vs construction value (in brackets)

Core Ceiling: R5.0 (5.2)

Perimeter Ceiling: R3.2 (3.3)

Wall: R2.8 (2.0)

Floor: R1.79 (1.9)

Glazing: R0.46 (0.46)

LIGHTING

All exitways, access routes and common spaces within the Group Dwelling to have artificial lighting installed & available to a min. 20 lux at FFL in the absence of sufficient natural light enabling safe movement (i.e. electrical lighting to G8 / AS1)

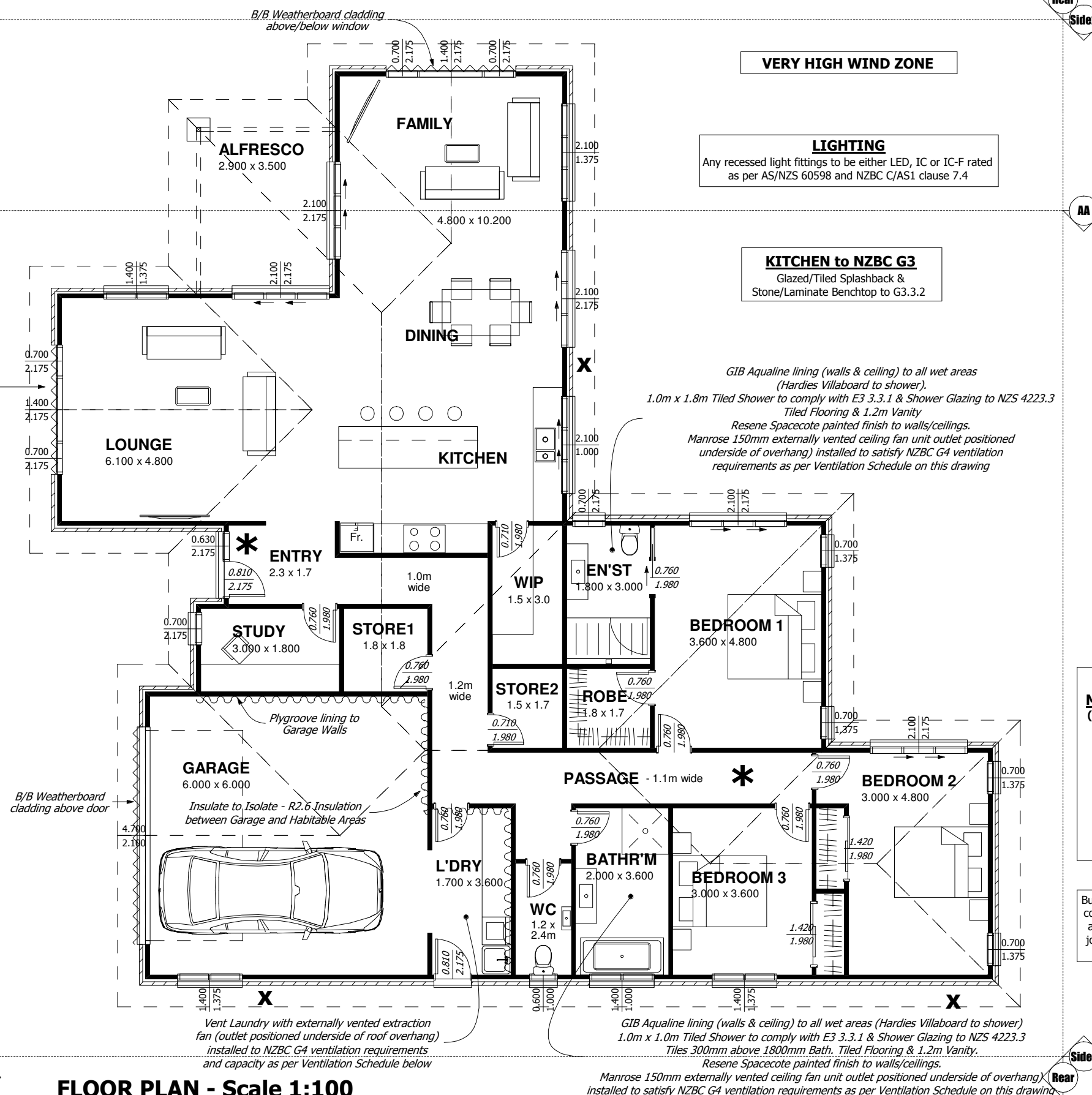
Provide:

Electrical Certification Documentation after completion and prior to Code of Completion Issue

Claddings to be installed to manufacturers requirements in particular, fixing and ground clearance.

SAFETY GLAZING:

Safety Glazing as required by NZS 4223: 2016 to be provided (glazed doors, side panels, full height windows and windows with low sills) as determined by the approved Joinery Manufacturer/GANZTech e-Decision Tree



FLOOR PLAN - Scale 1:100

Area = 236.5m² (over frame) & 246.7m² over brick (+ 1.0 & 10.0m² Entry/Alfresco)

Sheet 3

Note: 2.4m Stud Throughout. Room Sizes Shown Indicative Only (refer to Dimension Plan for all accurate sizes).

Joinery offset - Joinery as dimensioned, otherwise considered centred on applicable wall shown.

Aluminium Doors - Flooring to Aluminium Sill Liner. Carpeted Floors unless indicated otherwise.

Glazing install by approved Joinery Manufacturer to NZS 4223.3:2016 (GANZTech) - ref Chart Sheet 11A

X = Outdoor Tap Location

~~~~~ = Timber B/B Weatherboard (direct fixed) over plywood substrate

\* = Smoke Alarms within 3.0m of Bedroom doors and main point of Entry

### FRAMING KEY

See Dimension Plan

### BUILDING ENVELOPE RISK MATRIX (worst case)

|                         | RISK FACTOR      | SUB TOTALS |
|-------------------------|------------------|------------|
| Wind Zone               | <b>Very High</b> | <b>2</b>   |
| No. Stories             | <b>Single</b>    | <b>0</b>   |
| Roof/Wall Design        | <b>Low</b>       | <b>0</b>   |
| Eaves Width             | <b>Medium</b>    | <b>1</b>   |
| Envelope Complexity     | <b>Medium</b>    | <b>1</b>   |
| Deck Design             | <b>Low</b>       | <b>0</b>   |
| <b>TOTAL RISK SCORE</b> |                  | <b>4</b>   |

### TIMBER TREATMENT - B2/AS1 (amend 7)

|             |                                                                                                                                                                                                                                                                                                                      |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>H1.2</b> | - Enclosed Roof Framing, Trusses & Ceiling Elements<br>- Enclosed Wall Framing (protected from weather except all cantilever deck elements and cavity battens)<br>- Floor Framing (protected from weather but exposed to ground atmosphere)<br>- Internal Wall Framing<br>- Mid-Floor framing<br>- Interior Flooring |
| <b>H3.1</b> | Cavity Battens                                                                                                                                                                                                                                                                                                       |
| <b>H3.2</b> | Framing Exposed To Weather (and above ground)                                                                                                                                                                                                                                                                        |
| <b>H4</b>   | Framing Exposed To Weather (and in contact with ground ie fence posts, landscape timbers)                                                                                                                                                                                                                            |
| <b>H5</b>   | Framing Exposed To Weather (and in contact with ground ie house piles, poles and crib walling)                                                                                                                                                                                                                       |

### VENTILATION SCHEDULE (G4/AS1)

Minimum opening area (sashes) for each room as follows: (the compliant opening sizing designed for each room shown in brackets)

|                                                                               |
|-------------------------------------------------------------------------------|
| Study - 5.43 x 5% = 0.27m <sup>2</sup> (1.03m <sup>2</sup> )                  |
| Lounge/Dining/Kitchen - 75.30 x 5% = 3.77m <sup>2</sup> (7.00m <sup>2</sup> ) |
| Ensuite - 5.41 x 5% = 0.27m <sup>2</sup> (1.03m <sup>2</sup> )                |
| Bedroom 1 - 17.36 x 5% = 0.87m <sup>2</sup> (1.93m <sup>2</sup> )             |
| Bedroom 2 - 15.30 x 5% = 0.77m <sup>2</sup> (1.93m <sup>2</sup> )             |
| Bedroom 3 - 10.87 x 5% = 0.54m <sup>2</sup> (0.96m <sup>2</sup> )             |
| Bathroom - 7.26 x 5% = 0.36m <sup>2</sup> (0.70m <sup>2</sup> )               |
| WC - 2.92 x 5% = 0.15m <sup>2</sup> (0.60m <sup>2</sup> )                     |
| Laundry - 6.17 x 5% = 0.31m <sup>2</sup> (via fan)                            |

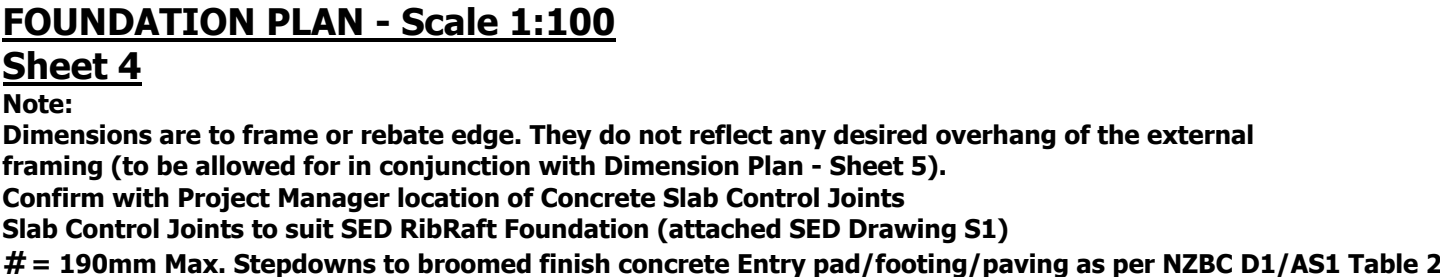
Builder to verify & check all dimensions & levels on site. All construction to comply with NZS 3604: 2011, NZBC, Local authority bylaws & engineer. Builder to verify all beams, joists, studs, rafter & other structural members on site to confirm full compliance.

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Proposed New Dwelling for:  
1 Pihoihi Close, Lot 45 Manu Park, Waikanae  
Prepared by:  
Drawn: S. Neale  
Date: 03-10-22  
Issue: A  
Job Number  
WA 45MP  
05-05-23

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**Bottom Plate Fixings**

*External Walls/Internal Walls (loadbearing):*  
Proprietary Anchor Screws:  
Set within 150mm of each end of the plate and at max. 900mm centres

*Internal Walls (non-loadbearing):*  
Proprietary Shot Fired Pins/Washers:  
Max. 600mm centres

**Level Entry Tiled Showers:**  
Deform concrete shower base to waste  
c/w min 1:50 fall.  
Dampfix Gold Waterproofing Membrane under Tiling  
Refer attached Engineers Design and Detail Sheet 11K

*DPC to all timber members  
in contact with concrete/slab*

**MINIMUM FINISHED FLOOR  
LEVEL ABOVE -**

|                           |                                             |
|---------------------------|---------------------------------------------|
| <u>PROTECTED GROUND</u>   | 100mm BRICK VENEER<br>150mm OTHER CLADDINGS |
| <u>UNPROTECTED GROUND</u> | 150mm BRICK VENEER<br>225mm OTHER CLADDINGS |

**1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

**Proposed New Dwelling for:**

Design Plans Ltd - t/a The Plan Workz  
Serving Clients New Zealand Wide  
Ph. 04 902 9090  
Email: [steve@theplanworkz.co.nz](mailto:steve@theplanworkz.co.nz)

Prepared by:



Drawn: S. Neale

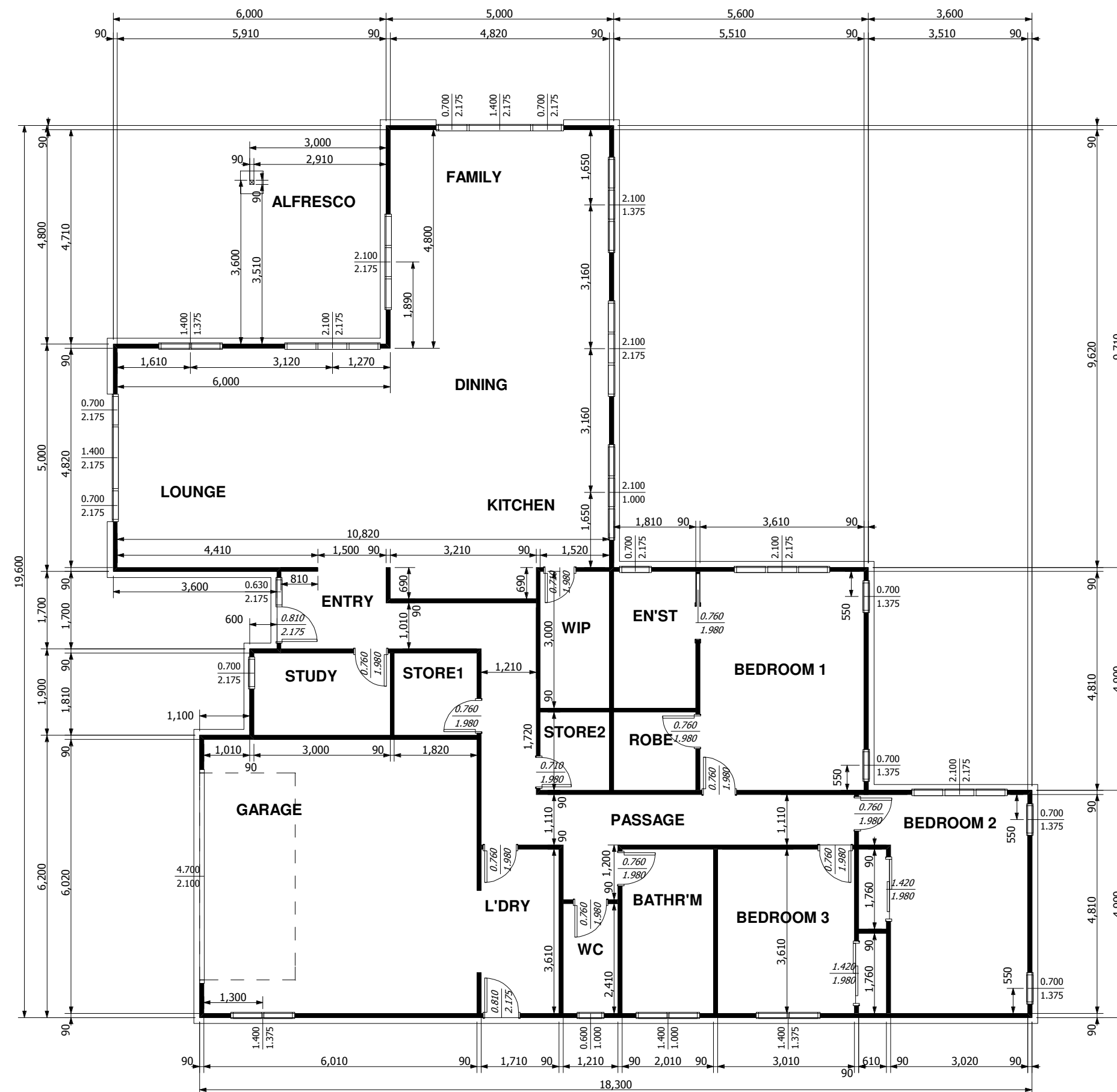
Date: 03-10-22

Issue: A

05-05-23

**Job Number**  
**WA 45MFM**

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VERY HIGH WIND ZONE

Double studs required to  
all openings for brick veneer ties

#### VERY HIGH WIND FRAMING KEY

##### Loadbearing Framing (SG 8):

- (Table 8.2 NZS 3604:2011)

Up to 2.4m Stud  = 90 x 45mm Frame Studs  
@ 400mm centres max.

##### Internal Framing (SG 8):

- (Table 8.2 NZS 3604:2011)

Up to 2.7m Stud  = 90 x 45mm Frame Studs  
@ 400mm centres max.

##### Non-LB Internal Framing (SG 8):

- (Table 8.4 NZS 3604:2011)

Up to 2.7m Stud  = 90 x 45mm Frame Studs  
@ 400mm centres max.

Note: Dwangs supporting linings or claddings to be flush with face of studs  
Dwangs may be staggered either side of a horizontal straight line by a  
centre to centre distance not exceeding 300mm  
All as per Section 8 - NZS 3604:2011

## DIMENSION PLAN - Scale 1:100

### Sheet 5

Note: All dimensions to be checked on site. All dimensions to internal 90mm framing.

Dimensions are to frame and do not reflect any desired overhang of the external framing (to be allowed for in conjunction with Foundation Plan Sheet 4).

Joinery offset - Joinery as dimensioned, otherwise considered centred on applicable wall shown.

All Lintels as Per Prenail Design/Connections as denoted refer to Pryda Lintel Fixing Schedule Detail Sheet 11E

Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: 

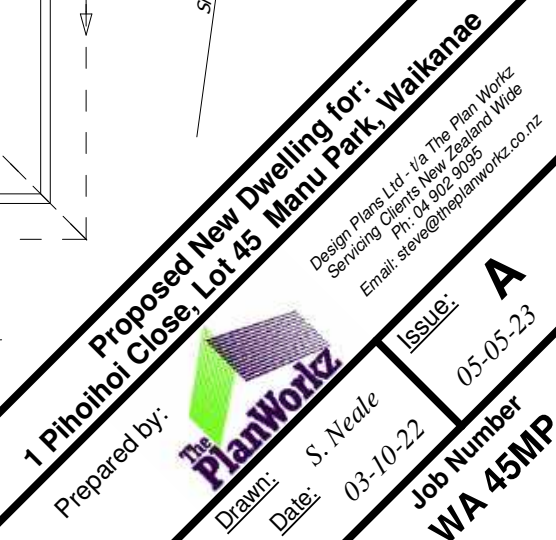
Design Plans Ltd - via The Plan Workz  
Serving Clients New Zealand Wide  
Email: steve@thepianworkz.co.nz

Drawn: S. Neale  
Date: 03-10-22

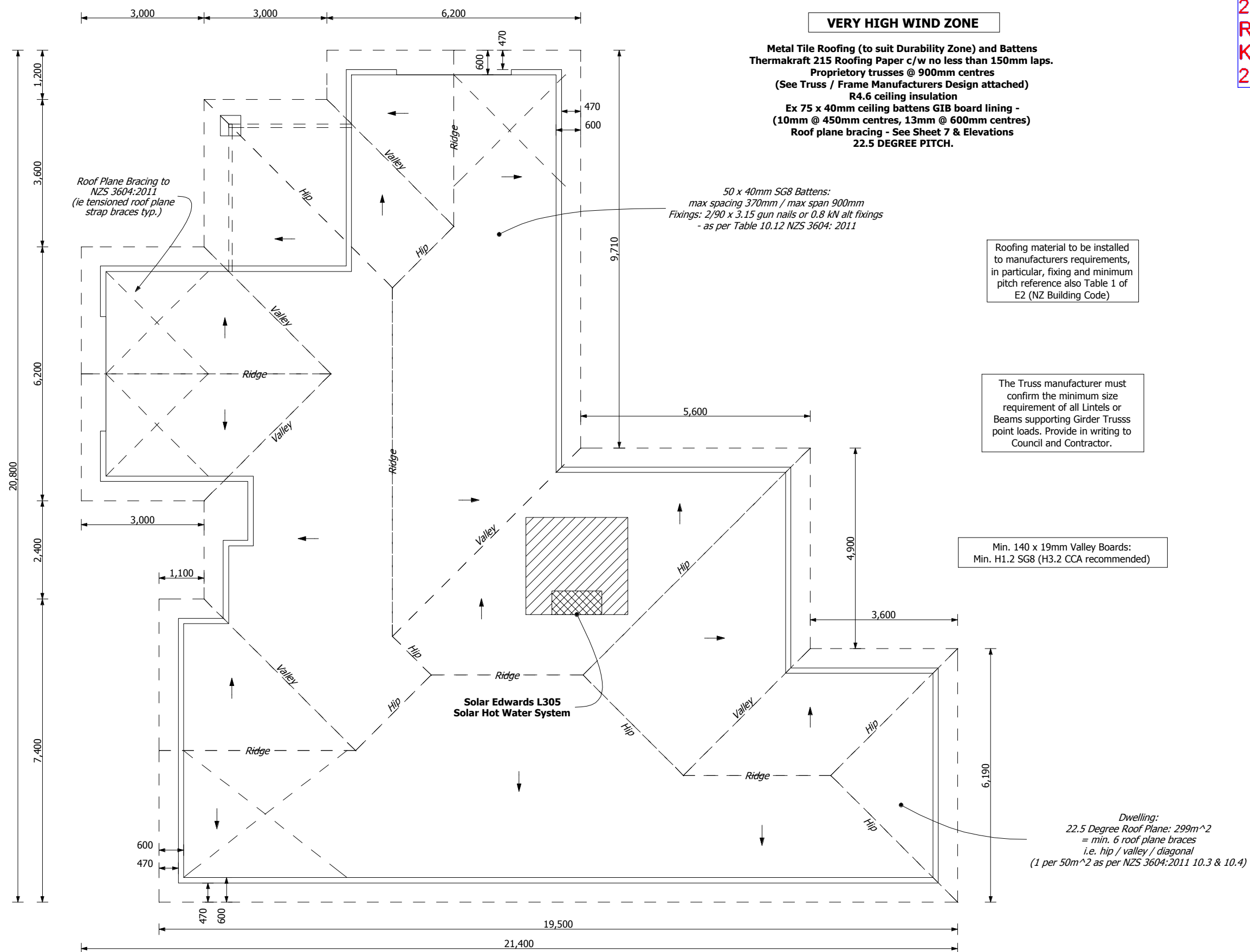
Issue: A  
05-05-23

Job Number  
WA 45MP

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**ROOF PLAN - Scale 1:100**  
**Sheet 7**

**Truss Design by Approved Supplier.**  
**See Producer Statement and Layout Plan attached**

**Proposed New Dwelling for:**  
**1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Prepared by: **the PlanWorkz**

Design Plans Ltd - via The Plan Workz  
 Servicing Clients New Zealand Wide  
 Email: steve@theplanworkz.co.nz

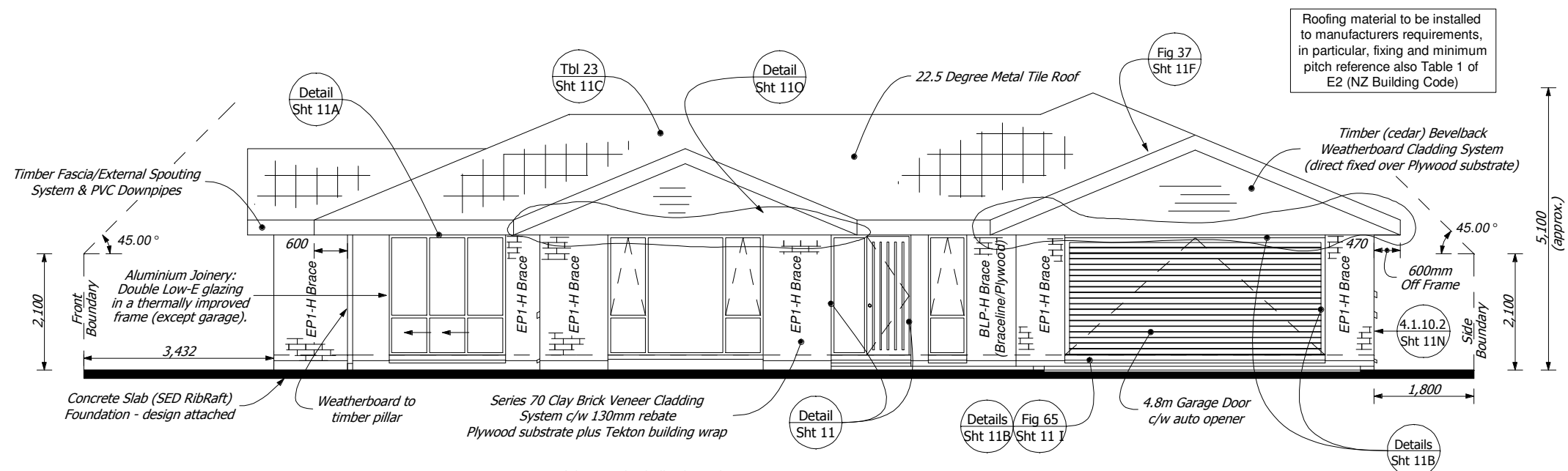
Drawn: **S. Neale**  
 Date: **03-10-22**

Issue: **A**  
 05-05-23

Job Number  
**WA 45MP**

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## FRONT ELEVATION - Scale 1:100

### Sheet 8a

Glazing install by approved Joinery Manufacturer to NZS 4223.3:2016 (GANZTech)

Aluminium Doors - Flooring to Aluminium Sill Liner

Opening Sashes as shown comply to G4/AS1 ventilation requirements

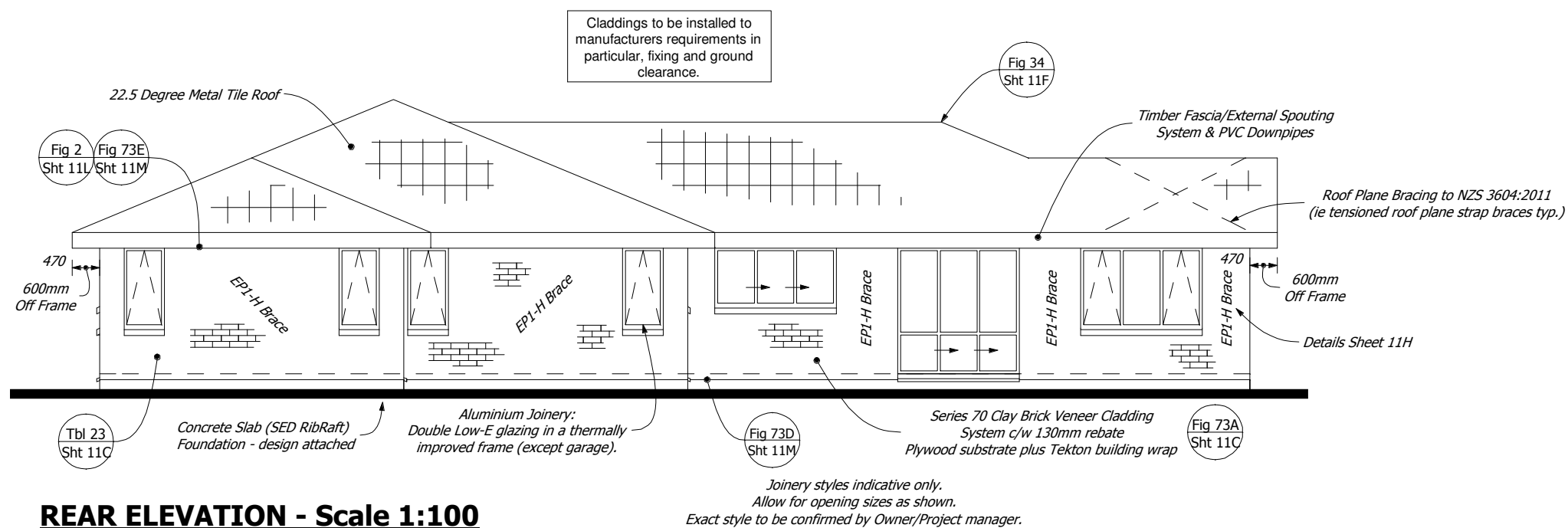
Joinery styles indicative only.  
Allow for opening sizes as shown.  
Exact style to be confirmed by Owner/Project manager.

#### SAFETY GLAZING:

Safety Glazing as required by NZS 4223: 2016 to be provided (glazed doors, side panels, full height windows and windows with low sills) as determined by the approved Joinery Manufacturer/GANZTech e-Decision Tree

#### Additional Details

Fig 29 Sht 11F / 4.1.19.3 Sht 11N = Pipe Penetration



## REAR ELEVATION - Scale 1:100

### Sheet 8a

Glazing install by approved Joinery Manufacturer to NZS 4223.3:2016 (GANZTech)

Aluminium Doors - Flooring to Aluminium Sill Liner

Opening Sashes as shown comply to G4/AS1 ventilation requirements

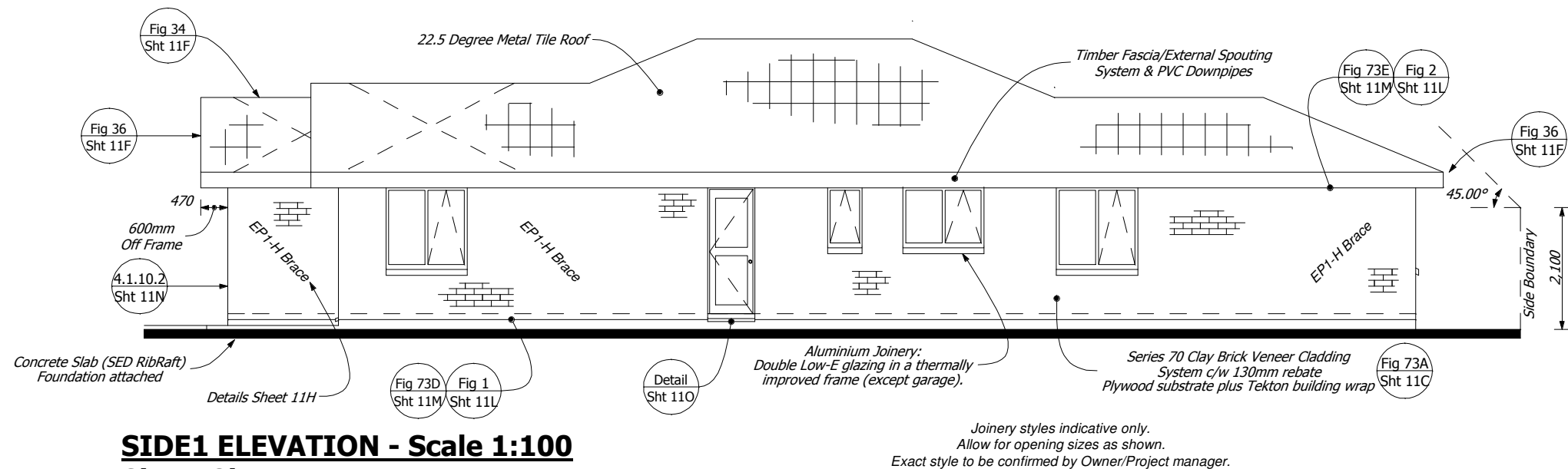
Joinery styles indicative only.  
Allow for opening sizes as shown.  
Exact style to be confirmed by Owner/Project manager.

#### SAFETY GLAZING:

Safety Glazing as required by NZS 4223: 2016 to be provided (glazed doors, side panels, full height windows and windows with low sills) as determined by the approved Joinery Manufacturer/GANZTech e-Decision Tree

KCDC RFI dated 08/06/23 - Sheets 8a, 8b, 11a, 11b, 11o, 12a, and 12c only  
Prepared by: 1 Pihoihoi Close, Lot 45 Manu Park, Waikanae  
Design Plans Ltd - via The Plan Workz  
Serving Clients New Zealand Wide  
Email: steve@thepanworkz.co.nz  
Drawn: S. Neale  
Date: 03-10-22  
Issue: A  
Job Number  
WA 45MP  
05-05-23

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## SIDE1 ELEVATION - Scale 1:100

### Sheet 8b

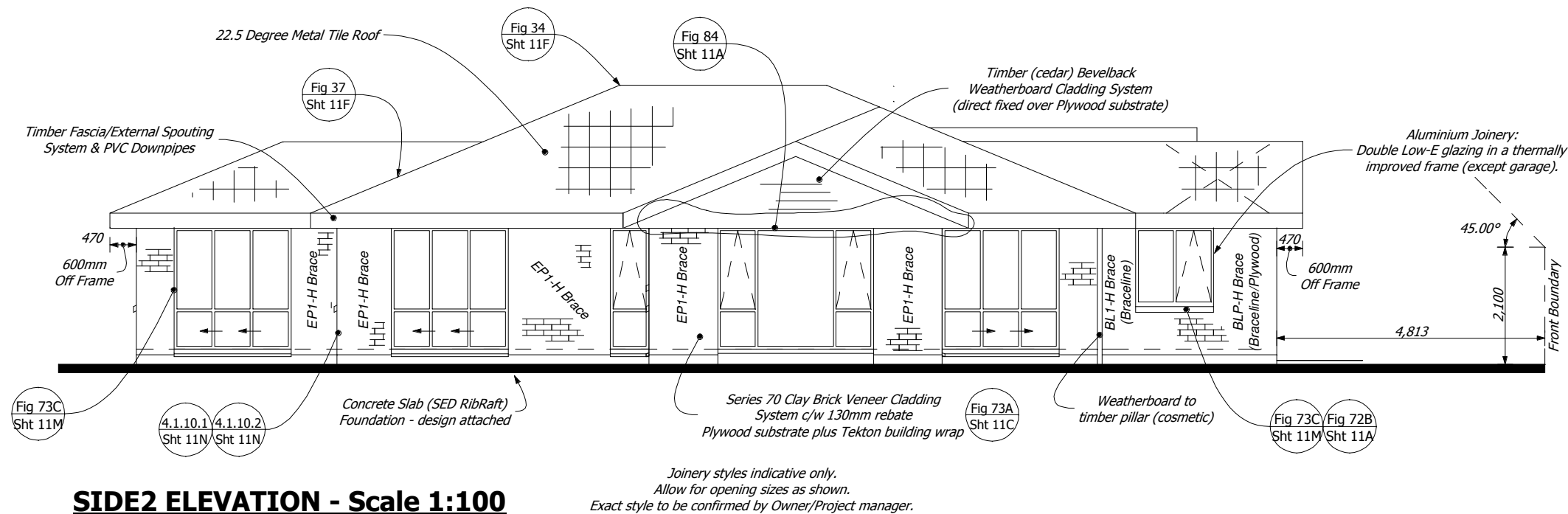
Glazing install by approved Joinery Manufacturer to NZS 4223.3:2016 (GANZTech)

Aluminium Doors - Flooring to Aluminium Sill Liner

Opening Sashes as shown comply to G4/AS1 ventilation requirements

#### SAFETY GLAZING:

Safety Glazing as required by NZS 4223: 2016 to be provided (glazed doors, side panels, full height windows and windows with low sills) as determined by the approved Joinery Manufacturer/GANZTech e-Decision Tree



## SIDE2 ELEVATION - Scale 1:100

### Sheet 8b

Glazing install by approved Joinery Manufacturer to NZS 4223.3:2016 (GANZTech)

Aluminium Doors - Flooring to Aluminium Sill Liner

Opening Sashes as shown comply to G4/AS1 ventilation requirements

#### SAFETY GLAZING:

Safety Glazing as required by NZS 4223: 2016 to be provided (glazed doors, side panels, full height windows and windows with low sills) as determined by the approved Joinery Manufacturer/GANZTech e-Decision Tree

KCDC RFI dated 08/06/23 - Sheets 8a, 8b, 11a, 11b, 11c, 12a, and 12c only

Prepared by: **The PlanWorkz**

Drawn: S. Neale

Date: 03-10-22

Issue: **A**

Job Number: **WA 45MP**

Proposed New Dwelling for: **1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Design Plans Ltd - via The PlanWorkz

Servicing Clients New Zealand Wide

Email: steve@theplanworkz.co.nz

05-05-23

**VERY HIGH WIND ZONE**

*Metal Tile Roofing (to suit Durability Zone) and Batts  
Thermakraft 215 Roofing Paper c/w no less than 150mm laps.  
Proprietary trusses @ 900mm centres  
(See Truss / Frame Manufacturers Design attached)  
R5.0 (core) & R3.2 (perimeter) ceiling insulation  
Ex 75 x 40mm ceiling battens GIB board lining -  
(10mm @ 450mm centres, 13mm @ 600mm centres)  
Roof plane bracing - See Sheet 10 & Elevations  
22.5 DEGREE PITCH.*

**Truss Design by Approved Supplier.  
See Producer Statement and Layout Plan attached**

## ROOF TRUSSES

Roof trusses shall be specifically designed  
in accordance with NZS 3603.  
Max. span between load points - 12m  
Max. eaves overhang - 750mm  
Max. truss spacings - 900mm (light roof)

## TOP PLATE CONNECTIONS

All top plate connections in accordance with 8.7.3.4 to be 6kN  
unless stated otherwise on Bracing Plans Sheet 6 & 7

*Continuous Colorsteel Fascia and Ogee Spouting c/w uPVC downpipes.  
Dynex Soffit System.*

*Cladding:*

*Series 70 Clay Brick Veneer (c/w 130mm offset).*

*Timber (cedar) Bevelback Weatherboard Cladding System (direct fixed over Plywood substrate) to NZS 3604:2011, E2/AS1, & manufacturers installation & warranty requirements.*

*TektonBuilding Wrap over Construction Ply Substrate (to all external wall framing) installed and secured as per manufacturers instruction.  
Protect edge of slab with subfloor polythene.*

10mm GIB to 90 x 45mm H1.2 framing to NZS 3604:2011  
Min. R2.8 insulation to all external framing.

Roofing material to be installed to manufacturers requirements, in particular, fixing and minimum pitch reference also Table 1 of E2 (NZ Building Code)

Claddings to be installed to manufacturers requirements in particular, fixing and ground clearance.

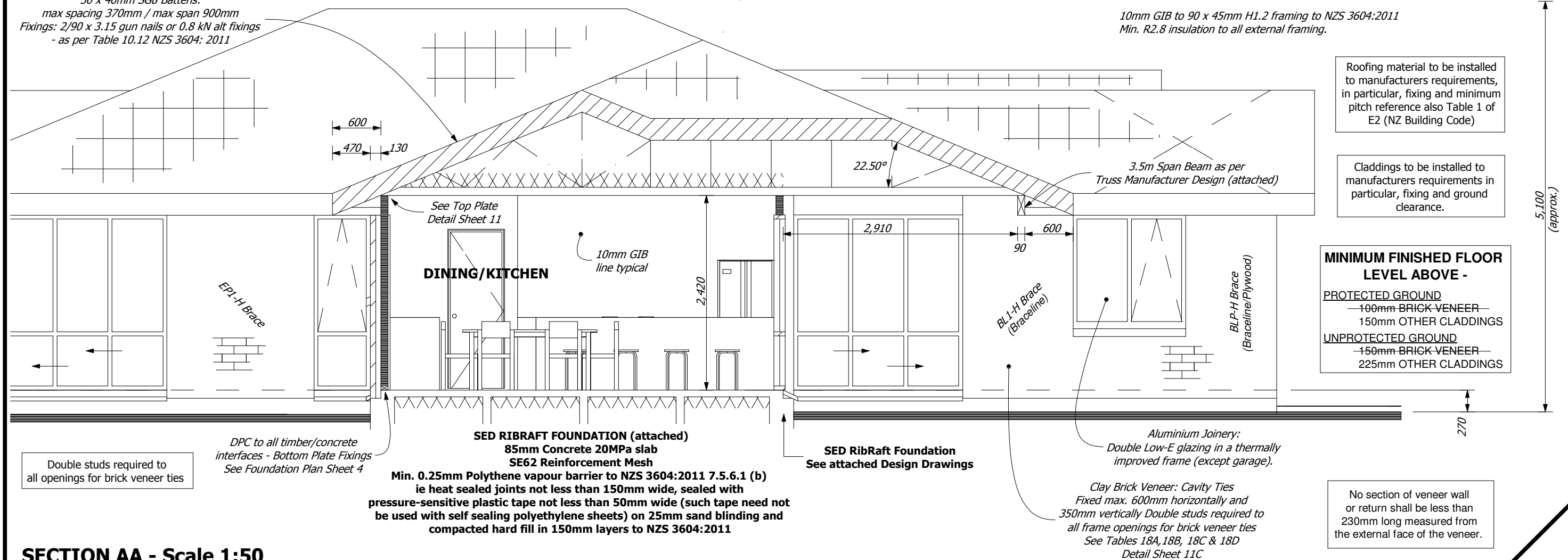
**MINIMUM FINISHED FLOOR  
LEVEL ABOVE -**

PROTECTED GROUND  
—100mm BRICK VENEER—  
150mm OTHER CLADDINGS

UNPROTECTED GROUND  
—150mm BRICK VENEER—  
225mm OTHER CLADDINGS

No section of veneer wall or return shall be less than 230mm long measured from the external face of the veneer.

50 x 40mm SG8 Battens:  
max spacing 370mm / max span 900mm  
Fixings: 2/90 x 3.15 gun nails or 0.8 kN alt fixings  
- as per Table 10.12 NZS 3604: 2011



**SECTION AA - Scale 1:50**  
**Sheet 9**

**To be read in conjunction with all other Sections/Details**

## All work to comply with the NZBC and NZS 3604:2011

**Glazing install by approved Joinery Manufacturer to NZS 4223.3:2016 (GANZTech) Detail Sheet 11A**

**Truss Design as per attached Prenail Manufacturers Design**

Builder to verify & check all dimensions & levels on site. All construction to comply with NZS 3604: 2011, NZBC, Local authority bylaws & engineer. Builder to verify all beams, joists, studs, rafter & other structural members on site to confirm full compliance.

**Proposed New Dwelling for:**

**1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Design Plans Ltd - 1/a The Plan Workz  
Serving Clients New Zealand Wide  
Ph: 04 902 9095  
Email: steve@theplanworkz.co.nz

**The PlanWorkz**

**Grass**

**Prepared by:**

**Drawn by: S. Neale**

**Date: 03-10-22**

**Issue:**

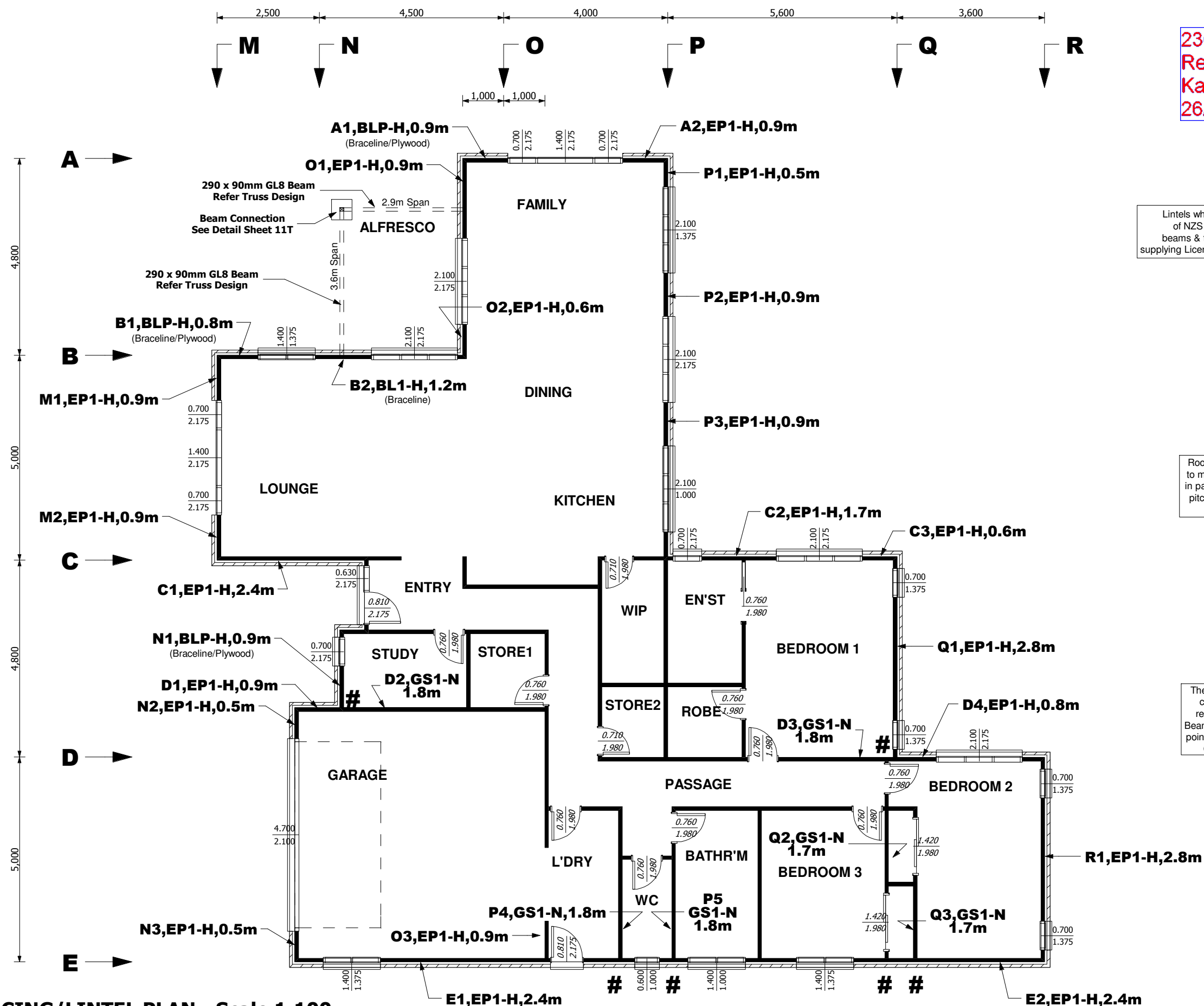
**05-05-23**

**Job Number**

**WA 45MP**

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Lintels where specified other than to tables of NZS 3604: 2011 and all proprietary beams & trusses must be confirmed by the supplying Licensed Prenaier or Registered Engineer

Roofing material to be installed to manufacturers requirements, in particular, fixing and minimum pitch reference also Table 1 of E2 (NZ Building Code)

The Truss manufacturer must confirm the minimum size requirement of all Lintels or Beams supporting Girder Trusses point loads. Provide in writing to Council and Contractor.

## BRACING/LINTEL PLAN - Scale 1:100

### Sheet 10

Note: All Bracing Elements to be installed as per Manufacturers Installation Instructions

GIB Braces refer to 10mm GIB linings as standard.

EP Braces as per attached Ecoply Spec and Detail 3.3 Sheet 11H

All top plate connections in accordance with 8.7.3.4 to be 6kN unless stated otherwise above, as per Figs 8.15 & 8.16 Detail Sheet 11G

# = Braced Wall Connection to NZS 3604:2011 8.7.3.4 - Details Sheet 11G

Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

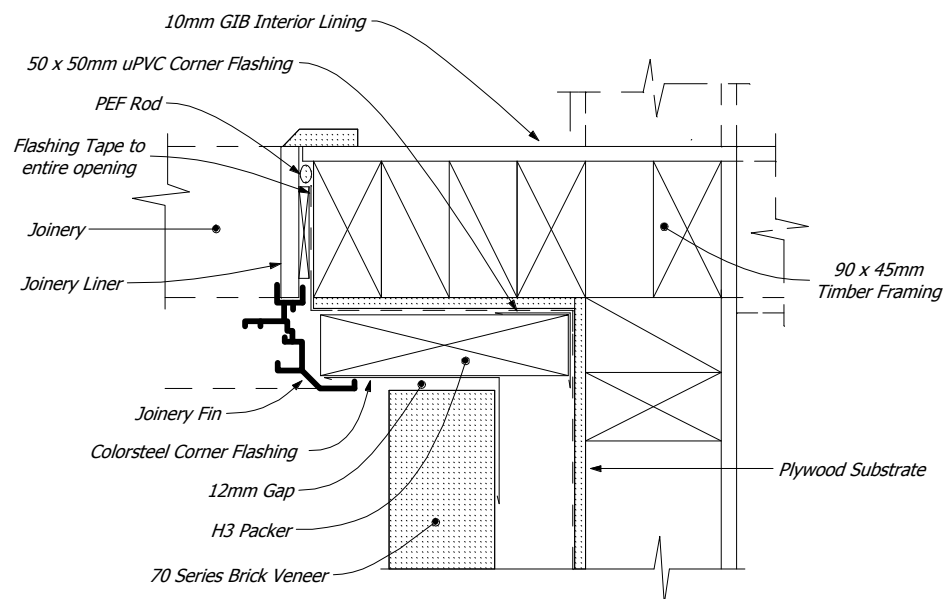
Prepared by:  Design Plans Ltd - via The Plan Workz  
Service Clients New Zealand Wide  
Email: steve@thepianworkz.co.nz

Drawn: S. Neale  
Date: 03-10-22  
Issue: A  
Job Number  
WA 45MP  
05-05-23

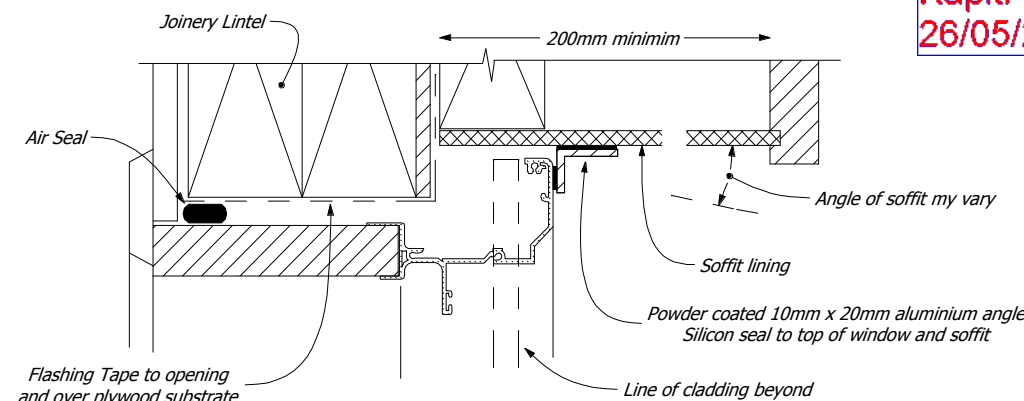
These plans have been prepared with all reasonable care taken to ensure dimensions and specifications are correct, and in the assumption they will be further checked on site and verified by the building manager who will have a sound knowledge of the NZBC and NZS 3604. If any discrepancy in the drawings is found it is to be immediately reported to the Drawer (Design Plans Ltd) before any building or related work commences. The Drawer accepts no responsibility for costs resulting from discrepancies in any plans produced which are not reported to the drawer before any building or related work commences. Any works carried out by any contractor, sub contractor or authorised agent, shall comply with the requirements of the local authority. Any works undertaken outside these requirements without the approval of designer, engineer, & local authority hereby indemnifies the Drawer or agent against any claim or claims in respect to the said works.



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26/05/23



**INTERNAL CORNER BRICK TO JAMB DETAIL**  
**Not to Scale**



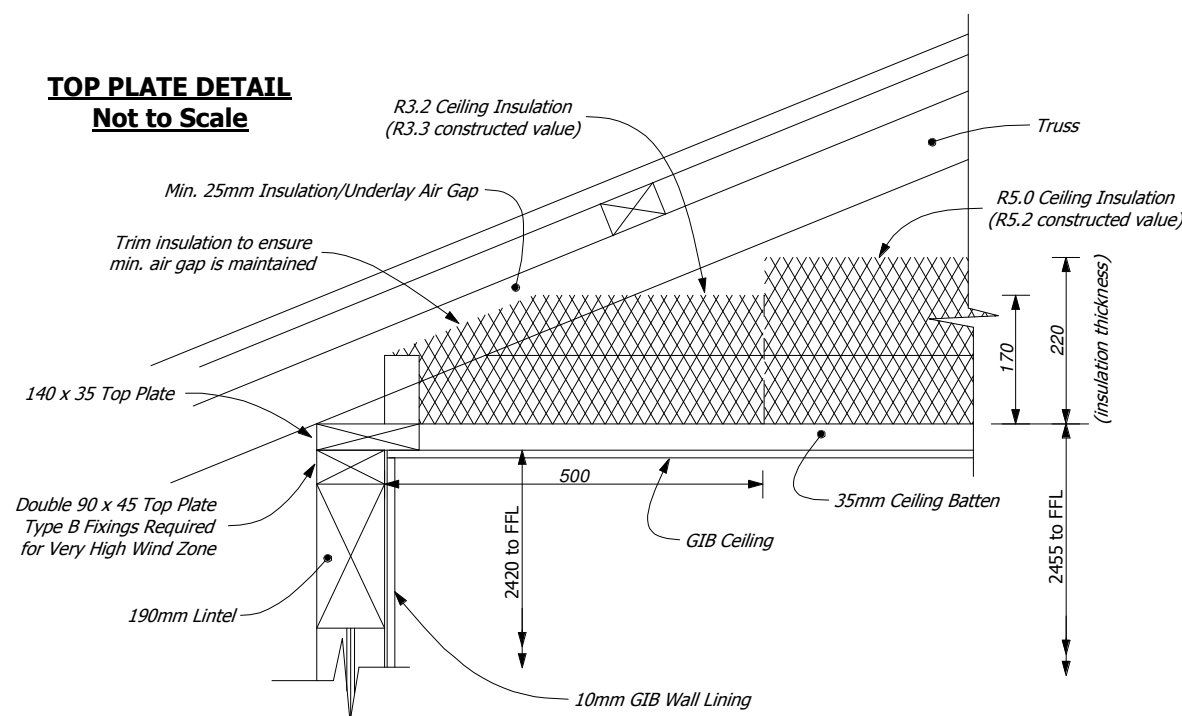
**SOFFIT AT WINDOW/DOOR HEAD**  
**Not to Scale**

## **CONSTRUCTION DETAILS - Not to Scale**

- 11/. - 11A/. Envelope Details
- 11B/. Garage Door Details
- 11C/. - 11D/. Miscellaneous Details
- 11E/. Frame/Roof Connection Details
- 11F/. - 11G/. Bracing/Roof Connection Details
- 11H/. Bracing/Roof/Foundation Details
- 11 I/. - 11J/. Plumbing/Drainage/Foundation Details
- 11K/. Tiled Shower Details
- 11L/. - 11N/. Brick Veneer Details
- 11O/. Weatherboard Cladding Details
- 11P/. Beam/Post Details

## **CONSTRUCTION DETAILS - Not to Scale** **Sheet 11**

### **TOP PLATE DETAIL** **Not to Scale**



Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: **the PlanWorkz**

Drawn: S. Neale

Date: 03-10-22

Issue: **A**

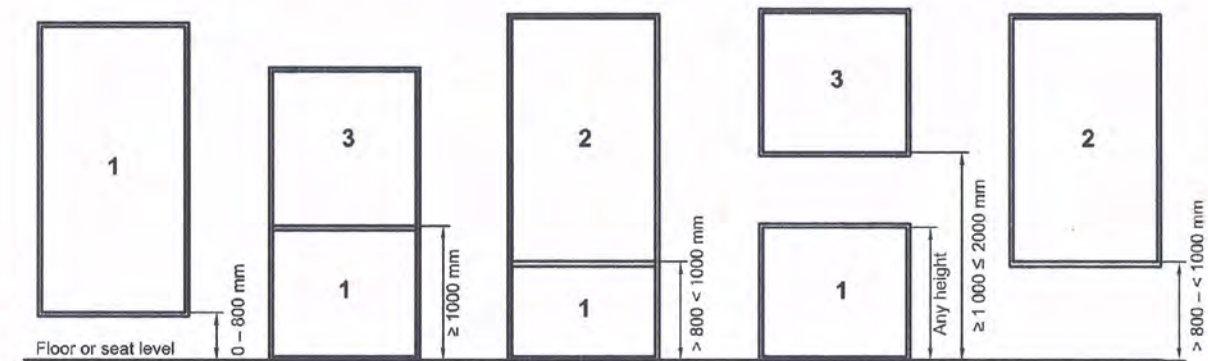
05-05-23

Job Number  
**WA 45MP**

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Email: steve@theplanworkz.co.nz

These plans have been prepared with all reasonable care taken to ensure dimensions and specifications are correct, and in the assumption they will be further checked on site and verified by the building manager who will have a sound knowledge of the NZBC and NZS 3604. If any discrepancy in the drawings is found it is to be immediately reported to the Drawer (Design Plans Ltd) trading as The Plan Workz before any building or related work commences. The Drawer accepts no responsibility for costs resulting from discrepancies in any plans produced which are not reported to the drawer before any building or related work commences. Any works carried out by any contractor, sub contractor or authorised agent of the owner or builder, shall comply with the requirements of the local authority. Any works undertaken outside these requirements without the approval of designer, engineer, & local authority hereby indemnifies the Drawer or agent against any claim or claims in respect to the said works.

Table 7 – Fully framed glazing safeguarding a fall of 1000 mm or more



| Glass selection table             |                                                                                                                       |                                                                                                                         |                                                                                                                                         |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Occupancy type<br>(AS/NZS 1170.1) | Pane 1                                                                                                                | Pane 2                                                                                                                  | Pane 3                                                                                                                                  |
| A (within private dwelling)       | Designed to uniform infill load and human impact<br>Safety glass to Table 1. Minimum 4 mm toughened or 6 mm laminated | Designed to uniform infill load and human impact<br>Safety glass to Table 1 or annealed glass to Table 2 (5 mm minimum) | Designed to wind pressure and human impact<br>Safety glass to Table 1 or annealed glass to Table 2. Check ULS wind pressure of 1.36 kPa |
| A (other), C3, B, & E             | Safety glass to Table 1. Minimum 4 mm toughened or 6 mm laminated                                                     | Safety glass to Table 1 or annealed glass to Table 2 (6 mm minimum)                                                     | Safety glass to Table 1 or annealed glass to Table 2                                                                                    |
| C1/C2, D, & C5                    | Safety glass to Table 1. Minimum 5 mm toughened or 8 mm laminated                                                     | Safety glass to Table 1. Minimum 4 mm toughened or 6 mm laminate                                                        | Safety glass to Table 1                                                                                                                 |

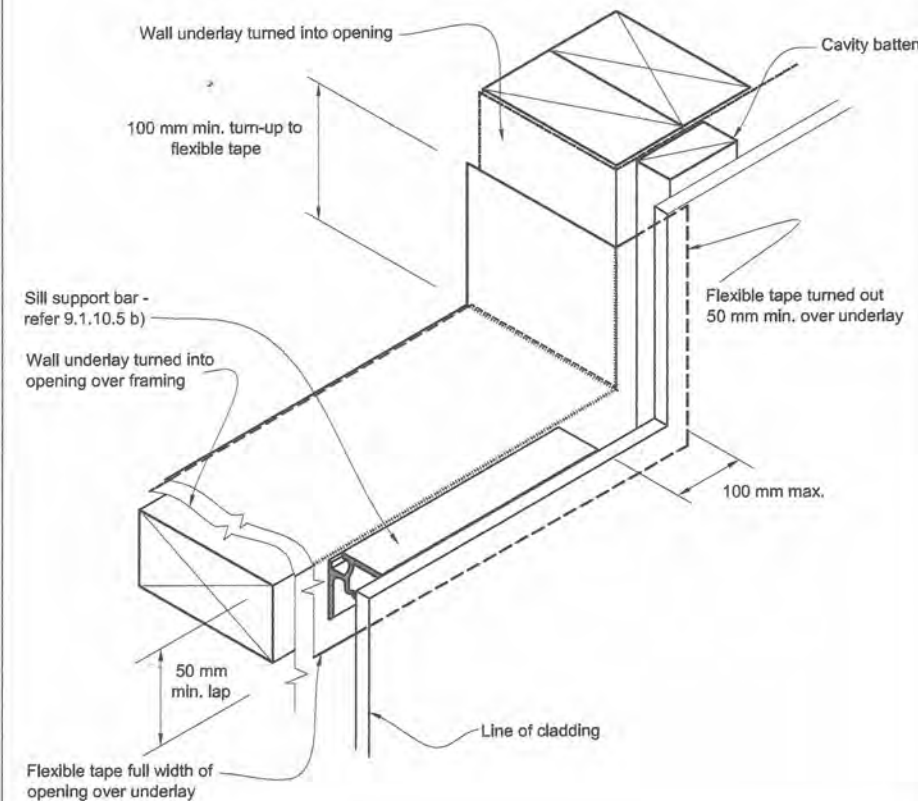
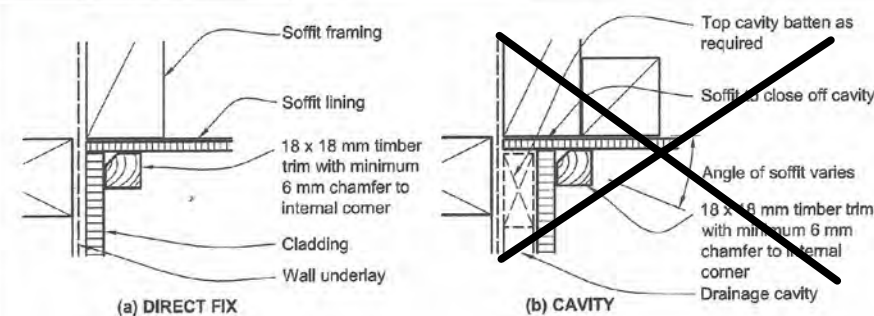
NOTE –

- (1) This figure applies to all glass widths and spans.
- (2) For single glazing the panes shall be also checked for wind pressures to NZS 4223.4.
- (3) For laminated glass the thickness excludes the interlayer.
- (4) For an IGU the inner pane shall be treated as single glazing and the type and thickness shall comply with the relevant table and column for single glazing.
- (5) For an IGU the outer pane shall be designed for the load share of wind pressure from NZS 4223.1 and for wind pressures to NZS 4223.4.
- (6) Uniform infill loads from Table 3.3 of AS/NZS 1170.1 are applied as per B1/VM1.
- (7) Top edge line and concentrated design loads are not applied to the glass pane, and specific design is required for these loads.
- (8) Pane 1 has been checked for an infill concentrated load of 0.35 kN SLS (0.53 kN ULS) which is considered suitable for this type of glazing. Specific design is required for higher loads.

Figure 72B: General window and door opening with drainage cavity  
Paragraphs 9.1.5, 9.1.10.3, 9.1.10.2, Figures 73C, 76, 85, 96, 97, 99, 116 and 138

## NOTE:

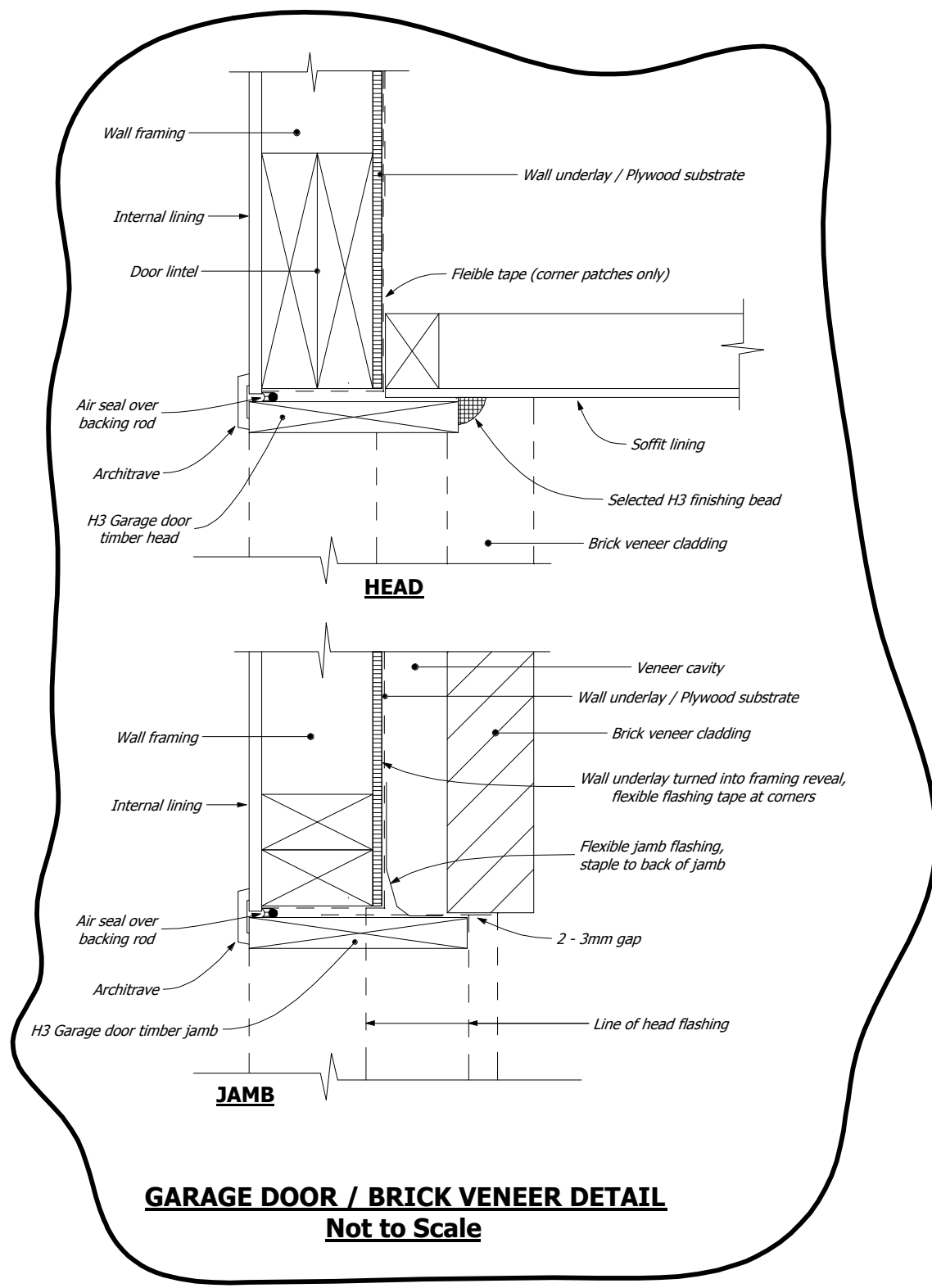
- (1) Detailed cladding omitted for clarity, refer to specific claddings.
- (2) Head to be treated similarly with continuous wall underlay and flexible tape at corners.
- (3) Refer individual cladding details for jamb flashings.

Amend 5  
Aug 2011Figure 8A: Soffit/wall junction  
Paragraphs 5.3, 8.1.3.1, 8.4.6, 9.7.5, 9.6.6

**ENVELOPE DETAILS - Not to Scale**  
**Sheet 11A**

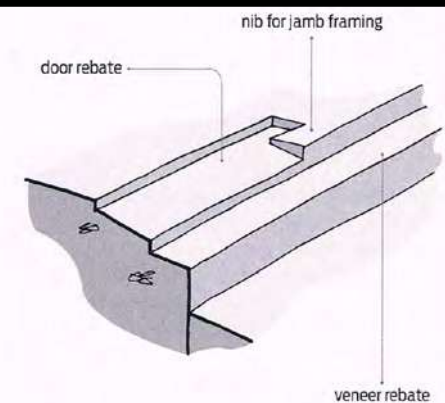
KCDC RFI dated 08/06/23 - Sheets 8a, 8b, 11a, 11b, 11c, 12a, and 12c only  
Prepared by: **The PlanWorkz**  
Drawn: S. Neale  
Date: 03-10-22  
Issue: **A**  
Job Number: **WA 45MP**  
Design Plans Ltd - via The PlanWorkz  
Serving Clients New Zealand Wide  
Email: steve@theplanworkz.co.nz



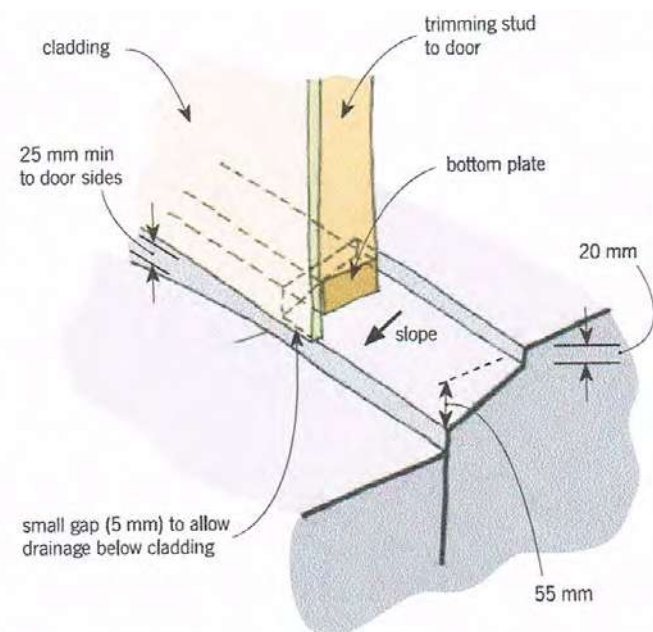


## GARAGE DOOR CONSTRUCTION DETAILS - Not to Scale

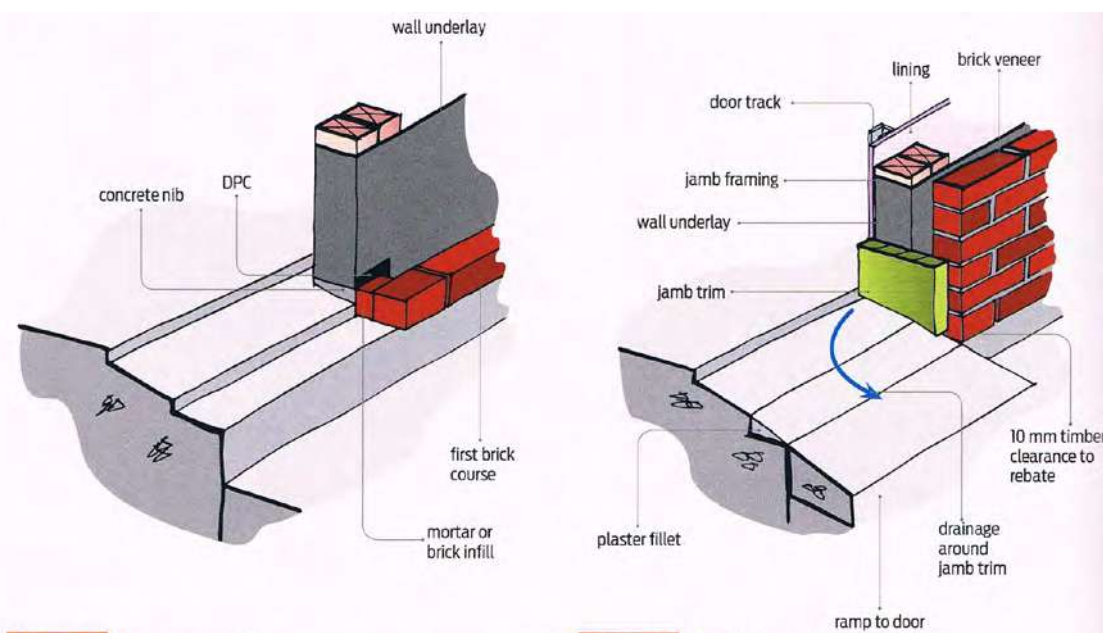
### Sheet 11B



**Figure 4** Detail 2 – Step 1.

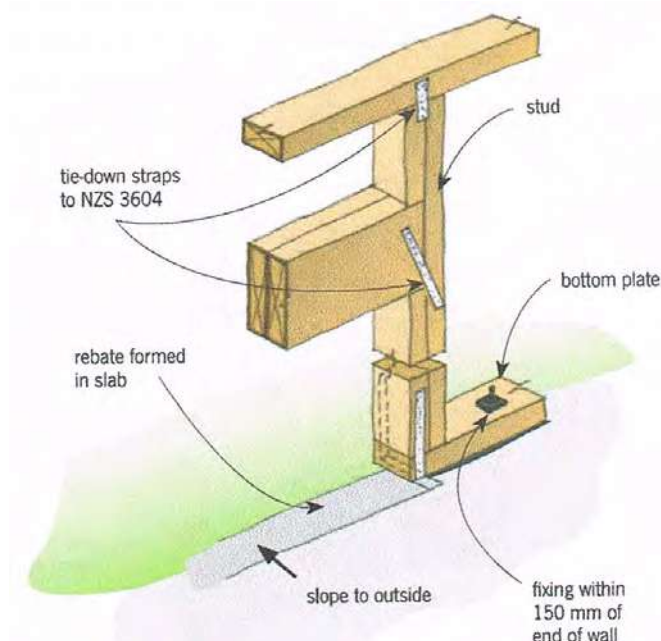


**Figure 3.** Door rebate detail



**Figure 5** Detail 2 – Step 2.

**Figure 6** Detail 2 – Step 3.



**Figure 2** Fixing lintels to prevent uplift

KCDC RFI dated 08/06/23 - Sheets 8a, 8b, 11a, 11b, 11c, 12a, and 12c only

Prepared by: **1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Drawn: **The PlanWorkz**

Date: **S. Neale**

Issue: **05-05-23**

Job Number: **WA 45MP**

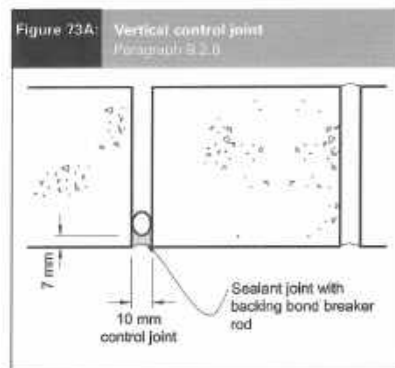
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| Table 7: Metal flashings – general dimensions<br>Paragraphs 4.6, 4.6.1.1, 4.6.1.2, 4.6.1.3, 4.6.1.4, 4.6.1.5, 4.6.1.6, 4.6.1.7, 5.1, 6.4, 6.5, 7.4.4, 8.3.8, 9.1.3, 9.1.10.2, 9.1.10.4 and 9.4.5.7 |                                                                     |             |                                                        |                                  |                                      |                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------|--------------------------------------------------------|----------------------------------|--------------------------------------|---------------------------------------------|
| Type                                                                                                                                                                                               | Description                                                         | All (1)     | Situation 1 (2)<br>minimum<br>mm                       | Situation 2 (3)<br>minimum<br>mm | Situation 3<br>(3a)<br>minimum<br>mm | Figure<br>reference<br>(as example)         |
| Aprons:<br>general                                                                                                                                                                                 | Transverse flashing<br>over roofing                                 |             | 130 (4)                                                | 200 (4)                          | 200 mm                               | Figure 7 and<br>Figure 44<br>(X values)     |
|                                                                                                                                                                                                    | Parallel flashing over<br>roofing                                   |             | Two crests, finish in next trough –<br>refer 4.6.1.1b) |                                  |                                      | Figures 47,<br>48 (Y values)                |
| Ridges/<br>hips                                                                                                                                                                                    | Transverse flashing<br>over roofing                                 |             | Refer Aprons: general                                  |                                  |                                      | Figures 43,<br>45b, 46                      |
| Changes<br>in roof<br>pitches                                                                                                                                                                      | Upper lap under<br>roofing                                          | 250 mm min. |                                                        |                                  | Not permitted<br>under E2/AS1        | Figure 44                                   |
|                                                                                                                                                                                                    | Transverse flashing<br>over roofing                                 |             | Refer Aprons: general                                  |                                  |                                      |                                             |
| Barges                                                                                                                                                                                             | Overlap to barge<br>board                                           |             | 50 (8)                                                 | 70 (8)                           | 90 mm                                | Figure 47<br>(Z values)                     |
| Cappings                                                                                                                                                                                           | Overlaps to cladding                                                |             | 50 (8)                                                 | 70 (8)                           | 90 mm                                | Figure 10<br>(Z values)                     |
|                                                                                                                                                                                                    | Slope to top: parapet<br>and balustrade<br>– metal capping          | 5° min.     |                                                        |                                  |                                      | Figures 10,<br>11, 12, 130                  |
|                                                                                                                                                                                                    | Slope to balustrade<br>– flush-finished EIFS<br>and fibre cement(5) | 10° min.    |                                                        |                                  |                                      | Figures 117,<br>129, 130                    |
| Roof<br>or Deck<br>to Wall                                                                                                                                                                         |                                                                     |             | Refer Aprons: general                                  |                                  |                                      |                                             |
| – See<br>membranes<br>below                                                                                                                                                                        | Lap under cladding<br>above                                         | 75 mm min.  |                                                        |                                  | 90 mm                                | Figures 7, 26,<br>30, 35, 37,<br>44, 48, 50 |
|                                                                                                                                                                                                    | Clearance below<br>cladding                                         | 35 mm min.  |                                                        |                                  |                                      |                                             |
|                                                                                                                                                                                                    | Total upstand                                                       | 110 mm min. |                                                        |                                  |                                      |                                             |

1 August 2011

DEPARTMENT OF BUILDING AND HOUSING

Amend 5  
Aug 2011

| Table 7: continued                                                                                                                                                                        |                                                                                        |                          |                                  |                                  |                                      |                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------|----------------------------------|----------------------------------|--------------------------------------|-------------------------------------|
| Metal flashings – general dimensions<br>Paragraphs 4.6, 4.6.1.1, 4.6.1.2, 4.6.1.3, 4.6.1.4, 4.6.1.5, 4.6.1.6, 4.6.1.7, 5.1, 6.4, 6.5, 7.4.4, 8.3.8, 9.1.3, 9.1.10.2, 9.1.10.4 and 9.4.5.7 |                                                                                        |                          |                                  |                                  |                                      |                                     |
| Membrane roofs and decks                                                                                                                                                                  |                                                                                        | Lap under cladding above | 115 min.                         |                                  |                                      | Figures 18, 62a, c, 64b             |
| Type                                                                                                                                                                                      | Description                                                                            | All (1)                  | Situation 1 (2)<br>minimum<br>mm | Situation 2 (3)<br>minimum<br>mm | Situation 3<br>(3a)<br>minimum<br>mm | Figure<br>reference<br>(as example) |
| Windows                                                                                                                                                                                   | Window flange clearance for direct fixed claddings and ply or fibre cement on cavities | 5 mm                     |                                  |                                  |                                      | Eg. Figure 81                       |
|                                                                                                                                                                                           | Cover to window/door jamb flange                                                       | 10 mm(7) min.            |                                  |                                  |                                      | Eg. Figure 81c                      |
|                                                                                                                                                                                           | Cover to window/door sill flange                                                       | 8 mm(7) min.             |                                  |                                  |                                      | Eg. Figure 81c                      |
| Sills                                                                                                                                                                                     | Sill flashing slope (6)                                                                | Flat(6)                  |                                  |                                  |                                      | Eg. Figures 72a, 81b                |
| Heads                                                                                                                                                                                     | Head flashing slope                                                                    | 15° min.                 |                                  |                                  |                                      | Eg. Figure 81a                      |
|                                                                                                                                                                                           | Lap under cladding above                                                               | 35 mm min.               |                                  |                                  | 60 mm                                | Eg. Figure 81a                      |
|                                                                                                                                                                                           | Anti-capillary gap to cladding                                                         | 5 mm                     |                                  |                                  |                                      | Eg. Figure 81a                      |
|                                                                                                                                                                                           | <b>Total upstand</b>                                                                   | <b>40 mm min.</b>        |                                  |                                  |                                      |                                     |
| Corners                                                                                                                                                                                   | Corner flashings (1)                                                                   | 50 mm x 50 mm minimum    |                                  |                                  | 75 x 75 mm                           | Eg. Figure 79                       |
| Inter-storey junctions                                                                                                                                                                    | Junction flashing: slope                                                               | 15° min.                 |                                  |                                  |                                      |                                     |
|                                                                                                                                                                                           | Lap over cladding below (1)                                                            | 35 mm min.(8)            |                                  |                                  | 60 mm                                | Figure 70                           |
|                                                                                                                                                                                           | Lap under cladding above                                                               | 35 mm min.               |                                  |                                  | 60 mm                                |                                     |
|                                                                                                                                                                                           | Clearance under cladding                                                               | 5 mm min.                |                                  |                                  |                                      |                                     |
|                                                                                                                                                                                           | <b>Total upstand</b>                                                                   | <b>40 mm min.</b>        |                                  |                                  |                                      |                                     |

- NOTES: (1) Unless otherwise dimensioned in details.  
 (2) **Situation 1:** Low, Medium, High wind zones, where roof pitch  $\geq 10^\circ$  (X or Z values)  
 (3) **Situation 2:** All roof pitches in Very High wind zones.  
 Low, Medium and High wind zones where roof pitch  $\geq 10^\circ$  (X or Z values)  
 (3a) **Situation 3:** For all roof pitches in Extra High wind zone.  
 (4) Excluding any soft edge or turn-down to roofing.  
 (5) For buildings other than housing, slope shall be as per F4/AS1.  
 (6) For direct fixed window/doors, unless shown, Sill flashing must extend past the condensation channel. Ensure sill flashings are not installed with backwards slope.  
 (7) Excluding drip edge.  
 (8) Excluding drip edge.

DEPARTMENT OF BUILDING AND HOUSING

24 December 2011

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## EXTERNAL MOISTURE

Acceptable Solution E2/AS1

| Table 23: Properties of roof underlays and building wraps<br>Paragraphs 5.2, 6.1.5, 8.2.3, 8.3.8, 8.4.7, 9.1.3, 9.1.4, 9.1.7.1, 9.1.7.2, 9.1.8.2, 9.2.4, 9.2.6, 9.3.3, 9.3.5.1, 9.4.2, 9.4.3, 9.5.3, 9.5.8.1, 9.6.3.1, 9.6.3.2, 9.7.2.1, 9.8.3 and 9.9.4 |                                                                                                                                                                                                                                 |                             |                                             |                                                               |                           |                       |                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------|---------------------------------------------------------------|---------------------------|-----------------------|-----------------------------------------------------------------------------------------------|
| Category                                                                                                                                                                                                                                                 | Application                                                                                                                                                                                                                     | Vapour resistance           | Absorbency                                  | Water resistance                                              | pH of extract             | Shrinkage             | Mechanical                                                                                    |
| <b>Roof (1) Underlay</b><br>(Bitumen and fire-retardant paper-based products)(2)                                                                                                                                                                         | All roofs                                                                                                                                                                                                                       | $\leq 7$ MN s/g ASTM E96 B. |                                             | NZS 2295: 2006 section 3                                      |                           |                       |                                                                                               |
| <b>Flexible Wall Underlay</b><br>(Includes paper and synthetic underlays)                                                                                                                                                                                | Wall claddings over a cavity(6)<br>Flexible underlays over rigid underlays – refer Paragraph 9.1.7 (h)<br>Direct fixed absorbent wall claddings(4)<br>(eg. timber, fibre cement etc)<br>Direct fixed non-absorbent claddings(3) |                             |                                             | NZS 2295: 2006 section 2<br>No minimum Absorbency requirement |                           |                       |                                                                                               |
| <b>Rigid Wall Underlay</b><br>(plywood(5) and fibre cement sheet)                                                                                                                                                                                        | Wall claddings over a cavity(6)<br>Direct fixed absorbent wall claddings (eg. timber, fibre cement etc)                                                                                                                         | $\leq 7$ MN s/g ASTM E96 B. |                                             | $\geq 20$ mm NZS 2295                                         |                           |                       |                                                                                               |
| <b>Air Barrier</b>                                                                                                                                                                                                                                       | Where no internal linings                                                                                                                                                                                                       | $\leq 7$ MN s/g ASTM E96 B. | $\geq 100$ g/m <sup>2</sup> (7)<br>NZS 2295 | $\geq 20$ mm NZS 2295                                         | $\geq 6.0$ and $\leq 9.0$ | $\leq 0.5\%$ NZS 2295 | Edge tear strength NZS 2295<br>Air resistance BS 6538: Part 3: $\geq 0.1$ MN s/m <sup>3</sup> |
| <b>DPC/DPM</b>                                                                                                                                                                                                                                           | All applications                                                                                                                                                                                                                | $\geq 90$ MN s/g ASTM E96   |                                             |                                                               |                           |                       |                                                                                               |

- NOTE:  
 1) Metal roofs and direct-fixed metal wall claddings require paper-based underlays  
 2) Excluding synthetic underlays  
 3) Use paper based underlays where directly behind (in contact with) profiled metal wall cladding  
 4) Excludes profiled metal wall cladding  
 5) Plywood to be treated in accordance with NZS 3802  
 6) Bitumen based products shall not be used in direct contact with LOSP-treated plywood  
 7) Applies only to air barriers used with non-absorbent claddings.

Amend 5  
Aug 2011

| Table 18B: Placement of wall ties<br>Paragraphs 9.2.2 and 9.2.3                                 |                                                                               |
|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Location                                                                                        | Placement of masonry ties                                                     |
| Unsupported panel sides and edges of openings                                                   | Within 300 mm of panel side or edge.                                          |
| Top of veneer panels and top of panels under openings                                           | Within 300 mm or two courses (whichever is the smaller) of top of veneer      |
| Bottom of veneer panel in masonry rebate sealed with liquid applied damp-proof course           | Within 300 mm or two courses (whichever is the smaller) from bottom of veneer |
| Bottom of veneer panel supported on steel angle lintel                                          |                                                                               |
| Bottom of veneer panel in masonry rebate with membrane damp-proof course                        | In each of the first two courses                                              |
| NOTES:<br>Ties are to be screw fixed (ie. non-impact method) using screws outlined in Table 24. |                                                                               |

Amend 5  
Aug 2011

| Table 18C: Corrosion protection to masonry wall ties<br>Paragraph 9.2.3 |                                   |                                                |
|-------------------------------------------------------------------------|-----------------------------------|------------------------------------------------|
| Zone                                                                    | 316, 316L, or 304 stainless steel | 470 g/m <sup>2</sup> galvanising on mild steel |
| Zone B                                                                  | Yes                               | Yes                                            |
| Zone C                                                                  | Yes                               | Yes                                            |
| Zone D                                                                  | Yes                               | Yes                                            |

Amend 2  
Dec 2011

| Table 18D: Corrosion protection to fixings<br>Paragraph 9.2.3 |                                                                                                                |                                                                                                                            |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Zone                                                          | 316 or 316L or 304(2) stainless steel or 600 g/m <sup>2</sup> galvanising on mild steel plus duplex coating(1) | 500 g/m <sup>2</sup> galvanising on mild steel(1) or 300 g/m <sup>2</sup> galvanising on mild steel plus duplex coating(1) |
| Zone C                                                        | Yes                                                                                                            | Yes                                                                                                                        |
| Zone D                                                        | Yes                                                                                                            | Yes                                                                                                                        |

- 1) To AS/NZS 2698.3  
 2) 304 stainless steel will exhibit greater levels of surface rusting than 316 stainless steel, especially where not exposed to rain washing.

Amend 5  
Aug 2011

## MISCELLANEOUS DETAILS - Not to Scale

### Sheet 11C

230413  
 Received by  
 Kapiti Coast District Council  
 26/05/23

Proposed New Dwelling for:  
 1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by:  
 The PlanWorkz

Drawn: S. Neale  
 Date: 03-10-22

Issue: A  
 05-05-23

Job Number  
 WA 45MP

Design Plans Ltd - via The PlanWorkz  
 Servicing Clients New Zealand Wide  
 Email: steve@theplanworkz.co.nz

These Plans have been prepared with all reasonable care taken to ensure dimensions and specifications are correct, and in the assumption they will be further checked on site and verified by the building manager who will have a sound knowledge of the NZBC and NZS 3804. If any discrepancy in the drawings is found it is to be immediately reported to the Drawer (Design Plans Ltd) before any building or related work commences. Any works carried out by any contractor, sub-contractor or authorised agent of the owner or builder, shall comply with the requirements of the local authority. Any works undertaken outside these requirements without the approval of designer, engineer & local authority hereby indemnifies the Drawer or agent against any claim or claims in respect to the said works.



## SECTION 10 – ROOF FRAMING

NZS 3604:2011

Table 10.18 – Nailing schedule for hand-driven and power-driven nails (see 10.5.1)

| Joint                                                                                          | Hand-driven nails                                              |                            | Power-driven nails                                            |                            |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------|---------------------------------------------------------------|----------------------------|
|                                                                                                | Length (mm) x diameter (mm) and type                           | Number/ Location           | Length (mm) x diameter (mm) and type                          | Number/ Location           |
| <b>Roof framing</b>                                                                            |                                                                |                            |                                                               |                            |
| Rafter or jack rafter to ridge board or top plate (except skillion roofs) (see 10.2.1.3.7)     | See table 10.1                                                 | See table 10.1             | See table 10.1                                                | See table 10.1             |
| Truss to top plate of external wall                                                            | See tables 10.14 and 10.15                                     | See tables 10.14 and 10.15 | See tables 10.14 and 10.15                                    | See tables 10.14 and 10.15 |
| Truss to top plate of internal wall                                                            | 100 x 3.75                                                     | 2                          | 90 x 3.15                                                     | 2                          |
| Ceiling batten to parallel top plate of internal wall bracing element                          | 75 x 3.15                                                      | 2 at 400 mm centres        | 90 x 3.15                                                     | 2 at 400 mm centres        |
| Collar tie or cleat to rafter                                                                  | 75 x 3.15                                                      | 4                          | 75 x 3.06                                                     | 4                          |
| Fitches to ridge board and roof members for each side on both joints                           | 60 x 2.8                                                       | 3                          | 60 x 2.8                                                      | 3                          |
| Hip rafter to top plate                                                                        | See table 10.1                                                 | See table 10.1             | See table 10.1                                                | See table 10.1             |
| Underpurlin strut to underpurlin or top plate or strutting beam                                | 100 x 3.75 together with fixing types as set out in table 10.5 | 2                          | 90 x 3.15 together with fixing types as set out in table 10.5 | 3                          |
| Strutting beam to top plate                                                                    | See table 10.7                                                 | See table 10.7             | See table 10.7                                                | See table 10.7             |
| Roof braces at each connection to a framing member:                                            |                                                                |                            |                                                               |                            |
| (a) 90 mm x 19 mm brace                                                                        | 75 x 3.15                                                      | 3                          | 75 x 3.15                                                     | 3                          |
| (b) 70 mm x 45 mm brace runner                                                                 | 100 x 3.75                                                     | 2                          | 90 x 3.15                                                     | 3                          |
| (c) 90 mm x 45 mm brace                                                                        | 100 x 3.75                                                     | 3                          | 90 x 3.15                                                     | 5                          |
| (d) Steel strip brace                                                                          |                                                                |                            |                                                               |                            |
| (i) At ends                                                                                    | 60 x 3.15                                                      | 3                          | –                                                             | –                          |
| (ii) Other cases                                                                               | 60 x 3.15                                                      | 2                          | –                                                             | –                          |
| (iii) To ends of braces                                                                        | –                                                              | –                          | –                                                             | –                          |
| NOTE –                                                                                         |                                                                |                            |                                                               |                            |
| (1) Nail lengths and diameters are the minimum required.                                       |                                                                |                            |                                                               |                            |
| (2) Refer to 4.4 for required protective coatings for metal fasteners.                         |                                                                |                            |                                                               |                            |
| (3) Proprietary fixings with the required fixing capacity indicated in the tables may be used. |                                                                |                            |                                                               |                            |

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## SECTION 10 – ROOF FRAMING

NZS 3604:2011

Table 10.18 – Nailing schedule for hand-driven and power-driven nails (continued) (see 10.5.1)

| Joint                                                                                          | Hand-driven nails                    |                                 | Power-driven nails                   |                                 |
|------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------|--------------------------------------|---------------------------------|
|                                                                                                | Length (mm) x diameter (mm) and type | Number/ Location                | Length (mm) x diameter (mm) and type | Number/ Location                |
| <b>Roof framing (continued)</b>                                                                |                                      |                                 |                                      |                                 |
| Blocking between rafters, joists or truss chords, 90 mm x 45 mm                                | 100 x 3.75                           | 2 (end nailed)                  | 90 x 3.15                            | 2 (end nailed)                  |
| Outrigger to gable top plate (as for equivalent purlins)                                       | See table 10.10 and table 10.11      | See table 10.10 and table 10.11 | See table 10.10 and table 10.11      | See table 10.10 and table 10.11 |
| Outrigger to rafter                                                                            | 100 x 3.75 or 75 x 3.15              | 2 (end nailed) 4 (skewed)       | 90 x 3.15                            | 3 (end nailed)                  |
| Flying rafter to outrigger                                                                     | 100 x 3.75                           | 2                               | 90 x 3.15                            | 3                               |
| Outrigger blocking to top plate                                                                | 100 x 3.75                           | 4 (skewed)                      | 90 x 3.15                            | 4 (skewed)                      |
| Purlin or batten directly to rafter or top chord                                               | See table 10.10 and table 10.11      | See table 10.10 and table 10.11 | See table 10.10 and table 10.11      | See table 10.10 and table 10.11 |
| <b>Roof sarking</b>                                                                            |                                      |                                 |                                      |                                 |
| Board sarking to rafters or top chords:                                                        |                                      |                                 |                                      |                                 |
| (a) Boards not exceeding 75 mm wide                                                            | 2½ x finished thickness              | 1                               | –                                    | –                               |
| (b) Boards exceeding 75 mm wide                                                                |                                      | 2                               | –                                    | –                               |
| Sheet material for sheet sarking to:                                                           |                                      |                                 |                                      |                                 |
| (a) Rafters or top chords at sheet edges                                                       | 30 x 2.5 FH                          | 150 mm centres                  | –                                    | –                               |
| (b) Intermediate supports                                                                      |                                      | 300 mm centres                  | –                                    | –                               |
| Purlins or battens through sarking to rafter or top chord                                      | See table 10.15                      | See table 10.15                 | See table 10.15                      | See table 10.15                 |
| NOTE –                                                                                         |                                      |                                 |                                      |                                 |
| (1) Nail lengths and diameters are the minimum required.                                       |                                      |                                 |                                      |                                 |
| (2) Refer to 4.4 for required protective coatings for metal fasteners.                         |                                      |                                 |                                      |                                 |
| (3) Proprietary fixings with the required fixing capacity indicated in the tables may be used. |                                      |                                 |                                      |                                 |

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Table 13.1 – Ceiling battens (see 13.2.1 and 13.2.2)

| Maximum spacing of ceiling battens (mm) | Size of ceiling battens for a maximum span (mm) of: |               |                |
|-----------------------------------------|-----------------------------------------------------|---------------|----------------|
|                                         | 600 (mm x mm)                                       | 900 (mm x mm) | 1200 (mm x mm) |
| 400                                     | 45 x 19                                             | 70 x 35       | 70 x 35        |
| 600                                     | 70 x 19                                             | 70 x 35       | 70 x 35        |

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Table 8.18 – Fixing of top plate of wall to supporting members such as studs and lintels at 600 mm centres (see 8.7.6 and figure 8.12)

| Loaded dimension of wall (m) | Light roof                            |   |   |    |    |           |   |   |    |    | Heavy roof                          |   |   |    |    |  |  |  |  |  |
|------------------------------|---------------------------------------|---|---|----|----|-----------|---|---|----|----|-------------------------------------|---|---|----|----|--|--|--|--|--|
|                              | Roof member spacing (mm)              |   |   |    |    |           |   |   |    |    |                                     |   |   |    |    |  |  |  |  |  |
|                              | 900                                   |   |   |    |    | 1200      |   |   |    |    | 900                                 |   |   |    |    |  |  |  |  |  |
|                              | Wind zone                             |   |   |    |    | Wind zone |   |   |    |    | Wind zone                           |   |   |    |    |  |  |  |  |  |
|                              | L                                     | M | H | VH | EH | L         | M | H | VH | EH | L                                   | M | H | VH | EH |  |  |  |  |  |
| Fixing type (see below)      |                                       |   |   |    |    |           |   |   |    |    |                                     |   |   |    |    |  |  |  |  |  |
| 2.0                          | A                                     | A | B | B  | B  | A         | A | B | B  | B  | A                                   | A | A | B  | B  |  |  |  |  |  |
| 3.0                          | A                                     | A | B | B  | B  | A         | A | B | B  | B  | A                                   | A | A | B  | B  |  |  |  |  |  |
| 4.0                          | A                                     | A | B | B  | B  | A         | A | B | B  | B  | A                                   | A | A | B  | B  |  |  |  |  |  |
| 5.0                          | B                                     | B | B | B  | B  | B         | B | B | B  | B  | A                                   | A | A | B  | B  |  |  |  |  |  |
| 6.0                          | B                                     | B | B | B  | B  | B         | B | B | B  | B  | A                                   | A | A | B  | B  |  |  |  |  |  |
| Fixing type                  | Fixing to resist uplift               |   |   |    |    |           |   |   |    |    | Capacity of alternative fixing (kN) |   |   |    |    |  |  |  |  |  |
| A                            | 2 / 90 x 3.15 end nails               |   |   |    |    |           |   |   |    |    | 3.7                                 |   |   |    |    |  |  |  |  |  |
| B                            | 2 / 90 x 3.15 end nails + 2 wire dogs |   |   |    |    |           |   |   |    |    | 4.7                                 |   |   |    |    |  |  |  |  |  |

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## MISCELLANEOUS DETAILS - Not to Scale

### Sheet 11D

Prepared by: **1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Drawn: **PlanWorkz**

Date: **03-10-22**

Issue: **A**

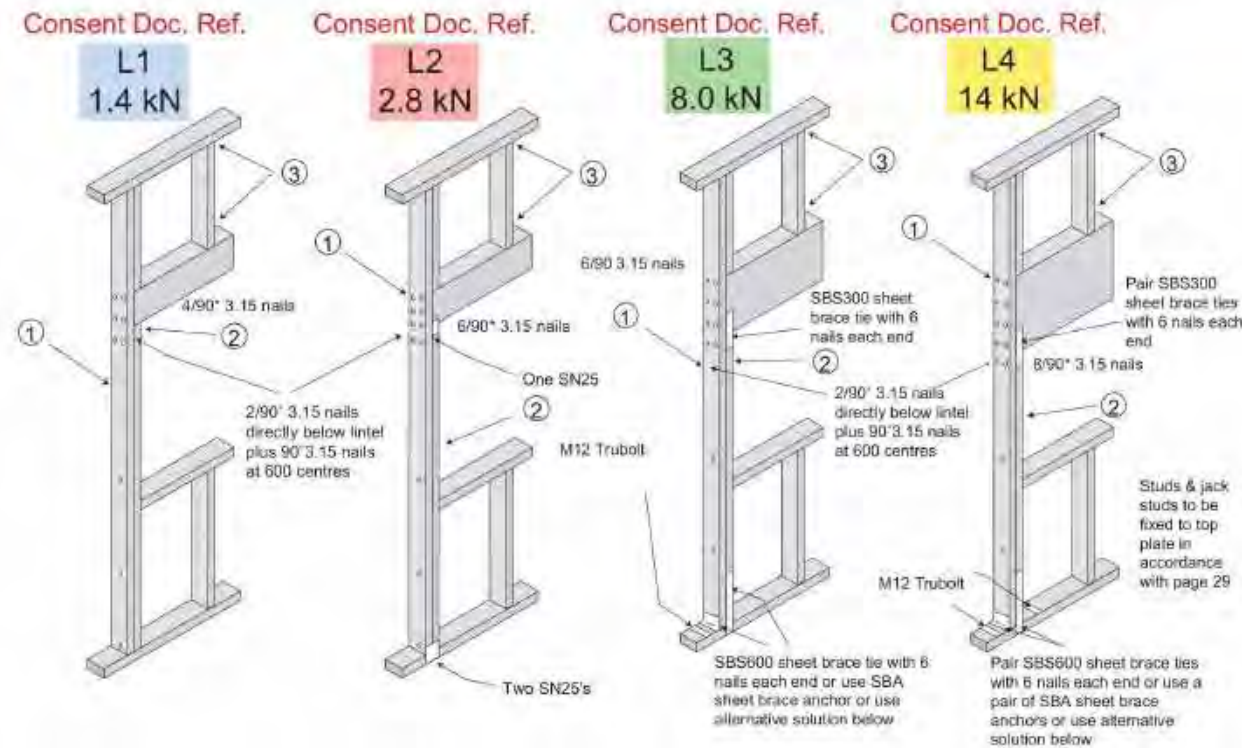
Job Number: **WA 45MP**

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# ACCEPTABLE SOLUTIONS IN CONJUNCTION WITH TABLES 8:14 & FIG 8:12 OF NZS3604:2011



1. For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90° 3.15 nails.
2. Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of trimming studs.
3. Studs & jacks to be fixed to top plate in accordance with the Top Plate to Stud Fixing Guide on pg. 39. Same fixing is required for jack stud to lintel.

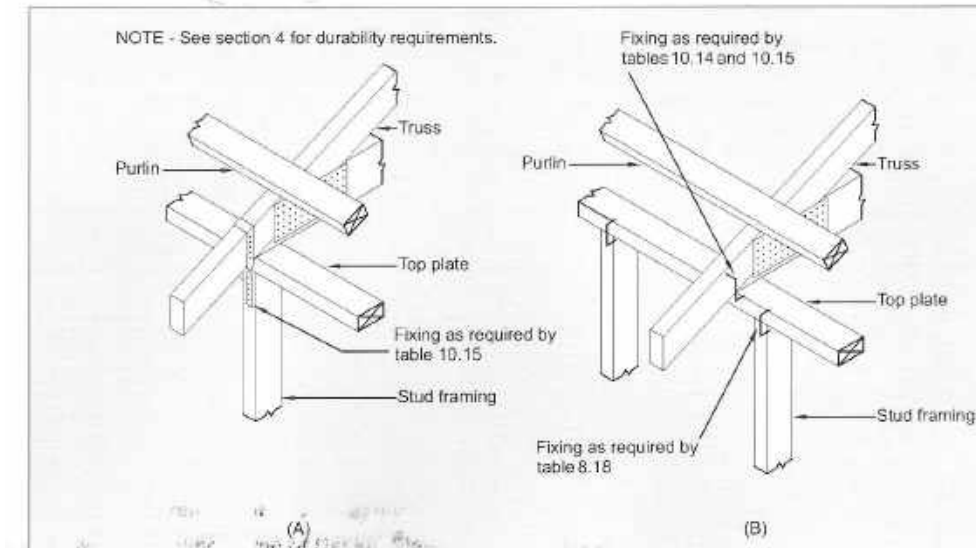


Figure 10.21 – Truss/top plate connections (see 10.2.2.6)

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**FRAME/ROOF CONNECTION DETAILS - Not to Scale**  
**Sheet 11E**

Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: **the PlanWorkz**

Drawn: S. Neale  
Date: 03-10-22

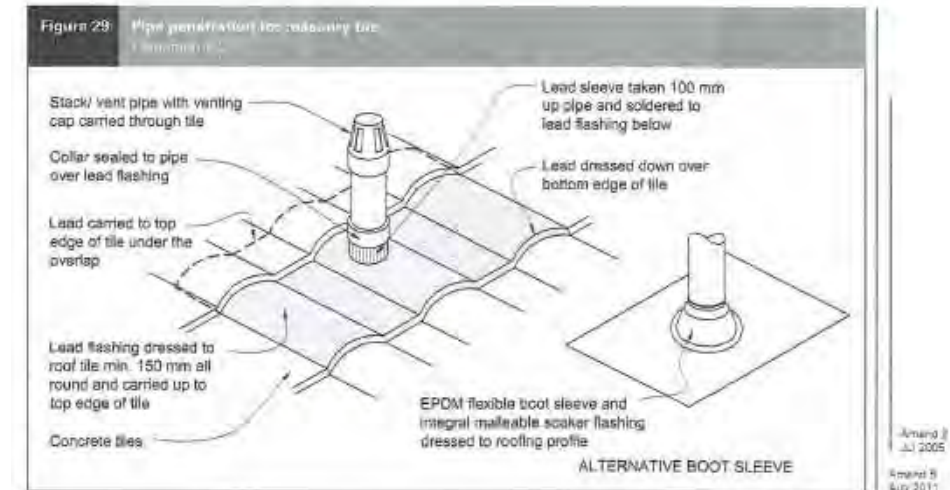
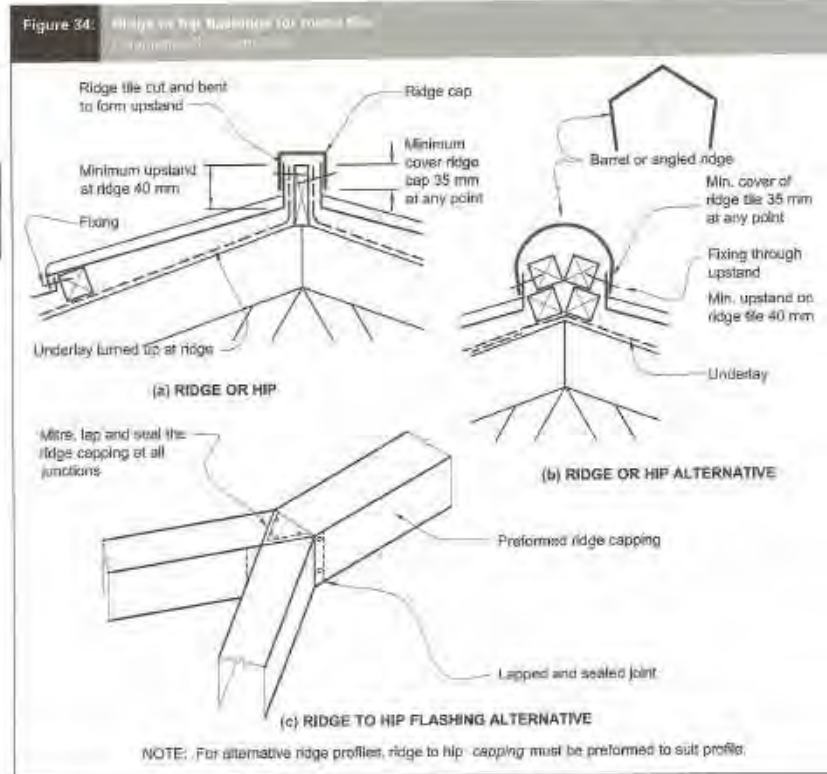
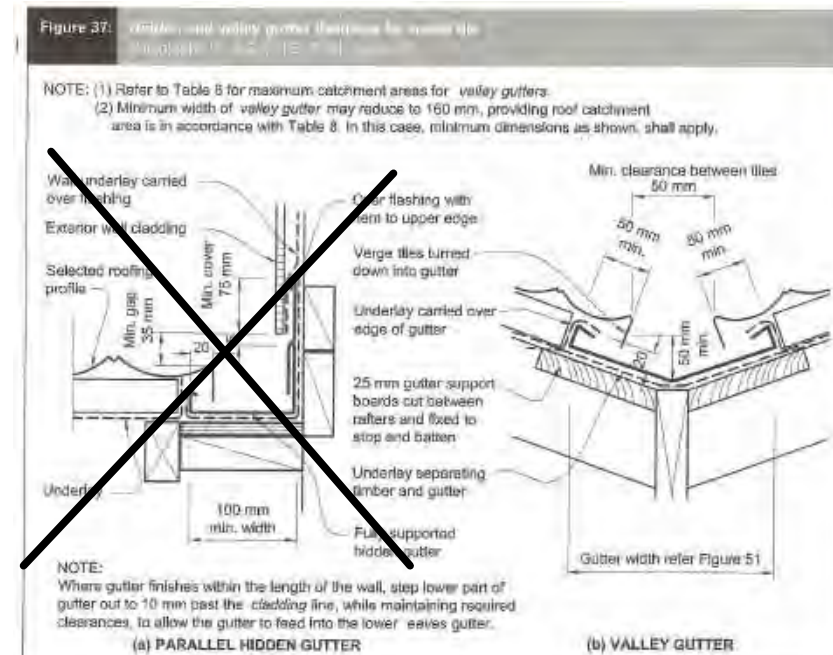
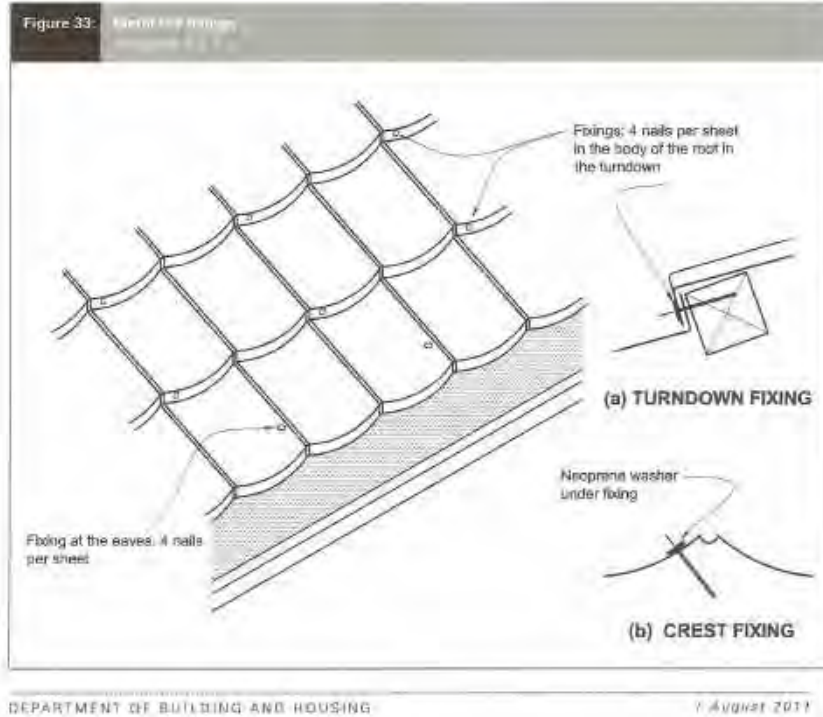
Issue: **A**  
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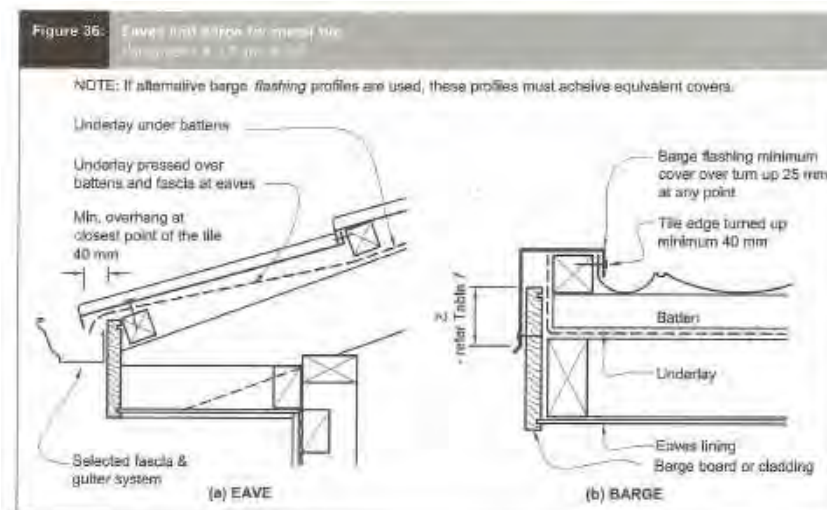
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**Metal Tile Roof Penetration:**  
**Use above Fig 29 as per masonry tiles notation in E2/AS1 8.3.10**



**BRACING/ROOF DETAILS - Not to Scale**  
**Sheet 11F**

**Proposed New Dwelling for:**  
**1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Prepared by: **PlanWorkz**

Drawn: **S. Neale**

Date: **03-10-22**

Issue: **A**

Job Number: **WA 45MP**

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Issue: **05-05-23**



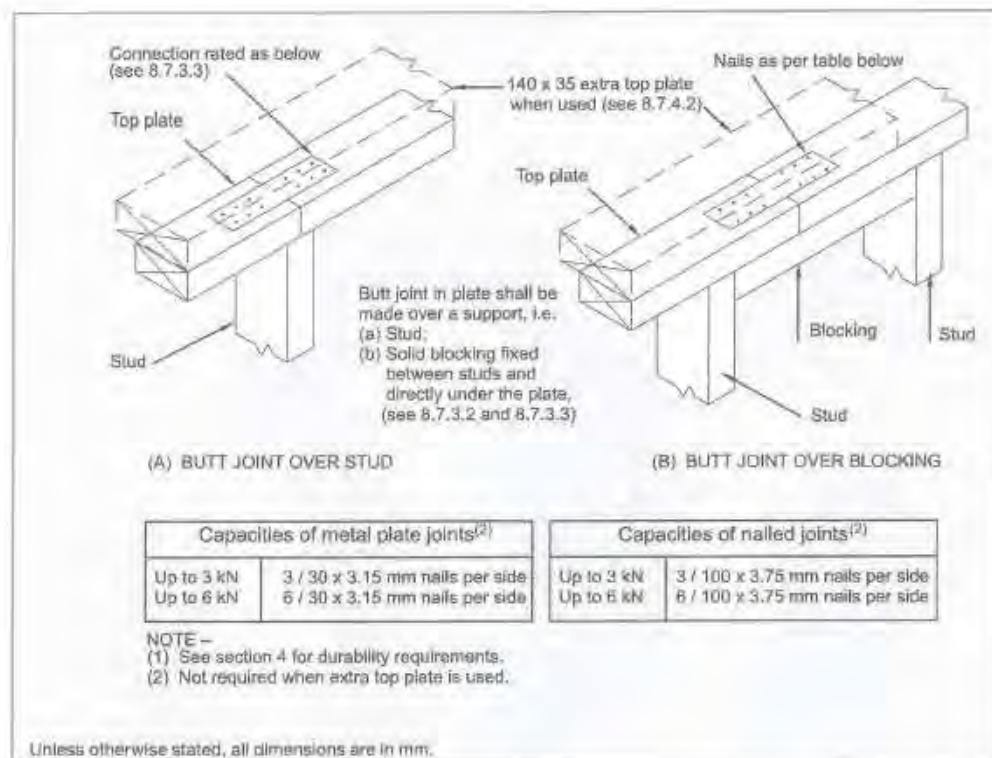


Figure 8.15 – Connecting top plates in line – Walls containing bracing (see 8.7.3.3)

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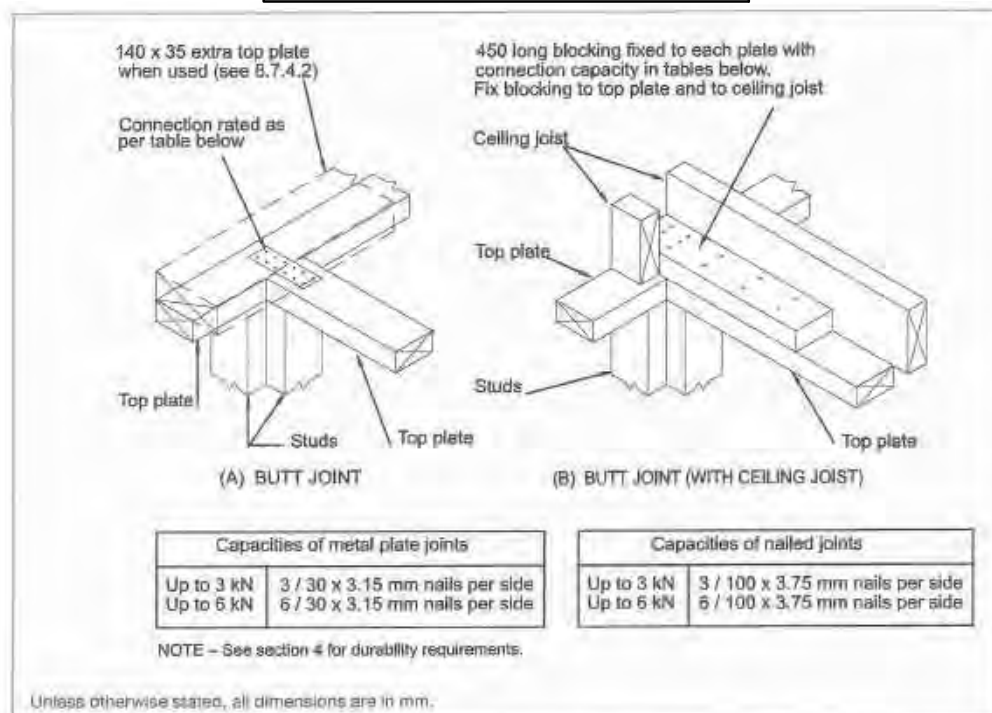
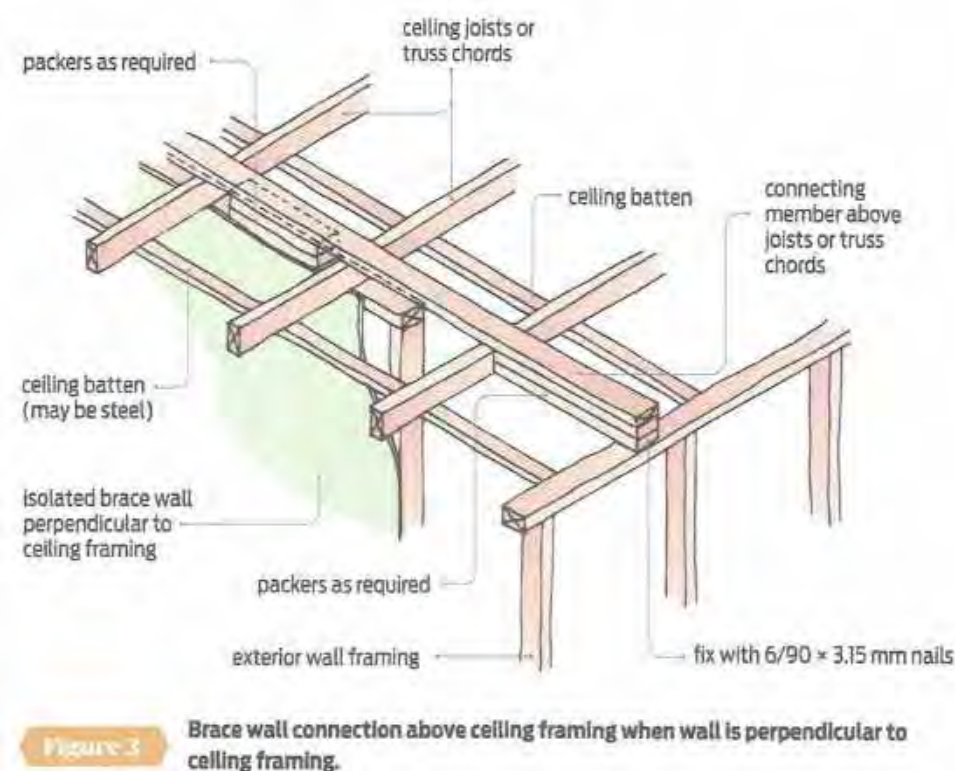
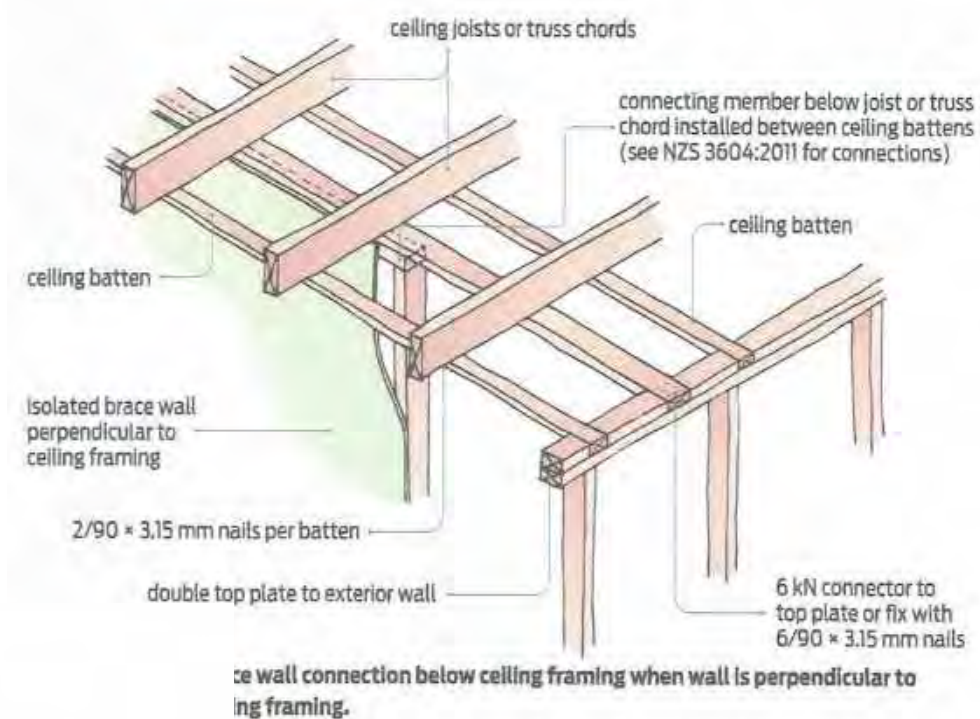
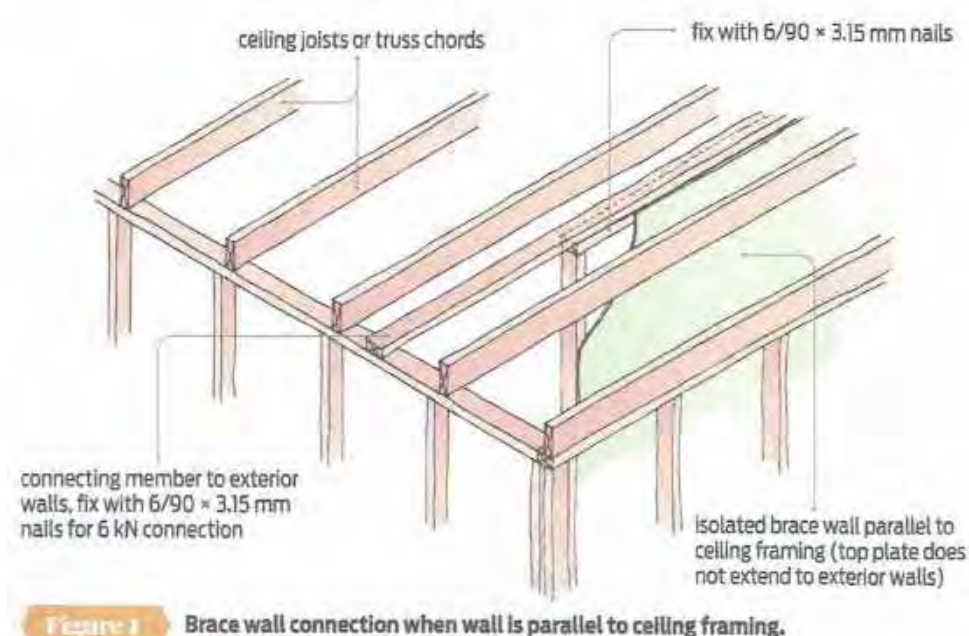


Figure 8.16 – Connecting top plates to external walls at right angles - Walls containing bracing (see 8.7.3.4)

## BRACING/ROOF DETAILS - Not to Scale

### Sheet 11G



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Proposed New Dwelling for:  
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Prepared by: **the PlanWorkz**

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Drawn: S. Neale  
Date: 03-10-22  
Issue: 05-05-23  
Job Number: WA 45MP



## 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           | 0.4m                | Ecoply® one side    | 80          | 95                |
| EPI_0.6           | 0.6m                | Ecoply one side     | 95          | 105               |
| EPI_1.2           | 1.2m                | Ecoply one side     | 120         | 135               |

## 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 HandBrac® 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 7mm, 9mm or 12mm 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 2-3mm expansion gap should be left between sheets.

## Fastening the Ecoply® Panels

Fasten with 50 x 2.8mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7mm 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.

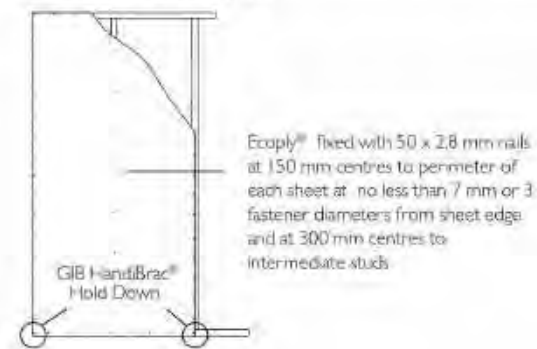
## Fasteners for H3.2 CCA Treated Ecoply Panels

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 150mm centres around the perimeter of each sheet and 300mm 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 HandBrac® are registered trade marks of Fletcher Building Holdings Ltd.

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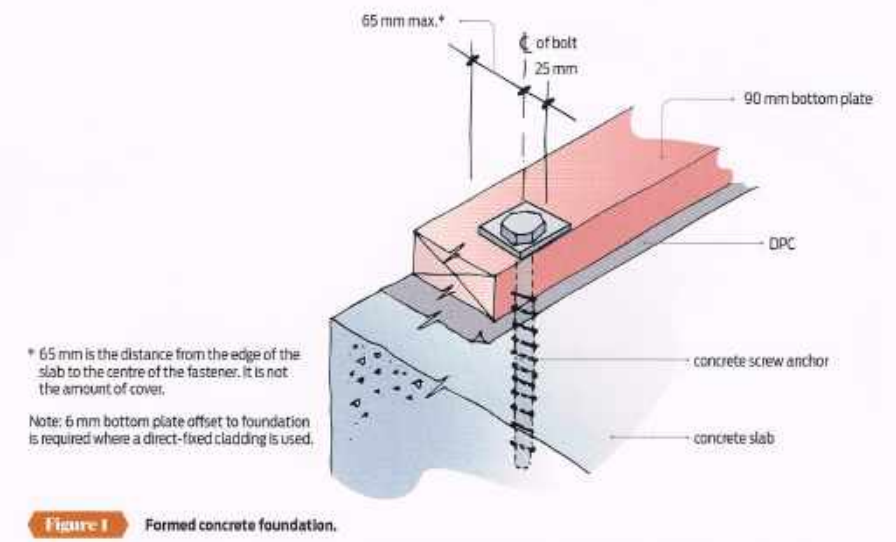


Table 8: Maximum catchment areas for valley gutters  
Paragraphs 8.1.6.2, 8.4.16.2, 9.7.7.1, 9.8.4.4, 9.8.10.1, Figures 27, 37 and 51

| Gutter width     | Maximum catchment area | Minimum roof pitch |
|------------------|------------------------|--------------------|
| 250 mm           | 25 m <sup>2</sup>      | 8°                 |
| 180 mm to 249 mm | 15 m <sup>2</sup>      | 12.5°              |

**NOTE: Catchment areas are limited to:**

- Gutters in accordance with Paragraph 8.1.6.2.
- Rainfall intensity with average recurrence interval (ARI) no greater than 200 mm per hour.

Amend 5  
Aug 2011

## COMMENT:

Gutters for lower-pitched roofs, or for catchment areas other than those shown in Table 8, require specific design. Additional information may be found in the New Zealand Metal Roof and Wall Cladding Code of Practice.

Amend 5  
Aug 2011

## BRACING/ROOF/FOUNDATION DETAILS - Not to Scale

### Sheet 11H

Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: PlanWorkz

Drawn: S. Neale

Date: 03-10-22

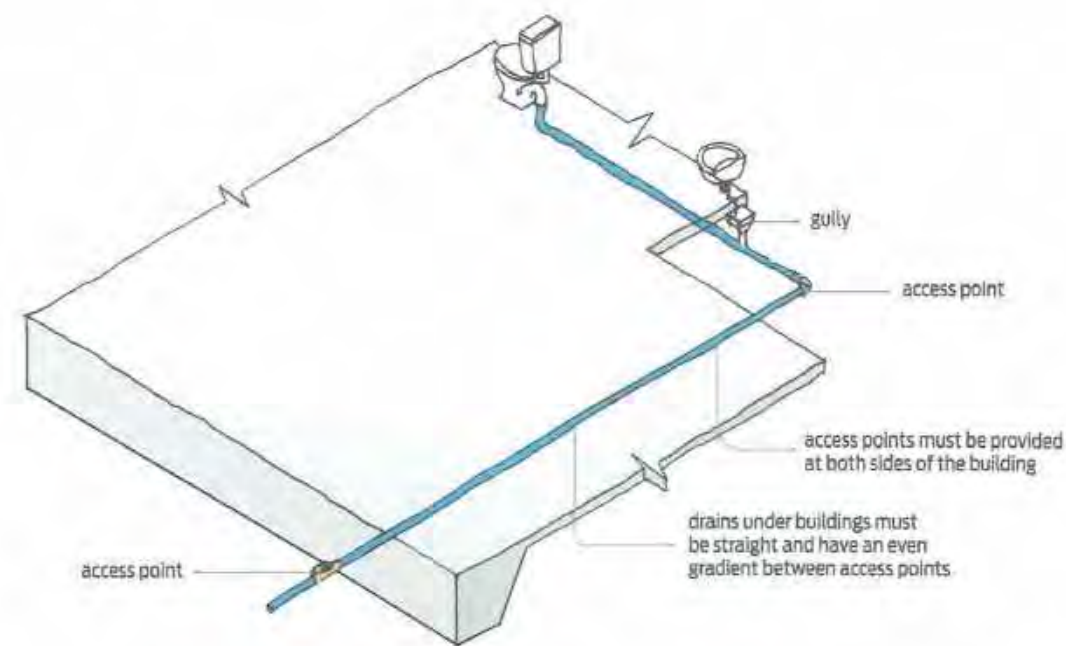
Issue: 05-05-23

Job Number: WA 45MP

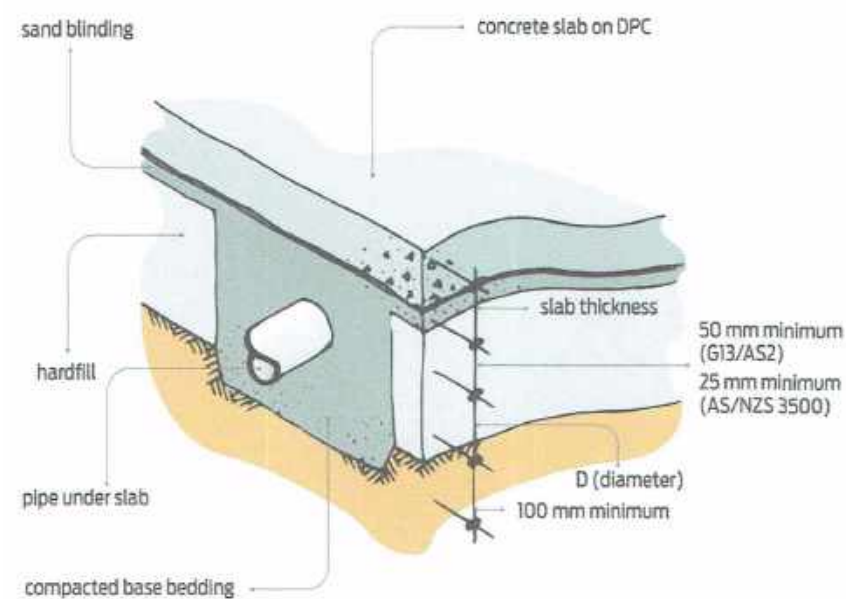
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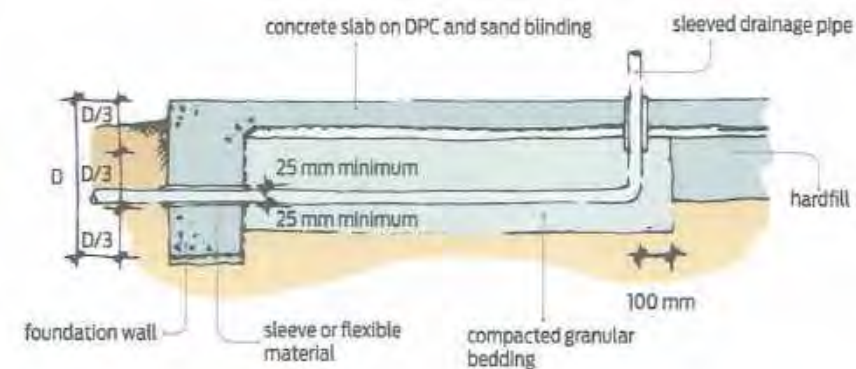




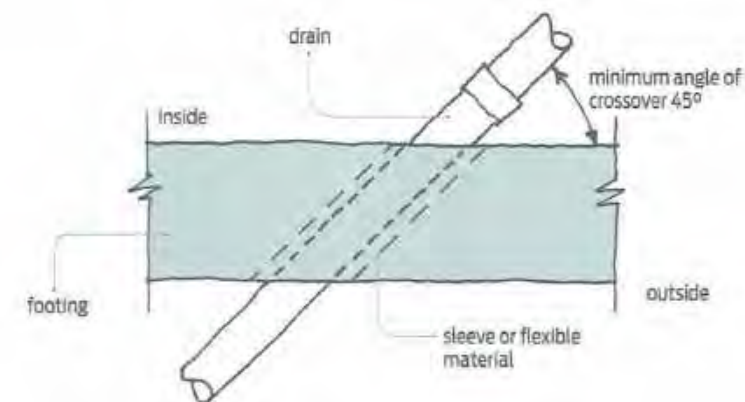
**Figure 1** Drainage pipes under concrete slab.



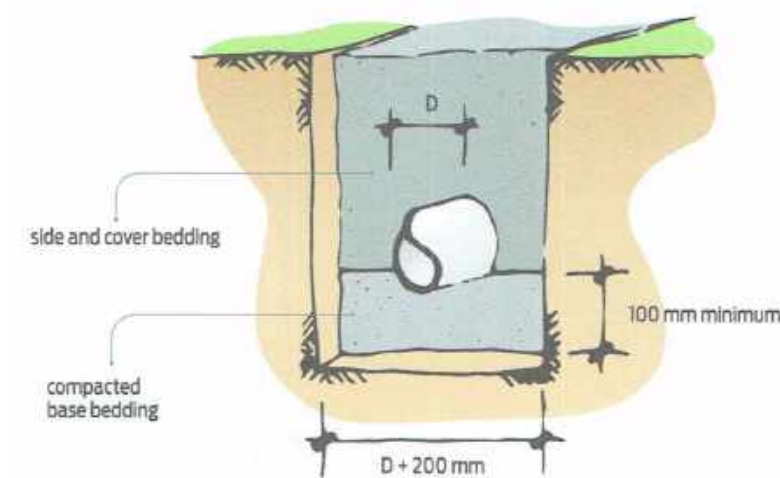
**Figure 2** Clearance between pipe and slab.



**Figure 3** Drainage pipe through foundation beam.



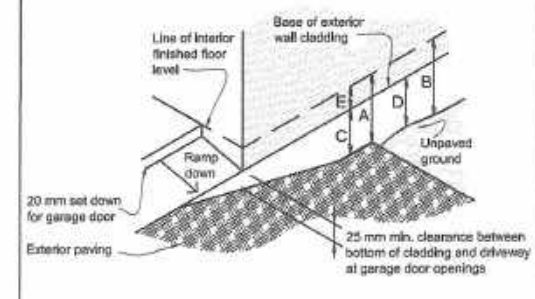
**Figure 4** Pipe passing through a footing (plan view).



**Figure 5** Trench bedding and backfilling outside slab area.

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**Figure 65:** Levels and garage openings  
Paragraphs 9.1.3, 9.1.3.4, 9.2.5,  
Table 18



Amend 5  
Aug 2011

**Table 18:** Minimum clearances  
Paragraphs 9.1.3, 9.1.3.1, 9.1.3.2,  
9.1.3.3, 9.1.3.4, 9.1.3.5 and 9.2.7

Amend 5  
Aug 2011

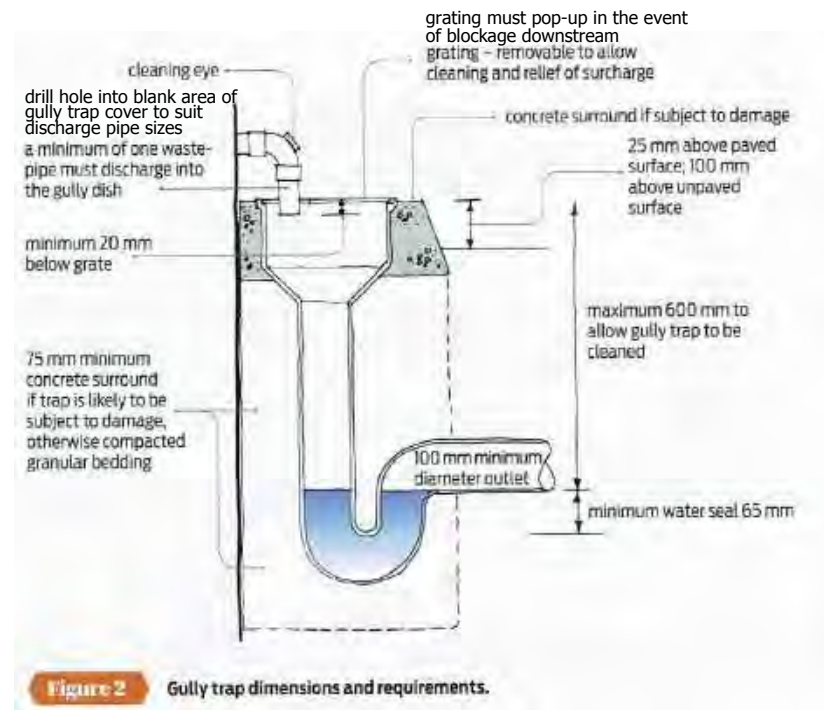
| Minimum clearances (mm) | Masonry veneer |     | Other claddings |     |     |     |    |
|-------------------------|----------------|-----|-----------------|-----|-----|-----|----|
|                         | A              | B   | A               | B   | C   | D   | E  |
| Concrete slab           | 100            | 150 | 150             | 225 | 100 | 175 | 50 |
| Timber floor            | Refer Note 1)  |     |                 |     | 100 | 175 | 50 |

**NOTE:** 1) Refer to NZS 3604 for requirements.

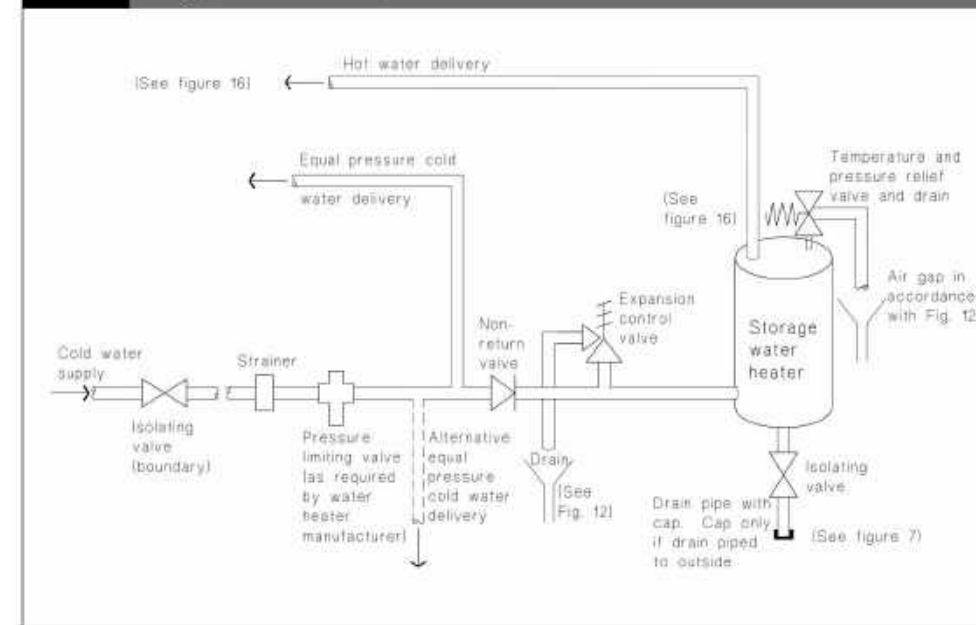
2) Cladding to extend minimum 50 mm below bearer or lowest part of timber floor framing.

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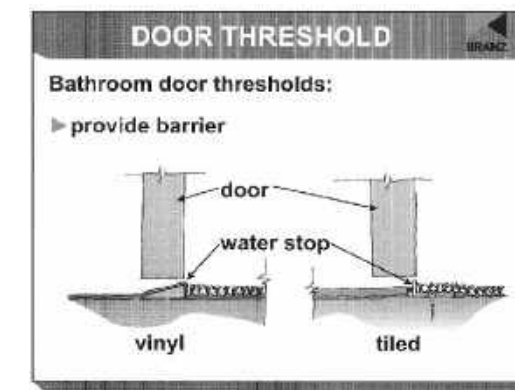
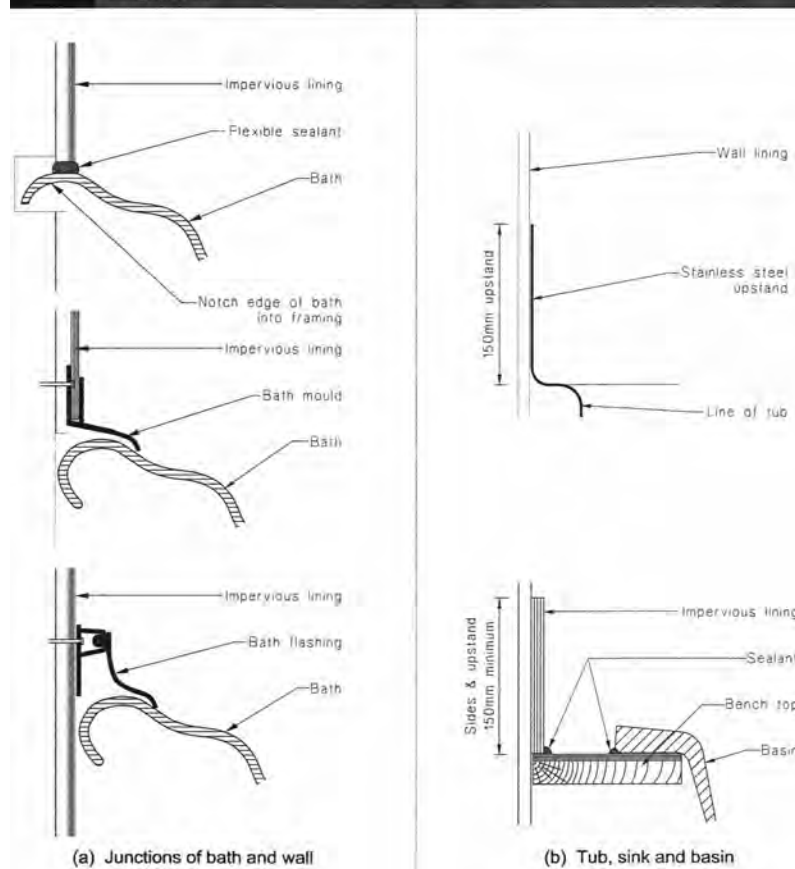
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**Figure 8:** Mains Pressure Storage Water Heater System (unvented)  
Paragraphs 6.1.2 and 6.2.1 b)



**Figure 3:** Baths, Basins, Tubs and Sinks, Joints against Wall Linings  
Paragraph 3.2.2



**PLUMBING/DRAINAGE/FOUNDATION DETAILS - Not to Scale**  
**Sheet 11J**

**Proposed New Dwelling for:**  
**1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Prepared by: **PlanWorkz**

Drawn: **S. Neale**

Date: **03-10-22**

Issue: **A**

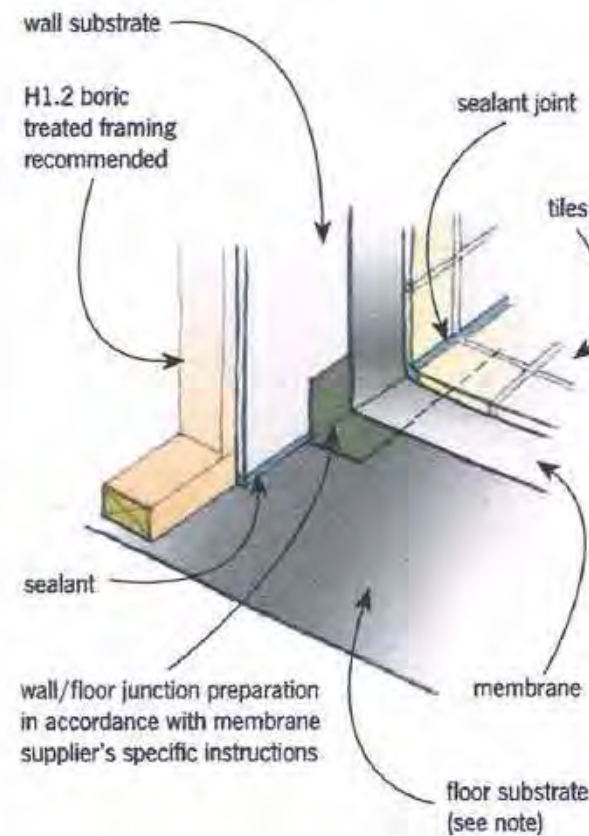
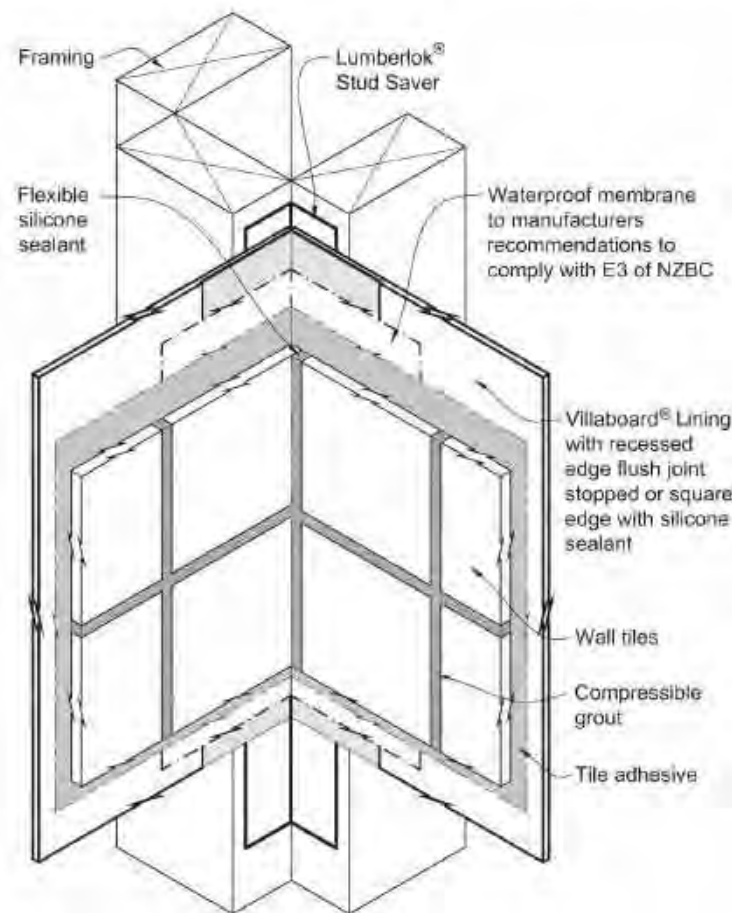
Job Number: **WA 45MP**

Design Plans Ltd - via The Plan Workz  
Serving Clients New Zealand Wide  
Email: [steve@theplanworkz.co.nz](mailto:steve@theplanworkz.co.nz)

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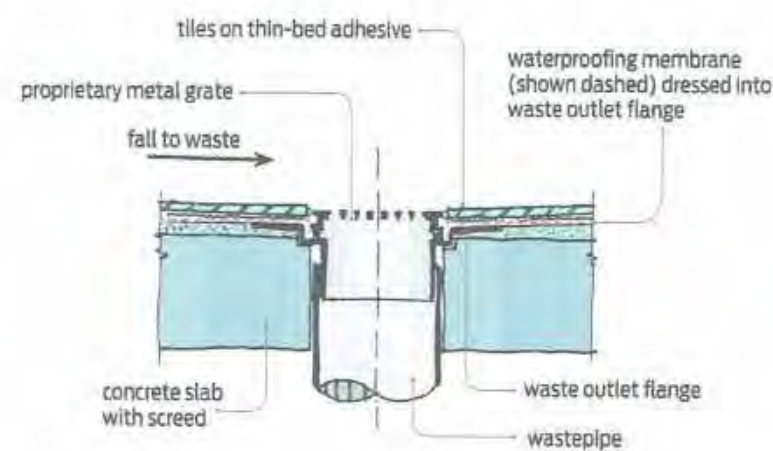
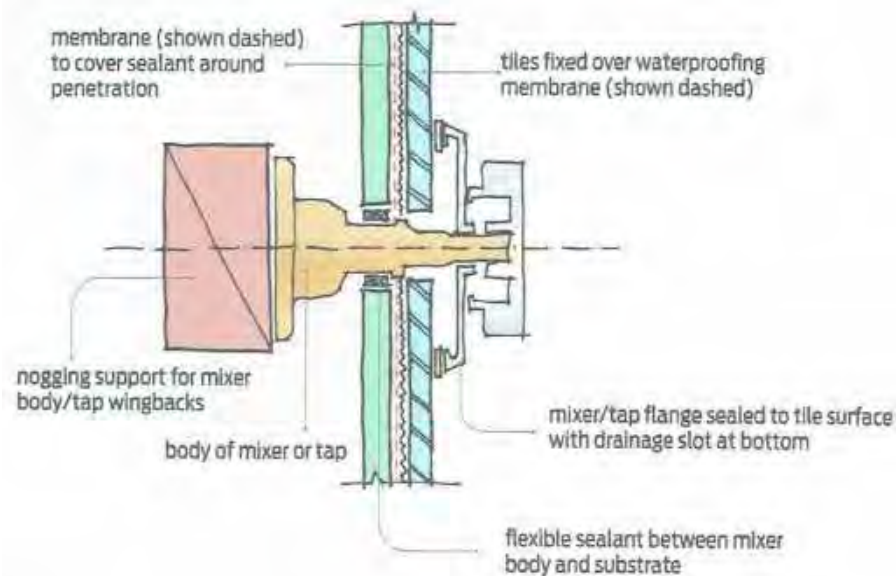
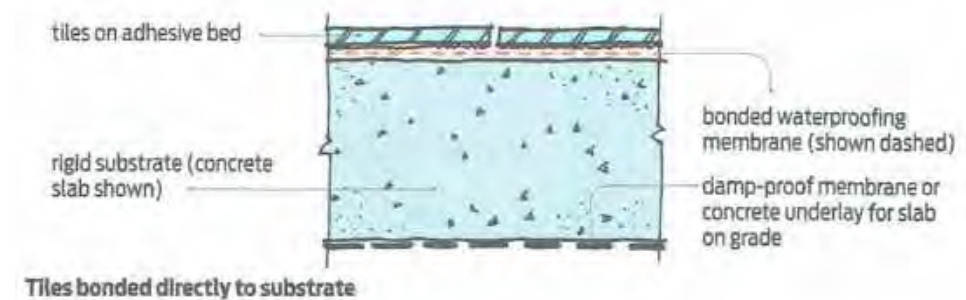
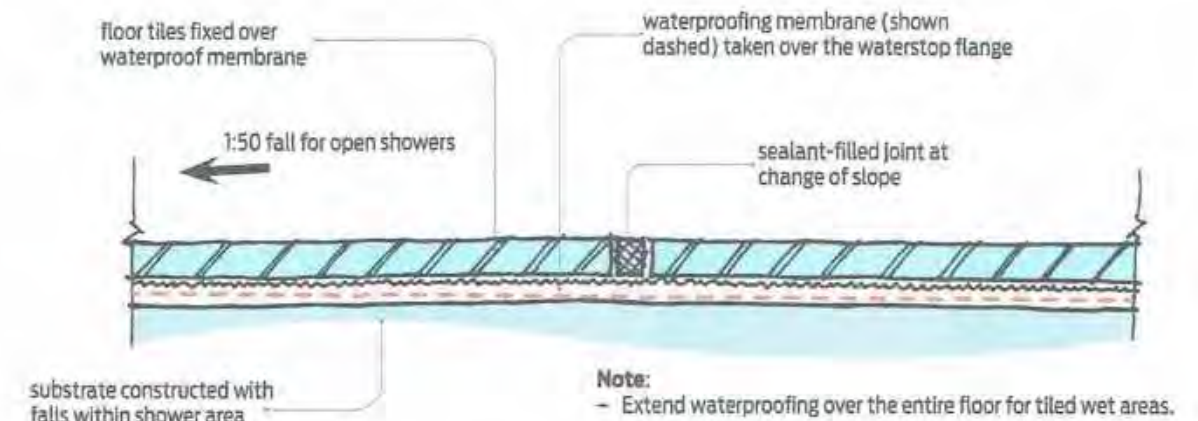


Figure 22: Wall to wall wet area tiled wall internal corner



Note: Membrane to cover entire floor if tiling over absorbent substrates in showers, bathrooms, laundries and kitchens.

Floor membrane may terminate at dotted line if floor steel-trowel finished concrete.



**TILED SHOWER DETAILS - Not to Scale**  
**Sheet 11K**

Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: **the PlanWorkz**

Drawn: S. Neale

Date: 03-10-22

Issue: **A**

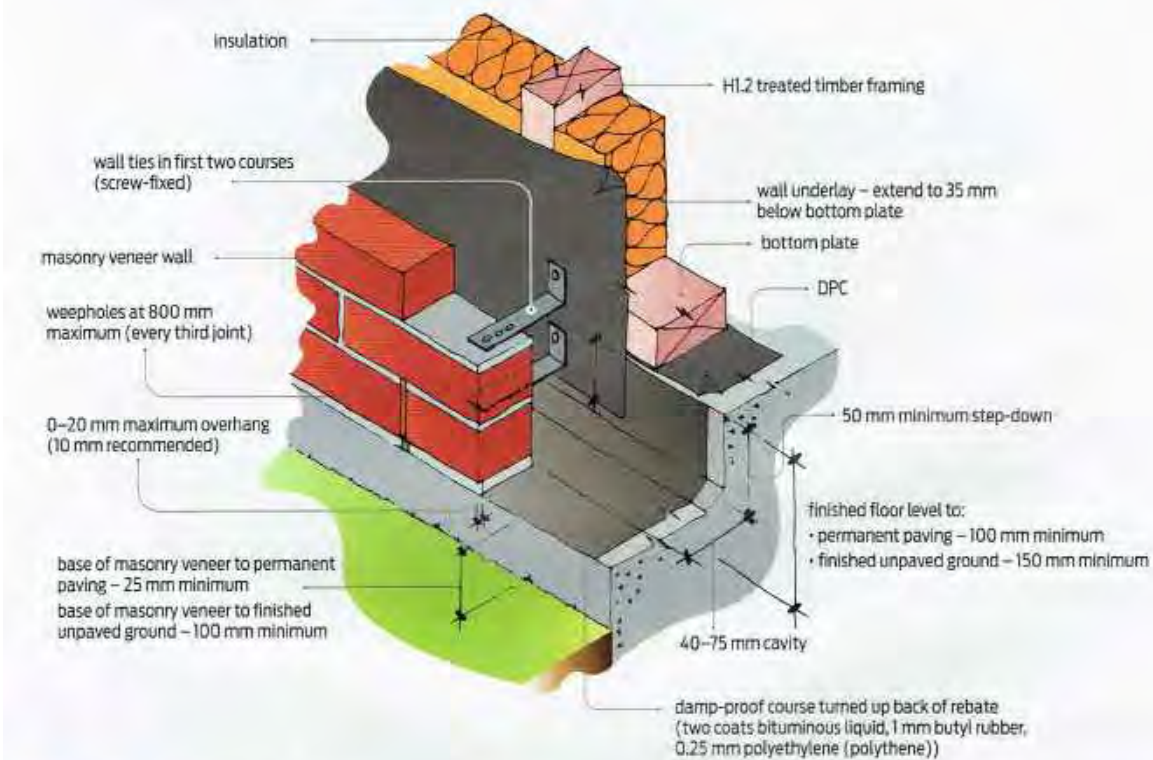
05-05-23

Job Number  
**WA 45MP**

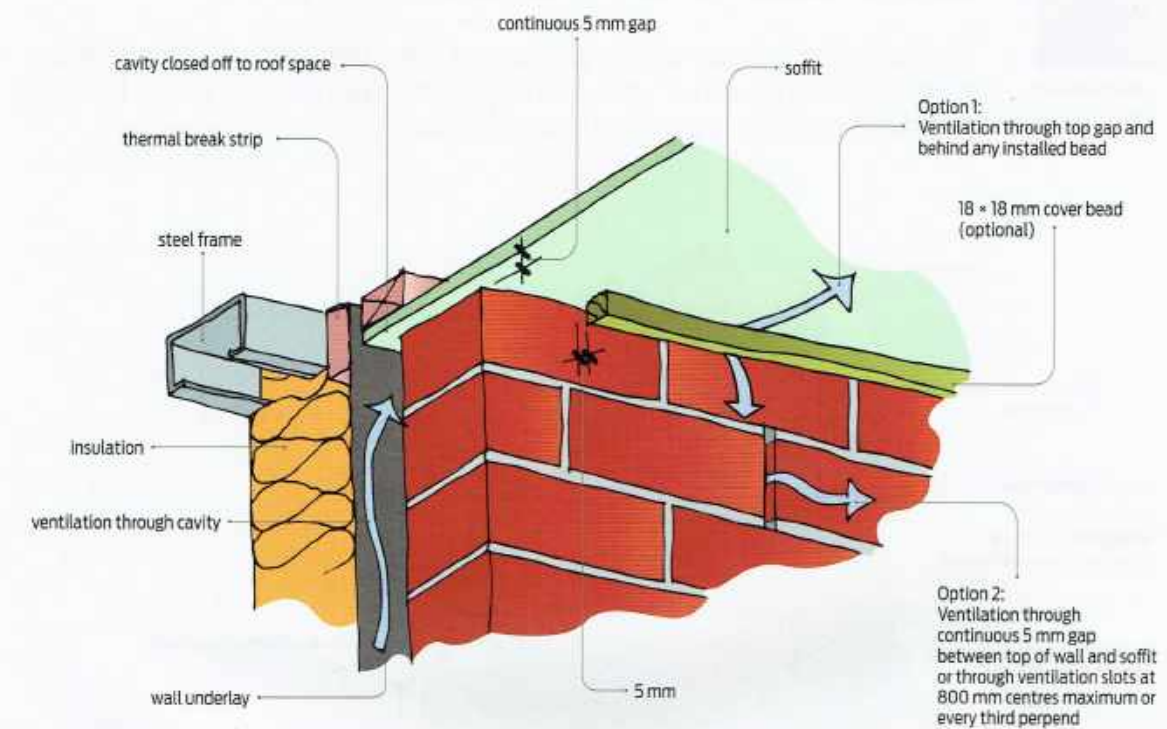
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Email: steve@theplanworkz.co.nz



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26/05/23



**Figure 1** Basic elements of a masonry veneer cladding system.



Note: Thermal break for steel framing may be placed over or under wall underlay.

**Figure 2** Brick veneer - top of wall.

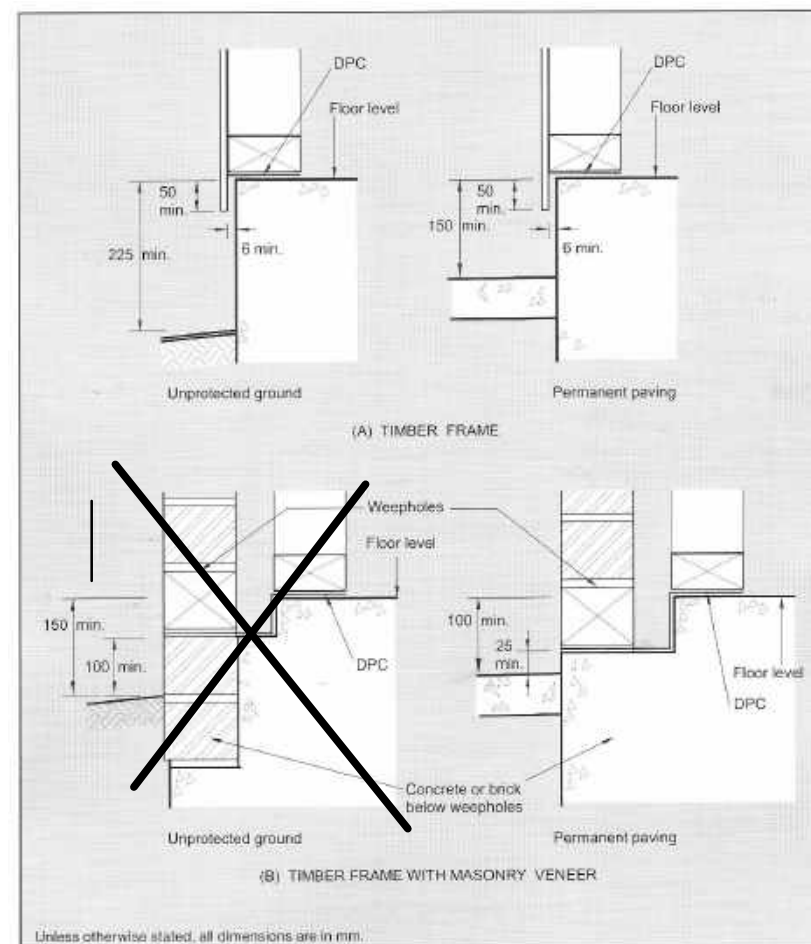


Figure 7.11 - Minimum heights of finished concrete (residential, habitable) slab-on-ground floors above adjoining finished ground level (see 7.5.2.1)

Content from NZS 3604:2011 - Timber Framed Buildings, has been provided by Standards New Zealand under licence 000998. Please refer to full standard for full details, available for purchase from [www.standards.co.nz](http://www.standards.co.nz)

## BRICK VENEER CLADDING DETAILS - Not to Scale Sheet 11L

Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: **PlanWorkz**

Drawn: S. Neale  
Date: 03-10-22

Issue: **A**  
05-05-23

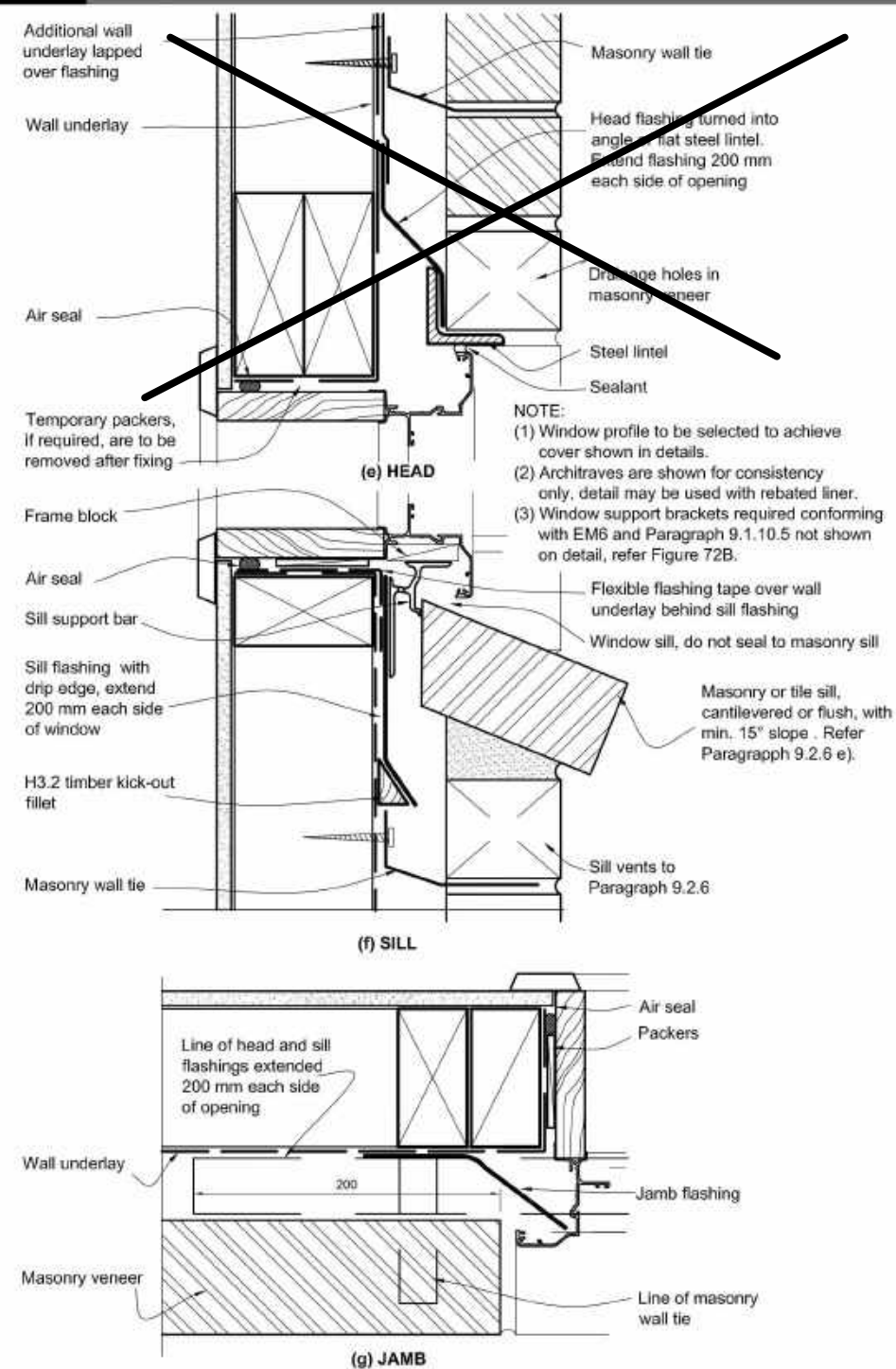
Job Number  
**WA 45MP**

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Serving Clients New Zealand Wide  
Email: [steve@theplanworkz.co.nz](mailto:steve@theplanworkz.co.nz)

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**Figure 73C: Masonry veneer window and door installation**  
Paragraphs 9.2.4, 9.2.6 and 9.2.9



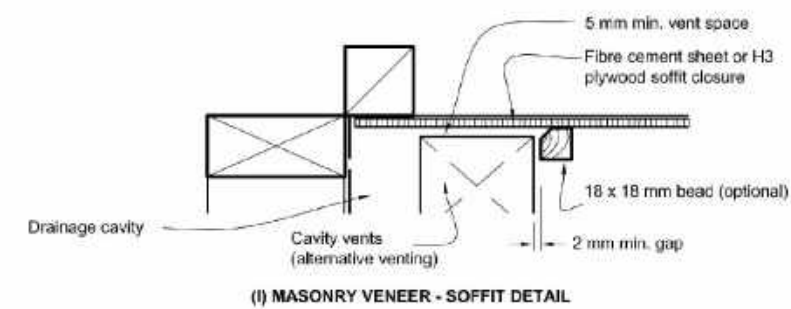
24 December 2011

DEPARTMENT OF BUILDING AND HOUSING

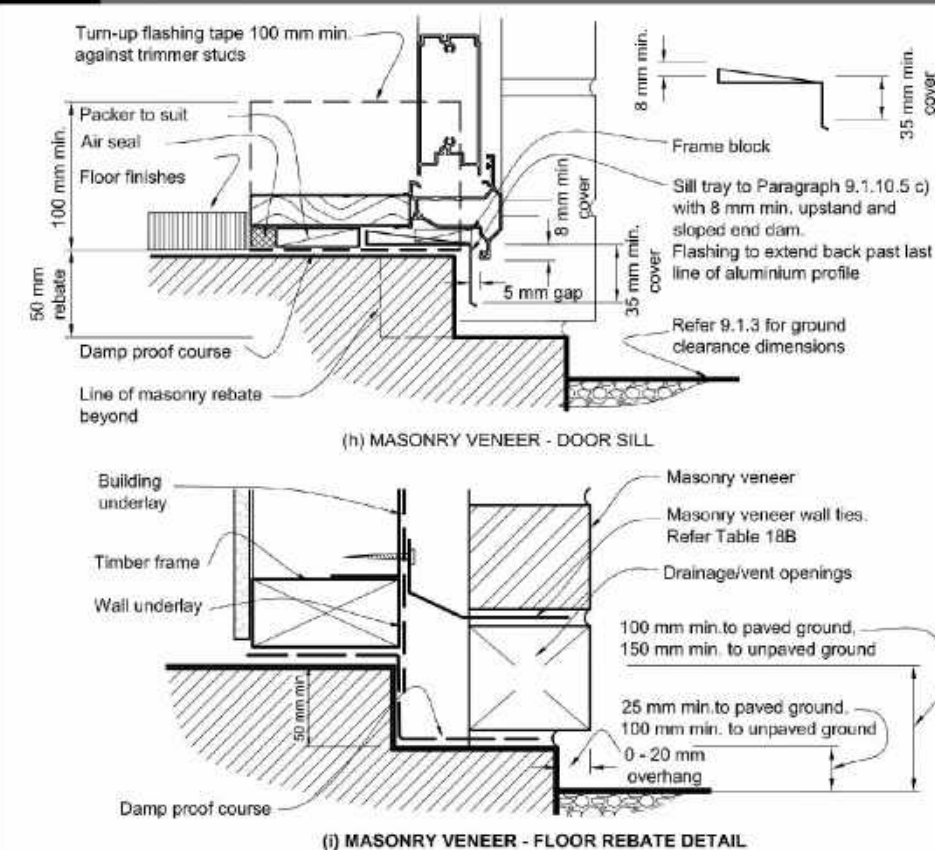
## BRICK VENEER CLADDING DETAILS - Not to Scale

### Sheet 11M

**Figure 73E: Masonry veneer details**  
Paragraphs 9.2.5 and 9.2.8



**Figure 73D: Masonry veneer details**  
Paragraph 9.2.5



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26/05/23

Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: **the PlanWorkz**

Drawn: S. Neale  
Date: 03-10-22

Design Plans Ltd - via The Plan Workz  
Serving Clients New Zealand Wide  
Email: steve@theplanworkz.co.nz

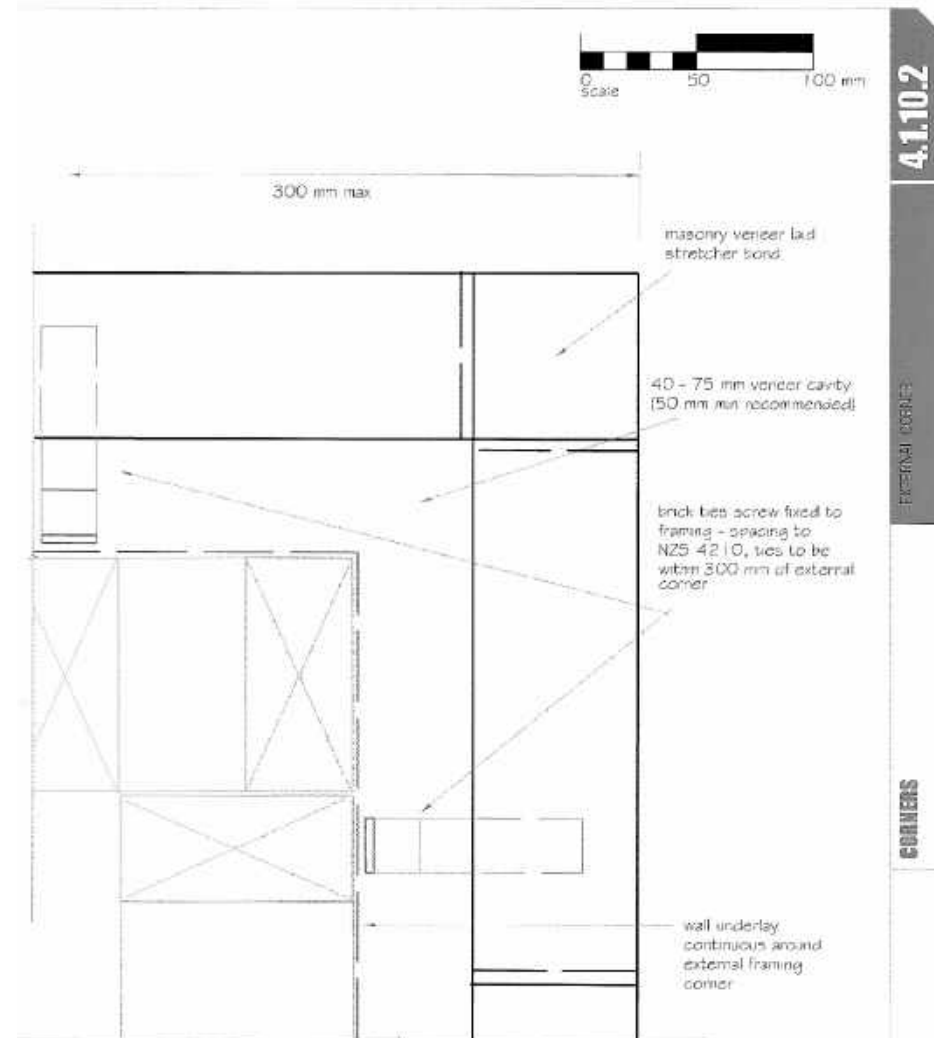
Issue: **A**  
05-05-23

Job Number  
**WA 45MP**

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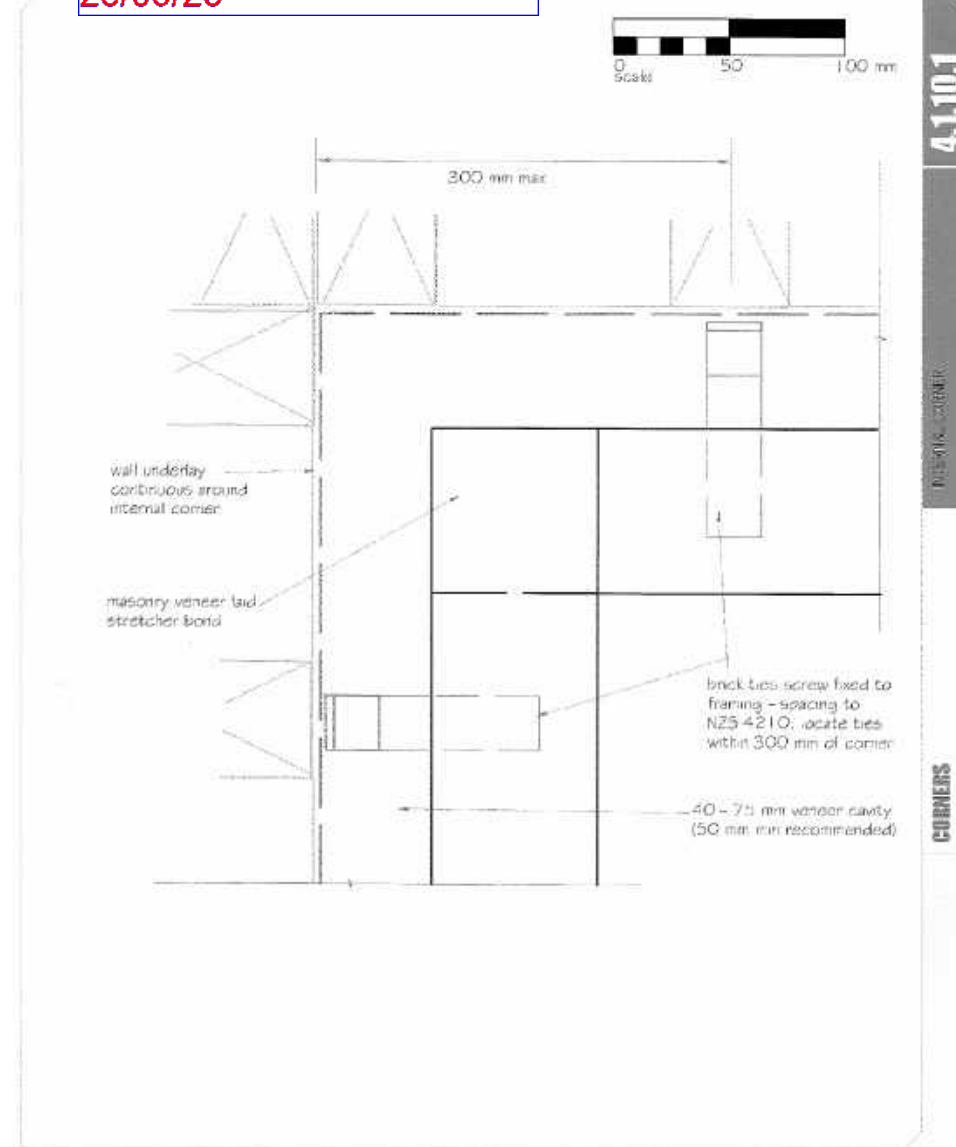
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Received by  
Kapiti Coast District Council  
26/05/23



4.1.10.2

EXTERNAL CORNERS

CORNERS



4.1.10.1

INTERNAL CORNERS

CORNERS

BRANZ  
CORNERS  
INTERNAL CORNER

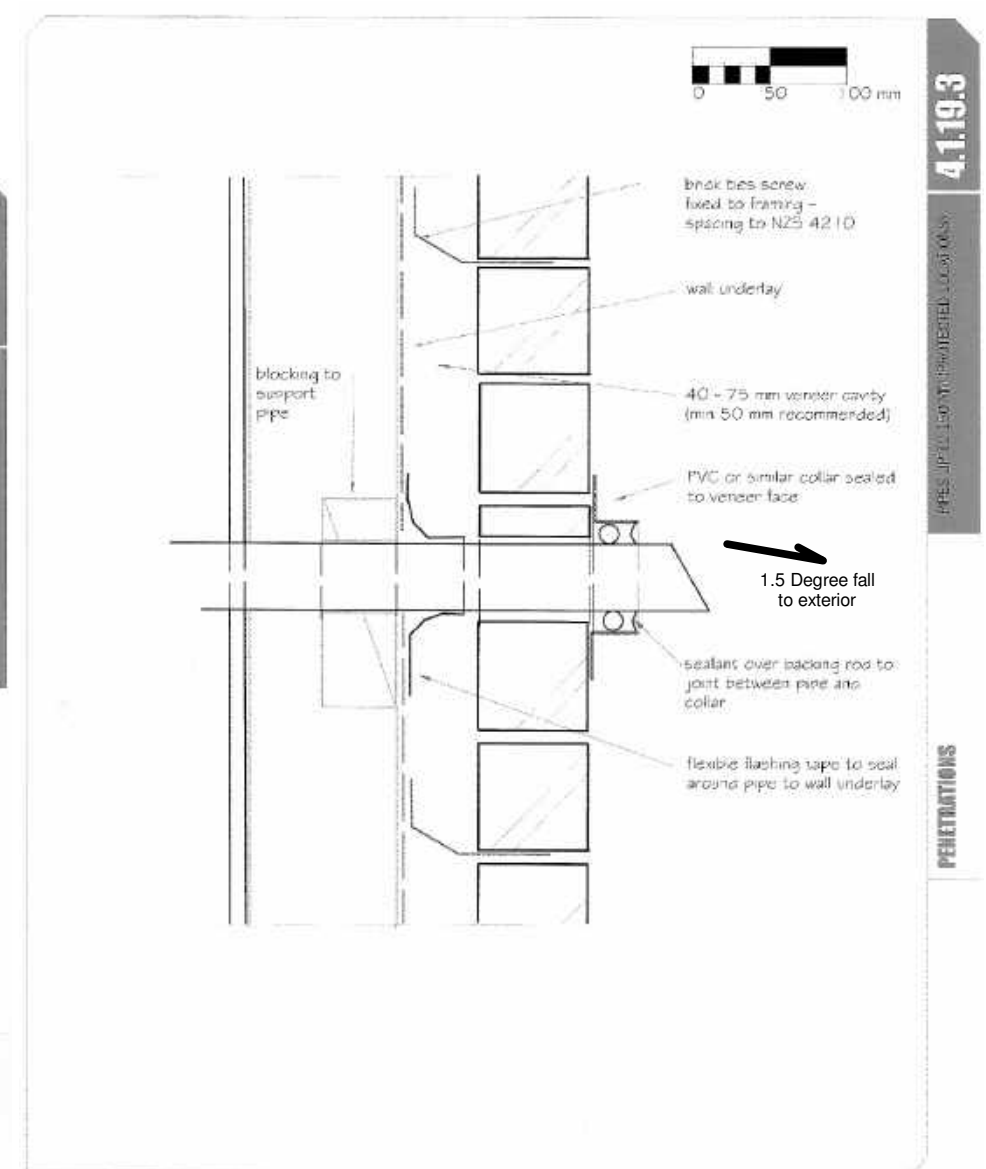
4.1.10.1

BRANZ WEATHERTIGHT SOLUTIONS VOLUME 4 - MASONRY 4.1.10.1

BRANZ  
CORNERS  
EXTERNAL CORNER

4.1.10.2

BRANZ WEATHERTIGHT SOLUTIONS VOLUME 4 - MASONRY 4.1.10.2



4.1.19.3

PIPES UP TO 150 MM (PROTECTED LOCATIONS)

PENETRATIONS

BRANZ

PENETRATIONS  
PIPES UP TO 150 MM (PROTECTED LOCATIONS)

4.1.19.3

BRANZ WEATHERTIGHT SOLUTIONS VOLUME 4 - MASONRY 4.1.19.3

**BRICK CLADDING DETAILS - Not to Scale**  
**Sheet 11N**

Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae

Prepared by: PlanWorkz

Drawn: S. Neale

Date: 03-10-22

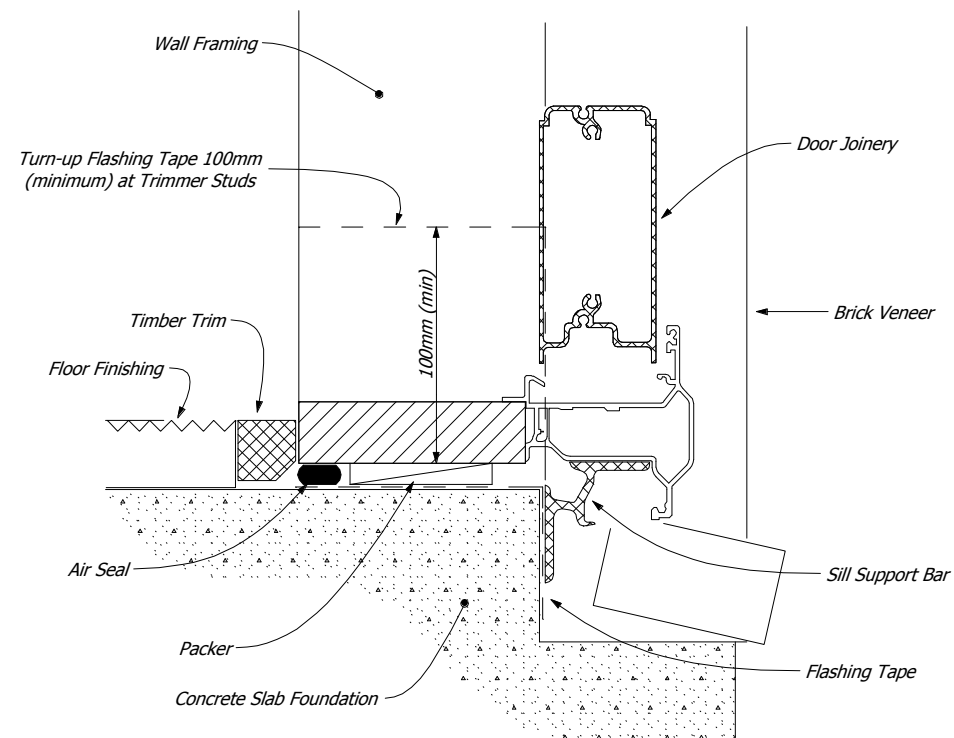
Issue: A

05-05-23

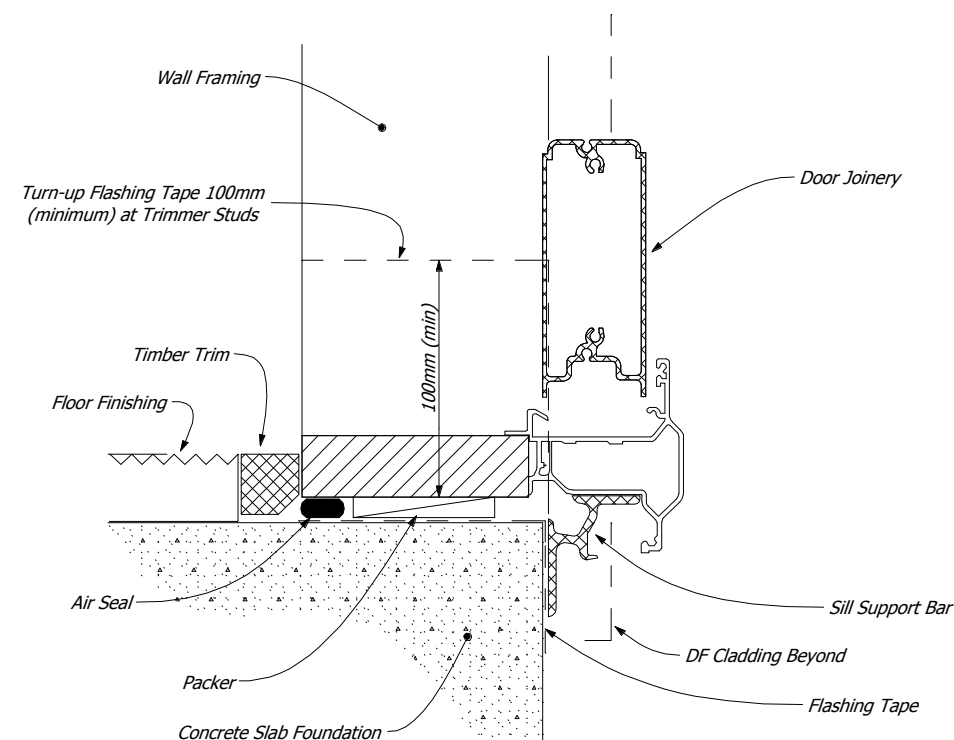
Job Number  
WA 45MP

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Email: steve@theplanworkz.co.nz

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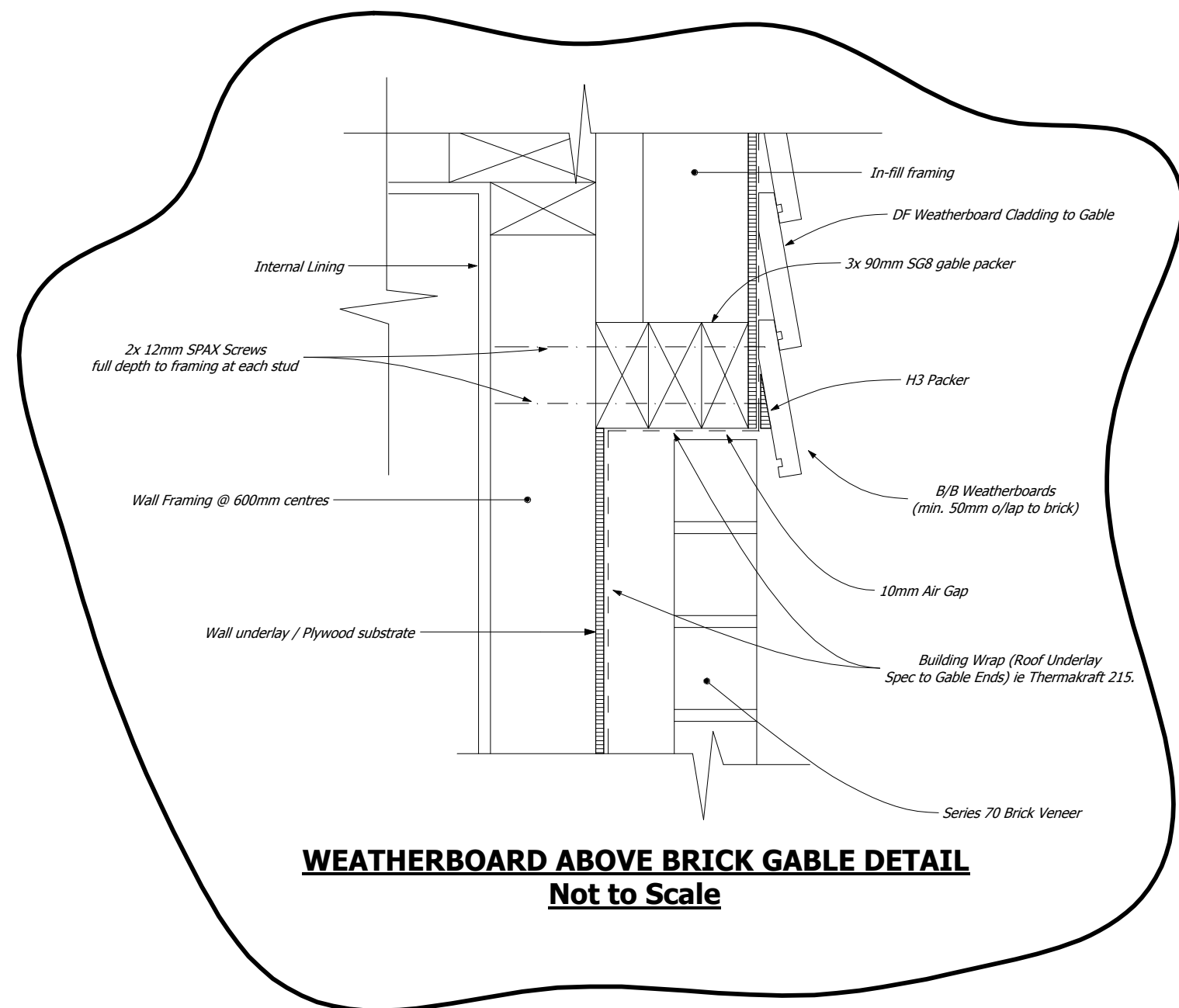


**BRICK VENEER DOOR SILL**  
**Not to Scale**



**DIRECT FIX CLADDING DOOR SILL**  
**Not to Scale**

**BRICK CLADDING DETAILS - Not to Scale**  
**Sheet 110**

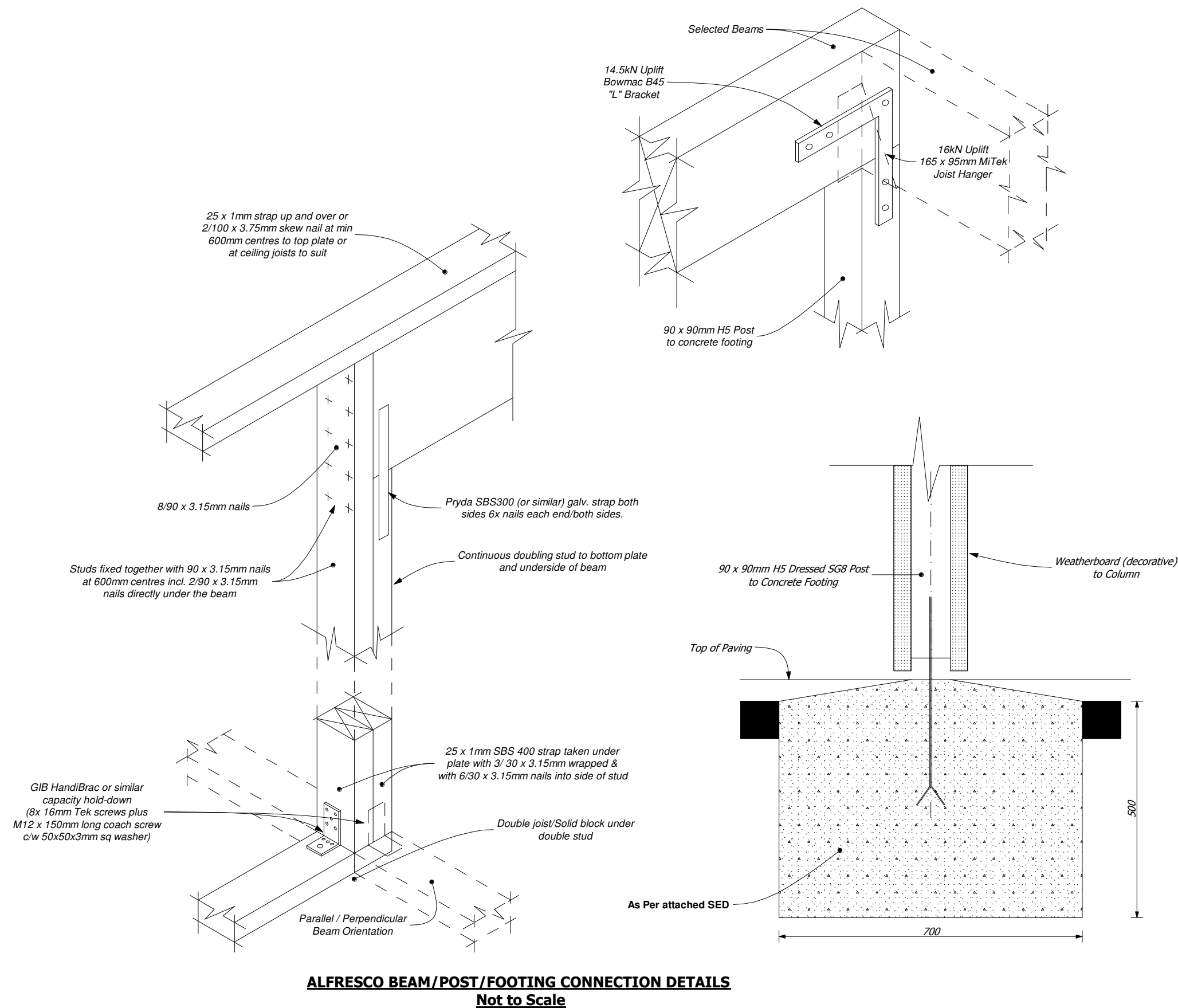


**WEATHERBOARD ABOVE BRICK GABLE DETAIL**  
**Not to Scale**

KCDC RFI dated 08/06/23 - Sheets 8a, 8b, 11a, 11b, 11o, 12a, and 12c only  
Prepared by: **The PlanWorkz**  
Proposed New Dwelling for:  
1 Pihoihoi Close, Lot 45 Manu Park, Waikanae  
Drawn: S. Neale  
Date: 03-10-22  
Issue: **A**  
05-05-23  
Job Number  
**WA 45MP**

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Kapiti Coast District Council  
26/05/23



**BEAM/POST DETAILS - Not to Scale**  
**Sheet 11P**

**Proposed New Dwelling for:**  
**1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Prepared by: **the PlanWorkz**

Drawn: S. Neale  
Date: 03-10-22

Issue: **A**  
05-05-23

Job Number  
**WA 45MP**

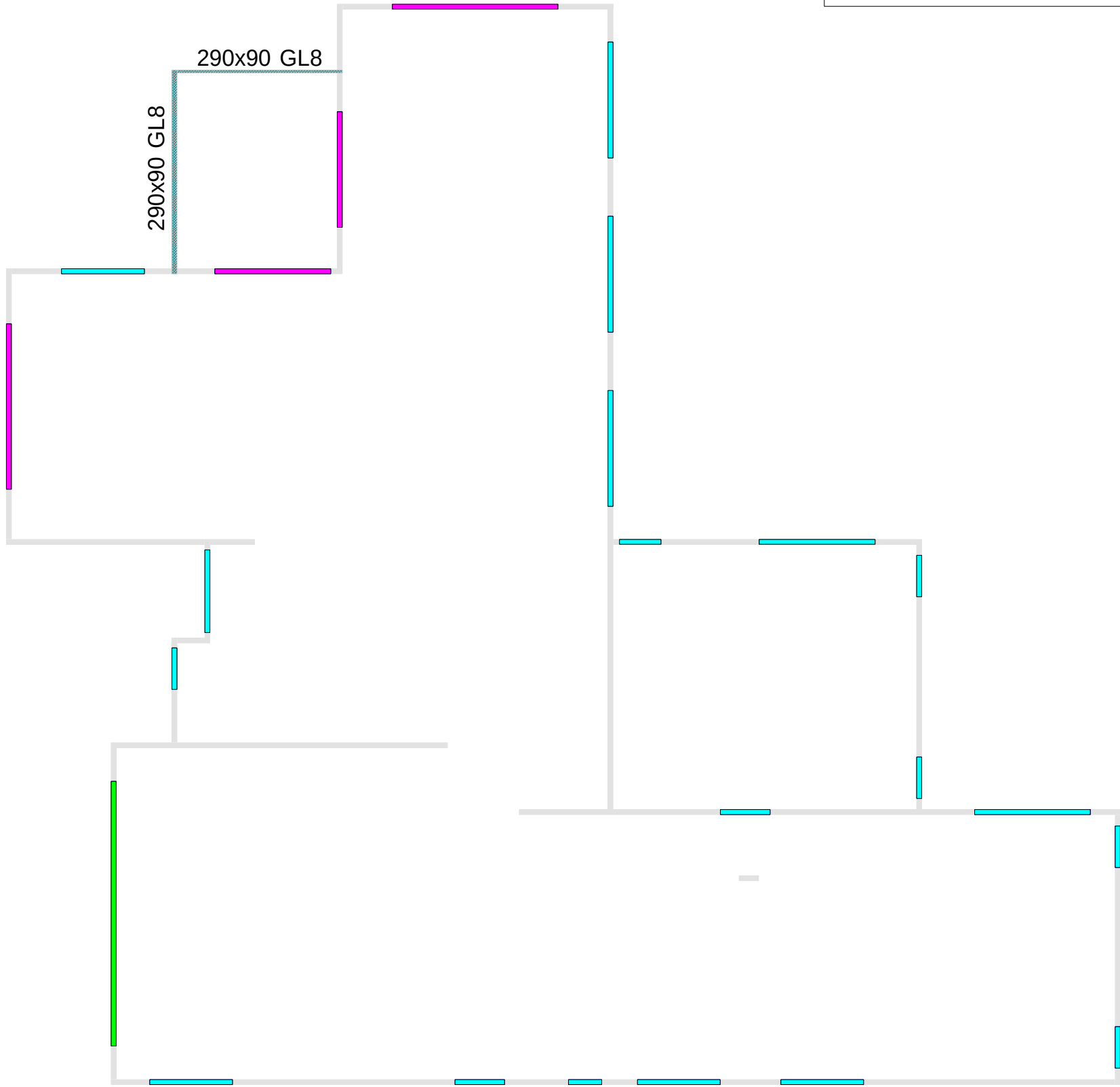
Design Plans Ltd - via The Plan Workz  
Serving Clients New Zealand Wide  
Email: steve@theplanworkz.co.nz

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For Building Consent Purposes Only

No Internal wall exceeds 7kN point load, LB1 up to 10kN is sufficient.



**INTERNAL CONCRETE FOUNDATION SUPPORT REQUIREMENTS - 10kN** Consent Doc. Ref: **LB1**

| 12kN load |              | 50B                    |
|-----------|--------------|------------------------|
| HEIGHT m  | Stud size mm | No of studs under load |
| 2.4       | 90 x 45      | 1                      |
| 2.7       | 90 x 45      | 2                      |
| 3         | 90 x 45      | 2                      |

**pyda**

"Minimum Requirement for internal load bearing walls"

**INTERNAL CONCRETE FOUNDATION SUPPORT REQUIREMENTS - 24kN** Consent Doc. Ref: **LB2**

| 24kN load |              | 50B                    |
|-----------|--------------|------------------------|
| HEIGHT m  | Stud size mm | No of studs under load |
| 2.4       | 90 x 45      | 2                      |
| 2.7       | 90 x 45      | 2                      |
| 3         | 90 x 45      | 3                      |

**pyda**



LB2

**INTERNAL CONCRETE FOUNDATION SUPPORT REQUIREMENTS - 36kN** Consent Doc. Ref: **LB3**

| 36kN load |              | 50B                    |
|-----------|--------------|------------------------|
| HEIGHT m  | Stud size mm | No of studs under load |
| 2.4       | 90 x 45      | 3                      |
| 2.7       | 90 x 45      | 3                      |
| 3         | 90 x 45      | 4                      |

**pyda**



LB3

- Windzone has been determined as per Branz unless specified on Architectural or Engineering Drawings.
- All Lintels Designed As Per Truss Loadings.
- Design Valid Only With "Paraparaumu Prenail" supplied frames and trusses.
- All Lintels Are Designed As GL8 Unless Otherwise Stated.
- All Walls Shown On Layout Are Loadbearing.
- Lintels have not been designed to receive any wind-face loading. For any larger lintels that may cause concern please consult with engineer.
- Lintels have not been designed to support brick or stone cladding, lintels have been designed to support up to 80kg per m² for medium weight cladding.



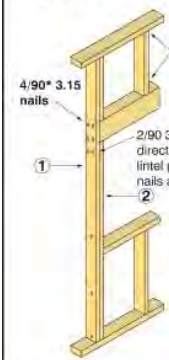
Lintel + Slab Layout

Customer: New residence  
Site Address: Lot 45 Manu Park  
Waikanae

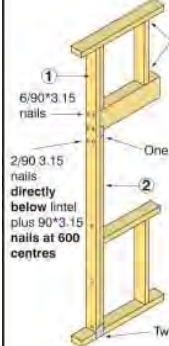
Job Details:  
Roofing: Pressed metal tiles  
Pitch: 22.50 Deg.  
Truss Spacing: 900  
Design Wind Velocity: 50.00 m/s (Ult.)  
Detailer: Jimmy

Job Ref:  
**1713PS**

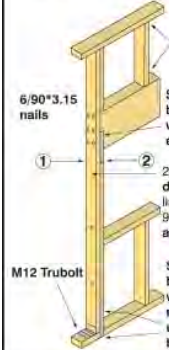
www.pryda.co.nz

**TIMBER LINTEL FIXING - 1.4kN** Consent Doc. Ref. **L1**

1. For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90°\*3.15 nails.
2. Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of the trimming studs.
3. Studs & jacks to be fixed to top plate in accordance with the Pryda Top Plate Fixing Guide.

**L1**  
1.4 kN**pryda****TIMBER LINTEL FIXING - 2.8kN** Consent Doc. Ref. **L2**

1. For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90°\*3.15 nails.
2. Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of the trimming studs.
3. Studs & jacks to be fixed to top plate in accordance with the Pryda Top Plate Fixing Guide.

**L2**  
2.8 kN**pryda****TIMBER LINTEL FIXING - 8.0kN** Consent Doc. Ref. **L3**

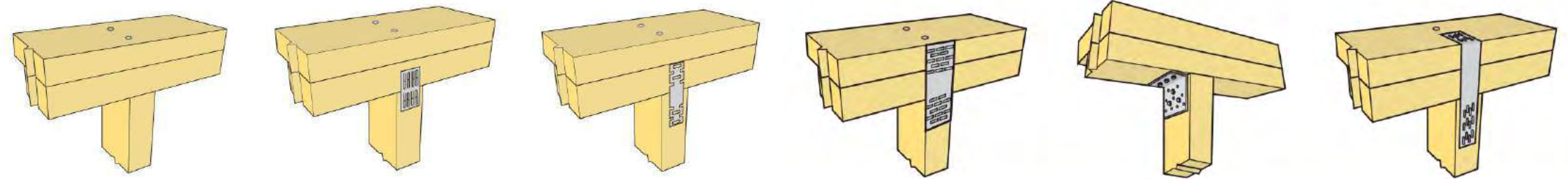
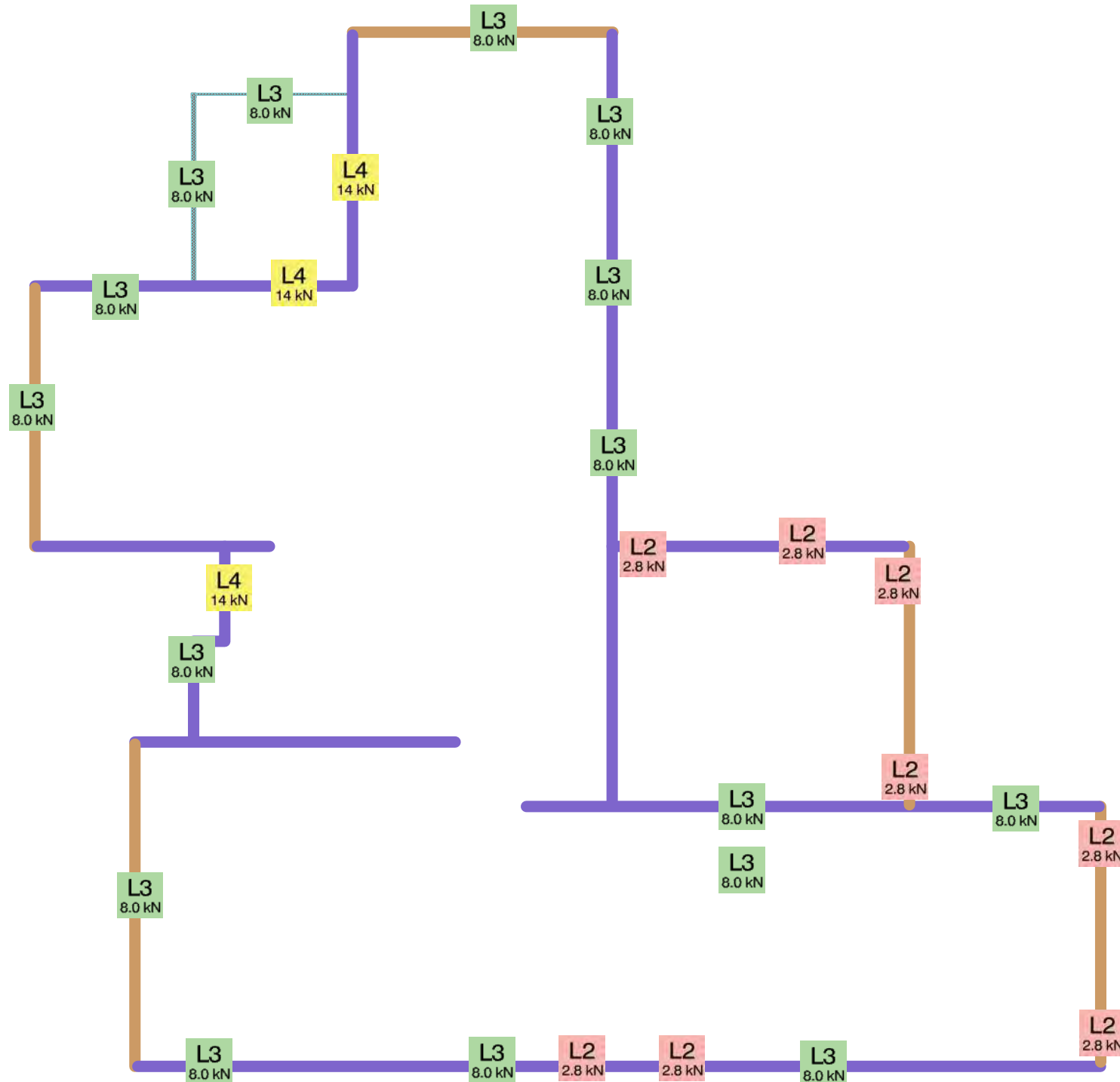
1. For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90°\*3.15 nails.
2. Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of the trimming studs.
3. Studs & jacks to be fixed to top plate in accordance with the Pryda Top Plate Fixing Guide.

**L3**  
8.0 kN**pryda**

L3 fixing to be attached to studs supporting girder trusses unless noted otherwise. Please refer to truss layout.

**TIMBER LINTEL FIXING - 14kN** Consent Doc. Ref. **L4**

1. For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90°\*3.15 nails.
2. Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of the trimming studs.
3. Studs & jacks to be fixed to top plate in accordance with the Pryda Top Plate Fixing Guide.

**L4**  
14 kN**pryda****TPO - 0.7kN****TP1 - 1.7kN****TP2 - 2.5kN****TP3 - 4.7kN****TP3 - 6.0kN****TP3 - 6.0kN****Wall Fix Layout**

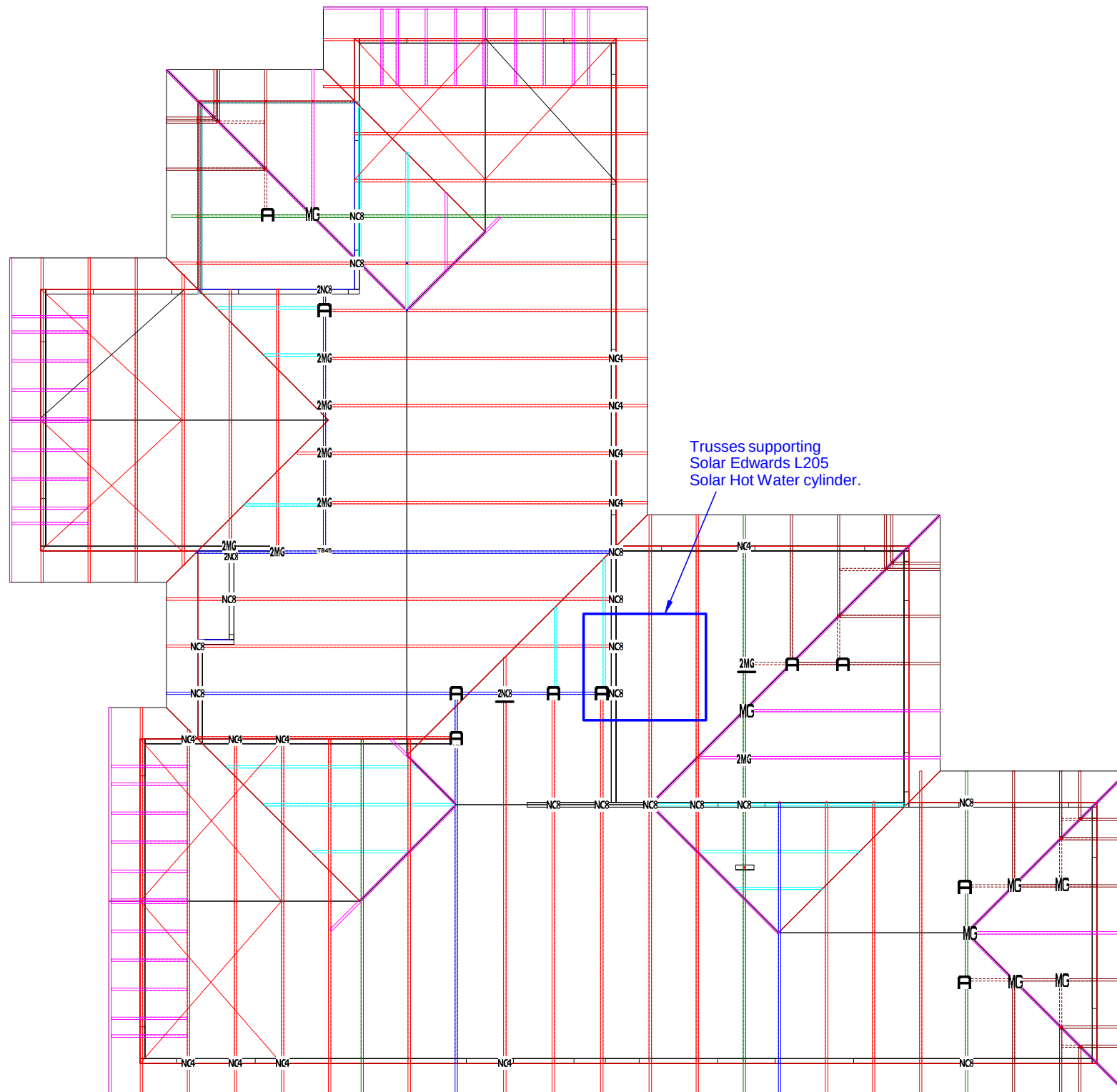
Customer: New residence  
Site Address: Lot 45 Manu Park  
Waikanae

**Job Details:**

Roofing: Pressed metal tiles  
Pitch: 22.50 Deg.  
Truss Spacing: 900  
Design Wind Velocity: 50.00 m/s (Ult.)  
Detailer: Jimmy

**Job Ref:****1713PS****pryda**





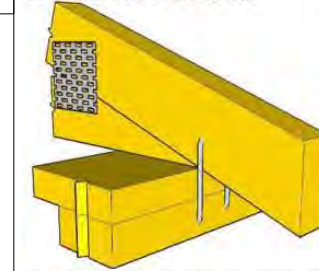
## Truss Connections

- Trusses need to be fixed at each timber support with 2/90x3.15 dia Skew Nails unless otherwise noted.

|      |                             |
|------|-----------------------------|
| NC3  | 17 x 1/NPPC8 Purlin cleat   |
| NC4  | 12 x 1/NPPC4 Purlin cleat   |
| 2NC3 | 2 x 2/NPPC8 Purlin cleat    |
| 2MG  | 7 x 2/MG Multigrips         |
| TB45 | 1 x 1/TB45/16 Truss boot    |
| A    | 10 x 1/FB4590 Joist hanger  |
| 2NC3 | 1 x 2/NPPC8 Purlin cleat    |
| MG   | 12 x 1/MGL Multigrip (long) |
| 2MG  | 1 x 2/MGL Multigrip (long)  |

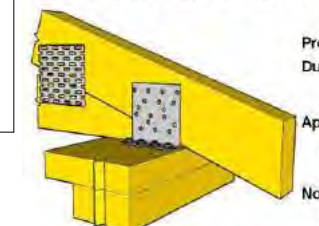
- \* Please attach SN25 below @ 600cnrs on all gable wall as tiedown to wall frame below.
- \* All truss to truss use 3/90x3.15 dia Skew nails to top and bottom chord where relevant plus fixing listed.
- \* All outriggers, valley trusses and rafters to be fixed to supporting truss with 1 pair of Z-Nails.
- \* All trusses to be tied down to supporting wall frame with 1 Pair of Z-Nails unless noted otherwise.

## Z-NAIL TIE DOWN X2



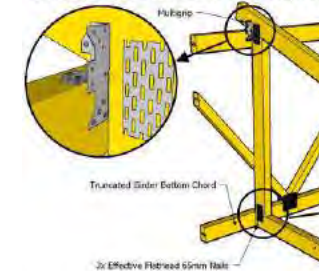
**Consent Doc. Code Z**  
**Product Code:** ZR & ZL (left & right hand) Also sold as MPZR & MPZL  
**Durability:** Suitable for all roof spaces that are closed. Stainless required in open soffits. Compliant with Table 4.1 of NZS3604:1999 Amendments 1 & 2  
**Application:** Usually used in pairs when employed as a truss tie down  
**Note:** The Z-nails should be anchored to the lower wall plate, and may not terminate in the ceiling plate.

## CONCEALED PURLIN CLEAT TIE DOWN



**Consent Doc. Code NC4, NC6, NC8**  
**Product Code:** NPPC4, NPPC6 & NPPC8  
**Durability:** Suitable for all closed roof spaces. Compliant with Table 4.1 of NZS3604:1999 Amendments 1 & 2.  
**Application:** All holes in large flange filled with 30x3.15mm Pryda product nails. In small flange either Type 17 12g x 35mm or 14g x 75mm hex head galv. screws.  
**Note:** 14g x 35 screw can be used in single top plate situations. 14g x 75 screws required in a double top plate situation.

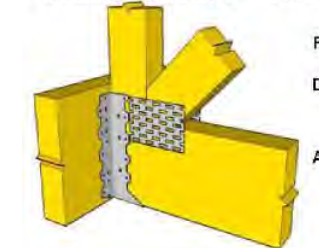
## JACK TRUSS TO TRUNCATED GIRDER TRUSS



**Product Code:** MGL or MG

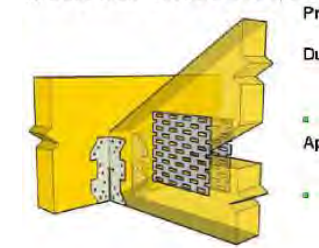
**Consent Doc. Code X**  
**Application:** All holes filled with 30x3.15mm Pryda product nails.

## FRAMING BRACKET TRUSS SUPPORT



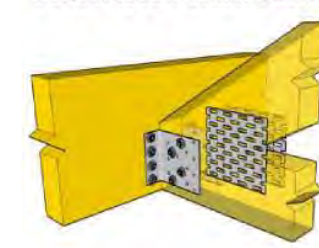
**Consent Doc. Ref. A, B, C**  
**Product Code:** MPFB4590, MPFB45120, MPFB45180  
**Durability:** Suitable for all closed roof spaces. Stainless steel required in open roofs in Sea spray zone and Zone 1 in order to be compliant with Table 4.1 of NZS3604:2011  
**Application:** All holes filled with 30x3.15mm Pryda product nails or type 17 12g x 35mm hex head galv. screws.

## MULTIGRIP TRUSS SUPPORT



**Consent Doc. Ref. G**  
**Product Code:** MG/MGL  
 \*Also sold as MPMG  
**Durability:** Suitable for all roof spaces that are closed. Stainless steel required in open car port roofs in Sea spray zone and Zone 1 in order to be compliant with Table 4.1 of NZS3604:2011.  
**Application:** Used in pairs when employed as a truss to truss fixing. All holes filled with 30x3.15mm Pryda product nails.  
 Long Multigrip (MGL - 125mm long) to be used when top chord of supported trusses is deeper than 90mm.

## CONCEALED PURLIN CLEAT TRUSS SUPPORT



**Consent Doc. Ref. NC8**  
**Product Code:** NPPC8  
**Durability:** Suitable for all closed roof spaces. Stainless steel not available. Compliant with Table 4.1 of NZS3604:2011.  
**Application:** Variable width connection option utilising screws. All screw holes filled with type 17 12g x 35mm hex head galv. screws.

- If Ceiling Battens Are Not Being Direct Fixed To The Bottom Chord Of The Truss, Bottom Chord Restraints Will Be Required At 1800mm Ctrs Max.
- Builder to read Pre-nail plans in conjunction with Architectural plans, please check all opening trim sizes & braces on site before enclosing. If any variations please contact Paraparaumu Prenail.
- Paraparaumu Prenail will not accept any charges for remedial work unless written authority is issued by Paraparaumu Prenail before work is commenced.
- Cross shown across roof plane indicates Pryda Roof Plane Brace in accordance with NZ3604. Should this exceed capabilities supplementary bracing may be required and to be reviewed by others.
- Gable Outriggers and Barge rafter will be 90x45 SG8 unless stated otherwise
- Windzone has been determined as per Branz unless specified on Architectural or Engineering Drawings
- All gable trusses have been framed to accommodate specific cladding specification.
- Please read all layouts in conjunction with all supporting consent documents.



## TRUSS LAYOUT

**Customer:** New residence  
**Site Address:** Lot 45 Manu Park  
 Waikanae

## Job Details:

**Roofing:** Pressed metal tiles  
**Pitch:** 22.50 Deg.  
**Truss Spacing:** 900  
**Design Wind Velocity:** 50.00 m/s (Ult.)  
**Detailer:** Jimmy

**Job Ref:** 1713PS

**pryda**  
 www.pryda.co.nz



**Fabricator / Designer Statement**Job Ref: **1713PS**

This statement may be used by the Building Consent Authority for compliance purposes and is issued by a licensed truss fabricator using Pryda Build software.

**CLIENT Name:** *New residence***SITE Details:**

Address : *Lot 45 Manu Park*  
*Waikanae*

City:

Post Code:

**Nominal Design Criteria:**

Design working life: 50 years

Building importance: Residential (Importance Level 2)

Roofing: Pressed metal tiles (7.5 kg/sq.m)

Ceiling: 13mm Gib-board (8.5 kg/sq.m)

Top chord battens: 380 mm

BC restraints: Battens at 400 mm crs

Standard truss spacing: 900 mm

Standard roof pitch: 22.50 deg.

Ult. design wind speed: 50 m/s (wind classification = Very high)

Design roof snow load: 0 Pa  
(incl. probability factor)

Ground snow load: 0 Pa

Location: Region N1 - lower Nth Island  
Altitude above sea level: 100 m

Max. eaves height: 3 m

Max. ridge height: 6 m

Int pressure coeff. up: 0.2

Overhang Condition: Metal fascia

The design criteria inputs used by Pryda Build software is the responsibility of the fabricator.

Note: Where relevant, a structural fascia beam is required at all hip and dutch hip corners to support creeper/rafter overhangs, as shown in AS 4440-2004

Note: This Producer Statement shall be read in conjunction with the Roof truss layout and detail sheets.

Note: Some trusses in this job support ceiling materials that are different to this nominal data (see individual truss detail sheets).

Note: The Structural Timber products supplied in this building stores approximately '980' kg of carbon.

Truss and connection designs listed in the Producer Statement have been designed using Pryda design software. Additional items such as roof/ceiling plane bracing, special notes, supplementary timber, etc., which may be shown on the plan drawings are the responsibility of others.

All trusses have been manufactured in accordance with the fabrication specifications provided by Pryda, and shall be installed, connected and braced in accordance with the recommendations given in - : AS 4440-2004 "Installation of nailplated timber roof trusses" and any other supplementary details that may be provided, such as the Pryda Installation Guides.

Timber verification and grading values are in accordance with clause B1 and timber treatment in accordance with clause B2 of the New Zealand Building Code.

I/we confirm that the trusses for this project have been manufactured in accordance with the fabrication specifications provided by Pryda New Zealand.

Name: Jimmy RooneyPosition: DetailerSigned: Date: 24-04-2023

**Fabricator / Designer Statement**Job Ref: **1713PS**

Note 1: All timber framing nails are machine-driven, glue coated, or annular/helical deformed shank.

Use specified fixings with Pryda connectors as noted.

Note 2: The following trusses have not yet fully passed all of the design criteria, eg:-

| <b>Truss Mark</b> | <b>Truss Design Status</b>            | <b>Connection Design Status</b>                 |
|-------------------|---------------------------------------|-------------------------------------------------|
| TG1               | Plates overlapped.                    | -                                               |
| S6                | Plates overlapped.                    | -                                               |
| S13               | Plates overlapped.                    | -                                               |
| BR1               | -                                     | Fixings and connections have not been designed. |
| R4                | -                                     | Fixings and connections have not been designed. |
| R5                | -                                     | Fixings and connections have not been designed. |
| J15               | -                                     | Fixings and connections have not been designed. |
| BR2               | -                                     | Fixings and connections have not been designed. |
| R1                | -                                     | Fixings and connections have not been designed. |
| R3                | -                                     | Fixings and connections have not been designed. |
| J4                | Excessive deflection under live load. | -                                               |
| J23               | Excessive deflection under live load. | -                                               |
| J14               | Excessive deflection under live load. | -                                               |
| MV10              | -                                     | Fixings and connections have not been designed. |
| J11               | -                                     | Fixings and connections have not been designed. |

**Tie-downs to walls/beams:**

Trusses need to be fixed at each timber support with 2/90x3.15 dia Skew Nails.

All additional tie-downs are as follows:

| <b>Truss Mark</b> | <b>Sup No.</b> | <b>Distance</b> | <b>Fixing</b> | <b>Support Jt Grp</b> | <b>Width</b> | <b>Truss Jt Grp</b> | <b>Uplift (kN)</b> | <b>Fixing Details</b>                 |
|-------------------|----------------|-----------------|---------------|-----------------------|--------------|---------------------|--------------------|---------------------------------------|
| J1                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.57              |                                       |
| J10               | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -1.64              |                                       |
| J12               | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -0.66              |                                       |
| J13               | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -0.91              |                                       |
| J14               | 1              | -               | 2/Z           | JD5                   | 70           | JD4                 | -1.54              |                                       |
| J16               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.51              |                                       |
| J2                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.00              |                                       |
| J23               | 1              | -               | 2/Z           | JD5                   | 90           | JD4                 | -1.33              |                                       |
| J25               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -0.79              |                                       |
| J26               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -0.80              |                                       |
| J27               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.34              |                                       |
| J29               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.42              |                                       |
| J3                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.25              |                                       |
| J30               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.03              |                                       |
| J4                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.52              |                                       |
| J5                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -0.95              |                                       |
| J6                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -0.80              |                                       |
| J7                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.80              |                                       |
| J8                | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -1.59              |                                       |
| J9                | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -0.91              |                                       |
| MTG1              | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.66              |                                       |
|                   | 6              | 6200            | 2/Z           | JD5                   | 90           | JD5                 | -2.59              |                                       |
| N1                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.33              |                                       |
|                   | 11             | 8000            | 2/Z           | JD5                   | 70           | JD5                 | -1.30              |                                       |
|                   | 7              | 4955            | 1/NPPC8       | JD5                   | 90           | JD5                 | -7.02              | 4/12g-11x35 screws, 12/30x3.15d nails |
| N2                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.88              |                                       |
| R2                | 4              | 1373            | 2/MGL         | JD5                   | 45           | JD5                 | -0.77              | 6/30x3.15d nails, 4/30x3.15d nails    |
|                   | 5              | 428             | 2/MGL         | JD5                   | 45           | JD5                 | -1.13              | 6/30x3.15d nails, 4/30x3.15d nails    |
| S1                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.74              |                                       |
|                   | 5              | 4990            | 2/Z           | JD5                   | 90           | JD5                 | -2.74              |                                       |
| S10               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.74              |                                       |
| S11               | 1              | -               | 1/NPPC4       | JD5                   | 90           | JD5                 | -3.16              | 2/12g-11x35 screws, 6/30x3.15d nails  |
| S12               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.74              |                                       |
|                   | 5              | 5000            | 2/Z           | JD5                   | 90           | JD5                 | -2.75              |                                       |
| S13               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.42              |                                       |
|                   | 10             | 4300            | 2/Z           | JD5                   | 70           | JD5                 | -2.36              |                                       |
|                   | 13             | 5000            | 2/Z           | JD5                   | 90           | JD5                 | -1.44              |                                       |
|                   | 4              | 700             | 2/Z           | JD5                   | 70           | JD5                 | -2.36              |                                       |
|                   | 5              | 1300            | 2/Z           | JD5                   | 70           | JD5                 | -1.33              |                                       |
|                   | 6              | 1900            | 2/Z           | JD5                   | 70           | JD5                 | -1.29              |                                       |

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|     |    |      |         |     |    |     |        |                                       |
|-----|----|------|---------|-----|----|-----|--------|---------------------------------------|
|     | 7  | 2500 | 2/Z     | JD5 | 70 | JD5 | -1.03  |                                       |
|     | 8  | 3100 | 2/Z     | JD5 | 70 | JD5 | -1.29  |                                       |
|     | 9  | 3700 | 2/Z     | JD5 | 70 | JD5 | -1.33  |                                       |
| S14 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.78  |                                       |
|     | 5  | 5000 | 2/Z     | JD5 | 90 | JD5 | -2.73  |                                       |
| S15 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.56  |                                       |
| S16 | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -3.99  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 6  | 7400 | 1/NPPC8 | JD5 | 90 | JD5 | -4.07  | 4/12g-11x35 screws, 12/30x3.15d nails |
| S17 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -1.68  |                                       |
|     | 5  | 4945 | 1/NPPC8 | JD5 | 90 | JD5 | -5.45  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 9  | 9890 | 2/Z     | JD5 | 90 | JD5 | -1.68  |                                       |
| S18 | 1  | -    | 1/NPPC4 | JD5 | 90 | JD5 | -3.17  | 2/12g-11x35 screws, 6/30x3.15d nails  |
| S19 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.54  |                                       |
|     | 7  | 6200 | 2/Z     | JD5 | 90 | JD5 | -2.51  |                                       |
| S2  | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.39  |                                       |
|     | 5  | 4990 | 2/Z     | JD5 | 90 | JD5 | -2.43  |                                       |
| S20 | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -4.38  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 7  | 8000 | 1/NPPC8 | JD5 | 90 | JD5 | -4.42  | 4/12g-11x35 screws, 12/30x3.15d nails |
| S21 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.42  |                                       |
|     | 5  | 5000 | 2/Z     | JD5 | 90 | JD5 | -2.37  |                                       |
| S3  | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -3.90  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 5  | 4990 | 1/NPPC8 | JD5 | 90 | JD5 | -4.07  | 4/12g-11x35 screws, 12/30x3.15d nails |
| S4  | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.01  |                                       |
|     | 5  | 4945 | 1/NPPC8 | JD5 | 90 | JD5 | -4.13  | 4/12g-11x35 screws, 12/30x3.15d nails |
| S5  | 1  | -    | 1/NPPC4 | JD5 | 90 | JD5 | -3.39  | 2/12g-11x35 screws, 6/30x3.15d nails  |
|     | 7  | 6200 | 1/NPPC4 | JD5 | 90 | JD5 | -3.43  | 2/12g-11x35 screws, 6/30x3.15d nails  |
| S6  | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -1.30  |                                       |
|     | 10 | 4300 | 2/Z     | JD5 | 70 | JD5 | -1.38  |                                       |
|     | 11 | 4900 | 2/Z     | JD5 | 70 | JD5 | -1.35  |                                       |
|     | 12 | 5500 | 2/Z     | JD5 | 70 | JD5 | -2.30  |                                       |
|     | 15 | 6200 | 2/Z     | JD5 | 90 | JD5 | -1.31  |                                       |
|     | 4  | 700  | 2/Z     | JD5 | 70 | JD5 | -2.30  |                                       |
|     | 5  | 1300 | 2/Z     | JD5 | 70 | JD5 | -1.35  |                                       |
|     | 6  | 1900 | 2/Z     | JD5 | 70 | JD5 | -1.38  |                                       |
|     | 7  | 2500 | 2/Z     | JD5 | 70 | JD5 | -1.30  |                                       |
|     | 8  | 3100 | 2/Z     | JD5 | 70 | JD5 | -0.89  |                                       |
|     | 9  | 3700 | 2/Z     | JD5 | 70 | JD5 | -1.30  |                                       |
| S7  | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.77  |                                       |
|     | 5  | 5000 | 2/Z     | JD5 | 90 | JD5 | -2.77  |                                       |
| S8  | 1  | -    | 1/NPPC4 | JD5 | 90 | JD5 | -3.39  | 2/12g-11x35 screws, 6/30x3.15d nails  |
|     | 7  | 6200 | 1/NPPC4 | JD5 | 90 | JD5 | -3.44  | 2/12g-11x35 screws, 6/30x3.15d nails  |
| S9  | 1  | -    | 1/NPPC4 | JD5 | 90 | JD5 | -3.26  | 2/12g-11x35 screws, 6/30x3.15d nails  |
| SG1 | 1  | -    | 2/NPPC8 | JD5 | 90 | JD5 | -9.77  | 4/12g-11x35 screws, 12/30x3.15d nails |
| SG2 | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -6.29  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 6  | 7400 | 2/NPPC8 | JD5 | 90 | JD5 | -14.05 | 4/12g-11x35 screws, 12/30x3.15d nails |
| SG3 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.39  |                                       |
|     | 5  | 4990 | 2/Z     | JD5 | 90 | JD5 | -2.43  |                                       |
| SG4 | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -6.59  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 7  | 8000 | 1/NPPC8 | JD5 | 90 | JD5 | -4.93  | 4/12g-11x35 screws, 12/30x3.15d nails |
| SG5 | 2  | 900  | 1/NPPC8 | JD5 | 90 | JD5 | -4.62  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 7  | 7055 | 2/Z     | JD5 | 90 | JD5 | -2.72  |                                       |
| TS1 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.25  |                                       |
|     | 5  | 4955 | 1/NPPC8 | JD5 | 90 | JD5 | -5.72  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 8  | 8000 | 2/Z     | JD5 | 70 | JD5 | -0.87  |                                       |
| TS2 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -1.87  |                                       |
|     | 5  | 4945 | 1/NPPC8 | JD5 | 90 | JD5 | -4.74  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 9  | 9890 | 2/Z     | JD5 | 90 | JD5 | -1.87  |                                       |
| TS3 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.64  |                                       |
|     | 6  | 6200 | 2/Z     | JD5 | 90 | JD5 | -2.52  |                                       |

**Primary connections (truss to girder):**

| <b>Truss Marks</b> |                  |                  | <b>Fixing Details</b> |                     |
|--------------------|------------------|------------------|-----------------------|---------------------|
| <b>Girder</b>      | <b>Supported</b> | <b>Connector</b> | <b>Girder</b>         | <b>Supported</b>    |
| SG1                | S11              | 2/MG             | 8/30x3.15d nails      | 8/30x3.15d nails    |
|                    | S15              | FB4590           | 8/30x3.15d nails      | 4/30x3.15d nails    |
|                    | S18              | 2/MG             | 8/30x3.15d nails      | 8/30x3.15d nails    |
| SG2                | S10              | 2/MG             | 8/30x3.15d nails      | 8/30x3.15d nails    |
|                    | SG1              | TB45/16          | 8/12g-11x35 screws    | 12/12g-11x35 screws |
| SG4                | S4               | FB4590           | 8/30x3.15d nails      | 4/30x3.15d nails    |



**Paraparaumu Prenail 2016 Ltd.**

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|     |     |         |                    |                    |
|-----|-----|---------|--------------------|--------------------|
|     | S9  | 2/NPPC8 | 6/12g-11x35 screws | 6/12g-11x35 screws |
|     | SG5 | FB4590  | 8/30x3.15d nails   | 4/30x3.15d nails   |
| SG5 | N2  | FB4590  | 8/30x3.15d nails   | 4/30x3.15d nails   |

**Secondary fixings (hip & gable ends, valleys):**

All trusses are to be fixed at each support with the following:

|                                |                                                |
|--------------------------------|------------------------------------------------|
| Hip truss to truncated girder  | 3 face nails, bottom chords                    |
| Jack truss to truncated girder | 3 skew nails or back face nails, bottom chords |
| Creeper truss to hip truss     | 3 face nails, top and bottom chords            |
| Top chord extensions           | 2 skew nails                                   |
| Valley trusses                 | 1 skew nail                                    |
| Outriggers                     | 2 skew nails                                   |

All additional connections are as follows:

| <b><u>Supporting Truss</u></b> | <b><u>Supported Truss</u></b> | <b><u>Top Chord</u></b> | <b><u>Bottom Chord</u></b> |
|--------------------------------|-------------------------------|-------------------------|----------------------------|
| (Various)                      | MV11                          | -                       | 1/MGL                      |
|                                | MV12                          | -                       | 1/MGL                      |
|                                | MV13                          | -                       | 1/MGL                      |
|                                | MV3                           | -                       | 1/MGL                      |
|                                | MV4                           | -                       | 1/MGL                      |
|                                | MV5                           | -                       | 1/MGL                      |
|                                | MV7                           | -                       | 1/MGL                      |
|                                | MV8                           | -                       | 1/MGL                      |
| N1                             | J8                            | 1/MGL                   | -                          |
| S13                            | OR5                           | 1/MGL                   | -                          |
|                                | OR6                           | 1/MGL                   | -                          |
| S3                             | J1                            | 1/MGL                   | -                          |
| S6                             | OR1                           | 1/MGL                   | -                          |
|                                | OR3                           | 1/MGL                   | -                          |
|                                | OR4                           | 1/MGL                   | -                          |
| TG1                            | J16                           | 1/MGL                   | -                          |
|                                | J30                           | 2/MGL                   | -                          |

**Fixing Summary:**

| <b><u>Connector</u></b> | <b><u>Description</u></b> | <b><u>Total</u></b> | <b><u>Fixing Method (per connector)</u></b> |                               |
|-------------------------|---------------------------|---------------------|---------------------------------------------|-------------------------------|
| <b><u>Primary</u></b>   |                           |                     | <b><u>Girder</u></b>                        | <b><u>Supported Truss</u></b> |
| FB4590                  | Joist hanger              | 5                   | 8/30x3.15d nails                            | 4/30x3.15d nails              |
| MG                      | Multigrips                | 12                  | 8/30x3.15d nails                            | 8/30x3.15d nails              |
| NPPC8                   | Purlin cleat              | 2                   | 6/12g-11x35 screws                          | 6/12g-11x35 screws            |
| TB45/16                 | Truss boot                | 1                   | 8/12g-11x35 screws                          | 12/12g-11x35 screws           |
| <b><u>Secondary</u></b> |                           |                     | <b><u>Supporting Truss</u></b>              | <b><u>Supported Truss</u></b> |
| MGL                     | Multigrip (long)          | 44                  | 6/30x3.15d nails                            | 4/30x3.15d nails              |
| <b><u>Tiedown</u></b>   |                           |                     | <b><u>Support</u></b>                       | <b><u>Truss</u></b>           |
| MGL                     | Multigrip (long)          | 4                   | 6/30x3.15d nails                            | 4/30x3.15d nails              |
| NPPC4                   | Purlin cleat              | 11                  | 2/12g-11x35 screws                          | 6/30x3.15d nails              |
| NPPC8                   | Purlin cleat              | 20                  | 4/12g-11x35 screws                          | 12/30x3.15d nails             |
| Z                       | Z nail                    | 194                 |                                             |                               |

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**Producer Statement - PS1 - Design**Job Ref: **1713PS**

This producer statement applies to the structural engineering design software "Pryda Build" supplied by Pryda NZ to  
Paraparaumu Prenail 2016 Ltd.

These truss designs are in accordance with sound and widely accepted engineering principles. I believe on reasonable grounds that if constructed in accordance with the design, the trusses will comply with relevant requirements of the New Zealand Building Code, Clause B1 and Verification Method B1/VM1. The durability shall comply with the New Zealand Building Code, Clause B2, for building Importance Level 2 and a design working life of 50 years.

In addition to the above, this software also complies in part with:

ANSI / TPI 1 - 2002 National Design Standard for metal plate connected wood truss construction.

AS 1649 - 2001 Timber - Methods of test for mechanical fasteners and connectors - Basic working loads and characteristic strengths.

The truss designs require that the supporting structure is stable in its own right, and that the trusses will be braced in accordance with the New Zealand Building Code Standard NZS 3604:2011, and any supplementary details provided, including but not limited to Pryda Installation Guides.

Pryda NZ holds a current policy of Professional Indemnity Insurance with cover no less than NZ\$2 million. The policy includes the engineering design processes used in the software.

**On behalf of Pryda NZ (a division of ITW New Zealand)**



**Dr. Kristopher Orlowski**

Structural Engineer

BSc (Eng), MEng, DR-PHILENG, CPEng AUS (4125476), CPEng NZ (2001879)

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**Fabricator / Designer Statement**

Job Ref: 1713PS

***Design Information for Building Consent Application*****CLIENT Name:** *New residence***SITE Details:**Address : *Lot 45 Manu Park*  
*Waikanae*

City:

Post Code: State:

***Nominal Design Criteria:***

Design working life: 50 years  
 Building importance: Residential (Importance Level 2)  
 Roofing: Pressed metal tiles (7.5 kg/sq.m)  
 Ceiling: 13mm Gib-board (8.5 kg/sq.m)  
 Standard roof pitch: 22.50 deg.  
 Ult. design wind speed: 50 m/s (wind classification = Very high)  
 Max. eaves height: 3 m  
 Max. ridge height: 6 m  
 Int pressure coeff. up: 0.2

Design roof snow load: 0 Pa  
 (incl. probability factor)  
 Ground snow load: 0 Pa  
 Location: Region N1 - lower Nth Island  
 Altitude above sea level: 100 m

Note: This statement must be read in conjunction with the wall layout and detail sheets.

Note: The Structural Timber products supplied in this building stores approximately '980' kg of carbon.

All lintels, beams and associated components are to be installed and connected in accordance with the recommendations given in - : NZS3604: 2011 "Timber Framed Buildings" and any other supplementary details that may be provided, such as the Pryda Builders Guides, and the supporting structure shall be stable in its own right.

Timber verification and grading values are in accordance with clause B1 and timber treatment in accordance with clause B2 of the New Zealand Building Code.

Name: Jimmy RooneyPosition: DetailerSigned:  \_\_\_\_\_Date: 24-04-2023



**Paraparaumu Prenail 2016 Ltd.**

37 Ihakara St. PARAPARAUMU Ph (04) 902 5618 Fax (04) 902 5619

Page 1 of 1

Date: 24-04-2023

Ver 5.03.00

**Producer Statement - PS1 - Design**

Job Ref: 1713PS

This producer statement applies to the structural engineering design software "Pryda Build" supplied by Pryda NZ to  
Paraparaumu Prenail 2016 Ltd.

These lintel, beam and associated component designs are in accordance with sound and widely accepted engineering principles. I believe on reasonable grounds that if constructed in accordance with the design, the lintels, beams and associated components will comply with relevant requirements of the New Zealand Building Code, Clause B1 and Verification Method B1/VM1. The durability shall comply with the New Zealand Building Code, Clause B2, for building Importance Level 2 and a design working life of 50 years.

In addition to the above, this software also complies in part with:

ANSI / TPI 1 - 2002 National Design Standard for metal plate connected wood truss construction.

AS 1649 - 2001 Timber - Methods of test for mechanical fasteners and connectors - Basic working loads and characteristic strengths.

The lintel, beam and associated component designs require that the supporting structure is stable in its own right, and that the lintels, beams and associated components will be installed in accordance with the New Zealand Building Code Standard NZS 3604:2011, and any supplementary details provided, including but not limited to Pryda Installation Guides.

Pryda NZ holds a current policy of Professional Indemnity Insurance with cover no less than NZ\$2 million. The policy includes the engineering design processes used in the software.

**On behalf of Pryda NZ (a division of ITW New Zealand)**



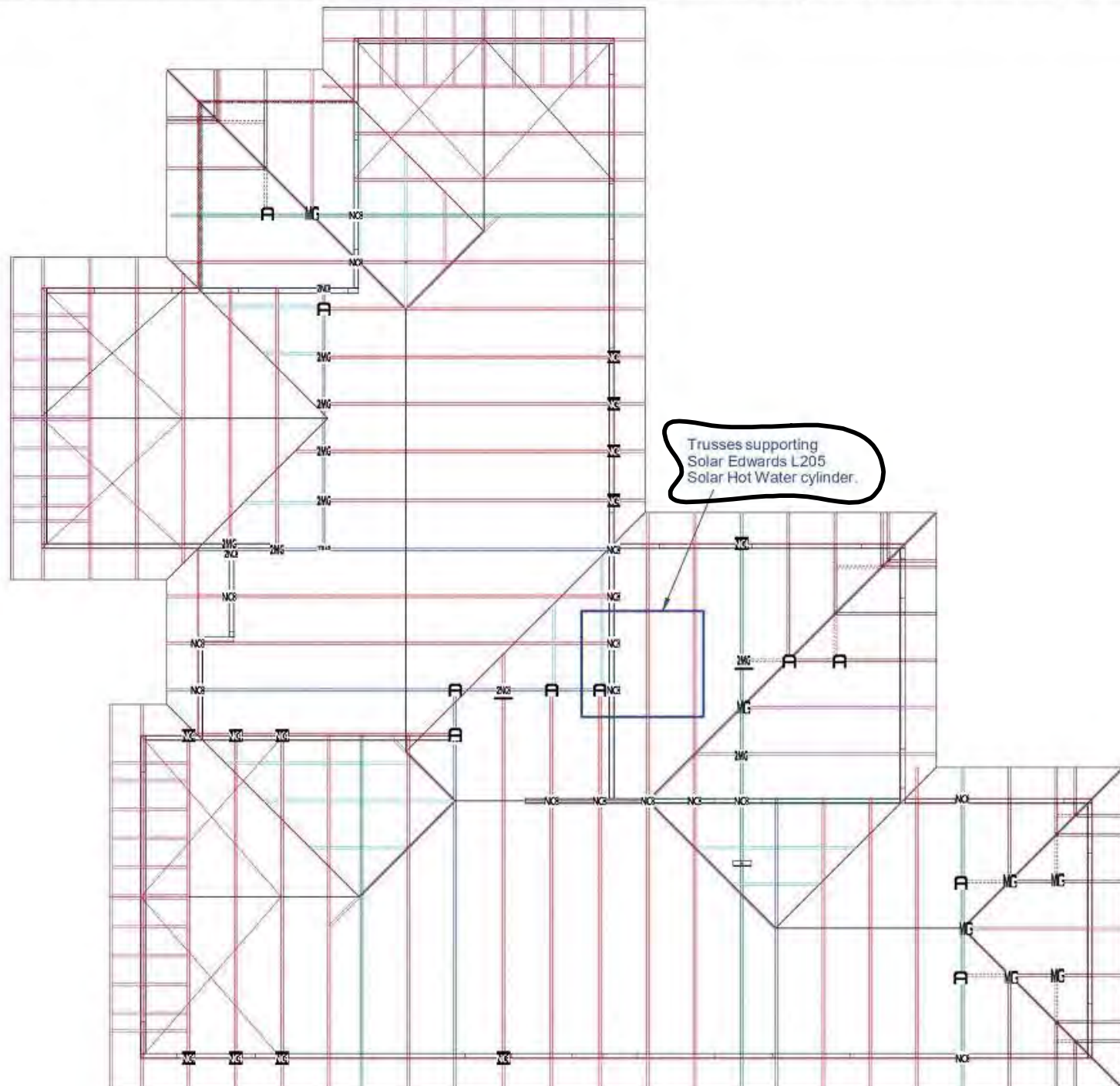
**Dr. Kristopher Orlowski**

Structural Engineer

BSc (Eng), MEng, DR-PHILENG, CPEng AUS (4125476), CPEng NZ (2001879)



Date: Tuesday, 13 June 2023



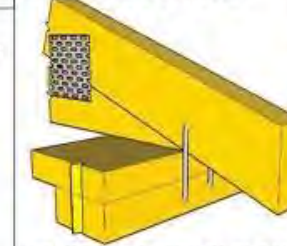
## Truss Connections

- Trusses need to be fixed at each timber support with 2/90x3.15 dia Skew Nails unless otherwise noted.

|      |                             |
|------|-----------------------------|
| NC3  | 17 x 1/NPPC8 Purlin cleat   |
| NC4  | 12 x 1/NPPC4 Purlin cleat   |
| NC5  | 2 x 2/NPPC8 Purlin cleat    |
| NC6  | 7 x 2/MG Multigrips         |
| NC7  | 1 x 1/TB45/16 Truss boot    |
| NC8  | 10 x 1/FB4590 Joist hanger  |
| NC9  | 1 x 2/NPPC8 Purlin cleat    |
| NC10 | 12 x 1/MGL Multigrip (long) |
| NC11 | 1 x 2/MGL Multigrip (long)  |

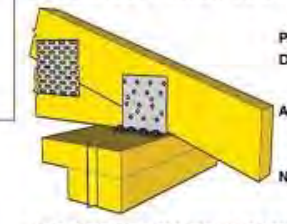
- \* Please attach SN25 below @ 600cns on all gable wall as tiedown to wall frame below.
- \* All truss to truss use 3/90x3.15 dia Skew nails to top and bottom chord where relevant plus fixing listed.
- \* All outriggers, valley trusses and rafters to be fixed to supporting truss with 1 pair of Z-Nails.
- \* All trusses to be tied down to supporting wall frame with 1 Pair of Z-Nails unless noted otherwise.

## Z-NAIL TIE DOWN X2



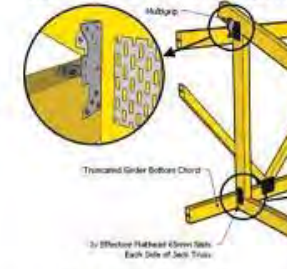
Consent Doc. Code **Z**  
**Product Code:** ZR & ZL (left & right hand) Also sold as MPZR & MPZL  
**Durability:** Suitable for all roof spaces that are closed. Stainless required in open soffits. Compliant with Table 4.1 of NZS3604:1999 Amendments 1 & 2  
**Application:** Usually used in pairs when employed as a truss tie down  
**Note:** The Z-nails should be anchored to the lower wall plate, and may not terminate in the ceiling plate

## CONCEALED PURLIN CLEAT TIE DOWN



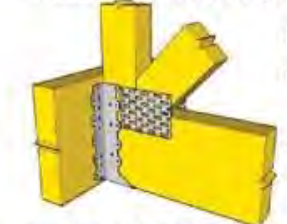
Consent Doc. Code **NC4, NC6, NC8**  
**Product Code:** NPPC4, NPPC6 & NPPC8  
**Durability:** Suitable for all closed roof spaces. Compliant with Table 4.1 of NZS3604:1999 Amendments 1 & 2  
**Application:** All holes in large flange filled with 30x3.15mm Pryda product nails. In small flange either Type 17 12g x 35mm or 14g x 75mm hex head galv. screws  
**Note:** 14gx35 screw can be used in single top plate situations. 14gx75 screws required in a double top plate situation

## JACK TRUSS TO TRUNCATED GIRDER TRUSS



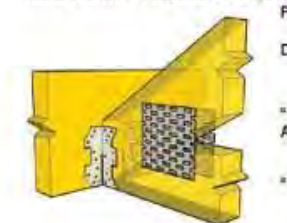
Consent Doc. Code **X**  
**Product Code:** MGL or MG  
**Application:** All holes filled with 30x3.15mm Pryda product nails

## FRAMING BRACKET TRUSS SUPPORT



Consent Doc. Ref. **A, B, C**  
**Product Code:** MPFB4590, MPFB45120, MPFB45180  
**Durability:** Suitable for all closed roof spaces. Stainless steel required in open roofs in sea spray zone and Zone 1 in order to be compliant with Table 4.1 of NZS3604:2011  
**Application:** All holes filled with 30x3.15mm Pryda product nails or type 17 12g x 35mm hex head galv. screws

## MULTIGRIP TRUSS SUPPORT



Consent Doc. Ref. **G**  
**Product Code:** MGL & MGL  
**Durability:** Suitable for all roof spaces that are closed. Stainless steel required in open val part roofs in sea spray zone and Zone 1 in order to be compliant with Table 4.1 of NZS3604:2011  
**Application:** Used in pairs when employed as a truss to truss tie. All holes filled with 30x3.15mm Pryda product nails.  
 \* Long Multigrip (MGL - 125mm long) to be used when top chord of supported trusses is deeper than 90mm

## CONCEALED PURLIN CLEAT TRUSS SUPPORT



Consent Doc. Ref. **NC8**  
**Product Code:** NPPC8  
**Durability:** Suitable for all closed roof spaces. Stainless steel not available. Compliant with Table 4.1 of NZS3604:2011  
**Application:** Variable width connection option utilising screws. All screw holes filled with type 17 12g x 35mm hex head galv. screws

- If Ceiling Battens Are Not Being Direct Fixed To The Bottom Chord Of The Truss, Bottom Chord Restraints Will Be Required At 1800mm Cns Max.
- Builder to read Pre-nail plans in conjunction with Architectural plans, please check all opening trim sizes & braces on site before enclosing. If any variations please contact Paraparaumu Prenail.
- Paraparaumu Prenail will not accept any charges for remedial work unless written authority is issued by Paraparaumu Prenail before work is commenced.
- Cross shown across roof plane indicates Pryda Roof Plane Brace in accordance with NZ3604. Should this exceed capabilities supplementary bracing may be required and to be reviewed by others.
- Gable Outriggers and Barge rafter will be 90x45 SG8 unless stated otherwise
- Windzone has been determined as per Branz unless specified on Architectural or Engineering Drawings
- All gable trusses have been framed to accommodate specific cladding specification.
- Please read all layouts in conjunction with all supporting consent documents.



## TRUSS LAYOUT

Customer: New residence  
 Site Address: Lot 45 Manu Park  
 Waikanae

## Job Details:

Roofing: Pressed metal tiles  
 Pitch: 22.50 Deg.  
 Truss Spacing: 900  
 Design Wind Velocity: 50.00 m/s (Ult.)  
 Detailer: Jimmy

Job Ref: 1713PS

TRUSS LAYOUT - Not to Scale

Sheet 12 A

KCDC RFI dated 08/06/23 - Sheets 8a, 8b, 11a, 11b, 11c, 12a, and 12c only  
 Prepared by: 1 Pihoihoi Close, Lot 45 Manu Park, Waikanae  
 Drawn: S. Neale  
 Date: 03-10-22  
 Issue: A  
 Job Number: WA 45MP  
 Design Plans Ltd - via The Plan Workz  
 Serving Clients New Zealand Wide  
 Email: steve@thepanworkz.co.nz

These plans have been prepared with all reasonable care taken to ensure dimensions and specifications are correct, and in the assumption they will be further checked on site and verified by the building manager who will have a sound knowledge of the NZBC and NZS 3604. If any discrepancy in the drawings is found it is to be immediately reported to the Drawer (Design Plans Ltd) before any building or related work commences. The Drawer accepts no responsibility for costs resulting from discrepancies in any plans produced which are not reported to the drawer before any building or related work commences. Any works carried out by any contractor, sub contractor or authorised agent of the owner or builder, shall comply with the requirements of the local authority. Any works undertaken outside these requirements without the approval of designer, engineer, & local authority hereby indemnifies the Drawer or agent against any claim or claims in respect to the said works.

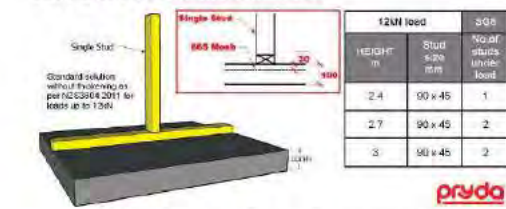


## For Building Consent Purposes Only

No Internal wall exceeds 7kN point load, LB1 up to 10kN is sufficient.

INTERNAL CONCRETE FOUNDATION  
SUPPORT REQUIREMENTS - 10kN

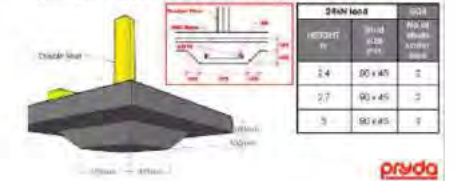
Consent Doc. Ref: LB1



"Minimum Requirement for  
internal load bearing walls"

INTERNAL CONCRETE FOUNDATION  
SUPPORT REQUIREMENTS - 24kN

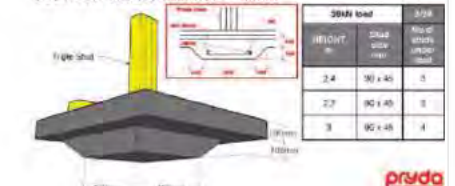
Consent Doc. Ref: LB2



LB2

INTERNAL CONCRETE FOUNDATION  
SUPPORT REQUIREMENTS - 36kN

Consent Doc. Ref: LB3



LB3

- Windzone has been determined as per Branz unless specified on Architectural or Engineering Drawings.
- All Lintels Designed As Per Truss Loadings.
- Design Valid Only With "Paraparaumu Prenail" supplied frames and trusses.
- All Lintels Are Designed As GL8 Unless Otherwise Stated.
- All Walls Shown On Layout Are Loadbearing.
- Lintels have not been designed to receive any wind-face loading. For any larger lintels that may cause concern please consult with engineer.
- Lintels have not been designed to support brick or stone cladding. Lintels have been designed to support up to 80kg per m<sup>2</sup> for medium weight cladding.



## Lintel + Slab Layout

Customer: New residence  
Site Address: Lot 45 Manu Park  
Waikanae

## Job Details:

Roofing: Pressed metal tiles  
Pitch: 22.50 Deg.  
Truss Spacing: 900  
Design Wind Velocity: 50.00 m/s (Ult.)  
Detailer: Jimmy

Job Ref:

1713PS

**pryda**

www.pryda.co.nz

**LINTEL/SLAB LAYOUT - Not to Scale**

**Sheet 12 C**

KCDC RFI dated 08/06/23 - Sheets 8a, 8b, 11a, 11b, 11c, 12a, and 12c only  
Prepared by: 1 Pihoihoi Close, Lot 45 Manu Park, Waikanae  
Drawn: S. Neale  
Date: 03-10-22  
Issue: A  
Job Number: WA 45MP



GENERAL:

1. REFER ARCHITECT'S DRAWINGS FOR DIMENSIONS, UNLESS NOTED OTHERWISE. DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO STEEL FABRICATION. DO NOT SCALE OFF THIS DRAWING.
2. IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN
3. STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATIONS, ARCHITECTURAL, CIVIL AND ENGINEERING SERVICES DOCUMENTS.
4. UNLESS OTHERWISE NOTED ALL LEVELS ARE IN METERS, AND ALL DIMENSIONS ARE IN MILLIMETERS, AND SHALL BE CHECKED BY CONTRACTOR PRIOR TO CONSTRUCTION.
5. DIMENSION SHALL NOT BE OBTAINED BY SCALING FROM DRAWINGS.
6. ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT OR ENGINEER FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
7. ALL MATERIAL AND WORKMANSHIP SHALL BE ON ACCORDANCE WITH THE CURRENT CODES OF PRACTICE EXCEPT WHERE VARIED BY THE SPECIFICATION AND/OR DRAWINGS.
8. WHERE PROPRIETY PRODUCTS ARE SPECIFIED IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL.
9. ENGINEER REQUIRES 24 HOURS NOTICE BEFORE ANY INSPECTION (REFER TO STRUCTURAL CALCULATIONS FOR SCHEDULE OF INSPECTIONS).

FILL SPECIFICATION:

1. SITE TO BE CLEARED OF ALL TOPSOIL AND ANY ORGANIC MATERIAL THEN CUT TO A SERIES OF LEVEL BENCHES.
2. ENGINEER TO INSPECT PRIOR TO ANY FILL PLACEMENT.
3. FILL MATERIAL TO BE CRUSHED ROCK TOPCOURSE MATERIAL FREE OF ORGANIC MATERIAL FULLY COMPACTED TO 90% OF MAXIMUM DENSITY TO BS1377 TEST 9.
4. COMPACT IN MAXIMUM LAYERS OF 150mm THICK WITH A 2 TONNE ROLLER - TRACK ROLLING WITH A DIGGER IS NOT ACCEPTABLE
5. ENGINEER TO INSPECT AND TEST EVERY 2nd LAYER PLACED (300mm INTERVALS)

PILING:

1. PILE DEPTH ESTIMATIONS ARE HIGHLY APPROXIMATE AND MAY BE SUBJECT TO SIGNIFICANT VARIATION ON SITE. IF GREATER CONFIDENCE IS REQUIRED WE RECOMMEND INSTALLATION OF TEST PILES.
2. DRIVEN TIMBER PILES TO HAVE A DEPENDABLE ULTIMATE CAPACITY OF 65kN U.N.O. (REFER DRAWING FOR ESTIMATED LENGTH)
3. PILING CONTRACTOR TO PROVIDE RECORD OF PILE SETS AND PILE DRIVING EQUIPMENT DETAILS. TOP OF PILES TO BE PAINTED WITH METALEX AND HAVE A GAP BETWEEN PILE AND FOOTING STEEL OR A LAYER OF DPM
4. FOR LARGE POLE HOLES IT IS RECOMMENDED TO DRILL & POUR INTERMEDIATE HOLES, THEN COMPLETE REMAINDER IN A SEPARATE POUR TO MINIMISE HOLE COLLAPSE.
5. ENSURE BOTTOM OF PILE HOLES ARE FREE OF WATER AND LOOSE MATERIAL. TAMP AS NECESSARY

WAFFLE SLAB NOTES:

1. SLAB AND FOOTINGS - USE 25MPa CONCRETE, 100mm SLUMP
2. REFER POD SUPPLIER SPECIFICATIONS AND DRAWINGS FOR SAWCUTS AND SHRINKAGE CONTROL JOINTS
3. BASECOURSE AS REQUIRED TO BRING SITE LEVEL. ANY SOFT SPOTS ARE TO BE EXCAVATED AND REPLACED WITH BASECOURSE.
4. POLISHED FLOOR - USE 30MPa CONCRETE WITH 13mm AGGREGATE (DO NOT USE A PUMP MIX), 100mm SLUMP, ENSURE WET CURING FOR AT LEAST 7 DAYS. 2 LAYERS OF DPC ON 20mm SAND BLINDING. ENSURE SAWCUTS ARE MADE AT THE EARLIEST POSSIBLE TIME (WITHIN 48 HRS)

STRUCTURAL MAINTENANCE SCHEDULE:

- YEARLY: WASH DOWN ALL EXPOSED STEELWORK THAT IS NOT IN A FULLY INTERIOR ENVIRONMENT.
- 10 YEARLY: INSPECT AND REPAIR SEALANT THAT ENCLOSES STRUCTURAL MILD-STEEL COMPONENTS AND/OR TIMBER WITH MILD-STEEL FIXINGS.  
  
CHECK EXPOSED TIMBER FIXINGS FOR CORROSION, REPAIR AS REQUIRED.
- 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. INSPECTION MAY TYPICALLY REQUIRE REMOVAL OF CLADDING 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 OR CRACKING. REPAIR AS REQUIRED.

STEEL:

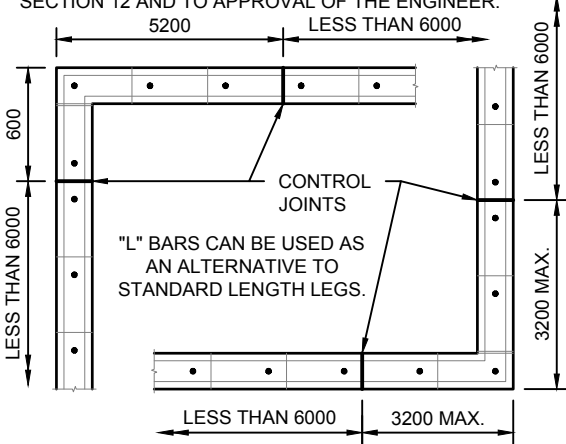
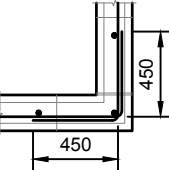
1. ALL STEEL WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3404:2009
2. ALL WELDS TO BE 6 FILLET WELDS ALL ROUND UNLESS NOTED OTHERWISE.
3. ALL M12 BOLTS TO BE GRADE 4.6. ALL M16 BOLTS TO BE GRADE 8.8 UNLESS NOTED OTHERWISE.
4. ALL PLATES TO BE 10 THICK UNLESS NOTED OTHERWISE.
5. STEEL GRADES:  
- PLATES 250MPa  
- HOT ROLLED SECTIONS 300MPa  
- HOLLOW SECTIONS 350MPa
6. ALL WELD ELECTRODES ARE E48XX OR W50X.
7. ALL INTERNAL STRUCTURAL STEEL TO BE PAINTED IN ACCORDANCE WITH SYSTEM DESIGNATION AS/NZS2312/AKL1 BEFORE DELIVERY TO SITE. ANY AREAS DAMAGED TO BE MADE GOOD UPON INSTALLATION.
8. ALL EXTERNAL STRUCTURAL STEEL TREATMENT SHALL BE ONE OF THE FOLLOWING: (NZS TS 3404-2018)
  - TSZ150S - 150µm THERMAL SPRAY ZINC + 75µm ACRYLIC PAINT (EXTERIOR OVER 1KM FROM COAST).
  - HDG900 - 900gm/m² GALVANISED COATING.

CONCRETE:

1. ALL CONCRETE WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3109:1997
2. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF:  
- SLABS & FOOTINGS 25MPa  
- PILES 17.5MPa  
- TIDY SLABS 10MPa
3. MAXIMUM SLUMP TO BE 100mm UNLESS NOTED OTHERWISE
4. CONCRETE FINISHES SHALL BE:  
- SLABS U3  
- EXPOSED FOOTINGS F4
5. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 (HD BARS SHALL NOT BE REBENT)
6. THE CONCRETE SHALL BE KEPT CONTINUOUSLY WET FOR A PERIOD OF A LEAST 4 DAYS. FROM 4-10 DAYS AFTER POURING IT SHALL BE KEPT DAMP BY OCCASIONAL HOSING..
7. ALL CHEMICAL ANCHOR HOLES TO BE CLEANED OUT AND EMBEDDED TO DEPTHS IN ACCORDANCE WITH MANUFACTURES INSTRUCTIONS.

230413  
Received by  
Kapiti Coast District Council  
26/05/23

MASONRY:

1. ALL MASONRY IS LAID IN RUNNING BOND CONFIGURATION UNLESS NOTED OTHERWISE.
2. ALL MASONRY WITHIN THE BUILDING STRUCTURE IS GRADE B AS DEFINED IN NZS 4230.
3. ALL CONCRETE MASONRY BLOCKS SHALL CONFORM TO NZS 3102 UNLESS NOTED OTHERWISE. DENSITY SHALL BE > 1750 kg/m³.
4. ALL MASONRY WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS4210:2001 & NZS4229:2013. LINTELS WHERE NOT SPECIFICALLY DETAILED SHALL COMPLY WITH THE PROVISIONS OF NZS4229:2013. USE 800g/m³ OF SIKA 'CAVEX' EXPANSION AGENT, OR APPROVED ALTERNATIVE, FOR MASONRY BLOCK INFILL.
5. VERTICAL CONTROL JOINTS IN MASONRY TO BE PROVIDED AT 6m MAX. CENTRES. WHERE NOT SHOWN ON DRAWINGS THE JOINTS SHOULD BE LOCATED IN ACCORDANCE WITH NZS4229:2013 SECTION 12 AND TO APPROVAL OF THE ENGINEER.
6. BLOCK WORK CONTROL JOINTS:  
R16-600 800 LONG DEBONDED ONE END 10 GAP WITH POLYSTYRENE STRIP CENTRAL & SEALED BOTH FACES WITH URAFLEX
7. ALL BLOCK WORK HORIZONTAL REINFORCING MUST LAP ADEQUATELY AT CORNERS AND JUNCTIONS AS INDICATED BELOW:  
NOTE: "L" BARS CAN BE USED AS AN ALTERNATIVE TO STANDARD LENGTH LEGS.
8. IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN
9. CONCRETE SHALL BE: B1  
- BLOCK FILL 17.5MPa
10. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 AND SHALL BE PLACED CENTRAL IN MASONRY BLOCK U.N.O. (HD BARS SHALL NOT BE REBENT)
11. CHASING OF LOAD BEARING MASONRY UNITS IS NOT PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

| REINFORCING LAP LENGTHS |                  |      |                  |      |
|-------------------------|------------------|------|------------------|------|
|                         | MASONRY(17.5MPa) |      | CONCRETE (25MPa) |      |
| BAR SIZE                | 300              | 500  | 300              | 500  |
| 10                      | 400              | 700  | -                | -    |
| 12                      | 480              | 840  | 360              | 600  |
| 16                      | 640              | 1120 | 480              | 800  |
| 20                      | 800              | 1400 | 600              | 1000 |
| 25                      | -                | -    | 750              | 1250 |

| REINFORCEMENT COVER     |    | MASONRY | CONCRETE |
|-------------------------|----|---------|----------|
| EXPOSURE CLASSIFICATION |    | 17.5MPa | 25MPa    |
| INTERIOR                | A1 | 35      | 25       |
| EXTERIOR - MOD          | B1 | 50      | 40       |
| AGAINST GROUND          |    | -       | 75       |

TIMBER:

1. ALL TIMBER WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3602:2003
2. ALL BOLTED TIMBER CONNECTIONS TO HAVE 50x50x3 WASHERS.
3. ALL TIMBER TO BE MSG8 UNLESS SPECIFIED OTHERWISE.
4. TIMBER CONNECTIONS NOT SHOWN TO BE IN ACCORDANCE WITH NZS3604. TIMBER SIZES NOT SHOWN REFER ARCHITECT.
5. EXTERNAL BOLTS, WASHERS & BRACKETS TO BE STAINLESS STEEL.

| TIMBER HAZARD CLASSIFICATIONS |                                                                                                                                                   |                                                                                    |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| HAZARD CLASS                  | SERVICE CONDITIONS                                                                                                                                | TYPICAL USES                                                                       |
| H1.2                          | PROTECTED FROM WEATHER, BUT WITH A RISK OF MOISTURE CONTENT CONDUCTIVE TO DECAY                                                                   | WALL FRAMING - SEE NZS3604                                                         |
| H3.2                          | PERIODIC WETTING, NOT IN CONTACT WITH THE GROUND, MORE CRITICAL END USES                                                                          | DECKS, PERGOLAS, EXTERNAL BEAMS, POST NOT IN GROUND                                |
| H4                            | GROUND CONTACT, OR CONDITIONS OF SEVERE OR CONTINUOUS WETTING                                                                                     | FENCE POSTS, LANDSCAPING TIMBER NOT REQUIRING A BUILDING CONSENT                   |
| H5                            | GROUND CONTACT, OR CONDITIONS OF SEVERE OF CONTINUOUS WETTING, WHERE USES ARE CRITICAL AND WHERE A HIGHER LEVEL OF PROTECTION THAN H4 IS REQUIRED | HOUSE PILES AND POLES, CRIB WALLING, POSTS IN GROUND FOR DECKS, VERANDAS, PERGOLAS |

SAFETY STATEMENT:

1. PROPPING:

EXISTING LOAD BEARING STRUCTURAL ELEMENTS SHALL BE ADEQUATELY PROPPED PRIOR TO REMOVING ANY SUPPORTING STRUCTURE. PROPPING SHALL REMAIN UNTIL NEW SUPPORTING STRUCTURE IS INSTALLED AS PER THE ENGINEER'S DRAWINGS AND REQUIREMENTS.

THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE BUILDER.

TEMPORARY WORK AND PROPPING IS THE RESPONSIBILITY OF THE BUILDER.

PRECAST WALL

THE PRE-CAST PANEL MANUFACTURER AND BUILDER SHALL FOLLOW THE;

*Approved Code of Practice for The Safe Handling, Transportation and Erection of Precast Concrete, AND*

ANY REQUIREMENTS SPECIFIED BY THE HEALTH AND SAFETY AT WORK REGULATIONS.

REFER TO [www.business.govt.nz/worksafe/information\\_guidance/all\\_guidance\\_items/scaffolding\\_best\\_practice\\_guideline\\_for\\_scaffolding\\_in\\_new\\_zealand/section\\_6\\_particular\\_scaffolds\\_and\\_scaffolding\\_structures/6.13\\_falsework\\_or\\_propping](http://www.business.govt.nz/worksafe/information_guidance/all_guidance_items/scaffolding_best_practice_guideline_for_scaffolding_in_new_zealand/section_6_particular_scaffolds_and_scaffolding_structures/6.13_falsework_or_propping)

PROJECT

PROPOSED NEW DWELLING

ADDRESS

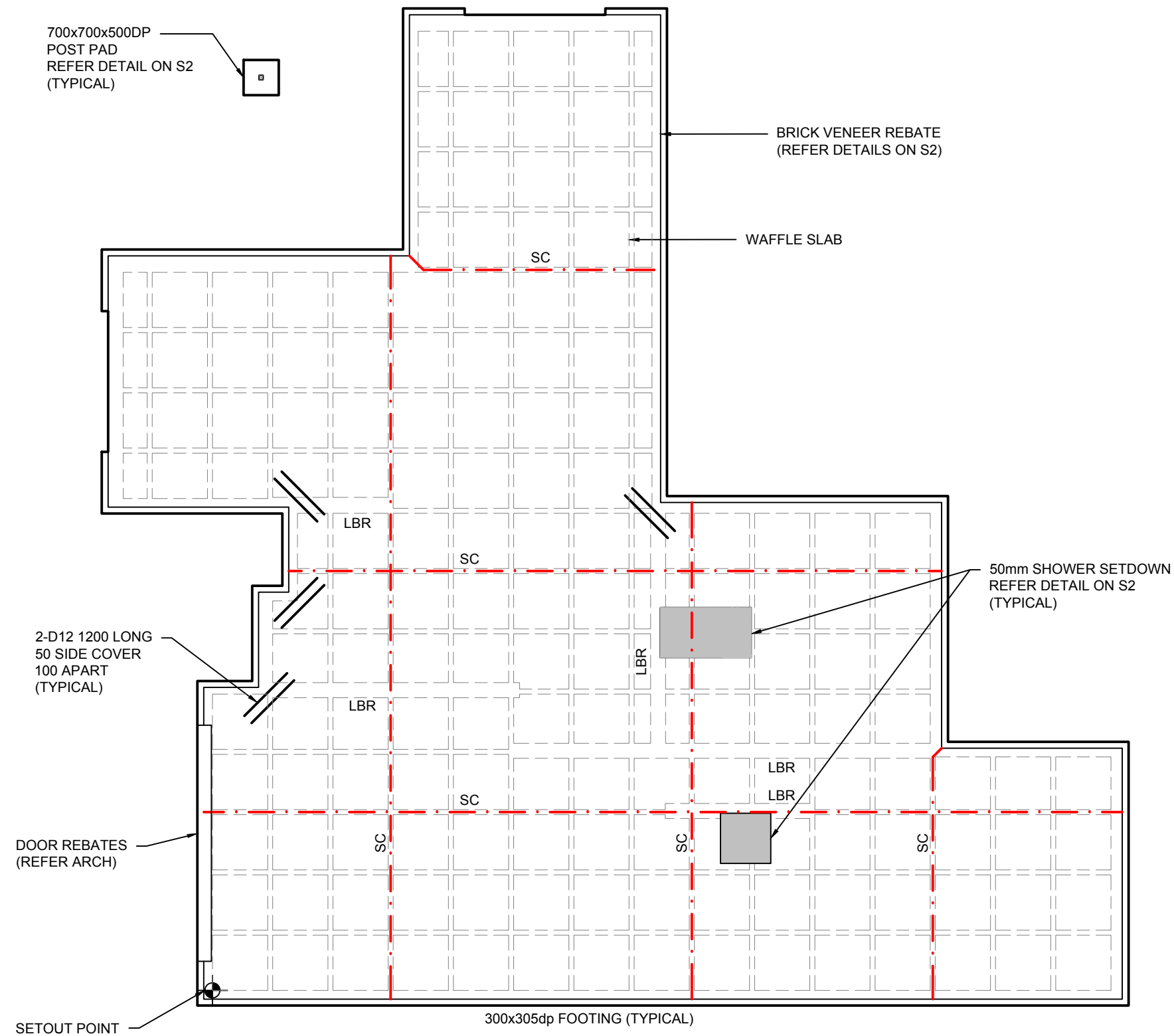
1 PIHIOHOI CLOSE, WAIKANAE



**CERTA**  
ENGINEERING

Lower Hutt Office  
Tel: 04 566 8004  
Level 1, 70 Bloomfield Tce  
P.O. Box 30 535  
Lower Hutt 5040  
[email@certa.nz](mailto:email@certa.nz)

|         |            |           |      |
|---------|------------|-----------|------|
| DATE:   | 4 May 2023 | DESIGNED: | JW   |
| DRAWN:  | BV         | APPROVED: | SRNP |
| JOB No: | 44175      | SHT No:   | S0   |
|         |            | REV:      | A    |



230413  
Received by  
Kapiti Coast District Council  
26/05/23

ARCHITECT TO ENSURE THAT ALL LOAD BEARING WALL HAVE A LOAD BEARING FOUNDATION BEAM UNDERNEATH THEM.

REFER STRUCTURAL CALCULATIONS  
FOR INSPECTION SCHEDULE

TRUSS MANUFACTURER TO ENSURE ALL TRUSS  
LOADS ARE TO INTERNAL THICKENINGS OR  
EXTERNAL PERIMETER

PROJECT

### PROPOSED NEW DWELLING

ADDRESS

## 1 PIHIOHOI CLOSE, WAIKANAE

## FOUNDATION PLAN

SCALE 1:100

— . SC . — SAWCUT (REFER S2)

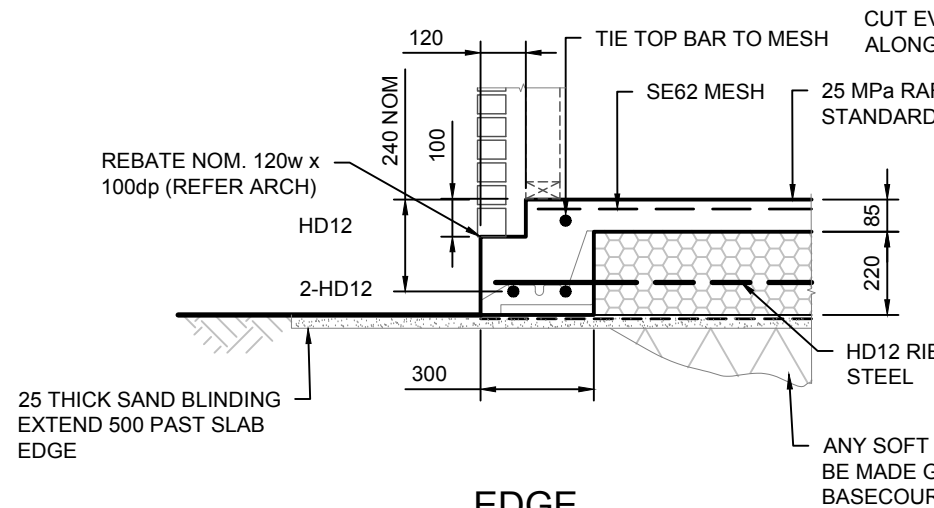
LBR LOAD BEARING RIB - 300x300dp TYPICAL (REFER S2)



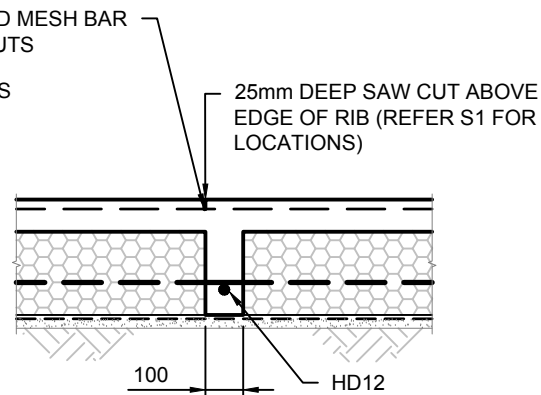
**CERTA**  
**ENGINEERING**

**Lower Hutt Office**  
Tel: 04 566 8004  
Level 1, 70 Bloomfield Tce  
P.O. Box 30 535  
Lower Hutt 5040  
[email@certa.nz](mailto:email@certa.nz)

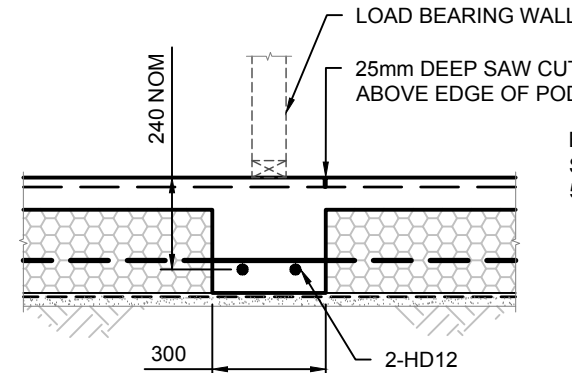
|                      |                   |               |  |
|----------------------|-------------------|---------------|--|
| DATE: 4 May 2023     | DESIGNED: JW      |               |  |
| DRAWN: BV            | APPROVED: SRNP    |               |  |
| JOB No: <b>44175</b> | SHT No: <b>S1</b> | REV: <b>A</b> |  |



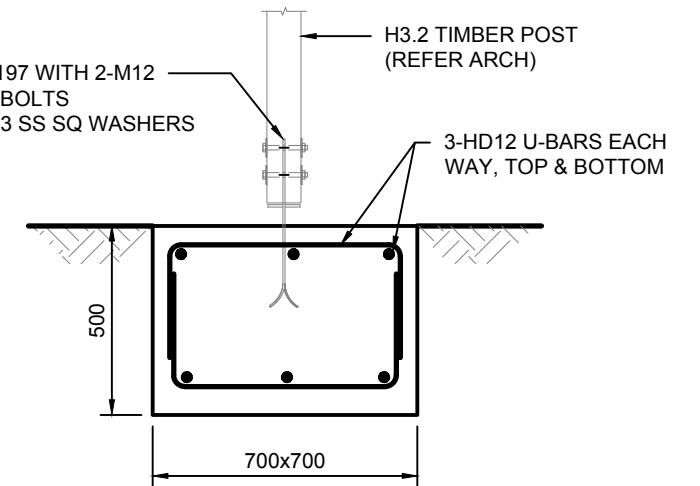
**EDGE  
BEAM DETAIL**  
SCALE 1:20



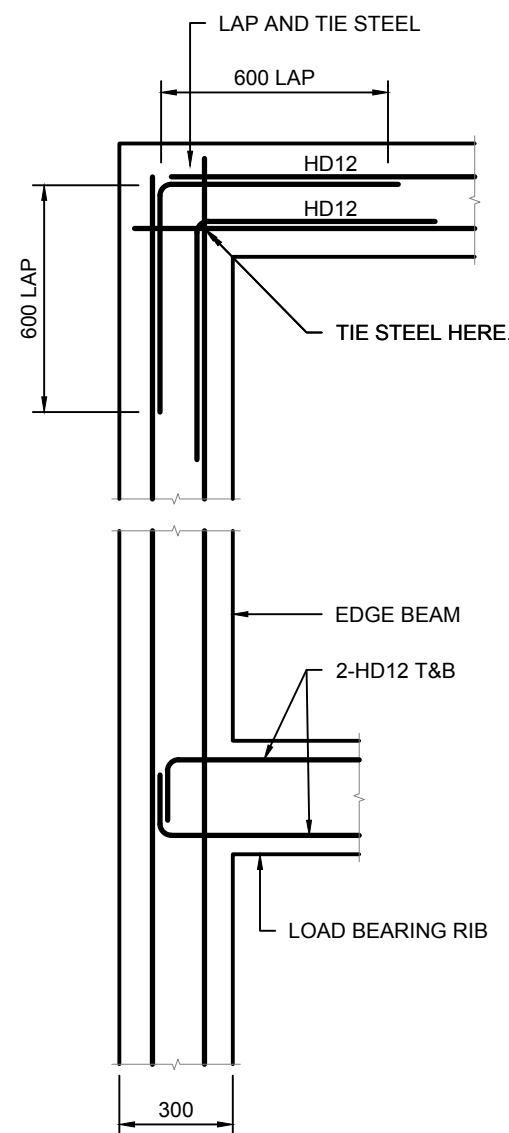
**SAW CUT  
JOINT RIB DETAIL**  
SCALE 1:20



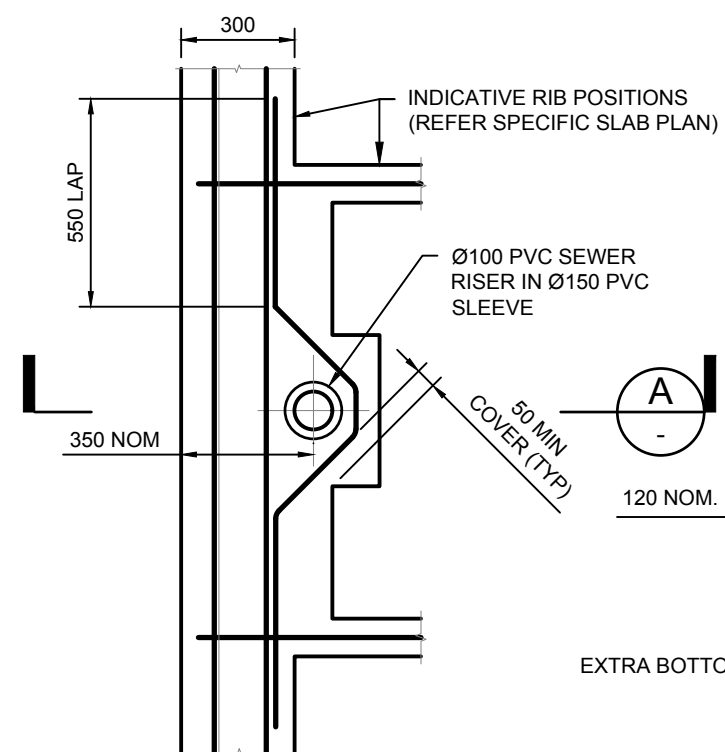
**INTERNAL  
LOAD BEARING RIB DETAIL**  
SCALE 1:20



**POST PAD DETAIL**  
SCALE 1:20

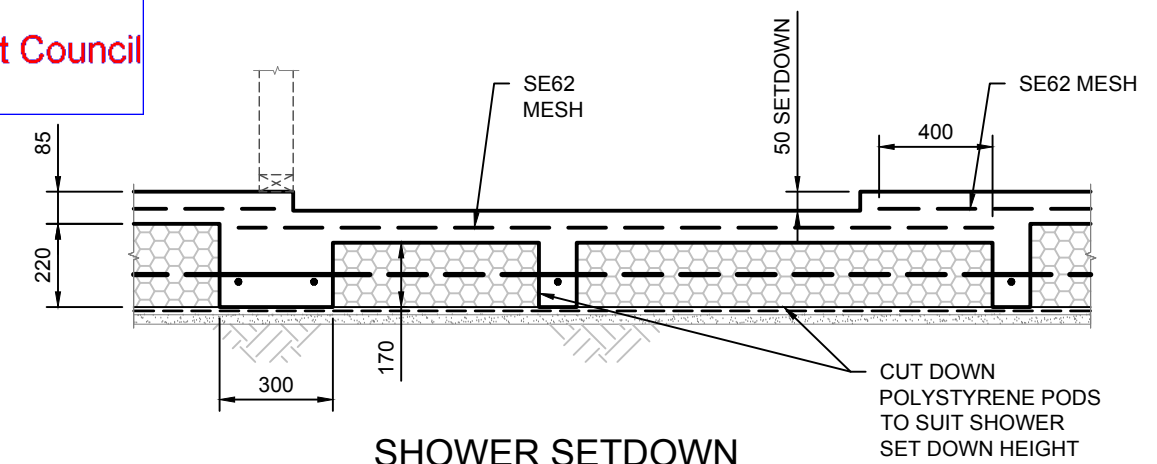


**SLAB CORNER  
LOAD BEARING RIB STEEL**  
SCALE 1:20

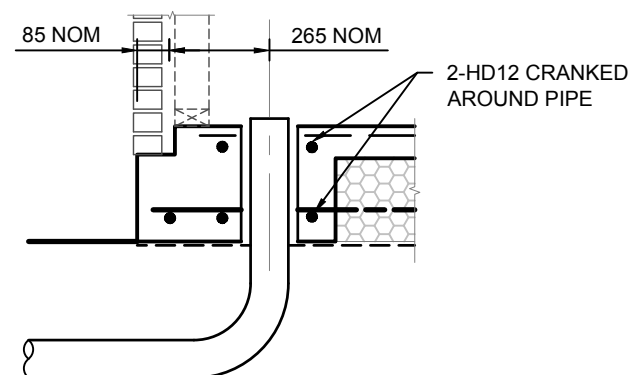


**SLAB  
SEWER PENETRATION DETAIL**  
SCALE 1:20

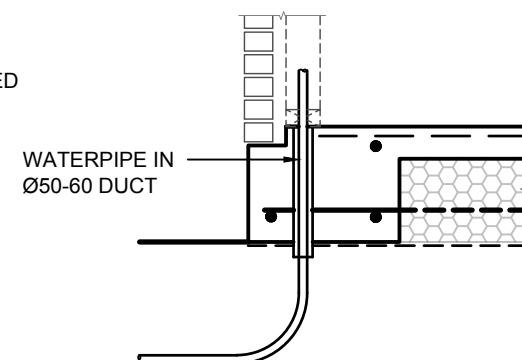
230413  
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26/05/23



**SHOWER SETDOWN  
DETAIL**  
SCALE 1:20



**SECTION A**  
SCALE 1:20



**FOUNDATION STEP  
AT WINDOW (4 OFF)**  
SCALE 1:20

|                                                                                                                                                                                                                                                                                                                                       |              |           |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|-----------|
| PROJECT<br><b>PROPOSED NEW DWELLING</b>                                                                                                                                                                                                                                                                                               |              |           |           |
| ADDRESS<br><b>1 PIHIOHOI CLOSE, WAIKANAE</b>                                                                                                                                                                                                                                                                                          |              |           |           |
| <div>  <div> <b>CERTA<br/>ENGINEERING</b> </div> </div> <div> <p>Lower Hutt Office<br/>Tel: 04 566 8004<br/>Level 1, 70 Bloomfield Tce<br/>P.O. Box 30 535<br/>Lower Hutt 5040<br/><a href="mailto:email@certa.nz">email@certa.nz</a></p> </div> |              |           |           |
| DATE:                                                                                                                                                                                                                                                                                                                                 | 4 May 2023   | DESIGNED: | JW        |
| DRAWN:                                                                                                                                                                                                                                                                                                                                | BV           | APPROVED: | SRNP      |
| JOB No:                                                                                                                                                                                                                                                                                                                               | <b>44175</b> | SHT No:   | <b>S2</b> |
|                                                                                                                                                                                                                                                                                                                                       |              | REV:      | <b>A</b>  |



## Demand Calculation Sheet

### Job Details

Name: 1 Pihoihoi Close Waikanae  
 Street and Number: 1 Pihoihoi Close  
 Lot and DP Number: Lot 45  
 City/Town/District: Kapiti Coast  
 Designer: S Neale  
 Company:  
 Date: Thursday, 20 April 2023

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 Kapiti Coast District Council  
 26/05/23

### Building Specification

Number of Storeys 1  
 Floor Loading 2 kPa  
 Foundation Type Slab

**Single**

Cladding Weight Heavy  
 Roof Weight Light  
 Room in Roof Space No  
 Roof Pitch (degrees) 22.5  
 Roof Height above Eaves (m) 2.6  
 Building Height to Apex (m) 5.1  
 Ground to Lower Floor (m) 0.3

Average Stud Height (m) 2.4  
 Building Length (m) 20.5  
 Building Width (m) 19.9  
 Building Plan Area (m²) 247

### Building Location

Wind Zone = Very High

Earthquake Zone 3

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 | 1330  | 1399   |

### Bracing Units required for Earthquake

|              | Along & Across |
|--------------|----------------|
| Single Level | 2046           |

## Single Level Along Resistance Sheet

Job Name: 1 Pihoihoi Close Waikanae

|      |                        |               |                    |                 |       |          |               |             | Wind         | EQ           |
|------|------------------------|---------------|--------------------|-----------------|-------|----------|---------------|-------------|--------------|--------------|
|      |                        |               |                    |                 |       |          |               |             | Demand       |              |
|      |                        |               |                    |                 |       |          |               |             | 1330         | 2046         |
|      |                        |               |                    |                 |       |          |               |             | Achieved     |              |
| Line | Element                | Length<br>(m) | Angle<br>(degrees) | Stud Ht.<br>(m) | Type  | Supplier | Wind<br>(BUs) | EQ<br>(BUs) | 2026<br>152% | 2133<br>104% |
| A    | 1                      | 0.90          |                    | 2.4             | BLP-H | GIB®     | 135           | 135         |              |              |
|      | 2                      | 0.90          |                    | 2.4             | EP16  | Ecoply   | 86            | 95          |              |              |
|      | External Length = 8.0  |               |                    |                 |       |          |               |             | 221 OK       | 230 OK       |
| B    | 1                      | 0.80          |                    | 2.4             | BLP-H | GIB®     | 117           | 120         |              |              |
|      | 2                      | 1.20          |                    | 2.4             | BL1-H | GIB®     | 154           | 125         |              |              |
|      | External Length = 3.0  |               |                    |                 |       |          |               |             | 271 OK       | 245 OK       |
| C    | 1                      | 2.40          |                    | 2.4             | EP112 | Ecoply   | 288           | 324         |              |              |
|      | 2                      | 1.70          |                    | 2.4             | EP112 | Ecoply   | 204           | 230         |              |              |
|      | 3                      | 0.60          |                    | 2.4             | EP16  | Ecoply   | 57            | 63          |              |              |
|      | External Length = 9.2  |               |                    |                 |       |          |               |             | 549 OK       | 617 OK       |
| D    | 1                      | 0.90          |                    | 2.4             | EP16  | Ecoply   | 86            | 95          |              |              |
|      | 2                      | 1.80          |                    | 2.4             | GS1-N | GIB®     | 124           | 108         |              |              |
|      | 3                      | 1.80          |                    | 2.4             | GS1-N | GIB®     | 124           | 108         |              |              |
|      | 4                      | 0.80          |                    | 2.4             | EP16  | Ecoply   | 76            | 84          |              |              |
|      | External Length = 4.7  |               |                    |                 |       |          |               |             | 410 OK       | 395 OK       |
| E    | 1                      | 2.40          |                    | 2.4             | EP112 | Ecoply   | 288           | 324         |              |              |
|      | 2                      | 2.40          |                    | 2.4             | EP112 | Ecoply   | 288           | 324         |              |              |
|      | External Length = 18.3 |               |                    |                 |       |          |               |             | 576 OK       | 648 OK       |

## Single Level Across Resistance Sheet

Job Name: 1 Pihoihoi Close Waikanae

|      |                        |               |                    |                 |       |          |               |             | Wind         | EQ           |
|------|------------------------|---------------|--------------------|-----------------|-------|----------|---------------|-------------|--------------|--------------|
|      |                        |               |                    |                 |       |          |               |             | Demand       |              |
|      |                        |               |                    |                 |       |          |               |             | 1399         | 2046         |
|      |                        |               |                    |                 |       |          |               |             | Achieved     |              |
| Line | Element                | Length<br>(m) | Angle<br>(degrees) | Stud Ht.<br>(m) | Type  | Supplier | Wind<br>(BUs) | EQ<br>(BUs) | 1980<br>142% | 2084<br>102% |
| M    | 1                      | 0.90          |                    | 2.4             | EP16  | Ecoply   | 86            | 95          |              |              |
|      | 2                      | 0.90          |                    | 2.4             | EP16  | Ecoply   | 86            | 95          |              |              |
|      | External Length = 5.0  |               |                    |                 |       |          |               |             | 171 OK       | 189 OK       |
| N    | 1                      | 0.90          |                    | 2.4             | BLP-H | GIB®     | 135           | 135         |              |              |
|      | 2                      | 0.50          |                    | 2.4             | EP14  | Ecoply   | 40            | 48          |              |              |
|      | 3                      | 0.50          |                    | 2.4             | EP14  | Ecoply   | 40            | 48          |              |              |
|      | External Length = 11.7 |               |                    |                 |       |          |               |             | 215 OK       | 230 OK       |
| O    | 1                      | 0.90          |                    | 2.4             | EP16  | Ecoply   | 86            | 95          |              |              |
|      | 2                      | 0.60          |                    | 2.4             | EP16  | Ecoply   | 57            | 63          |              |              |
|      | 3                      | 0.90          |                    | 2.4             | EP16  | Ecoply   | 86            | 95          |              |              |
|      | External Length = 4.8  |               |                    |                 |       |          |               |             | 228 OK       | 252 OK       |
| P    | 1                      | 0.50          |                    | 2.4             | EP14  | Ecoply   | 40            | 48          |              |              |
|      | 2                      | 0.90          |                    | 2.4             | EP16  | Ecoply   | 86            | 95          |              |              |
|      | 3                      | 0.90          |                    | 2.4             | EP16  | Ecoply   | 86            | 95          |              |              |
|      | 4                      | 1.80          |                    | 2.4             | GS1-N | GIB®     | 124           | 108         |              |              |
|      | 5                      | 1.80          |                    | 2.4             | GS1-N | GIB®     | 124           | 108         |              |              |
|      | External Length = 9.7  |               |                    |                 |       |          |               |             | 459 OK       | 453 OK       |
| Q    | 1                      | 2.80          |                    | 2.4             | EP112 | Ecoply   | 336           | 378         |              |              |
|      | 2                      | 1.70          |                    | 2.4             | GS1-N | GIB®     | 117           | 102         |              |              |
|      | 3                      | 1.70          |                    | 2.4             | GS1-N | GIB®     | 117           | 102         |              |              |
|      | External Length = 4.9  |               |                    |                 |       |          |               |             | 571 OK       | 582 OK       |
| R    | 1                      | 2.80          |                    | 2.4             | EP112 | Ecoply   | 336           | 378         |              |              |
|      | External Length = 5.0  |               |                    |                 |       |          |               |             | 336 OK       | 378 OK       |



## Custom Wall Elements

| Supplier   | System | Min. Length<br>m | Wind<br>BUs/m | EQ<br>BUs/m |
|------------|--------|------------------|---------------|-------------|
| Ecoply     | EP14   | 0.4              | 80            | 95          |
| Ecoply     | EP16   | 0.6              | 95            | 105         |
| Ecoply     | EP112  | 1.2              | 120           | 135         |
| HardiesRAB | JHDn   | 1.2              | 118           | 102         |
| HardiesRAB | JHD4   | 0.4              | 83            | 107         |
| HardiesRAB | JHD6   | 0.6              | 99            | 107         |
| HardiesRAB | JHD12  | 1.2              | 154           | 140         |
| HardiesRAB | JHD24  | 2.4              | 133           | 150         |
|            |        |                  |               |             |
|            |        |                  |               |             |
|            |        |                  |               |             |
|            |        |                  |               |             |
|            |        |                  |               |             |
|            |        |                  |               |             |
|            |        |                  |               |             |

## Some limits on R-value flexibility

1. Roof, wall and floor R-values in the proposed building must not be less than 50% of the corresponding reference building R-values (= Schedule method R-values)

2.1.3.8 The *construction R-value* in the proposed *building* for *roofs*, walls, and floors, that form part of the *building thermal envelope* shall be at least 50% of the *construction R-value* of the corresponding *building element* in the reference *building* equation.



# H1/AS1 5<sup>th</sup> Edition Calculation Method Spreadsheet - Results

Version: 21-Oct-2022

|                              |                           |                     |         |
|------------------------------|---------------------------|---------------------|---------|
| <b>Client</b>                | Paterson Homes Ltd        |                     |         |
| <b>Project name</b>          |                           |                     |         |
| <b>Address</b>               | 1 Pihoihi Close, Waikanae |                     |         |
| <b>Designer</b>              | S Neale                   |                     |         |
| <b>Date</b>                  | 14/06/2023                |                     |         |
| <b>Territorial Authority</b> | Kapiti Coast District     | <b>Climate Zone</b> | 3       |
| <b>When submitted</b>        | Before 2 November 2023    | <b>Application</b>  | Housing |

| Proposed Building                                  |                        |                                   |
|----------------------------------------------------|------------------------|-----------------------------------|
| Element                                            | Area (m <sup>2</sup> ) | Proposed Building Heat Loss (W/K) |
| Slab Floors                                        | 245.0                  | 102.1                             |
| Other Floors                                       | 0.0                    | 0.0                               |
| Roof                                               | 246.7                  | 51.3                              |
| Skylights                                          | 0.0                    | 0.0                               |
| Walls                                              | 136.5                  | 67.9                              |
| Glazing (walls & doors) (27.9% of total wall area) | 54.2                   | 117.7                             |
| Doors (opaque)                                     | 3.3                    | 8.2                               |
|                                                    | 685.6                  | <b>Total 347.1</b>                |

| Reference Building                         |                   |                                    |
|--------------------------------------------|-------------------|------------------------------------|
| Element                                    | (m <sup>2</sup> ) | Reference Building Heat Loss (W/K) |
| Slab Floors                                | 245.0             | 1.5 163.3                          |
| Other Floors                               | 0.0               | 2.5 0.0                            |
| Total Roof (includes skylight area)        | 246.7             | 6.6 37.4                           |
| Walls (70% of total wall area)             | 135.7             | 2.0 67.9                           |
| Glazing allowance (30% of total wall area) | 58.2              | 0.46 126.5                         |
|                                            | 685.6             | <b>Total 395.1</b>                 |

Comparison of proposed building against the reference building

**PASS**

| Element type              | Description           | Embed heating? | Area (m <sup>2</sup> ) | Construction R-value (m <sup>2</sup> .K/W) | Heat Loss (W/K) | Errors |
|---------------------------|-----------------------|----------------|------------------------|--------------------------------------------|-----------------|--------|
| 1 Slab Floors             | Floor                 | No             | 245.0                  | 2.4                                        | 102.1           |        |
| 2 Roof                    | Core Metal Tile       | No             | 212.3                  | 5.2                                        | 40.8            |        |
| 3 Roof                    | Perimeter             | No             | 34.4                   | 3.3                                        | 10.4            |        |
| 4 Walls                   | External Brick Veneer | No             | 136.5                  | 2.0                                        | 67.9            |        |
| 5 Glazing (walls & doors) | Windows and Sliders   |                | 54.2                   | 0.46                                       | 117.7           |        |
| 6 Doors (opaque)          | Entrance Door         |                | 1.7                    | 0.40                                       | 4.4             |        |
| 7 Doors (opaque)          | Internal Laundry Door |                | 1.5                    | 0.40                                       | 3.8             |        |
| 8                         |                       |                |                        |                                            |                 |        |
| 9                         |                       |                |                        |                                            |                 |        |
| 10                        |                       |                |                        |                                            |                 |        |
| 11                        |                       |                |                        |                                            |                 |        |
| 12                        |                       |                |                        |                                            |                 |        |
| 13                        |                       |                |                        |                                            |                 |        |
| 14                        |                       |                |                        |                                            |                 |        |
| 15                        |                       |                |                        |                                            |                 |        |
| 16                        |                       |                |                        |                                            |                 |        |
| 17                        |                       |                |                        |                                            |                 |        |
| 18                        |                       |                |                        |                                            |                 |        |
| 19                        |                       |                |                        |                                            |                 |        |
| 20                        |                       |                |                        |                                            |                 |        |
| 21                        |                       |                |                        |                                            |                 |        |
| 22                        |                       |                |                        |                                            |                 |        |
| 23                        |                       |                |                        |                                            |                 |        |





12/05/2023

Lot 45 709m<sup>2</sup>

**1 Pihoiho Close, Manu Park, Waikanae North**

The plans submitted with the attached building consent achieve compliance with the below standards noted for the dwelling located in Pihoiho Close, Residential House within the Waikanae North Development:

- Solar Hot Water (Solar Edwards L305), roof mounted.
- Constructed Insulation is R1.9 (R1.79) for floor, R2.0 (R2.8) for walls, and R5.2 (core) / R3.3 (perimeter) for ceiling (R5.0 & R3.2).
- 

**WAIKANAЕ NORTH DEVELOPMENT ZONE RULES AND STANDARDS**

Where there are no specific Waikanae North Zone Standards, the permitted activity standards of the Residential Zone will apply. These have been included in the proposed dwelling design and therefore it is deemed to achieve compliance with the standard.

Regards - Steve Neale (LBP 112 998)

The Plan Workz – Ph 021 672 182 - [www.theplanworkz.co.nz](http://www.theplanworkz.co.nz)

## Memorandum from licensed building practitioner: Certificate of design work

### Section 45 and section 30C, Building Act 2004

Please fill in the form as fully and correctly as possible.

If there is insufficient room on the form for requested details, please continue on another sheet and attach the additional sheet(s) to this form.

| THE BUILDING    |                           |
|-----------------|---------------------------|
| Street address: | (LOT 45) 1 PIHOIHOI CLOSE |
| Suburb:         | MANU BEACH, WAIKANAHE     |
| Town/City:      | KAPITI COAST              |
| Postcode:       |                           |

| THE OWNER(S)        |                    |
|---------------------|--------------------|
| Name(s):            | PATERSON HOMES LTD |
| Mailing address:    | PO BOX 493         |
| Suburb:             | PARAPARAUMU        |
| PO Box/Private Bag: |                    |
| Town/City:          | KAPITI COAST       |
| Postcode:           |                    |
| Phone number:       | 0274 358 828       |
| Email address:      |                    |

DATE: 10/10/2011 THIS MEMORANDUM

I am providing this memorandum in my role as the: Please tick the option that applies ☒

- ☐ **sole** designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design work myself – no other person will be providing any additional memoranda for the project
- ☐ **lead** designer who carried out some of the RBW design myself but also supervised other designers – this memorandum covers their RBW design work as well as mine, and **no other** person will be providing any additional memoranda for the project
- ☒ **lead** designer for all but specific elements of RBW – this memorandum only covers the RBW design work that I carried out or supervised and the **other** designers will provide their own memorandum 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

MEMORANDUM TO BE COMPLETED BY THE DESIGNER OF THE RBW DESIGN WORK

I, SEVE NEALE carried out / supervised the following design work that is restricted building work

RBW DESIGN WORK

| Design work that is RBW                                                                                        | Description of RBW                         | Carried out or supervised                                                                                                                  | Reference to plans and specifications |
|----------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Tick <input checked="" type="checkbox"/> if included.<br>Cross <input checked="" type="checkbox"/> if excluded | If appropriate, provide details of the RBW | Tick <input checked="" type="checkbox"/> whether you carried out this design work or supervised someone else carrying out this design work | If appropriate, specify references    |
| All RBW design work relating to B1 <input checked="" type="checkbox"/>                                         |                                            | <input type="radio"/> Carried out<br><input type="radio"/> Supervised                                                                      |                                       |
| Foundations and subfloor framing <input checked="" type="checkbox"/>                                           |                                            | <input type="radio"/> Carried out<br><input type="radio"/> Supervised                                                                      | See                                   |



| Design work that is RBV                                                                                         | Description of RBV                         |  | Carried out or supervised                                                                                                                  | Reference to plans and specifications     |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Tick <input checked="" type="checkbox"/> if included.<br>Cross <input checked="" type="checkbox"/> if excluded. | If appropriate, provide details of the RBV |  | Tick <input checked="" type="checkbox"/> whether you carried out this design work or supervised someone else carrying out this design work | If appropriate, specify references:       |
| Walls                                                                                                           | <input checked="" type="checkbox"/>        |  | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | SHEETS 5 + 9<br>(Plus PREVAL)             |
| Roof                                                                                                            | <input checked="" type="checkbox"/>        |  | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | SHEETS 7 + 9                              |
| Columns and beams                                                                                               | <input checked="" type="checkbox"/>        |  | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | SHEET 10 + 110                            |
| Bracing                                                                                                         | <input checked="" type="checkbox"/>        |  | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | SHEET 10 +<br>(ATTACHED<br>EZYBRACE SCH.) |
| Other                                                                                                           | <input type="checkbox"/>                   |  | <input type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                                |                                           |

| Design work that is RBW                                                                                        | Description of RBW                         | Carried out or supervised                                                                                                                  | Reference to plans and specifications |
|----------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Tick <input checked="" type="checkbox"/> if included.<br>Cross <input checked="" type="checkbox"/> if excluded | If appropriate, provide details of the RBW | Tick <input checked="" type="checkbox"/> whether you carried out this design work or supervised someone else carrying out this design work | If appropriate, specify references    |
| <b>EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2</b>                                                                |                                            |                                                                                                                                            |                                       |
| <b>All RBW design work relating to E2</b>                                                                      | <input checked="" type="checkbox"/>        | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     |                                       |
| Damp proofing                                                                                                  | <input checked="" type="checkbox"/>        | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | <b>SHEETS 4 &amp; 9</b>               |
| Roof cladding or roof cladding system                                                                          | <input checked="" type="checkbox"/>        | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | <b>SHEETS 7, 9 &amp; 11F</b>          |
| Ventilation system (for example, subfloor or cavity)                                                           | <input checked="" type="checkbox"/>        | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | <b>SHEET 3</b>                        |
| Wall cladding or wall cladding system                                                                          | <input checked="" type="checkbox"/>        | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | <b>SHEETS 11K - 11N + 11P - 11S</b>   |
| Waterproofing                                                                                                  | <input checked="" type="checkbox"/>        | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | <b>SHEETS 4 &amp; 11K</b>             |
| Other                                                                                                          | <input type="checkbox"/>                   | <input type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                                |                                       |

| Design work that is RBW                                                                                                                                                                                              | Description of RBW                                                                                                | Carried out or supervised                                                                                                                  | Reference to plans and specifications |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Tick <input checked="" type="checkbox"/> If included.<br>Cross <input type="checkbox"/> If excluded                                                                                                                  | If appropriate, provide details of the RBW                                                                        | Tick <input checked="" type="checkbox"/> whether you carried out this design work or supervised someone else carrying out this design work | If appropriate, specify references    |
| <b>FIRE SAFETY SYSTEMS (1-3)</b>                                                                                                                                                                                     |                                                                                                                   |                                                                                                                                            |                                       |
| Emergency warning systems<br>Evacuation and fire service operation systems<br>Suppression or control systems<br>Other                                                                                                | SMOKE DETECTORS<br>WITHIN 3m OF ALL<br>BEDROOM DOORS &<br><input checked="" type="checkbox"/> MAIN POINT OF ENTRY | <input checked="" type="checkbox"/> Carried out<br><input type="checkbox"/> Supervised                                                     | SHEET 3                               |
| <b>Note:</b> 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. |                                                                                                                   |                                                                                                                                            |                                       |
| <b>WAIVERS AND MODIFICATIONS</b>                                                                                                                                                                                     |                                                                                                                   |                                                                                                                                            |                                       |
| Waivers or modifications of the Building Code are required. <input type="radio"/> Yes <input checked="" type="radio"/> No                                                                                            |                                                                                                                   |                                                                                                                                            |                                       |
| If Yes, provide details of the waivers or modifications below:                                                                                                                                                       |                                                                                                                   |                                                                                                                                            |                                       |
| <b>Clause</b>                                                                                                                                                                                                        | <b>Waiver/modification required</b>                                                                               |                                                                                                                                            |                                       |
| List relevant clause numbers of building code                                                                                                                                                                        | Specify nature of waiver or modification of building code required                                                |                                                                                                                                            |                                       |
|                                                                                                                                                                                                                      |                                                                                                                   |                                                                                                                                            |                                       |
|                                                                                                                                                                                                                      |                                                                                                                   |                                                                                                                                            |                                       |
|                                                                                                                                                                                                                      |                                                                                                                   |                                                                                                                                            |                                       |



WORKED BY

Name and contact details of the licensed building practitioner who is licensed to carry out or supervise design work that is restricted building work.

Name: **STEVE NEALE**

LBP or Registration number: **112998**

The practitioner is a: ☒ Design LBP ☐ Registered architect ☐ Chartered professional engineer

Design Entity or Company (optional):

Mailing address (if different from below):

Street address/Registered office: **67a Gauders Road**

Suburb: **ELDERSBURG**

Town/City: **UPPER HUTT**

PO Box/Private Bag:

Postcode: **5018**

Phone number: **04 902 9095**

Mobile: **021 672 182**

After hours:

Fax:

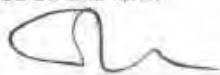
Email address: **steve@thedanworks.co.nz** Website:

DECLARATION

I, **STEVE NEALE** LBP, state that I have applied the skill and care reasonably required of a competent design professional in carrying out or supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- Complies with the building code, or
- Complies with the building code subject to any waiver or modification of the building code recorded on this form

Signature:



Date:

**12/05/2023**

**Subject:** FW: [#Land Matters - 596] 210292 - Manu Park Stage 2 - foundation report clarification

**From:** Phillip Mitchell <phillip@landmatters.nz>

**Date:** 22/03/2023, 2:21 pm

**To:** sales <sales@patersonhomes.co.nz>

Hi Glen, the below email has been sent to KCDC.

If you have any queries, please contact me or Charles directly.

Regards

Phillip Mitchell

Tel: 027 877 0002

230413

Received by

Kapiti Coast District Council

26/05/23

**From:** Phillip Mitchell <phillip@landmatters.nz>

**Sent:** Wednesday, March 22, 2023 2:19 PM

**To:** michelle.salmon@kapiticoast.govt.nz

**Cc:** Mailbox - Building Approvals <Building.Approvals@kapiticoast.govt.nz>; Mailbox - Building Administration <BuildingAdministration@kapiticoast.govt.nz>; Charles McDermott <Charles.McDermott@miyamoto.nz>

**Subject:** FW: [#Land Matters - 596] 210292 - Manu Park Stage 2 - foundation report clarification

Hi Michelle,

I have had some correspondence with a few landowners at Manu Park stage 2 regarding the geotechnical - foundation report completed by Miyamoto, that KCDC are not accepting this report. Please see the below email from Charles confirming that the report is sufficient to meet 3604 requirements for build consent.

If you have any queries, please get in touch with me or contact Charles directly.

Regards

The Miyamoto Technical Memorandum 'Manu Park Subdivision, Waikanae - Stage 2: Foundation Recommendations' (210292.02-TM-001[B]) dated 28 September 2022 is intended to support building consent applications for all lots within Stage 2 (Lot Nos. 40 to 60, 65 to 75, 126 & 128 to 130), with the recommendations as per Section 5 of the Memorandum considered applicable to all lots without the requirement for further pre-construction testing.

To clarify, the recommendation *"The subgrade should be inspected by a suitably experienced geo-professional during construction and compacted / proof rolled prior to foundation construction. Any material identified as being soft or unsuitable should be removed and replaced with compacted hardfill (or site materials suitable for backfill and compaction)"* is considered standard practice as part of the construction monitoring phase of works and not required prior

to construction.

The attached Scala Penetrometer results from Cuttriss may provide Council with additional confidence in approving the building consent applications.

Cheers,

Charles

**Charles McDermott**

BEng(Hons) CEngNZ CPEng IntPE(NZ)

Associate Geotechnical Engineer

M +64 (0) 27 566 6535

**miyamoto.** ENGINEERS+  
CONSTRUCTION  
CONSULTANTS

Miyamoto International NZ Ltd

[miyamotointernational.co.nz](http://miyamotointernational.co.nz)

[LinkedIn](#) | [Instagram](#) | [Youtube](#)

*Please note that our Wellington office has moved. We're now located at Level 7, 138 The Terrace, Wellington Central.*

If you receive this message in error, please delete it immediately.

This message may contain information that is confidential and privileged.

**Phillip Mitchell**

Project Manager

Tel: 027 877 0002

[phillip@landmatters.nz](mailto:phillip@landmatters.nz)

DELIVERING INNOVATIVE PROPERTY, COMMUNITY AND ENVIRONMENTAL SOLUTIONS

20 Addington Road, RD 1, Otaki 5581

Tel 06 364 7293

[www.landmatters.nz](http://www.landmatters.nz)

— Attachments: —

22621 Manu Park Stage 2 - Finish lot scala test records.pdf

172 KB



**210292.02-TM-001[B] Manu Park Stage 2 Foundation  
Recommendations.pdf**

**4.0 MB**

PARAPARAUMU OFFICE

[illegible]

CLIENT Land Matters Ltd  
JOB NO. 22621  
SHEET 2 of 5 SHEETS

|          |                 |
|----------|-----------------|
| SITE ADD | Manu Park Stg 2 |
| LOCALITY | Waikanae        |

PARAPARAUMU OFFICE

[illegible]



CLIENT Land Matters Ltd  
JOB NO. 22621  
SHEET 3 of 5 SHEETS

|          |                 |
|----------|-----------------|
| SITE ADD | Manu Park Stg 2 |
| LOCALITY | Waikanae        |

PARAPARAUMU OFFICE

[illegible]

CLIENT Land Matters Ltd  
JOB NO 22621  
SHEET 4 of 5 SHEETS

|          |                 |
|----------|-----------------|
| SITE ADD | Manu Park Stg 2 |
| LOCALITY | Waikanae        |

PARAPARAUMU OFFICE

[illegible]

CLIENT Land Matters Ltd  
JOB NO 22821  
SHEET 5 of 5 SHEETS

|          |                 |
|----------|-----------------|
| SITE ADD | Manu Park Stg 2 |
| LOCALITY | Waikanae        |

PARAPARAUMU OFFICE

[illegible]



# **SPECIFICATION FOR:**

**New Dwelling:**

**Lot 45 709m<sup>2</sup>**

**1 Pihoihoi Close, Manu Park**

**Waikanae**

**KAPITI COAST**

OVERVIEW

REFERENCED DOCUMENTS

GENERAL REQUIREMENTS

PREPARATION AND GROUNDWORK

FOUNDATIONS

CONCRETE

TIMBER FRAMING

WALL CLADDING

BRICK VENEER CLADDING

ROOFING

RAINWATER SYSTEM

ALUMINIUM WINDOWS AND DOORS

GLAZING

INSULATION

INTERNAL LININGS

INTERIOR DOORS AND TRIM

FLOORING

JOINERY FIXTURES AND FITTINGS

TILING

PAINTING

PAPERHANGING

**WATER SYSTEM****SANITARY PLUMBING****SANITARYWARE, TAPWARE & ACCESSORIES****DRAINAGE****ELECTRICAL****APPLICABLE BUILDING CODES****OVERVIEW**

(to be read in conjunction with architectural drawings and any consultants documentation)

All work undertaken on site to comply with the relevant NZBC (ie masonry, concrete etc), NZS 3604 requirements, the Evacuation Code of Practice, Occupational Health & Safety Dept and Territorial Authority requirements.

**Roofing:**

Metal Tile Roofing installed as per manufacturers requirements but not less than as detailed on attached drawings. External Spouting System & PVC DP's. All roofing system warranties to be lodged with local authority.

**Frames & Trusses:**

As per attached manufacturers design and layout requirements  
Timber grades as per attached drawings.

**Cladding:**

Brick Veneer and Timber Weatherboard Cladding Systems and Building Wrap (over plywood substrate) as detailed on attached drawings. Any manufacturers warranties to be lodged with local authority.

**Linings:**

10/13mm GIB internal wall/ceiling linings installed as per requirements on attached drawings and manufacturers installation instruction. Note internal linings required for bracing integrity on attached drawings (Sheet 10).

**Foundation:**

As required by local authority but not less than as detailed on Sheet 4 (ensure Frame & Truss Design required foundation modifications are implemented). Specific design (SED) by Engineers shall be constructed as per their attached documentation and provided to the local authority.

**Joinery:**

All new joinery to be double glazed aluminum (garage single glazed). Refer to drawings for sizes and specific requirements. All installed as per E2 and manufacturers requirements. See attached details.

**Insulation:**

Install to all roof and external wall cavities as per attached drawings, and the attached project H1 Insulation Calculation Spreadsheet (BRANZ).

## REFERENCED DOCUMENTS

Documents listed below are, when referred to in the text, part of this specification. However, this specification takes precedence in the event of it being at variance with and requiring a higher standard than any cited document.

### Acts and Regulations

Building Act 2004  
 Gas Regulations 1993  
 Health and Safety in Employment Act 1992  
 Electricity Regulations 1997  
 Plumbers, Gasfitters and Drainlayers Act 1976  
 New Zealand Electrical Codes of Practice (ECP)

### New Zealand Building Code verification methods

E2/VM1 External moisture

### New Zealand Building Code acceptable solutions

B1/AS1 Structure - general  
 D1/AS1 Access routes  
 E1/AS1 Surface water  
 E2/AS1 External moisture  
 F2/AS1 Hazardous building materials  
 F7/AS1 Domestic smoke alarms  
 G10/AS1 Piped services - Gas  
 G12/AS1 Water supplies  
 G13/AS2 Foul water - Drainage

### New Zealand Standards

AS/NZS 1748 Mechanically stress - Graded for structural purposes  
 AS/NZS 2642 Polybutylene pipe systems  
 AS/NZS 2269 Plywood - Structural  
 AS/NZS 2589 Gypsum linings - Application and finishing  
 AS/NZS 2699.1 Built-in components for masonry construction Wall ties  
 AS/NZS 3000 Electrical installations (known as the Australian/NZ Wiring Rules)  
 AS/NZS 3500.2 Plumbing and drainage - Sanitary plumbing and drainage  
 AS/NZS 3500.3 Plumbing and drainage - Stormwater drainage  
 AS/NZS 4129 Fittings for polyethylene pipes for pressure applications  
 AS/NZS 4130 Polyethylene (PE) pipes for pressure applications  
 AS/NZS 4357 Structural laminated veneer lumber  
 AS/NZS 4666 Insulating glass units  
 AS/NZS 4671 Steel reinforcing materials  
 NZS 3103 Sands for mortars and plasters  
 NZS 3104 Specification for concrete production  
 NZS 3109 Concrete construction  
 NZS 3114 Concrete surface finishes  
 NZS 3501 Specification for copper tubes for water, gas and sanitation  
 NZS 3602 Timber and wood-based products for use in building  
 NZS 3604 Timber framed buildings  
 NZS 3631 New Zealand national timber grading rules  
 NZS 4210 Masonry construction materials and workmanship  
 NZS 4223.1 Glazing in buildings - Glass selection and glazing  
     NZS 4223.3 Glazing in buildings - Human impact safety requirements  
     NZS 4223.4 Glazing in buildings - Wind, dead, snow and live actions  
 NZS 4229 Concrete masonry buildings not requiring specific design  
 NZS 4251.1 Solid plastering - Cement plasters for walls, ceilings and soffits  
 NZS 4357 Structural laminated veneer lumber  
 NZS 5261 Installation of gas burning appliances and equipment  
 NZS 6803 Acoustics - Construction noise



**Building Research Association of New Zealand (BRANZ)**

Good practice guide: Stucco

Good practice guide: Tiling

Good practice guide: Membrane roofing

Bulletin 441      Sealed joints in external claddings - 2. Sealants

Bulletin 453      Fasteners selection

**Other documents**

Department of Labour – Occupational Safety and Health (OSH)

Approved code of practice for demolition

Approved code of practice for safety in excavation and shafts for foundations

Guidelines for the management and removal of asbestos

Repainting lead based paints

New Zealand Metal Roofing Manufacturers Inc

NZ Metal roofing and wall cladding: Code of practice

Window Association of New Zealand Incorporated (WANZ)

Aluminium Window Handbook

Specification for powder coatings on architectural aluminium products

Installation code for aluminium joinery products

WIS™ Window Installation System

## GENERAL REQUIREMENTS

### THE WORKS

The works are as described in this specification and shown on the drawings.

### PERSONNEL

Owner: The person defined as “owner” in the New Zealand Building Code.

Contractor: The person contracted by the owner to carry out the contract.

### THE SITE

The site of the works, the site address and the legal description are listed under PROJECT INFORMATION. Confine access and work to the area of site indicated on the drawings.

### SPECIFICATION SECTIONS

Sections are for reference and convenience only and do not constitute individual trade sections or work elements. Read all sections together and read GENERAL REQUIREMENTS with all other sections.

### INTERPRETATIONS

|              |                                                                                                                      |
|--------------|----------------------------------------------------------------------------------------------------------------------|
| Required:    | Required by the documents, or by a statutory authority.                                                              |
| Proprietary: | Identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number. |
| Approval:    | Approval in writing.                                                                                                 |
| Direction:   | Direction in writing.                                                                                                |
| Notified:    | Notified in writing.                                                                                                 |

### INCONSISTENCIES

If there are any inconsistencies, errors or omissions in or between documents, the contractor must seek direction in resolving it. Figured dimensions take precedence over scaled dimensions; drawings to a larger scale take precedence over drawings to a smaller scale and drawings take precedence over specification.

### SUBSTITUTIONS

A substitution may be proposed where specified products are not available, or if substitute products are brought to the attention of and are considered by the owner as equivalent or superior to those specified. Except where a specified product is not available, the owner is not bound to accept any substitutions.

Notify proposed substitution of specified products. Include sufficient information to allow the owner to confirm that the substitution is equivalent or superior to that specified. Advise the owner whether an amendment will or may be required to the Building Consent and the expected costs of such amendment.

### THE WORDS "PROVIDE" OR "FIX"

The words “provide” (or “supply”) or “fix” if used separately mean “provide and fix” unless explicitly stated otherwise.

### MANUFACTURERS AND SUPPLIERS

Manufacturers and suppliers requirements, instructions, specifications or details are those issued by them for their particular material, product or component and are the latest edition.

### REFERENCED DOCUMENTS

Reference is made to various New Zealand Building Code (NZBC) acceptable solutions (AS) and verification methods (VM) for criteria and/or methods used to establish compliance with the Building Act 2004. Reference is also made to various Standards produced by Standards New Zealand (NZS, AS/NZS) and to listed Acts, Regulations and various industry codes of practice and practice guides. The latest edition (including amendments and provisional editions) at the date of this specification applies unless stated otherwise. Documents cited both directly and within other cited publications are part of this specification.

## PRECEDENCE OF REFERENCED DOCUMENTS

This specification takes precedence in the event of it being at variance with and requiring a higher standard than, the cited documents. Resolution of any variance must be confirmed in writing and where Building Consent is affected, the change notified to the Building Consent Authority.

## BUILDING CONSENT COMPLIANCE

It is an offence under the Building Act 2004 to carry out any work not in accordance with the Building Consent. Refer the resolution of matters concerning compliance to the owner for a direction. Where Building Consent is affected refer any change to the Building Consent Authority.

## STATUTORY OBLIGATIONS

Comply with all statutory obligations and regulations of regulatory bodies controlling execution of the works.

## BUILDING CONSENT

Obtain the original or copies of the Building Consent form and documents from the owner and keep on site. Liaise with the Building Consent Authority and/or the building certifier for all required notices and all inspections required during construction to ensure compliance. Return the consent form and documents to the owner on completion.

## INSPECTIONS

Do not proceed with work noted on the Building Consent for inspection until it has been inspected and passed by the Building Consent Authority inspector.

## PRODUCER STATEMENTS

When producer statements verifying construction are required, provide copies to both the Building Consent Authority and the owner. Provide producer statements in the form required by the Building Consent Authority.

## TRADE GUARANTEES AND WARRANTIES

Where specific trade guarantees/warranties are offered covering materials and/or execution of proprietary products or complete installations, provide copies of all guarantees/warranties to the owner.

## SITE ACCOMMODATION

Provide, erect and maintain scaffolding, sheds, toilets, water, power and hoardings. Allow for cartage, craneage, plant hire and storage. Arrange for temporary works and services necessary for the completion of the works.

## HEALTH AND SAFETY

Make the works safe and provide and maintain a safe working environment. Ensure that all those working on or visiting the site are aware of the rules governing site safety, are properly supervised and are not unnecessarily exposed to hazards.

## PROTECT THE WORKS

Protect parts of the work liable to damage until completion of the works. Take all precautions necessary to protect the works from damage by unauthorised entry or inclement weather. Brace and support all parts of the works against damage during construction.

## STORAGE AND PROTECTION

Provide temporary storage areas and protective covers and screens. Fillet stack and protect all framing and structural members from moisture and contamination. Completely protect finishing materials from the weather and damage and store in accordance with the manufacturer's requirements. Protect fabricated elements from the weather and damage, and store in accordance with suppliers requirements.

## ANTIQUITIES AND ITEMS OF VALUE AND INTEREST

Report immediately the finding of any fossils, antiquities, or objects of value. Ensure they remain undisturbed until approval is given for their removal.

## MEANS OF COMMUNICATION

All directions and approvals in writing.



## PROGRAMME

Provide a programme for the contract works, including the work of separate contractors being carried out concurrently with this contract. Form of programme: A dated bar chart, identifying the contract work's critical path and all key dates for the provision of labour, materials and elements. Supply a copy of the programme, and any updates to the owner.

## WORKING HOURS

Work on site is restricted to between 0800 to 1800, Monday to Friday, excluding statutory holidays. Work outside these hours may be permitted, with prior approval in writing by the owner.

## RESTRICTIONS

Do not:

- smoke on site
- light rubbish fires on the site
- bring dogs on to or near the site
- bring radios/audio players on to the site.

## QUALITY ASSURANCE

Carry out and record regular checks of material quality and accuracy. Provide all necessary materials, equipment, plant, attendances, supervision, inspections and programming to ensure required standards are met.

## DAMAGE AND NUISANCE

Prevent damage and nuisance from water, fire, smoke, vehicles, dust, rubbish, noise and other causes resulting from the contract works. Comply with the requirements of the territorial authority and relevant Acts and Standards.

## SET-OUT AND DATUM

Set out the works to conform with the drawings. Establish a permanent site datum to confirm the existing ground floor level and its relationship to other existing and new building levels.

## EXECUTION OF THE WORK

Conform to the requirements of this specification. Ensure work is level, plumb, and true to line and face. Employ only experienced workers familiar with the materials and techniques specified.

## MATERIALS AND PRODUCTS

Use only new materials and products, unless stated otherwise, of the specified quality and complying with cited documents.

## COMPATIBILITY

Ensure all parts of a construction or finish are compatible and their individual use approved by the manufacturers and suppliers of other parts of the system. Source all parts of a system from a single manufacturer or supplier.

## COMPLETE ALL SERVICES

Ensure completed building services are operational, with temporary labelling removed, required labelling fixed and service instructions provided.

## CLEAR AWAY

Regularly clear away trade debris, unused materials and elements from the site. On completion of the work leave the building clean and ready for occupancy, with all services operating and mechanical parts in good working order. Remove temporary markings, coverings and protective wrappings.

## CLEAN

Clean and wash down external surfaces to remove dirt, debris and marking. Clean interior surfaces including floors, glass, cabinetwork, joinery, sanitary and hardware items.

## PREPARATION AND GROUNDWORK

Refer to SED for specific product, material, accessories and finish selections.

### SITE SAFETY

Provide proper support for excavations. Cover holes and fence off open trenches and banks.

### FILLING MATERIALS

Volcanic tuff: Scoriaceous tuff of variable grading excluding silt or clay material, capable of being placed and compacted as specified.  
 Rock fill: Hard material comprising rock, broken stone, hard brick, concrete, run of pit scoria, or other comparable inert material capable of being placed and compacted as specified.  
 Sand fill: Clean sand of such grading in particle size as to allow for mechanical compaction to 90% maximum density.  
 Hardcore: Scoria or crushed rock to GAP (General All Passing) 40 grading.  
 Granular base: Screened crushed gravel or scoria graded in size from 20 mm to 7 mm, clean. When tested with a standard sieve of 4.75 opening no material is to pass.  
 Dressing course: Scoria to GAP 20 grading, or "dirty footpath scoria", or equivalent "all in" graded crushed metal aggregate.  
 Free-draining aggregate: Scoria or crushed gravel graded 50 to 14 clean.

### EXCAVATION GUIDELINES

Carry out excavation to the guidelines set in OSH Approved Code of Practice for Safety in Excavation and Shafts for Foundations.

### PROTECT EXISTING

Protect from damage existing buildings, structures, roads, paving and services nominated on the drawings as being retained, throughout the course of the work.

### PROTECT TREES

Protect from damage all trees, shrubs, natural site features and existing landscaped areas nominated on the drawings as being retained, throughout the course of the work.

### SURFACE PREPARATION

Conforming with NZS 3604, 3.5 Site preparation, remove all turf, vegetation, trees, topsoil, stumps and rubbish from the area being built on.

### UNDERGROUND ELEMENTS AND SERVICES

Break out and remove underground elements and redundant services. Report for instructions when unexpected voids, made-up ground or services are encountered. Seal off the ends of drains or remove to utility operator approval.

### STOCKPILE TOPSOIL

Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.

### GENERAL EXCAVATION

Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

### EXCAVATION FOR FOUNDATIONS

Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and solid, stepped as detailed and clean and free of water.

### INADEQUATE BEARING

If bearing is inadequate then excavate further and backfill with material as follows:

Slabs on grade: Hardfill  
 Footings: 10 MPa concrete  
 Service trenches: Hardfill

If excavation exceeds the required depths, backfill and compact to the correct level with listed material.

#### GRANULAR BASE FOR SLABS

To NZS 3604, 7.5.3 Granular base. Consolidate with a vibrating roller. Blind the surface with coarse sand or sand/cement and roll ready to receive a dampproof membrane.

#### GENERAL BACKFILLING

Compact backfilling in 150 mm layers, with the last 200 mm in clean topsoil, lightly compacted and neatly finished off.



## FOUNDATIONS

Refer to Sheet 4 and attached Engineers documentation for specific product, material, accessories and finish selections.

## ACCESSORIES

Nails: Steel, stainless steel and galvanized steel of pattern to NZS 3604, table 6.8 Nailing schedule for hand and power driven nails, and section 4, Durability.

Bolts and screws: Steel, stainless steel and galvanized steel to NZS, section 6 Foundation and subfloor framing, and section 4 Durability.

Nail plates: Stainless steel and galvanized steel toothed or nailed steel plates to the plate manufacturer's design for the particular locations shown on the drawings.

Concrete: For piles, prescribed grade 17.5 MPa to NZS 3104, table 3.1 Prescribed mixes (P).

## EXECUTION GENERALLY

Comply with NZS 3602 and NZS 3604 except as varied by this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

## CONCRETE

Refer to Sheet 4 and attached Engineers Design for specific product, material, accessories and finish selections.

### REINFORCEMENT

Bars to AS/NZS 4671, grade 300 deformed. Welded reinforcing mesh to AS/NZS 4671. Mild drawn steel tying wire not less than 1.2 mm diameter.

### SPACERS AND CHAIRS

Precast concrete or purpose made moulded PVC. Use concrete spacer blocks only where the concrete surface is not exposed in the finished work.

### CONCRETE

Strength as selected. Ready-mix normal grade, maximum aggregate size 19 mm to NZS 3104. Site mixed prescribed grade, using either separate batching of sand and coarse aggregate, or builder's mix, to NZS 3104.

### HANDLE AND STORE REINFORCING

Handle and store reinforcing steel and accessories without damage or contamination. Ensure reinforcement is clean and remains clean and free of contamination that may reduce bonding capacity.

### FALSEWORK AND FORMWORK

Use falsework and formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality.

### CUT AND BEND

Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3109. Do not rebend bars without written approval. Bend main reinforcing bars, stirrups and ties to the former pin diameters as given in NZS 3109, figure 3.1.

### SECURE REINFORCEMENT

Secure reinforcement adequately with tying wire and place, support and secure against displacement when concreting. Bend tying wire back well clear of the formwork. Spacing as dimensioned, or if not shown, to the clear distance minimums laid down in NZS 3109, clause 3.3.

### LAPPED SPLICES

Set length of laps, where not dimensioned on the drawings, in accordance with NZS 3109: 3.7. Increase laps of plain round steel by 100%.

### COVER

Minimum cover to reinforcing as shown on the drawings and to NZS 3109, clause 2.7. Fix chairs for top reinforcement in slabs at 1.0 metre centres. Cover tolerances to NZS 3109, clause 3.8.

### SURFACE FINISHES

To comply with NZS 3114, section 105, or as denoted on the drawings. Formwork linings and surface finishes as nominated for both fair face and concealed or exposed surfaces. Surface tolerances to comply with NZS 3114, sections 104 and clause 105.3.2.

### DAMPPROOF MEMBRANE

Apply membrane to prepared basecourse with 150 mm laps between sheets. Tape seal laps and penetrations with 50 mm wide pressure sensitive plastic tape. Refer to drawings for perimeter details.

### CASTING IN

Build in grounds, bolts and fixings for wall plates and bracing elements, holding down bolts, pipes, sleeves and fixings as required. Form pockets, chases and flashing grooves as required. No grounds exceeding 100 mm in length. Minimum cover on conduits 40 mm. Do not encase aluminium items in concrete. Do not paint steel embedded items more than 25 mm into the concrete encasement. Cut back form ties to specified cover and fill the cavities with mortar. Wrap all pipes embedded in concrete with tape to break the bond and to allow for expansion.

## CONSTRUCT FLOOR SLABS

Construct in accordance with NZS 3604, 7.5 Concrete slab-on-ground floors for timber buildings. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3 mm gradual deviation over a 3 metre straight-edge, to the requirements of NZS 3114, section 104.

## SAW CUTS

Pour floor slabs cast on the ground in areas no greater than 25 square metres, with a maximum ratio of length to breadth of 1:1.5. Cut slabs where indicated on the drawings and as required to control shrinkage cracking. Carry out cutting as soon as possible, without causing tear-out of aggregate and before shrinkage cracking has occurred, generally within 24 hours of pouring. Where saw cuts are made, cut out 100 mm of every second wire of the mesh for a length of 50 mm each side of the saw cut position. Saw cuts:  $\frac{1}{3}$ rd slab depth, or 30 mm minimum.

## SURFACE REPAIRS

Make good surface defects as soon as forms are stripped. Make good hollows or bony areas with 1:2 mortar, finished to the same tolerances as the parent concrete. Fill tie rod holes with 1:2 mortar.

## CURING OF CONCRETE

Keep damp for not less than seven days. Ensure curing of slabs commences as soon as possible after final finishing, by the use of continuous water sprays, or ponding. Alternately, apply a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.

## STRIKE FORMWORK

Strike formwork without damaging or overloading structure.

## CLEAN OUT

Clean out saw cuts. Fill with cement grout where the floor will be covered with carpet or vinyl.

## TIMBER FRAMING

Refer to Sheet 5 and Prenail Design (Sheet 12a, 12b & 12c) for specific product, material, accessories and finish selections.

### TIMBER FRAMING GENERALLY

Species, grade and level of treatment to NZS 3602, tables 1 to 3 Requirements for wood-based building components..., and moisture content to NZS 3602, table 4 Allowable moisture content..... Grading to NZS 3631. Mechanical stress grading acceptable as an alternative to visual grading.

### TIMBER FRAMING DRY, CHEMICAL FREE, MECHANICALLY STRESS GRADED

Species and grade to NZS 3602, tables 1 to 3 Requirements for wood-based building components..., with an average moisture content at supply of 16% or less. Machine stress graded to AS/NZS 1748.

### TIMBER FRAMING DRY, TREATED

Species, grade and level of treatment to NZS 3602, tables 1 to 3 Requirements for wood-based building components..., and moisture content to NZS 3602, table 4 Allowable moisture content. Either mechanically stress graded to AS/NZS 1748, or visual grading to NZS 3631.

### ACCESSORIES

|                          |                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Damp proof course:       | High impact embossed polyethylene                                                                                                                                                                                                                                                                                                                                                                           |
| Nails, bolts and screws: | Steel, stainless steel, galvanized steel of pattern to suit the location and to BRANZ Bulletin 453: Fasteners selection. To NZS 3604, section 4 Durability, for durability.                                                                                                                                                                                                                                 |
| Nail plates connectors:  | Stainless steel and/or galvanized steel toothed or nailed plates to the plate manufacturer's design for the particular locations as shown on the drawings and to NZS 3604, section 4 Durability, for durability. Galvanized steel and stainless steel connectors and brackets to the connector manufacturer's design for locations shown on drawings and to NZS 3604, section 4 Durability, for durability. |

### ATTENDANCE

Provide and fix blocks, nogs, openings and other items as required by others.

### MOISTURE CONTENT

Maximum allowable moisture content to NZS 3602, table 4 Allowable moisture content..., for framing supporting interior linings:

|                        |     |
|------------------------|-----|
| - Framing at erection  | 24% |
| - Framing at enclosure | 20% |
| - Framing at lining    | 16% |

### EXECUTION GENERALLY

To NZS 3604 except as varied in this specification. To include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs). Set out framing in accordance with the requirements of NZS 3604 and as required to support sheet linings and claddings.

### INSTALL FLOOR, WALL AND ROOF FRAMING

Floors and bottom plates framed and fastened to NZS 3604, section 7 Floors. Frame walls to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to NZS 3604, section 8 Walls. Frame roof to required loading and bracing complete with valley boards, ridge boards and purlins to NZS 3604, section 10 Roof framing. Design and fit roof trusses complete with anchorage. All fabricated and fastened to NZS 3604, section 9 Posts, and section 10 Roof framing.



## WALL CLADDING

Refer to Sheets 9 and 11O for specific product, material, accessories and finish selections.

### PLYWOOD

Structural plywood to AS/NZS 2269.

### PROPRIETARY SOFFIT LINING

uPVC sheets.

### TIMBER WEATHERBOARD

As selected, or radiata pine to NZS 3631 for grading and to NZS 3602, table 2 Requirements for wood-based building components ..., for selection and treatment.

### TIMBER FASCIAS AND BARGE BOARDS

As selected, or radiata pine to NZS 3631 for grading and to NZS 3602, table 2 Requirements for wood-based building components ..., for selection and treatment.

### ACCESSORIES

Building wrap: Breather type, waterproof.

Rigid Air Barriers: Proprietary rigid sheet pre-cladding systems.

PVC jointers: To suit sheet thickness.

Nails, screws, fastenings: Metal, size and pattern, to cladding manufacturer's requirements and complying with the relevant aspects of NZS 3604, section 4: Durability.

### MOISTURE CONTENT

Maximum allowable moisture content to NZS 3602, table 4 Allowable moisture content....

### EXECUTION GENERALLY

To NZBC E2/AS1 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

### INSTALL WALL WRAP

Fix to the manufacturer's requirements.

### INSTALL PLYWOOD

Install to NZBC E2/AS1, 9.8 Plywood sheet.

### PRIME OR SEAL

Prime (for opaque finish) or seal (for clear finish) front and back faces, edges and end grain (minimum 2 coats) before fixing weatherboards and exterior trim.

### INSTALL TIMBER WEATHERBOARDS

Install level, true to line and face, to NZBC E2/AS1, 9.4 Timber weatherboards.

### INSTALL EXTERIOR TIMBER FINISHINGS

Install timber fascias, barge boards, facings, beads, trim and enclosures level, true to line and face, with all end grain sealed and joints mitred.

### INSTALL FLASHINGS

Install flashings, covers and soakers as detailed on the drawings and to NZBC E2/AS1, 4.0 Flashings.

### USE OF SEALANTS

Selection and use of sealants to follow BRANZ Bulletin 441: Sealed joints in external claddings - 2. Sealants.

### COMPLETE

Complete all flashings, finishings and trim so the cladding system is completely weathertight.

## BRICK VENEER CLADDING

Refer to Sheets 9 & 11L – 11N for specific product, material, accessories and finish selections.

### QUALIFICATIONS

Carry out brickwork with persons competent and experienced in the trade.

### ACCESSORIES

Lintels: To NZS 3604, table 11.4 Veneer lintels, for size and NZS 3604, 4.5 Brick veneer ties and lintels, for durability.

Vermin stop: Galvanized steel wire netting strip with reinforced edges and galvanized staples for fixing.

Dampproofing: Heavy kraft strip laminates saturated and coated with bitumen, or bituminous brush-applied liquid membrane to suit location and detail.

Ties: To NZS 3604, 4.5 Brick veneer ties and lintels. Design to conform with AS/NZS 2699.1, as modified by NZBC B1/AS1, 3.1 (NZS 3604).

Sand for mortar: To NZS 3103. Chloride levels to not exceed 0.04% by dry weight of sand.

### MORTAR

Composed of Portland cement, sand and water with an admixture to the provisions of NZS 4210, clause 2.2. Obtain written approval if intending to use cement mortar as a damp proof course and where or if intending to use hydrated lime in the mortar.

### MORTAR COLOUR

Add mineral oxide pigment to the requirements of NZS 4210, clause 2.2.2.2 (f).

### STORAGE

Store bricks and other materials clear of the ground, under cover and well ventilated until placed in the work.

### VENEER WORK GENERALLY

Comply with NZS 3604, 11.7 masonry veneer wall cladding, NZS 4210, section 2.9.

### LAYING GENERALLY

To NZS 4210. Ensure bricks are dry when laid. Use bricks equally off all pallets as work proceeds. Distribute facing bricks of varying colour randomly throughout so no patches or striping appears.

### BOND

Stretcher bond, single width unless detailed or stated otherwise.

### INSTALLING WALL TIES

Screw fix to face of studs without otherwise piercing or damaging the building wrap. Ties placed and spaced to NZS 4210, section 2.9, as modified by NZBC B1/AS1, 3.1. Install ties to NZS 3604, 11.7.5, Wall ties, subclause 11.7.5.3.

### MORTARING

To maximum practical density. Mortar fully laid, firmly placed, correctly cured and not re-tempered. Discard any mortar not used within 1 1/2 hours of mixing. Joint thickness 10 mm plus or minus 2 mm.

### RAKE OUT

Rake out joints as work proceeds, for pointing as detailed. Maximum depth of rake 6 mm.

### POINTING

Joints tooled concave after initial stiffening.

#### WEEPHOLES

Rake out every third perpend where weep holes are required, and vent veneer to NZS 3604, 11.7.4 Cavities, subclause 11.7.4.3.

#### CO-ORDINATE

Co-ordinate the building-in of exterior joinery and items required for fitting as the work proceeds. Rake out for or build in flashings as required.

#### KEEP CAVITY AND TIES CLEAR

Keep cavity and ties clear of mortar droppings and clean the brickwork face of any marking as the work proceeds. Repair damage to building wrap immediately it occurs.

#### BASE OF CAVITY

Flaunch base of cavity and either:

- apply bituminous brush-on liquid applied membrane as a primer and 2 coats, or
- lay bitumen laminate sheet, lapped and adhered, to drain water effectively out of the cavity.

#### CLEAN DOWN

Clean down brickwork to remove stains. Remove efflorescence with a stiff bristle broom, blot with a damp sponge and wash walls with a plentiful supply of clean water during fine weather.

## ROOFING

Refer to Sheet 9 for specific product, material, accessories and finish selections.

### QUALIFICATIONS

Use experienced competent roofers familiar with the materials and techniques specified.

### WIND AND EARTHQUAKE LOADINGS

Use fixings and methods capable of sustaining the loads appropriate to the area as set out in NZS 3604, section 5 Bracing design, and confirmed under COMPLIANCE INFORMATION.

### METAL TILES

Profile, metal and finish as selected. Accessories, cappings, flashings, and fixings to match and to the roofing manufacturer's requirements.

### ACCESSORIES

|                            |                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tile battens:              | Douglas fir or radiata pine to NZS 3602, table 1 Requirements for wood-based building components..... Size and grade to NZS 3604, section 10 Roof framing |
| Roof underlays:            | As selected.                                                                                                                                              |
| Nails, screws, fastenings: | Metal, size and pattern, to roofing manufacturer's requirements and complying with the relevant aspects of NZS 3604, section 4 Durability.                |
| Flashings:                 | As required.                                                                                                                                              |

### STORAGE

Stack roofing and accessories on clean, level areas of the site. Cover and protect from damage and from weather until ready to fix in place.

### SET-OUT

Set out the planned layout before fixing commences, to ensure true lines and the correct relationship to module, grid and roof features. Overlaps to face away from prevailing wind direction.

### LAY ROOF UNDERLAY

Lay and fix to NZBC E2/AS1, 8.1.5 Underlays, and to NZS 3604, 11.2 Roof cladding underlays.

### TAKE CARE

Take care to avoid damaging pre-finished roofing both during and after fixing. Mark only with chalk or spirit-based pen. Wear only soft-soled shoes on the finished surface. Remove metal filings daily.

### INSTALL TILE BATTENS

Install to the roofing manufacturer's requirements, with joints fully supported and staggered.

### FIXINGS AND SEALANTS

Refer to the roofing manufacturer's literature for fixing details and to NZS 3604 for fixings durability requirements. Select and use sealants only as recommended by the roofing manufacturer.

### INSTALL COVERS AND FLASHINGS

Provide apron, verge and ridge flashings. Install and fix as detailed and to the roofing manufacturer's details and to comply with NZBC E2/AS1, 4.0 Flashings, 5.0 Roof/wall junctions, and 6.0 Parapets.

### PENETRATIONS

Flash and overflash penetrations through the roof. Fit proprietary boots to pipework penetrations.

### COMPLETE

Ensure the work is complete with flashings, undercloaks, valleys, ridges and hips properly installed so the finished roof is completely weathertight.



**CLEAR**

Clear trade debris and unused materials from the roof and surrounds regularly during the work and at completion. Sweep down the completed roof and flush out spoutings, gutters and rainwater pipes.

## **RAINWATER SYSTEM**

Refer to Sheet for specific product, material, accessories and finish selections.

### **SPOUTING**

Profile, jointing, brackets and fittings brand matched and complete to the spouting manufacturer's specifications.

### **UPVC DOWNPIPES**

Tubes, stand-off brackets and fittings brand matched and complete to the manufacturers specifications.

### **RAINWATER HEADS, DROPPERS, OVERFLOWS**

Fabricate and install as detailed.

### **ELECTROLYTIC ACTION**

Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

### **LIAISON**

Ensure liaison with associated installations to ensure material selections are compatible and required flashing work is completed.

### **INSTALL SPOUTING AND UPVC DOWNPIPES**

Fit and screw fix brackets, set to falls to outlets. Ensure solvent welded or rubber ring jointed spouting sections are complete with all fittings to the spouting manufacturer's requirements. Screw fix stand-off brackets, set pipes plumb and clear of the wall, solvent welded. Discharge into stormwater bends.

### **ENSURE**

Ensure rainwater services are operational, flashings complete and the building weathertight.

## ALUMINIUM WINDOWS AND DOORS

Refer to Sheets 3, 5 & 8a/8b (and confirm with owner) for specific product, material, accessories and finish selections.

### WINDOW AND DOOR REVEALS

As selected with timber jamb liners to NZS 3602.

### FLASHINGS

As required.

### ORGANIC POWDER COATING FINISH

To the Window Association of New Zealand's "Specification for powder coatings on architectural aluminium products". All finished surfaces to show uniformity of gloss and colour (to match sample) free of all coating defects.

### SEALANT, GLAZING TAPE AND GASKETS

To the window manufacturer's requirements.

### FIXINGS

Ensure fixings and bracketing are compatible with aluminium. Do not use electroplated zinc fasteners or brass fastenings.

### OPENING PREPARATION

Confirm framing openings on site for dimension, plumb and straightness prior to fabrication or ordering of aluminium joinery. Prepare and trim to WANZ WIS™ Pre Cladding Trim Preparation requirements.

### EXECUTION GENERALLY

To NZBC E2/VM1, WANZ "Aluminium Window Handbook" and "Installation code for aluminium joinery products". Install to WANZ WIS™ Window installation System requirements.

### HANDLING

Avoid distortion of elements during transit, handling and storage. Prevent pre-finished surfaces from rubbing together. Prevent contact with mud, plaster and cement. Do not deliver to site any elements which cannot be immediately unloaded into suitable conditions of storage.

### CORROSION PROTECTION

Seal or suitably coat cut ends and holes drilled in aluminium before the frames are installed. Before fixing, apply bituminous coatings, slips or underlays between dissimilar metals in contact, or aluminium in contact with concrete.

### FIX FRAMES

Fix frames rigidly in place without distortion, to the window manufacturer's and the Window Association of New Zealand's "Aluminium Window Handbook" requirements, plumb, true to line and face, weathertight and with all openings operating freely.

### DRAINAGE

Anti-condensation channels to sills. All sills to sashes and fixed lights to incorporate positive drainage to the exterior.

### GLAZING INSTALLATION

All glass held in aluminium beads and black PVC gaskets.

### SAFETY GLASS INSTALLATION

Use in doors, sidelight panels, low level windows and all other locations to comply with NZS 4223, part 3, as modified by NZBC F2/AS1, 1.0 Glazing.

### INSTALL FLASHINGS

Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the drawings. Finish on head flashings to match window finish

#### SEAL FRAMES ON SITE

Seal frames to each other and to adjoining structure and finishes, all as required by the window manufacturer and to make the installation weathertight.

#### SAFETY

Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Permanent manifestations to comply with NZS 4223, part 3, 303.1.

#### CLEAN GLASS AND FRAMES

Clean off or remove glass indicators at completion of the building. Clean glass inside and out to a shining finish. Clean down both sides of window and door frames using the methods required by the window and door manufacturer.



## INSULATION

Refer to Sheets 9 for specific product, material, accessories and finish selections.  
Reference the BRANZ H1 Calculation Spreadsheet attached.

### GLASS FIBRE THERMAL INSULATING PADS

Glass fibres bonded with a thermosetting resin to form a rectangular insulating pad.

### POLYESTER FIBRE THERMAL INSULATING PADS

Polyester fibres bonded together to form a rectangular insulating pad.

### INSTALL INSULATION - GENERAL

Lay, install, fit and fix to NZBC H1/AS1: Energy efficiency, 2.0 Building thermal envelope, and to the insulation manufacturer's requirements. Install in housing to NZS 4218 and NZS 4246.

### FIT GLASS FIBRE THERMAL INSULATING PADS

Friction fit insulating pads in place to completely fill the whole of the cavities. Carefully scribe cut insulating pads slightly oversize to maintain friction fit to each other, to smaller spaces and around penetrations. Leave no gaps between, and maintain full thickness of the insulating pads over the whole of the installation. Do not cover vents and leave a 150 mm gap around recessed light fittings and metal flues.

### FIT POLYESTER FIBRE THERMAL INSULATING PADS

Friction fit insulating pads in place to completely fill the whole of the cavities. Slightly oversize length for friction fit and tear by hand across pad and fill cavity. Tear to smaller pieces for smaller spaces and around penetrations. Leave no gaps between, and maintain full thickness of the insulating segments over the whole of the installation. Do not cover vents. Leave a 150 mm clear gap around recessed light fittings and metal flues.

## INTERIOR LININGS

Refer to Sheets 9 for specific product, material, accessories and finish selections.

### FRAMING MOISTURE CONTENT

Maximum allowable moisture content to NZS 3602, table 4 Allowable moisture content.....

### PROTECT

Protect joinery, fittings and finishes already in place from water staining or damage from lining installation. Ensure building is weatherproof before lining work commences.

### PLASTERBOARD

Gypsum plaster core encased in a durable face and backing paper formed for standard use, bracing use, fire rated use and water resistance use.

### PLASTERBOARD ACCESSORIES

|                                 |                                                                      |
|---------------------------------|----------------------------------------------------------------------|
| External angles:                | Slim type 0.5 mm galvanized steel.                                   |
| Casing bead:                    | Slim type 0.5 mm galvanized steel or PVC.                            |
| Cornice:                        | Plasterboard scotia type.                                            |
| Nails:                          | Galvanized clouts 40 mm x 2.5 mm.                                    |
| Screws:                         | 40 mm x 6 gauge zinc electro-plated bugle head gypsum drywall screws |
| Jointing compound & paper tape: | To the board manufacturer's requirements.                            |
| Adhesive:                       | Multi-purpose water based wallboard adhesive.                        |

### FIBRE CEMENT SHEET

Cellulose cement autoclaved sheets.

### SUBSTRATE

To NZS 3604, section 8 Walls, section 10 Roof framing, section 12 Interior linings, section 13 Ceilings, and the standard required by the lining manufacturer's requirements. Ensure moisture content of timber framing is at or below specified levels.

### CONFIRM LEVELS OF FINISH

Before commencing work, confirm the surface finish assessment procedures necessary to ensure the specified levels of finish will be obtained. Provide levels of finish as laid down in AS/NZS 2589.

### LINE PLASTERBOARD CEILINGS AND WALLS

Line walls and ceilings with plasterboard sheets, fastened to the plasterboard manufacturer's requirements.

### SPECIAL PLASTERBOARD LININGS

Line wet area walls with water resistant plasterboard sheets using adhesive and nail fixing to studs at centres to suit the surface finish. Form bracing panels using high density plasterboard sheets fixed with clout-washers and clouts and to conform to NZS 3604, 5.5 Wall bracing design, and 13.5 Structural ceiling diaphragms. Form sound rated panels following the sheet manufacturer's specifications and details for the required sound rating. Form fire rated panels following the sheet manufacturer's specifications and details for the required fire rating.

### FIX PLASTERBOARD EXTERNAL ANGLES

Fix full length to external corners, with clouts at 100 mm each side staggered.

### FIX PLASTERBOARD CORNICE

Fix with adhesive and with joints scribe-fitted to the plasterboard manufacturer's requirements.

### PLASTERBOARD JOINTING AND STOPPING

Fill joint recess with bedding compound, centre the paper tape, apply second coat of bedding compound followed by a coat of finishing compound. Allow to dry and lightly sand off. Fill nail holes and flush up external angles with two successive coats of bedding compound followed by a coat of finishing compound. Allow to dry and lightly sand off. All to the plasterboard manufacturer's requirements.

#### LEVELS OF FINISH

Provide levels of finish to standards laid down by AS/NZS 2589 as follows:

Level 4: surfaces receiving light texture or wall covering finishes

Level 5: surfaces receiving thin coating finishes.

#### INSTALL FIBRE CEMENT SHEET LININGS

Fix to timber framing with jointing as detailed and to the panel manufacturer's requirements.

#### INSTALL TRIM

Scribe and fit reveal linings to exterior timber joinery, architraves to interior joinery, skirtings to walls and timber beads to wall/ceiling junctions.

## INTERIOR DOORS AND TRIM

Refer to client/drawings for any specific product, material, accessories and finish selections.

### PROTECT

Protect joinery, fittings and finishes already in place from water staining or damage from lining installation. Ensure building is weatherproof before lining work commences.

### DOORS GENERALLY

As selected.

### GLAZED DOORS

Solid timber framed and bead glazed.

### TIMBER LOUVRE DOORS

Solid timber framed with louvres slotted in.

### INTERIOR CAVITY SLIDERS

Hollow core door within a proprietary cavity slider frame, with brand-matched sliding door gear.

### DOOR HINGES

Type: loose-pin zinc-plated steel

Size: 89 mm

Material: zinc-plated steel

Number: 3 hinges per door

### INTERIOR SLIDING DOOR GEAR

To suit door size and weight and as detailed.

### INTERIOR SLIDING-FOLDING DOOR GEAR

Bi-fold pattern to suit size and weight of doors and as detailed.

### DOOR HARDWARE

As selected.

### NAILS

Zinc-plated steel, stainless steel and galvanized steel of pattern to suit location and to BRANZ Bulletin 453: Fasteners selection.

### INTERIOR FINISHING TRIM

Timber selection to NZS 3602, table 3 Requirements for wood-based building components.... Profile as detailed, or to match existing. Jointer profiles to suit location.

### INTERNAL JOINERY FRAMES

Fabricate as detailed. Wedge and rigidly fix in place without distortion, plumb, and true to line and face.

### INTERNAL CAVITY SLIDERS

Install in accordance with the door manufacturer's requirements.

### FIT HARDWARE

Fit hardware selected and provided, all in accordance with the hardware manufacturer's requirements.

### CHECK

Check and adjust operation of doors sets, hardware and furniture.



## FLOORING

Refer to client/drawings for any specific product, material, accessories and finish selections.

### FLOORING AND DECKING

|                        |                                                                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Particle board:        | Flooring grade high density resin bonded.                                                                                                                                              |
| Plywood:               | Structural plywood for bracing, bracketing, sarking and floors.                                                                                                                        |
| Spaced decking:        | Selected radiata pine to NZS 3602, table 1 Requirements for wood-based building components.... Dressed four sides and with arrises removed. Provide sample for review prior to laying. |
| Timber strip flooring: | To NZS 3602, table 1 Requirements for wood-based building components..., and to match existing or dressing grade to NZS 3631, section 4.4.                                             |

### LAY TIMBER STRIP FLOORING

Lay, cramp and fasten to NZS 3604, 7.2.2 Timber strip flooring. Punch nails, fill holes, then sand off with one coarse and one fine paper, hand sanding into corners.

## JOINERY FIXTURES AND FITTINGS

Refer to client/drawings for any specific product, material, accessories and finish selections.

### TIMBER BOARDS AND FRAMES

Carefully sawn to minimise the inherent warping, twisting and bowing of the selected species and to give a finish suitable for clear finishing.

### EXECUTION GENERALLY

To include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

### TRANSIT AND DELIVERY

Load, transport and unload fittings without distortion or damage and keep covered to protect from the weather. Do not deliver fittings until floor, wall and ceiling surfaces are in place and the fittings can be placed in their final location.

### FABRICATION QUALITY

Check site dimensions. Carry out machining within the practices required for the particular timber or wood product being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's requirements. Work accurate, square and true to line and face.

### FABRICATE JOINERY FITTINGS

Carry out jointing, dowelling and other operations necessary for the proper assembly of the fittings as detailed, with fixings concealed unless otherwise detailed. Use glue joints where provision for shrinkage is not required, with contact surfaces, glueing and pressure all applied to the glue manufacturer's requirements. Locate and drive connectors and fasteners to the bolt manufacturer's requirements. Scribe fit adjustable shelves with 4 shelf pins and locate force fit pin holes at 50 mm maximum centres in solid cheeks. Hang doors on concealed hinges.

### INSTALL JOINERY FITTINGS

Scribe fit on site and install level, square, plumb and true to line and face.

## TILING

Refer to client for any specific product, material, accessories and finish selections.

## QUALIFICATIONS

Use tilers experienced with the materials and techniques specified.

## ADHESIVES COMPATIBILITY

On proprietary substrates or waterproof membranes use only adhesives with documented compatibility approval from the respective manufacturers.

## SLIP RESISTANCE

Slip resistance to NZBC D1/AS1, 2.1 Slip resistance.

## ACCESSORIES

|                          |                                                                                                                         |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Waterproofing membranes: | As selected.                                                                                                            |
| Cement-based screed:     | Mix of 3:1 Portland cement, wash-mix sand, gauged with liquid polymer additive to the tile manufacturer's requirements. |
| Tile adhesive:           | To the tile manufacturer's requirements.                                                                                |
| Grout:                   | Cement based, compressible and to suit the particular location and use.                                                 |
| Control joint sealant:   | To BRANZ Good practice guide: Tiling, section 5.0.                                                                      |

## HANDLING AND STORAGE

Handle tiles with care to avoid chipping, soiling and damage. Store on hard, level standings in non-traffic, non-work areas that are enclosed, clean and dry. Reject all damaged tiles.

## SUBSTRATE

Ensure all services and accessories are in place, located to suit the tile layout, with the substrate required for tiling work.

## TEMPERATURE

Do not carry out tiling where the ambient temperature is below 5°C, or onto a substrate with a temperature higher than 40°C.

## LAYOUT

Obtain confirmation of the proposed layout of tiles, expansion joints and other visual considerations.

## EXECUTION GENERALLY

Prepare surfaces and carry out the tiling work in accordance with BRANZ Good practice guide: Tiling.

## SURFACE PREPARATION

To BRANZ Good practice guide: Tiling, section 4.0.

## LAY CEMENT SCREED

Apply a proprietary cement slurry bond coat over the whole of the floor. Mix and place a 40 mm thick mortar bed over the bond coat and firmly tamp, screed and compact to the required level. In waterproofed areas where the cement screed has been laid over the waterproofing membrane, prepare the screed surface by applying a further waterproof coating before laying tiles.

## LAY SHEET WATERPROOFING MEMBRANE

Apply the selected sheet waterproof membrane system to the membrane manufacturer's requirements.

## APPLY LIQUID WATERPROOFING MEMBRANE

Apply the selected liquid waterproof membrane system to the membrane manufacturer's requirements.

## INSTALL UNDER TILE ELECTRIC HEATING

Install to the membrane manufacturer's requirements. Arrange for electrician to connect power supply.

#### TILE FIXING, CONCRETE, CEMENT-BASED ADHESIVE

Apply and float thin (thick) bed cement-based adhesive to a minimum 3 mm (6 mm) bed thickness to the tile manufacturer's requirements. Rib surface with a notched trowel, press the tile and beat it into place with 3 mm joints, and to obtain required coverage of adhesive on the back of each tile.

#### GROUTING

Remove spacers. Prepare joints, mix and apply proprietary grout and finish off the grout uniform in colour, smooth and without voids, pinholes or low spots.

#### CLEAN

Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave clean and free of blemish. Finally polish tiles with a clean, dry cloth.



## **PAINTING**

Refer to client/drawings for any specific product, material, accessories and finish selections.

### **QUALIFICATIONS**

Carry out work using competent and experienced painters.

### **HEALTH AND SAFETY**

Refer to the requirements of the Health and Safety in Employment Act 1992 and if elimination or isolation is not possible, then minimise the hazards in this work. Refer to OSH publication, Repainting lead based paints, for the required procedures and precautions when treating or removing lead based paint, burning or sanding off paint, or using solvent based paint removers.

### **PAINT**

As selected and to the paint manufacturer's standards for exterior and/or interior primers, undercoats, sealers, stains, clear coatings, solvent-borne and water-borne paints.

### **GAP FILLERS**

Linseed oil, putty, plastic wood, wood filler or plastic filler, to suit and to match the surface being prepared.

### **INSPECT SURFACES**

Inspect surfaces being painted and report to the owner any that will not, after the preparatory work laid down by the paint manufacturer, allow work of the required standard. Confirm that all areas have adequate lighting and are sufficiently free of other construction activities to enable painting work to proceed.

### **PROTECT**

Cover up adjoining surfaces and areas liable to damage or over-painting.

### **REMOVE HARDWARE**

Remove hardware and door/window furniture and replace on completion. Do not paint over permanently attached hinges, or any hardware items which cannot be removed.

### **PRIMING AND SEALING**

Ensure that priming and sealing work needed before or during construction is carried out when required.

### **ENVIRONMENTAL CONDITIONS**

Carry out work within acceptable temperature and humidity limits, with timber dry, all to the requirements of the paint manufacturer.

### **SELECTIONS**

Confirm all selections, colours and finishes for both paint and wallpaper with the owner.

### **SHARP EDGES, CRACKS AND HOLES**

Repair as required by the paint manufacturer.

### **PREPARE SURFACES**

Prepare surfaces as required by the paint manufacturer. Make good all damage and defects.

### **PAINT APPLICATION**

Apply paint by brush and/or roller to suit the location of the coating and to the paint manufacturer's requirements. Do not spray on site without express permission.

### **MANUFACTURER'S MANUALS**

Refer to the paint manufacturers' manuals and follow their preparation, sequence and application requirements applying to each system. Ensure all paint coats in any system are supplied by the same manufacturer.

### **SCUFF BETWEEN COATS**

Scuff between all coats to remove any dust pick-up, protruding fibres and coarse particles.

**FINISHED PAINT SURFACES**

Finished paint surfaces to show uniformity of gloss and colour, with the correct thickness for each coat, and freedom from painting defects. Ensure finished work is clean and free of any disfigurement.

**CLEAN**

Clean adjoining surfaces, glass and fittings of any paint contamination.

**REPLACE**

Replace hardware without damage to the hardware or the adjoining surfaces.

**PAPERHANGING**

Refer to client/drawings for any specific product, material, accessories and finish selections.

**QUALIFICATIONS**

Carry out work using competent and experienced paperhangers.

**INSPECT SURFACES**

Inspect surfaces being painted and report to the owner any that will not, after the preparatory work laid down by the paint manufacturer, allow work of the required standard. Confirm that all areas have adequate lighting and are sufficiently free of other construction activities to enable painting and/or paperhanging work to proceed.

**SELECTIONS**

Confirm all selections, colours and finishes for both paint and wallpaper with the owner.

**CONFIRM WALLPAPER BATCH**

Confirm that all rolls of each pattern are from the same batch.

**WALLPAPER INSTALLATION**

Seal or size walls. Drops full-length, completely glued, pattern matched and hung vertically without bubbles or visible butt joints. Scribe cut paper 2 mm onto surrounding trim.

## **WATER SYSTEM**

Refer to client/drawings for any specific product, material, accessories and finish selections.

### **QUALIFICATIONS**

Carry out work by or under the direct supervision of a person registered under the Plumbers, Gasfitters and Drainlayers Act 1976.

### **POLYBUTYLENE WATER PIPE**

Polybutylene tubing complete with fittings and accessories brand-matched to AS/NZS 2642.

### **INSULATION FOR HOT WATER PIPES**

Preformed closed cell foam.

### **EXPOSED PIPES**

- white polyethylene composite pipe with white nuts and accessories
- pipework finish to include escutcheon plates and bends and elbows protruding from walls or fittings.

### **EXECUTION GENERALLY**

Generally carry out the whole of this work and tests to NZBC G12/AS1.

### **INSTALL POLYBUTYLENE/POLYETHYLENE WATER SUPPLY**

Size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Run pipes complete with all fittings, support and fixing, and jointed to the pipe manufacturer's specifications, all to NZBC G12/AS1, 5.0 Water supply. Conceal pipework and pressure test before wall linings are fixed.

### **OUTLET LOCATIONS**

Ensure wall outlets for exposed pipes are level and centred on the fixture to ensure the neat installation of exposed pipework.

### **INSTALL HOT WATER PIPE INSULATION**

Insulate hot water pipes in accordance with the insulation manufacturer's instructions. Cut insulation sections tight between timber framing and tight between the webs of steel studs. Where hair felt is used, wrap around pipes in two layers in opposite directions and secure with galvanized steel wire ties.

### **INSTALL ELECTRIC HOT WATER CYLINDERS**

Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and NZBC G12/AS1, 6.10 Water heater installation.

### **PENETRATIONS**

Provide and fit collars and escutcheon plates to match pipework at penetrations through constructions.

### **COMPLETION**

Pressure test to ensure no leakage and leave in proper working order. Clean tapware and fittings.



## **SANITARY PLUMBING**

Refer to client/drawings for any specific product, material, accessories and finish selections.

### **QUALIFICATIONS**

Carry out work by or under the direct supervision of a person registered under the Plumbers, Gasfitters and Drainlayers Act 1976.

### **UPVC WASTE, SOIL AND VENT PIPES**

UPVC pipe, complete with fittings brand-matched to the pipe manufacturer's requirements.

### **EXPOSED PIPES AND TRAPS**

As selected and to the following details:

- chrome plate on copper pipes and associated copper and brass fittings
- white polybutylene or PVC, including all associated fittings.

### **EXECUTION GENERALLY**

Carry out this work and complete all tests to AS/NZS 3500.2.

### **ELECTROLYTIC ACTION**

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

### **INSTALL TRAPS, WASTE AND VENT PIPES**

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to AS/NZS 3500.2. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to roof vents and vermin proof mesh to untrapped waste pipes.

### **PENETRATIONS**

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

### **TEST**

Test soil and waste disposal systems to ensure no leakage exists and leave in working order.

### **1.9 ENSURE**

Ensure all sanitary plumbing fittings and pipework are complete and operational.

**SANITARYWARE, TAPWARE & ACCESSORIES**

Refer to client/drawings for any specific product, material, accessories and finish selections.

**QUALIFICATIONS**

Carry out work by or under the direct supervision of a person registered under the Plumbers, Gasfitters and Drainlayers Act 1976.

**EXECUTION GENERALLY**

Carry out this work and complete all tests to AS/NZS 3500.2.

**INSTALL SANITARYWARE**

Fit and install sanitaryware and associated screens, elements and hardware, plumb, true to line and rigid, to the fixture manufacturer's requirements. Supply standard chrome plated brass wastes and plastic plugs on chrome plated chains with all basins, tubs and baths.

**INSTALL TAPWARE**

Install tapware in accordance with the tap manufacturer's requirements. Flush out on completion. Check that washers or ceramic discs are operating correctly.

**TEST**

Test soil and waste disposal systems to ensure no leakage exists and leave in working order.

**ENSURE**

Ensure all sanitary plumbing fittings and pipework are complete and operational.

## DRAINAGE

Refer to client/drawings for any specific product, material, accessories and finish selections.

## QUALIFICATIONS

Carry out work by or under the direct supervision of a person registered under the Plumbers, Gasfitters and Drainlayers Act 1976.

## MATERIALS

|                            |                                                                                                         |
|----------------------------|---------------------------------------------------------------------------------------------------------|
| Concrete:                  | 17.5 MPa prescribed grade.                                                                              |
| Reinforcement:             | Grade 300 deformed bars.                                                                                |
| uPVC pipes:                | uPVC pipes bends, junctions, fittings and joints.                                                       |
| Field drains:              | Plastic pipes for field drains perforated and coiled with filter fabric over.                           |
| Drainage/filling materials |                                                                                                         |
| Granular fill:             | Clean gravel or crushed stone or a blend of these.<br>Particle size from minimum 7 mm to maximum 20 mm. |
| Selected fill:             | Fine grain soil or granular material suitable for bedding,<br>excluding topsoil.                        |
| Ordinary fill:             | Top soil or other excavated materials.                                                                  |

## FITTINGS

|                      |                                                                                                                                                                                 |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gully traps:         | To NZBC G13/AS2, 3.3 Gully traps, complete with grating.                                                                                                                        |
| Strip drain channel: | Proprietary, modular, variable invert, uPVC or precast concrete drainage channel sections and drainage sump, embedded in site concrete and fitted with selected metal gratings. |

## EXCAVATE

Excavate for drains to a firm even base with correct gradients set in straight runs.

## MANUFACTURER'S REQUIREMENTS

All drainage installations to the pipe and fitting manufacturer's requirements.

## EXCAVATION GENERALLY

Carry out drainage work to AS/NZS 3500.2 (sanitary plumbing and drainage) and AS/NZS 3500.3 (stormwater drainage) as modified by NZBC B1/AS1, 6.0 Drains.

## LAY WASTEWATER DRAINS

Lay drains in straight runs to correct gradients, to discharge into the network utility operators sewer. Set inspection fittings on a concrete base.

## INSTALL GULLY TRAPS

Set on concrete 50 mm above surrounding ground or paving and brought up to protect the top of the fitting. Trowel off.

## LAY STORMWATER DRAINS

Confirm the required location of downpipes and finished ground levels before commencing pipework. Set downpipe bends in concrete brought up to protect the top of the bend from damage. Lay drains in straight runs to correct gradients to discharge into the network utility operator's stormwater system.

## LAY GROUNDWATER DRAINS

Lay perforated coil piping firmly in a granular bed in straight runs to correct gradients, discharging into a sump. Carry the granular bed up over the pipes without disturbing them, to a total depth of 300 mm and cover with geotextile fabric; all to the pipe manufacturer's requirements.

## INSTALL STRIP DRAIN CHANNEL

Excavate trench and form site concrete base to fall. Set interlocking channel sections, sumps and accessories in place, all in accordance with the channel manufacturer's requirements. Check falls and install gratings and covers.

**INSTALL SURFACE WATER SUMP**

To NZBC E1/AS1, 3.6 Surface water inlets to drains. Ceramic half-siphon pipe. Cast iron frame with a lift out grating.

**CONCRETE ENCASEMENT**

Concrete encase shallow drains and drains under driveways, on a 100 mm deep 17.5 MPa concrete bed reinforced with three 10 mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100 mm 17.5 MPa concrete.

**FIELD TEST**

Field test drains for watertightness to the satisfaction of the Building Consent Authority inspector.

**BACKFILL**

Backfill drain lines in 150 mm layers, well tamped but without disturbing the drains. Finish off with 150 mm of topsoil, slightly mounded above the finished ground line.

**AS-BUILT DRAWINGS**

Supply a 1:100 as-built drawing to the Building Consent Authority and the owner on completion.



## ELECTRICAL

Refer to client/drawings for any specific product, material, accessories and finish selections.

### COMPLY

Comply with the Electricity Regulations 1997, AS/NZS 3000 and the New Zealand Electrical Codes of Practice for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

### QUALIFICATIONS

Carry out work by or under the direct supervision of a holder of a practising certificate under the Electricity Regulations 1997.

### CERTIFICATE OF COMPLIANCE

Supply a certificate of compliance to the owner, as required by the Electricity Regulations 1997. Allow the network utility operator to view before the meter installation, listed work inspection, polarity check and livening of supply.

### METER BOARD / DISTRIBUTION BOARD / SUB BOARD

Proprietary manufactured meter board complete with flashing kit. Proprietary manufactured distribution board, zinc plated powder coated, or heavy duty plastic, fire resistant enclosed construction, complete with neutral and earth busbars, MCB's, RCD's and main switch. All protective devices: 6kA MCB's of the appropriate rating. Fit to board manufacturer's requirements where detailed. Recess into wall and ensure fire containment properties of the enclosure is maintained.

### CABLES

Tough plastic sheathed copper conductors. Minimum sizes are indicated below. Increase these as necessary due to method of installation, cable length or load.

Lighting circuits: 1.5 mm<sup>2</sup> on 10 amp MCBs for domestic construction

Power circuits: 1.5 mm<sup>2</sup> on 16 amp MCBs for domestic construction

### ELECTRICAL ACCESSORIES

As selected and to the following details:

|                                       |                                                                                                                                                                                                      |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switch units:                         | Minimum 16 amp, 230 volt flush polycarbonate units. For number of switches per unit, dimmer units, neon (indicator or toggle) units, locator units and 2-way units refer to the electrical drawings. |
| Switched socket units:                | 10 amp, 230 volt flush polycarbonate 3 pin combined switch units.                                                                                                                                    |
| Hot water system switch:              | One way 20 amp switch complete with clamp for flexible PVC conduit.                                                                                                                                  |
| Stove/range socket outlet and switch: | 32 amp, 230 volt flush polycarbonate 3 pin combined switch unit, with remote isolating switch.                                                                                                       |

### CABLING

Install with a maximum of 10 light outlet units or 6 switched socket units on any circuit. Separate circuits for all electric heating appliances. All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the centre line of the timber member.

### INSTALL SWITCH AND SOCKET UNITS

Fit single and double switch units and socket units level and plumb where shown on the drawings. Install at the following heights (to the centre of the unit) unless shown otherwise on the drawings or to match existing.

Switch Units: 1000 mm.

Socket Units: 150 mm above work benches.  
400 mm elsewhere.

Mount switches vertically and socket units horizontally. Label switch units which control electrical equipment by engraving on the rocker switch.

### INSTALL LIGHT FITTINGS

Install selected light fittings in the locations and heights shown on the drawings and in accordance with the fitting manufacturer's requirements.

#### ELECTRIC HOT WATER SYSTEM

Wire as a separate circuit through a wall-mounted isolating switch, with the cable from switch to element encased in flexible PVC conduit, clamp fixed at each end.

#### UNDERFLOOR HEATING SYSTEMS

Connect under floor heating systems complete with thermostats to manufacturer's requirements.

#### WIRE FOR PLUMBING FITTINGS

Wire for fittings to the Electricity Regulations 1997 and to the fitting manufacturer's requirements.

#### INSTALL SMOKE ALARMS

Install alarms to NZBC F7/AS1, 3.3 Location of smoke alarms, and to manufacturer's requirements, fitted neatly and without damage to the surrounding finish.

#### ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire selected fittings and equipment to the Electricity Regulations 1997 and the individual fittings and equipment manufacturer's requirements. Refer to the drawings for required layouts and locations for equipment.

#### COMPLETION

Leave all fittings, lamps and tubes operational, with equipment and diffusers clean.

## **APPLICABLE BUILDING CODES**

---

### **B1 STRUCTURE**

B1/AS2, NZS 3604, NZS 4203

### **B1 DURABILITY**

B2/AS1, NZS 3604, E2/AS1

### **E1 SURFACE WATER**

E1/AS1

### **E2 EXTERNAL MOISTURE**

E2/AS1

### **E3 INTERNAL MOISTURE**

E3/AS1

### **G1 PERSONAL HYGIENE**

G1/AS1

### **G2 LAUNDERING**

G2/AS1

### **G3 FOOD PREPERATION**

G3/AS1

### **G4 VENTILATION**

G4/AS1

### **G7 NATURAL LIGHT**

G7/AS1

### **G9 ELECTRICITY**

G9/AS1

### **G11 GAS AS AN ENERGY SOURCE**

G11/AS1

### **G12 WATER SUPPLIES**

G12/AS1, AS/NZS 3500.1

### **G13 FOUL WATER**

G13/AS1, NZS3500.2

### **H1 ENERGY EFFICIENCY**

H1/AS1, NZS 4218



## Structural Calculations for

### 1 Pihoihoi Close (Lot 45 Manu Park) Waikanae Proposed New Dwelling

These calculations are in accordance with:

AS/NZS 1170:2004 Structural Design Actions  
NZS 3101:2006 Concrete Structures Standard

**Engineer:**  
Stuart Preston  
Hugh Falkner  
Jared Waller

**Initials:**  
SRNP  
HAF  
JW

#### Preamble:

The project comprises a proposed single storey dwelling with heavy cladding and a light roof.

These calculations pertain to the design of:

- Specifically designed waffle slab and canopy pad foundations

A geotechnical report titled "Manu Park Subdivision, Waikanae - Stage 2: Foundation Recommendations" has been completed by Miyamoto dated 28 September 2022. The following paragraph is the report's liquefaction assessment summary;

- "The liquefaction assessment indicates that liquefaction is unlikely to be triggered under SLS loading conditions with moderate effects anticipated under ULS loading conditions. Furthermore, the presence of a thick non-liquefiable crust (2.5 m to 6.5 m in thickness) provides additional resilience and significantly reduces the severity of liquefaction induced damage (demonstrated by the low values of LSN)."

The report then states that "NZS3604 foundation systems are considered feasible for NZS3604 compliant structures, with consideration of the available bearing capacity."

Certa has conducted scala penetrometer tests on 22/03/2023 after the groundworks, 0-2.5m out, had been performed by others. The results show that good ground to NZS3604 is achieved at surface level. Consideration of the geotechnical report and the scala test results have been considered in the foundation design which is a non-piled waffle slab. The bearing capacity is to be confirmed on site by the engineer.

**Date:**  
3 May 2023

**Job No.**  
J44175



# SCHEDULE OF INSPECTIONS

## for

### 1 Pihoihoi Close (Lot 45 Manu Park)

### Waikanae

### Proposed New Dwelling



We confirm that CERTA Engineering Ltd have been engaged to undertake construction monitoring of the specific engineering design items to an EngNZ/ACENZ CM3 level and propose to undertake the following site inspections:

| No. | Item of inspection                                        | Timeframe |
|-----|-----------------------------------------------------------|-----------|
| 1   | Foundation waffle slab and confirmation of ground bearing | Pre-pour  |

**Notes:**

- a) The above items of inspections are the minimum required to enable CERTA Engineering Ltd to issue a PS4 – Producer Statement Construction Review for the specific engineering design items.
- b) The above items of inspection do not cover work constructed in accordance with NZS 3604:2011, for which inspections are to be undertaken by the Building Consent Authority.
- c) The Contractor/BUILDER is to provide CERTA Engineering Ltd at least 24 hours' notice of the requirement for an inspection. The above timeframes are indicative, the Engineer and Contractor are to agree the timing of inspection prior to work commencing on site.
- d) The Contractor /Builder is to provide reasonable and safe access to enable works to be inspected.
- e) The above schedule does not necessarily represent the actual number of inspections to be undertaken. The number of inspections will depend on the construction method, sequence of the works and whether or not unforeseen conditions or difficulties are encountered on site.

**Date:**  
**3 May 2023**

**Job No.**  
**J44175**



Building Code Clause(s) B1

J44175

**PRODUCER STATEMENT - PS1 - DESIGN**

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

**ISSUED:** CERTA Engineering Ltd

**TO:** Paterson Homes Ltd  
(Owner / Developer)

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

**IN RESPECT OF:** Proposed New Dwelling  
(Description of Building Work)

**AT:** 1 Pihoihi Close (Lot 45 Manu Park), Waikanae  
(Address)  
LOT 45 DP 582129

230413

Received by

Kapiti Coast District Council

26/05/23

We have been engaged by the owner/developer referred to above to provide **structural design services and construction monitoring of specifically designed elements** in respect of the requirements of Clause B1 (B2 of specifically designed elements) of the building code for

☐

All

☒
**Part only as specified of building work:**

- Specifically designed waffle slab and canopy pad foundations

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 and B2/AS1

The proposed building work covered by this producer statement is described on the drawings titled 1 Pihoihi Close (Lot 45 Manu Park), Waikanae and numbered S0 to S2.

**On behalf of the Design Firm, and subject to:**

- (i) Site verification of the following design assumptions: Bearing capacity of excavated foundations to satisfy required amount and to be confirmed on site by the Engineer;
- (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 will comply with the relevant provisions of the Building Code and b), the persons who have undertaken this design work have the necessary competency to do so. I also recommend the following level of construction monitoring:

☐ CM1 ☐ CM2 ☒ CM3 ☐ CM4 ☐ CM5 observation services.

(Engineering Categories)

I, Stuart Preston am CPEng # 138744

I am a member of: Engineering New Zealand and hold the following qualifications: BE(Civil), 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 Stuart Preston ON BEHALF OF CERTA Engineering Ltd

Date 3 May 2023

(Signature)

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

This form is to accompany Form 2 of the Building (Forms) Regulations 2004 for the application of a Building Consent.

## GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1992. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Engineering New Zealand, Association of Consulting Engineers New Zealand in consultation with the Building Officials Institute of New Zealand. The original suite of producer statements has been revised as at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

- |                                |                                                                                                                                                                                                                                                                                                                        |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PS1 Design</b>              | Intended for the use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;                                                                                                              |
| <b>PS2 Design Review</b>       | Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;                                                                                               |
| <b>PS3 Construction</b>        | Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013; or Schedules E1/E2 of NZIA's SCC 2007 2                                                                                                                                                                           |
| <b>PS4 Construction Review</b> | Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate. This must be accompanied by a statement of completion of building work (Schedule 6). |

The following guidelines are provided by ACENZ, EngNZ and NZIA to interpret the Producer Statement.

### Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence-based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as the Engineering New Zealand (EngNZ) or the New Zealand Institute of Architects (NZIA) provides additional assurance of the designer's standing within the profession. If the design firm is a member of the Association of Consulting Engineers New Zealand (ACENZ), this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

### Professional Indemnity Insurance

As part of membership requirements, ACENZ requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to \$500,000.

### Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-5)3 (OL1-OL4)2. The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

### Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

### Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

### Refer Also:

- 1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
- 2 NZIA Standard Conditions of Contract SCC 2007 (1st edition)
- 3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACENZ, 2004)

[www.acenz.org.nz](http://www.acenz.org.nz)  
[www.engineeringnz.org](http://www.engineeringnz.org)  
[www.nzia.co.nz](http://www.nzia.co.nz)



**Memorandum from licensed building practitioner:**

**J44175**

**Certificate of design work**

**Section 45 and Section 30C, Building Act 2004**

**THE BUILDING**

Street Address: 1 Pihoihi Close (Lot 45 Manu Park)

Suburb: Waikanae

Town/City: Waikanae

Postcode: 5036

**THE OWNER**

Name(s): Paterson Homes Ltd

**BASIS FOR PROVIDING THIS MEMORANDUM**

I am providing this memorandum in my role as the **Specialist** designer who supervised specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work.

**IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)**

I, Stuart Preston, supervised the following design work that is restricted building work

**PRIMARY STRUCTURE: B1**

| Design work that is restricted building work | Description (as required)                     |
|----------------------------------------------|-----------------------------------------------|
| Foundations (✓)                              | SED <sup>(1)</sup> waffle slab and canopy pad |
| Retaining Walls (✗)                          |                                               |
| Beams (✗)                                    |                                               |
| Portal (✗)                                   |                                               |
| Bracing (✗)                                  |                                               |
| Other (primary) (✗)                          |                                               |

**WAIVERS AND MODIFICATIONS**

No waivers or modifications of the building code are required.

**ISSUED BY**

Name: **Stuart Preston**

CPEng number: **138744**

Design Entity/Company: Certa Engineering Limited

**DECLARATION**

I, **Stuart Preston**, LBP, state that I have applied the skill and care reasonably required of a competent design professional in supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- Complies with the building code; or
- Complies with the building code subject to any waiver or modification of the building code recorded on this form.

Signature:

Date: 3 May 2023

(1) SED = Elements subject to **Specific Engineering Design** outside of the scope of NZS 3604:2011, unless noted otherwise.



GENERAL:

1. REFER ARCHITECT'S DRAWINGS FOR DIMENSIONS, UNLESS NOTED OTHERWISE. DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO STEEL FABRICATION. DO NOT SCALE OFF THIS DRAWING.
2. IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN
3. STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATIONS, ARCHITECTURAL, CIVIL AND ENGINEERING SERVICES DOCUMENTS.
4. UNLESS OTHERWISE NOTED ALL LEVELS ARE IN METERS, AND ALL DIMENSIONS ARE IN MILLIMETERS, AND SHALL BE CHECKED BY CONTRACTOR PRIOR TO CONSTRUCTION.
5. DIMENSION SHALL NOT BE OBTAINED BY SCALING FROM DRAWINGS.
6. ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT OR ENGINEER FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
7. ALL MATERIAL AND WORKMANSHIP SHALL BE ON ACCORDANCE WITH THE CURRENT CODES OF PRACTICE EXCEPT WHERE VARIED BY THE SPECIFICATION AND/OR DRAWINGS.
8. WHERE PROPRIETY PRODUCTS ARE SPECIFIED IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL.
9. ENGINEER REQUIRES 24 HOURS NOTICE BEFORE ANY INSPECTION (REFER TO STRUCTURAL CALCULATIONS FOR SCHEDULE OF INSPECTIONS).

FILL SPECIFICATION:

1. SITE TO BE CLEARED OF ALL TOPSOIL AND ANY ORGANIC MATERIAL THEN CUT TO A SERIES OF LEVEL BENCHES.
2. ENGINEER TO INSPECT PRIOR TO ANY FILL PLACEMENT.
3. FILL MATERIAL TO BE CRUSHED ROCK TOPCOURSE MATERIAL FREE OF ORGANIC MATERIAL FULLY COMPACTED TO 90% OF MAXIMUM DENSITY TO BS1377 TEST 9.
4. COMPACT IN MAXIMUM LAYERS OF 150mm THICK WITH A 2 TONNE ROLLER - TRACK ROLLING WITH A DIGGER IS NOT ACCEPTABLE
5. ENGINEER TO INSPECT AND TEST EVERY 2nd LAYER PLACED (300mm INTERVALS)

PILING:

1. PILE DEPTH ESTIMATIONS ARE HIGHLY APPROXIMATE AND MAY BE SUBJECT TO SIGNIFICANT VARIATION ON SITE. IF GREATER CONFIDENCE IS REQUIRED WE RECOMMEND INSTALLATION OF TEST PILES.
2. DRIVEN TIMBER PILES TO HAVE A DEPENDABLE ULTIMATE CAPACITY OF 65kN U.N.O. (REFER DRAWING FOR ESTIMATED LENGTH)
3. PILING CONTRACTOR TO PROVIDE RECORD OF PILE SETS AND PILE DRIVING EQUIPMENT DETAILS. TOP OF PILES TO BE PAINTED WITH METALEX AND HAVE A GAP BETWEEN PILE AND FOOTING STEEL OR A LAYER OF DPM
4. FOR LARGE POLE HOLES IT IS RECOMMENDED TO DRILL & POUR INTERMEDIATE HOLES, THEN COMPLETE REMAINDER IN A SEPARATE POUR TO MINIMISE HOLE COLLAPSE.
5. ENSURE BOTTOM OF PILE HOLES ARE FREE OF WATER AND LOOSE MATERIAL. TAMP AS NECESSARY

WAFFLE SLAB NOTES:

1. SLAB AND FOOTINGS - USE 25MPa CONCRETE, 100mm SLUMP
2. REFER POD SUPPLIER SPECIFICATIONS AND DRAWINGS FOR SAWCUTS AND SHRINKAGE CONTROL JOINTS
3. BASECOURSE AS REQUIRED TO BRING SITE LEVEL. ANY SOFT SPOTS ARE TO BE EXCAVATED AND REPLACED WITH BASECOURSE.
4. POLISHED FLOOR - USE 30MPa CONCRETE WITH 13mm AGGREGATE (DO NOT USE A PUMP MIX), 100mm SLUMP, ENSURE WET CURING FOR AT LEAST 7 DAYS. 2 LAYERS OF DPC ON 20mm SAND BLINDING. ENSURE SAWCUTS ARE MADE AT THE EARLIEST POSSIBLE TIME (WITHIN 48 HRS)

STRUCTURAL MAINTENANCE SCHEDULE:

- YEARLY: WASH DOWN ALL EXPOSED STEELWORK THAT IS NOT IN A FULLY INTERIOR ENVIRONMENT.
- 10 YEARLY: INSPECT AND REPAIR SEALANT THAT ENCLOSES STRUCTURAL MILD-STEEL COMPONENTS AND/OR TIMBER WITH MILD-STEEL FIXINGS.  
  
CHECK EXPOSED TIMBER FIXINGS FOR CORROSION, REPAIR AS REQUIRED.
- 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. INSPECTION MAY TYPICALLY REQUIRE REMOVAL OF CLADDING 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 OR CRACKING. REPAIR AS REQUIRED.

STEEL:

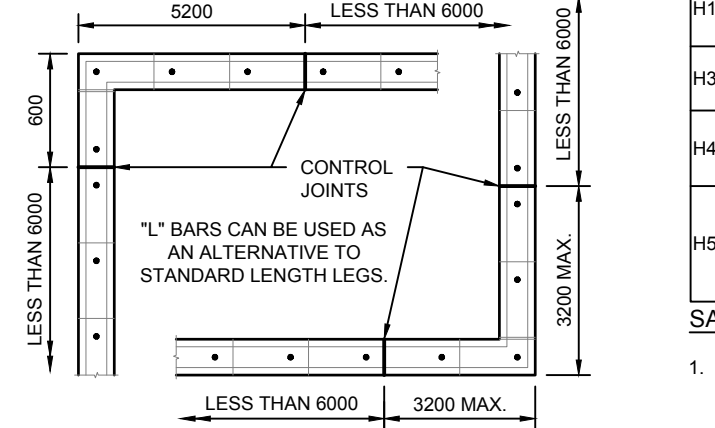
1. ALL STEEL WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3404:2009
2. ALL WELDS TO BE 6 FILLET WELDS ALL ROUND UNLESS NOTED OTHERWISE.
3. ALL M12 BOLTS TO BE GRADE 4.6. ALL M16 BOLTS TO BE GRADE 8.8 UNLESS NOTED OTHERWISE.
4. ALL PLATES TO BE 10 THICK UNLESS NOTED OTHERWISE.
5. STEEL GRADES:  
- PLATES 250MPa  
- HOT ROLLED SECTIONS 300MPa  
- HOLLOW SECTIONS 350MPa
6. ALL WELD ELECTRODES ARE E48XX OR W50X.
7. ALL INTERNAL STRUCTURAL STEEL TO BE PAINTED IN ACCORDANCE WITH SYSTEM DESIGNATION AS/NZS2312/AKL1 BEFORE DELIVERY TO SITE. ANY AREAS DAMAGED TO BE MADE GOOD UPON INSTALLATION.
8. ALL EXTERNAL STRUCTURAL STEEL TREATMENT SHALL BE ONE OF THE FOLLOWING: (NZS TS 3404-2018)
  - TSZ150S - 150µm THERMAL SPRAY ZINC + 75µm ACRYLIC PAINT (EXTERIOR OVER 1KM FROM COAST).
  - HDG900 - 900gm/m² GALVANISED COATING.

CONCRETE:

1. ALL CONCRETE WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3109:1997
2. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF:  
- SLABS & FOOTINGS 25MPa  
- PILES 17.5MPa  
- TIDY SLABS 10MPa
3. MAXIMUM SLUMP TO BE 100mm UNLESS NOTED OTHERWISE
4. CONCRETE FINISHES SHALL BE:  
- SLABS U3  
- EXPOSED FOOTINGS F4
5. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 (HD BARS SHALL NOT BE REBENT)
6. THE CONCRETE SHALL BE KEPT CONTINUOUSLY WET FOR A PERIOD OF A LEAST 4 DAYS. FROM 4-10 DAYS AFTER POURING IT SHALL BE KEPT DAMP BY OCCASIONAL HOSING..
7. ALL CHEMICAL ANCHOR HOLES TO BE CLEANED OUT AND EMBEDDED TO DEPTHS IN ACCORDANCE WITH MANUFACTURES INSTRUCTIONS.

MASONRY:

1. ALL MASONRY IS LAID IN RUNNING BOND CONFIGURATION UNLESS NOTED OTHERWISE.
2. ALL MASONRY WITHIN THE BUILDING STRUCTURE IS GRADE B AS DEFINED IN NZS 4230.
3. ALL CONCRETE MASONRY BLOCKS SHALL CONFORM TO NZS 3102 UNLESS NOTED OTHERWISE. DENSITY SHALL BE > 1750 kg/m³.
4. ALL MASONRY WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS4210:2001 & NZS4229:2013. LINTELS WHERE NOT SPECIFICALLY DETAILED SHALL COMPLY WITH THE PROVISIONS OF NZS4229:2013. USE 800g/m³ OF SIKA 'CAVEX' EXPANSION AGENT, OR APPROVED ALTERNATIVE, FOR MASONRY BLOCK INFILL.
5. VERTICAL CONTROL JOINTS IN MASONRY TO BE PROVIDED AT 6m MAX. CENTRES. WHERE NOT SHOWN ON DRAWINGS THE JOINTS SHOULD BE LOCATED IN ACCORDANCE WITH NZS4229:2013 SECTION 12 AND TO APPROVAL OF THE ENGINEER.



6. BLOCK WORK CONTROL JOINTS:
7. ALL BLOCK WORK HORIZONTAL REINFORCING MUST LAP ADEQUATELY AT CORNERS AND JUNCTIONS AS INDICATED BELOW:
8. IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN
9. CONCRETE SHALL BE: B1  
- BLOCK FILL 17.5MPa
10. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 AND SHALL BE PLACED CENTRAL IN MASONRY BLOCK U.N.O. (HD BARS SHALL NOT BE REBENT)
11. CHASING OF LOAD BEARING MASONRY UNITS IS NOT PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

| REINFORCING LAP LENGTHS |                  |         |                  |      |
|-------------------------|------------------|---------|------------------|------|
|                         | MASONRY(17.5MPa) |         | CONCRETE (25MPa) |      |
| BAR SIZE                | 300              | 500     | 300              | 500  |
| 10                      | 400              | 700     | -                | -    |
| 12                      | 480              | 840     | 360              | 600  |
| 16                      | 640              | 1120    | 480              | 800  |
| 20                      | 800              | 1400    | 600              | 1000 |
| 25                      | -                | -       | 750              | 1250 |
| REINFORCEMENT COVER     |                  | MASONRY | CONCRETE         |      |
| EXPOSURE CLASSIFICATION |                  | 17.5MPa | 25MPa            |      |
| INTERIOR                | A1               | 35      | 25               |      |
| EXTERIOR - MOD          | B1               | 50      | 40               |      |
| AGAINST GROUND          |                  | -       | 75               |      |

TIMBER:

1. ALL TIMBER WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3602:2003
2. ALL BOLTED TIMBER CONNECTIONS TO HAVE 50x50x3 WASHERS.
3. ALL TIMBER TO BE MSG8 UNLESS SPECIFIED OTHERWISE.
4. TIMBER CONNECTIONS NOT SHOWN TO BE IN ACCORDANCE WITH NZS3604. TIMBER SIZES NOT SHOWN REFER ARCHITECT.
5. EXTERNAL BOLTS, WASHERS & BRACKETS TO BE STAINLESS STEEL.

| TIMBER HAZARD CLASSIFICATIONS |                                                                                                                                                   |                                                                                    |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| HAZARD CLASS                  | SERVICE CONDITIONS                                                                                                                                | TYPICAL USES                                                                       |
| H1.2                          | PROTECTED FROM WEATHER, BUT WITH A RISK OF MOISTURE CONTENT CONDUCTIVE TO DECAY                                                                   | WALL FRAMING - SEE NZS3604                                                         |
| H3.2                          | PERIODIC WETTING, NOT IN CONTACT WITH THE GROUND, MORE CRITICAL END USES                                                                          | DECKS, PERGOLAS, EXTERNAL BEAMS, POST NOT IN GROUND                                |
| H4                            | GROUND CONTACT, OR CONDITIONS OF SEVERE OR CONTINUOUS WETTING                                                                                     | FENCE POSTS, LANDSCAPING TIMBER NOT REQUIRING A BUILDING CONSENT                   |
| H5                            | GROUND CONTACT, OR CONDITIONS OF SEVERE OF CONTINUOUS WETTING, WHERE USES ARE CRITICAL AND WHERE A HIGHER LEVEL OF PROTECTION THAN H4 IS REQUIRED | HOUSE PILES AND POLES, CRIB WALLING, POSTS IN GROUND FOR DECKS, VERANDAS, PERGOLAS |

SAFETY STATEMENT:

1. PROPPING:  
  
EXISTING LOAD BEARING STRUCTURAL ELEMENTS SHALL BE ADEQUATELY PROPPED PRIOR TO REMOVING ANY SUPPORTING STRUCTURE. PROPPING SHALL REMAIN UNTIL NEW SUPPORTING STRUCTURE IS INSTALLED AS PER THE ENGINEER'S DRAWINGS AND REQUIREMENTS.  
  
THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE BUILDER.  
  
TEMPORARY WORK AND PROPPING IS THE RESPONSIBILITY OF THE BUILDER.
2. PRECAST WALL  
  
THE PRE-CAST PANEL MANUFACTURER AND BUILDER SHALL FOLLOW THE:  
  
*Approved Code of Practice for The Safe Handling, Transportation and Erection of Precast Concrete, AND*  
  
ANY REQUIREMENTS SPECIFIED BY THE HEALTH AND SAFETY AT WORK REGULATIONS.  
  
REFER TO [www.business.govt.nz/worksafe/information\\_guidance/all\\_guidance\\_items/scaffolding\\_best\\_practice\\_guideline\\_for\\_scaffolding\\_in\\_new\\_zealand/section\\_6\\_particular\\_scaffolds\\_and\\_scaffolding\\_structures/6.13\\_falsework\\_or\\_propping](http://www.business.govt.nz/worksafe/information_guidance/all_guidance_items/scaffolding_best_practice_guideline_for_scaffolding_in_new_zealand/section_6_particular_scaffolds_and_scaffolding_structures/6.13_falsework_or_propping)

PROJECT

PROPOSED NEW DWELLING

ADDRESS

1 PIHIOHOI CLOSE, WAIKANAE

Lower Hutt Office  
Tel: 04 566 8004  
Level 1, 70 Bloomfield Tce  
P.O. Box 30 535  
Lower Hutt 5040  
[email@certa.nz](mailto:email@certa.nz)

DATE: 4 May 2023

DESIGNED: JW

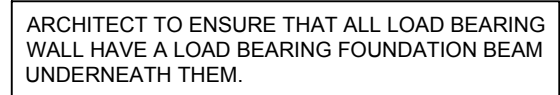
DRAWN: BV

APPROVED: SRNP

JOB No: 44175

SHT No: S0

REV: A



REFER STRUCTURAL CALCULATIONS  
FOR INSPECTION SCHEDULE

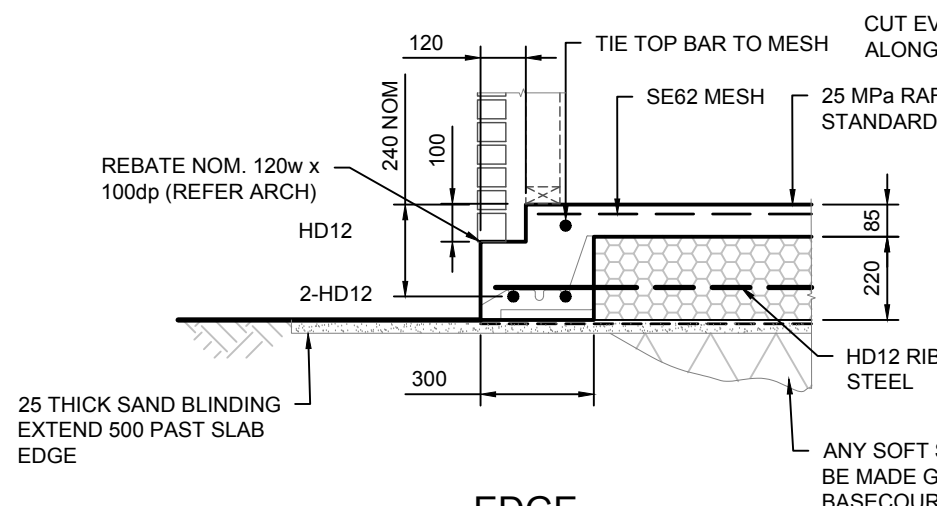
TRUSS MANUFACTURER TO ENSURE ALL TRUSS  
LOADS ARE TO INTERNAL THICKENINGS OR  
EXTERNAL PERIMETER

PROJECT

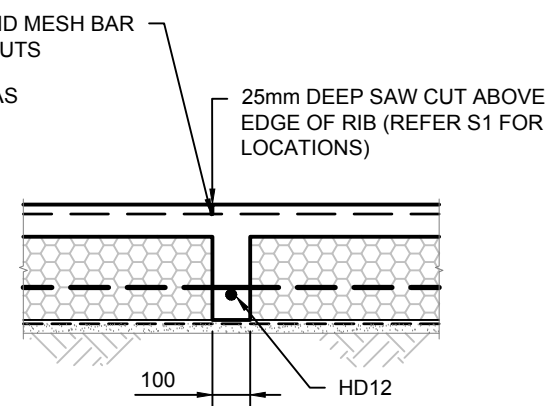
PROPOSED NEW DWELLING

ADDRESS  
**1 PIHIOHOI CLOSE, WAIKANAE**

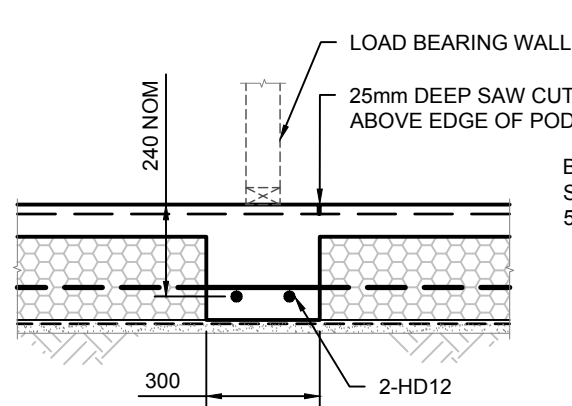
|                                                                                                                   |                                                                                                                                                                        |               |  |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--|
|  <b>CERTA</b><br>ENGINEERING | <b>Lower Hutt Office</b><br>Tel: 04 566 8004<br>Level 1, 70 Bloomfield Tce<br>P.O. Box 30 535<br>Lower Hutt 5040<br><a href="mailto:email@certa.nz">email@certa.nz</a> |               |  |
|                                                                                                                   | DATE: 4 May 2023                                                                                                                                                       | DESIGNED: JW  |  |
| DRAWN: BV                                                                                                         | APPROVED: SRNP                                                                                                                                                         |               |  |
| JOB No: <b>44175</b>                                                                                              | SHT No: <b>S1</b>                                                                                                                                                      | REV: <b>A</b> |  |



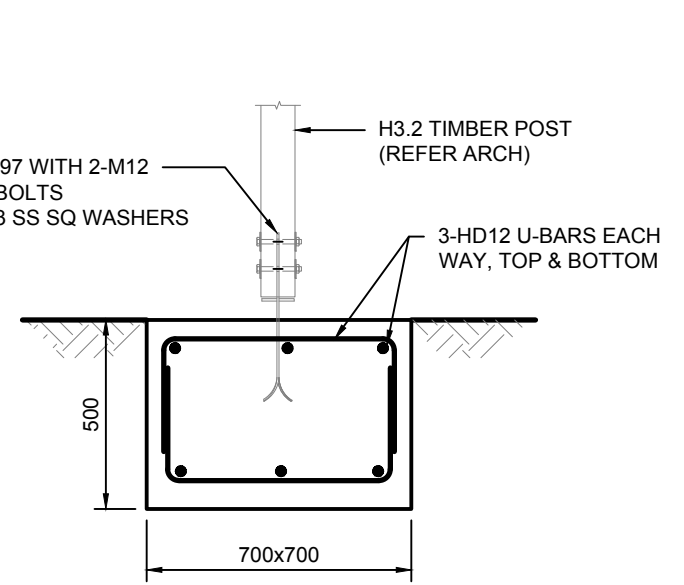
**EDGE BEAM DETAIL**  
SCALE 1:20



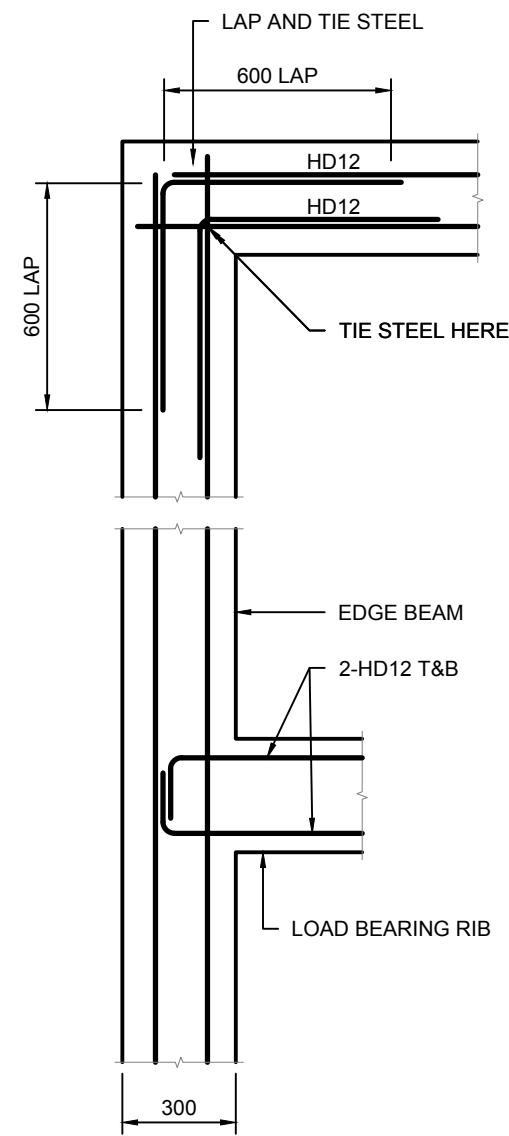
**SAW CUT JOINT RIB DETAIL**  
SCALE 1:20



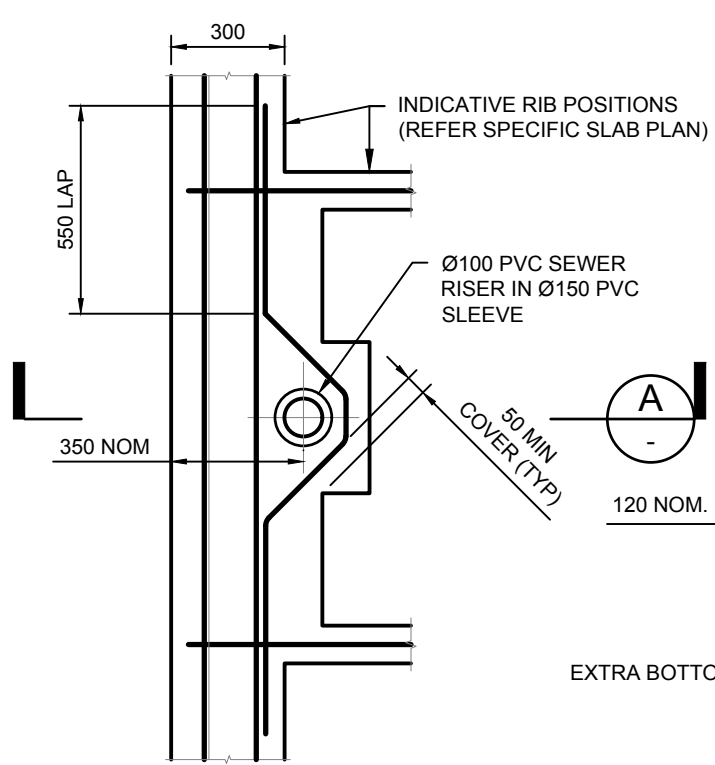
**INTERNAL LOAD BEARING RIB DETAIL**  
SCALE 1:20



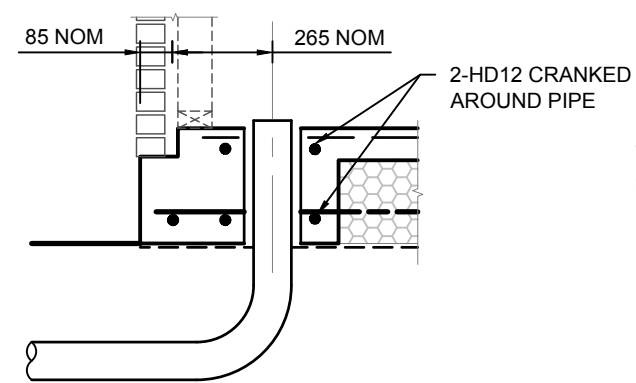
**POST PAD DETAIL**  
SCALE 1:20



**SLAB CORNER LOAD BEARING RIB STEEL**  
SCALE 1:20

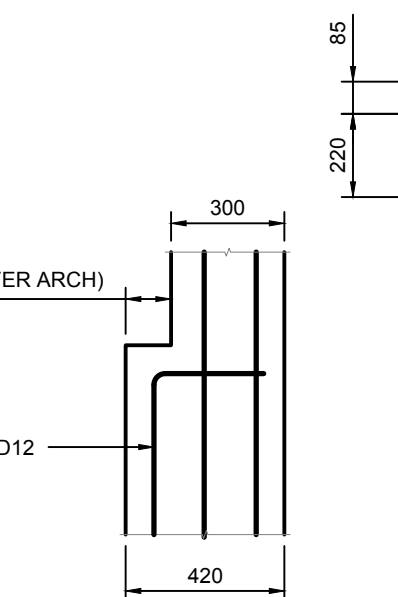


**SLAB SEWER PENETRATION DETAIL**  
SCALE 1:20

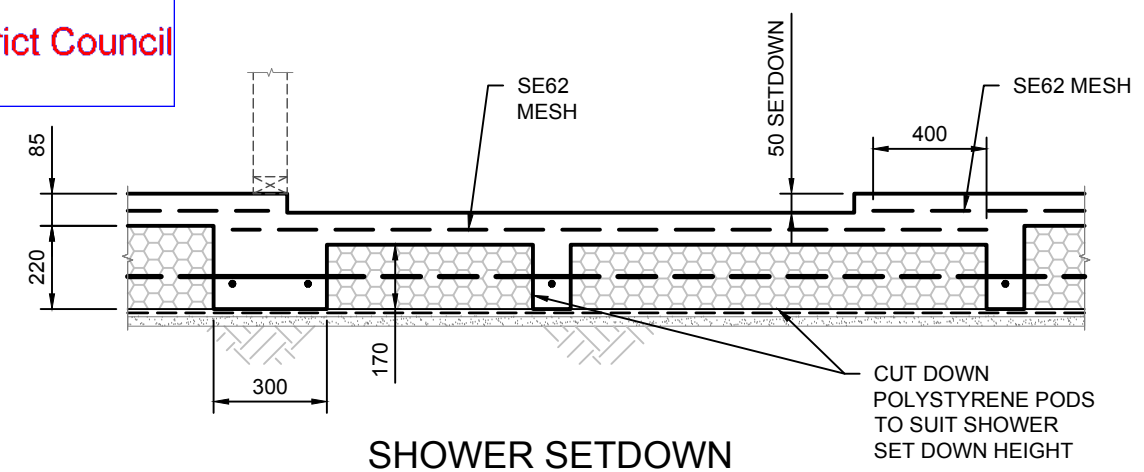


**SECTION A**  
SCALE 1:20

230413  
Received by  
Kapiti Coast District Council  
26/05/23



**FOUNDATION STEP AT WINDOW (4 OFF)**  
SCALE 1:20



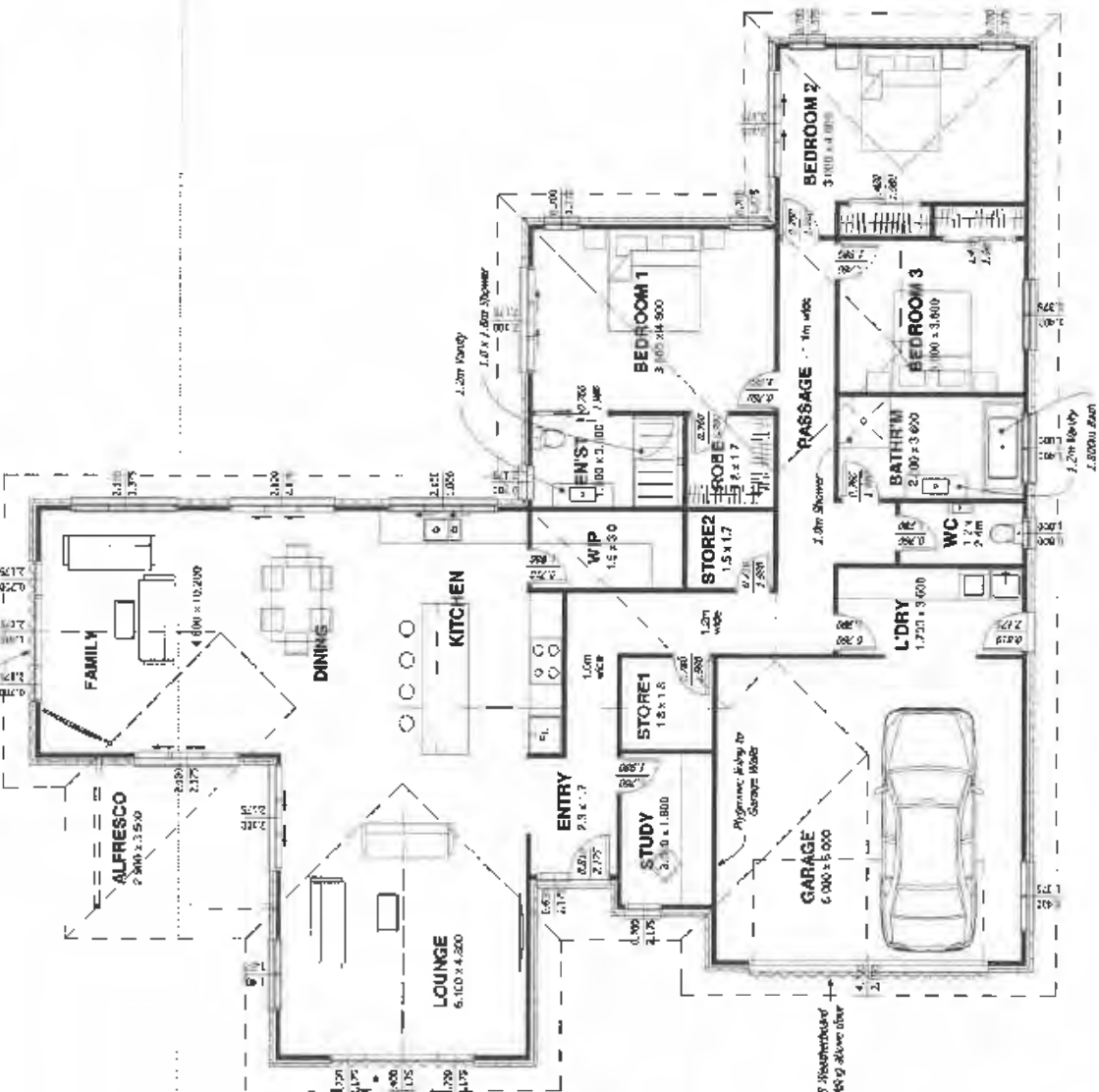
**SHOWER SETDOWN DETAIL**  
SCALE 1:20

|                                                                                                                                                                                                                                                                                                                                     |              |           |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|-----------|
| PROJECT<br><b>PROPOSED NEW DWELLING</b>                                                                                                                                                                                                                                                                                             |              |           |           |
| ADDRESS<br><b>1 PIHIOHOI CLOSE, WAIKANAE</b>                                                                                                                                                                                                                                                                                        |              |           |           |
| <div><div><div><div>Lower Hutt Office</div><div>Tel: 04 566 8004</div><div>Level 1, 70 Bloomfield Tce</div><div>P.O. Box 30 535</div><div>Lower Hutt 5040</div><div><a href="mailto:email@certa.nz">email@certa.nz</a></div></div></div></div> |              |           |           |
| DATE:                                                                                                                                                                                                                                                                                                                               | 4 May 2023   | DESIGNED: | JW        |
| DRAWN:                                                                                                                                                                                                                                                                                                                              | BV           | APPROVED: | SRNP      |
| JOB No:                                                                                                                                                                                                                                                                                                                             | <b>44175</b> | SHT No:   | <b>S2</b> |
|                                                                                                                                                                                                                                                                                                                                     |              | REV:      | <b>A</b>  |



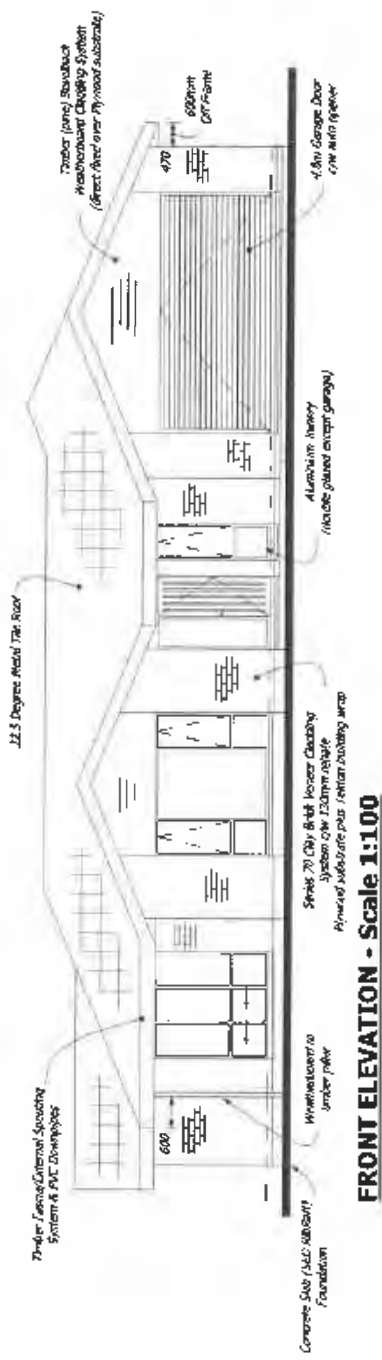


Prepared by: **PlanWorld**  
 Date: 03-10-22  
 Job Number: **WA 45MP**  
 Issue: 1  
 Project: **Proposed New Dwelling for Lot 45 Mann Park Stage II, Warranvale**  
 Date: 03-10-22  
 Project: **Proposed New Dwelling for Lot 45 Mann Park Stage II, Warranvale**  
 Issue: 1

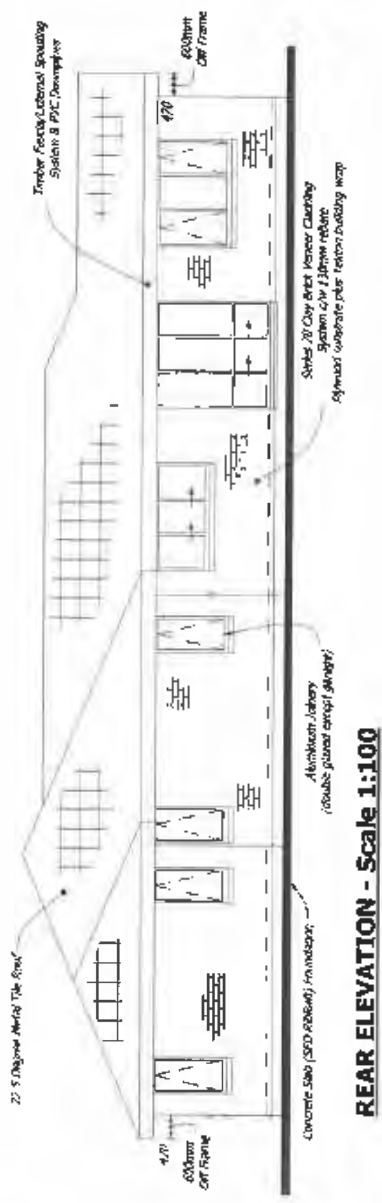


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Ordering for:  
Mr. Il. Walikhanov



**FRONT ELEVATION - Scale 1:100**



**REAR ELEVATION - Scale 1:100**

Date

12/4/23

Eng.

Jw

Job No.

44175

Sheet No.

Project

(Lot 45 Manu Park) | Pihikoi Close, Waihorowea



CALCULATIONS

Foundations (only doing fndns.)

Geotech report

300mm slab thickening beam  $\rightarrow$  200kPa 0.3m BGL

300kPa 0.5m BGL

errate 300mm topsoil

add 2x150mm layers hard fill

bearing  $\rightarrow$  200kPahouse  $\rightarrow$  single storey heavy cladding  
light roof1.5blow/150mm  $\rightarrow$  230kPa (200) for 200mm  $\rightarrow$  41.5blow/150mm  $\rightarrow$  300kPa (300) for 100mm  $\rightarrow$  3300mm  $\rightarrow$  7 blowsbased on  
sewer  
scale's
 150mm  
 70 blows  
 150mm  
 OK
Ribratt Manual  $\rightarrow$  Building Type B (single storey heavy walls)min blows/300mm  $\rightarrow$  7 for type B  $\rightarrow$  OK
 ↓  
 Typ. Ribratt Fdn OK

 good  
 ground

Date  
12/4/23

Eng. J W

Job No.  
44175

Sheet No.

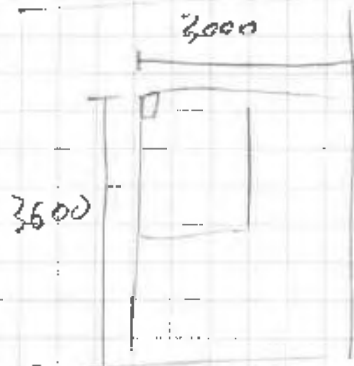
Project

Lot 45 Mann Park



CALCULATIONS

Al fresco canopy post



house door

$$\text{Area onto post} = \frac{3.6 \times 3}{4} = 2.7 \text{ m}^2$$

light roof

(p.u. -1.5 up, 0.3 down)

wind - 0.4 H (arch.)

~~300 Pa at 0m BGL~~  
~~300 Pa at 0.5m BGL~~

600 x 600 decr. OK

$$A = 0.383 \text{ m}^2$$

$$550 \times 550, A = 0.303 \text{ m}^2$$





Table 2: Estimated "Free-Field" Ground Surface Settlements & Performance Levels

| Earthquake scenario                    | Total Estimated Ground Surface Settlements (full depth tested) | Performance Level (as per Table 5.1 of MBIE – NZGS Module 3)   |
|----------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
| <b>Interim NZ Seismic Hazard Model</b> |                                                                |                                                                |
| 1/25-year SLS event                    | -                                                              | Insignificant effects - L0                                     |
| 1/100-year IE                          | <40 mm                                                         | LSN 0 to 5<br>LPI 0 to 2<br>Mild to moderate effects - L1 / L2 |
| 1/500-year ULS event                   | <60 mm                                                         | LSN 0 to 8<br>LPI 0 to 11<br>Moderate effects - L2             |

\* LSN = Liquefaction Severity Number. LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

The liquefaction assessment indicates that liquefaction is unlikely to be triggered under SLS loading conditions with moderate effects anticipated under ULS loading conditions. Furthermore, the presence of a thick non-liquefiable crust (2.5 m to 6.5 m in thickness) provides additional resilience and significantly reduces the severity of liquefaction induced damage (demonstrated by the low values of LSN).

## 5. Foundation Recommendations

With consideration of the assessment presented herein, NZS3604 foundation systems are considered feasible for NZS3604 compliant structures, with consideration of the available bearing capacity.

The following geotechnical ultimate bearing capacities (GUBC) may be assumed for typical foundations:

- Min. 300 mm wide strip footing / ground beam / slab thickening:
  - 200 kPa at 0.3 mbgl.
  - 300 kPa at 0.5 mbgl.
- Min. 400 mm square pad footing / pile base:
  - 300 kPa at 0.4 mbgl.

- \* The subgrade should be inspected by a suitably experienced geo-professional during construction and compacted / proof rolled prior to foundation construction. Any material identified as being soft or unsuitable should be removed and replaced with compacted hardfill (or site materials suitable for backfill and compaction).

*generic-site wide  
scalars done by Corta 22/3/23  
show good ground at surface  
for Lot 45.*







## SCALA PENETROMETER TEST LOCATION PLAN

**CLIENT** Paterson Homes Ltd

**PROJECT** Lot 46, 3 Pihohoi Close  
Manu Park



**CERTA  
ENGINEERING**

Lower Hutt Office  
Tel: 04 566 8004  
Unit 1, 14 Lingsi Rd  
P.O. Box 30 535  
Lower Hutt 5040  
[email@certa.nz](mailto:email@certa.nz)

DATE 22/03/2023

DESIGNED

DRAWN KJG

APPROVED

JOB No M4051

SHEET No

REV



Job Number **J44051**  
 Date **22-Mar-23**  
 Location **Lot 46 Manu Park**  
 Client **0**

Signed \_\_\_\_\_



| Probe Number 1                                         |             |              |            | Probe Number 2                                           |             |              |            | Probe Number 3                                           |             |              |            |
|--------------------------------------------------------|-------------|--------------|------------|----------------------------------------------------------|-------------|--------------|------------|----------------------------------------------------------|-------------|--------------|------------|
| ULS Reduct. $\phi = 1$                                 |             |              |            | ULS Reduct. $\phi = 1$                                   |             |              |            | ULS Reduct. $\phi = 1$                                   |             |              |            |
| Des. pile depth = 300 mm                               |             |              |            | Des. pile depth = mm                                     |             |              |            | Des. pile depth = mm                                     |             |              |            |
| Design $\phi_{q_s} = 665$ kPa (at design found. depth) |             |              |            | Design $\phi_{q_s} = \#N/A$ kPa (at design found. depth) |             |              |            | Design $\phi_{q_s} = \#N/A$ kPa (at design found. depth) |             |              |            |
| Depth                                                  | blows /50mm | $\phi_{q_s}$ | blows/50mm | Depth                                                    | blows /50mm | $\phi_{q_s}$ | blows/50mm | Depth                                                    | blows /50mm | $\phi_{q_s}$ | blows/50mm |
| 50                                                     | 2           | 390          |            | 50                                                       | 2           | 390          |            | 50                                                       | 2           | 390          |            |
| 100                                                    | 2           | 390          |            | 100                                                      | 2           | 390          |            | 100                                                      | 2           | 390          |            |
| 150                                                    | 2           | 390          |            | 150                                                      | 2           | 390          |            | 150                                                      | 2           | 390          |            |
| 200                                                    | 3           | 545          |            | 200                                                      | 2           | 390          |            | 200                                                      | 2           | 390          |            |
| 250                                                    | 3           | 545          |            | 250                                                      | 3           | 545          |            | 250                                                      | 6           | 820          |            |
| 300                                                    | 4           | 665          |            | 300                                                      | 3           | 545          |            | 300                                                      | 8           | 1000         |            |
| 350                                                    | 5           | 735          |            | 350                                                      | 4           | 665          |            | 350                                                      | 15          | 1470         |            |
| 400                                                    | 6           | 820          |            | 400                                                      | 4           | 665          |            | 400                                                      | 0           |              |            |
| 450                                                    | 7           | 915          |            | 450                                                      | 5           | 735          |            | 450                                                      | 0           |              |            |
| 500                                                    | 15          | 1470         |            | 500                                                      | 5           | 735          |            | 500                                                      | 0           |              |            |
| 550                                                    | 0           |              |            | 550                                                      | 6           | 820          |            | 550                                                      | 0           |              |            |
| 600                                                    | 0           |              |            | 600                                                      | 15          | 1470         |            | 600                                                      | 0           |              |            |
| 650                                                    | 0           |              |            | 650                                                      | 0           |              |            | 650                                                      | 0           |              |            |
| 700                                                    | 0           |              |            | 700                                                      | 0           |              |            | 700                                                      | 0           |              |            |
| 750                                                    | 0           |              |            | 750                                                      | 0           |              |            | 750                                                      | 0           |              |            |
| 800                                                    | 0           |              |            | 800                                                      | 0           |              |            | 800                                                      | 0           |              |            |
| 850                                                    | 0           |              |            | 850                                                      | 0           |              |            | 850                                                      | 0           |              |            |
| 900                                                    | 0           |              |            | 900                                                      | 0           |              |            | 900                                                      | 0           |              |            |
| 950                                                    | 0           |              |            | 950                                                      | 0           |              |            | 950                                                      | 0           |              |            |
| 1000                                                   | 0           |              |            | 1000                                                     | 0           |              |            | 1000                                                     | 0           |              |            |
| 1050                                                   | 0           |              |            | 1050                                                     | 0           |              |            | 1050                                                     | 0           |              |            |
| 1100                                                   | 0           |              |            | 1100                                                     | 0           |              |            | 1100                                                     | 0           |              |            |
| 1150                                                   | 0           |              |            | 1150                                                     | 0           |              |            | 1150                                                     | 0           |              |            |
| 1200                                                   | 0           |              |            | 1200                                                     | 0           |              |            | 1200                                                     | 0           |              |            |
| 1250                                                   | 0           |              |            | 1250                                                     | 0           |              |            | 1250                                                     | 0           |              |            |
| 1300                                                   | 0           |              |            | 1300                                                     | 0           |              |            | 1300                                                     | 0           |              |            |
| 1350                                                   | 0           |              |            | 1350                                                     | 0           |              |            | 1350                                                     | 0           |              |            |
| 1400                                                   | 0           |              |            | 1400                                                     | 0           |              |            | 1400                                                     | 0           |              |            |
| 1450                                                   | 0           |              |            | 1450                                                     | 0           |              |            | 1450                                                     | 0           |              |            |
| 1500                                                   | 0           |              |            | 1500                                                     | 0           |              |            | 1500                                                     | 0           |              |            |
| 1550                                                   | 0           |              |            | 1550                                                     | 0           |              |            | 1550                                                     | 0           |              |            |
| 1600                                                   | 0           |              |            | 1600                                                     | 0           |              |            | 1600                                                     | 0           |              |            |
| 1650                                                   | 0           |              |            | 1650                                                     | 0           |              |            | 1650                                                     | 0           |              |            |
| 1700                                                   | 0           |              |            | 1700                                                     | 0           |              |            | 1700                                                     | 0           |              |            |
| 1750                                                   | 0           |              |            | 1750                                                     | 0           |              |            | 1750                                                     | 0           |              |            |
| 1800                                                   | 0           |              |            | 1800                                                     | 0           |              |            | 1800                                                     | 0           |              |            |
| 1850                                                   | 0           |              |            | 1850                                                     | 0           |              |            | 1850                                                     | 0           |              |            |
| 1900                                                   | 0           |              |            | 1900                                                     | 0           |              |            | 1900                                                     | 0           |              |            |
| 1950                                                   | 0           |              |            | 1950                                                     | 0           |              |            | 1950                                                     | 0           |              |            |
| 2000                                                   | 0           |              |            | 2000                                                     | 0           |              |            | 2000                                                     | 0           |              |            |
| 2050                                                   | 0           |              |            | 2050                                                     | 0           |              |            | 2050                                                     | 0           |              |            |
| 2100                                                   | 0           |              |            | 2100                                                     | 0           |              |            | 2100                                                     | 0           |              |            |
| 2150                                                   | 0           |              |            | 2150                                                     | 0           |              |            | 2150                                                     | 0           |              |            |
| 2200                                                   | 0           |              |            | 2200                                                     | 0           |              |            | 2200                                                     | 0           |              |            |
| 2250                                                   | 0           |              |            | 2250                                                     | 0           |              |            | 2250                                                     | 0           |              |            |
| 2300                                                   | 0           |              |            | 2300                                                     | 0           |              |            | 2300                                                     | 0           |              |            |
| 2350                                                   | 0           |              |            | 2350                                                     | 0           |              |            | 2350                                                     | 0           |              |            |
| 2400                                                   | 0           |              |            | 2400                                                     | 0           |              |            | 2400                                                     | 0           |              |            |
| 2450                                                   | 0           |              |            | 2450                                                     | 0           |              |            | 2450                                                     | 0           |              |            |
| 2500                                                   | 0           |              |            | 2500                                                     | 0           |              |            | 2500                                                     | 0           |              |            |
| 2550                                                   | 0           |              |            | 2550                                                     | 0           |              |            | 2550                                                     | 0           |              |            |
| 2600                                                   | 0           |              |            | 2600                                                     | 0           |              |            | 2600                                                     | 0           |              |            |
| 2650                                                   | 0           |              |            | 2650                                                     | 0           |              |            | 2650                                                     | 0           |              |            |
| 2700                                                   | 0           |              |            | 2700                                                     | 0           |              |            | 2700                                                     | 0           |              |            |
| 2750                                                   | 0           |              |            | 2750                                                     | 0           |              |            | 2750                                                     | 0           |              |            |
| 2800                                                   | 0           |              |            | 2800                                                     | 0           |              |            | 2800                                                     | 0           |              |            |
| 2850                                                   | 0           |              |            | 2850                                                     | 0           |              |            | 2850                                                     | 0           |              |            |
| 2900                                                   | 0           |              |            | 2900                                                     | 0           |              |            | 2900                                                     | 0           |              |            |
| 2950                                                   | 0           |              |            | 2950                                                     | 0           |              |            | 2950                                                     | 0           |              |            |
| 3000                                                   | 0           |              |            | 3000                                                     | 0           |              |            | 3000                                                     | 0           |              |            |
| 3050                                                   | 0           |              |            | 3050                                                     | 0           |              |            | 3050                                                     | 0           |              |            |
| 3100                                                   | 0           |              |            | 3100                                                     | 0           |              |            | 3100                                                     | 0           |              |            |
| 3150                                                   | 0           |              |            | 3150                                                     | 0           |              |            | 3150                                                     | 0           |              |            |
| 3200                                                   | 0           |              |            | 3200                                                     | 0           |              |            | 3200                                                     | 0           |              |            |
| 3250                                                   | 0           |              |            | 3250                                                     | 0           |              |            | 3250                                                     | 0           |              |            |
| 3300                                                   | 0           |              |            | 3300                                                     | 0           |              |            | 3300                                                     | 0           |              |            |
| 3350                                                   | 0           |              |            | 3350                                                     | 0           |              |            | 3350                                                     | 0           |              |            |
| 3400                                                   | 0           |              |            | 3400                                                     | 0           |              |            | 3400                                                     | 0           |              |            |
| 3450                                                   | 0           |              |            | 3450                                                     | 0           |              |            | 3450                                                     | 0           |              |            |
| 3500                                                   | 0           |              |            | 3500                                                     | 0           |              |            | 3500                                                     | 0           |              |            |

NB: Design  $\phi_{q_s}$  calculated by conversion of the allowable bearing stress Stockwell 1977 Scale penetrometer charts of the publication "Determination of allowable bearing pressure under small structures - New Zealand Engineering, Vol. 32, No. 6, June 1977; 132-135"

Job Number J44051  
 Date 22-Mar-23  
 Location Lot 46 Manu Park

Signed



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Client

## Probe Number 4

ULS Reduct.  $\phi = 1$   
 Des. pile depth = mm  
 Design  $\phi q_n =$  #N/A kPa (at design found. depth)

| Depth | blows /50mm | $\phi q_n$ | 0 | 5 | 10 | 15 |
|-------|-------------|------------|---|---|----|----|
| 50    | 2           | 390        |   |   |    |    |
| 100   | 3           | 545        |   |   |    |    |
| 150   | 4           | 665        |   |   |    |    |
| 200   | 3           | 545        |   |   |    |    |
| 250   | 5           | 735        |   |   |    |    |
| 300   | 7           | 915        |   |   |    |    |
| 350   | 7           | 915        |   |   |    |    |
| 400   | 8           | 1000       |   |   |    |    |
| 450   | 15          | 1470       |   |   |    |    |
| 500   | 0           |            |   |   |    |    |
| 550   | 0           |            |   |   |    |    |
| 600   | 0           |            |   |   |    |    |
| 650   | 0           |            |   |   |    |    |
| 700   | 0           |            |   |   |    |    |
| 750   | 0           |            |   |   |    |    |
| 800   | 0           |            |   |   |    |    |
| 850   | 0           |            |   |   |    |    |
| 900   | 0           |            |   |   |    |    |
| 950   | 0           |            |   |   |    |    |
| 1000  | 0           |            |   |   |    |    |
| 1050  | 0           |            |   |   |    |    |
| 1100  | 0           |            |   |   |    |    |
| 1150  | 0           |            |   |   |    |    |
| 1200  | 0           |            |   |   |    |    |
| 1250  | 0           |            |   |   |    |    |
| 1300  | 0           |            |   |   |    |    |
| 1350  | 0           |            |   |   |    |    |
| 1400  | 0           |            |   |   |    |    |
| 1450  | 0           |            |   |   |    |    |
| 1500  | 0           |            |   |   |    |    |
| 1550  | 0           |            |   |   |    |    |
| 1600  | 0           |            |   |   |    |    |
| 1650  | 0           |            |   |   |    |    |
| 1700  | 0           |            |   |   |    |    |
| 1750  | 0           |            |   |   |    |    |
| 1800  | 0           |            |   |   |    |    |
| 1850  | 0           |            |   |   |    |    |
| 1900  | 0           |            |   |   |    |    |
| 1950  | 0           |            |   |   |    |    |
| 2000  | 0           |            |   |   |    |    |
| 2050  | 0           |            |   |   |    |    |
| 2100  | 0           |            |   |   |    |    |
| 2150  | 0           |            |   |   |    |    |
| 2200  | 0           |            |   |   |    |    |
| 2250  | 0           |            |   |   |    |    |
| 2300  | 0           |            |   |   |    |    |
| 2350  | 0           |            |   |   |    |    |
| 2400  | 0           |            |   |   |    |    |
| 2450  | 0           |            |   |   |    |    |
| 2500  | 0           |            |   |   |    |    |
| 2550  | 0           |            |   |   |    |    |
| 2600  | 0           |            |   |   |    |    |
| 2650  | 0           |            |   |   |    |    |
| 2700  | 0           |            |   |   |    |    |
| 2750  | 0           |            |   |   |    |    |
| 2800  | 0           |            |   |   |    |    |
| 2850  | 0           |            |   |   |    |    |
| 2900  | 0           |            |   |   |    |    |
| 2950  | 0           |            |   |   |    |    |
| 3000  | 0           |            |   |   |    |    |
| 3050  | 0           |            |   |   |    |    |
| 3100  | 0           |            |   |   |    |    |
| 3150  | 0           |            |   |   |    |    |
| 3200  | 0           |            |   |   |    |    |
| 3250  | 0           |            |   |   |    |    |
| 3300  | 0           |            |   |   |    |    |
| 3350  | 0           |            |   |   |    |    |
| 3400  | 0           |            |   |   |    |    |
| 3450  | 0           |            |   |   |    |    |
| 3500  | 0           |            |   |   |    |    |

## Probe Number 5

ULS Reduct.  $\phi = 1$   
 Des. pile depth = mm  
 Design  $\phi q_n =$  #N/A kPa (at design found. depth)

| Depth | blows /50mm | $\phi q_n$ | 0 | 5 | 10 | 15 |
|-------|-------------|------------|---|---|----|----|
| 50    | 2           | 390        |   |   |    |    |
| 100   | 3           | 545        |   |   |    |    |
| 150   | 3           | 545        |   |   |    |    |
| 200   | 4           | 665        |   |   |    |    |
| 250   | 4           | 665        |   |   |    |    |
| 300   | 4           | 665        |   |   |    |    |
| 350   | 5           | 735        |   |   |    |    |
| 400   | 5           | 735        |   |   |    |    |
| 450   | 5           | 735        |   |   |    |    |
| 500   | 7           | 915        |   |   |    |    |
| 550   | 8           | 1000       |   |   |    |    |
| 600   | 10          | 1140       |   |   |    |    |
| 650   | 0           |            |   |   |    |    |
| 700   | 0           |            |   |   |    |    |
| 750   | 0           |            |   |   |    |    |
| 800   | 0           |            |   |   |    |    |
| 850   | 0           |            |   |   |    |    |
| 900   | 0           |            |   |   |    |    |
| 950   | 0           |            |   |   |    |    |
| 1000  | 0           |            |   |   |    |    |
| 1050  | 0           |            |   |   |    |    |
| 1100  | 0           |            |   |   |    |    |
| 1150  | 0           |            |   |   |    |    |
| 1200  | 0           |            |   |   |    |    |
| 1250  | 0           |            |   |   |    |    |
| 1300  | 0           |            |   |   |    |    |
| 1350  | 0           |            |   |   |    |    |
| 1400  | 0           |            |   |   |    |    |
| 1450  | 0           |            |   |   |    |    |
| 1500  | 0           |            |   |   |    |    |
| 1550  | 0           |            |   |   |    |    |
| 1600  | 0           |            |   |   |    |    |
| 1650  | 0           |            |   |   |    |    |
| 1700  | 0           |            |   |   |    |    |
| 1750  | 0           |            |   |   |    |    |
| 1800  | 0           |            |   |   |    |    |
| 1850  | 0           |            |   |   |    |    |
| 1900  | 0           |            |   |   |    |    |
| 1950  | 0           |            |   |   |    |    |
| 2000  | 0           |            |   |   |    |    |
| 2050  | 0           |            |   |   |    |    |
| 2100  | 0           |            |   |   |    |    |
| 2150  | 0           |            |   |   |    |    |
| 2200  | 0           |            |   |   |    |    |
| 2250  | 0           |            |   |   |    |    |
| 2300  | 0           |            |   |   |    |    |
| 2350  | 0           |            |   |   |    |    |
| 2400  | 0           |            |   |   |    |    |
| 2450  | 0           |            |   |   |    |    |
| 2500  | 0           |            |   |   |    |    |
| 2550  | 0           |            |   |   |    |    |
| 2600  | 0           |            |   |   |    |    |
| 2650  | 0           |            |   |   |    |    |
| 2700  | 0           |            |   |   |    |    |
| 2750  | 0           |            |   |   |    |    |
| 2800  | 0           |            |   |   |    |    |
| 2850  | 0           |            |   |   |    |    |
| 2900  | 0           |            |   |   |    |    |
| 2950  | 0           |            |   |   |    |    |
| 3000  | 0           |            |   |   |    |    |
| 3050  | 0           |            |   |   |    |    |
| 3100  | 0           |            |   |   |    |    |
| 3150  | 0           |            |   |   |    |    |
| 3200  | 0           |            |   |   |    |    |
| 3250  | 0           |            |   |   |    |    |
| 3300  | 0           |            |   |   |    |    |
| 3350  | 0           |            |   |   |    |    |
| 3400  | 0           |            |   |   |    |    |
| 3450  | 0           |            |   |   |    |    |
| 3500  | 0           |            |   |   |    |    |

## Probe Number 6

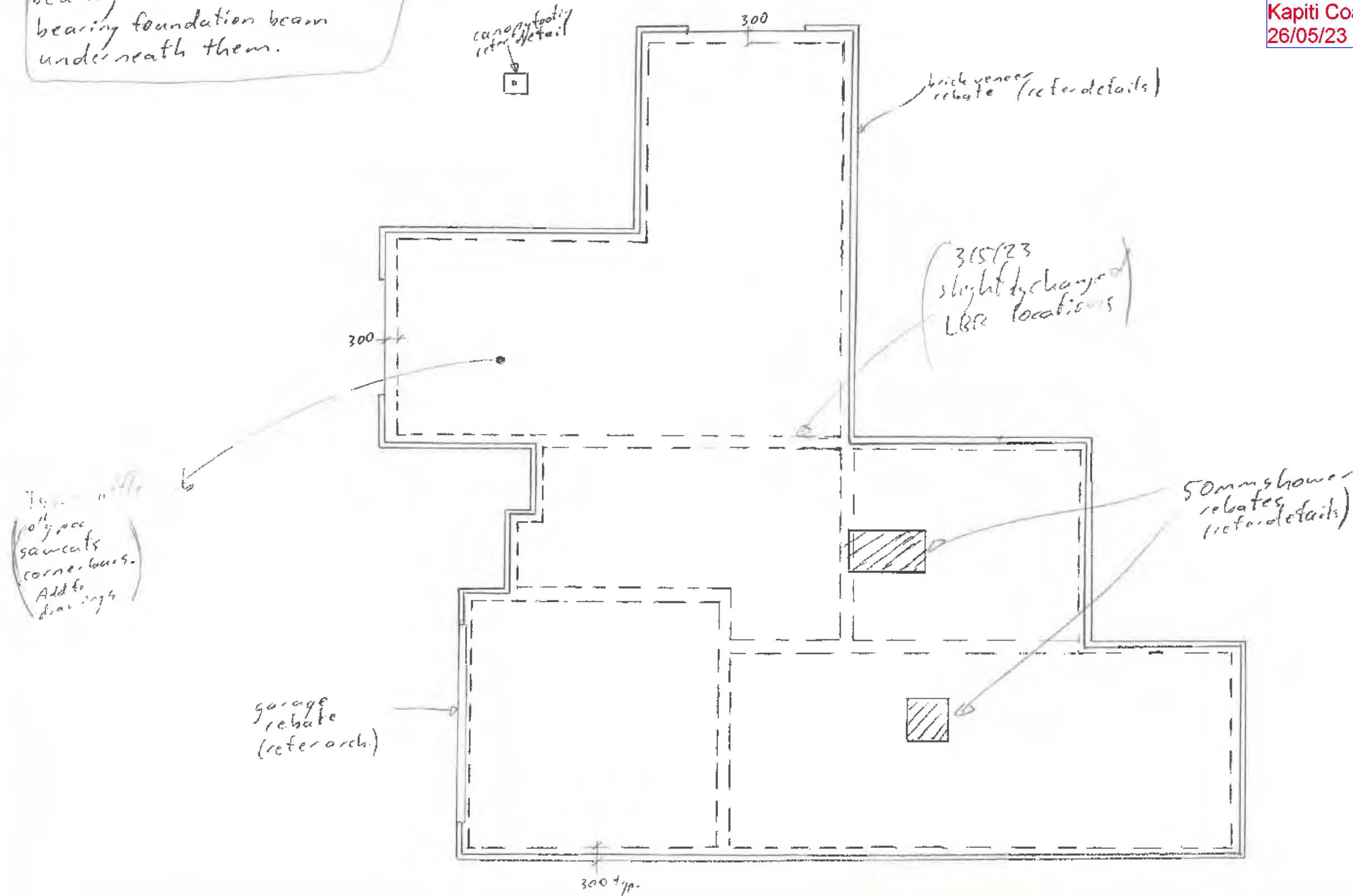
ULS Reduct.  $\phi = 1$   
 Des. pile depth = mm  
 Design  $\phi q_n =$  #N/A kPa (at design found. depth)

| Depth | blows /50mm | $\phi q_n$ | 0 | 5 | 10 | 15 |
|-------|-------------|------------|---|---|----|----|
| 50    | 2           | 390        |   |   |    |    |
| 100   | 3           | 545        |   |   |    |    |
| 150   | 3           | 545        |   |   |    |    |
| 200   | 4           | 665        |   |   |    |    |
| 250   | 5           | 735        |   |   |    |    |
| 300   | 6           | 820        |   |   |    |    |
| 350   | 7           | 915        |   |   |    |    |
| 400   | 7           | 915        |   |   |    |    |
| 450   | 7           | 915        |   |   |    |    |
| 500   | 8           | 1000       |   |   |    |    |
| 550   | 15          | 1470       |   |   |    |    |
| 600   | 0           |            |   |   |    |    |
| 650   | 0           |            |   |   |    |    |
| 700   | 0           |            |   |   |    |    |
| 750   | 0           |            |   |   |    |    |
| 800   | 0           |            |   |   |    |    |
| 850   | 0           |            |   |   |    |    |
| 900   | 0           |            |   |   |    |    |
| 950   | 0           |            |   |   |    |    |
| 1000  | 0           |            |   |   |    |    |
| 1050  | 0           |            |   |   |    |    |
| 1100  | 0           |            |   |   |    |    |
| 1150  | 0           |            |   |   |    |    |
| 1200  | 0           |            |   |   |    |    |
| 1250  | 0           |            |   |   |    |    |
| 1300  | 0           |            |   |   |    |    |
| 1350  | 0           |            |   |   |    |    |
| 1400  | 0           |            |   |   |    |    |
| 1450  | 0           |            |   |   |    |    |
| 1500  | 0           |            |   |   |    |    |
| 1550  | 0           |            |   |   |    |    |
| 1600  | 0           |            |   |   |    |    |
| 1650  | 0           |            |   |   |    |    |
| 1700  | 0           |            |   |   |    |    |
| 1750  | 0           |            |   |   |    |    |
| 1800  | 0           |            |   |   |    |    |
| 1850  | 0           |            |   |   |    |    |
| 1900  | 0           |            |   |   |    |    |
| 1950  | 0           |            |   |   |    |    |
| 2000  | 0           |            |   |   |    |    |
| 2050  | 0           |            |   |   |    |    |
| 2100  | 0           |            |   |   |    |    |
| 2150  | 0           |            |   |   |    |    |
| 2200  | 0           |            |   |   |    |    |
| 2250  | 0           |            |   |   |    |    |
| 2300  | 0           |            |   |   |    |    |
| 2350  | 0           |            |   |   |    |    |
| 2400  | 0           |            |   |   |    |    |
| 2450  | 0           |            |   |   |    |    |
| 2500  | 0           |            |   |   |    |    |
| 2550  | 0           |            |   |   |    |    |
| 2600  | 0           |            |   |   |    |    |
| 2650  | 0           |            |   |   |    |    |
| 2700  | 0           |            |   |   |    |    |
| 2750  | 0           |            |   |   |    |    |
| 2800  | 0           |            |   |   |    |    |
| 2850  | 0           |            |   |   |    |    |
| 2900  | 0           |            |   |   |    |    |
| 2950  | 0           |            |   |   |    |    |
| 3000  | 0           |            |   |   |    |    |
| 3050  | 0           |            |   |   |    |    |
| 3100  | 0           |            |   |   |    |    |
| 3150  | 0           |            |   |   |    |    |
| 3200  | 0           |            |   |   |    |    |
| 3250  | 0           |            |   |   |    |    |
| 3300  | 0           |            |   |   |    |    |
| 3350  | 0           |            |   |   |    |    |
| 3400  | 0           |            |   |   |    |    |
| 3450  | 0           |            |   |   |    |    |
| 3500  | 0           |            |   |   |    |    |

NB: Design  $\phi q_n$  calculated by conversion of the allowable bearing stress Stockwell 1977 Scala penetrometer charts of the publication "Determination of allowable bearing pressure under small structures - New Zealand Engineering, Vol. 32, No. 6, June 1977; 132-135"

Architect to ensure that load bearing walls have a load bearing foundation beam underneath them.

230413  
Received by  
Kapiti Coast District Council  
26/05/23



## PROJECT

Proposed New Dwelling

## ADDRESS

1 Pihōhōi Close  
(Lot 45 Mann Park), Waihanae



**CERTA**  
ENGINEERING

Lower Hutt Office  
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P.O. Box 30 535  
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DATE: April 2023

DESIGNED: JW

DRAWN:

APPROVED:

JOB No: 44175

SHT No:

REV:



Date

12/4/23

Eng.

JW

Job No.

44175

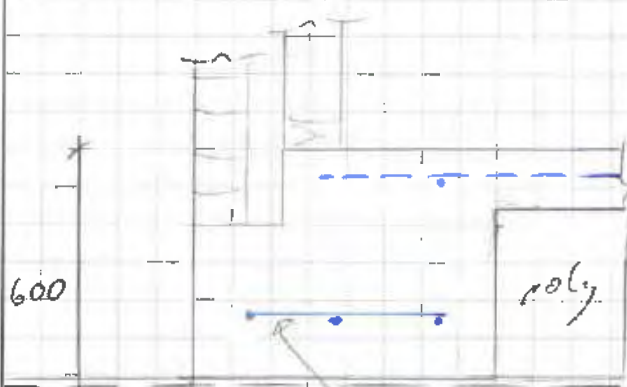
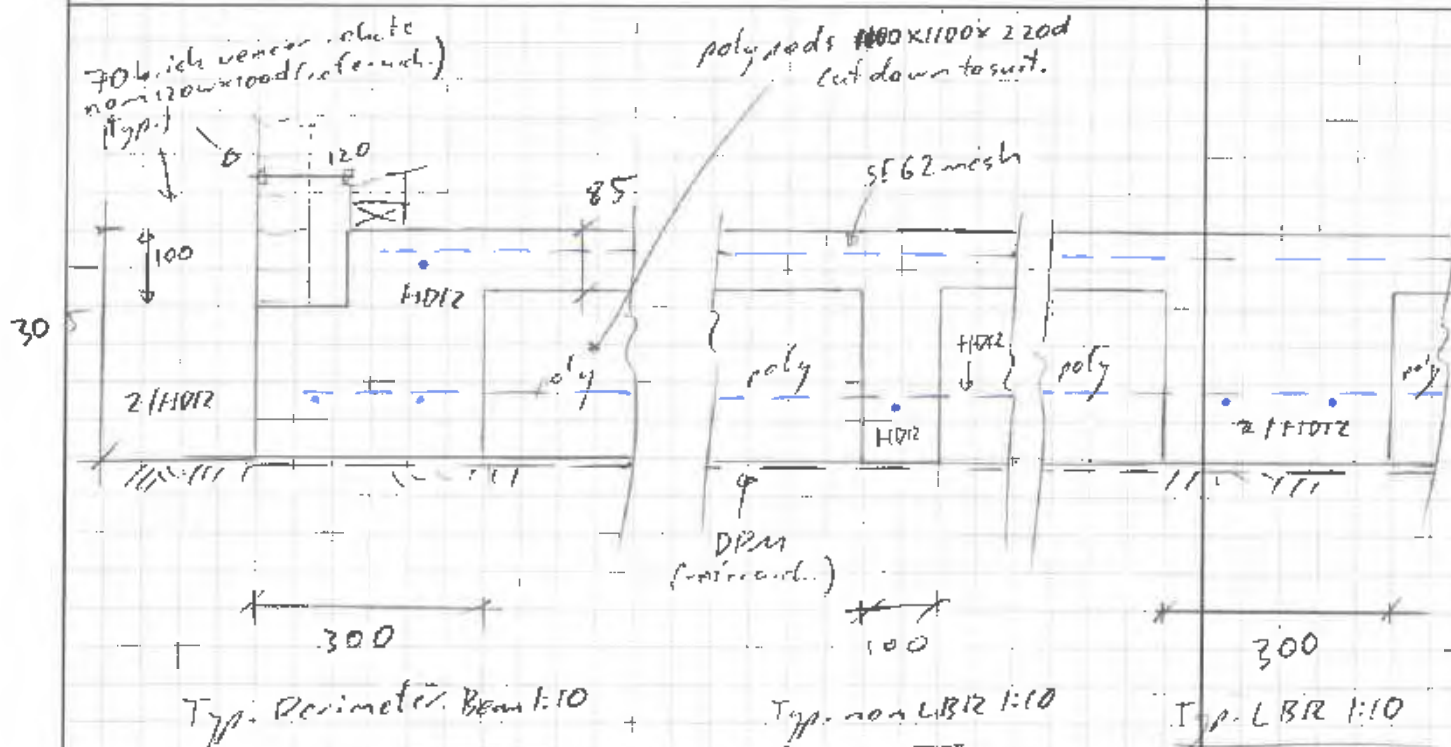
Sheet No.

Project

Lot 45 Monarch Park



CALCULATIONS



Sec A 1:10

extra HDR12 in wider  
perimeter beams.(ref. arch.)  
nom 120

300

A

A

Non typ. where rebar ends  
by window 1:10

Add excavation &  
compact to these  
pages.



Date  
17/4/23

Eng. Jw

Job No.  
44175

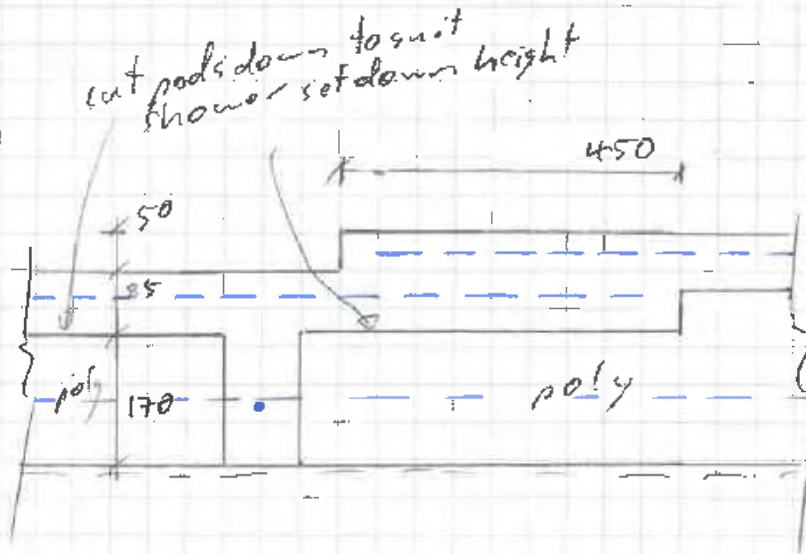
Sheet No.

Project

1 Pihoihoi Close (Lot 45 Manu Pahi)



CALCULATIONS



Shower Rebate Detail (Typ.) 1:10

Date 12/4/23

Eng. J. W.

Job No. 44175

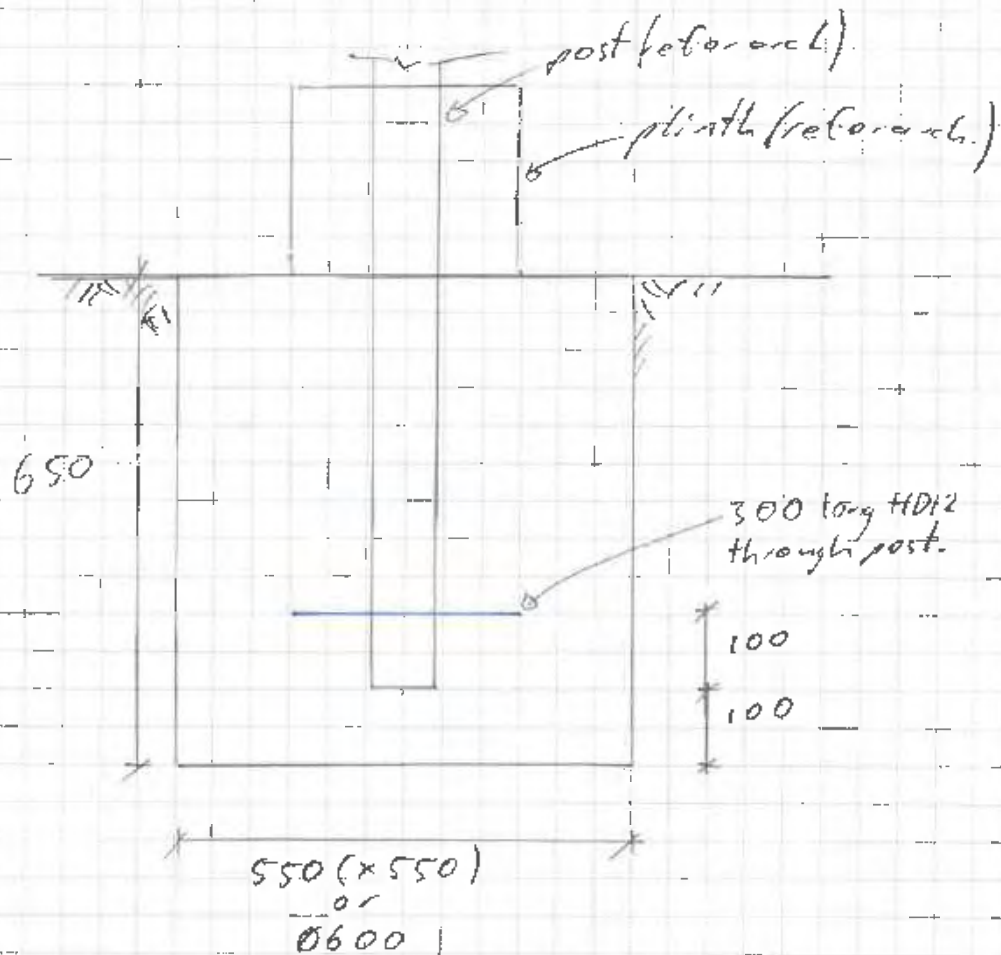
Sheet No.

Project

Lot 45 Mon + Park



CALCULATIONS



or

See next page.

Canopy Footing Detail 1:10

Date

17/14/23

Eng.

JW

Job No.

44195

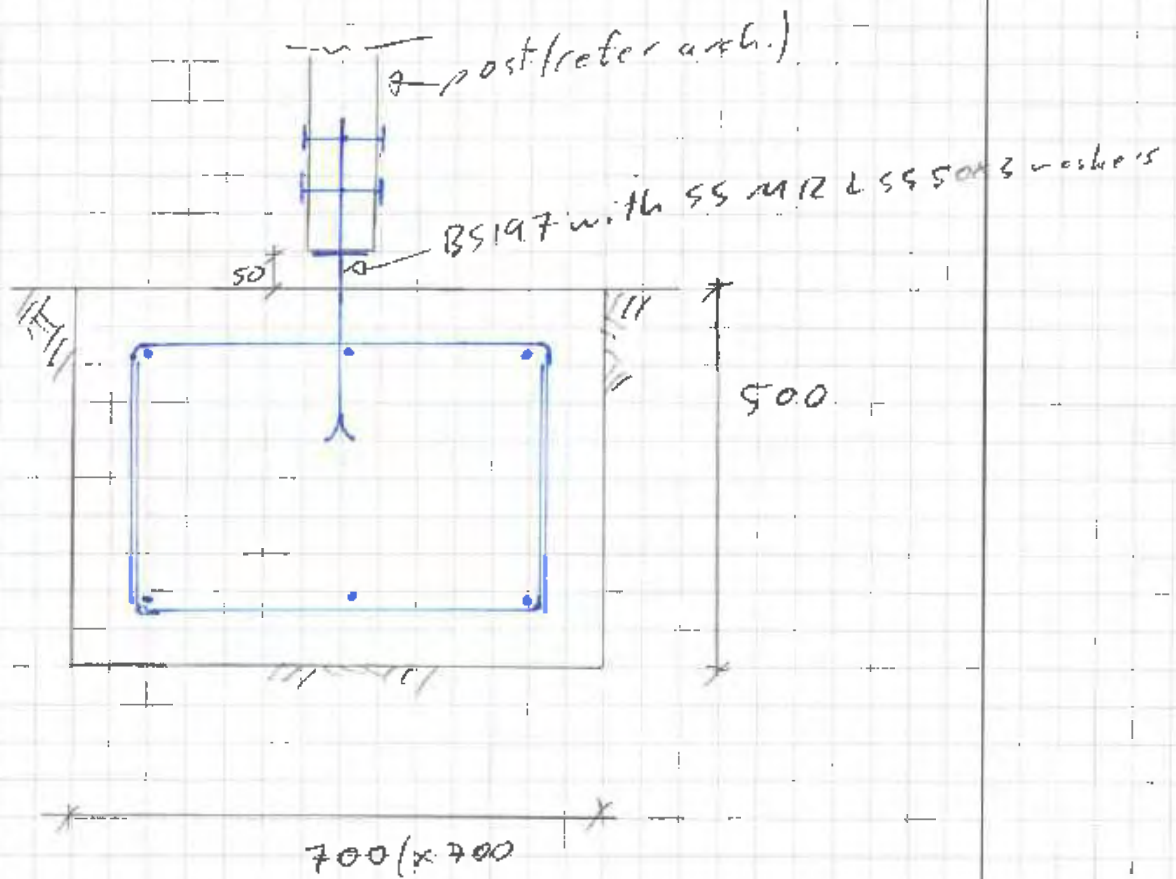
Sheet No.

Project

Lot 45 Mann Park



CALCULATIONS



alternative canopy post detail



GENERAL:

1. REFER ARCHITECT'S DRAWINGS FOR DIMENSIONS, UNLESS NOTED OTHERWISE. DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO STEEL FABRICATION. DO NOT SCALE OFF THIS DRAWING.
2. IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN
3. STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATIONS, ARCHITECTURAL, CIVIL AND ENGINEERING SERVICES DOCUMENTS.
4. UNLESS OTHERWISE NOTED ALL LEVELS ARE IN METERS, AND ALL DIMENSIONS ARE IN MILLIMETERS, AND SHALL BE CHECKED BY CONTRACTOR PRIOR TO CONSTRUCTION.
5. DIMENSION SHALL NOT BE OBTAINED BY SCALING FROM DRAWINGS.
6. ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT OR ENGINEER FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
7. ALL MATERIAL AND WORKMANSHIP SHALL BE ON ACCORDANCE WITH THE CURRENT CODES OF PRACTICE EXCEPT WHERE VARIED BY THE SPECIFICATION AND/OR DRAWINGS.
8. WHERE PROPRIETY PRODUCTS ARE SPECIFIED IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL.
9. ENGINEER REQUIRES 24 HOURS NOTICE BEFORE ANY INSPECTION (REFER TO STRUCTURAL CALCULATIONS FOR SCHEDULE OF INSPECTIONS).

FILL SPECIFICATION:

1. SITE TO BE CLEARED OF ALL TOPSOIL AND ANY ORGANIC MATERIAL THEN CUT TO A SERIES OF LEVEL BENCHES.
2. ENGINEER TO INSPECT PRIOR TO ANY FILL PLACEMENT.
3. FILL MATERIAL TO BE CRUSHED ROCK TOPCOURSE MATERIAL FREE OF ORGANIC MATERIAL FULLY COMPACTED TO 90% OF MAXIMUM DENSITY TO BS1377 TEST 9.
4. COMPACT IN MAXIMUM LAYERS OF 150mm THICK WITH A 2 TONNE ROLLER - TRACK ROLLING WITH A DIGGER IS NOT ACCEPTABLE
5. ENGINEER TO INSPECT AND TEST EVERY 2nd LAYER PLACED (300mm INTERVALS)

PILING:

1. PILE DEPTH ESTIMATIONS ARE HIGHLY APPROXIMATE AND MAY BE SUBJECT TO SIGNIFICANT VARIATION ON SITE. IF GREATER CONFIDENCE IS REQUIRED WE RECOMMEND INSTALLATION OF TEST PILES.
2. DRIVEN TIMBER PILES TO HAVE A DEPENDABLE ULTIMATE CAPACITY OF 65kN U.N.O. (REFER DRAWING FOR ESTIMATED LENGTH)
3. PILING CONTRACTOR TO PROVIDE RECORD OF PILE SETS AND PILE DRIVING EQUIPMENT DETAILS. TOP OF PILES TO BE PAINTED WITH METALEX AND HAVE A GAP BETWEEN PILE AND FOOTING STEEL OR A LAYER OF DPM
4. FOR LARGE POLE HOLES IT IS RECOMMENDED TO DRILL & POUR INTERMEDIATE HOLES, THEN COMPLETE REMAINDER IN A SEPARATE POUR TO MINIMISE HOLE COLLAPSE.
5. ENSURE BOTTOM OF PILE HOLES ARE FREE OF WATER AND LOOSE MATERIAL. TAMP AS NECESSARY

WAFFLE SLAB NOTES:

1. SLAB AND FOOTINGS - USE 25MPa CONCRETE, 100mm SLUMP
2. REFER POD SUPPLIER SPECIFICATIONS AND DRAWINGS FOR SAWCUTS AND SHRINKAGE CONTROL JOINTS
3. BASECOURSE AS REQUIRED TO BRING SITE LEVEL. ANY SOFT SPOTS ARE TO BE EXCAVATED AND REPLACED WITH BASECOURSE.
4. POLISHED FLOOR - USE 30MPa CONCRETE WITH 13mm AGGREGATE (DO NOT USE A PUMP MIX), 100mm SLUMP, ENSURE WET CURING FOR AT LEAST 7 DAYS. 2 LAYERS OF DPC ON 20mm SAND BLINDING. ENSURE SAWCUTS ARE MADE AT THE EARLIEST POSSIBLE TIME (WITHIN 48 HRS)

STRUCTURAL MAINTENANCE SCHEDULE:

- YEARLY: WASH DOWN ALL EXPOSED STEELWORK THAT IS NOT IN A FULLY INTERIOR ENVIRONMENT.
- 10 YEARLY: INSPECT AND REPAIR SEALANT THAT ENCLOSES STRUCTURAL MILD-STEEL COMPONENTS AND/OR TIMBER WITH MILD-STEEL FIXINGS.  
  
CHECK EXPOSED TIMBER FIXINGS FOR CORROSION, REPAIR AS REQUIRED.
- 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. INSPECTION MAY TYPICALLY REQUIRE REMOVAL OF CLADDING 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 OR CRACKING. REPAIR AS REQUIRED.

STEEL:

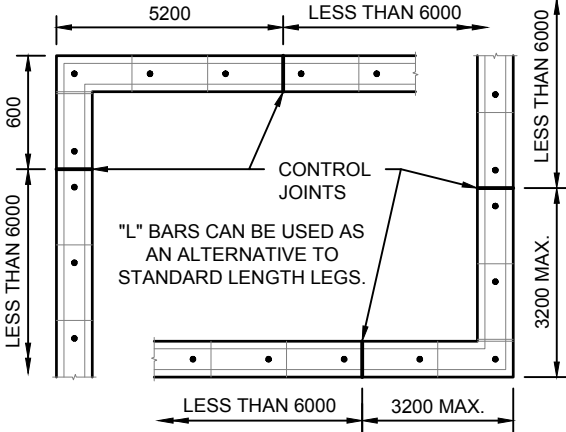
1. ALL STEEL WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3404:2009
2. ALL WELDS TO BE 6 FILLET WELDS ALL ROUND UNLESS NOTED OTHERWISE.
3. ALL M12 BOLTS TO BE GRADE 4.6. ALL M16 BOLTS TO BE GRADE 8.8 UNLESS NOTED OTHERWISE.
4. ALL PLATES TO BE 10 THICK UNLESS NOTED OTHERWISE.
5. STEEL GRADES:  
- PLATES 250MPa  
- HOT ROLLED SECTIONS 300MPa  
- HOLLOW SECTIONS 350MPa
6. ALL WELD ELECTRODES ARE E48XX OR W50X.
7. ALL INTERNAL STRUCTURAL STEEL TO BE PAINTED IN ACCORDANCE WITH SYSTEM DESIGNATION AS/NZS2312/AKL1 BEFORE DELIVERY TO SITE. ANY AREAS DAMAGED TO BE MADE GOOD UPON INSTALLATION.
8. ALL EXTERNAL STRUCTURAL STEEL TREATMENT SHALL BE ONE OF THE FOLLOWING: (NZS TS 3404-2018)
  - TSZ150S - 150µm THERMAL SPRAY ZINC + 75µm ACRYLIC PAINT (EXTERIOR OVER 1KM FROM COAST).
  - HDG900 - 900gm/m² GALVANISED COATING.

CONCRETE:

1. ALL CONCRETE WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3109:1997
2. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF:  
- SLABS & FOOTINGS 25MPa  
- PILES 17.5MPa  
- TIDY SLABS 10MPa
3. MAXIMUM SLUMP TO BE 100mm UNLESS NOTED OTHERWISE
4. CONCRETE FINISHES SHALL BE:  
- SLABS U3  
- EXPOSED FOOTINGS F4
5. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 (HD BARS SHALL NOT BE REBENT)
6. THE CONCRETE SHALL BE KEPT CONTINUOUSLY WET FOR A PERIOD OF A LEAST 4 DAYS. FROM 4-10 DAYS AFTER POURING IT SHALL BE KEPT DAMP BY OCCASIONAL HOSING..
7. ALL CHEMICAL ANCHOR HOLES TO BE CLEANED OUT AND EMBEDDED TO DEPTHS IN ACCORDANCE WITH MANUFACTURES INSTRUCTIONS.

MASONRY:

1. ALL MASONRY IS LAID IN RUNNING BOND CONFIGURATION UNLESS NOTED OTHERWISE.
2. ALL MASONRY WITHIN THE BUILDING STRUCTURE IS GRADE B AS DEFINED IN NZS 4230.
3. ALL CONCRETE MASONRY BLOCKS SHALL CONFORM TO NZS 3102 UNLESS NOTED OTHERWISE. DENSITY SHALL BE > 1750 kg/m³.
4. ALL MASONRY WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS4210:2001 & NZS4229:2013. LINTELS WHERE NOT SPECIFICALLY DETAILED SHALL COMPLY WITH THE PROVISIONS OF NZS4229:2013. USE 800g/m³ OF SIKA 'CAVEX' EXPANSION AGENT, OR APPROVED ALTERNATIVE, FOR MASONRY BLOCK INFILL.
5. VERTICAL CONTROL JOINTS IN MASONRY TO BE PROVIDED AT 6m MAX. CENTRES. WHERE NOT SHOWN ON DRAWINGS THE JOINTS SHOULD BE LOCATED IN ACCORDANCE WITH NZS4229:2013 SECTION 12 AND TO APPROVAL OF THE ENGINEER.



6. BLOCK WORK CONTROL JOINTS:  
  
R16-600 800 LONG DEBONDED ONE END 10 GAP WITH POLYSTYRENE STRIP CENTRAL & SEALED BOTH FACES WITH URAFLEX
7. ALL BLOCK WORK HORIZONTAL REINFORCING MUST LAP ADEQUATELY AT CORNERS AND JUNCTIONS AS INDICATED BELOW:  
  
NOTE: "L" BARS CAN BE USED AS AN ALTERNATIVE TO STANDARD LENGTH LEGS.
8. IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN

9. CONCRETE SHALL BE: B1  
- BLOCK FILL 17.5MPa
10. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 AND SHALL BE PLACED CENTRAL IN MASONRY BLOCK U.N.O. (HD BARS SHALL NOT BE REBENT)
11. CHASING OF LOAD BEARING MASONRY UNITS IS NOT PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

| REINFORCING LAP LENGTHS |                  |      |                  |      |
|-------------------------|------------------|------|------------------|------|
|                         | MASONRY(17.5MPa) |      | CONCRETE (25MPa) |      |
| BAR SIZE                | 300              | 500  | 300              | 500  |
| 10                      | 400              | 700  | -                | -    |
| 12                      | 480              | 840  | 360              | 600  |
| 16                      | 640              | 1120 | 480              | 800  |
| 20                      | 800              | 1400 | 600              | 1000 |
| 25                      | -                | -    | 750              | 1250 |

| REINFORCEMENT COVER     |    | MASONRY | CONCRETE |
|-------------------------|----|---------|----------|
| EXPOSURE CLASSIFICATION |    | 17.5MPa | 25MPa    |
| INTERIOR                | A1 | 35      | 25       |
| EXTERIOR - MOD          | B1 | 50      | 40       |
| AGAINST GROUND          |    | -       | 75       |

TIMBER:

1. ALL TIMBER WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3602:2003
2. ALL BOLTED TIMBER CONNECTIONS TO HAVE 50x50x3 WASHERS.
3. ALL TIMBER TO BE MSG8 UNLESS SPECIFIED OTHERWISE.
4. TIMBER CONNECTIONS NOT SHOWN TO BE IN ACCORDANCE WITH NZS3604. TIMBER SIZES NOT SHOWN REFER ARCHITECT.
5. EXTERNAL BOLTS, WASHERS & BRACKETS TO BE STAINLESS STEEL.

| TIMBER HAZARD CLASSIFICATIONS |                                                                                                                                                   |                                                                                    |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| HAZARD CLASS                  | SERVICE CONDITIONS                                                                                                                                | TYPICAL USES                                                                       |
| H1.2                          | PROTECTED FROM WEATHER, BUT WITH A RISK OF MOISTURE CONTENT CONDUCTIVE TO DECAY                                                                   | WALL FRAMING - SEE NZS3604                                                         |
| H3.2                          | PERIODIC WETTING, NOT IN CONTACT WITH THE GROUND, MORE CRITICAL END USES                                                                          | DECKS, PERGOLAS, EXTERNAL BEAMS, POST NOT IN GROUND                                |
| H4                            | GROUND CONTACT, OR CONDITIONS OF SEVERE OR CONTINUOUS WETTING                                                                                     | FENCE POSTS, LANDSCAPING TIMBER NOT REQUIRING A BUILDING CONSENT                   |
| H5                            | GROUND CONTACT, OR CONDITIONS OF SEVERE OF CONTINUOUS WETTING, WHERE USES ARE CRITICAL AND WHERE A HIGHER LEVEL OF PROTECTION THAN H4 IS REQUIRED | HOUSE PILES AND POLES, CRIB WALLING, POSTS IN GROUND FOR DECKS, VERANDAS, PERGOLAS |

SAFETY STATEMENT:

1. PROPPING:  
  
EXISTING LOAD BEARING STRUCTURAL ELEMENTS SHALL BE ADEQUATELY PROPPED PRIOR TO REMOVING ANY SUPPORTING STRUCTURE. PROPPING SHALL REMAIN UNTIL NEW SUPPORTING STRUCTURE IS INSTALLED AS PER THE ENGINEER'S DRAWINGS AND REQUIREMENTS.  
  
THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE BUILDER.  
  
TEMPORARY WORK AND PROPPING IS THE RESPONSIBILITY OF THE BUILDER.
2. PRECAST WALL  
  
THE PRE-CAST PANEL MANUFACTURER AND BUILDER SHALL FOLLOW THE:  
  
*Approved Code of Practice for The Safe Handling, Transportation and Erection of Precast Concrete*, AND  
  
ANY REQUIREMENTS SPECIFIED BY THE HEALTH AND SAFETY AT WORK REGULATIONS.  
  
REFER TO [www.business.govt.nz/worksafe/information\\_guidance/all\\_guidance\\_items/scaffolding\\_best\\_practice\\_guideline\\_for\\_scaffolding\\_in\\_new\\_zealand/section\\_6\\_particular\\_scaffolds\\_and\\_scaffolding\\_structures/6.13\\_falsework\\_or\\_propping](http://www.business.govt.nz/worksafe/information_guidance/all_guidance_items/scaffolding_best_practice_guideline_for_scaffolding_in_new_zealand/section_6_particular_scaffolds_and_scaffolding_structures/6.13_falsework_or_propping)

PROJECT

PROPOSED NEW DWELLING

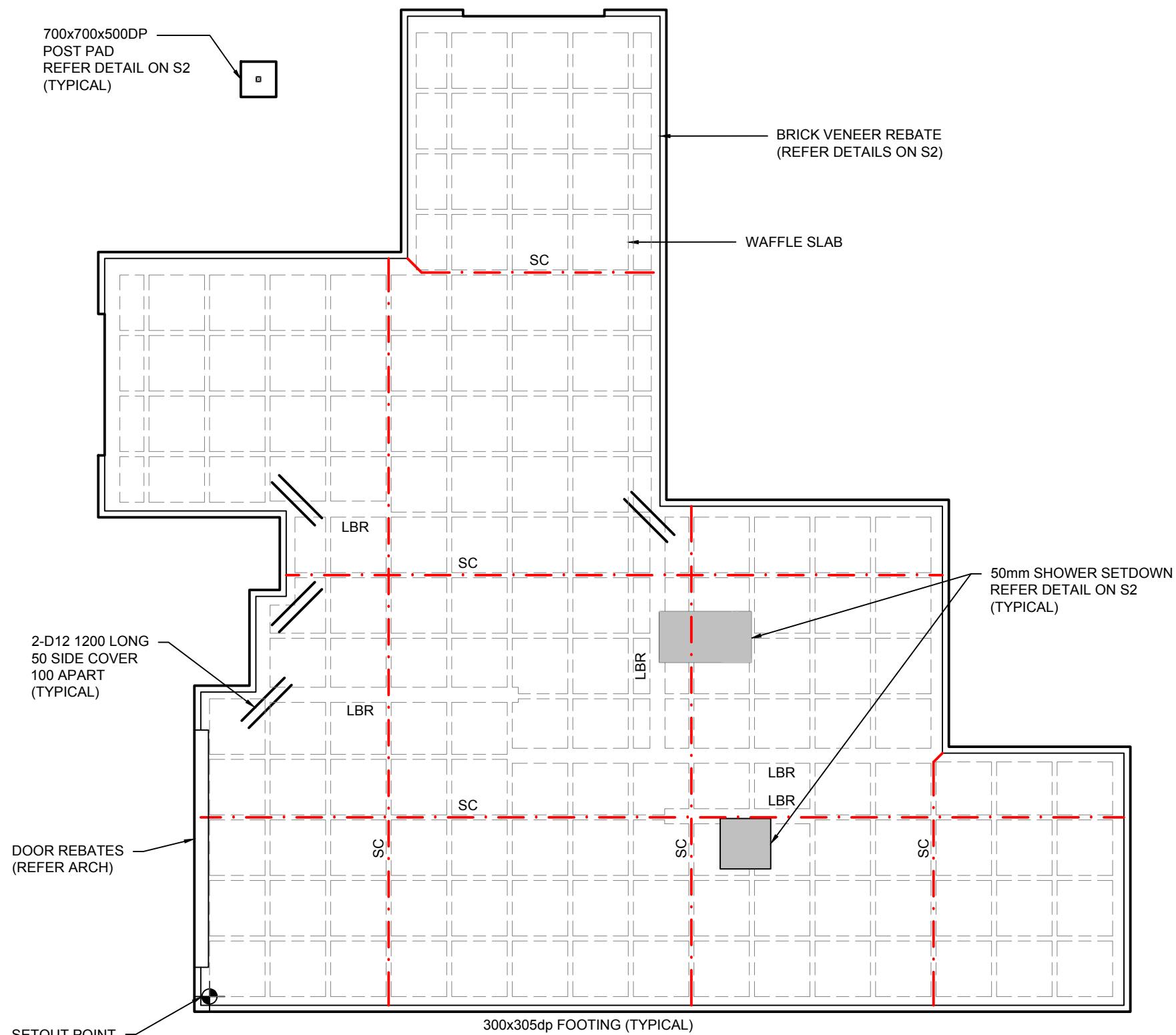
ADDRESS

1 PIHIOHOI CLOSE, WAIKANAE

Lower Hutt Office  
Tel: 04 566 8004  
Level 1, 70 Bloomfield Tce  
P.O. Box 30 535  
Lower Hutt 5040  
[email@certa.nz](mailto:email@certa.nz)

|         |            |           |      |      |   |
|---------|------------|-----------|------|------|---|
| DATE:   | 4 May 2023 | DESIGNED: | JW   |      |   |
| DRAWN:  | BV         | APPROVED: | SRNP |      |   |
| JOB No: | 44175      | SHT No:   | S0   | REV: | A |





**FOUNDATION PLAN**

SCALE 1:100

- SC SAWCUT (REFER S2)
- LBR LOAD BEARING RIB - 300x300dp TYPICAL (REFER S2)

ARCHITECT TO ENSURE THAT ALL LOAD BEARING WALL HAVE A LOAD BEARING FOUNDATION BEAM UNDERNEATH THEM.

REFER STRUCTURAL CALCULATIONS FOR INSPECTION SCHEDULE

TRUSS MANUFACTURER TO ENSURE ALL TRUSS LOADS ARE TO INTERNAL THICKENINGS OR EXTERNAL PERIMETER

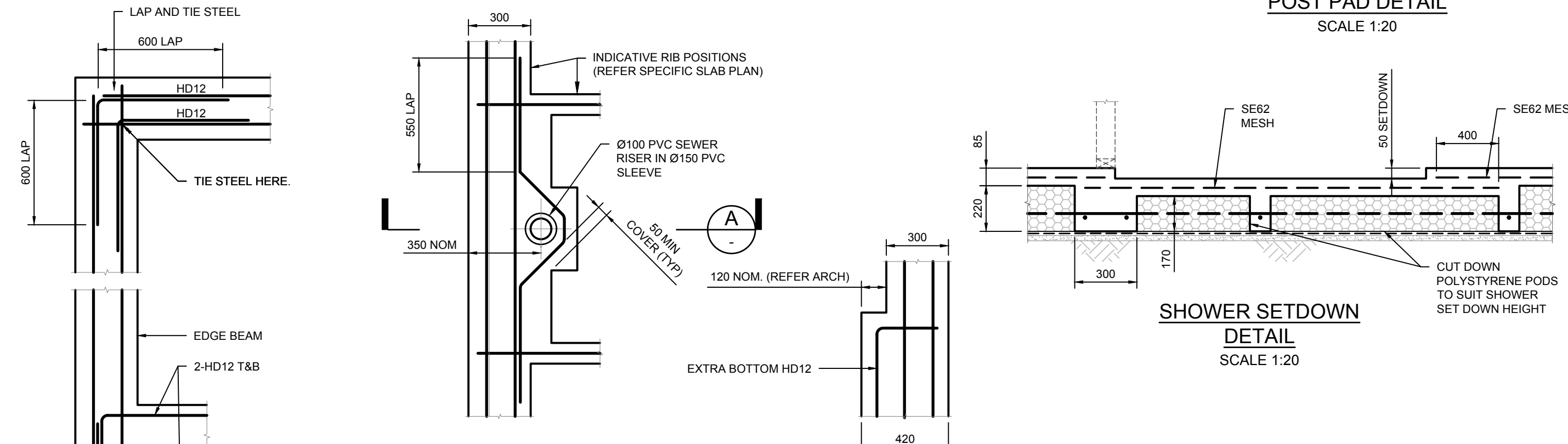
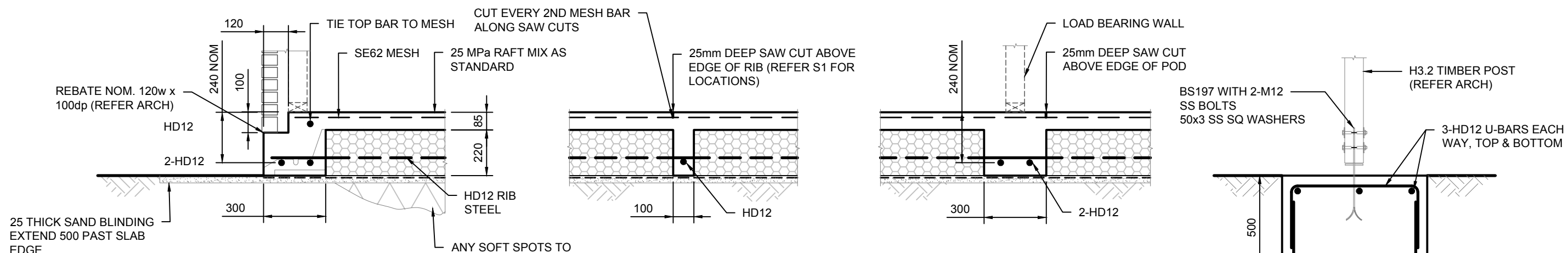
PROJECT  
**PROPOSED NEW DWELLING**

ADDRESS  
**1 PIHIOHOI CLOSE, WAIKANA**



Lower Hutt Office  
Tel: 04 566 8004  
Level 1, 70 Bloomfield Tce  
P.O. Box 30 535  
Lower Hutt 5040  
[email@certa.nz](mailto:email@certa.nz)

|         |            |           |      |
|---------|------------|-----------|------|
| DATE:   | 4 May 2023 | DESIGNED: | JW   |
| DRAWN:  | BV         | APPROVED: | SRNP |
| JOB No: | 44175      | SHT No:   | S1   |
|         |            | REV:      | A    |



|                                                                                                                                                                                                                                                       |            |           |      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------|
| PROJECT                                                                                                                                                                                                                                               |            |           |      |
| PROPOSED NEW DWELLING                                                                                                                                                                                                                                 |            |           |      |
| ADDRESS                                                                                                                                                                                                                                               |            |           |      |
| 1 PIHIOHOI CLOSE, WAIKANA                                                                                                                                                                                                                             |            |           |      |
|  Lower Hutt Office<br>Tel: 04 566 8004<br>Level 1, 70 Bloomfield Tce<br>P.O. Box 30 535<br>Lower Hutt 5040<br><a href="mailto:email@certa.nz">email@certa.nz</a> |            |           |      |
| DATE:                                                                                                                                                                                                                                                 | 4 May 2023 | DESIGNED: | JW   |
| DRAWN:                                                                                                                                                                                                                                                | BV         | APPROVED: | SRNP |
| JOB No:                                                                                                                                                                                                                                               | 44175      | SHT No:   | S2   |
|                                                                                                                                                                                                                                                       |            | REV:      | A    |

230413  
Received by  
Kapiti Coast District Council  
26/05/23



**Wintec**  
WAIKATO INSTITUTE OF TECHNOLOGY  
Te Kura hiri o Waikato

**EDWARD SENIOR**

has completed the following course:

**Short Course Certificate in  
Solar Hot Water – Installer/Manager**

**Duration: 28 – 30 July 2007**

  
Selwyn Hikuroa  
Plumbing, Gasfitting, Draining and Roofing  
Principal Academic Staff Member  
School of Trades, Engineering & Construction

30 July 2007

Solar Group Ltd  
ACCREDITED SOLAR  
INSTALLER



**Annual Licence 2023-2024**

**Edward Senior**  
SPARKS ENERGY SYSTEMS

Issued By

Solar Group Ltd **23/3/2023**

This licence entitles the holder to carry out installations of solar water heaters authorised by Solar Group Ltd, in accordance with AS/NZS1500.4, G12, Solar Industries Association code of practice and the latest building codes.

If found return to PO Box 10188, Drummoyne, Auckland



# **Stormwater Disposal Design Report for Building Consent – Lot 45 DP 582129, 1 Pihoihoi Close, Waikanae**

**Ref: 23177**

**15 May 2023**

Prepared for:

**Paterson Homes Ltd**  
1 Pihoihoi Close, Waikanae



## **STORMWATER DISPOSAL DESIGN FOR PROPOSED NEW DWELLING – 1 PIHOIHOI CLOSE, WAIKANAE**

Following the engagement of our services for investigating and reporting on stormwater disposal for building consent at the above site we have carried out a percolation test and we detail our findings and report below.

### **1. PREAMBLE**

This report has been prepared to provide options for stormwater disposal of the collected run off from the proposed roof areas and driveway at the above site.

The report has been prepared to provide stormwater disposal options and to confirm hydraulic neutrality in accordance with the infrastructure policy on managing the effects on network utilities as detailed in Part 2 of the *Kapiti Coast District Council Operative District Plan – rule INF-MENU-P17 Hydraulic Neutrality - Stormwater*.

A 1% AEP design storm event (1 in 100 year) has been considered in accordance with KCDC requirements.

The proposed dwelling and location are known with building plans prepared by The PlanWorkz Ltd and provided to Cuttriss Consultants Ltd by Paterson Homes Ltd (Appendix E).

### **2. DOCUMENTS**

The following documents are referred to within this report:

- Test record sheets (Appendix A)
- Photo pages (Appendix B)
- Calculations (Appendix C)
- Design drawings (Appendix D)
- Architects plans (Appendix E)
- System information (Appendix F)
- KCDC Subdivision Development Principles and Requirements 2012 (KCDC SDPR)
- New Zealand Building Code E1: Surface Water (NZBC E1)
- KCDC Operative District Plan 2021

The test sheets record the soakage results and a soakage rate has been interpolated from this data. It should be noted that generally the raw soakage rates have a factor of safety of 4 applied to them (i.e. soakage rates divided by 4) in accordance with KCDC SDPR (Section 4 clause 4.3.7.9).

Rainfall data for determining the anticipated stormwater rainfall intensity has been sourced from the KCDC SDPR, Part 4, Schedule 4, Appendix 1, Appendix A - Rainfall Occurrence Isohyet Maps - Climate affected (2090) Isohyet rainfall depths have been used.

The basis of the soakpit design is NZBC E1 from the approved document prepared by the Ministry of Building, Innovation and Employment (MBIE). NZBC E1 details the rainfall intensity used in the design as being an event having a 1 hour duration and a 10% probability of occurring annually (1 in 10-year event). However, a 1 in 100-year event has been considered in this design in accordance with KCDC requirements.

### 3. LOCATION

The site is located within a new residential subdivision development, with the site being located approximately 650 metres to the north-west of the old state highway 1, and 750 metres to east of Nga Manu.

### 4. TOPOGRAPHY

The topography of the site is such that there is a slight rise to the south-west with the building platform level sitting around RL 16.5.

Soil conditions generally comprise of underlying sand with some topsoil overlaying these sands. These conditions have been confirmed by way of a hand auger during the testing process.

### 5. TESTING

A percolation test has been carried out approximately centrally on site.

The tests determined the soakage rate of the underlying sand material with the test hole being hand augered, lined with a PVC sleeve and tested for the soakage rate out of the base. The test procedure is in accordance with NZBC E1 Clause 9.0.2.

### 6. RESULTS

The soakage test results are summarised below and presented in Appendix A.

Table 1 Soakage test results

| Test no. | Predominant soil | Location        | Raw soakage (mm/hr) | Design soakage <sup>1</sup> (mm/hr) |
|----------|------------------|-----------------|---------------------|-------------------------------------|
| A        | sand             | Central on site | 540                 | 135                                 |

The soakage rate indicates that typical low impact urban designs (e.g. soakpits or soak trenches) are suitable for this site.

<sup>1</sup> Design soakage has a factor of safety of 4 applied for this particular site for the design for the Q100 event.

## 7. DESIGN

The design has assumed that it will be possible for a conventional rock filled soakpit or crate/modular system to collect the overflow from a new water re-use tank which in turn takes runoff for the roof area of the proposed new dwelling. The soakage system shall also be sized to accommodate any runoff generated from paved outdoor surfaces ie. driveways. The assumed catchment delineation is outlined in Table 2 below:

Table 2 Catchment delineation

| Catchment Surface | Catchment Area (m <sup>2</sup> ) | Runoff Coefficient |
|-------------------|----------------------------------|--------------------|
| Roof              | 287.7                            | 0.9                |
| Paving            | 74.7                             | 0.85               |

Both options must be positioned on the site with consideration to their surroundings. The below minimum clearances to the following structures are advised:

Table 3 Soakage system offsets

| Proximity to        | Required clearance    |
|---------------------|-----------------------|
| Dwellings           | 2.0m                  |
| Small out-buildings | 1.5m                  |
| Boundaries          | 1.5m                  |
| Retaining walls     | Height of wall + 1.5m |
| Sewers              | 1.0m                  |

### Option 1 – Conventional Rock-filled Soakpit

It is proposed to use a conventional rock filled soakpit with a perforated manhole and perforated pipe within graded gravels (no fines) between 100mm and 300mm diameter. Alternative aggregate sizes may be considered at the discretion of the Engineer.

Filter cloth on the sides and along the top of the excavation shall have a mass per unit area of 140 g/m<sup>2</sup> and a minimum thickness of 0.45mm in accordance with NZBC E1. Note filter cloth should not be placed on the base of the excavation.

Soakpit Dimensions:

Rock-filled design minimum dimensions      4.0m wide  
                                                                                  4.5m long  
                                                                                  1.67m deep (allowance for 100mm topsoil).

An alternative soakpit shape may be constructed within the site providing the base area remains the same.

## Option 2 – Crate/Modular System

It is proposed to use *Cirtex SmartSoak Residential Stormwater Management System* (Appendix F). These modules should be installed in accordance with the manufacturers specifications.

Soakage system dimensions:

|                      |                                              |
|----------------------|----------------------------------------------|
| Crate/Modular system | 5.2m wide (13 modules @ 0.4m wide each)      |
|                      | 2.9m long (4 modules @ 0.715m long each)     |
|                      | 0.86m high (double module)                   |
|                      | 1.46m deep (double module with 600mm cover). |

An alternative system layout could be constructed within the site providing the base area remains the same.

A minimum of 450mm cover is required for the SmartSoak system located under a landscaped area. 600mm cover is required if the SmartSoak system is located under a trafficable area in addition to geogrid as per the manufacturers specifications.

## 8. MAINTENANCE

Our recommendation for the monitoring and maintenance of on-site stormwater disposal using **Conventional Rock-Filled Soakpits** is as follows:

- *The soakpit needs to be checked fortnightly by the builder during any subsequent construction works (after the soakpit is constructed), or after intense sediment deposit in the catchment area. On completion of all construction works the likelihood of sediment build-up will be reduced.*
- *The soakpit chambers need to be checked by the land owner every 3 months to monitor the amount of sediment build-up. If checks confirm sediment build-up is within 100mm of the bottom set of perforated holes the soakpit chamber must be cleaned.*
- *The soakpit chambers shall also be checked after intense rainfall events, and cleaned if sediment is discovered.*

Our recommendation for the monitoring and maintenance of on-site stormwater using **Crate/Modular System** disposal is as follows:

- *The SmartSoak Sump Tanks should be checked fortnightly by the builder during any subsequent construction works (after the soakpit is constructed), or after intense sediment deposit in the catchment area. On completion of all construction works the likelihood of sediment build-up will be reduced.*
- *The SmartSoak Sump Tanks need to be checked by the land owner every 3 months to monitor the amount of sediment build-up. If checks confirm sediment build-up is within the bottom linear access pipe then the Sump Tank must be cleaned.*
- *The Sump Tank shall also be checked after intense rainfall events and cleaned if sediment is discovered.*



## 9. CONCLUSION

This report has been prepared to provide options for stormwater disposal from the overflow of a water re-use tank, which will collect the run off from the proposed dwelling.

The design for a suitable soakpit is summarised below. Refer also to Appendix D for design drawings.

### Soakpit Dimensions:

Rock-filled design minimum dimensions      4.0m wide  
                                                                                  4.5m long  
                                                                                  1.67m deep (allowance for 100mm topsoil).

The above dimensions are based on one 0.90m diameter perforated chamber. Other combinations of soakpit lengths, widths and chambers may be considered at the discretion of the Engineer.

The design for a suitable crate/ modular system is summarised below. Refer also to Appendix D for design drawings.

### Soakage Module dimensions:

Crate/Modular system      5.2m wide (13 modules @ 0.4m wide each)  
                                                                                  2.9m long (4 modules @ 0.715m long each)  
                                                                                  0.86m high (double module)  
                                                                                  1.46m deep (double module with 600mm cover).

An inspection must be carried out on the base of the excavation at the time of construction, to confirm underlying sand material, for both options above. The base of the soak pit must be inspected by the Engineer in order to provide PS4 certification.

Prepared by:

John Butler  
 Civil Engineer  
**CUTTRISS CONSULTANTS LTD**



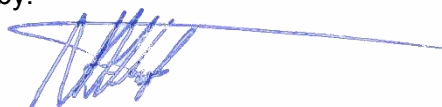
Reviewed by:

Jamal Rautao  
 Civil Engineer  
**CUTTRISS CONSULTANTS LTD**



Approved for Release by:

Neil Johnstone  
 Chartered Professional Engineer  
**CUTTRISS CONSULTANTS LTD**



## APPENDIX A

### Soakage Test Results

CLIENT Paterson Homes Ltd  
 JOB NO. 23177  
 DATE 14/04/23  
 SHEET 1 OF 1 SHEETS

LEGAL DES Lot 45 DP 582129  
 SITE ADD 1 Pihoihoi Close, Waikanae  
 FIELDWORK CJB

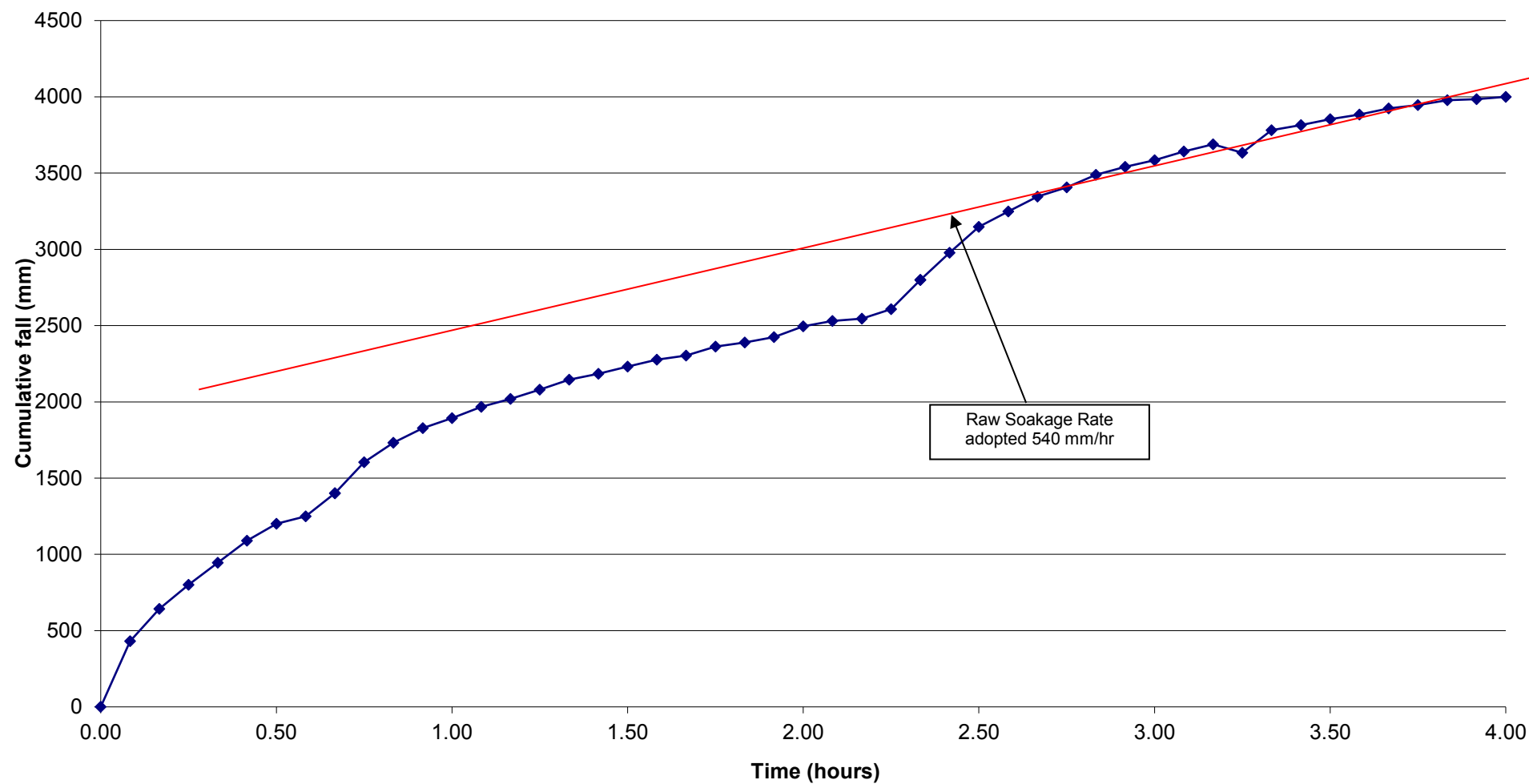
LOCATION A

DEPTH OF AUGERED HOLE 1.10

LENGTH OF PIPE 1.4

| Time       | Time Difference | Cumulative Time | Level in Pipe | Cumulative Fall in Pipe | Time       | Time Difference | Cumulative Time | Level in Pipe | Cumulative Fall in Pipe |
|------------|-----------------|-----------------|---------------|-------------------------|------------|-----------------|-----------------|---------------|-------------------------|
| (hh:mm:ss) | (min)           | (hrs)           | (mm)          | (mm)                    | (hh:mm:ss) | (min)           | (hrs)           | (mm)          | (mm)                    |
| 12:15:00   | 0               | 0.00            | 0             | 0                       | 14:35:00   | 5               | 2.33            | 1400          | 2800                    |
| 12:20:00   | 5               | 0.08            | 430           | 430                     | 14:35:00   | 0               | 2.33            | 0             | 2800                    |
| 12:25:00   | 5               | 0.17            | 643           | 643                     | 14:40:00   | 5               | 2.42            | 178           | 2978                    |
| 12:30:00   | 5               | 0.25            | 800           | 800                     | 14:45:00   | 5               | 2.50            | 347           | 3147                    |
| 12:35:00   | 5               | 0.33            | 945           | 945                     | 14:50:00   | 5               | 2.58            | 448           | 3248                    |
| 12:40:00   | 5               | 0.42            | 1090          | 1090                    | 14:55:00   | 5               | 2.67            | 546           | 3346                    |
| 12:45:00   | 5               | 0.50            | 1200          | 1200                    | 15:00:00   | 5               | 2.75            | 606           | 3406                    |
| 12:50:00   | 5               | 0.58            | 1250          | 1250                    | 15:05:00   | 5               | 2.83            | 689           | 3489                    |
| 12:55:00   | 5               | 0.67            | 1400          | 1400                    | 15:10:00   | 5               | 2.92            | 740           | 3540                    |
| 12:55:00   | 0               | 0.67            | 0             | 1400                    | 15:15:00   | 5               | 3.00            | 784           | 3584                    |
| 13:00:00   | 5               | 0.75            | 205           | 1605                    | 15:20:00   | 5               | 3.08            | 841           | 3641                    |
| 13:05:00   | 5               | 0.83            | 332           | 1732                    | 15:25:00   | 5               | 3.17            | 889           | 3689                    |
| 13:10:00   | 5               | 0.92            | 428           | 1828                    | 15:30:00   | 5               | 3.25            | 833           | 3633                    |
| 13:15:00   | 5               | 1.00            | 494           | 1894                    | 15:35:00   | 5               | 3.33            | 982           | 3782                    |
| 13:20:00   | 5               | 1.08            | 567           | 1967                    | 15:40:00   | 5               | 3.42            | 1015          | 3815                    |
| 13:25:00   | 5               | 1.17            | 620           | 2020                    | 15:45:00   | 5               | 3.50            | 1054          | 3854                    |
| 13:30:00   | 5               | 1.25            | 680           | 2080                    | 15:50:00   | 5               | 3.58            | 1083          | 3883                    |
| 13:35:00   | 5               | 1.33            | 745           | 2145                    | 15:55:00   | 5               | 3.67            | 1124          | 3924                    |
| 13:40:00   | 5               | 1.42            | 785           | 2185                    | 16:00:00   | 5               | 3.75            | 1146          | 3946                    |
| 13:45:00   | 5               | 1.50            | 831           | 2231                    | 16:05:00   | 5               | 3.83            | 1178          | 3978                    |
| 13:50:00   | 5               | 1.58            | 876           | 2276                    | 16:10:00   | 5               | 3.92            | 1185          | 3985                    |
| 13:55:00   | 5               | 1.67            | 904           | 2304                    | 16:15:00   | 5               | 4.00            | 1200          | 4000                    |
| 14:00:00   | 5               | 1.75            | 963           | 2363                    |            |                 |                 |               |                         |
| 14:05:00   | 5               | 1.83            | 990           | 2390                    |            |                 |                 |               |                         |
| 14:10:00   | 5               | 1.92            | 1025          | 2425                    |            |                 |                 |               |                         |
| 14:15:00   | 5               | 2.00            | 1095          | 2495                    |            |                 |                 |               |                         |
| 14:20:00   | 5               | 2.08            | 1130          | 2530                    |            |                 |                 |               |                         |
| 14:25:00   | 5               | 2.17            | 1146          | 2546                    |            |                 |                 |               |                         |
| 14:30:00   | 5               | 2.25            | 1207          | 2607                    |            |                 |                 |               |                         |

Graph - Cumulative fall (mm) vs time (hr) @ Location A





## APPENDIX B

### Photos of site and testing





Above: 14 April 2023 – Augered hole at test location – well compacted sand material encountered.



## APPENDIX C

### Calculations

# **NORMALISED RAINFALL DEPTHS - 2090 CLIMATE AFFECTED**

## **1 Pihoihoi Close, Waikanae**

| Event | Rainfall Depth |
|-------|----------------|
| (a)   | (mm/24hrs)     |
| 2     | 76             |
| 5     | 98             |
| 10    | 112            |
| 20    | 128            |
| 50    | 150            |
| 100   | 168            |

| Duration | Normalised Rainfall Depth | 2Y Rainfall Depth | 2Yr Rainfall Intensity | 5Y Rainfall Depth | 5Yr Rainfall Intensity | 10Y Rainfall Depth | 10Yr Rainfall Intensity | 20Y Rainfall Depth | 20Yr Rainfall Intensity |
|----------|---------------------------|-------------------|------------------------|-------------------|------------------------|--------------------|-------------------------|--------------------|-------------------------|
| (min)    | (m)                       | (mm)              | (mm/hr)                | (mm)              | (mm/hr)                | (mm)               | (mm/hr)                 | (mm)               | (mm/hr)                 |
| 5        | 0.08                      | 6                 | 73.0                   | 8                 | 94.1                   | 9                  | 107.5                   | 10                 | 122.9                   |
| 10       | 0.11                      | 8                 | 50.2                   | 11                | 64.7                   | 12                 | 73.9                    | 14                 | 84.5                    |
| 15       | 0.14                      | 11                | 42.6                   | 14                | 54.9                   | 16                 | 62.7                    | 18                 | 71.7                    |
| 30       | 0.19                      | 14                | 28.9                   | 19                | 37.2                   | 21                 | 42.6                    | 24                 | 48.6                    |
| 60       | 0.26                      | 20                | 19.8                   | 25                | 25.5                   | 29                 | 29.1                    | 33                 | 33.3                    |
| 120      | 0.35                      | 27                | 13.3                   | 34                | 17.2                   | 39                 | 19.6                    | 45                 | 22.4                    |
| 180      | 0.46                      | 35                | 11.7                   | 45                | 15.0                   | 52                 | 17.2                    | 59                 | 19.6                    |
| 360      | 0.60                      | 46                | 7.6                    | 59                | 9.8                    | 67                 | 11.2                    | 77                 | 12.8                    |
| 720      | 0.81                      | 62                | 5.1                    | 79                | 6.6                    | 91                 | 7.6                     | 104                | 8.6                     |
| 1440     | 1                         | 76                | 3.2                    | 98                | 4.1                    | 112                | 4.7                     | 128                | 5.3                     |

| Duration | Normalised Rainfall Depth | 50Y Rainfall Depth | 50Yr Rainfall Intensity | 100Y Rainfall Depth | 100Yr Rainfall Intensity |
|----------|---------------------------|--------------------|-------------------------|---------------------|--------------------------|
| (min)    | (m)                       | (mm)               | (mm/hr)                 | (mm)                | (mm/hr)                  |
| 5        | 0.08                      | 12.0               | 144.0                   | 13.4                | 161.3                    |
| 10       | 0.11                      | 16.5               | 99.0                    | 18.5                | 110.9                    |
| 15       | 0.14                      | 21.0               | 84.0                    | 23.5                | 94.1                     |
| 30       | 0.19                      | 28.5               | 57.0                    | 31.9                | 63.8                     |
| 60       | 0.26                      | 39.0               | 39.0                    | 43.7                | 43.7                     |
| 120      | 0.35                      | 52.5               | 26.3                    | 58.8                | 29.4                     |
| 180      | 0.46                      | 69.0               | 23.0                    | 77.3                | 25.8                     |
| 360      | 0.60                      | 90.0               | 15.0                    | 100.8               | 16.8                     |
| 720      | 0.81                      | 121.5              | 10.1                    | 136.1               | 11.3                     |
| 1440     | 1                         | 150.0              | 6.3                     | 168.0               | 7.0                      |



## INDICATIVE SOAKPIT DESIGN FOR STORMWATER RUNOFF DISPOSAL

### DESIGN TO E1/VM1 (NZ BUILDING CODE) FOR STORMWATER INTO SOAKPIT (CONVENTIONAL)

#### Estimated Dimensions of Soakpit

|                                                       |                        |                                      |       |
|-------------------------------------------------------|------------------------|--------------------------------------|-------|
| W =                                                   | 4.0 m                  | L =                                  | 4.5 m |
| A <sub>sp</sub> =                                     | 18.0 m <sup>2</sup>    | (area of base of soakpit)            |       |
| C =                                                   | 0.9                    | (run-off coefficient (from Table 1)) |       |
| ARI =                                                 | 100 year return period |                                      |       |
| Duration =                                            | 60 min                 |                                      |       |
| I =                                                   | 43.68 mm/hr            | (60 minute storm event)              |       |
| <b>NB: 60 minute storm not necessarily worst case</b> |                        |                                      |       |

#### Estimated Catchment Area

|                                                               |                      |                                                |
|---------------------------------------------------------------|----------------------|------------------------------------------------|
| A <sub>Roof</sub> =                                           | 287.7 m <sup>2</sup> | (impervious area of roof)                      |
| A <sub>Driveway</sub> =                                       | 74.7 m <sup>2</sup>  | (impervious area of driveway)                  |
| A <sub>total</sub> =                                          | 362.4 m <sup>2</sup> |                                                |
| S <sub>r</sub> =                                              | 135 mm/hr            | (factor of safety of 4 applied to raw soakage) |
| R <sub>c</sub> = 60 x C x I x A =                             | 14.08 m <sup>3</sup> | (total rainfall)                               |
| V <sub>soak</sub> = A <sub>sp</sub> x S <sub>r</sub> / 1000 = | 2.43 m <sup>3</sup>  | (base soakage)                                 |
| V <sub>stor</sub> = R <sub>c</sub> - V <sub>soak</sub> =      | 11.65 m <sup>3</sup> | (design storage)                               |

#### Dimensions of Chambers

|                                                                                   |                      |                                                                |                           |
|-----------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------|---------------------------|
| Ø =                                                                               | 900 mm               | D =                                                            | 2.00 m (depth of chamber) |
| A <sub>chamb</sub> =                                                              | 0.64 m <sup>2</sup>  | (footprint of chamber)                                         |                           |
| V <sub>chamb</sub> =                                                              | 1.27 m <sup>3</sup>  | (storage of chamber)                                           |                           |
| V <sub>hole</sub> =                                                               | 27.32 m <sup>3</sup> | (rubble volume of required hole - based on void ratio of 0.38) |                           |
| D <sub>hole</sub> = V <sub>hole</sub> / (A <sub>sp</sub> - A <sub>chamb</sub> ) = | 1.57 m               | (required hole depth)                                          |                           |

#### Indicative Soakpit Dimensions

|           |        |                             |     |
|-----------|--------|-----------------------------|-----|
| W =       | 4.00 m | Min cover:                  | 100 |
| L =       | 4.50 m |                             |     |
| D (min) = | 1.67 m | (assumes 100 mm of topsoil) |     |

## INDICATIVE SOAKPIT DESIGN FOR STORMWATER RUNOFF DISPOSAL

### DESIGN TO E1/VM1 (NZ BUILDING CODE) FOR STORMWATER INTO SOAKPIT (CIRTEX CRATE)

#### Estimated Dimensions of Soakpit

|                                                       |                        |                                      |         |                         |
|-------------------------------------------------------|------------------------|--------------------------------------|---------|-------------------------|
| Width =                                               | 13 cells               | Length =                             | 4 cells | <b>Rainsmart System</b> |
| =                                                     | 5.2 m                  | =                                    | 2.9 m   |                         |
| $A_{sp}$ =                                            | 14.9 m <sup>2</sup>    | (area of base of soakpit)            |         |                         |
| C =                                                   | 0.9                    | (run-off coefficient (from Table 1)) |         |                         |
| ARI =                                                 | 100 year return period |                                      |         |                         |
| Duration =                                            | 60 min                 |                                      |         |                         |
| I =                                                   | 43.68 mm/hr            | (60 minute storm event)              |         |                         |
| <b>NB: 60 minute storm not necessarily worst case</b> |                        |                                      |         |                         |

#### Estimated Catchment Area

|                                         |                      |                                                |
|-----------------------------------------|----------------------|------------------------------------------------|
| $A_{Roof}$ =                            | 287.7 m <sup>2</sup> | (impervious area of roof)                      |
| $A_{Driveway}$ =                        | 74.7 m <sup>2</sup>  | (impervious area of driveway)                  |
| $A_{total}$ =                           | 362.4 m <sup>2</sup> |                                                |
| $S_r$ =                                 | 135 mm/hr            | (factor of safety of 4 applied to raw soakage) |
| $R_c = C \times I \times A$ =           | 14.08 m <sup>3</sup> | (total rainfall)                               |
| $V_{soak} = A_{sp} \times S_r / 1000$ = | 2.01 m <sup>3</sup>  | (base soakage)                                 |
| $V_{stor} = R_c - V_{soak}$ =           | 12.08 m <sup>3</sup> | (design storage)                               |

#### Dimensions of Chambers

|                                  |                      |                               |
|----------------------------------|----------------------|-------------------------------|
| $V_{cells}$ =                    | 12.71 m <sup>3</sup> | (based on void ratio of 0.95) |
| $D_{cells} = V_{cells} / A_{sp}$ | 0.85 m               | (required cell depth)         |
| Select cell depth =              | Double               | Select cell depth             |
| =                                | 0.86 m               | (actual cell depth)           |
| Cell depth acceptable            |                      |                               |
| Trafficable?                     | No                   |                               |
| Min cover =                      | 0.30 m               |                               |

#### Indicative Soakpit Dimensions

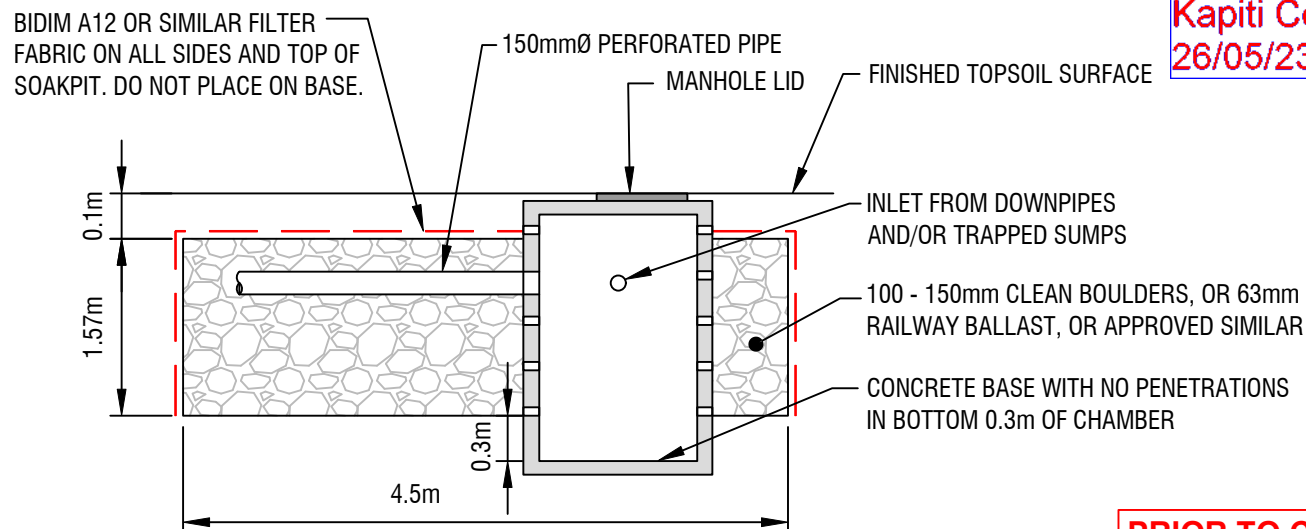
|                          |        |                                                |
|--------------------------|--------|------------------------------------------------|
| W =                      | 5.2 m  |                                                |
| L =                      | 2.9 m  |                                                |
| Excavation depth (min) = | 1.16 m | (provided that sands/ gravels are encountered) |

## APPENDIX D

### Design

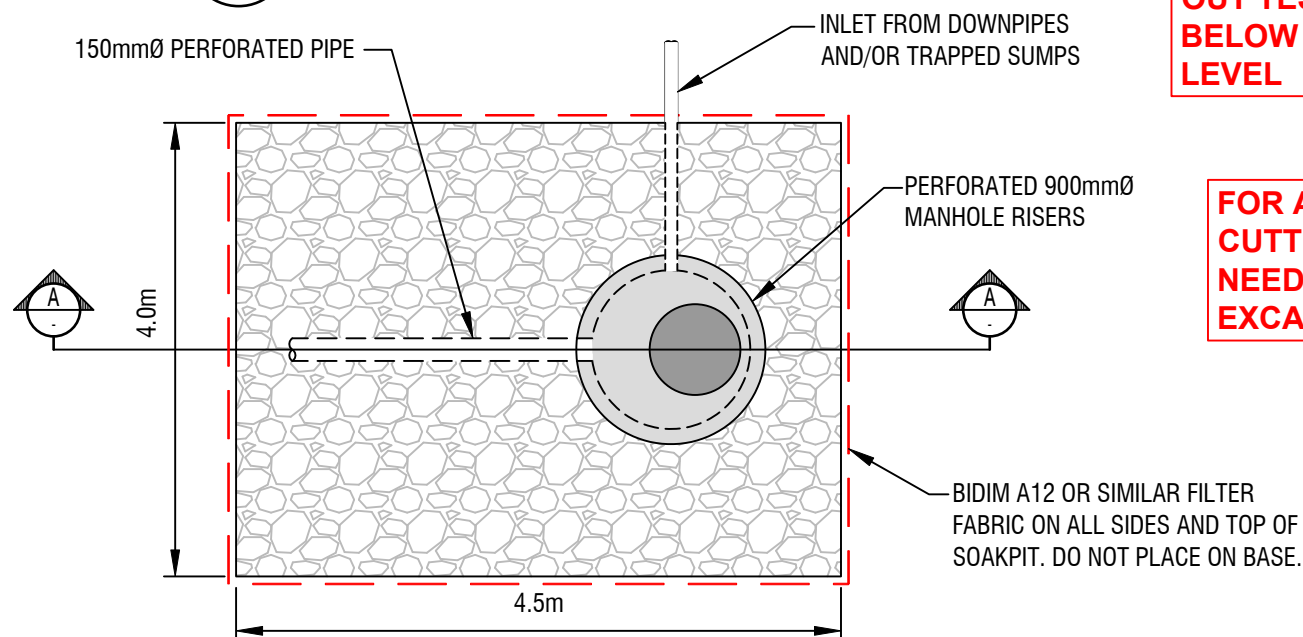
230413

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**A** CONVENTIONAL SOAKPIT CROSS SECTION

**PRIOR TO COMMENCING  
 FULL DIG OUT FOR SOAKPIT,  
 CONTRACTOR TO CARRY  
 OUT TEST HOLE 1.67m  
 BELOW EXISTING GROUND  
 LEVEL**



**CONVENTIONAL SOAKPIT PLAN**

**FOR A PS4 TO BE ISSUED,  
 CUTTRISS CONSULTANTS  
 NEED TO INSPECT THE  
 EXCAVATED SOAKPIT BASE**

| REVISION DETAILS |              | NAME | DATE  |
|------------------|--------------|------|-------|
| A                | SIZE AMENDED | JFB  | 05/23 |
|                  |              |      |       |
|                  |              |      |       |
|                  |              |      |       |

## NOTES:

1. THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY & NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
2. THIS PLAN MUST BE USED IN CONJUNCTION WITH CUTTRISS CONSULTANTS STORMWATER DISPOSAL REPORT
3. BASE OF EXCAVATION TO BE INSPECTED BY ENGINEER OR KCDC
4. UNDERLYING SAND MUST BE FOUND AT BASE OF SOAKPIT
5. ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

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CLIENT

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PROJECT

PROPOSED SOAKPIT

LOT 45 DP 582129

1 PIHOIHOI CLOSE, WAIKANAE

**CONVENTIONAL SOAKPIT DIAGRAM**

SCALE

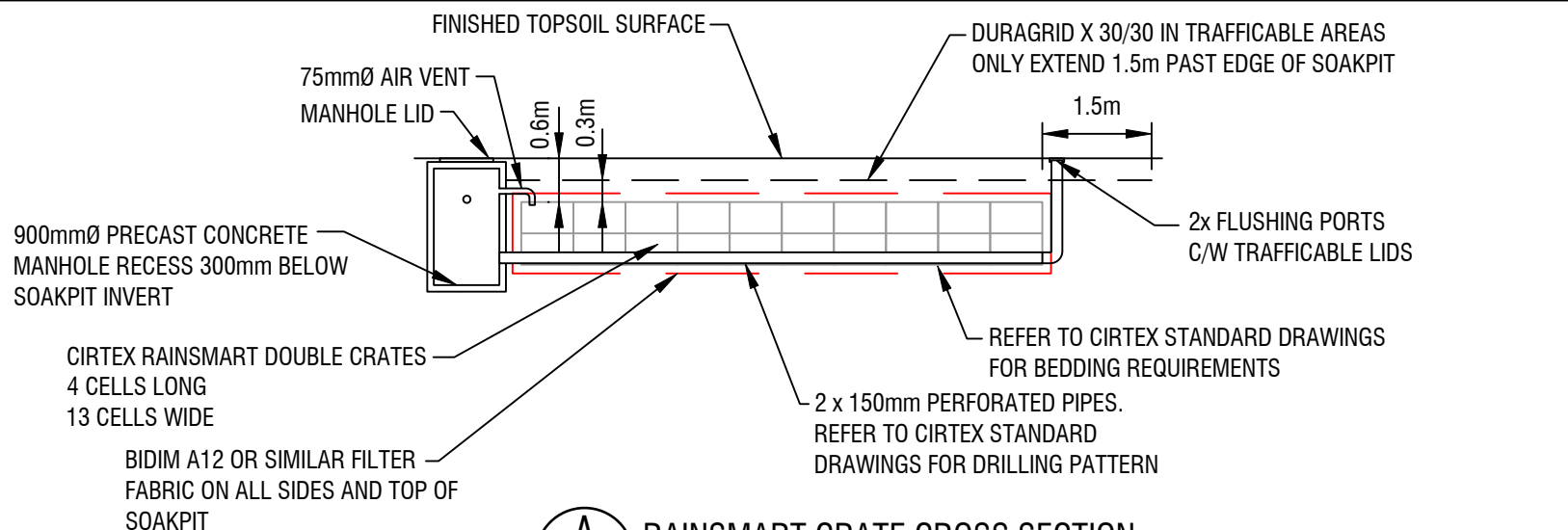
NOT TO SCALE

SIZE

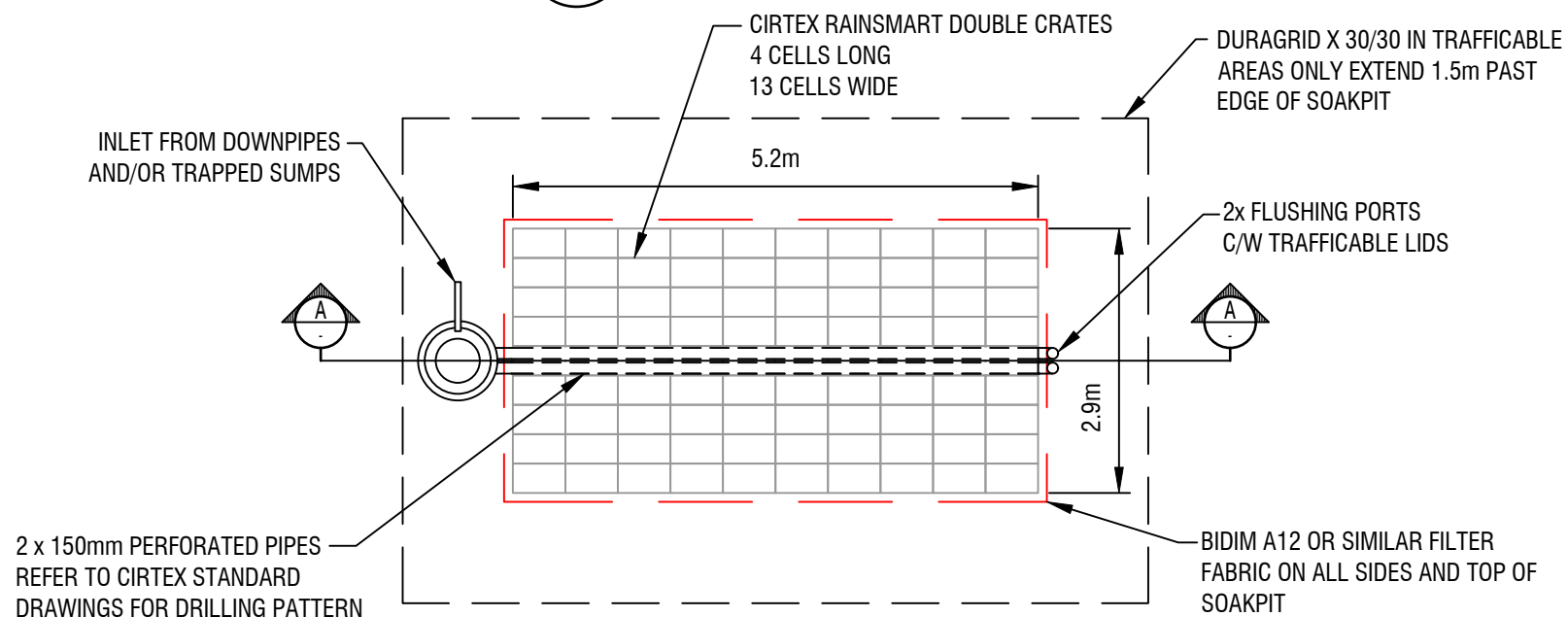
A4

| FIELDWORK | NAME | DATE  | DRAWING NUMBER      |   |
|-----------|------|-------|---------------------|---|
| DESIGNED  | CJB  | 04/23 | 23177 SP            |   |
| DRAWN     | JFB  | 04/23 | SHEET 1 OF 1 SHEETS |   |
| CHECKED   | NAJ  | 04/23 | REVISION            | A |





**A** RAINSMART CRATE CROSS SECTION



**RAINSMART CRATE SOAKPIT PLAN**

**FOR A PS4 TO BE ISSUED, CUTTRISS CONSULTANTS NEED TO INSPECT THE EXCAVATED SOAKPIT BASE**

**PRIOR TO COMMENCING FULL DIG OUT FOR SOAKPIT, CONTRACTOR TO CARRY OUT TEST HOLE 1.46m BELOW EXISTING GROUND LEVEL**

| REVISION DETAILS |              | NAME | DATE  |
|------------------|--------------|------|-------|
| A                | SIZE AMENDED | JFB  | 05/23 |
|                  |              |      |       |
|                  |              |      |       |
|                  |              |      |       |

**NOTES:**

1. THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY & NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
2. THIS PLAN MUST BE USED IN CONJUNCTION WITH CUTTRISS CONSULTANTS STORMWATER DISPOSAL REPORT
3. BASE OF EXCAVATION TO BE INSPECTED BY ENGINEER OR KCDC
4. UNDERLYING SAND MUST BE FOUND AT BASE OF SOAKPIT
5. ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

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PROJECT

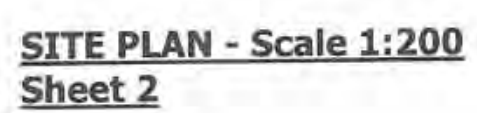
**PROPOSED SOAKPIT**  
LOT 45 DP 582129  
1 PIHOIHOI CLOSE, WAIKANAE  
**RAINSMART DIAGRAM - DOUBLE**

|              |      |       |                     |
|--------------|------|-------|---------------------|
| SCALE        |      | SIZE  |                     |
| NOT TO SCALE |      | A4    |                     |
|              | NAME | DATE  | DRAWING NUMBER      |
| FIELDWORK    | CJB  | 04/23 | 23177 SP            |
| DESIGNED     | JFB  | 04/23 |                     |
| DRAWN        | JFB  | 04/23 | SHEET 1 OF 1 SHEETS |
| CHECKED      | NAJ  | 04/23 | REVISION A          |

## APPENDIX E

### Architects Plans





**1 Pihoihoi Close, Lot 45 Manu Park, Waikanae**

Proposed New Dwelling for:

Design Plans: L10-11a The Plan Workz  
Clients: New Zealand Wide  
Servicing: Ph 04 902 9095  
Email: [steve@theplanworkz.co.nz](mailto:steve@theplanworkz.co.nz)

Prepared by:

The PlanWorkz

Drawn: S. Neale

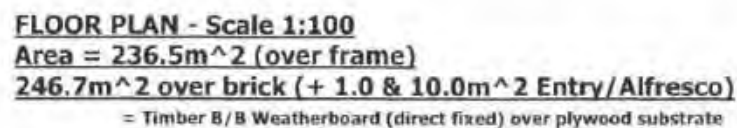
Date: 03-10-22

Issue: A

05-05-23

Job Number  
WA 45M

These plans have been prepared with all reasonable care taken to ensure dimensions and specifications are correct, and in the assumption they will be further checked on site and verified by the building contractor who will have a sound knowledge of the building materials and construction techniques. The Drafter accepts no responsibility for costs incurred as a result of errors or omissions in the drawings, whether caused by negligence or otherwise, unless such error or omission has been brought to the attention of the Drafter prior to the completion of the drawings. Any works carried out by any contractor, subcontractor or authorised agent of the owner of the building shall comply with the requirements of the local authority. Any works must also satisfy these requirements without the approval or design. Any works must also satisfy these requirements without the approval or design. Any works must also satisfy these requirements without the approval or design.



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Proposed New Dwelling for:  
Lot 45 Manu Park Stage II, Waikanae

Prepared by:

 PlanWorkz

Drawn By: S. Neale

Scale: 1:500

Job Number: WA 45MP

14-10-22



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Received by  
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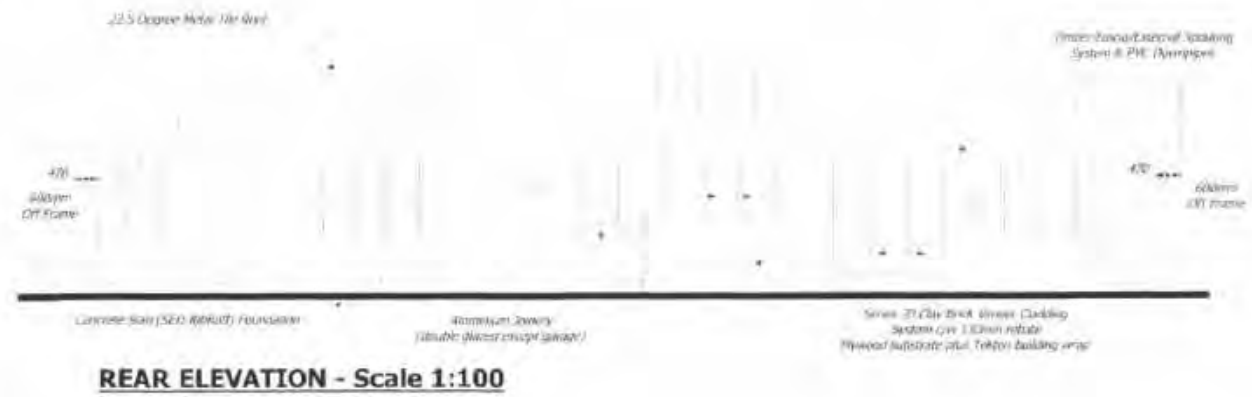
**DIMENSION PLAN - Scale 1:100**

Proposed New Dwelling for:  
**Lot 45 Manu Park Stage II, Waikanae**

Prepared by:  
**PlanWorld**

Client: S Neale  
Date: 03.10.22  
Job Number: 155006  
WA 45MP

Design Plan for the Proposed New Dwelling for Lot 45 Manu Park Stage II, Waikanae. This plan is a preliminary design and is not to be used for construction purposes. It is intended to provide a general indication of the proposed layout and dimensions. The final design will be based on the detailed architectural drawings and specifications. The client is responsible for ensuring that the proposed design complies with all relevant building codes and regulations. The design is subject to change without notice.



**Proposed New Dwelling for:**  
**Lot 45 Manu Park Stage II, Waikanae**

Prepared by: **PlanWorld**

Drawn: **S. Neale**

Date: **02/10/22**

Issue: **1**

Job Number: **WA 45MP**

Design Plans Ltd. is the Provider  
located at 200, Main Road, Waikanae  
Phone: 0438 820000, Email: info@designplans.co.nz

This drawing is a preliminary design and is not to be used for construction purposes. It is subject to change without notice. The client acknowledges that the design is preliminary and that the final design may differ. The client also acknowledges that the design is preliminary and that the final design may differ. The client also acknowledges that the design is preliminary and that the final design may differ.







## APPENDIX F

### SmartSoak System





# RAINSMART®

## INSTALLATION GUIDE



0800 CIRTEX (247 839) | [WWW.CIRTEX.CO.NZ](http://WWW.CIRTEX.CO.NZ)

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# PRE-CONSTRUCTION CHECKLIST

## TOOLS YOU WILL NEED

- Laser level
- Measuring tape (long enough to mark RainSmart system footprint)
- Knife
- Screw driver
- String line
- Spray paint
- Reciprocating saw (to cut in inspection & maintenance ports)

### If you're assembling RainSmart modules:

- Rubber mallet
- Work tables or smooth, hard surface such as concrete or plywood.



## MATERIALS YOU WILL NEED

- RainSmart plates
- DuraForce™ geotextile (typically AS410 for soakage systems & AS640 for lined systems)
- DuraGrid geogrid (only for load bearing applications)
- Impermeable liner (only for stormwater retention/recycling applications)
- Clean bedding & backfill material compactable to a minimum of 95% MDD, angular free draining stone/sand with a max particle size of 20mm)
- Pipe Boot Kits (if not using kits, you'll need duct tape and a stainless steel band clamp for each inlet and outlet pipe)
- Metallic tape to mark system edges, to allow for system location post-construction
- Cover soil to meet the site specific requirements, as per the engineers specification

### Inspection and maintenance ports (if required)

- Pipe for inspection & maintenance ports (typically 150mm and 300mm PVC pipe, respectively)
- Ring, collar & cap (to fit each port)
- Pipe Boot Kits (fabric pipe boot, duct tape, stainless steel band clamp for each inspection and maintenance port)
- Traffic load rated ring, cover and frame, where required

## EQUIPMENT YOU WILL NEED

- Forklift and other equipment/tools needed to unload curtain-sider truck
- Walk-behind trench roller/plate compactor
- Tracked skid steer or suitable loader, as per table on page 16
- Roller (2-3 tonne smooth drum)



**Note: This list does not include equipment or tools needed to excavate or level the floor of the excavation.**



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**



# BEFORE YOU TURN THE FIRST SOD

- 1** Be sure to contact your Cirtex representative at least two weeks prior to installation. We can provide the necessary support to facilitate your installation.
- 2** All pictures, illustrations and instructions have been included to guide you through a typical installation. The approved engineering drawings should ALWAYS take precedence over these instructions.
- 3** Coordinate the installation of the RainSmart system at the end of the construction activities to minimise the construction traffic over the system. If the installation is completed during construction activities then the system MUST be roped off and construction traffic routed around the system. The installation contractor is responsible for all loads placed or driven over the RainSmart system during the construction process (including excavators, loaders, dump trucks, forklifts, concrete trucks, material delivery trucks and cranes). Rope off the area to prevent unauthorised traffic from driving over the RainSmart system. If sequencing of the project makes this impossible, a construction road or pad may be constructed over the RainSmart system. Consult the project engineer and/or Cirtex for assistance before allowing construction traffic on the system. **(For additional information see Step 12: Secure the installation, page 18)**
- 4** After installation of the RainSmart system, stormwater should not be allowed to enter the system until the site is completely stabilised and all pretreatment systems (designed to remove debris and heavy sediment) are active. Otherwise, the RainSmart system may become prematurely contaminated with sediments from the project.

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## IMPORTANT INFORMATION

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Throughout this document you will see three types of notes:



### TIP

Ideas to improve your profitability on the installation.



### IMPORTANT

Steps that require extra attention.



### WARNING

Critical issues that MUST be handled correctly to ensure a successful installation.



# 1. EXCAVATION

The excavation limits and the location of the RainSmart system should be staked out. The design drawings should be used to determine these locations. If the excavation limits are not shown on the plans, then add 500mm- 600mm on each side of the RainSmart system to determine the limits. Excavate the designated surveyed area according to plans, following all relevant regulations. Typical excavations should include:

- 500mm-600mm perimeter around RainSmart system to allow for proper compaction of backfill.
- Enough depth to accommodate 50mm-100mm of bedding material below the RainSmart modules if required.
- Enough depth to allow for a minimum of 600mm of cover material or as per engineer plans.

Level the bottom of the excavation (Fig. 1) as shown on plans. Most excavations have a flat base, however a slight fall towards an outlet is allowable.

Prepare the subgrade according to plans. Base of excavation shall be smooth, level and free of debris. Compact to at least 95% Standard Proctor Density (or as required by engineer) unless infiltration of stormwater into subgrade is desired. A thin layer, 100mm of material, is recommended to establish a level working platform (may not be needed in areas with sandy soils). A CBR > 5% must be achieved prior to beginning installation of RainSmart modules.

If the subgrade is heaving or appears excessively soft, the design engineer should be consulted for advice. In many cases a layer of GridTex 40/40 and 190mm-300mm of compactable material, that drains well will be sufficient to amend the bearing capacity of the soil.



**Fig. 1**  
Excavate according to plans, following all relevant regulations



## IMPORTANT

For trafficable applications - minimum cover of 600mm and maximum cover of 2m is required. Non-trafficable applications (inaccessible by vehicles) require minimum cover of 300mm and maximum cover of 2m.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **[sales@cirtex.co.nz](mailto:sales@cirtex.co.nz)**

## 2. ASSEMBLE RAINSMART MODULES

RainSmart modules are supplied flat packed and will need to be assembled on site. Building the modules should take 2-3 minutes per module layer. This is a conservative estimate used to approximate the total man hours needed for assembly.

| MODULES | TIME          |
|---------|---------------|
| Half    | 2-3 Minutes   |
| Single  | 2-3 Minutes   |
| Double  | 4-6 Minutes   |
| Triple  | 6-9 Minutes   |
| Quad    | 8-12 Minutes  |
| Penta   | 10-15 Minutes |



### WARNING

Times relate to assembly only. Placement time frames will be dependent on site accessibility and layout.

**Assembly Instructions - following the drawings in Fig. 2 and Fig. 3:** Connect five small plates onto one large panel using the short pegs (not the long pegs). Attach small plates onto the large panel at the locations marked in red on Fig. 2. Only use these peg locations marked in yellow on Fig. 2 if you are building a 7-plate module. Use 7-plate modules for installation with more than 2m of cover and for installations beneath traffic loads with less than 600mm of cover. Please note, the RainSmart plate configuration shall be specifically designed by the project engineer for installations with >2m of cover or <600mm of cover.

Next, working from one end to the other, attach a second large plate on the opposite side of the first. Once the top and bottom large plates are attached, two more larger side plates are attached to complete the sides of the module. This is a single RainSmart module.

Completed RainSmart modules should be staged as close to the installation area as possible. Some projects may require 5 or 7 plate modules.

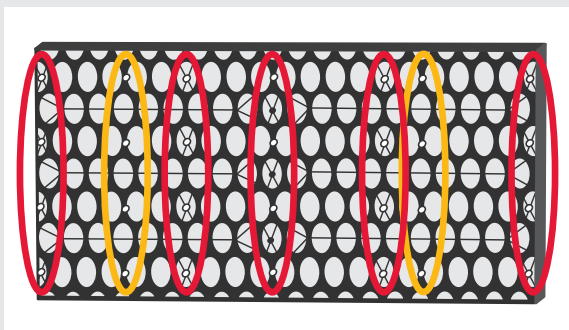


Fig. 2

For standard 5-plate installations, attach small plates at locations circled in red such that all small and large pegs are on same side.

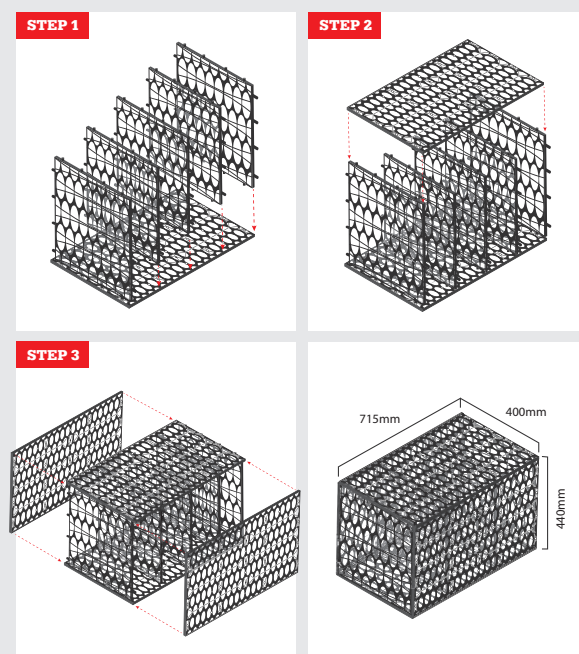


Fig. 3

Follow these steps to assemble a standard RainSmart 5 Plate Single module.



### IMPORTANT

To build a DOUBLE module (or larger) follow the directions above, starting at "Assembly Instructions" using the top of the existing module as the base large plate for the next layer up.

### 3. PREPARE BASE

Examine prepared excavation and conditions for smoothness, compaction and level. Do not start RainSmart system installation until unsatisfactory conditions are corrected. Check for presence of high water table, which must be kept at levels below the bottom of the RainSmart system structure at all times. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact project manager for resolution.

Standing water in the excavation will prevent proper base preparation and must be removed, if present.

Grade and level base as shown on plans with no more than 10mm variance.  
Base must be free of debris and large rocks.



**Fig. 5**  
Base must be smooth to ensure modules fit together without gaps.



**Fig. 4**  
Preassembled modules can be placed in the excavation or installation can be sped up by assembling the modules in the excavation.



#### TIP

In regions with sandy soils meeting the requirements noted and where the subgrade elevation is above the ground water table, imported backfill materials may not be needed.

Creating a smooth, level platform will allow for faster installation of RainSmart modules, as they will fit together evenly, eliminating detail work that can delay your progress (Fig. 5).

|                      |                                                                                                   |
|----------------------|---------------------------------------------------------------------------------------------------|
| <b>Compaction</b>    | To 95% MDD minimum                                                                                |
| <b>Shape</b>         | Angular                                                                                           |
| <b>Size</b>          | Not larger than 20mm in diameter                                                                  |
| <b>Consistency</b>   | Free of lumps, debris and sharp objects that could puncture the geotextile                        |
| <b>Applicability</b> | Stone or sand is acceptable if it meets these requirements. In <b>NO</b> case shall clays be used |



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## 4. PLACE GEOTEXTILE

DuraForce™ AS410 geotextile will be required below the RainSmart system on most projects, but not all. Check your plans to confirm that geotextile is to be placed between the base and the RainSmart system.

Cut full-width strips of geotextile to the proper length and place them over the base, covering the floor of the excavation. The geotextile should extend at least the height of the module plus 1m beyond the edge of the RainSmart system footprint. This will enable the whole module to be wrapped to the dimensions required. All overlaps are then to be suitably secured, weighted down, taped or stapled in order to minimise the ingress of unwanted materials.



**Fig. 6**  
Pull wrinkles out of geotextile so material lays flat



**Fig. 7**  
Overlap geotextile by a minimum of 300mm

Adjacent panels of geotextile should be overlapped by 300mm or more, as shown on the plans (Fig. 7). Use pins, staples, sandbags or other ballast to hold the DuraForce geotextile in place, preventing it from blowing or sliding out of position. Patch any holes made in the DuraForce geotextile by placing a patch of fabric over the damaged area. The patch must be large enough to cover the damaged area with at least 300mm of overlap on undamaged fabric.

If an impermeable liner and/or additional geotextile is required per plans, install these now as shown on the project plans.



### TIP

Some contractors choose to cut the geotextile strips long enough to wrap up the sides and over the top of the RainSmart module in a single piece (Fig. 6). If space allows and the folded flaps of geotextile will not slow your progress, you may want to consider doing this. If a liner is required on your project, this method should be used to protect the liner.



## 5. INSTALL RAINSMART MODULES

Determine the starting location. It is often helpful to use an inlet or outlet pipe to guide you. Using a string line, establish two adjacent edges of the RainSmart modules footprint. Ensure that your corner is square. Mark these two edges with spray paint and remove the string line (Fig. 8 and Fig. 8a)

Begin placing RainSmart modules in the corner of the marked area. DO NOT place modules on their sides, as this will void the warranty. Check your plans to ensure correct orientation of the RainSmart modules (Fig. 9).

Check the plans to ensure the RainSmart modules are running in the correct direction (North/South vs. East/West) to match the footprint shown.

- RainSmart modules width - 400mm
- RainSmart modules length - 715mm

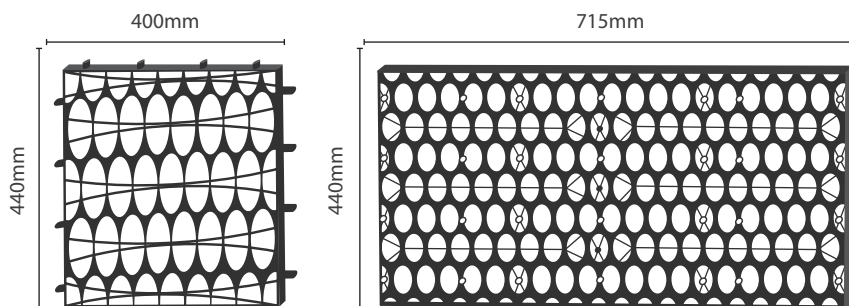


**Fig. 8**  
Use a string line & marking paint to square the system footprint.

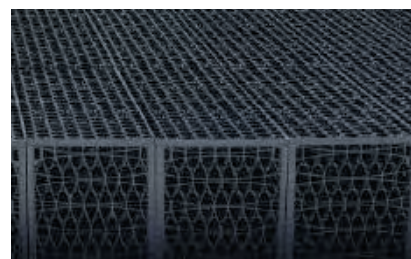


**Fig. 8a**

RainSmart modules should fit together evenly. Minor gaps between modules <10mm or variations in the height of the modules <10mm are acceptable (Fig. 10), but reasonable efforts should be made to minimise these variations. Minor gaps will be eliminated during compaction of side backfill material. No lateral connections between adjacent RainSmart modules are required, but modules can be cable tied as a housekeeping measure.



**Fig. 9**  
Make sure the modules are oriented properly and in the correct way in the excavation.



**Fig. 10**  
Minor variations (less than 10mm) in height are acceptable.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **[sales@cirtex.co.nz](mailto:sales@cirtex.co.nz)**

After placement of the RainSmart modules, wrap with geotextile which is brought up around the sides and lapped over the top of the full structure. Should any gaps be evident additional fabric can be cut and placed over any of these areas. Fold excess fabric at corners to lay flat against sides of structure, securing folds and seams with staples or similar methods.

Identify locations of inlet, outlet, inspection ports, and any other penetrations. All pipes should be positioned at 90 degree to the module structure. Any inlets, outlets etc should be installed using the RainSmart 160mm or 300mm access plates where the geotextile fabric shall be cut to enable hydraulic continuity at the pipe penetrations and must be secured around the pipe using a suitable coupling or a stainless steel clamp prior to backfilling.

Cutting of the modules to accommodate pipework may be acceptable, if required. However, will need to be approved by the engineer.



Modules require ventilation for proper hydraulic performance. The number of pipes and vents will depend on the size of the system and are to be stipulated by project engineer.

Vents are often installed using 90 degree elbows with PVC pipe into soft landscape areas with 'U' bend or venting bollard to inhibit the ingress of debris, alternatively a ground level concrete steel cover can be fixed to suit. If the manhole/catch pit connected to the RainSmart system is unsealed, vent connections back to the manhole can be used.



## IMPORTANT

If using a liner, be careful not to puncture it with stakes or pins while placing your string line.



## WARNING

Do not place the modules on their sides as this will void warranty.



## TIP

Moving RainSmart modules into the excavation quickly is essential to a successful installation. Many contractors fabricate a platform that can be lifted by their forklift to quickly move a large number of modules with each trip.



## TIP

RainSmart modules should be constructed around any pipe joints as the joint collars will typically not feed through the 160mm or 300mm access plates.

## 6. INSTALL INSPECTION/MAINTENANCE PORTS [IF REQUIRED]

If required by the design engineer, all ports should be made from pipe long enough to extend from the bottom of the RainSmart system to finished grade. They are typically PVC pipe, but can be formed from other types of pipe, as well.

Identify the location of all ports and remove the RainSmart module from each location.

### Inspection ports:

Typically made from 150mm PVC pipe, cut the pipe to length, leaving enough excess to trim the top when final grade is reached (Fig. 11).

If the pipe is not already perforated, drill several holes in the pipe starting at the bottom. Perforations should extend as high as the height of the RainSmart module units being used. No perforations should be visible above the top of the RainSmart module once the port is in place.

Using your reciprocating saw, cut the horizontal RainSmart module plates (Fig. 12) in the centre, between the two internal plates, to accommodate the port. If the pipe will not fit between the two interior plates, one or both plates may be moved to the outer connection locations on the large plate (Fig. 13). All horizontally oriented plates will need to be cut EXCEPT FOR THE BOTTOM PLATE.

### In total you will need to cut:

| MODULES | PLATES   |
|---------|----------|
| Single  | 1 Plate  |
| Double  | 2 Plates |
| Triple  | 3 Plates |
| Quad    | 4 Plates |
| Penta   | 5 Plates |



### IMPORTANT

Do not over-cut the RainSmart module plates, minimise the gaps between the pipe and the RainSmart module plates. This is particularly important with the top plate.

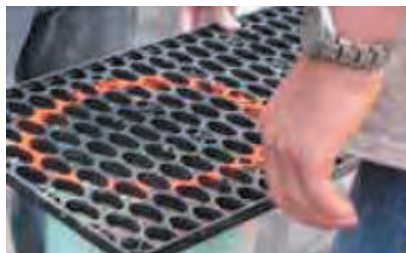


### TIP

If the location of inspection ports is not shown on your plans, use a single inspection port located in the middle of the RainSmart system.



**Fig. 11**  
Installed inspection port.



**Fig. 12**  
Cut the horizontal plates to accommodate all ports.



**Fig. 13**  
Additional space for port can be created by moving the internal plates towards the ends



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **[sales@cirtex.co.nz](mailto:sales@cirtex.co.nz)**

For all systems deeper than a single module, you will need to disassemble the RainSmart module in order to cut the interior plates. Reassemble the RainSmart module when cutting is completed, and replace the RainSmart module into the proper location. (Fig. 15)

Install the pipe into the RainSmart module (Fig. 16)

Seal the opening on top of the pipe with a cap or temporary lid to prevent debris from entering the system.

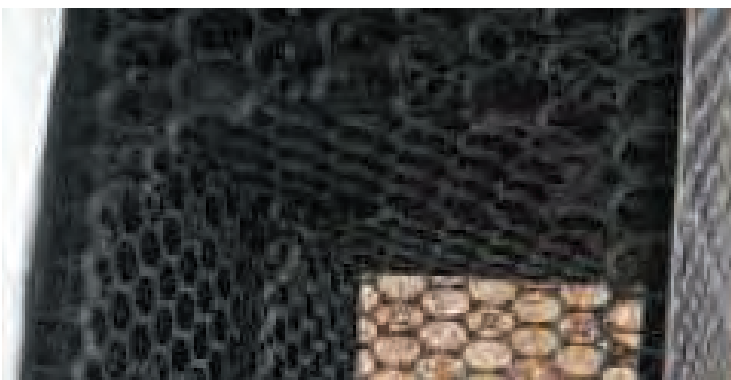
#### Maintenance ports

Typically made from 300mm PVC pipe (check plans for actual type and size of pipe), cut the pipe to length, leaving enough excess to trim the top when final grade is reached.

Using your reciprocating saw, cut several 200mm notches into the bottom of the pipe as shown on plans (Fig. 14).



**Fig. 14**  
Cut 200mm notches into the bottom of maintenance port.



**Fig. 15**  
If after adjusting the internal plates, the pipe will not fit, the top plate can be cut off centre and one of the internal plates can be removed.



#### TIP

If using prefabricated pipe boot kits, install them onto the pipe now, leaving the band clamps loose so that final adjustments may be made in Step 7.



#### TIP

If the location of maintenance ports is not shown on your plans, include a port within 3m of all inlet and outlet pipes (a single maintenance port can cover multiple pipe connections), and include additional maintenance ports, as needed, to prevent the distance between ports from exceeding 20m.



#### IMPORTANT

Do not over-cut the RainSmart module plates, minimise the gaps between the pipe and the RainSmart module plates. This is particularly important with the top plate.



Using your reciprocating saw, cut the horizontal plates in the centre, between the two internal plates, to accommodate the port. If the pipe will not fit between the two interior plates, one or both plates may be moved to the outer connection locations on the large plate (Fig. 13). All horizontally oriented plates will need to be cut EXCEPT FOR THE BOTTOM PLATE.

**In total you will need to cut:**

| MODULES | CUT            | MOVE            |
|---------|----------------|-----------------|
| Half    | 1 Large Plate  | 2 Small Plates  |
| Single  | 1 Large Plate  | 2 Small Plates  |
| Double  | 2 Large Plates | 4 Small Plates  |
| Triple  | 3 Large Plates | 6 Small Plates  |
| Quad    | 4 Large Plates | 8 Small Plates  |
| Penta   | 5 Large Plates | 10 Small Plates |

For all modules you will need to disassemble the RainSmart module in order to cut and/ or move the interior plates.

Reassemble the RainSmart module when cutting is completed. Remember to insert the non-corrosive anti-scour pad in the bottom of the RainSmart module (should fit directly below the maintenance port), and replace the RainSmart module into the proper location (Fig. 15).

Install the pipe into the RainSmart module (Fig. 17) and seal the opening on top of the pipe with a cap or temporary lid to prevent debris from entering the system.



**TIP**

If using Prefabricated Pipe Boot Kits, install them onto the pipe now, leaving the band clamps loose so that final adjustments may be made in Step 7.



**Fig. 16**  
Installed maintenance port



**Fig. 17**  
Install port into RainSmart System



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

## 7. WRAP RAINSMART SYSTEM WITH GEOTEXTILE

Clean off any debris that may be lying on top of the exposed geotextile around the perimeter of the RainSmart system.

Cut strips of geotextile to fit over the top and down both sides of the RainSmart system with at least 600mm of excess material on each side of the system. This 600mm flap should overlay the geotextile placed below the RainSmart modules, creating a clean 600mm overlap to wrap the system.

Adjacent strips of geotextile should overlap at least 300mm or as shown on plans. Use duct tape, sand bags or other ballast to temporarily secure overlaps.

Fold geotextile for outside corners similar to sheets on a bed, and lay excess material flat against RainSmart system. Leave corners loose to avoid creating weak spots in the material. Temporarily secure excess fabric with duct tape. Ensure geotextile is flush against RainSmart system.



### IMPORTANT

Take special care with inside corners on the footprint of the system. Cut geotextile as needed to ensure that it lays flat against the RainSmart system. Use additional pieces of geotextile to seal the corner and any cuts that are made. Allow for 300mm overlap.



**Fig. 18**  
Encapsulate RainSmart system with geotextile

### Connect inlet & outlet pipes

Where the inlet and outlet pipes connect to the RainSmart system, cut an "X" into the geotextile. Pull the flaps of the "X" over the pipe so that the flaps of the "X" point AWAY from the RainSmart module. Use a stainless steel band clamp to seal the flaps to the pipe.

If used, adjust all pipe boots so that the fabric lays snug against the RainSmart system. Tighten the band clamps with a screw driver. Use duct tape to secure the boot flap to the outside of the geotextile envelope.



Fig. 21



### WARNING

Inlet and outlet pipes must enter the RainSmart module allowing water to flow directly into or out of the system without filtering through the geotextile or module side wall. Failing to correctly connect pipes to the RainSmart module, will void the warranty. Where possible, use RainSmart 160mm or 300mm access plates.



### TIP

If using prefabricated pipe boot kits, install them onto the inlet and outlet pipes, leaving the band clamps loose so that final adjustments may be made.



If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **[sales@cirtex.co.nz](mailto:sales@cirtex.co.nz)**



## 8. BACKFILL SIDES

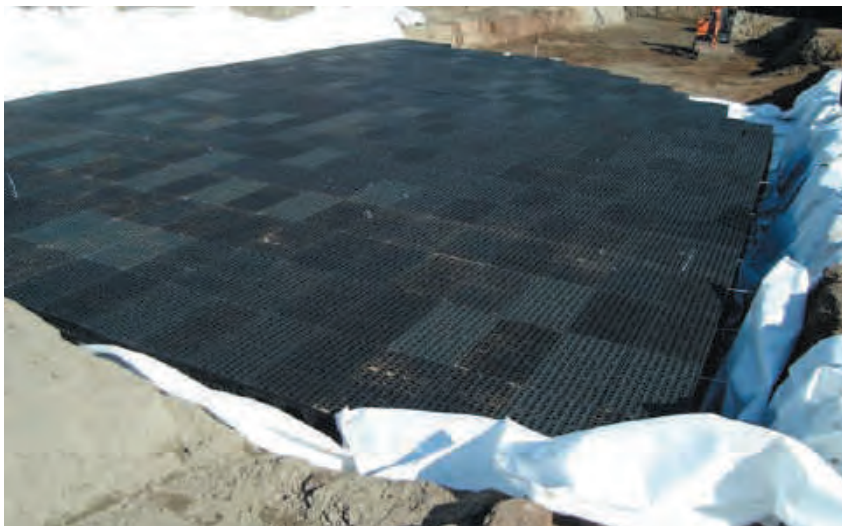
Place backfill material (same as bedding materials in Step 3) around perimeter of the RainSmart system, distributing the material evenly to prevent shoving of the RainSmart modules.

Use a trench roller or plate compactor to compact backfill in 300mm lifts.

Continue placing and compacting backfill in 300mm lifts until the material reaches the top of the RainSmart modules.



**Fig. 22**  
**Vibratory compaction of side backfill is always required , regardless of what backfill material is used.**



### WARNING

Care should be taken to NOT damage the geotextile or liner during backfill placement and compaction.



### IMPORTANT

Vibratory compaction of the side backfill (Fig. 22) is a critical step that both compacts the backfill and eliminates the minor gaps between individual RainSmart modules. While some backfill materials will yield a 95% proctor density without compaction, **vibratory compaction of the material must be completed to ensure the stability of the system.** Skipping this step will void the manufacturer's warranty.



## 9. BACKFILL TOP

Dump backfill material adjacent to the RainSmart system and, using your skid-steer or dozer, place the material over the RainSmart system (Fig. 23). Install 100mm of clean backfill over the RainSmart system and compact backfill layer with walk-behind plate compactor (max 450kg). Place site specified cover material, over backfill layer, in no more than 300mm lifts. Continue compacting backfill material with a walk behind plate compactor until 450mm cover is achieved. Once 450mm cover is achieved, compact cover material using a 2-3 tonne smooth drum roller.

**Largest track dozers that can be used with 450mm of cover over the RainSmart system.**

| MACHINE             | OPERATING WEIGHT | TRACK DIMENSIONS                    | GROUND PRESSURE       |
|---------------------|------------------|-------------------------------------|-----------------------|
| Case 850K LGP       | 9.38 t           | 0.70m x 2.35m = 1.67 m <sup>2</sup> | 2.80 t/m <sup>2</sup> |
| Caterpillar D5K LGP | 9.68 t           | 0.66m x 2.31m = 1.52 m <sup>2</sup> | 3.17 t/m <sup>2</sup> |
| John Deere 550J LGP | 8.27 t           | 0.61m x 2.18m = 1.33 m <sup>2</sup> | 2.95 t/m <sup>2</sup> |
| Komatsu D39PX-21    | 8.90 t           | 0.63m x 2.36m = 1.49 m <sup>2</sup> | 3.00 t/m <sup>2</sup> |
| New Holland D95 LGP | 9.38 t           | 0.71m x 2.36m = 1.68 m <sup>2</sup> | 2.81 t/m <sup>2</sup> |

\*\* This list is not intended to be all inclusive, but representative.

If your machine is not listed, you'll need to find your vehicle's operating weight and measure the area where the tracks contact the ground. Take these dimensions and multiply them (length x width), then multiply by 2 (since the machine has two tracks), then divide the operating weight by the total sqm of contact area to determine the contact pressure of the machine. If the contact pressure is less than 4.8t and the operating weight is less than 9.0t the machine will work with 450mm of cover.



**Fig. 23**  
Use skid-steer to place backfill over RainSmart modules.



### TIP

When placing backfill over RainSmart modules, work in the direction of the geotextile overlap to avoid pushing material between the fabric layers.



### WARNING

Dump trucks should not drive over or dump material on top of the RainSmart system, until pavement construction is fully complete.



### WARNING

Some materials will compact significantly while others may shove excessively as you work. Never allow your lift thickness to compact to less than 300mm without adding more material.

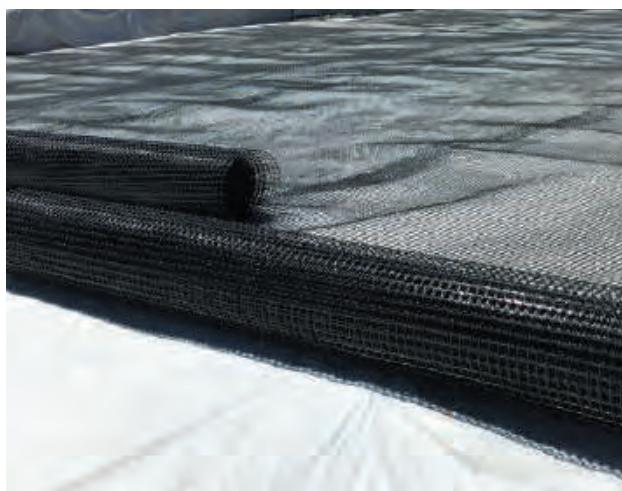
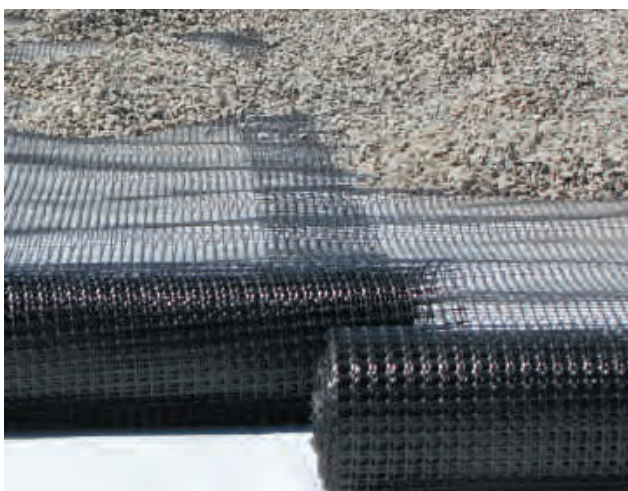


If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **sales@cirtex.co.nz**

## 10. PLACE GEOGRID

Geogrid is required for all load-bearing applications (Fig. 24), such as systems placed beneath parking lots and roads. It is not required above systems used in open space where traffic is prohibited, such as sport fields or natural areas. Typically DuraGrid 30/30 is used in this application.

Geogrid must be placed 300mm above the RainSmart system. Overlap adjacent panels by 300mm minimum or as specified in plans. Roll out geogrid over the top of the system, with the edges of the grid extending 1.5m from RainSmart system footprint or 1m from edge of excavation or more as show on plans.



**Fig. 24**  
Overlap geogrid 300mm or as required by plans.

## 11. PLACE ADDITIONAL COVER MATERIAL AS NEEDED

If additional cover or pavement base is required by the plans, begin placing and compacting material in the same manner as discussed in Step 9. Push cover material parallel to the geogrid for best results.

**Maximum cover for RainSmart modules is 2m with 4 internal plates. If your system exceeds these limits contact a Cirtex representative.**



### TIP

To achieve proper compaction requirements, it may be beneficial to begin placing material in 150mm lifts.



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## 12. SECURE THE INSTALLATION

The contractor is to ensure the RainSmart system is protected from contamination during the construction phase of the project.

The RainSmart system should also be secured to prevent damage from construction equipment once it has been installed.

### Rope off area (preferred method)

Use warning tape or temporary fencing to prevent unauthorised traffic from driving over the RainSmart system.

Regardless of which method is selected to secure the installation, it must remain in place until one of the following conditions is met:

- Pavement has been placed
- Construction activity at the site has been completed.



**Fig. 25**  
Secure RainSmart system installation using barriers.



### IMPORTANT

Some projects require the use of cranes above the RainSmart system. While it is advisable to avoid this scenario, it may be feasible to utilise a crane over the RainSmart system based on the depth of the RainSmart system installation and the size and weight of the crane. Please consult the project engineer or Cirtex for assistance prior to allowing a crane to drive over the RainSmart system.

## 13. INSTALLING PRETREATMENT DEVICES

If required by the engineer, install pre-treatment devices prior to activating the RainSmart system to keep debris from entering the system.



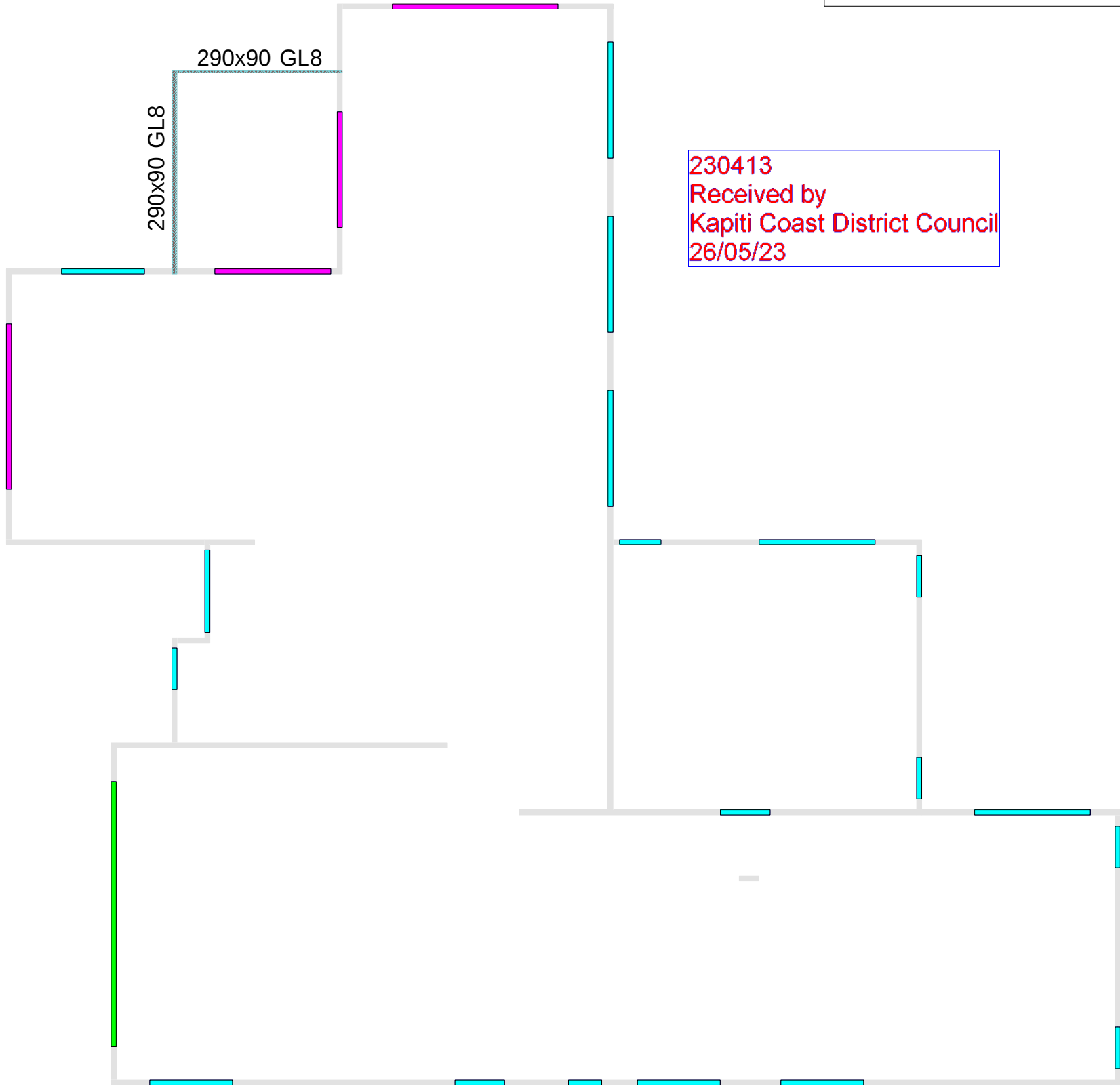
If any questions or concerns are not covered by these instructions please contact Cirtex on **0800 247 839** or email **[sales@cirtex.co.nz](mailto:sales@cirtex.co.nz)**



**CIRTEX®**

For Building Consent Purposes Only

No Internal wall exceeds 6kN point load, LB1 up to 10kN is sufficient.



**INTERNAL CONCRETE FOUNDATION SUPPORT REQUIREMENTS - 10kN** Consent Doc Ref: LB1

| 12kN load  |                         | 50kN                    |
|------------|-------------------------|-------------------------|
| HEIGHT (m) | MINIMUM STUD WIDTH (mm) | MINIMUM STUD DEPTH (mm) |
| 2.4        | 90 x 40                 | 1                       |
| 2.7        | 90 x 45                 | 2                       |
| 3          | 90 x 45                 | 2                       |

**pryda**

"Minimum Requirement for internal load bearing walls"

**INTERNAL CONCRETE FOUNDATION SUPPORT REQUIREMENTS - 24kN** Consent Doc Ref: LB2

| 24kN load  |                         | 50kN                    |
|------------|-------------------------|-------------------------|
| HEIGHT (m) | MINIMUM STUD WIDTH (mm) | MINIMUM STUD DEPTH (mm) |
| 2.4        | 90 x 45                 | 2                       |
| 2.7        | 90 x 45                 | 2                       |
| 3          | 90 x 45                 | 2                       |

**pryda**



LB2

**INTERNAL CONCRETE FOUNDATION SUPPORT REQUIREMENTS - 36kN** Consent Doc Ref: LB3

| 36kN load  |                         | 50kN                    |
|------------|-------------------------|-------------------------|
| HEIGHT (m) | MINIMUM STUD WIDTH (mm) | MINIMUM STUD DEPTH (mm) |
| 2.4        | 90 x 45                 | 2                       |
| 2.7        | 90 x 45                 | 2                       |
| 3          | 90 x 45                 | 2                       |

**pryda**



LB3

- Windzone has been determined as per Branz unless specified on Architectural or Engineering Drawings.
- All Lintels Designed As Per Truss Loadings.
- Design Valid Only With "Paraparaumu Prenail" supplied frames and trusses.
- All Lintels Are Designed As GL8 Unless Otherwise Stated.
- All Walls Shown On Layout Are Loadbearing.
- Lintels have not been designed to receive any wind-face loading. For any larger lintels that may cause concern please consult with engineer.
- Lintels have not been designed to support brick or stone cladding, lintels have been designed to support up to 80kg per m² for medium weight cladding.



Lintel + Slab Layout

Customer: New residence  
Site Address: Lot 45 Manu Park  
Waikanae

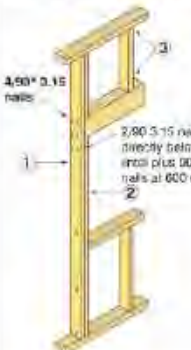
Job Details:  
Roofing: Pressed metal tiles  
Pitch: 22.50 Deg.  
Truss Spacing: 900  
Design Wind Velocity: 50.00 m/s (Ult.)  
Detailer: Jimmy

Job Ref:  
**1713PS**

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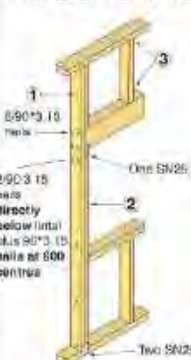
**TIMBER LINTEL FIXING - 1.4kN** Consent Doc. Ref. **L1**



- For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90° 3.15 nails.
- Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of the trimming studs.
- Studs & jacks to be fixed to top plate in accordance with the Pryda Top Plate Fixing Guide.

**L1**  
1.4 kN **pryda**

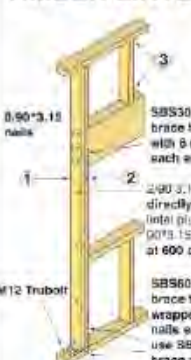
**TIMBER LINTEL FIXING - 2.8kN** Consent Doc. Ref. **L2**



- For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90° 3.15 nails.
- Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of the trimming studs.
- Studs & jacks to be fixed to top plate in accordance with the Pryda Top Plate Fixing Guide.

**L2**  
2.8 kN **pryda**

**TIMBER LINTEL FIXING - 8.0kN** Consent Doc. Ref. **L3**



- For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90° 3.15 nails.
- Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of the trimming studs.
- Studs & jacks to be fixed to top plate in accordance with the Pryda Top Plate Fixing Guide.

**L3**  
8.0 kN **pryda**

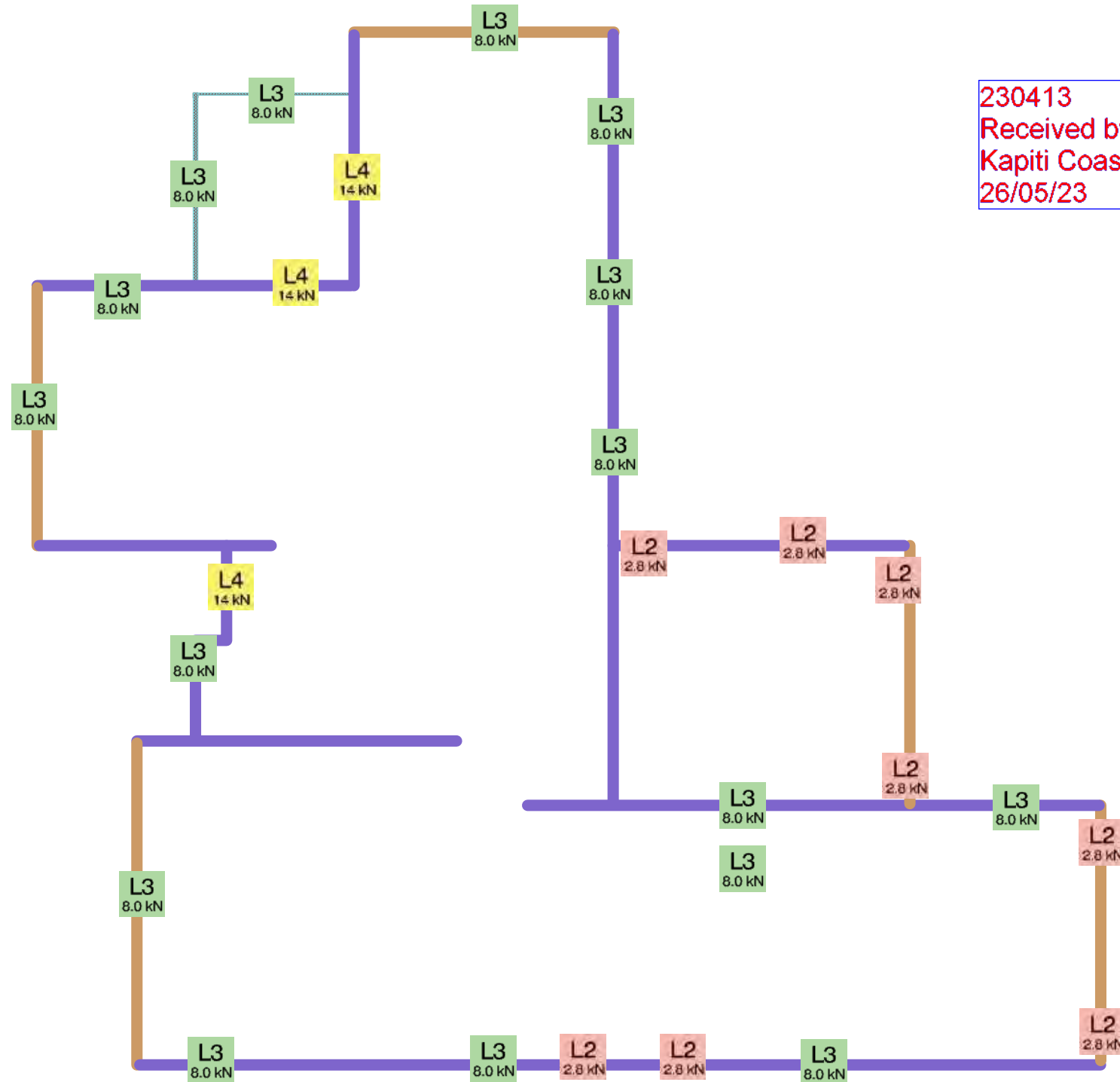
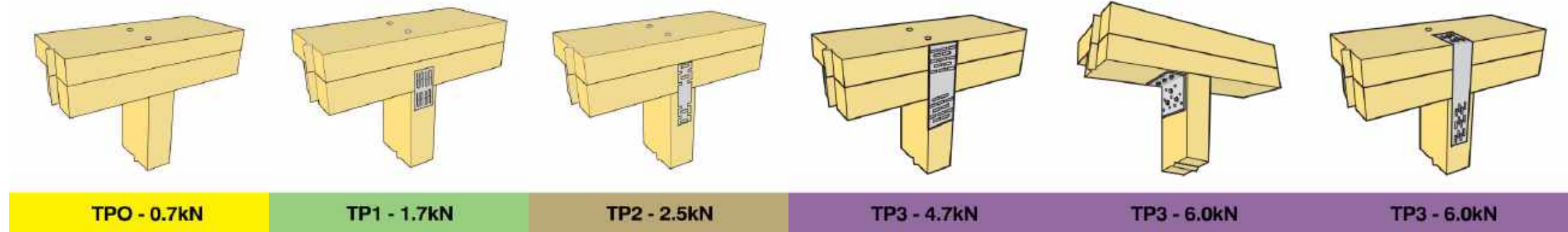
L3 fixing to be attached to studs supporting girder trusses unless noted otherwise. Please refer to truss layout.

**TIMBER LINTEL FIXING - 14kN** Consent Doc. Ref. **L4**



- For trimming stud thickness refer to Table 8.5 NZS 3604:2011. Additional studs to that shown to have a minimum stud to stud fixing of 11/90° 3.15 nails.
- Where a double stud which provides support for a lintel is shorter by 400mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of the trimming studs.
- Studs & jacks to be fixed to top plate in accordance with the Pryda Top Plate Fixing Guide.

**L4**  
14 kN **pryda**



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### Wall Fix Layout

Customer: New residence  
Site Address: Lot 45 Manu Park  
Waikanae

### Job Details:

Roofing: Pressed metal tiles  
Pitch: 22.50 Deg.  
Truss Spacing: 900  
Design Wind Velocity: 50.00 m/s (Ult.)  
Detailer: Jimmy

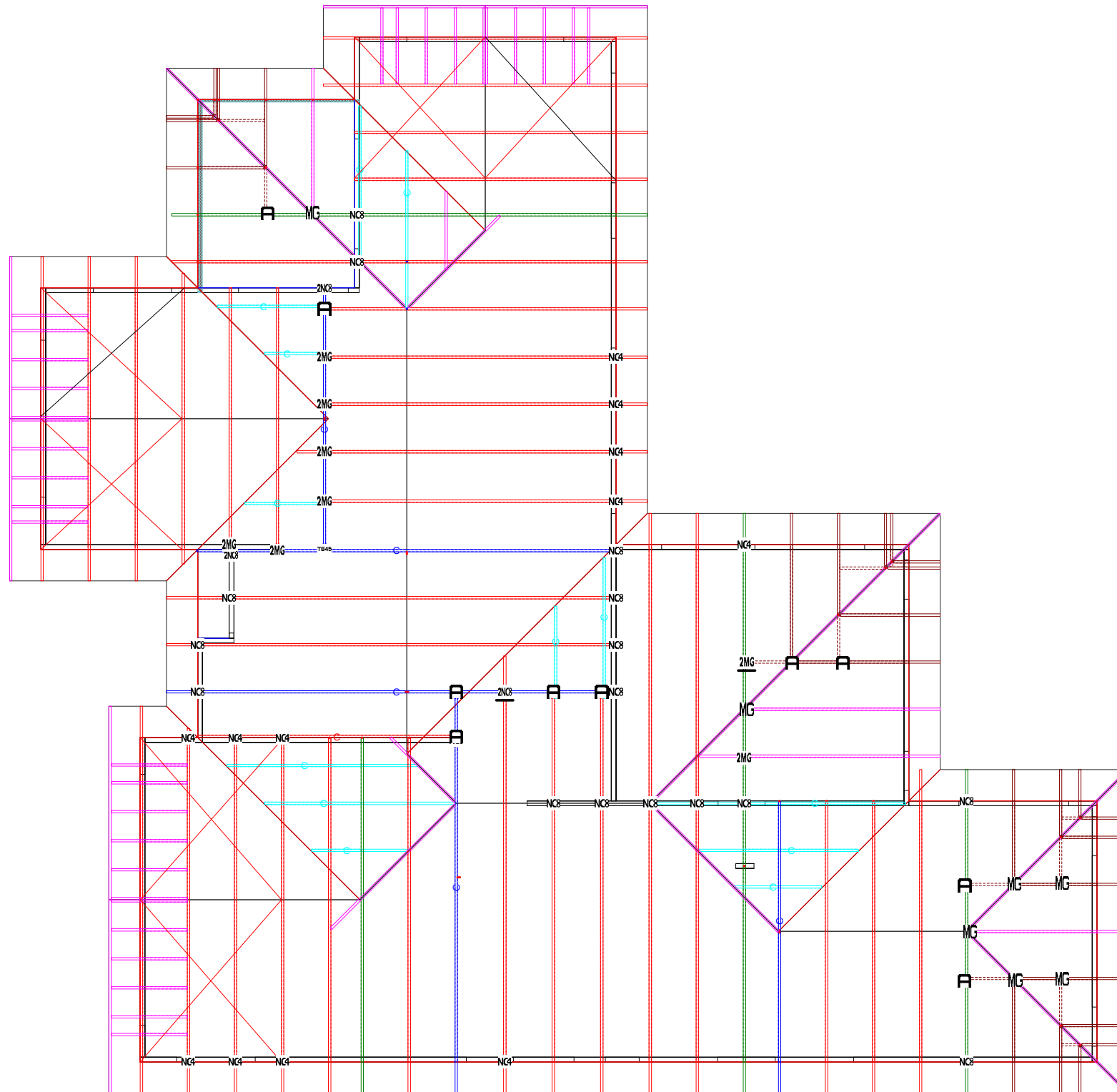
### Job Ref:

1713PS

**pryda**







## Truss Connections

- Trusses need to be fixed at each timber support with 2/90x3.15 dia Skew Nails unless otherwise noted.

|      |                             |
|------|-----------------------------|
| NC3  | 17 x 1/NPPC8 Purlin cleat   |
| NC4  | 12 x 1/NPPC4 Purlin cleat   |
| 2NC3 | 2 x 2/NPPC8 Purlin cleat    |
| 2MG  | 7 x 2/MG Multigrips         |
| TB45 | 1 x 1/TB45/16 Truss boot    |
| A    | 10 x 1/FB4590 Joist hanger  |
| 2NC3 | 1 x 2/NPPC8 Purlin cleat    |
| MC   | 12 x 1/MGL Multigrip (long) |
| 2MG  | 1 x 2/MGL Multigrip (long)  |

- \* Please attach SN25 below @ 600cnrs on all gable wall as tiedown to wall frame below.
- \* All truss to truss use 3/90x3.15 dia Skew nails to top and bottom chord where relevant plus fixing listed.
- \* All outriggers, valley trusses and rafters to be fixed to supporting truss with 1 pair of Z-Nails.
- \* All trusses to be tied down to supporting wall frame with 1 Pair of Z-Nails unless noted otherwise.

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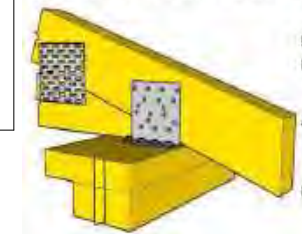
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## Z-NAIL TIE DOWN X2



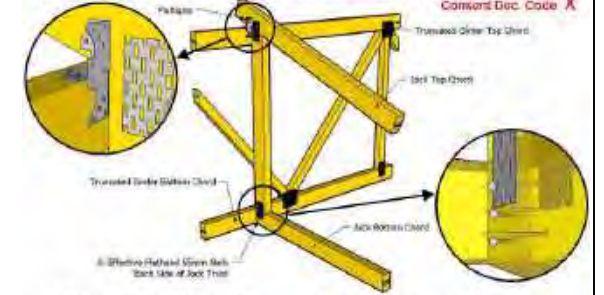
**Consent Doc. Code Z**  
**Product Code:** ZR & ZL (left & right hand) Also sold as MPZR & MPZL  
**Durability:** Suitable for all closed roof spaces that are closed. Stainless required in open roofs. Compliant with Table 4.1 of NZS3604:1999 Amendments 1 & 2  
**Application:** Usually used in pairs when employed as a truss tie down  
**Note:** The Z-nail should be anchored to the lower wall plate, and may not terminate in the ceiling plate.

## CONCEALED PURLIN CLEAT TIE DOWN



**Consent Doc. Code NC4, NC6, NC8**  
**Product Code:** NPPC4, NPPC6 & NPPC8  
**Durability:** Suitable for all closed roof spaces. Compliant with Table 4.1 of NZS3604:1999 Amendments 1 & 2  
**Application:** All holes in large flange filled with 30x3.15mm Pryda product nails. In small flange either Type 17 12g x 35mm or 14g x 75mm hex head galy. screws.  
**Note:** 14g/35 screw can be used in single top plate situations. 14g/75 screws required in a double top plate situation.

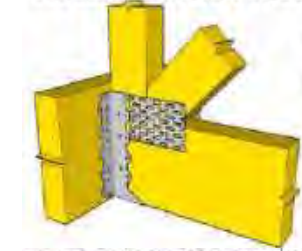
## JACK TRUSS TO TRUNCATED GIRDER TRUSS



Product Code: MGL or MG

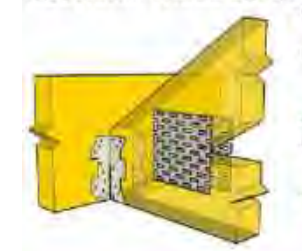
Application: All holes filled with 30x3.15mm Pryda product nails.

## FRAMING BRACKET TRUSS SUPPORT



**Consent Doc. Ref. A, B, C**  
**Product Code:** MPFE4580, MPFB45120, MPFB45180  
**Durability:** Suitable for all closed roof spaces. Stainless steel required in open roofs in sea spray zone and Zone 1 in order to be compliant with Table 4.1 of NZS3604:2011  
**Application:** All holes filled with 30x3.15mm Pryda product nails or type 17 12g x 35mm hex head galy. screws.

## MULTIGRIP TRUSS SUPPORT



**Consent Doc. Ref. G**  
**Product Code:** M3A/M3L (Also sold as MPMG)  
**Durability:** Suitable for all roof spaces that are closed. Stainless steel required in open (bar joint) roofs in sea spray zone and Zone 1 in order to be compliant with Table 4.1 of NZS3604:2011  
**Application:** Used in pairs when employed as a truss to truss fixing. All holes filled with 30x3.15mm Pryda product nails  
 \* Using Multigrip (MGL - 125mm long) to be used when top chord of supported truss is deeper than 80mm

## CONCEALED PURLIN CLEAT TRUSS SUPPORT



**Consent Doc. Ref. NC8**  
**Product Code:** NPPC8  
**Durability:** Suitable for all closed roof spaces. Stainless steel not available. Compliant with Table 4.1 of NZS3604:2011  
**Application:** Variable. With connection option using screws. All screw holes filled with type 17 12g x 35mm hex head galy. screws.

- If Ceiling Battens Are Not Being Direct Fixed To The Bottom Chord Of The Truss, Bottom Chord Restraints Will Be Required At 1800mm Crs Max.
- Builder to read Pre-nail plans in conjunction with Architectural plans, please check all opening trim sizes & braces on site before enclosing. If any variations please contact Paraparaumu Prenail.
- Paraparaumu Prenail will not accept any charges for remedial work unless written authority is issued by Paraparaumu Prenail before work is commenced.
- Cross shown across roof plane indicates Pryda Roof Plane Brace in accordance with NZ3604. Should this exceed capabilities supplementary bracing may be required and to be reviewed by others.
- Gable Outriggers and Barge rafter will be 90x45 SG8 unless stated otherwise
- Windzone has been determined as per Branz unless specified on Architectural or Engineering Drawings
- All gable trusses have been framed to accommodate specific cladding specification.
- Please read all layouts in conjunction with all supporting consent documents.

## TRUSS LAYOUT

Customer: New residence  
 Site Address: Lot 45 Manu Park  
 Waikanae

## Job Details:

Roofing: Pressed metal tiles  
 Pitch: 22.50 Deg.  
 Truss Spacing: 900  
 Design Wind Velocity: 50.00 m/s (Ult.)  
 Detailer: Jimmy

Job Ref: 1713PS



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**Paraparaumu Prenail 2016 Ltd.**

37 Ihakara St. PARAPARAUMU Ph (04) 902 5618 Fax (04) 902 5619

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Date: 24-04-2023

Ver 5.03.00

**Fabricator / Designer Statement**Job Ref: **1713PS**

This statement may be used by the Building Consent Authority for compliance purposes and is issued by a licensed truss fabricator using Pryda Build software.

**CLIENT Name:** *New residence***SITE Details:**

Address : *Lot 45 Manu Park*  
*Waikanae*

City:

Post Code:

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**Received by**  
**Kapiti Coast District Council**  
**26/05/23**

**Nominal Design Criteria:**

Design working life: 50 years  
Building importance: Residential (Importance Level 2)  
Roofing: Pressed metal tiles (7.5 kg/sq.m)  
Ceiling: 13mm Gib-board (8.5 kg/sq.m)  
Top chord battens: 380 mm

Design roof snow load: 0 Pa  
(incl. probability factor)  
Ground snow load: 0 Pa  
Location: Region N1 - lower Nth Island  
Altitude above sea level: 100 m

BC restraints: Battens at 400 mm crs  
Standard truss spacing: 900 mm  
Standard roof pitch: 22.50 deg.  
Ult. design wind speed: 50 m/s (wind classification = Very high)

Max. eaves height: 3 m  
Max. ridge height: 6 m

Int pressure coeff. up: 0.2  
Overhang Condition: Metal fascia

The design criteria inputs used by Pryda Build software is the responsibility of the fabricator.

Note: Where relevant, a structural fascia beam is required at all hip and dutch hip corners to support creeper/rafter overhangs, as shown in AS 4440-2004

Note: This Producer Statement shall be read in conjunction with the Roof truss layout and detail sheets.

Note: Some trusses in this job support ceiling materials that are different to this nominal data (see individual truss detail sheets).

Note: The Structural Timber products supplied in this building stores approximately '980' kg of carbon.

Truss and connection designs listed in the Producer Statement have been designed using Pryda design software. Additional items such as roof/ceiling plane bracing, special notes, supplementary timber, etc., which may be shown on the plan drawings are the responsibility of others.

All trusses have been manufactured in accordance with the fabrication specifications provided by Pryda, and shall be installed, connected and braced in accordance with the recommendations given in - : AS 4440-2004 "Installation of nailplated timber roof trusses" and any other supplementary details that may be provided, such as the Pryda Installation Guides.

Timber verification and grading values are in accordance with clause B1 and timber treatment in accordance with clause B2 of the New Zealand Building Code.

I/we confirm that the trusses for this project have been manufactured in accordance with the fabrication specifications provided by Pryda New Zealand.

Name: Jimmy RooneyPosition: DetailerSigned: Date: 24-04-2023

**Fabricator / Designer Statement**Job Ref: **1713PS**

Note 1: All timber framing nails are machine-driven, glue coated, or annular/helical deformed shank.

Use specified fixings with Pryda connectors as noted.

Note 2: The following trusses have not yet fully passed all of the design criteria, eg:-

| <b>Truss Mark</b> | <b>Truss Design Status</b>            | <b>Connection Design Status</b>                 |
|-------------------|---------------------------------------|-------------------------------------------------|
| TG1               | Plates overlapped.                    | -                                               |
| S6                | Plates overlapped.                    | -                                               |
| S13               | Plates overlapped.                    | -                                               |
| BR1               | -                                     | Fixings and connections have not been designed. |
| R4                | -                                     | Fixings and connections have not been designed. |
| R5                | -                                     | Fixings and connections have not been designed. |
| J15               | -                                     | Fixings and connections have not been designed. |
| BR2               | -                                     | Fixings and connections have not been designed. |
| R1                | -                                     | Fixings and connections have not been designed. |
| R3                | -                                     | Fixings and connections have not been designed. |
| J4                | Excessive deflection under live load. | -                                               |
| J23               | Excessive deflection under live load. | -                                               |
| J14               | Excessive deflection under live load. | -                                               |
| MV10              | -                                     | Fixings and connections have not been designed. |
| J11               | -                                     | Fixings and connections have not been designed. |

**Tie-downs to walls/beams:**

Trusses need to be fixed at each timber support with 2/90x3.15 dia Skew Nails.

All additional tie-downs are as follows:

| <b>Truss Mark</b> | <b>Sup No.</b> | <b>Distance</b> | <b>Fixing</b> | <b>Support Jt Grp</b> | <b>Width</b> | <b>Truss Jt Grp</b> | <b>Uplift (kN)</b> | <b>Fixing Details</b>                 |
|-------------------|----------------|-----------------|---------------|-----------------------|--------------|---------------------|--------------------|---------------------------------------|
| J1                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.57              |                                       |
| J10               | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -1.64              |                                       |
| J12               | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -0.66              |                                       |
| J13               | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -0.91              |                                       |
| J14               | 1              | -               | 2/Z           | JD5                   | 70           | JD4                 | -1.54              |                                       |
| J16               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.51              |                                       |
| J2                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.00              |                                       |
| J23               | 1              | -               | 2/Z           | JD5                   | 90           | JD4                 | -1.33              |                                       |
| J25               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -0.79              |                                       |
| J26               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -0.80              |                                       |
| J27               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.34              |                                       |
| J29               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.42              |                                       |
| J3                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.25              |                                       |
| J30               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.03              |                                       |
| J4                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.52              |                                       |
| J5                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -0.95              |                                       |
| J6                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -0.80              |                                       |
| J7                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.80              |                                       |
| J8                | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -1.59              |                                       |
| J9                | 1              | -               | 2/Z           | JD5                   | 70           | JD5                 | -0.91              |                                       |
| MTG1              | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.66              |                                       |
|                   | 6              | 6200            | 2/Z           | JD5                   | 90           | JD5                 | -2.59              |                                       |
| N1                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.33              |                                       |
|                   | 11             | 8000            | 2/Z           | JD5                   | 70           | JD5                 | -1.30              |                                       |
|                   | 7              | 4955            | 1/NPPC8       | JD5                   | 90           | JD5                 | -7.02              | 4/12g-11x35 screws, 12/30x3.15d nails |
| N2                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.88              |                                       |
| R2                | 4              | 1373            | 2/MGL         | JD5                   | 45           | JD5                 | -0.77              | 6/30x3.15d nails, 4/30x3.15d nails    |
|                   | 5              | 428             | 2/MGL         | JD5                   | 45           | JD5                 | -1.13              | 6/30x3.15d nails, 4/30x3.15d nails    |
| S1                | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.74              |                                       |
|                   | 5              | 4990            | 2/Z           | JD5                   | 90           | JD5                 | -2.74              |                                       |
| S10               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.74              |                                       |
| S11               | 1              | -               | 1/NPPC4       | JD5                   | 90           | JD5                 | -3.16              | 2/12g-11x35 screws, 6/30x3.15d nails  |
| S12               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -2.74              |                                       |
|                   | 5              | 5000            | 2/Z           | JD5                   | 90           | JD5                 | -2.75              |                                       |
| S13               | 1              | -               | 2/Z           | JD5                   | 90           | JD5                 | -1.42              |                                       |
|                   | 10             | 4300            | 2/Z           | JD5                   | 70           | JD5                 | -2.36              |                                       |
|                   | 13             | 5000            | 2/Z           | JD5                   | 90           | JD5                 | -1.44              |                                       |
|                   | 4              | 700             | 2/Z           | JD5                   | 70           | JD5                 | -2.36              |                                       |
|                   | 5              | 1300            | 2/Z           | JD5                   | 70           | JD5                 | -1.33              |                                       |
|                   | 6              | 1900            | 2/Z           | JD5                   | 70           | JD5                 | -1.29              |                                       |

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**26/05/23**



**Fabricator / Designer Statement**Job Ref: **1713PS**

|     |    |      |         |     |    |     |        |                                       |
|-----|----|------|---------|-----|----|-----|--------|---------------------------------------|
|     | 7  | 2500 | 2/Z     | JD5 | 70 | JD5 | -1.03  |                                       |
|     | 8  | 3100 | 2/Z     | JD5 | 70 | JD5 | -1.29  |                                       |
|     | 9  | 3700 | 2/Z     | JD5 | 70 | JD5 | -1.33  |                                       |
| S14 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.78  |                                       |
|     | 5  | 5000 | 2/Z     | JD5 | 90 | JD5 | -2.73  |                                       |
| S15 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.56  |                                       |
| S16 | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -3.99  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 6  | 7400 | 1/NPPC8 | JD5 | 90 | JD5 | -4.07  | 4/12g-11x35 screws, 12/30x3.15d nails |
| S17 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -1.68  |                                       |
|     | 5  | 4945 | 1/NPPC8 | JD5 | 90 | JD5 | -5.45  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 9  | 9890 | 2/Z     | JD5 | 90 | JD5 | -1.68  |                                       |
| S18 | 1  | -    | 1/NPPC4 | JD5 | 90 | JD5 | -3.17  | 2/12g-11x35 screws, 6/30x3.15d nails  |
| S19 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.54  |                                       |
|     | 7  | 6200 | 2/Z     | JD5 | 90 | JD5 | -2.51  |                                       |
| S2  | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.39  |                                       |
|     | 5  | 4990 | 2/Z     | JD5 | 90 | JD5 | -2.43  |                                       |
| S20 | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -4.38  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 7  | 8000 | 1/NPPC8 | JD5 | 90 | JD5 | -4.42  | 4/12g-11x35 screws, 12/30x3.15d nails |
| S21 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.42  |                                       |
|     | 5  | 5000 | 2/Z     | JD5 | 90 | JD5 | -2.37  |                                       |
| S3  | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -3.90  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 5  | 4990 | 1/NPPC8 | JD5 | 90 | JD5 | -4.07  | 4/12g-11x35 screws, 12/30x3.15d nails |
| S4  | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.01  |                                       |
|     | 5  | 4945 | 1/NPPC8 | JD5 | 90 | JD5 | -4.13  | 4/12g-11x35 screws, 12/30x3.15d nails |
| S5  | 1  | -    | 1/NPPC4 | JD5 | 90 | JD5 | -3.39  | 2/12g-11x35 screws, 6/30x3.15d nails  |
|     | 7  | 6200 | 1/NPPC4 | JD5 | 90 | JD5 | -3.43  | 2/12g-11x35 screws, 6/30x3.15d nails  |
| S6  | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -1.30  |                                       |
|     | 10 | 4300 | 2/Z     | JD5 | 70 | JD5 | -1.38  |                                       |
|     | 11 | 4900 | 2/Z     | JD5 | 70 | JD5 | -1.35  |                                       |
|     | 12 | 5500 | 2/Z     | JD5 | 70 | JD5 | -2.30  |                                       |
|     | 15 | 6200 | 2/Z     | JD5 | 90 | JD5 | -1.31  |                                       |
|     | 4  | 700  | 2/Z     | JD5 | 70 | JD5 | -2.30  |                                       |
|     | 5  | 1300 | 2/Z     | JD5 | 70 | JD5 | -1.35  |                                       |
|     | 6  | 1900 | 2/Z     | JD5 | 70 | JD5 | -1.38  |                                       |
|     | 7  | 2500 | 2/Z     | JD5 | 70 | JD5 | -1.30  |                                       |
|     | 8  | 3100 | 2/Z     | JD5 | 70 | JD5 | -0.89  |                                       |
|     | 9  | 3700 | 2/Z     | JD5 | 70 | JD5 | -1.30  |                                       |
| S7  | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.77  |                                       |
|     | 5  | 5000 | 2/Z     | JD5 | 90 | JD5 | -2.77  |                                       |
| S8  | 1  | -    | 1/NPPC4 | JD5 | 90 | JD5 | -3.39  | 2/12g-11x35 screws, 6/30x3.15d nails  |
|     | 7  | 6200 | 1/NPPC4 | JD5 | 90 | JD5 | -3.44  | 2/12g-11x35 screws, 6/30x3.15d nails  |
| S9  | 1  | -    | 1/NPPC4 | JD5 | 90 | JD5 | -3.26  | 2/12g-11x35 screws, 6/30x3.15d nails  |
| SG1 | 1  | -    | 2/NPPC8 | JD5 | 90 | JD5 | -9.77  | 4/12g-11x35 screws, 12/30x3.15d nails |
| SG2 | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -6.29  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 6  | 7400 | 2/NPPC8 | JD5 | 90 | JD5 | -14.05 | 4/12g-11x35 screws, 12/30x3.15d nails |
| SG3 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.39  |                                       |
|     | 5  | 4990 | 2/Z     | JD5 | 90 | JD5 | -2.43  |                                       |
| SG4 | 1  | -    | 1/NPPC8 | JD5 | 90 | JD5 | -6.59  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 7  | 8000 | 1/NPPC8 | JD5 | 90 | JD5 | -4.93  | 4/12g-11x35 screws, 12/30x3.15d nails |
| SG5 | 2  | 900  | 1/NPPC8 | JD5 | 90 | JD5 | -4.62  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 7  | 7055 | 2/Z     | JD5 | 90 | JD5 | -2.72  |                                       |
| TS1 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.25  |                                       |
|     | 5  | 4955 | 1/NPPC8 | JD5 | 90 | JD5 | -5.72  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 8  | 8000 | 2/Z     | JD5 | 70 | JD5 | -0.87  |                                       |
| TS2 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -1.87  |                                       |
|     | 5  | 4945 | 1/NPPC8 | JD5 | 90 | JD5 | -4.74  | 4/12g-11x35 screws, 12/30x3.15d nails |
|     | 9  | 9890 | 2/Z     | JD5 | 90 | JD5 | -1.87  |                                       |
| TS3 | 1  | -    | 2/Z     | JD5 | 90 | JD5 | -2.64  |                                       |
|     | 6  | 6200 | 2/Z     | JD5 | 90 | JD5 | -2.52  |                                       |

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**Primary connections (truss to girder):**

| <b>Truss Marks</b> |                  |                  | <b>Fixing Details</b> |                     |
|--------------------|------------------|------------------|-----------------------|---------------------|
| <b>Girder</b>      | <b>Supported</b> | <b>Connector</b> | <b>Girder</b>         | <b>Supported</b>    |
| SG1                | S11              | 2/MG             | 8/30x3.15d nails      | 8/30x3.15d nails    |
|                    | S15              | FB4590           | 8/30x3.15d nails      | 4/30x3.15d nails    |
|                    | S18              | 2/MG             | 8/30x3.15d nails      | 8/30x3.15d nails    |
| SG2                | S10              | 2/MG             | 8/30x3.15d nails      | 8/30x3.15d nails    |
|                    | SG1              | TB45/16          | 8/12g-11x35 screws    | 12/12g-11x35 screws |
| SG4                | S4               | FB4590           | 8/30x3.15d nails      | 4/30x3.15d nails    |

**Paraparaumu Prenail 2016 Ltd.**

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**Fabricator / Designer Statement**Job Ref: **1713PS**

|     |     |         |                    |                    |
|-----|-----|---------|--------------------|--------------------|
|     | S9  | 2/NPPC8 | 6/12g-11x35 screws | 6/12g-11x35 screws |
|     | SG5 | FB4590  | 8/30x3.15d nails   | 4/30x3.15d nails   |
| SG5 | N2  | FB4590  | 8/30x3.15d nails   | 4/30x3.15d nails   |

**Secondary fixings (hip & gable ends, valleys):**

All trusses are to be fixed at each support with the following:

|                                |                                                |
|--------------------------------|------------------------------------------------|
| Hip truss to truncated girder  | 3 face nails, bottom chords                    |
| Jack truss to truncated girder | 3 skew nails or back face nails, bottom chords |
| Creeper truss to hip truss     | 3 face nails, top and bottom chords            |
| Top chord extensions           | 2 skew nails                                   |
| Valley trusses                 | 1 skew nail                                    |
| Outriggers                     | 2 skew nails                                   |

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All additional connections are as follows:

| <b><u>Supporting Truss</u></b> | <b><u>Supported Truss</u></b> | <b><u>Top Chord</u></b> | <b><u>Bottom Chord</u></b> |
|--------------------------------|-------------------------------|-------------------------|----------------------------|
| (Various)                      | MV11                          | -                       | 1/MGL                      |
|                                | MV12                          | -                       | 1/MGL                      |
|                                | MV13                          | -                       | 1/MGL                      |
|                                | MV3                           | -                       | 1/MGL                      |
|                                | MV4                           | -                       | 1/MGL                      |
|                                | MV5                           | -                       | 1/MGL                      |
|                                | MV7                           | -                       | 1/MGL                      |
|                                | MV8                           | -                       | 1/MGL                      |
| N1                             | J8                            | 1/MGL                   | -                          |
| S13                            | OR5                           | 1/MGL                   | -                          |
|                                | OR6                           | 1/MGL                   | -                          |
| S3                             | J1                            | 1/MGL                   | -                          |
| S6                             | OR1                           | 1/MGL                   | -                          |
|                                | OR3                           | 1/MGL                   | -                          |
|                                | OR4                           | 1/MGL                   | -                          |
| TG1                            | J16                           | 1/MGL                   | -                          |
|                                | J30                           | 2/MGL                   | -                          |

**Fixing Summary:**

| <b><u>Connector</u></b> | <b><u>Description</u></b> | <b><u>Total</u></b> | <b><u>Fixing Method (per connector)</u></b> |                               |
|-------------------------|---------------------------|---------------------|---------------------------------------------|-------------------------------|
| <b><u>Primary</u></b>   |                           |                     | <b><u>Girder</u></b>                        | <b><u>Supported Truss</u></b> |
| FB4590                  | Joist hanger              | 5                   | 8/30x3.15d nails                            | 4/30x3.15d nails              |
| MG                      | Multigrips                | 12                  | 8/30x3.15d nails                            | 8/30x3.15d nails              |
| NPPC8                   | Purlin cleat              | 2                   | 6/12g-11x35 screws                          | 6/12g-11x35 screws            |
| TB45/16                 | Truss boot                | 1                   | 8/12g-11x35 screws                          | 12/12g-11x35 screws           |
| <b><u>Secondary</u></b> |                           |                     | <b><u>Supporting Truss</u></b>              | <b><u>Supported Truss</u></b> |
| MGL                     | Multigrip (long)          | 44                  | 6/30x3.15d nails                            | 4/30x3.15d nails              |
| <b><u>Tiedown</u></b>   |                           |                     | <b><u>Support</u></b>                       | <b><u>Truss</u></b>           |
| MGL                     | Multigrip (long)          | 4                   | 6/30x3.15d nails                            | 4/30x3.15d nails              |
| NPPC4                   | Purlin cleat              | 11                  | 2/12g-11x35 screws                          | 6/30x3.15d nails              |
| NPPC8                   | Purlin cleat              | 20                  | 4/12g-11x35 screws                          | 12/30x3.15d nails             |
| Z                       | Z nail                    | 194                 |                                             |                               |

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Date: 24-04-2023

Ver 5.03.00

**Producer Statement - PS1 - Design**

Job Ref: 1713PS

This producer statement applies to the structural engineering design software "Pryda Build" supplied by Pryda NZ to  
Paraparaumu Prenail 2016 Ltd.

These truss designs are in accordance with sound and widely accepted engineering principles. I believe on reasonable grounds that if constructed in accordance with the design, the trusses will comply with relevant requirements of the New Zealand Building Code, Clause B1 and Verification Method B1/VM1. The durability shall comply with the New Zealand Building Code, Clause B2, for building Importance Level 2 and a design working life of 50 years.

In addition to the above, this software also complies in part with:

ANSI / TPI 1 - 2002 National Design Standard for metal plate connected wood truss construction.

AS 1649 - 2001 Timber - Methods of test for mechanical fasteners and connectors - Basic working loads and characteristic strengths.

The truss designs require that the supporting structure is stable in its own right, and that the trusses will be braced in accordance with the New Zealand Building Code Standard NZS 3604:2011, and any supplementary details provided, including but not limited to Pryda Installation Guides.

Pryda NZ holds a current policy of Professional Indemnity Insurance with cover no less than NZ\$2 million. The policy includes the engineering design processes used in the software.

On behalf of Pryda NZ (a division of ITW New Zealand)



**Dr. Kristopher Orlowski**

Structural Engineer

BSc (Eng), MEng, DR-PHILENG, CPEng AUS (4125476), CPEng NZ (2001879)

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Page 1 of 1

Date: 24-04-2023

Ver 5.03.00

**Fabricator / Designer Statement**

Job Ref: 1713PS

***Design Information for Building Consent Application*****CLIENT Name:** *New residence***SITE Details:**Address : *Lot 45 Manu Park  
Waikanae*

City:

Post Code: State:

***Nominal Design Criteria:***

Design working life: 50 years

Building importance: Residential (Importance Level 2)

Roofing: Pressed metal tiles (7.5 kg/sq.m)

Ceiling: 13mm Gib-board (8.5 kg/sq.m)

Standard roof pitch: 22.50 deg.

Ult. design wind speed: 50 m/s (wind classification = Very high)

Max. eaves height: 3 m

Max. ridge height: 6 m

Int pressure coeff. up: 0.2

Design roof snow load: 0 Pa

(incl. probability factor)

Ground snow load: 0 Pa

Location: Region N1 - lower Nth Island

Altitude above sea level: 100 m

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Note: This statement must be read in conjunction with the wall layout and detail sheets.

Note: The Structural Timber products supplied in this building stores approximately '980' kg of carbon.

All lintels, beams and associated components are to be installed and connected in accordance with the recommendations given in - : NZS3604: 2011 "Timber Framed Buildings" and any other supplementary details that may be provided, such as the Pryda Builders Guides, and the supporting structure shall be stable in its own right.

Timber verification and grading values are in accordance with clause B1 and timber treatment in accordance with clause B2 of the New Zealand Building Code.

Name: Jimmy RooneyPosition: DetailerSigned: Date: 24-04-2023



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Date: 24-04-2023

Ver 5.03.00

**Producer Statement - PS1 - Design**

Job Ref: 1713PS

This producer statement applies to the structural engineering design software "Pryda Build" supplied by Pryda NZ to  
Paraparaumu Prenail 2016 Ltd.

These lintel, beam and associated component designs are in accordance with sound and widely accepted engineering principles. I believe on reasonable grounds that if constructed in accordance with the design, the lintels, beams and associated components will comply with relevant requirements of the New Zealand Building Code, Clause B1 and Verification Method B1/VM1. The durability shall comply with the New Zealand Building Code, Clause B2, for building Importance Level 2 and a design working life of 50 years.

In addition to the above, this software also complies in part with:

ANSI / TPI 1 - 2002 National Design Standard for metal plate connected wood truss construction.

AS 1649 - 2001 Timber - Methods of test for mechanical fasteners and connectors - Basic working loads and characteristic strengths.

The lintel, beam and associated component designs require that the supporting structure is stable in its own right, and that the lintels, beams and associated components will be installed in accordance with the New Zealand Building Code Standard NZS 3604:2011, and any supplementary details provided, including but not limited to Pryda Installation Guides.

Pryda NZ holds a current policy of Professional Indemnity Insurance with cover no less than NZ\$2 million. The policy includes the engineering design processes used in the software.

On behalf of Pryda NZ (a division of ITW New Zealand)



**Dr. Kristopher Orlowski**

Structural Engineer

BSc (Eng), MEng, DR-PHILENG, CPEng AUS (4125476), CPEng NZ (2001879)

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26/05/23



## Structural Calculations for

### 1 Pihoihoi Close (Lot 45 Manu Park) Waikanae Proposed New Dwelling

These calculations are in accordance with:

AS/NZS 1170:2004 Structural Design Actions  
NZS 3101:2006 Concrete Structures Standard

**Engineer:**  
Stuart Preston  
Hugh Falkner  
Jared Waller

**Initials:**  
SRNP  
HAF  
JW

#### Preamble:

The project comprises a proposed single storey dwelling with heavy cladding and a light roof.

These calculations pertain to the design of:

- Specifically designed waffle slab and canopy pad foundations

A geotechnical report titled "Manu Park Subdivision, Waikanae - Stage 2: Foundation Recommendations" has been completed by Miyamoto dated 28 September 2022. The following paragraph is the report's liquefaction assessment summary;

- "The liquefaction assessment indicates that liquefaction is unlikely to be triggered under SLS loading conditions with moderate effects anticipated under ULS loading conditions. Furthermore, the presence of a thick non-liquefiable crust (2.5 m to 6.5 m in thickness) provides additional resilience and significantly reduces the severity of liquefaction induced damage (demonstrated by the low values of LSN)."

The report then states that "NZS3604 foundation systems are considered feasible for NZS3604 compliant structures, with consideration of the available bearing capacity."

Certa has conducted scala penetrometer tests on 22/03/2023 after the groundworks, 0-2.5m cut, had been performed by others. The results show that good ground to NZS3604 is achieved at surface level. Consideration of the geotechnical report and the scala test results have been considered in the foundation design which is a non-piled waffle slab. The bearing capacity is to be confirmed on site by the engineer.

**SCHEDULE OF INSPECTIONS**  
**for**  
**1 Pihoihoi Close (Lot 45 Manu Park)**  
**Waikanae**  
**Proposed New Dwelling**



We confirm that CERTA Engineering Ltd have been engaged to undertake construction monitoring of the specific engineering design items to an EngNZ/ACENZ CM3 level and propose to undertake the following site inspections:

| No. | Item of Inspection                                        | Timeframe |
|-----|-----------------------------------------------------------|-----------|
| 1   | Foundation waffle slab and confirmation of ground bearing | Pre-pour  |

**Notes:**

- The above items of inspections are the minimum required to enable CERTA Engineering Ltd to issue a PS4 – Producer Statement Construction Review for the specific engineering design items.
- The above items of inspection do not cover work constructed in accordance with NZS 3604:2011, for which Inspections are to be undertaken by the Building Consent Authority.
- The Contractor/Builder is to provide CERTA Engineering Ltd at least 24 hours' notice of the requirement for an inspection. The above timeframes are indicative, the Engineer and Contractor are to agree the timing of inspection prior to work commencing on site.
- The Contractor /Builder is to provide reasonable and safe access to enable works to be inspected.
- The above schedule does not necessarily represent the actual number of inspections to be undertaken. The number of inspections will depend on the construction method, sequence of the works and whether or not unforeseen conditions or difficulties are encountered on site.

**Date:**  
**3 May 2023**

**Job No.**  
**J44175**



Building Code Clause(s) B1

J44175

**PRODUCER STATEMENT - PS1 - DESIGN**

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

**ISSUED:** CERTA Engineering Ltd

**TO:** Paterson Homes Ltd  
(Owner / Developer)

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

**IN RESPECT OF:** Proposed New Dwelling  
(Description of Building Work)

**AT:** 1 Pihoihi Close (Lot 45 Manu Park), Waikanae  
(Address)  
LOT 45 DP 582129

230413

Received by

Kapiti Coast District Council

26/05/23

We have been engaged by the owner/developer referred to above to provide **structural design services and construction monitoring of specifically designed elements** in respect of the requirements of Clause B1 (B2 of specifically designed elements) of the building code for

☐ All ☒ **Part only as specified of building work:**  
- Specifically designed waffle slab and canopy pad foundations

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 and B2/AS1

The proposed building work covered by this producer statement is described on the drawings titled 1 Pihoihi Close (Lot 45 Manu Park), Waikanae and numbered S0 to S2.

**On behalf of the Design Firm, and subject to:**

- (i) Site verification of the following design assumptions: Bearing capacity of excavated foundations to satisfy required amount and to be confirmed on site by the Engineer;
- (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 will comply with the relevant provisions of the Building Code and b), the persons who have undertaken this design work have the necessary competency to do so. I also recommend the following level of construction monitoring:

☐ CM1 ☐ CM2 ☒ CM3 ☐ CM4 ☐ CM5 observation services.  
(Engineering Categories)

I, Stuart Preston am CPEng # 138744

I am a member of: Engineering New Zealand and hold the following qualifications: BE(Civil), 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 Stuart Preston ON BEHALF OF CERTA Engineering Ltd

Date 3 May 2023

(Signature)

Note: this statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000\*.  
This form is to accompany Form 2 of the Building (Forms) Regulations 2004 for the application of a Building Consent.



## GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1992. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Engineering New Zealand, Association of Consulting Engineers New Zealand in consultation with the Building Officials Institute of New Zealand. The original suite of producer statements has been revised as at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

- |                                |                                                                                                                                                                                                                                                                                                                        |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PS1 Design</b>              | Intended for the use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;                                                                                                              |
| <b>PS2 Design Review</b>       | Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;                                                                                               |
| <b>PS3 Construction</b>        | Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013; or Schedules E1/E2 of NZIA's SCC 2007 2                                                                                                                                                                           |
| <b>PS4 Construction Review</b> | Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate. This must be accompanied by a statement of completion of building work (Schedule 6). |

The following guidelines are provided by ACENZ, EngNZ and NZIA to interpret the Producer Statement.

### Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence-based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as the Engineering New Zealand (EngNZ) or the New Zealand Institute of Architects (NZIA) provides additional assurance of the designer's standing within the profession. If the design firm is a member of the Association of Consulting Engineers New Zealand (ACENZ), this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

### Professional Indemnity Insurance

As part of membership requirements, ACENZ requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to \$500,000.

### Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-5)3 (OL1-OL4)2. The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

### Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

### Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

### Refer Also:

- 1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
- 2 NZIA Standard Conditions of Contract SCC 2007 (1st edition)
- 3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACENZ, 2004)

[www.acenz.org.nz](http://www.acenz.org.nz)  
[www.engineeringnz.org](http://www.engineeringnz.org)  
[www.nzia.co.nz](http://www.nzia.co.nz)



**Memorandum from licensed building practitioner:  
Certificate of design work  
Section 45 and Section 30C, Building Act 2004**

**J44175**

**THE BUILDING**

Street Address: 1 Pihoihoi Close (Lot 45 Manu Park)

Suburb: Waikanae

Town/City: Waikanae

Postcode: 5036

**THE OWNER**

Name(s): Paterson Homes Ltd

**BASIS FOR PROVIDING THIS MEMORANDUM**

I am providing this memorandum in my role as the **Specialist** designer who supervised specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work.

**IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)**

I, Stuart Preston, supervised the following design work that is restricted building work

**PRIMARY STRUCTURE: B1**

| Design work that is restricted building work | Description (as required)                     |
|----------------------------------------------|-----------------------------------------------|
| Foundations (✓)                              | SED <sup>(1)</sup> waffle slab and canopy pad |
| Retaining Walls (✗)                          |                                               |
| Beams (✗)                                    |                                               |
| Portal (✗)                                   |                                               |
| Bracing (✗)                                  |                                               |
| Other (primary) (✗)                          |                                               |

**WAIVERS AND MODIFICATIONS**

No waivers or modifications of the building code are required.

**ISSUED BY**

Name: **Stuart Preston**

CPEng number: **138744**

Design Entity/Company: Certa Engineering Limited

**DECLARATION**

I, **Stuart Preston**, LBP, state that I have applied the skill and care reasonably required of a competent design professional in supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- Complies with the building code; or
- Complies with the building code subject to any waiver or modification of the building code recorded on this form.

Signature:

Date: 3 May 2023

(1) SED = Elements subject to **Specific Engineering Design** outside of the scope of NZS 3604:2011, unless noted otherwise.

GENERAL:

1. REFER ARCHITECT'S DRAWINGS FOR DIMENSIONS, UNLESS NOTED OTHERWISE. DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO STEEL FABRICATION. DO NOT SCALE OFF THIS DRAWING.
2. IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN
3. STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATIONS, ARCHITECTURAL, CIVIL AND ENGINEERING SERVICES DOCUMENTS.
4. UNLESS OTHERWISE NOTED ALL LEVELS ARE IN METERS, AND ALL DIMENSIONS ARE IN MILLIMETERS, AND SHALL BE CHECKED BY CONTRACTOR PRIOR TO CONSTRUCTION.
5. DIMENSION SHALL NOT BE OBTAINED BY SCALING FROM DRAWINGS.
6. ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT OR ENGINEER FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
7. ALL MATERIAL AND WORKMANSHIP SHALL BE ON ACCORDANCE WITH THE CURRENT CODES OF PRACTICE EXCEPT WHERE VARIED BY THE SPECIFICATION AND/OR DRAWINGS.
8. WHERE PROPRIETY PRODUCTS ARE SPECIFIED IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL.
9. ENGINEER REQUIRES 24 HOURS NOTICE BEFORE ANY INSPECTION (REFER TO STRUCTURAL CALCULATIONS FOR SCHEDULE OF INSPECTIONS).

FILL SPECIFICATION:

1. SITE TO BE CLEARED OF ALL TOPSOIL AND ANY ORGANIC MATERIAL THEN CUT TO A SERIES OF LEVEL BENCHES.
2. ENGINEER TO INSPECT PRIOR TO ANY FILL PLACEMENT.
3. FILL MATERIAL TO BE CRUSHED ROCK TOPCOURSE MATERIAL FREE OF ORGANIC MATERIAL FULLY COMPACTED TO 90% OF MAXIMUM DENSITY TO BS1377 TEST 9.
4. COMPACT IN MAXIMUM LAYERS OF 150mm THICK WITH A 2 TONNE ROLLER - TRACK ROLLING WITH A DIGGER IS NOT ACCEPTABLE
5. ENGINEER TO INSPECT AND TEST EVERY 2nd LAYER PLACED (300mm INTERVALS)

PILING:

1. PILE DEPTH ESTIMATIONS ARE HIGHLY APPROXIMATE AND MAY BE SUBJECT TO SIGNIFICANT VARIATION ON SITE. IF GREATER CONFIDENCE IS REQUIRED WE RECOMMEND INSTALLATION OF TEST PILES.
2. DRIVEN TIMBER PILES TO HAVE A DEPENDABLE ULTIMATE CAPACITY OF 65kN U.N.O. (REFER DRAWING FOR ESTIMATED LENGTH)
3. PILING CONTRACTOR TO PROVIDE RECORD OF PILE SETS AND PILE DRIVING EQUIPMENT DETAILS. TOP OF PILES TO BE PAINTED WITH METALEX AND HAVE A GAP BETWEEN PILE AND FOOTING STEEL OR A LAYER OF DPM
4. FOR LARGE POLE HOLES IT IS RECOMMENDED TO DRILL & POUR INTERMEDIATE HOLES, THEN COMPLETE REMAINDER IN A SEPARATE POUR TO MINIMISE HOLE COLLAPSE.
5. ENSURE BOTTOM OF PILE HOLES ARE FREE OF WATER AND LOOSE MATERIAL. TAMP AS NECESSARY

WAFFLE SLAB NOTES:

1. SLAB AND FOOTINGS - USE 25MPa CONCRETE, 100mm SLUMP
2. REFER POD SUPPLIER SPECIFICATIONS AND DRAWINGS FOR SAWCUTS AND SHRINKAGE CONTROL JOINTS
3. BASECOURSE AS REQUIRED TO BRING SITE LEVEL. ANY SOFT SPOTS ARE TO BE EXCAVATED AND REPLACED WITH BASECOURSE.
4. POLISHED FLOOR - USE 30MPa CONCRETE WITH 13mm AGGREGATE (DO NOT USE A PUMP MIX), 100mm SLUMP, ENSURE WET CURING FOR AT LEAST 7 DAYS. 2 LAYERS OF DPC ON 20mm SAND BLINDING. ENSURE SAWCUTS ARE MADE AT THE EARLIEST POSSIBLE TIME (WITHIN 48 HRS)

STRUCTURAL MAINTENANCE SCHEDULE:

- YEARLY: WASH DOWN ALL EXPOSED STEELWORK THAT IS NOT IN A FULLY INTERIOR ENVIRONMENT.
- 10 YEARLY: INSPECT AND REPAIR SEALANT THAT ENCLOSES STRUCTURAL MILD-STEEL COMPONENTS AND/OR TIMBER WITH MILD-STEEL FIXINGS.  
  
CHECK EXPOSED TIMBER FIXINGS FOR CORROSION, REPAIR AS REQUIRED.
- 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. INSPECTION MAY TYPICALLY REQUIRE REMOVAL OF CLADDING 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 OR CRACKING. REPAIR AS REQUIRED.

STEEL:

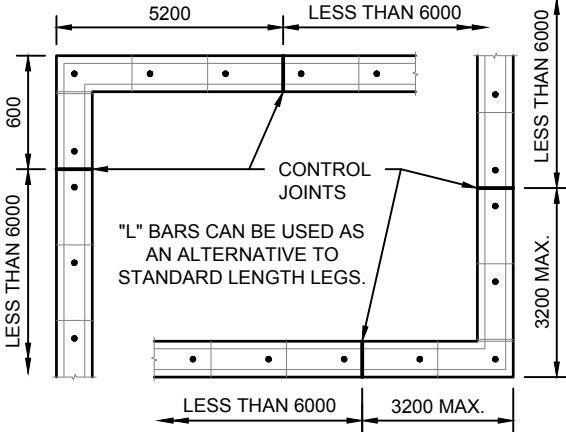
1. ALL STEEL WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3404:2009
2. ALL WELDS TO BE 6 FILLET WELDS ALL ROUND UNLESS NOTED OTHERWISE.
3. ALL M12 BOLTS TO BE GRADE 4.6. ALL M16 BOLTS TO BE GRADE 8.8 UNLESS NOTED OTHERWISE.
4. ALL PLATES TO BE 10 THICK UNLESS NOTED OTHERWISE.
5. STEEL GRADES:  
- PLATES 250MPa  
- HOT ROLLED SECTIONS 300MPa  
- HOLLOW SECTIONS 350MPa
6. ALL WELD ELECTRODES ARE E48XX OR W50X.
7. ALL INTERNAL STRUCTURAL STEEL TO BE PAINTED IN ACCORDANCE WITH SYSTEM DESIGNATION AS/NZS2312/AKL1 BEFORE DELIVERY TO SITE. ANY AREAS DAMAGED TO BE MADE GOOD UPON INSTALLATION.
8. ALL EXTERNAL STRUCTURAL STEEL TREATMENT SHALL BE ONE OF THE FOLLOWING: (NZS TS 3404-2018)
  - TSZ150S - 150µm THERMAL SPRAY ZINC + 75µm ACRYLIC PAINT (EXTERIOR OVER 1KM FROM COAST).
  - HDG900 - 900gm/m² GALVANISED COATING.

CONCRETE:

1. ALL CONCRETE WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3109:1997
2. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF:  
- SLABS & FOOTINGS 25MPa  
- PILES 17.5MPa  
- TIDY SLABS 10MPa
3. MAXIMUM SLUMP TO BE 100mm UNLESS NOTED OTHERWISE
4. CONCRETE FINISHES SHALL BE:  
- SLABS U3  
- EXPOSED FOOTINGS F4
5. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 (HD BARS SHALL NOT BE REBENT)
6. THE CONCRETE SHALL BE KEPT CONTINUOUSLY WET FOR A PERIOD OF A LEAST 4 DAYS. FROM 4-10 DAYS AFTER POURING IT SHALL BE KEPT DAMP BY OCCASIONAL HOSING..
7. ALL CHEMICAL ANCHOR HOLES TO BE CLEANED OUT AND EMBEDDED TO DEPTHS IN ACCORDANCE WITH MANUFACTURES INSTRUCTIONS.

MASONRY:

1. ALL MASONRY IS LAID IN RUNNING BOND CONFIGURATION UNLESS NOTED OTHERWISE.
2. ALL MASONRY WITHIN THE BUILDING STRUCTURE IS GRADE B AS DEFINED IN NZS 4230.
3. ALL CONCRETE MASONRY BLOCKS SHALL CONFORM TO NZS 3102 UNLESS NOTED OTHERWISE. DENSITY SHALL BE > 1750 kg/m³.
4. ALL MASONRY WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS4210:2001 & NZS4229:2013. LINTELS WHERE NOT SPECIFICALLY DETAILED SHALL COMPLY WITH THE PROVISIONS OF NZS4229:2013. USE 800g/m³ OF SIKA 'CAVEX' EXPANSION AGENT, OR APPROVED ALTERNATIVE, FOR MASONRY BLOCK INFILL.
5. VERTICAL CONTROL JOINTS IN MASONRY TO BE PROVIDED AT 6m MAX. CENTRES. WHERE NOT SHOWN ON DRAWINGS THE JOINTS SHOULD BE LOCATED IN ACCORDANCE WITH NZS4229:2013 SECTION 12 AND TO APPROVAL OF THE ENGINEER.



6. BLOCK WORK CONTROL JOINTS:  
  
R16-600 800 LONG DEBONDED ONE END 10 GAP WITH POLYSTYRENE STRIP CENTRAL & SEALED BOTH FACES WITH URAFLEX
7. ALL BLOCK WORK HORIZONTAL REINFORCING MUST LAP ADEQUATELY AT CORNERS AND JUNCTIONS AS INDICATED BELOW:
- NOTE: "L" BARS CAN BE USED AS AN ALTERNATIVE TO STANDARD LENGTH LEGS.
8. IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN

9. CONCRETE SHALL BE: B1  
- BLOCK FILL 17.5MPa
10. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 AND SHALL BE PLACED CENTRAL IN MASONRY BLOCK U.N.O. (HD BARS SHALL NOT BE REBENT)
11. CHASING OF LOAD BEARING MASONRY UNITS IS NOT PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

| REINFORCING LAP LENGTHS |                  |      |                  |      |
|-------------------------|------------------|------|------------------|------|
|                         | MASONRY(17.5MPa) |      | CONCRETE (25MPa) |      |
| BAR SIZE                | 300              | 500  | 300              | 500  |
| 10                      | 400              | 700  | -                | -    |
| 12                      | 480              | 840  | 360              | 600  |
| 16                      | 640              | 1120 | 480              | 800  |
| 20                      | 800              | 1400 | 600              | 1000 |
| 25                      | -                | -    | 750              | 1250 |

| REINFORCEMENT COVER     |    | MASONRY | CONCRETE |
|-------------------------|----|---------|----------|
| EXPOSURE CLASSIFICATION |    | 17.5MPa | 25MPa    |
| INTERIOR                | A1 | 35      | 25       |
| EXTERIOR - MOD          | B1 | 50      | 40       |
| AGAINST GROUND          |    | -       | 75       |

TIMBER:

1. ALL TIMBER WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3602:2003
2. ALL BOLTED TIMBER CONNECTIONS TO HAVE 50x50x3 WASHERS.
3. ALL TIMBER TO BE MSG8 UNLESS SPECIFIED OTHERWISE.
4. TIMBER CONNECTIONS NOT SHOWN TO BE IN ACCORDANCE WITH NZS3604. TIMBER SIZES NOT SHOWN REFER ARCHITECT.
5. EXTERNAL BOLTS, WASHERS & BRACKETS TO BE STAINLESS STEEL.

| TIMBER HAZARD CLASSIFICATIONS |                                                                                                                                                   |                                                                                    |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| HAZARD CLASS                  | SERVICE CONDITIONS                                                                                                                                | TYPICAL USES                                                                       |
| H1.2                          | PROTECTED FROM WEATHER, BUT WITH A RISK OF MOISTURE CONTENT CONDUCTIVE TO DECAY                                                                   | WALL FRAMING - SEE NZS3604                                                         |
| H3.2                          | PERIODIC WETTING, NOT IN CONTACT WITH THE GROUND, MORE CRITICAL END USES                                                                          | DECKS, PERGOLAS, EXTERNAL BEAMS, POST NOT IN GROUND                                |
| H4                            | GROUND CONTACT, OR CONDITIONS OF SEVERE OR CONTINUOUS WETTING                                                                                     | FENCE POSTS, LANDSCAPING TIMBER NOT REQUIRING A BUILDING CONSENT                   |
| H5                            | GROUND CONTACT, OR CONDITIONS OF SEVERE OF CONTINUOUS WETTING, WHERE USES ARE CRITICAL AND WHERE A HIGHER LEVEL OF PROTECTION THAN H4 IS REQUIRED | HOUSE PILES AND POLES, CRIB WALLING, POSTS IN GROUND FOR DECKS, VERANDAS, PERGOLAS |

SAFETY STATEMENT:

1. PROPPING:  
  
EXISTING LOAD BEARING STRUCTURAL ELEMENTS SHALL BE ADEQUATELY PROPPED PRIOR TO REMOVING ANY SUPPORTING STRUCTURE. PROPPING SHALL REMAIN UNTIL NEW SUPPORTING STRUCTURE IS INSTALLED AS PER THE ENGINEER'S DRAWINGS AND REQUIREMENTS.  
  
THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE BUILDER.  
  
TEMPORARY WORK AND PROPPING IS THE RESPONSIBILITY OF THE BUILDER.
2. PRECAST WALL  
  
THE PRE-CAST PANEL MANUFACTURER AND BUILDER SHALL FOLLOW THE:  
  
*Approved Code of Practice for The Safe Handling, Transportation and Erection of Precast Concrete*, AND  
  
ANY REQUIREMENTS SPECIFIED BY THE HEALTH AND SAFETY AT WORK REGULATIONS.  
  
REFER TO [www.business.govt.nz/worksafe/information\\_guidance/all\\_guidance\\_items/scaffolding\\_best\\_practice\\_guideline\\_for\\_scaffolding\\_in\\_new\\_zealand/section\\_6\\_particular\\_scaffolds\\_and\\_scaffolding\\_structures/6.13\\_falsework\\_or\\_propping](http://www.business.govt.nz/worksafe/information_guidance/all_guidance_items/scaffolding_best_practice_guideline_for_scaffolding_in_new_zealand/section_6_particular_scaffolds_and_scaffolding_structures/6.13_falsework_or_propping)

PROJECT

PROPOSED NEW DWELLING

ADDRESS

1 PIHIOHOI CLOSE, WAIKANAE

Lower Hutt Office  
Tel: 04 566 8004  
Level 1, 70 Bloomfield Tce  
P.O. Box 30 535  
Lower Hutt 5040  
[email@certa.nz](mailto:email@certa.nz)

DATE: 4 May 2023

DESIGNED: JW

DRAWN: BV

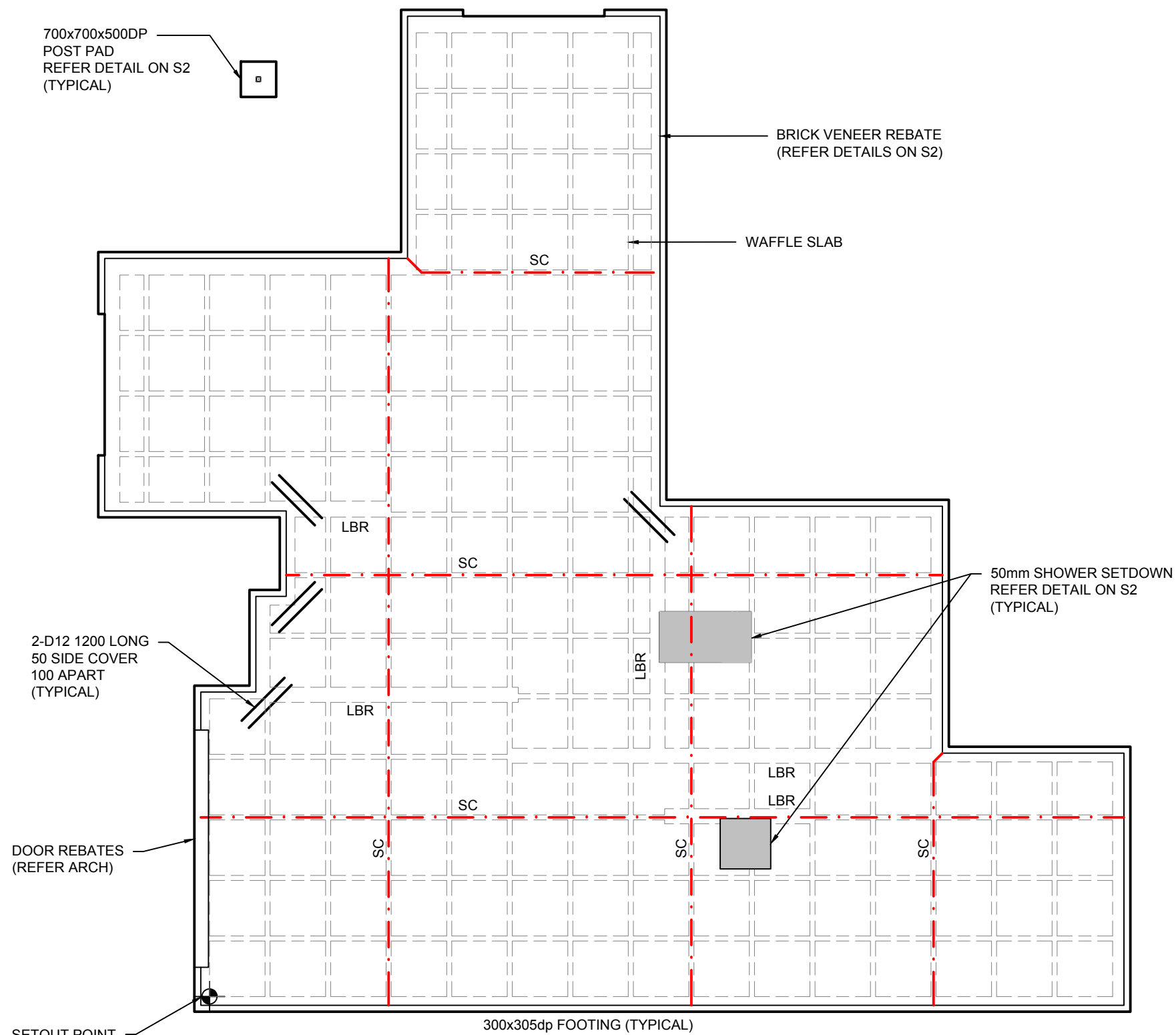
APPROVED: SRNP

JOB No: 44175

SHT No: S0

REV: A

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**FOUNDATION PLAN**

SCALE 1:100

- SC SAWCUT (REFER S2)
- LBR LOAD BEARING RIB - 300x300dp TYPICAL (REFER S2)

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ARCHITECT TO ENSURE THAT ALL LOAD BEARING WALL HAVE A LOAD BEARING FOUNDATION BEAM UNDERNEATH THEM.

REFER STRUCTURAL CALCULATIONS FOR INSPECTION SCHEDULE

TRUSS MANUFACTURER TO ENSURE ALL TRUSS LOADS ARE TO INTERNAL THICKENINGS OR EXTERNAL PERIMETER

PROJECT

**PROPOSED NEW DWELLING**

ADDRESS

**1 PIHIOHOI CLOSE, WAIKANAE**

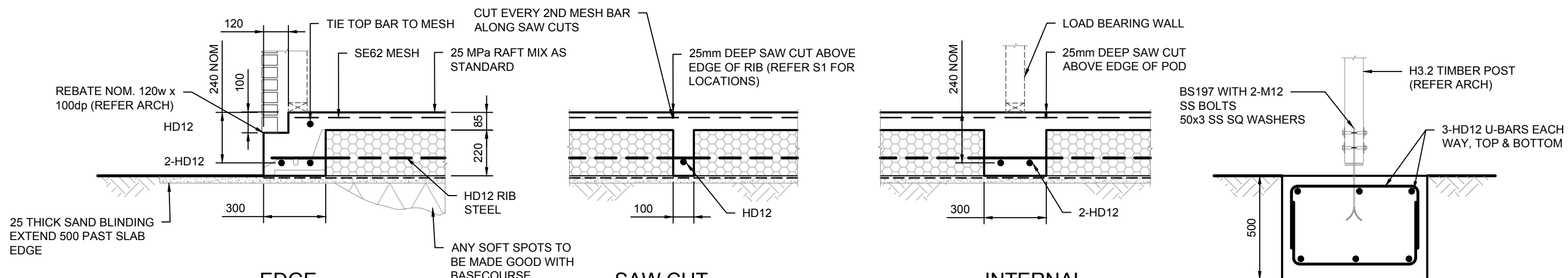


**CERTA  
ENGINEERING**

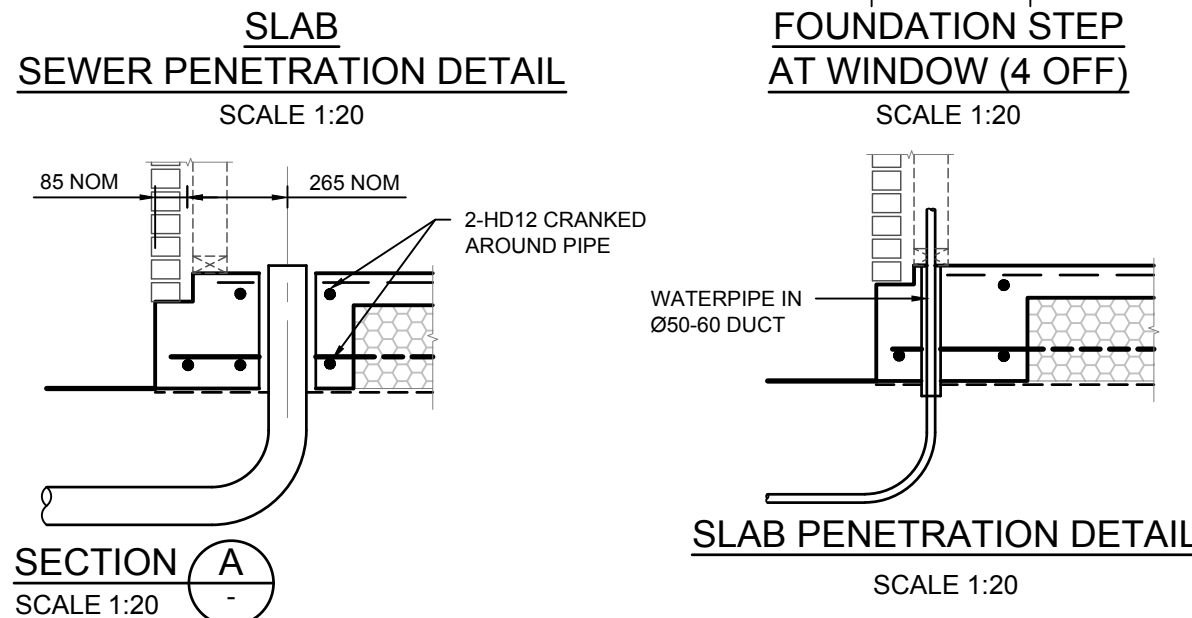
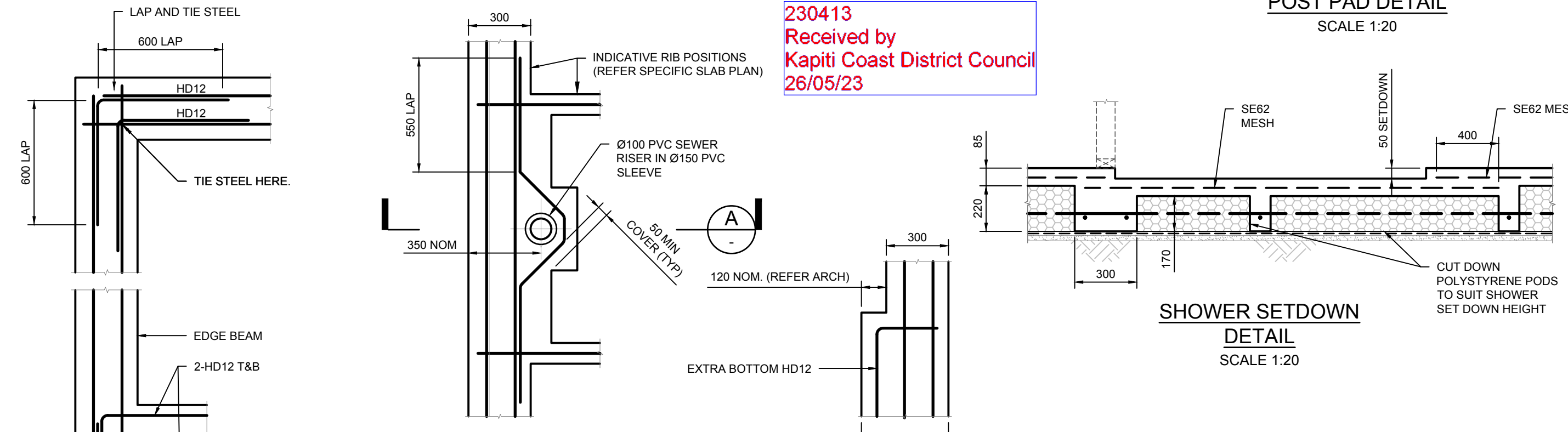
Lower Hutt Office  
Tel: 04 566 8004  
Level 1, 70 Bloomfield Tce  
P.O. Box 30 535  
Lower Hutt 5040  
[email@certa.nz](mailto:email@certa.nz)

|         |              |           |           |
|---------|--------------|-----------|-----------|
| DATE:   | 4 May 2023   | DESIGNED: | JW        |
| DRAWN:  | BV           | APPROVED: | SRNP      |
| JOB No: | <b>44175</b> | SHT No:   | <b>S1</b> |
|         |              | REV:      | <b>A</b>  |





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|                                                                                                                                                                                                                                                                       |                   |               |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|--|
| PROJECT<br><b>PROPOSED NEW DWELLING</b>                                                                                                                                                                                                                               |                   |               |  |
| ADDRESS<br><b>1 PIHIOHOI CLOSE, WAIKANAE</b>                                                                                                                                                                                                                          |                   |               |  |
|  <div>Lower Hutt Office<br/>Tel: 04 566 8004<br/>Level 1, 70 Bloomfield Tce<br/>P.O. Box 30 535<br/>Lower Hutt 5040<br/><a href="mailto:email@certa.nz">email@certa.nz</a></div> |                   |               |  |
| DATE: 4 May 2023                                                                                                                                                                                                                                                      | DESIGNED: JW      |               |  |
| DRAWN: BV                                                                                                                                                                                                                                                             | APPROVED: SRNP    |               |  |
| JOB No: <b>44175</b>                                                                                                                                                                                                                                                  | SHT No: <b>S2</b> | REV: <b>A</b> |  |



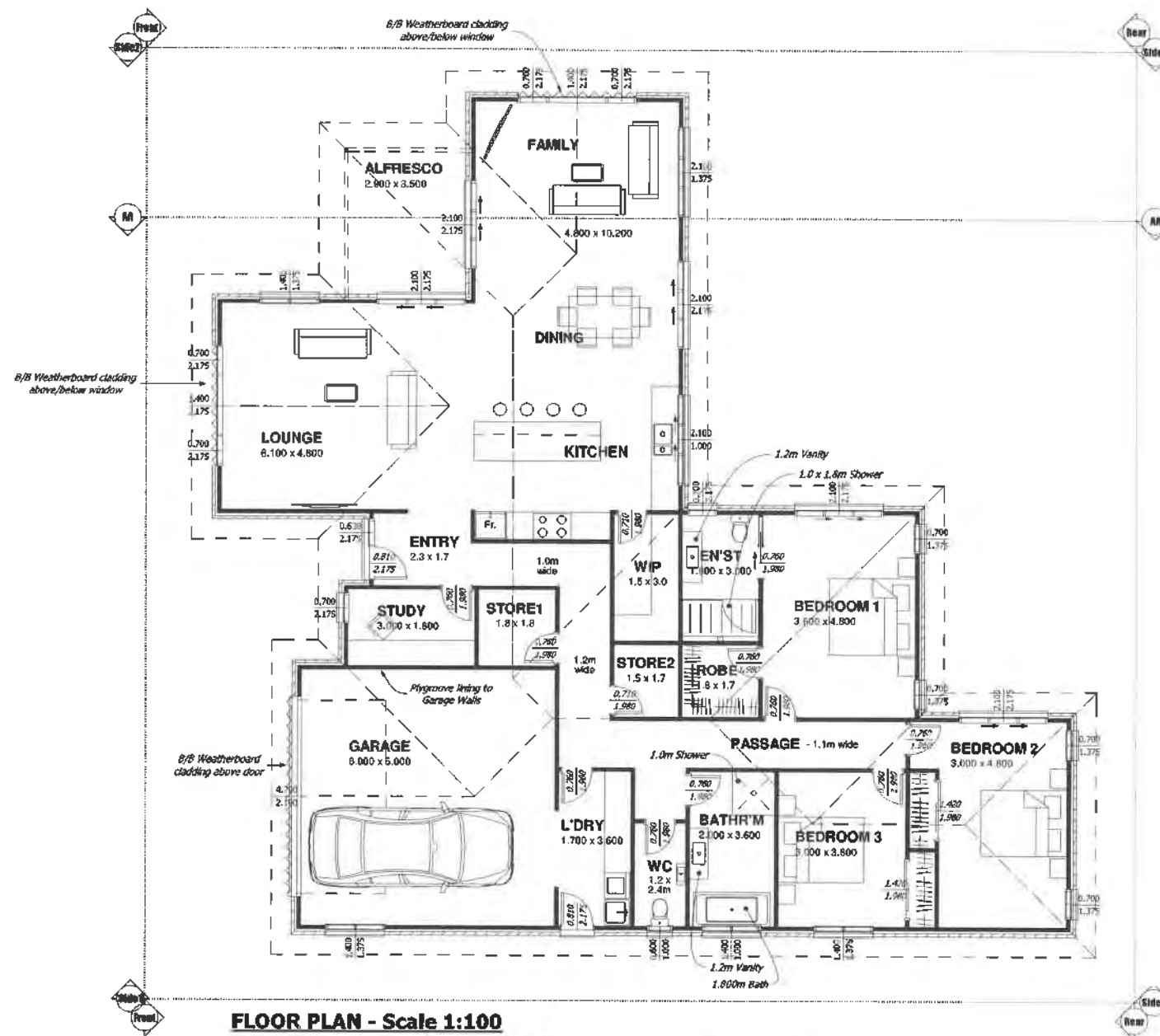
**Proposed New Dwelling for:  
Lot 45 Manu Park Stage II, Waikanae**

Prepared by:  **PlanWork**

Drawn: S. Neale  
Date: 03-10-22

Issue:  
Job Number  
**WA 45MP**

Design Plans Ltd / P.O. Box 10424  
Services: New Zealand House  
Phone: 04 478 4000, Mobile: 021 672 1102  
Email: [info@newzealandh.co.nz](mailto:info@newzealandh.co.nz)



**FLOOR PLAN - Scale 1:100**  
**Area = 236.5m<sup>2</sup> (over frame)**  
**246.7m<sup>2</sup> over brick (+ 1.0 & 10.0m<sup>2</sup> Entry/Alfresco)**  
 ~~~~~ = Timber B/B Weatherboard (direct fixed) over plywood substrate

Proposed New Dwelling for:
Lot 45 Manu Park Stage II, Waitanee

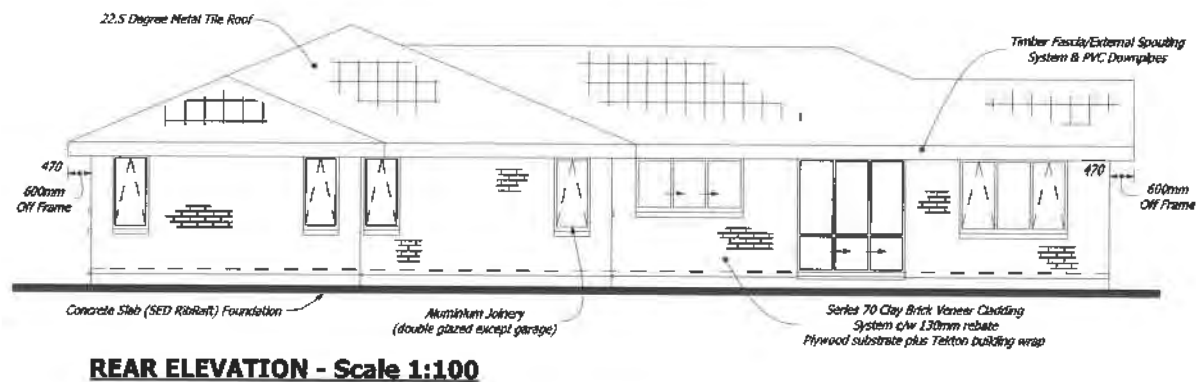
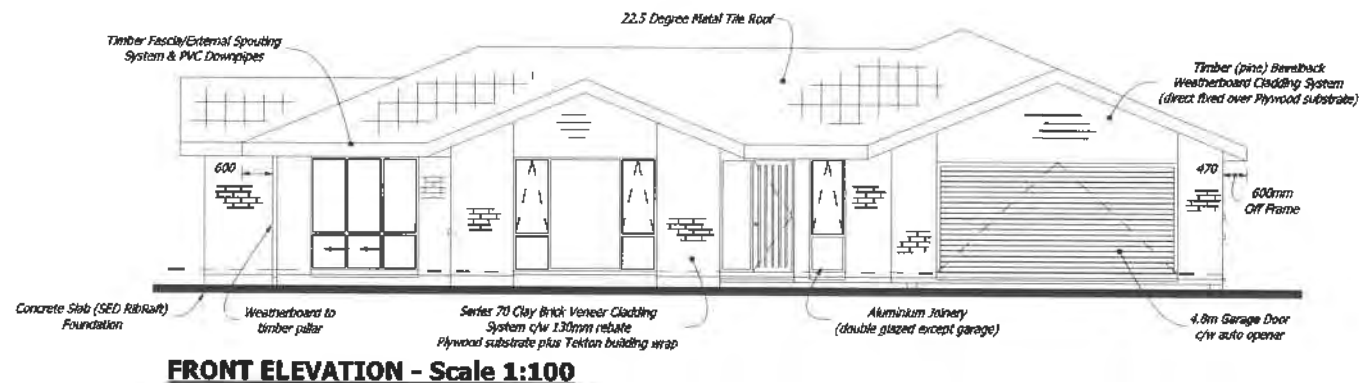
Prepared by: **PlanWorks**

Drawn: S. Neale
 Date: 03-10-22
 Job Number: **WA 45MP**

Issue:

Design Plans Ltd - 43 The Iron Horse
 Seaford, New Zealand
 Phone: 027 307 9016 Mobile: 027 672 178
 Email: info@designplans.co.nz

These plans have been prepared with all reasonable care and attention, and the drafter accepts no liability for any loss or damage arising from the use of these plans. The drafter is not responsible for any loss or damage arising from the use of these plans. The drafter is not responsible for any loss or damage arising from the use of these plans.



Proposed New Dwelling for:
Lot 45 Manu Park Stage II, Waitanee

Prepared by: **PlanWorks**

Drawn: S. Neale
Date: 03-10-22

Issue:

Job Number
WA 45MP

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Services New Zealand Wide.
Phone: 0800 300 300. Mobile: 08 672 672 180.
Email: info@thepanworks.co.nz

I hereby certify that the information contained in this plan is true and correct, and that I am a duly qualified and registered architect under the provisions of the Architectural Act 1992 and the Architectural Regulations 1992. I am not aware of any other person who is not a duly qualified and registered architect who has provided information to me for inclusion in this plan. I warrant that the information provided to me is true and correct, and that I am a duly qualified and registered architect under the provisions of the Architectural Act 1992 and the Architectural Regulations 1992. I warrant that the information provided to me is true and correct, and that I am a duly qualified and registered architect under the provisions of the Architectural Act 1992 and the Architectural Regulations 1992.

Date

12/4/23

Eng.

Jw

Job No.

44175

Sheet No.

Project

(Lot 45 Mann Park) | Pihāhōi Close, Waihanape



CALCULATIONS

Foundations (only doing fdn's.)

- geotech report

300mm slab thickening/beam to 200kPa 0.3m BGL
 300kPa 0.5m BGL

excavate 300mm topsoil

add 2x150mm layers hard fill.

bearing to 200kPa

house to single storey heavy cladding
light roof

1 blow 150mm to 230kPa (200) for 200mm to 4
 1.5 blows 150mm to 300kPa (200) for 100mm to 3

300mm to 7 blows

Riechert Manual to Building Type B (single storey heavy walls)

min blows / 300mm to 7 for type B to OK.

↓

Typ. Riechert Fdn OK.

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based on
newer
scale's

↓
 min
 20 blows
 150mm
 OK

good
 ground

Date
12/4/23

Eng. JW

Job No.
44175

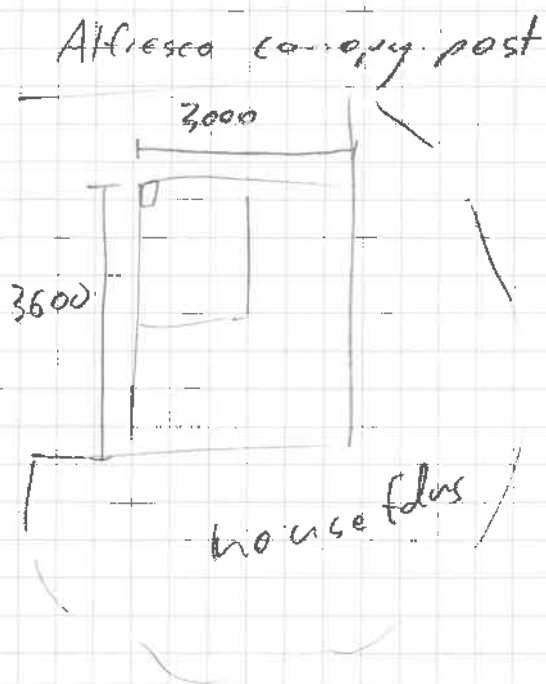
Sheet No.

Project

Lot 45 Mann Park



CALCULATIONS



$$\text{Area onto post} = \frac{3.6 \times 3}{4} = 2.7 \text{ m}^2$$

light roof

up 0. - 1.5 up, 0.3 down

wind 0 VH (arch.)

300Pa at 0m BGL

~~300Pa at 0.5m BGL~~

600 x 600 dec, OK

$$A = 0.283 \text{ m}^2$$

$$550 \times 550, A = 0.303 \text{ m}^2$$

Job Name: 1 Pihono Close (Lot 45 Manu Park)
Location: Waikanae

Job Num: 44175
Date: 17-Apr-23
Engineer: JW



Roof canopy post foundation

Determine loads from roof

Area = 2.70 m² G = 0.35 kPa Q = 0.25 kPa
 Up Down
 Vz = 50 m/s Cpn = -1.5 0.3

| G | Q | Wup | Wdn | 1.2G+1.5Q | 1.2G + Wdn | 0.9G+Wup |
|------|------|-------|------|-----------|------------|----------|
| 0.95 | 0.68 | -6.08 | 1.22 | 2.15 | 2.35 | -5.22 |

Max 2.35 kN Min -5.22 kN

Determine Critical Timber fixing Load

Max = 5.22 kN ($k_1 = 1$)

Type of fixing - M12 Bolt

F k1, k12 Qn n
 0.7x1x0.7 6.97 2 = 6.83 kN OKAY

Determine Pad & Plinth Capacity

$\Phi Q_b = 150$ kPa near surface
 Plinth b = 0 mm depth = 0 mm 225mm Min Plinth
 Pad b = 700 mm depth = 500 mm
 min b = 125 mm
 $Q_b = 5$ kPa OKAY $\Phi W_t = 5.29$ kN OKAY

(Skin fiction formula - Kulhawy 1979)

Determine Augered Pile & Plinth Capacity

Pile skin fiction = $\Phi \cdot \pi \cdot d \cdot L^2 \cdot 0.5 \cdot K_a \cdot \gamma \cdot \tan \phi$

NOTE: Assume loose sand friction properties

$\phi = 0.5$, $K_a = 0.33$, $\gamma = 16$ kN/m³, $\phi = 30$ deg

$\Phi Q_b = 100$ kPa at depth
 Plinth b = mm depth = mm 225mm Min Plinth
 Pile Dia = 600 mm depth = 620 mm
 min dia = 86 mm
 $Q_b = 8$ kPa OKAY $\Phi W_t = 4.67$ kN
 $\Phi F_t = 0.55$ kN
 Φ Total uplift resistance = 5.23 kN OKAY

(Due to soil creep, soil friction capacity is should be use to resist brief loads only)

Determine Driven Pile & Plinth Capacity

Pile skin fiction = $\Phi \cdot \pi \cdot d \cdot L^2 \cdot 0.5 \cdot \sqrt{K_p} \cdot \gamma \cdot \tan \phi$

NOTE: Assume dense sand friction properties

$\phi = 0.5$, $K_p = 3$, $\gamma = 16$ kN/m³, $\phi = 30$ deg

$\Phi N_c =$ kN
 Plinth b = mm depth = mm
 Pile cap b = mm
 Pile Dia = mm Total depth = mm
 Skin friction ignored to depth = mm (ignore skin friction in loose soils)
 ΦN_c OKAY $\Phi W_t = 0.00$ kN
 $\Phi F_t = 0.00$ kN
 Φ Total uplift resistance = 0.00 kN No Good

(Due to soil creep, soil friction capacity is should be use to resist brief loads only)

Table 2: Estimated "Free-Field" Ground Surface Settlements & Performance Levels

| Earthquake scenario | Total Estimated Ground Surface Settlements (full depth tested) | Performance Level
(as per Table 5.1 of MBIE – NZGS Module 3) |
|--|--|---|
| Interim NZ Seismic Hazard Model | | |
| 1/25-year SLS event | - | Insignificant effects - L0 |
| 1/100-year IE | <40 mm | LSN 0 to 5
LPI 0 to 2
Mild to moderate effects - L1 / L2 |
| 1/500-year ULS event | <60 mm | LSN 0 to 8
LPI 0 to 11
Moderate effects - L2 |

* LSN = Liquefaction Severity Number. LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

The liquefaction assessment indicates that liquefaction is unlikely to be triggered under SLS loading conditions with moderate effects anticipated under ULS loading conditions. Furthermore, the presence of a thick non-liquefiable crust (2.5 m to 6.5 m in thickness) provides additional resilience and significantly reduces the severity of liquefaction induced damage (demonstrated by the low values of LSN).

5. Foundation Recommendations

With consideration of the assessment presented herein, NZS3604 foundation systems are considered feasible for NZS3604 compliant structures, with consideration of the available bearing capacity.

The following geotechnical ultimate bearing capacities (GUBC) may be assumed for typical foundations:

- Min. 300 mm wide strip footing / ground beam / slab thickening:
 - 200 kPa at 0.3 mbgl.
 - 300 kPa at 0.5 mbgl.
- Min. 400 mm square pad footing / pile base:
 - 300 kPa at 0.4 mbgl.

* The subgrade should be inspected by a suitably experienced geo-professional during construction and compacted / proof rolled prior to foundation construction. Any material identified as being soft or unsuitable should be removed and replaced with compacted hardfill (or site materials suitable for backfill and compaction).

*generic-site wide
scalars done by Corta 22/3/23
show good ground at surface
for Lot 45.*

TOTAL CUT = 55040m³
TOTAL FILL = 61110m³
VOLUMES ARE SOLID IN PLACE, NO BULKING ALLOWANCE
VOLUMES ARE TO FINISHED DESIGN SURFACE TIN
NO ALLOWANCE FOR ADDITIONAL CUT TO SUBGRADE, TRENCHES, SOAKAGE ETC
NO ALLOWANCE FOR ADDITIONAL FILL TO SUPPORT AND COVER NEW SEWER PIPE
NO BULKING ALLOWANCE OR COMPACTION FACTOR ALLOWED FOR

In appendix
d Miyamoto
Geotech report.



CUT / FILL DEPTHS

| CUT / FILL DEPTHS | Color |
|-------------------|-----------|
| -4.0 to -3.5 m | Dark Red |
| -3.5 to -2 m | Red |
| -2 to -1.5 m | Light Red |
| -1.5 to -1 m | Light Red |
| -1 to -0.5 m | Light Red |
| -0.5 to 0 m | Light Red |
| 0 to 0.5 m | Light Red |
| 0.5 to 1 m | Light Red |
| 1 to 1.5 m | Light Red |
| 1.5 to 2 m | Light Red |
| 2 to 2.5 m | Light Red |
| 2.5 to 3 m | Light Red |

LEGEND

- ECOLOGICAL ZONE 10m BUFFER
- UNPAVED ROYALTY BOUNDARY
- PROTECTOR

SCALE
1:600

REDUCED SCALE
A3 - 1:200

CLIENT
LANDMATTERS LIMITED

PROJECT
MANU PARK STAGE 2 & 2A
WAIPUNAHAU ROAD
WAIKANA E NORTH

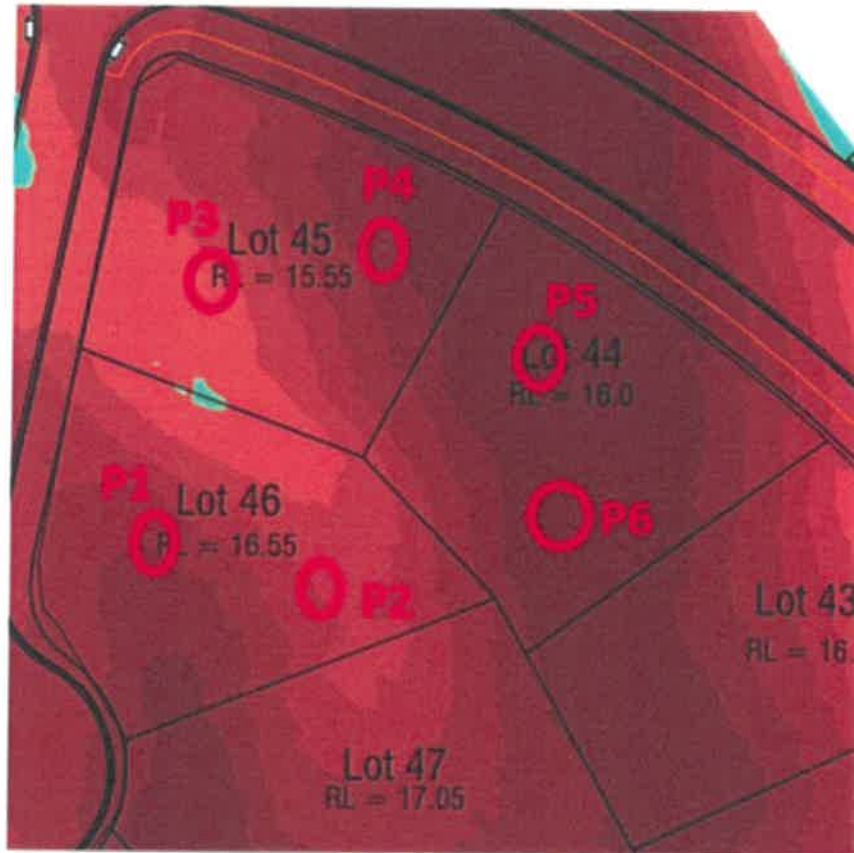
ENGINEERING PLANS
EWP 03

| NAME | DATE | SHEET | OF |
|----------|----------|-------|----|
| REVISION | 01/05/21 | 1 | 1 |
| ORANGE | 15/05/21 | 2 | 2 |
| CHIEF | 15/05/21 | 3 | 3 |

22621 ENG

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SCALA PENETROMETER TEST LOCATION PLAN

CLIENT
Peterson Homes Ltd

PROJECT
Lot 46, 3 Pihohoi Close
Manu Park



**CERTA
ENGINEERING**

Lower Hutt Office
Tel: 04 566 8004
Level 1, 14 Laings Rd
P.O. Box 30 535
Lower Hutt 5040
email@certa.nz

DATE 22/03/2023

DRAWN KJG

JOB No: J44051

DESIGNED

APPROVED:

SHEET No:

REV

Job Number J44051
 Date 22-Mar-23
 Location Lot 46 Manu Park
 Client 0

Signed



| Probe Number 1 | | | | Probe Number 2 | | | | Probe Number 3 | | | |
|--|-------------|--------------|------------|--|-------------|--------------|------------|--|-------------|--------------|------------|
| ULS Reduct. $\phi = 1$ | | | | ULS Reduct. $\phi = 1$ | | | | ULS Reduct. $\phi = 1$ | | | |
| Des. pile depth = 300 mm | | | | Des. pile depth = mm | | | | Des. pile depth = mm | | | |
| Design $\phi_{q_n} = 665$ kPa (at design found. depth) | | | | Design $\phi_{q_n} = \#N/A$ kPa (at design found. depth) | | | | Design $\phi_{q_n} = \#N/A$ kPa (at design found. depth) | | | |
| Depth | blows /50mm | ϕ_{q_n} | blows/50mm | Depth | blows /50mm | ϕ_{q_n} | blows/50mm | Depth | blows /50mm | ϕ_{q_n} | blows/50mm |
| 50 | 2 | 390 | | 50 | 2 | 390 | | 50 | 2 | 390 | |
| 100 | 2 | 390 | | 100 | 2 | 390 | | 100 | 2 | 390 | |
| 150 | 2 | 390 | | 150 | 2 | 390 | | 150 | 2 | 390 | |
| 200 | 3 | 545 | | 200 | 2 | 390 | | 200 | 2 | 390 | |
| 250 | 3 | 545 | | 250 | 3 | 545 | | 250 | 6 | 820 | |
| 300 | 4 | 665 | | 300 | 3 | 545 | | 300 | 8 | 1000 | |
| 350 | 5 | 735 | | 350 | 4 | 665 | | 350 | 15 | 1470 | |
| 400 | 6 | 820 | | 400 | 4 | 665 | | 400 | 0 | | |
| 450 | 7 | 915 | | 450 | 5 | 735 | | 450 | 0 | | |
| 500 | 15 | 1470 | | 500 | 5 | 735 | | 500 | 0 | | |
| 550 | 0 | | | 550 | 6 | 820 | | 550 | 0 | | |
| 600 | 0 | | | 600 | 15 | 1470 | | 600 | 0 | | |
| 650 | 0 | | | 650 | 0 | | | 650 | 0 | | |
| 700 | 0 | | | 700 | 0 | | | 700 | 0 | | |
| 750 | 0 | | | 750 | 0 | | | 750 | 0 | | |
| 800 | 0 | | | 800 | 0 | | | 800 | 0 | | |
| 850 | 0 | | | 850 | 0 | | | 850 | 0 | | |
| 900 | 0 | | | 900 | 0 | | | 900 | 0 | | |
| 950 | 0 | | | 950 | 0 | | | 950 | 0 | | |
| 1000 | 0 | | | 1000 | 0 | | | 1000 | 0 | | |
| 1050 | 0 | | | 1050 | 0 | | | 1050 | 0 | | |
| 1100 | 0 | | | 1100 | 0 | | | 1100 | 0 | | |
| 1150 | 0 | | | 1150 | 0 | | | 1150 | 0 | | |
| 1200 | 0 | | | 1200 | 0 | | | 1200 | 0 | | |
| 1250 | 0 | | | 1250 | 0 | | | 1250 | 0 | | |
| 1300 | 0 | | | 1300 | 0 | | | 1300 | 0 | | |
| 1350 | 0 | | | 1350 | 0 | | | 1350 | 0 | | |
| 1400 | 0 | | | 1400 | 0 | | | 1400 | 0 | | |
| 1450 | 0 | | | 1450 | 0 | | | 1450 | 0 | | |
| 1500 | 0 | | | 1500 | 0 | | | 1500 | 0 | | |
| 1550 | 0 | | | 1550 | 0 | | | 1550 | 0 | | |
| 1600 | 0 | | | 1600 | 0 | | | 1600 | 0 | | |
| 1650 | 0 | | | 1650 | 0 | | | 1650 | 0 | | |
| 1700 | 0 | | | 1700 | 0 | | | 1700 | 0 | | |
| 1750 | 0 | | | 1750 | 0 | | | 1750 | 0 | | |
| 1800 | 0 | | | 1800 | 0 | | | 1800 | 0 | | |
| 1850 | 0 | | | 1850 | 0 | | | 1850 | 0 | | |
| 1900 | 0 | | | 1900 | 0 | | | 1900 | 0 | | |
| 1950 | 0 | | | 1950 | 0 | | | 1950 | 0 | | |
| 2000 | 0 | | | 2000 | 0 | | | 2000 | 0 | | |
| 2050 | 0 | | | 2050 | 0 | | | 2050 | 0 | | |
| 2100 | 0 | | | 2100 | 0 | | | 2100 | 0 | | |
| 2150 | 0 | | | 2150 | 0 | | | 2150 | 0 | | |
| 2200 | 0 | | | 2200 | 0 | | | 2200 | 0 | | |
| 2250 | 0 | | | 2250 | 0 | | | 2250 | 0 | | |
| 2300 | 0 | | | 2300 | 0 | | | 2300 | 0 | | |
| 2350 | 0 | | | 2350 | 0 | | | 2350 | 0 | | |
| 2400 | 0 | | | 2400 | 0 | | | 2400 | 0 | | |
| 2450 | 0 | | | 2450 | 0 | | | 2450 | 0 | | |
| 2500 | 0 | | | 2500 | 0 | | | 2500 | 0 | | |
| 2550 | 0 | | | 2550 | 0 | | | 2550 | 0 | | |
| 2600 | 0 | | | 2600 | 0 | | | 2600 | 0 | | |
| 2650 | 0 | | | 2650 | 0 | | | 2650 | 0 | | |
| 2700 | 0 | | | 2700 | 0 | | | 2700 | 0 | | |
| 2750 | 0 | | | 2750 | 0 | | | 2750 | 0 | | |
| 2800 | 0 | | | 2800 | 0 | | | 2800 | 0 | | |
| 2850 | 0 | | | 2850 | 0 | | | 2850 | 0 | | |
| 2900 | 0 | | | 2900 | 0 | | | 2900 | 0 | | |
| 2950 | 0 | | | 2950 | 0 | | | 2950 | 0 | | |
| 3000 | 0 | | | 3000 | 0 | | | 3000 | 0 | | |
| 3050 | 0 | | | 3050 | 0 | | | 3050 | 0 | | |
| 3100 | 0 | | | 3100 | 0 | | | 3100 | 0 | | |
| 3150 | 0 | | | 3150 | 0 | | | 3150 | 0 | | |
| 3200 | 0 | | | 3200 | 0 | | | 3200 | 0 | | |
| 3250 | 0 | | | 3250 | 0 | | | 3250 | 0 | | |
| 3300 | 0 | | | 3300 | 0 | | | 3300 | 0 | | |
| 3350 | 0 | | | 3350 | 0 | | | 3350 | 0 | | |
| 3400 | 0 | | | 3400 | 0 | | | 3400 | 0 | | |
| 3450 | 0 | | | 3450 | 0 | | | 3450 | 0 | | |
| 3500 | 0 | | | 3500 | 0 | | | 3500 | 0 | | |

NB: Design ϕ_{q_n} calculated by conversion of the allowable bearing stress Stockwell 1977 Scala penetrometer charts of the publication "Determination of allowable bearing pressure under small structures - New Zealand Engineering, Vol. 32, No. 6, June 1977: 132-135"

Job Number **J44051**
 Date **22-Mar-23**
 Location **Lot 46 Manu Park**

Signed _____



www.certa.nz

Client _____

Probe Number 4

ULS Reduct. $\phi = 1$
 Des. pile depth = mm
 Design $\phi_{q_n} = \#N/A$ kPa (at design found. depth)

| Depth | blows /50mm | ϕ_{q_n} | blows/50mm |
|-------|-------------|--------------|------------|
| 50 | 2 | 390 | |
| 100 | 3 | 545 | |
| 150 | 4 | 665 | |
| 200 | 3 | 545 | |
| 250 | 5 | 735 | |
| 300 | 7 | 915 | |
| 350 | 7 | 915 | |
| 400 | 8 | 1000 | |
| 450 | 15 | 1470 | |
| 500 | 0 | | |
| 550 | 0 | | |
| 600 | 0 | | |
| 650 | 0 | | |
| 700 | 0 | | |
| 750 | 0 | | |
| 800 | 0 | | |
| 850 | 0 | | |
| 900 | 0 | | |
| 950 | 0 | | |
| 1000 | 0 | | |
| 1050 | 0 | | |
| 1100 | 0 | | |
| 1150 | 0 | | |
| 1200 | 0 | | |
| 1250 | 0 | | |
| 1300 | 0 | | |
| 1350 | 0 | | |
| 1400 | 0 | | |
| 1450 | 0 | | |
| 1500 | 0 | | |
| 1550 | 0 | | |
| 1600 | 0 | | |
| 1650 | 0 | | |
| 1700 | 0 | | |
| 1750 | 0 | | |
| 1800 | 0 | | |
| 1850 | 0 | | |
| 1900 | 0 | | |
| 1950 | 0 | | |
| 2000 | 0 | | |
| 2050 | 0 | | |
| 2100 | 0 | | |
| 2150 | 0 | | |
| 2200 | 0 | | |
| 2250 | 0 | | |
| 2300 | 0 | | |
| 2350 | 0 | | |
| 2400 | 0 | | |
| 2450 | 0 | | |
| 2500 | 0 | | |
| 2550 | 0 | | |
| 2600 | 0 | | |
| 2650 | 0 | | |
| 2700 | 0 | | |
| 2750 | 0 | | |
| 2800 | 0 | | |
| 2850 | 0 | | |
| 2900 | 0 | | |
| 2950 | 0 | | |
| 3000 | 0 | | |
| 3050 | 0 | | |
| 3100 | 0 | | |
| 3150 | 0 | | |
| 3200 | 0 | | |
| 3250 | 0 | | |
| 3300 | 0 | | |
| 3350 | 0 | | |
| 3400 | 0 | | |
| 3450 | 0 | | |
| 3500 | 0 | | |

Probe Number 5

ULS Reduct. $\phi = 1$
 Des. pile depth = mm
 Design $\phi_{q_n} = \#N/A$ kPa (at design found. depth)

| Depth | blows /50mm | ϕ_{q_n} | blows/50mm |
|-------|-------------|--------------|------------|
| 50 | 2 | 390 | |
| 100 | 3 | 545 | |
| 150 | 3 | 545 | |
| 200 | 4 | 665 | |
| 250 | 4 | 665 | |
| 300 | 4 | 665 | |
| 350 | 5 | 735 | |
| 400 | 5 | 735 | |
| 450 | 5 | 735 | |
| 500 | 7 | 915 | |
| 550 | 8 | 1000 | |
| 600 | 10 | 1140 | |
| 650 | 0 | | |
| 700 | 0 | | |
| 750 | 0 | | |
| 800 | 0 | | |
| 850 | 0 | | |
| 900 | 0 | | |
| 950 | 0 | | |
| 1000 | 0 | | |
| 1050 | 0 | | |
| 1100 | 0 | | |
| 1150 | 0 | | |
| 1200 | 0 | | |
| 1250 | 0 | | |
| 1300 | 0 | | |
| 1350 | 0 | | |
| 1400 | 0 | | |
| 1450 | 0 | | |
| 1500 | 0 | | |
| 1550 | 0 | | |
| 1600 | 0 | | |
| 1650 | 0 | | |
| 1700 | 0 | | |
| 1750 | 0 | | |
| 1800 | 0 | | |
| 1850 | 0 | | |
| 1900 | 0 | | |
| 1950 | 0 | | |
| 2000 | 0 | | |
| 2050 | 0 | | |
| 2100 | 0 | | |
| 2150 | 0 | | |
| 2200 | 0 | | |
| 2250 | 0 | | |
| 2300 | 0 | | |
| 2350 | 0 | | |
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| 2500 | 0 | | |
| 2550 | 0 | | |
| 2600 | 0 | | |
| 2650 | 0 | | |
| 2700 | 0 | | |
| 2750 | 0 | | |
| 2800 | 0 | | |
| 2850 | 0 | | |
| 2900 | 0 | | |
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| 3000 | 0 | | |
| 3050 | 0 | | |
| 3100 | 0 | | |
| 3150 | 0 | | |
| 3200 | 0 | | |
| 3250 | 0 | | |
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| 3400 | 0 | | |
| 3450 | 0 | | |
| 3500 | 0 | | |

Probe Number 6

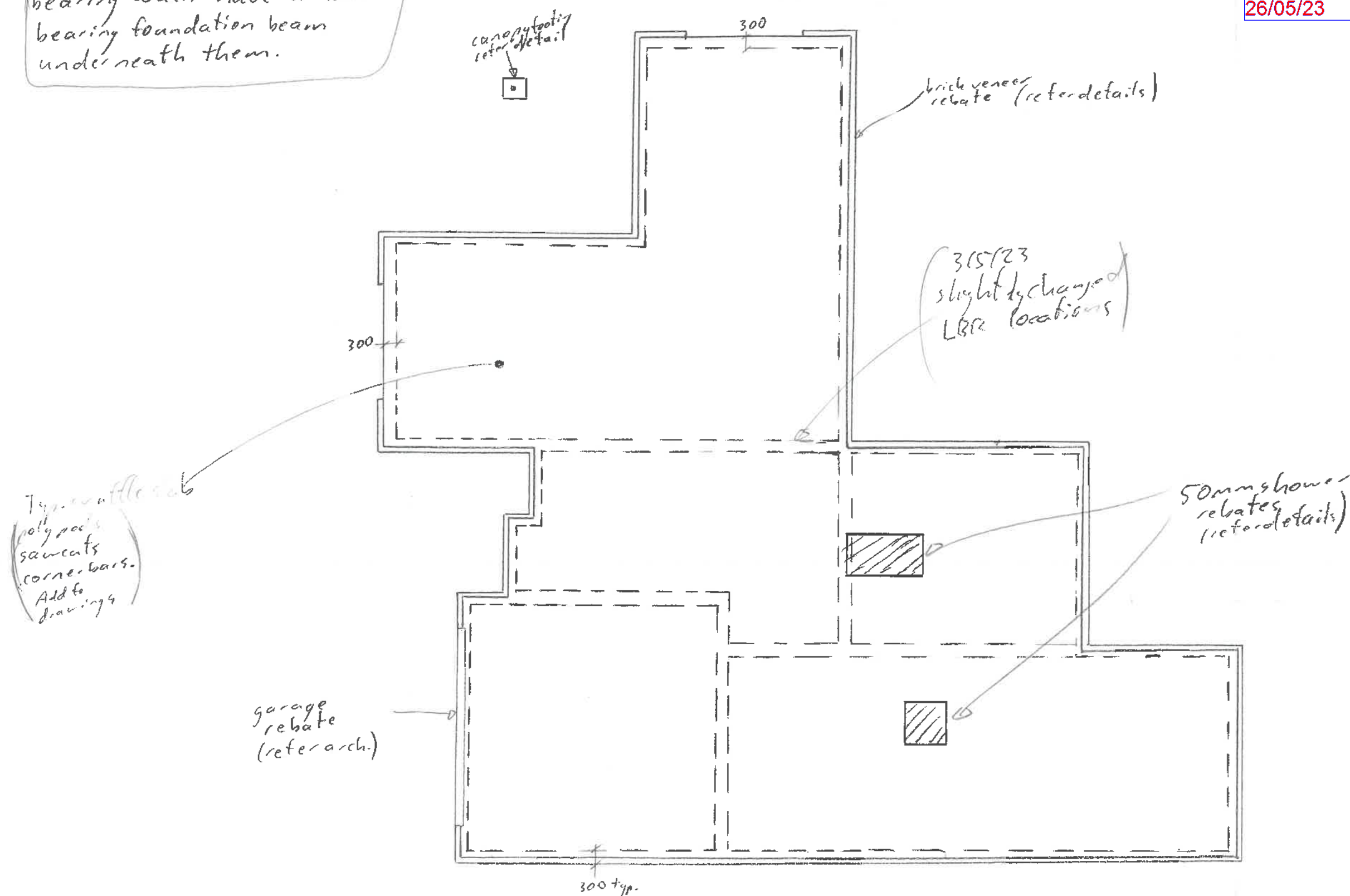
ULS Reduct. $\phi = 1$
 Des. pile depth = mm
 Design $\phi_{q_n} = \#N/A$ kPa (at design found. depth)

| Depth | blows /50mm | ϕ_{q_n} | blows/50mm |
|-------|-------------|--------------|------------|
| 50 | 2 | 390 | |
| 100 | 3 | 545 | |
| 150 | 3 | 545 | |
| 200 | 4 | 665 | |
| 250 | 5 | 735 | |
| 300 | 6 | 820 | |
| 350 | 7 | 915 | |
| 400 | 7 | 915 | |
| 450 | 7 | 915 | |
| 500 | 8 | 1000 | |
| 550 | 15 | 1470 | |
| 600 | 0 | | |
| 650 | 0 | | |
| 700 | 0 | | |
| 750 | 0 | | |
| 800 | 0 | | |
| 850 | 0 | | |
| 900 | 0 | | |
| 950 | 0 | | |
| 1000 | 0 | | |
| 1050 | 0 | | |
| 1100 | 0 | | |
| 1150 | 0 | | |
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| 1350 | 0 | | |
| 1400 | 0 | | |
| 1450 | 0 | | |
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| 1550 | 0 | | |
| 1600 | 0 | | |
| 1650 | 0 | | |
| 1700 | 0 | | |
| 1750 | 0 | | |
| 1800 | 0 | | |
| 1850 | 0 | | |
| 1900 | 0 | | |
| 1950 | 0 | | |
| 2000 | 0 | | |
| 2050 | 0 | | |
| 2100 | 0 | | |
| 2150 | 0 | | |
| 2200 | 0 | | |
| 2250 | 0 | | |
| 2300 | 0 | | |
| 2350 | 0 | | |
| 2400 | 0 | | |
| 2450 | 0 | | |
| 2500 | 0 | | |
| 2550 | 0 | | |
| 2600 | 0 | | |
| 2650 | 0 | | |
| 2700 | 0 | | |
| 2750 | 0 | | |
| 2800 | 0 | | |
| 2850 | 0 | | |
| 2900 | 0 | | |
| 2950 | 0 | | |
| 3000 | 0 | | |
| 3050 | 0 | | |
| 3100 | 0 | | |
| 3150 | 0 | | |
| 3200 | 0 | | |
| 3250 | 0 | | |
| 3300 | 0 | | |
| 3350 | 0 | | |
| 3400 | 0 | | |
| 3450 | 0 | | |
| 3500 | 0 | | |

NB: Design ϕ_{q_n} calculated by conversion of the allowable bearing stress Stockwell 1977 Scala penetrometer charts of the publication "Determination of allowable bearing pressure under small structures - New Zealand Engineering, Vol. 32, No. 6, June 1977: 132-135"

Architect to ensure that load bearing walls have a load bearing foundation beam underneath them.

230413
Received by
Kapiti Coast District Council
26/05/23



Foundation Plan

1:100

PROJECT

Proposed New Dwelling

ADDRESS

1 Pihooi Close
(Lot 45 Mann Park), Waihanae



Lower Hutt Office
Tel: 04 566 8004
Level 1, 70 Bloomfield Tce
P.O. Box 30 535
Lower Hutt 5040
email@certa.nz

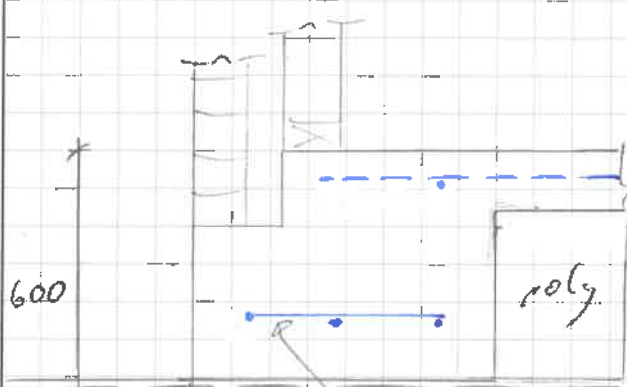
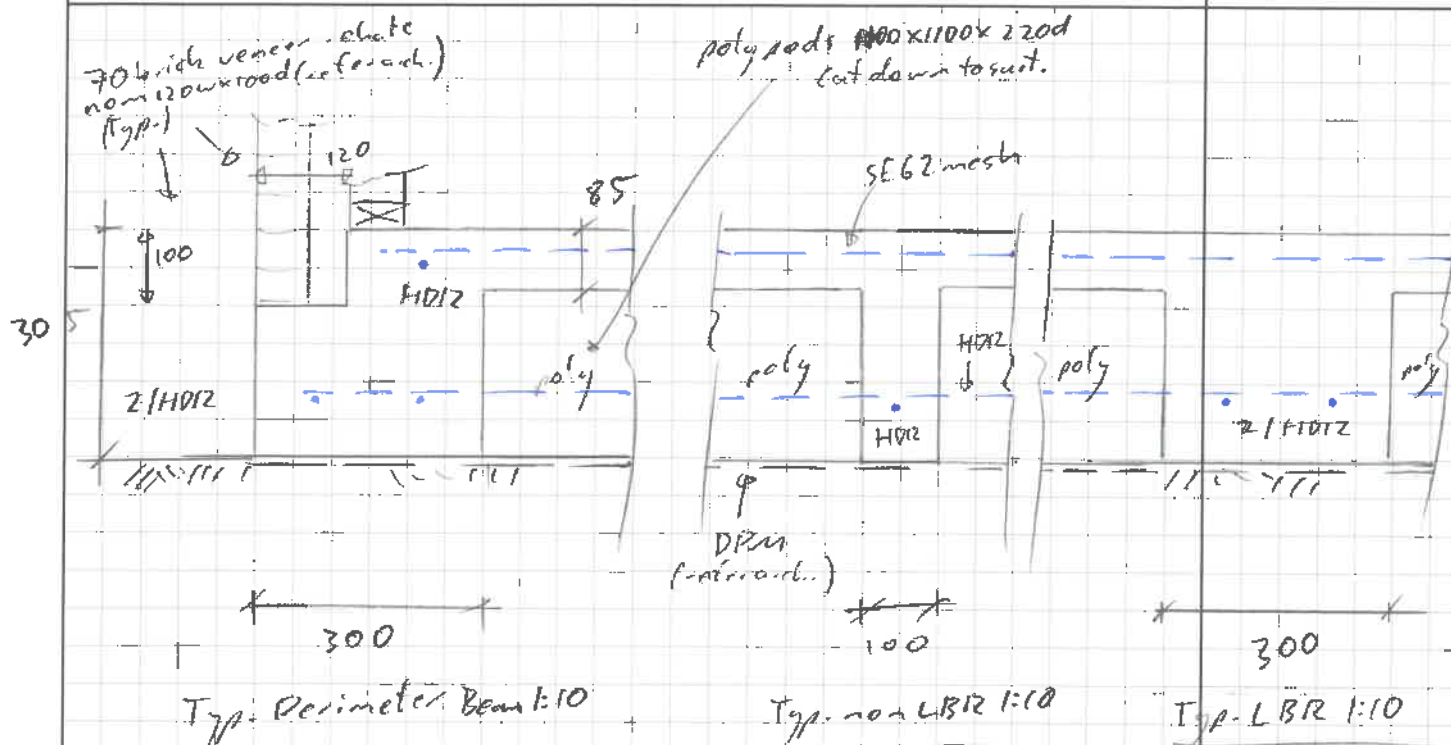
| | |
|------------------|--------------|
| DATE: April 2023 | DESIGNED: JW |
| DRAWN: | APPROVED: |
| JOB No: 44175 | SHT No: REV: |

Sheet No.

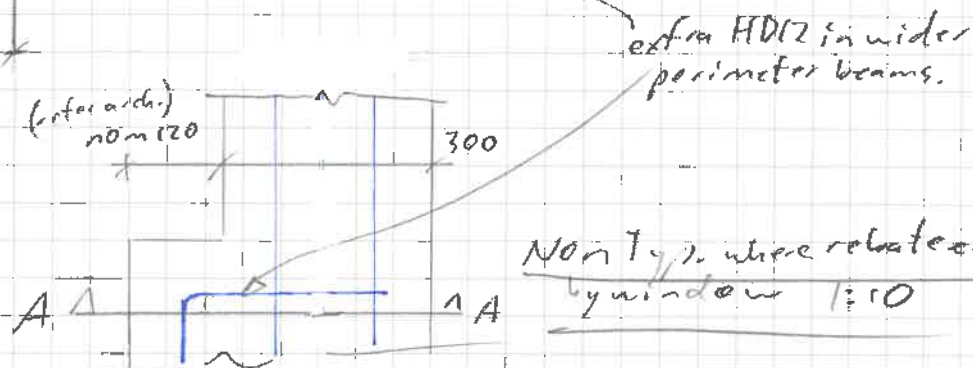
Lot 45 Main Park



CALCULATIONS



Sec A 1:10



Non Typ. where rotate ends
by window 1:10

~~Add excavation & compaction to these~~
~~next page~~

Date
17/4/23Eng. *JW*Job No.
44175

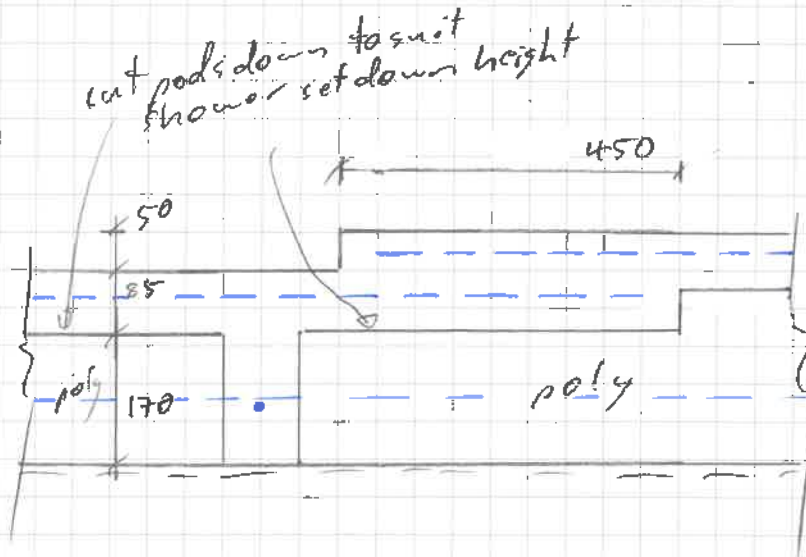
Sheet No.

Project

1 Pihoihoi Close (Lot 45 Manu Park)



CALCULATIONS



Shower Rebate Detail (Typ.) 1:10

Date 12/4/23

Eng. Jw

Job No. 44175

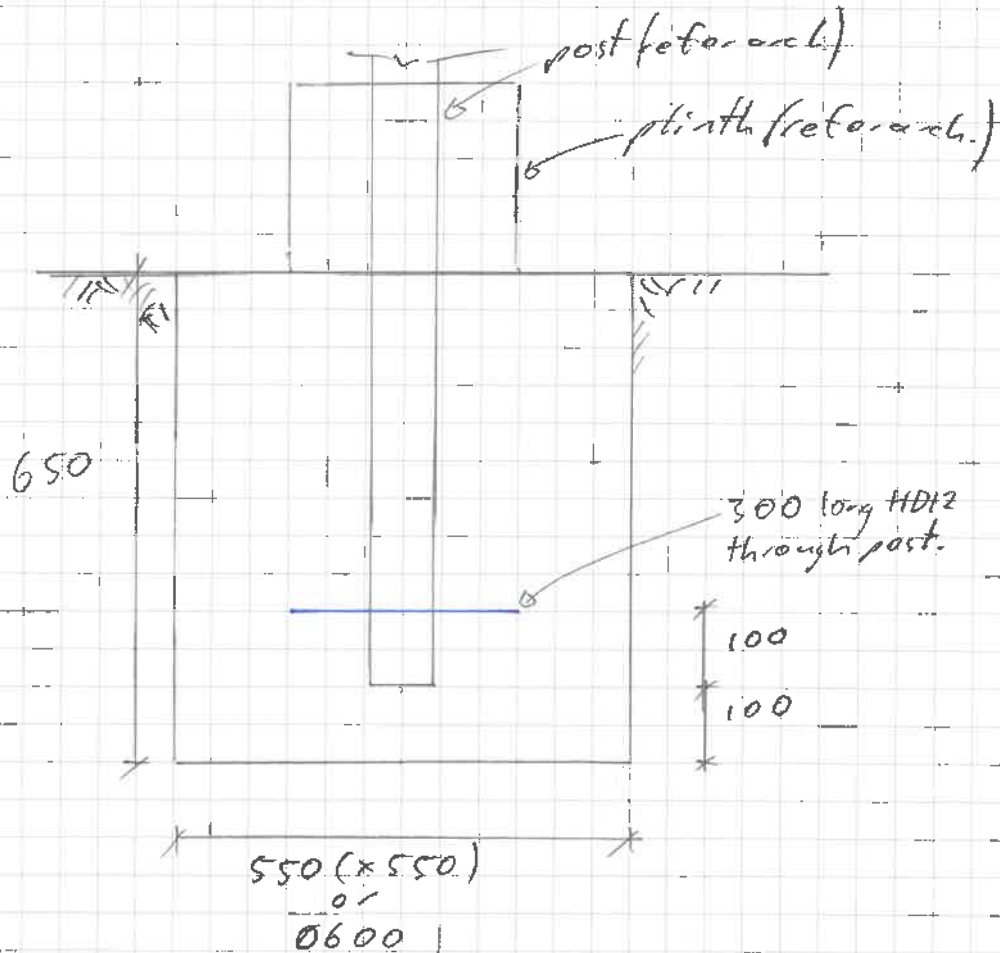
Sheet No.

Project

Lot 45 Monks Park



CALCULATIONS



or

see
next
page

Canopy Footing Detail 1:10

Date
17/14/23

Eng. JW

Job No.
44195

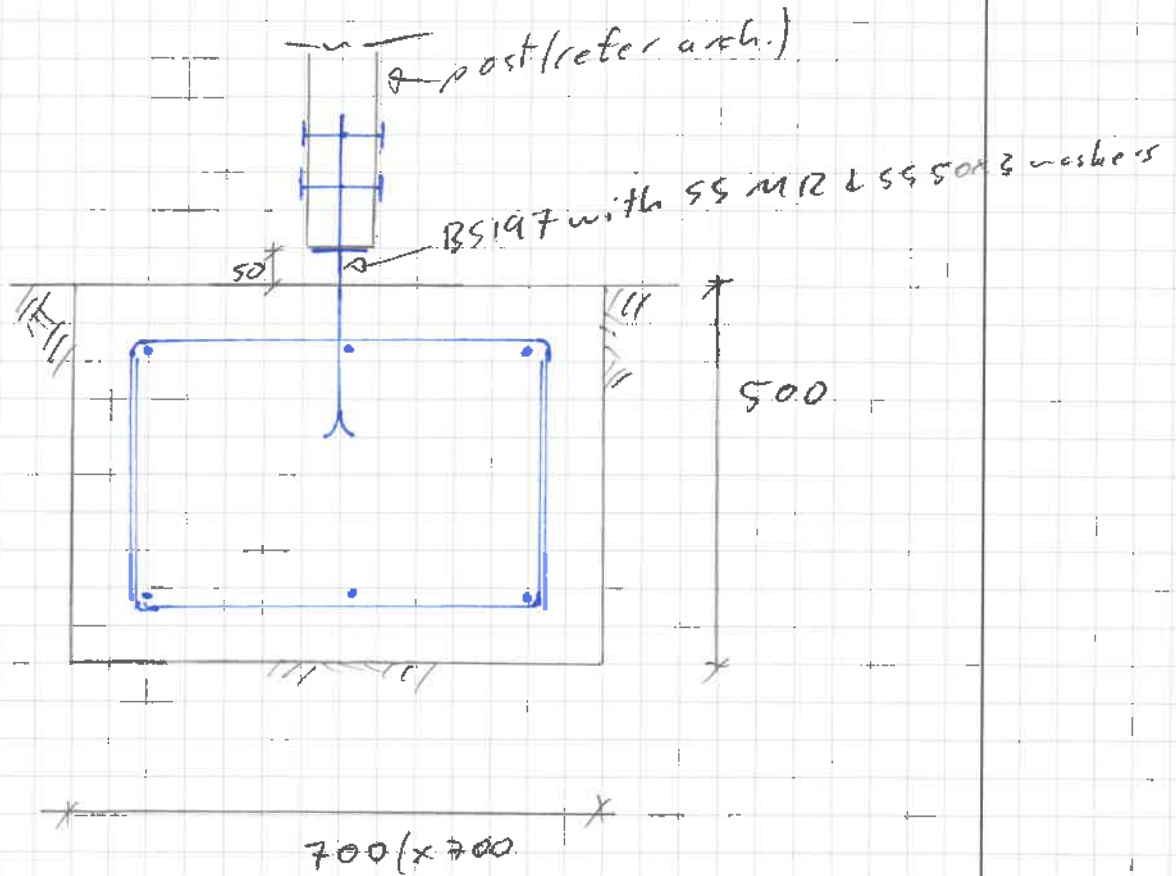
Sheet No.

Project

Lot 45 Mann Park



CALCULATIONS



alternative canopy post detail

BRANZ Appraised
Appraisal No. 928 [2021]

**GIB EZYBRACE®
SYSTEMS**

Appraisal No. 928 [2021]

This Appraisal replaces BRANZ
Appraisal No. 928 [2016]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



Winstone Wallboards Ltd

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Auckland 1642
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Helpline Tel: 0800 100 442
Helpline Fax: 0800 229 222
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BRANZ

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RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz



Product

- 1.1 GIB EzyBrace® Systems are a range of wall and ceiling bracing systems based on the use of GIB® Standard, GIB Braceline® and other GIB® plasterboards. GIB EzyBrace® Systems are used to resist earthquake and wind loads on timber-framed buildings designed and constructed in accordance with NZS 3604 and the GIBFix® Framing System. The GIB EzyBrace® Bracing Software provides an electronic means of calculating bracing demand and resistance.

Scope

- 2.1 GIB EzyBrace® Systems and the GIB EzyBrace® Bracing Software have been appraised for the design and use of interior wall and ceiling bracing systems in buildings within the scope limitations of NZS 3604.

Building Regulations

New Zealand Building Code [NZBC]

- 3.1 In the opinion of BRANZ, GIB EzyBrace® 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 B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GIB EzyBrace® Systems meet the requirements for loads arising from self-weight, earthquake, wind and impact [i.e. B1.3.3 [a], [f], [h] and [j]]. See Paragraphs 8.1-8.10.

Clause B2 DURABILITY: Performance B2.3.1 [a] not less than 50 years. GIB EzyBrace® Systems meet this requirement. See Paragraphs 9.1-9.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GIB EzyBrace® Systems meet this requirement.

Technical Specification

4.1 The GIB® plasterboards and accessories used with the GIB EzyBrace® Systems, and supplied or specified by Winstone Wallboards Ltd are as follows:

GIB® plasterboards

- **GIB® Standard** – GIB® Standard plasterboard is a paper-bound, fibreglass reinforced gypsum-plaster core sheet lining material. GIB® Standard plasterboard is available in 10 mm and 13 mm thicknesses and a sheet width of 1,200 mm and 1,350 mm [GIB® Wideline]. The sheets have a taper on the two long sheet edges. The 10 mm thick sheets are also available with a square edge. Sheets are available in various lengths from 2,400 mm to 6,000 mm. The nominal sheet weight is 6.5 kg/m² for 10 mm thick sheets and 8.5 kg/m² for 13 mm thick sheets. GIB® Standard plasterboard face paper is a light buff colour.
- **GIB Braceline®** – GIB Braceline® is a high-density fibreglass reinforced, paper-bound gypsum-plaster core sheet lining material. GIB Braceline® is available in 10 mm and 13 mm thicknesses. The sheets have a taper on the two long sheet edges. GIB Braceline® has a sheet width of 1,200 mm and 1,350 mm, and is available in lengths of 2,400 mm, 2,700 mm, 3,000 mm, 3,600 mm and 4,800 mm. The nominal sheet weight is 9 kg/m² for 10 mm thick sheets and 12.5 kg/m² for 13 mm thick sheets. GIB Braceline® face paper is light blue in colour.
- **Alternative GIB® plasterboards** – in certain situations, as specified in the Technical Literature, substitution is permitted with GIB Aqualine®, GIB Fyrelime®, GIB Toughline® and GIB Ultraline®.

Components and Accessories

- **GIB® Accessories and GIB® Jointing Compounds** – as specified in the GIB® Site Guide Technical Literature.
- **Fasteners**
 - GIB Grabber® High Thread Screws for fixing directly to timber – 32 mm x 6 g.
 - GIB Nail – 30 x 2.8 mm.
 - GIB Grabber® screws for fixing to light gauge steel battens – 32 mm x 6 g.
- **Adhesive and Sealants**
 - GIBFix® One – an off-white acrylic adhesive supplied in 375 ml cartridges and 600 ml sausages.
 - GIBFix® All-Bond – a green solvent-based adhesive supplied in 375 ml cartridges and 600 ml sausages.
- **GIBFix® Framing Components**
 - GIBFix® Angle – 45 x 45 x 0.55 mm galvanised steel angle with a knurled surface. Supplied in lengths of 2.4 m and 2.7 m.
 - GIB Grabber® Dual Thread Screws for fixing to timber through GIBFix® Angle – 32 mm x 7 g needle-point screw with coarse thread lower section and fine thread upper section.
- **Fasteners, Anchors and Connections**
 - GIB® HandiBrac® – a one-piece, 2 mm thick, galvanised steel angle bracket approximately 95 mm high, 65 mm long and 54 mm wide. The bracket is supplied with five Type 17 screws, 14 g x 35 mm.
 - BOWMAC® screw bolt – M10 x 140 mm screw anchor, with a blue painted hex head.
 - Coach screws – 12 mm x 150 mm and 50 x 50 x 3 mm washer, hot-dip galvanised for fixing to timber floors.
 - Cast-in bolts – M12 x 150 mm minimum and 50 x 50 x 3 mm washers for fixing to concrete floors.
 - Shot-fired fasteners – minimum 75 mm x 3.8 mm with 16 mm discs for fixing GS1-N, GS2-N and GS2-NOM internal line bracing elements to concrete slabs.
 - Galvanised or stainless steel strap – 25 x 0.9 mm top and bottom plate connections.
 - Strap fixings – 30 x 2.5 mm hot-dip galvanised or stainless steel flat head nails. [Note: For corrosion protection requirements, refer to NZS 3604, Section 4.]

- **Ceiling Diaphragms** - ceiling diaphragms are constructed using timber ceiling battens, or GIB® Rondo® or similar metal ceiling batten systems.
- **Plywood**
 - **Plywood** – minimum of 7 mm thick complying with AS/NZS 2269 D-D Structural Grade.
 - **Plywood fixings** – 50 x 2.5 mm hot-dip galvanised or stainless steel annular-grooved, flathead nails.

Handling and Storage

- 5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.
- 5.2 All accessories must be kept dry.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for GIB EzyBrace® 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 NZS 3604 provides methods to distribute the bracing elements in walls to resist forces. The use of ceiling diaphragms is defined in the Technical Literature.
- 7.2 GIB EzyBrace® Systems are for use in dry, internal situations only.
- 7.3 GIB EzyBrace® Systems must not be exposed to temperatures of 52°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.

GIB EzyBrace® Bracing Software

- 7.4 The GIB EzyBrace® Bracing Software contains design procedures and an electronic calculation method for bracing demand calculated in accordance with NZS 3604, Section 5. Floor loadings can be selected in accordance with either NZS 3604, Bracing Demand Tables 5.5–5.10 for 2 kPa floor loads or less, or Tables 14.1–14.3 for 3 kPa floor loads.
- 7.5 The bracing demand calculations contained in the GIB EzyBrace® Bracing Software are based on first principles engineering and calculate wind and earthquake demand, based on the building parameters entered. Resulting bracing demand calculations are project specific and can differ from values derived using NZS 3604 wind and earthquake demand tables. The GIB EzyBrace® Bracing Software has been assessed as part of this Appraisal.
- 7.6 The bracing ratings for GIB EzyBrace® Systems are embedded in the GIB EzyBrace® Bracing Software.

GIBFix® Framing System

- 7.7 The GIBFix® Framing System utilises GIBFix® Angles fixed at internal corners and at wall/ceiling junctions to reduce the potential for fastener ‘popping’ and joint cracking due to timber framing movement. The GIBFix® Framing System also offers an alternative arrangement of studs at corners and at intersecting walls to improve insulation and to reduce thermal bridging compared to traditional wall framing layouts. Refer to the Technical Literature for full details.
- 7.8 Where walls intersect, noggings are required at maximum 900 mm centres to enable fixing of the end stud of the intersecting wall to the main wall framing.
- 7.9 The GIBFix® Framing System permits the use of a single panel hold-down [e.g. GIB® HandiBrac®] at wall corners and T-intersections for both the across and along bracing directions.

Framing

- 7.10 GIB EzyBrace® Systems can be installed using conventional timber framing layouts or by using the layouts provided in the GIBFix® Framing System. The bracing ratings embedded in the GIB EzyBrace® Bracing Software are equally applicable to both framing options.
- 7.11 Timber framing grade, spacing and construction must comply with NZS 3604. Timber treatment must comply with NZBC Acceptable Solution B2/AS1.
- 7.12 Winstone Wallboards Ltd recommends the use of kiln-dried stress-graded framing timber. The minimum actual framing dimensions are 90 mm x 45 mm for external walls and 75 mm x 45 mm for internal walls.
- 7.13 Joints in the top plates of bracing panels must be tied together with 3 kN and 6 kN top plate connectors using 25 mm x 0.9 mm hot-dip galvanised mild steel strap, three nails each side of joint for 3 kN and six nails each side of joint for 6 kN.

Bracing System GS2-NOM

- 7.14 Most GIB EzyBrace® Systems require additional fasteners at the corners to achieve the published bracing ratings. The GS2-NOM system only requires fixings at 300 mm centres around the sheet perimeter.
- 7.15 Where internal doors penetrate a GS2-NOM bracing element and recessed door jambs are used, the sheets may be adhesive fixed around the door opening with GIBFix® All-Bond, instead of screw fixing. This is designed to reduce fastener 'popping' around internal doors when using grooved door frames. Screw fixing should be used where door frames are to be finished with architraves and the architrave will cover the screws. The adhesive fix option around door openings must not be used with any other GIB EzyBrace® Systems.

Alternative GIB® plasterboards

- 7.16 GIB Ezybrace® Systems have been designed and tested using only the products specified. Occasionally additional properties may be required to be provided by a different GIB® plasterboard product. Table 1 provides acceptable alternative options.

Table 1: Permitted Alternatives in GIB EzyBrace® Systems

| Specified | Permitted alternative GIB® plasterboard products | | | | | | | | |
|-------------------|--|-----------------|---------------------------|--------------------|-----------------|--------------------|------------------------------|-------|-------|
| GIB® plasterboard | GIB® Standard | GIB Ultraliner® | GIB Braceline/ Noiseline® | GIB Aqualiner® | GIB Toughliner® | GIB Fyreliner® | | | |
| | | | | | | 10 mm | 13 mm | 16 mm | 19 mm |
| GIB® Standard | N/A | ✓ | ✓ | ✓ | ✓ | ✓
<i>Note 1</i> | ✓
<i>Notes 1 and 3</i> | | |
| GIB Braceline® | X | X | N/A | ✓
<i>Note 2</i> | ✓ | X | ✓
<i>Notes 1, 2 and 3</i> | | |

- Note 1:** The fastener type and length and must be as required for the relevant Fire Resistance Rating (FRR) system but the fixing pattern must be as required for bracing elements.
- Note 2:** The bracing element must be 900 mm or longer. Fasteners must be at maximum 100 mm centres to the perimeter of the bracing element. The bracing corner fastening pattern applies to all four corners of the element.
- Note 3:** Specify traditional wall framing layout where a FRR is required. See Paragraph 11.4.

BOWMAC Screw Bolts

- 7.17 When BOWMAC Screw Bolts are used as fixings for external walls with concrete masonry header block foundations, the minimum grout/concrete strength must be as specified in NZS 3604. BOWMAC Screw Bolts may be used in Corrosion Zones B and C as defined in NZS 3604. BOWMAC Screw Bolts may only be used in NZS 3604 Corrosion Zone D where the minimum concrete cover to the bolt is 60 mm. This cannot be achieved with standard 90 mm wide timber framing. An alternative option in this scenario is to use 140 mm wide framing.

Structure

Bracing

- 8.1 The bracing unit [BU] ratings are embedded in the GIB EzyBrace® Bracing Software and vary with the wall length.
- 8.2 The Technical Literature provides comprehensive construction and panel hold-down details. These include bottom plate fixings using anchor screws and cast-in bolts (concrete), coach screws (timber), GIB® HandiBrac® or nailed stud-to-plate straps.
- 8.3 Bracing units derived from the BRANZ P21 test method are based on a wall height of 2.4 m. The GIB EzyBrace® Bracing Software calculates bracing ratings for higher wall heights by multiplying the appropriate bracing rating by 2.4 m and dividing by the actual wall height in metres. For walls less than 2.4 m in height, the GIB EzyBrace® Bracing Software calculates bracing ratings as if they were 2.4 m high.
- 8.4 NZS 3604 limits wall bracing elements to a maximum of 120 BU/m for timber-framed floors and 150 BU/m for concrete floors.

Ceiling Diaphragms

- 8.5 GIB® ceiling diaphragms are used to space bracing lines further apart than 6 m. The basic shape of a ceiling diaphragm must be square or rectangular and the length must not exceed twice the width.
- 8.6 For ceiling diaphragms not steeper than 15° and not exceeding 7.5 m in length, any GIB® plasterboard may be used provided the perimeter fixing are at 150 mm centres.
- 8.7 For ceiling diaphragms not steeper than 45° and not exceeding 7.5 m in length, and for diaphragms not steeper than 25° and not exceeding 12 m in length, any GIB® plasterboard may be used provided the perimeter fixings are at 100 mm centres.

Openings in Bracing Elements

- 8.8 Small openings of 90 x 90 mm or less may be placed anywhere except within 90 mm of the edge of the bracing element.

Shower Areas

- 8.9 GIB EzyBrace® Systems must not be located in shower cubicles or behind baths and the like. GIB EzyBrace® Systems may be used in water-splash areas provided they are protected as required by NZBC Clause E3 Internal Moisture. Refer to BRANZ Appraisal No. 427 GIB® Wet Area Systems.

Impact Resistance

- 8.10 GIB® plasterboards provide adequate resistance to soft body impact, based upon history of use in domestic and light commercial applications.

Durability

- 9.1 GIB EzyBrace® Systems, including linings and their fixings, have a serviceable life of at least 50 years. The ability of the systems to remain durable is dependent on them remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

- 9.2 The building must be maintained weatherproof and GIB® plasterboards must be protected from external and internal moisture in accordance with NZBC Clauses E2 and E3.
- 9.3 Holes resulting from damage to the lining, up to 100 x 100 mm square, will have no significant effect on the performance of the bracing panel. Such holes may be repaired by patching, stopping and finishing as appropriate. Independent expert advice must be sought to assess the effect and repair of larger areas of damage.
- 9.4 Bracing elements require no ongoing maintenance, apart from decoration and the repair of any damage.

Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to the GIB EzyBrace® Systems from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and NZBC Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

- 11.1 For internal surface finish properties and fire resistance ratings, refer to BRANZ Appraisal No. 289 GIB® Fire Rated Systems.

Internal Moisture

- 12.1 GIB® plasterboard must be used in dry internal situations, and must not be used where likely to be exposed to liquid water, or where extended exposure to humidity above 90% RH is expected, e.g., such as may be expected in sauna rooms, commercial kitchens and the like.

Installation Information

Installation Skill Level Requirement

- 13.1 Installation of GIB EzyBrace® Systems must be completed by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

- 14.1 GIB EzyBrace® Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

Framing

- 14.2 To achieve an acceptable decorative finish, the GIB® Site Guide specifies that walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommends a moisture content of 12% or less where buildings are to be air conditioned, centrally heated or have heat pumps installed.
- 14.3 Where the GIBFix® Framing System is used, GIBFix® Angles are tacked to the framing with flat head clouts prior to installation of the GIB® plasterboard.

Cutting

- 14.4 GIB® plasterboard is easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

Hold-downs

- 14.5 GIB EzyBrace® Systems which require hold-downs must either have a GIB® HandiBrac® fitted to each end of the bracing element or alternatively a metal stud-to-plate strap and hold-down anchor may be used. Refer to the Technical Literature for full installation details. Where a metal stud-to-plate strap is used, the hold-down anchor must be placed no more than 80 mm from the end of the bracing element.
- 14.6 Where the GIBFix® Framing System is used, a single hold-down located at a wall intersection may be used to provide the hold-down in both the across and along bracing directions.

Plasterboard Sheet Fixing

- 14.7 Corner fixings must be 50 mm away from the sheet corner. Fixings must be no closer than 12 mm from the paper-bound sheet edge, and no closer than 18 mm from a cut edge, and driven at right angles to the sheet until the head is seated in a slight dimple just below the surface of the paper liner. Fixings must not be over-driven.

- 14.8 Wall bracing plasterboards [except for those used with the GS2-NOM system] are fixed at 150 mm centres around the perimeter framing of the bracing element *[Note: There is a variation for GIB Aqualine® and GIB Fyrelime®, see Table 1]*. At the corners of the wall bracing elements, a special fastening pattern is required with fasteners spaced at 50 mm, 100 mm, 150 mm, 225 mm and 300 mm from the corner and thereafter at 150 mm centres. Fixing to other framing is either mechanical or by using GIBFix® adhesives.
- 14.9 When installing GS2-NOM bracing elements, the GIB® plasterboard is fixed to framing around the bracing element perimeter and at sheet joints with fasteners at maximum 300 mm centres. Where recessed door jambs are used on internal door frames, the GIB® plasterboard may be fixed to the framing around the door opening with GIBFix® All-Bond, see Paragraph 7.15.
- 14.10 Where GIB Aqualine® or GIB Fyrelime® substitutes for GIB Braceline®, bracing elements must be longer than 900 mm and the bracing element perimeter fasteners must be spaced at 100 mm centres and the corner pattern described in Paragraph 14.8 used.
- 14.11 Full sheets must be used wherever possible.

Fire Resistance Rated Bracing Elements

- 14.12 Where a bracing element is also used as a fire-rated element, the method of fixing [including the length of the fixing specified] for the fire-rated element must be used, but the perimeter fixings of the bracing element must be at 150 mm centres and fixings at corners of the bracing element must be fixed as described in Paragraph 14.8. In two-layer systems, the inner layer must be used for bracing.

Plywood Fixing

- 14.13 Plywood is nail fixed at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing.

Ceiling Diaphragms

- 14.14 All GIB EzyBrace® System ceiling diaphragms require fixings around the perimeter at 100 mm or 150 mm centres, depending on the ceiling pitch and length. See Paragraphs 8.4-8.6 and refer to the Technical Literature.
- 14.15 The perimeter of the ceiling diaphragm is fixed to GIBFix® Angles, GIB® Rondo® perimeter channels, or alternatively, to an additional ex 150 x 40 mm timber plate fixed to the top plate.

Jointing and Finishing

- 14.16 All bracing element joints must be reinforced with GIB® tape and finished in accordance with the GIB® Site Guide.

Health and Safety

- 15.1 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 16.1 Bracing tests were carried out by Winstone Wallboards Ltd in accordance with BRANZ Technical Paper P21 to determine the performance of GIB EzyBrace® Systems when the building is subjected to lateral wind or earthquake loading. Nail and screw slip tests were carried out by BRANZ and Winstone Wallboards Ltd. Winstone Wallboards Ltd's test facilities, procedures and results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 17.1 The GIB EzyBrace® Bracing Software has been assessed by BRANZ and found to be satisfactory.
- 17.2 The GIB EzyBrace® Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.
- 17.3 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.
- 17.4 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.
- 17.5 The properties of Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, Hunter hardness, inspection for fungal spores, and hard and soft body impact tests.

Quality

- 18.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.
- 18.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001, Registration No. 581.
- 18.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.
- 18.4 The quality of the application and finish on-site is the responsibility of the installation and stopping contractors.
- 18.5 Designers are responsible for the design of buildings.
- 18.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

Sources of Information

- AS/NZS 2269.0:2012 Plywood - Structural - Specifications.
- AS/NZS 2588:2018 Gypsum plasterboard.
- BRANZ Technical Paper P21:2010 A wall bracing test and evaluation procedure.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



In the opinion of BRANZ, **GIB EzyBrace® Systems** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Winstone Wallboards 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. **Winstone Wallboards 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 **Winstone Wallboards 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 **Winstone Wallboards Ltd** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

Date of Issue:

01 December 2021

BRANZ Appraised
Appraisal No. 427 [2021]

GIB® WET AREA SYSTEMS

Appraisal No. 427 [2021]

This Appraisal replaces BRANZ
Appraisal No. 427 [2007]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 GIB® Wet Area Systems are for the interior lining of timber and steel-framed walls and ceilings in wet areas such as bathrooms, laundries, kitchens and toilets where a water-resistant lining material is desirable.

Scope

- 2.1 GIB® Wet Area Systems have been appraised for use as a wet area wall and ceiling lining in buildings within the following scope:
- on timber-framed walls and ceilings within the scope limitations on NZS 3604; or,
 - on steel-framed walls and ceilings within the scope limitations of NASH Standard Part 2, or,
 - on timber and light gauge steel-framed walls and ceilings subject to specific design.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, GIB® Wet Area Systems, 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 B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GIB® Wet Area Systems meet the requirements for loads arising from self-weight and impact [i.e. B1.3.3 (a) and (j)]. See Paragraphs 8.1-8.3.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.1 (c) 5 years. GIB® Wet Area Systems meet these requirements. See Paragraphs 9.1-9.5.

Clause E3 INTERNAL MOISTURE: Performance E3.3.4 and E3.3.5. GIB® Wet Area Systems meet these requirements. See Paragraphs 12.1-12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GIB® Wet Area Systems meet this requirement.

Technical Specification

4.1 The GIB® plasterboards and accessories used in GIB® Wet Area Systems, and supplied by Winstone Wallboards Ltd are as follows:

GIB® Plasterboards

- **GIB Aqualine®** is a paper-bound, modified water-resistant gypsum-plaster core sheet lining material. It is available in 10 and 13 mm sheet thicknesses. Sheets are available in various edge profiles and lengths from 2,400 mm to 4,800 mm. Refer to Table 1. The nominal sheet weights are 8 kg/m² and 11 kg/m² for 10 mm and 13 mm thick sheets respectively. GIB Aqualine® face paper is green in colour.
- **GIB Toughline® Aqua** is a paper-bound, modified water-resistant gypsum-plaster core sheet lining material. It is available in a sheet thickness of 13 mm. Sheets are available in various edge profiles and lengths from 2,400 mm to 3,000 mm. Refer to Table 1. The nominal sheet weight is 11.4 kg/m². GIB Toughline® Aqua face paper is mauve in colour.
- **GIB Weatherline®** is an exterior-grade, glass-fibre fleece-wrapped modified-gypsum core sheet material. The product is available in 10 mm and 13 mm thicknesses and a board width of 1,200 mm. Standard sheet lengths are 2,450, 2,700 and 3,000 mm. Custom sheet lengths are also available. The nominal sheet weights are 9 kg/m² and 11.5 kg/m² for 10 mm and 13 mm thick sheets respectively.

Table 1: GIB® Wet Area Plasterboard Available Sheet Sizes

| Plasterboard Type | Sheet Thickness [mm] | Sheet Edge Profile | Sheet Width [mm] | Sheet Length [mm] | | | | | |
|---------------------|----------------------|--------------------|------------------|-------------------|-------|-------|-------|-------|-------|
| | | | | 2,400 | 2,450 | 2,700 | 3,000 | 3,600 | 4,800 |
| GIB Aqualine® | 10 | TE/TE | 1,200 | ✓ | | ✓ | ✓ | ✓ | |
| | | TE/SE | 1,200 | ✓ | | | | | ✓ |
| | | TE/SE | 1,350 | ✓ | | | | ✓ | |
| | 13 | TE/TE | 1,200 | ✓ | | ✓ | ✓ | ✓ | |
| GIB Toughline® Aqua | 13 | TE/TE | 1,200 | ✓ | | ✓ | ✓ | | |
| GIB Weatherline® | 10 | SE/SE | 1,200 | | ✓ | ✓ | ✓ | | |
| | 13 | SE/SE | 1,200 | | | ✓ | ✓ | | |

TE = Tapered Edge SE = Square Edge

Fastenings

- GIB® Grabber® High Thread Drywall screws for fixing to timber: 6 g x 25 mm and 32 mm.
- GIB® Grabber® Self Tapping Drywall screws for fixing to light gauge steel: 6 g x 25 mm and 32 mm.

Adhesive and Sealants

- GIBFix® One [Acrylic].
- GIBFix® All-Bond [Solvent].

GIB® Accessories

- Corner Support Angle - GIBFix® Angle or GIB® Rondo® NZ18. Minimum 32 x 32 x 0.55 mm galvanised metal angle.

GIB® Jointing Compounds

- As specified in the GIB® Wet Area Systems and GIB® Site Guide Technical Literature.

- 4.2 System components and accessories for the GIB® Wet Area Systems, which are supplied by the building contractor are:

Waterproofing

- A waterproofing system complying with AS/NZS 4858.

Finishes

- Finishes such as tiling, flexible sheet vinyl, paints and wallpapers have not been assessed and are outside the scope of this Appraisal.

Handling and Storage

- 5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.
- 5.2 All accessories must be kept dry.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for GIB® Wet Area 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 GIB® Wet Area Systems provide a water-resistant lining as a base for finishing systems in wet areas such as bathrooms, toilets, laundries and kitchens. The typical finishes are ceramic tiles and flexible sheet vinyl to walls, and paint and wallpaper to walls and ceilings. *[Note: GIB Weatherline® is a suitable substrate for ceramic tiles and sheet vinyl. For paint or wallpaper finishes use GIB Aqualine® or GIB Toughline® Aqua.]*
- 7.2 GIB® Wet Area Systems must not be used in the following situations:
- For bracing applications in shower areas or adjacent baths [See Paragraphs 7.4 and 8.2].
 - In areas of high humidity [above 90% RH] or continually wet areas such as group showers, steam rooms, or swimming pools.
 - Installed over a vapour barrier.
 - Applied directly to masonry, concrete or solid plaster.
 - Applied over other sheet lining materials.
 - Used externally of the building envelope.
 - Exposed to temperatures of 52°C or greater for prolonged periods. [Refer to appliance and fitting manufacturers for installation details.]
- 7.3 GIB Aqualine® may be substituted for some other GIB® plasterboard products in specific GIB® Bracing Systems, GIB® Fire Rated Systems and GIB® Noise Control Systems. Refer to the relevant systems technical literature for details.

Wet Areas

- 7.4 Wet areas are spaces where sanitary fixtures and sanitary appliances are located such as bathrooms, toilets, laundries and kitchens. There are two general categories of wet areas as follows:
- Water Splash – These are areas subject to intermittent splashing of water such as around baths, vanities, tubs and sinks.
 - Shower Areas – These are areas subject to frequent and heavy water splash such as enclosed showers, unenclosed shower zones and showers over baths.
- 7.5 Both the above wet area categories must be finished with surfaces and joints that are impervious and easily cleaned. In addition, shower areas must be waterproofed. This can be achieved using proprietary rigid shower lining systems, flexible vinyl shower wall finishes, or tiling. Tiled shower areas must include a wet area waterproofing membrane system under the tiles.

Intertenancy Walls – Wet Areas

- 7.6 Intertenancy construction that incorporates fire resistance and noise control must be protected from water splash. In shower areas, GIB® Wet Area plasterboards must not be substituted for other GIB® plasterboards but must be an extra lining layer. Refer to the Technical Literature.

Tiling

- 7.7 GIB® Wet Area Systems are suitable as a substrate for tiling up to the following weights:
- 10 mm GIB Aqualine® and GIB Weatherline® – up to 26 kg/m².
 - 13 mm GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® – up to 40 kg/m².
- [Note: Most ceramic and porcelain wall tiles weigh less than 20 kg/m². For further information on tiling consult the BRANZ Good Practice Guide – Tiling.]*

Framing

- 7.8 Supporting framing must comprise one of the following, subject to the minimum sizes, dwang centres and all other frame requirements of GIB® Wet Area Systems Technical Literature:
- Timber framing must be designed and constructed in accordance with NZS 3604, or to a specific design using NZS 3603 and AS/NZS 1170. Refer to Paragraph 15.2 regarding recommended moisture content of timber framing.
 - Steel framing must be designed and constructed in accordance with NASH Standard Part 2, or to a specific design in accordance with AS/NZS 1170.

Structure

Bracing

- 8.1 GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® can be used in GIB EzyBrace® Systems. Refer to BRANZ Appraisals Nos. 928 [2016] and 1048 [2019].
- 8.2 GIB Wet Area Systems must not be used for bracing in shower areas or behind baths.

Impact Resistance

- 8.3 GIB® plasterboards provide adequate resistance to soft body impact, based upon experience of use in domestic and light commercial applications. GIB Toughline® Aqua is recommended by Winstone Wallboards Ltd where higher impact resistance is desired.

Durability

Serviceable Life

- 9.1 GIB® Wet Area Systems have a serviceable life of at least 15 years as a fully protected shower or water splash lining. As a general wall and ceiling lining, GIB® Wet Area Systems will have a serviceable life in excess of 50 years. The ability of GIB® plasterboards to remain durable is dependent on being protected and remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

- 9.2 The building must be maintained weathertight and all lining systems protected from internal and external moisture.
- 9.3 Finishes to water splash and shower areas, including tiles, grout, waterproof membranes, sealants and flexible sheet vinyl must be checked to ensure the integrity of the system is maintained. They must be repaired or replaced if necessary. When repairing or replacing finishes, the GIB® plasterboard substrate must be checked for defects and repaired or replaced, as required.
- 9.4 For flexible sheet vinyl, particular attention must be paid to joints, especially at corners. Checks should be made to ensure the vinyl has not been punctured. Where damage has occurred, repairs must be made immediately.
- 9.5 Impact damage to GIB® plasterboard, resulting in small holes and cracks, may be patched, stopped and finished. For larger areas of damage, expert advice on repair must be sought from Winstone Wallboards Ltd.

Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to the GIB® Wet Area Systems from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

Control of Internal Fire and Smoke Spread

- 11.1 The gypsum plasterboard used in GIB® Wet Area Systems without an applied paint or wallpaper finish has been tested in accordance with ISO 5660 and achieved a Material Group Number of 1-S.
- 11.2 The gypsum plasterboard used in GIB® Wet Area Systems with an untested applied finish of a waterborne or solvent borne paint coating $\leq 0.4\text{mm}$ thick achieves a Material Group Number of G2-S in accordance with Table A1 of NZBC Verification Method C/VM2.
- 11.3 A lower Material Group Number may be achieved when used with a tested finishing system. The Material Group Number for the complete lining system must be obtained from the supplier of the finish product or system.

Fire Resistance Ratings (FRRs)

- 11.4 GIB® Wet Area plasterboards, when used as part of GIB® Fire Rated Systems, can be used to provide FRRs as determined by NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM2. Refer to BRANZ Appraisal No. 289 [2018] and relevant technical literature.

Internal Moisture

- 12.1 When installed in accordance with this Appraisal, GIB® Wet Area Systems will provide wall surfaces adjacent to sanitary fixtures and sanitary appliances that are impervious and easily cleaned.
- 12.2 The construction methods in the Technical Literature meet with the internal moisture requirements of the NZBC Acceptable Solution E3/AS1.
- 12.3 To minimise internal condensation, adequate levels of ventilation and thermal resistance must be provided to all spaces where moisture may be generated.

Airborne and Impact Sound

- 13.1 GIB® Wet Area plasterboards, when used as part of GIB® Noise Control systems, can be used to provide acoustic ratings as required by NZBC Acceptable Solution G6/AS1. Refer to BRANZ Appraisal No. 394 [2017] and relevant technical literature.

Installation Information

Installation Skill Level Requirement

- 14.1 Installation of GIB® Wet Area Systems must be completed by, or under the supervision of, a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

- 15.1 GIB® Wet Area Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

Framing

- 15.2 To achieve an acceptable decorative finish, the walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommend a moisture content of 8–12% where buildings are to be air conditioned or centrally heated.

Cutting

- 15.3 GIB® Wet Area plasterboards are easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

Fixing Sheets

Non-Tiled Areas

- 16.1 GIB® Wet Area plasterboards may be installed vertically or horizontally. Sheets are fixed with GIB® Grabber® screws at 300 mm centres around the perimeter of the sheet, and with GIBFix® adhesive on all intermediate studs and dwangs. Adhesive must not be used under fasteners. A 5–10 mm gap must be left between the floor and the bottom of the sheet.

Tiled Areas

- 16.2 Control joints must be provided at maximum 4 m centres.
- 16.3 Internal corners in shower areas must be reinforced with a minimum 32 x 32 x 0.55 mm galvanised metal angle [i.e. GIBFix® Angle or GIB® Rondo® NZ18] prior to lining the walls.
- 16.4 GIB® Wet Area plasterboards may be installed vertically or horizontally. Sheets are fixed with GIB® Grabber® screws at 150 mm centres to the perimeter of wall and to all intermediate studs. Adhesive must not be used in place of screws.

Ceilings

- 16.5 Supports of timber or steel battens or ceiling joists must be 450 mm centres for 10 mm GIB Aqualine®, or 600 mm centres for 13 mm GIB Aqualine® or GIB Toughline® Aqua.
- 16.6 GIB Aqualine® and GIB Toughline® Aqua sheets must be fixed with GIB® Grabber® screws at 600 mm centres around the perimeter of the ceiling and at 200 mm centre along supports. Alternatively, sheets are screw fixed at 600 mm centres along the supports and GIBFix® adhesive placed at 200 mm centres between the screws.

Penetrations and Sealants

- 17.1 All cut-outs for pipe penetrations must be made neatly using a hole saw. Cut-outs should be made approximately 12 mm diameter greater than the pipe.
- 17.2 A bead of sealant must be placed to the full thickness of the plasterboard sheet around all pipe penetrations, at bath rims and preformed shower bases and where an impervious junction is required at the floor/wall line.
- 17.3 In tiled areas, a bead of sealant 6 mm wide must also be placed to the full thickness of the tiles where the above situation occurs. The sealant manufacturer's technical literature must be followed for installation.

Jointing and Finishing

- 18.1 Jointing must be carried out in accordance with GIB® Site Guide Technical Literature.
- 18.2 Tiled shower areas must incorporate a waterproofing membrane over GIB® Wet Area Systems. Waterproofing membranes are outside the scope of this Appraisal and must otherwise be specified and approved.

Health and Safety

- 19.1 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 20.1 Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, edge hardness, water resistance, hard and soft body impact tests and humidified deflection.
- 20.2 Cone calorimeter tests to ISO 5660 have been carried out by BRANZ.

Other Investigations

- 21.1 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.
- 21.2 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.
- 21.3 The GIB® Wet Area Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

Quality

- 22.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.
- 22.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001: 2015, Registration No. 581.
- 22.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.
- 22.4 The quality of the application and finish on site is the responsibility of the installation, stopping and finishing contractors.
- 22.5 Designers are responsible for the design of buildings.
- 22.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

Sources of Information

- AS/NZS 1170: 2002 Structural design actions – General principles.
- AS/NZS 2588: 2018 Gypsum plasterboard.
- BRANZ Good Practice Guide: Tiling (3rd edition), April 2015.
- ISO 5660-1:2002 Reaction-to-fire tests – Heat release, smoke production and mass loss rate – Part 1: Heat release rate (cone calorimeter method).
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of Amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



In the opinion of BRANZ, **GIB® Wet Area Systems** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Winstone Wallboards 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. **Winstone Wallboards 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 **Winstone Wallboards 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 **Winstone Wallboards Ltd** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

Date of Issue:

15 February 2021

BRANZ Type Test Summary

This is to certify that the specimen described below has been tested by BRANZ Ltd on behalf of

Metallink Limited
RM 217, 21-39 Jellicoe Road
Panmure, Auckland 1072
New Zealand

Test standard: AS/NZS 2699.1:2000.

Specimen name: Metallink Brick Veneer ties (4 Types)

Specimen description: Metallink Brick Veneer ties to connect brick veneer to a substrate with following details:

| Tie Length (mm) | Material & Description | Veneer Thickness | Classification |
|-----------------|--|------------------|----------------|
| 85 | Hot dipped galvanised steel, 1.3 mm thick & 22 mm wide | 70 | EL |
| 105 | Hot dipped galvanised steel, 1.3 mm thick & 22 mm wide | 70 | EL |
| 85 | 4-hole flat end galvanised steel, 1.2 mm thick & 23.5 mm wide | 70 | EM |
| 85 | 3-hole rippled end galvanised steel, 1.2 mm thick & 23.5 mm wide | 70 | EM |

A full description of the test specimens and the test results are given in BRANZ Test Reports:

ST1025-TT [2014] – dated 24 September 2014

The test results were the basis for the following:

| Building Code Document | Tie Rating |
|--|------------------------------|
| NZBC Acceptable Solution E2/AS1
Table 18A | EL (2 Types)
EM (2 Types) |

Issue Date:

21 April 2022

Expiry Date:

21 April 2027



SCREW TIES FOR BRICK VENEER FIXING

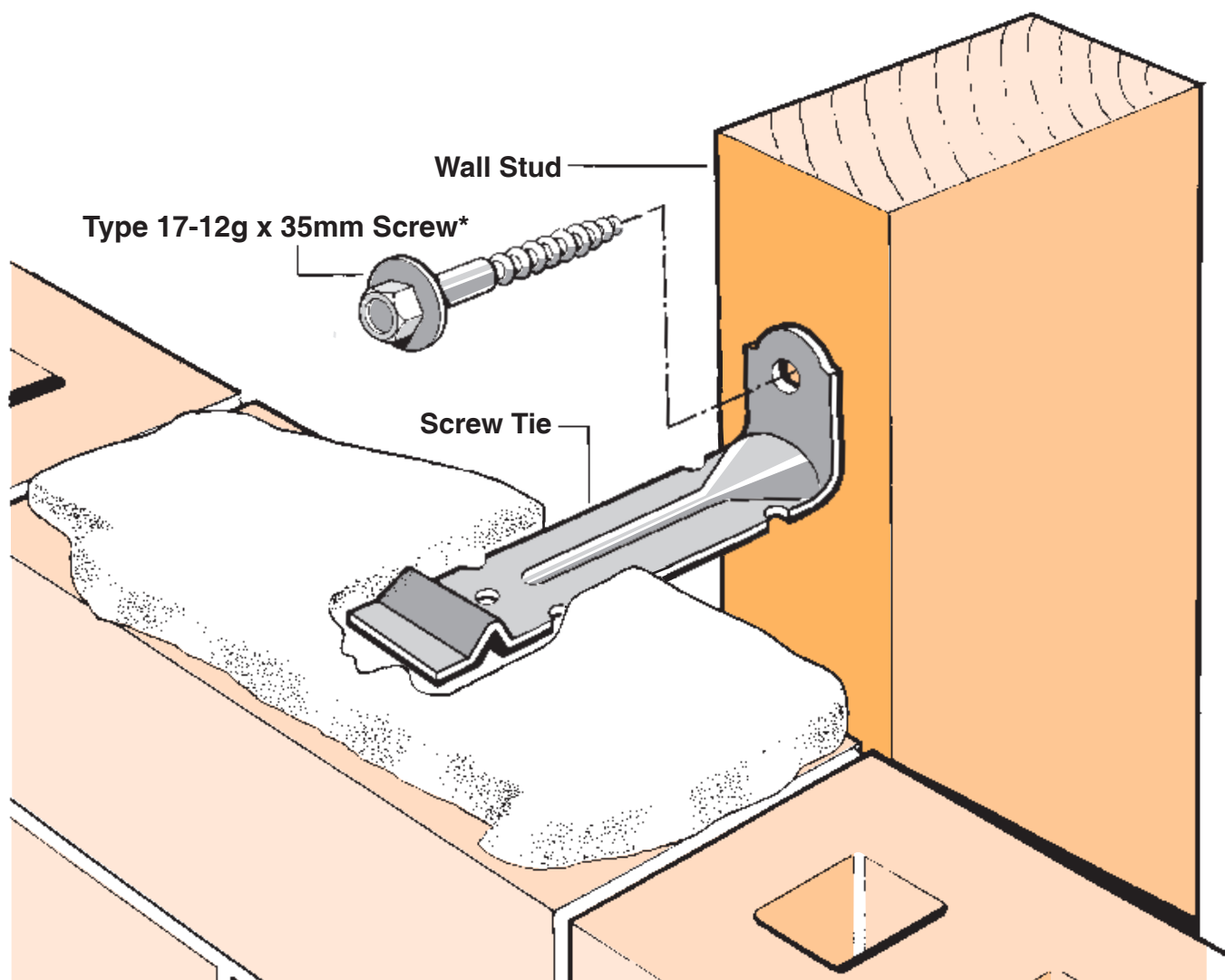
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Received by

Kapiti Coast District Council

26/05/23

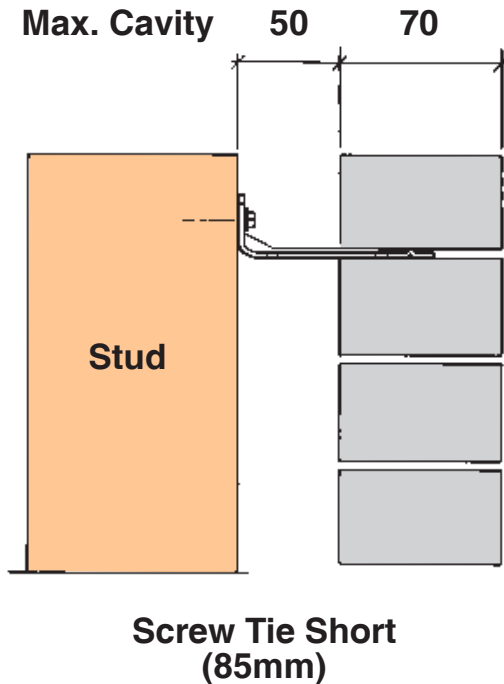
- ★ Medium duty (EM) classification
- ★ Tested by BRANZ in accordance with AS/NZS 2699.1:2000
- ★ BRANZ test report No. ST0725 November 2007
- ★ Suitable for both 'dry bedding' and encapsulated mortar
- ★ Hot Dip Galvanised ties for Zones B & C, and Stainless Steel Grade 316 ties for Zone D meet NZS 3604:2011 Sect. 4 Durability
- ★ Available in 85mm and 105mm sizes

***NOTE:**

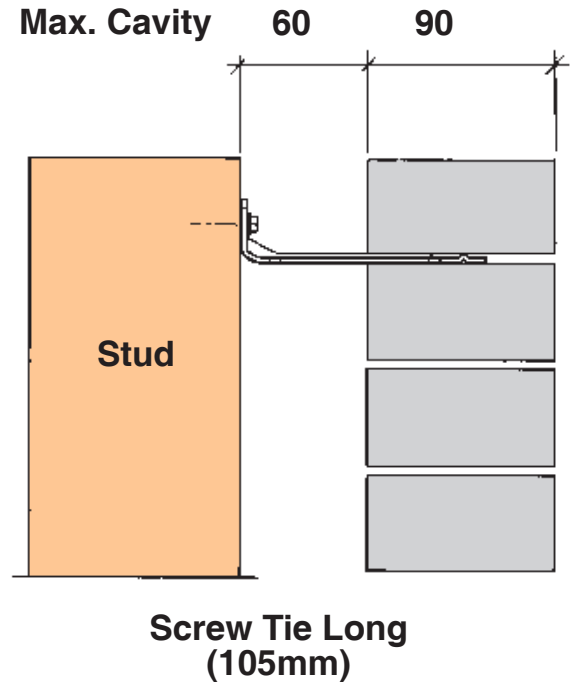
Use longer screws for fixing through Rigid Air Barrier (RAB). Maintain 35mm embedment in studs.

**Available from leading Builders Supply Merchants
throughout New Zealand**

70 SERIES BRICK



90 SERIES BRICK



- ★ All brick work must be constructed in accordance with NZS 4210:2001 Masonry Construction: Materials and Workmanship. Screw Ties must be applied accordingly and are not to be hammered into timber framing.
- ★ Water shedding shoulder prevents transfer of the moisture from tie to building.
- ★ Nail hole for Oamaru Stone.
- ★ Angled neck encourages increased tie embedment in mortar.

Material: 1.2mm NZCC-SD Hot Dip Galvanised Steel
Screws: Type 17-12g x 35mm Hex Head Hot Dip Galvanised Screws
Packed: 250 ties per box including screws

Also available in Stainless Steel Grade 316 for Zone D.

BRANZ Type Test Summary

This is to certify that the specimens described below have been tested by BRANZ Ltd on behalf of

Metallink Limited
RM 217, 21-39 Jellicoe Road
Panmure, Auckland 1072
New Zealand

Test standard: AS/NZS 2699.1:2000.

Specimen name: Metallink Brick Veneer tie

Specimen description: Metallink Brick Veneer ties to connect brick veneer to a timber substrate with following details:

| Designation | Length (mm) | Material & Description | Classification |
|-------------|-------------|--|----------------|
| Design 4 | 110 | Galvanised, 1.42 mm thick, 23 mm wide | EM |
| Design 5 | 110 | Galvanised, 1.3 mm thick, 23 mm wide | EM |
| Design 6 | 85 | Stainless Steel, 1.12 mm thick, 22.4 mm wide | EL |
| Design 7 | 85 | Stainless Steel, 1.13 mm thick, 23 mm wide | EL |
| Design 8 | 85 | Stainless Steel, 1.13 mm thick, 22 mm wide | EM |

A full description of the test specimens and the test results are given in BRANZ Test Report:

ST1025.4-TT [2015] – dated 22 April 2022

The test results were the basis for the following:

| Building Code Document | Tie Rating |
|---|------------------------------|
| NZBC Acceptable Solution E2/AS1 Table 18A | EM (3 Types)
EL (2 Types) |

Issue Date:
22 April 2022

Expiry Date:
21 April 2027

BRICK VENEER BEST PRACTICE GUIDE



BRICK & BLOCK LAYERS
- FEDERATION OF NEW ZEALAND -



BRICK VENEER BEST PRACTICE GUIDE - PREFACE

Preface

This document is the result of a collaboration between the collective of Brick and Blocklayers associations within New Zealand and the manufacturing and distribution sector under the guise of the 'Brick and Blocklayers Federation of New Zealand (BBFNZ).

Since 1991, New Zealand has had a 'performance based' Building Code in place. What this means is that there is no set, one way that buildings within New Zealand MUST be built but instead focus is placed on how a building should perform once built.

The Ministry of Business, Innovation and Employment (MBIE) provides to the industry a set of 'Acceptable solutions' as a means of complying with the Building Code. These documents however are not compulsory and at times the Best Practice Guide for Brick Veneer makes recommendations that are not part of, or contradict the Acceptable solutions. In these areas, we have endeavoured to point you towards information or independent study reports that show that these 'alternative solution proposals' should also meet the performance requirements of the NZ Building Code.

As an Industry, we believe that we also need to consider Workmanship Quality with our guidance. Workmanship Quality describes the brick work that is not related to building performance but the aesthetic finish that customers expect from Brick work.

An acceptable Workmanship Quality standard has been met if a brick veneer has been laid to meet the performance requirements of the Building Code and achieves no visible defects when viewed by a 6.1m with diffused light viewing distance as per manufacturer's specifications. This may be achieved without meeting all of the tolerances contained within this Best Practice Guide.

It is recommended, when planning the design of a Brick Veneer that you engage a bricklayer early on for their knowledge of design and product.

BBFNZ asks that you consider engaging the products and services of our members who have contributed and made this document possible.

THE BRICK CAVITY

The brick cavity has meant that most brick homeowners' managed to avoid owning a leaky home



Designing and building brick cavities

A 'cavity' or 'cavity gap' is an area of space between the timber framing and the brick veneer that enables sufficient airflow and drainage to dry any moisture that may penetrate the brick veneer.

Without a cavity, any moisture would be trapped between the brick and timber and may cause the timber to rot which has been the case with other cladding products, particularly prior to 2004 resulting in 'leaky home syndrome'.

CAVITY WIDTH

Unless a building consent states otherwise, a cavity should be between **40–75mm** to comply with

E2/AS1 which is the acceptable solution for claddings.

Designers and bricklayers should familiarise themselves with Section 9.2.6 Cavities and review Figure

73Dof E2/AS1. You can read this documentation here: E2/AS1 (part4).

It is important to remember that measurements for cavities are taken from the point where the brick tie is secured to the framing (which may not necessarily be the line of the supporting structure).

The cavity width should be clearly marked on all working drawings.

The Brick and Blocklayers Federation recommends that cavity gaps are designed to a 50mm cavity.

This provides a 10mm tolerance for variations in the framing or slab and accommodates should plywood bracing be a requirement. E2/AS1 allows for a maximum overhang of 20mm.

SLAB RECESSES

As a further weather tight design precaution brick veneers should be designed and constructed with a slab recess. This means that the veneer should be extended below the final floor level to ensure that any moisture that penetrates the cavity drains past the flooring level and out through the weep holes. This is intended to prevent moisture from potentially pooling and running to the inside of the dwelling.

Designers and Bricklayers should familiarise themselves with Section 9.2.5 and Figure 73DofE2/AS1 for options of slab recess. You can read this document here: [E2/AS1 \(part4\)](#)

E2/AS1 requires a step down of 50mm or more.

The Brick and Blocklayers Federation recommends a step down of 90-100mm and the placement of a sloping fillet at the base of the cavity to direct water to the outside.

DAMP PROOFING OF SLAB RECESSES

The slab edge and the bottom of the cavity should be sealed to prevent any moisture sitting in the bottom of the cavity from entering the dwelling.

E2/AS1 requires that damp proofing material be either:

Rebates lower than the ground; or

Two coats of a bituminous liquid; or

1mm of butyl rubber or bituminous sheet; or

0.25mm polythene or polyethylene damp proof membrane.

If the rebate is above ground level then either 1mm of butyl rubber or bituminous sheet or 0.25mm polythene or polyethylene damp proof membrane are the only options available.

WIDTH OF SLAB RECESSES

The width of the recess at the base of the veneer, where the brick sits upon, is governed by three factors:

The desired cavity width;

The width of the brick;

The amount, if any, that the brick will overhang the foundation.

If the brick product has not yet been selected, or if it is subject to change then it is important to ensure that this ledge is designed with flexibility.

The Brick and Blocklayers Federation recommends designing a 120mm wide ledge and planning to overhang the brick 10mm to provide a drip edge.

ENSURING THE CAVITY IS CLEAR

A clean cavity, free of mortar bridging the gap, is essential for preventing moisture transference. NZS4210:2001 Section 2.7.1.7 advises that mortar should not encroach into the cavity more than 5mm.

The Brick and Blocklayers Federation recommends specifying and installing 'wash-outs'.

A 'wash-out' involves laying every corner brick and every subsequent brick at 800mm centres on a bed of sand (thus coinciding with weep hole requirements). Once the veneer is approximately 800mm high, these bricks are removed to facilitate the regular washing out of mortar at the base of the cavity.

MORTAR

Mortar is used to hold bricks together and fill and seal any gaps around them. Basically mortar used in brick veneer is a mixture of sand, cement, ad mixture and water. It is however critical that the components of mortar are properly proportioned and mixed correctly.

MIXING MORTAR

For brick veneer to function correctly it is important that the bricks are stronger than the mortar. This will ensure that in the event of seismic activity the tensile bond strength or adhesion of the mortar will fracture rather than the bricks themselves.

NZS4210:2001 provides for a strength requirement for structural masonry but not for brick veneer and states that mortars for veneers shall follow the strength requirement of the masonry suppliers.

In 2011 BRANZ released SR258 – Critical properties of Mortar for good seismic performance of brick veneer.

You can read this report here:

http://www.branz.co.nz/cms_show_download.php?id=8270db8e7e10636a60e5faedc2cd280ee6041b62

This research indicates that mortar strength should be at least 6MPa and advises that this can be achieved with mortar mixes of 4:1 sand to cement.

A hydration process occurs between the water and cement which causes the cement to harden and bind with the sand and therefore cause the mortar to 'set'. If the mortar shows signs of powdering that may mean that hydration has not occurred properly and the resulting veneer will need to be pulled down.

One of the most common causes of mortar powdering is rapid loss of moisture when the bricks are first laid. If the temperature exceeds 27 degrees Celsius then it is important to ensure that the bricks are kept damp for the first 24 hours.

In summer any mortar which is more than 1.5 hours old should be discarded and for temperatures below 5 degrees Celsius mortar should be discarded after 2 hours.

NZS4210:2001 Section 2.2.2.2(e) advises that bricklayers should avoid re-tempering mortar with water.

Mixing good mortar is a skill obtained through experience. Mixing times, humidity levels and even the type of sand used can all have an effect on the final product. Bricklayers should consider using bagged mortar for quality control issues and to obtain compliant mortar strength.

Chemical admixture shall comply with NZS 3113:1979 or AS 1478.1:2000 Admixtures shall be dosed in accordance with the manufacturer's instructions.

The Brick and Blocklayers Federation ask that if you do use bagged mortar that you support our manufacturing members:

Dricon (Firth)

<http://www.firth.co.nz/product-information/dricon/dricon-product-range/trade-mortar.aspx>

MORTAR JOINTS

‘Mortar joint’ is the term for the space of mortar between bricks. According to NZS4210:2001 the average thickness of a mortar bed, cross or perpendicular joint should be 10mm +/- 3mm. A joint thickness of up to 20mm may be accepted on the bottom course to accommodate any slab level issues.

While the thickness of mortar needs to ensure that an adequate seal and bond is achieved, the mortar joint itself also provides an aesthetic value to the brick veneer. Different looks and weather tight properties can be achieved by creating different patterns in the mortar joint.

Varying mortar joint styles are created by bricklayers by running jointers, rakes or beadings across the mortar before it sets to achieve the desired look.

The most common mortar joint types are – grooved, weathered, ‘V’, raked, extruded or flush.

GROOVED JOINT – Also known as Concaved or rolled. This type of joint is formed by using a curved steel jointing tool. Its recessed profile and tight seal mean that it is very effective at resisting moisture penetration. This type of joint can be good for hiding small irregularities.

Should be tooled to a maximum depth of 6mm after initial stiffening has occurred. The delay of tooling is vital if a tight weatherproof joint is to be produced in horizontal but particularly, vertical joints. It is recommended that all slurry coated bricks should use a grooved joint.

WEATHERED JOINT – The mortar forms a joint that is recessed from the bottom to the top. This type of joint can give brickwork a neat, ordered appearance. While not as weathertight as Grooved and ‘V’ joints, it can be used on external walls and should be tooled to after initial stiffening has occurred. The delay of tooling is vital if a tight weatherproof joint is to be produced in horizontal but particularly, vertical joints.

‘V’ JOINT – This type of joint is formed with a V-shape jointer (or trowel). This type of joint can be good for hiding small irregularities. This joint has good weathertight properties. Should be tooled to a maximum depth of 6mm after initial stiffening has occurred. The delay of tooling is vital if a tight weatherproof joint is to be produced in horizontal but particularly, vertical joints.

RAKED JOINT – For this type of joint the mortar is raked out and once pointed and tooled shall not exceed a maximum depth of 6mm. It is important to compact the mortar to improve its weather tight performance, this design creates a form of ledge where water can pool.

EXTRUDED JOINT – This type of joint is formed without tooling. It is caused naturally as excessive mortar squeezes out between the bricks. Exposure to weather may degrade an Extruded joints appearance.



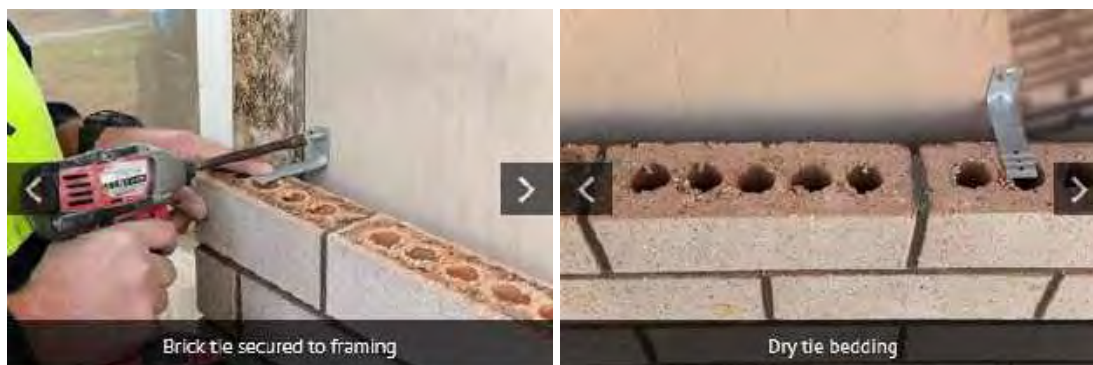
FLUSH JOINT – The Brick and Blocklayers Federation does not recommend the use of flush joints unless they are compacted. If the mortar is flush jointed and not compacted it can lead to the following issues:

- When veneer is to be honed, the mortar can ‘flick’ out with honing process.
- When brick is to be plastered it can lead to hairline cracking in the plaster where the outline of the brick can be seen.

The type of brick selected plays a part in which type of mortar joint will work best. Straight edged bricks with a ‘Vitrated’ or ‘slurry’ coat must use grooved (rolled) joints whereas colour through bricks with rumbled edges are better with raked joints. It is important to adhere to the recommendations of your brick manufacturer when deciding on which type or mortar joint to use.

BRICK TIES

Brick ties provide strength and flexibility to brick veneer.



Brick Tie

As the name suggests, a brick tie is a connector that ties the brick veneer to the structural framing of a building. This feature both prevents the bricks from simply falling away from the framing and they also increase the strength of the brick veneer by transferring some of the force away from the brick and on to the structural element.

BRICK TIE DURABILITY

As brick ties are considered a structural element they are required under the New Zealand Building Code to have a 50 year durability.

If a building is within 500m of the high water mark or within 100m of a tidal estuary (also known as the 'sea spray zone') then stainless steel brick ties will be required. If you are unsure of this then we recommend talking with your local council before commencing design or construction work.

BRICK TIE LENGTH

The length of the brick tie is dependent on two factors– the width of the brick cavity and the width of the brick being laid.

Brick ties generally come in four sizes– 85mm, 105mm, 115mm and 135mm.

To determine the minimum tie length required you need to ensure that the tie can sit flush with the framing and reaches at least half way across the width of the brick.

For example: If your cavity was 50mm and your brick was 70mm wide then you would need to ensure that a 85mm brick tie was used (50mm+35mm).

BRICK TIE INSTALLATION

Brick ties must be screw tied using a 35mm X12g screw and must be installed with a 5 degrees slope down from the frame. The slope ensures that any water is moved away from the framing.

BRICK TIE BEDDING

Brick ties are required to be bedded into the brick with mortar. You need to ensure that there is a minimum mortar cover of 15mm of the end of the tie.

There are two trade practices for the bedding of brick ties. Wet-bedding is the process where the brick tie is held with a layer of mortar both above and below the tie. With dry-bedding the brick tie is placed directly on top of the brick and mortar is only placed on the top of the tie.

Tie bedding is an area of the trade where regulation has not kept up with building science.

The current acceptable solutions for tie bedding are:

On timber framing E2/AS1 requires wet-bedding

On concrete block work E2/AS3 allows for either bedding methods.

In general, bricklayers prefer to dry-bed brick ties. This is because it is a more efficient, productive and a proven method of installation. In 2006 BRANZ released a report that confirms that dry bedding is an acceptable procedure in brick veneer construction. You can read a copy of this report here: [BRANZ DryBeddingMasonry Ties StudyReportno156:2006](#)

The Brick and Blocklayers Federation recommends that designers ensure they specify dry-tie bedding until NZS4210:2001 is updated. This may mean that you will need to identify your building consent application as an alternative solution proposal—were commend including the above reference to the BRANZ study report.

BRICK TIE PLACEMENT

Brick veneer is not assumed to have any structural strength and relies on support from the ties securing it to the structural timber framing. The ties themselves are designed to support a certain tributary area of masonry and it is important that the area per tie is not exceeded. The bottom brick tie, when the rebate is sealed with a liquid applied damp –proof course, must be within 300mm or two courses (whichever is smaller) of the base of the veneer. Brick ties are to be fixed to studs only with a maximum of 600mm centres horizontally and a maximum of 400mm vertically. Ties should also be positioned within 300mm horizontally of openings (BBFNZ recommends 200mm vertical spacing to meet the 220kg/m² mass requirement in any seismic zone)

Designers and bricklayers should familiarise themselves with Section 9.2.7 Wall Ties and Tables 18A and 18B of E2/AS1. You can read this documentation here: [E2/AS1 \(part4\)](#)

The Brick and Blocklayers Federation ask that when selecting brick ties that you support our manufacturing members:

INNOVATIVE BUILDING PRODUCTS LTD— www.brickties.co.nz

BRICK BONDING

The way that bricks are arranged affects a veneers stability and strength and is referred to as a 'bond' or 'bonding'.

Brick Bonds

The way that bricks are arranged affects a veneers stability and strength and is referred to as a 'bond' or 'bonding'.

RUNNING OR STRETCHER BOND

Section 9.2.2 of E2/AS1 requires that bricks are laid with a "running" bond (also referred to as "stretcher" bond). You can read this document here: [E2/AS1 \(part4\)](#)

This means that the bricks of each course overlap the previous course by between 25% and 75% of the length of the bricks as per NZS4210: 2001 Section 1.3 Definitions

NZS3604:2011 Section 11.7.2.2 advises that no length of veneer wall or return can be less than 230mm.

While 70mm brick maybe laid to 1/3 bond (also known as metric bond) it is recommended that bricks always be laid to 1/2 bond (50%). This may mean cutting all 70mm corner bricks to 190mm in length.

Internal corners and junctions need to be stitch bonded.

STACKBONDING

Stackbonding provides the ability to create a brick cladding that presents both vertical and horizontal lines and patterns that add new dimensions to the aesthetic appeal of the veneer.

Stackbonding is not recognised under the acceptable solution for brick veneers (E2/AS1) and therefore requires specific engineering design.

To assist with the design of stack bonded systems, the New Zealand Concrete Masonry Association (NZCMA) has released design guidance that provides the following specification and limitations for stackbond use:

Studs are to be positioned at a maximum 400mm centres.

Screw fixed brick ties are to be installed at maximum 400mm centres horizontally and 400mm centres vertically (every 4th course commencing at two courses above the base or equivalent in the case of a double height brick)

In-joint reinforcement is to be installed every 4th course (or maximum of 400mm) alternating with the rows of brick ties.

The maximum permitted height is 4.0m unless Specific Engineering Design has been undertaken to cover the additional required height specified.

You can read this information here: [NZCMA information on Stackbonding design](#)

LAYING BRICKS

A good bricklayer carefully plans their work prior to laying. This involves:

- Carefully reading **ALL** building consent documents and familiarising themselves with any standard cited in the documents before starting,
- Checking that the substrate has been properly prepared and sealed where required,
- Calculating how many bricks are going to be required (and ensuring that factors such as mortar thickness are taken into account),
- Checking the bricks supplied are correct as per the building consent and contract,
- Checking that there are no obvious issues/defects with the brick pallets provided,
- Checking that all pallets display the same batch number
- Identifying what cuts may be required.

Bricks should be laid to a straight line which generally involves running a string line at both ends of the wall. Bricks should be buttered to form perpend ("perps").

NZS4210:2001 sets out the following tolerances for brick veneers walls:

| Item | Tolerance |
|---|-----------------------------------|
| Deviation from vertical within a storey | 10 mm per 3m of height |
| Deviation from vertical in total height of bldg. | 20 mm |
| Relative vertical displacement between masonry courses. | 5mm on structural face |
| Deviation from line in plan: | |
| (a) In any length up to 10m | 5mm |
| (b) In any length over 10m | 10 mm total |
| Average thickness of bed joint, cross joint or perpend joint. | 10mm+/-3mm on thickness specified |

Tolerances cannot breach minimum cavity width requirements.

BRICK BLENDING

Bricks are natural products that are subject to colour variance between batches. 'Blending' is the process used to vary brick pallets as they are laid as a means of avoiding any unwanted patterns caused by a variance.

The Brick and Blocklayers Federation recommends that bricklayers select bricks and blend vertically from at least three pallets in order to achieve an adequate colour mix.

A bricklayer should also regularly check the veneer while laying from a viewing distance of 6.1m for obvious pockets of colour forming that may be unacceptable.

WEEP HOLES AND VENTS

Air flow and drainage are essential design features that ensure dry homes.



Weep holes and Vents

Weep holes and vents are components of brick design intended to assist with drainage and airflow within the brick cavity.

WEEP HOLES

It is important to remember that while brick veneers are an excellent rain shield, they are not waterproof. A considerable amount of water would be required before moisture is likely to flow down the back of the veneer.

In the event that this saturation does occur, a series of gaps or 'weep holes' are required to be placed along the bottom course.

A weep hole of 75mm x 10mm is required to be placed every 800mm along the base or alternatively 1000mm²/linear meter of wall.

Any weep hole wider than 13mm requires vermin proofing.

Weep hole requirements also need to be met across the heads of doors, windows and openings.

VENTS (VENTILATION)

Ventilation is the process of replacing air in any space with the intention of improving air quality. For the brick cavity this means replacing moist air within the cavity with drier air from the outside.

E2/AS1 provides two acceptable methods for venting brick veneer:

- Vertical vents installed as per the earlier weep holes; or
- Leaving a 5mm gap around the top of the veneer.

You can view these E2/AS1 requirements in Section 9.2.6(d) and Figure 73E here: [E2/AS1 \(part4\)](#).



The Brick and Blocklayers Federation recommends that if you are installing vertical vents that you install these in the second brick from the top.

This ensures that the bond of the bricks on the top row is not weakened.

Vent holes are generally not required under window sills as air can move freely around the frame.

The Brick and Blocklayers Federation recommends that where windows exceed 2.4m in length that 1 or 2 vent holes are evenly spaced under the sill.

PLASTERED OR PAINTED BRICK VENEER

Where a brick veneer is plastered or painted, the brick veneer exterior cladding is effectively a waterproof system. This means the need to have air circulation to dry the cavity and the weep holes to drain the veneer become less important.

The acceptable approach to weep holes in this scenario is 50mm x 10mm weep holes at 1m centres or 500mm²/linear meter of wall.

Vent holes are still required at the top of the plastered or painted veneer however designers should check with their local council as requirements vary.

The Brick and Blocklayers Federation ask that when selecting vents that you support our members:

Victor Vents: <http://www.victorvents.co.nz/>

BRICK VENEER FLASHINGS

It is the bricklayer's responsibility to ensure that all flashings have been correctly installed prior to the bricks being laid.

Brick veneer flashings

A flashing is an impervious material designed to prevent water from entering the brick cavity from joints such as those found in windows and doors.

The brick veneer system has functioned in New Zealand very successfully for many years with minimal flashings being installed; however, in the modern environment, flashings are an essential part of any cladding systems.

Designers and bricklayers should familiarise themselves with Figure 73 Cof E2/AS1 which can be viewed here: [E2/AS1 \(part4\)](#)

It is the bricklayer's responsibility to ensure that all flashings have been correctly installed prior to the bricks being laid.

HEADFLASHINGS

If a metal head flashing is used and fixed to the framing, you should ensure it is kept 5mm short at each end and the ends of the flashing should be turned up. This will allow for any movement in the framing without interfering with the bricks.

A 5-10mm gap between the underside of the lintel bar and the flashing allows for both drainage and ventilation eliminating the need for weep holes in the bricks across the head of the opening.

JAMB FLASHINGS

Jamb flashings are simple and inexpensive. Use a 200mm wide polyethylene flashing, tucked into the joinery flange. The open end of the flashing is to be held off the building wrap using a kick-out batten or protruding clouts. The junction between the bricks and the joinery does not need to be sealed.

SILL FLASHINGS

Any moisture being driven up the sill brick needs to be stopped from reaching the timber framing and redirected into the bottom of the cavity. NZS 3604S11.7.7 requires that flashings be extended

200mm past the sides of any openings where practical to do so.

DESIGNING AND CONSTRUCTING BRICK SILLS AND LINTEL BARS



Designing and Constructing Brick Sills and Lintel Bars

BRICK SILLS

Brick sills must overhang the brick work below by 30 - 50mm with a minimum slop of 15 degrees. Bricks must be evenly spread and of equal thickness across the width of the sill.

Another option is to have a header course spread evenly over the sill width. This applies to the heads of the windows as well.

LINTEL BARS

A lintel bar is a load-bearing building component that spans across openings such as windows and doors to provide structural support.

Designers and Bricklayers should familiarise themselves with Paragraph 9.2.9 and Table 18D and Table 18E of E2/AS1. You can read this here: [E2/AS1 \(part 4\)](#).

Lintel seating – lintels shall have a minimum seating into adjacent veneer of

- (i) 100mm for spans up to, and including 2m
- (ii) 200mm for spans over 2m

There are two methods of installing a lintel bar with brick veneer:

Acceptable solution for lintel bar – E2/AS1 provides a method where the angle spans the brick from one side to the other. The lintel should be kept either solely in the brick or the timber framing but not both. The angle sizes within Table 18E of E2/AS1 should be applied.

Alternative solution for lintel bar – The second method involves sitting the lintel back 20mm from the face of the veneer, and have correct seating. With this method, the angle is attached directly to the structure and kept 5mm short of the opening at each end to accommodate any movement in the frame. The below table applies to this method.

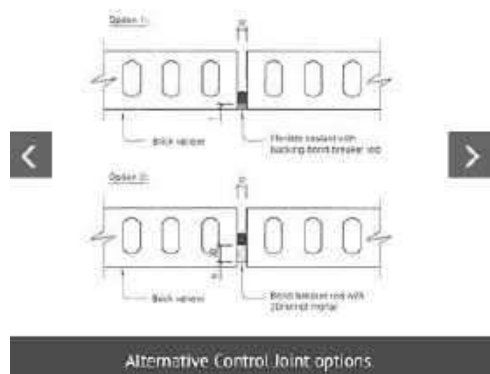


| Max.Span(mm) | Size of Angle |
|--------------|-------------------------------|
| 3000mm | 80X80X6 |
| 3500mm | 100 x 100 x 6 or 125 x 75 x 6 |
| 4500mm | 125 x 75 x 8 |
| 4800mm | 125 x 75 x 10 |

The durability requirements for lintel bars can be seen in Table 18D of [E2/AS1 \(part 4\)](#).

CONTROL JOINTS

Control joints allow concrete brick veneer to respond to minor movement of the building.



Control Joints

Buildings and building components generally move slightly after construction. Often this relates to normal expansion due to acceptable moisture absorption. Control joints are vertical gaps, usually filled with in elastic materials, which allow brick veneer to respond to these movements usually by opening in response to expansion.

Generally clay brick veneer does not require control joints. Slight expansion can occur soon after manufacture but this does not appear to present any issues in normal construction.

Concrete brick veneer however typically requires control joints. Designers and bricklayers should check manufacturers' specifications and familiarise themselves with Section 9.2.8.2 of E2/AS1 which you can read here: [E2/AS1 \(part4\)](#).

DESIGNING OF CONTROL JOINTS

Control joints should also be designed and constructed as shown in Figure 73A of E2/AS1.

This requires that control joints consist of:

- A backer rod of compressible foam; and
- Sealant that complies with either Type F, Class 20 LM or 25 LM of ISO11600 or Low modulus Type II Class A of Federal Specification TI-S-00230C

PLACEMENT OF CONTROL JOINTS

To allow for the potential shrinkage in the length of concrete brick veneer E2/AS1 requires that vertical control joints are placed at not more than 6m centres.

Vertical control joints are also required to be located:

- Within 600mm of Tjoints;
- Within 600mm of L shaped corners or by restricting the space to the next control joint to 3.2m maximum
- At changes in wall height that exceed 600mm;
- At changes in wall thickness.



It is not uncommon to read reports from Geo-Tech Engineering control joints in clay brick veneers due to expansive clay soils but this is not necessary. Where such soil types occur an appropriate foundation should be designed to manage this and there is no evidence that control joints would be necessary.

Control joints should be considered however in clay and concrete brick veneer in the following circumstances:

- If a wall is 10m or longer and has no window or door openings– a control joint should be installed at an intermediate point.
- Where a small panel of brick work adjoins a large panel of brickwork, as movement within the framing may cause a crack, a control joint may be considered. An alternative however would be to strengthen the framing using additional brick ties and using reinforcing in mortar joints in these areas.

Where a control joint is used it is important to ensure that the framing details provide a stud within 200mm of each side of the joint for the fitting of brick ties.

If possible, position a control joint behind down pipes to hide them.

It is important to remember that if a crack develops in an otherwise well-constructed brick veneer it is an aesthetic issue only and should cause no problems as to weather tightness or the overall integrity of the veneer. A control joint is in effect a controlled crack.



BRICK VENEER HEIGHTS

Brick Veneer Heights

E2/AS1 sets the limitations for Brick Veneer heights in Section 9.2.3 and Figure 73B . You can read this document here: [E2/AS1 \(part 4\)](#)

It advises that brick veneers with timber framing shall have:

- A maximum height of veneer above finished ground level of 7m;
- A maximum height of 4m from the foundation;
- A maximum height of 5.5m to the apex of a gabled area.

If the veneer is supported by a masonry structure, NZS4229:2001 permits a veneer height of 6.0 for the wall and up to 10m in a gable area.

The Clay Brick and Paver Manufacturers Association have developed a combined 2 storey system for clay brick veneer- Design Note TB 1. Designers and Bricklayers should familiarise themselves with this document which you can read here: [2StoreyClayBrickVeneerConstruction- MadeEasy](#)

You may also want to consider the following concrete brick 2Storeysolutions:

[Firth 2StoreyBrickVeneersolutionforDevonstoneand70mmBrickVeneers](#)

[Firth 2StoreyBrickVeneersolutionforFirth 10seriesHollowMasonry, Manorstoneand 90mmBrick Veneers](#)

BRICK STAINING

Staining generally has only an aesthetic effect on brick veneer.

Stain removal



While it is perfectly normal for clay bricks to have a slight variance in colour, this is different than brick stains. All care should be taken during construction to prevent staining occurring, however this is not always possible.

Stain removal depends on the cause of the stain.

The Brick and Blocklayers Federation recommends that you consult your bricklayer or brick supplier before attempting stain identification and removal.

VANADIUM STAINS

Light-coloured clays often contain vanadium salt that are generally colourless but under certain conditions may appear as yellow, green or reddish-brown discolouration of the brick. Vanadium stains are neither permanent nor harmful and do not indicate a defect in the brick.

Vanadium stains are often generated by the use of too strong a concentration of hydrochloric acid during the initial cleaning process, or from excessive water penetration.

While vanadium stains will wash off overtime, an application of 4% Sodium Hypochlorite (Janola) or a mixture of Sodium Bicarbonate and water (60g per litre of water) will assist in their removal.

Hydrochloric acid may turn vanadium salts black and make it difficult to remove. It is therefore important that vanadium salts are removed before attempting to clear mortar residue from clay brick veneer with hydrochloric acid.

MANGANESE STAINS

This stain occurs characteristically along the edges of grey or brown clay bricks. It appears as a dark-blue brown discolouration.

If you suspect manganese staining, contact your brick company for them to inspect and advise on a resolution.

**COPPER AND BRONZE STAINS**

Sometimes clay brick veneer may be in close proximity to metals such as copper or bronze. Water washing over these metal surfaces can result in a bluish-green stain appearing on the surface of the bricks.

These stains may be removed using a solution of 1 part acetic acid (80% or stronger): 1 part hydrogen peroxide (30%-35% strength): 6 parts water.

IRON OXIDE (RUST)

Rust can be the result of using hydrochloric acid on clay bricks. This may be able to be removed by applying a solution of 1 part phosphoric acid to 4 parts of water. Allow up to 24 hours for it to work.

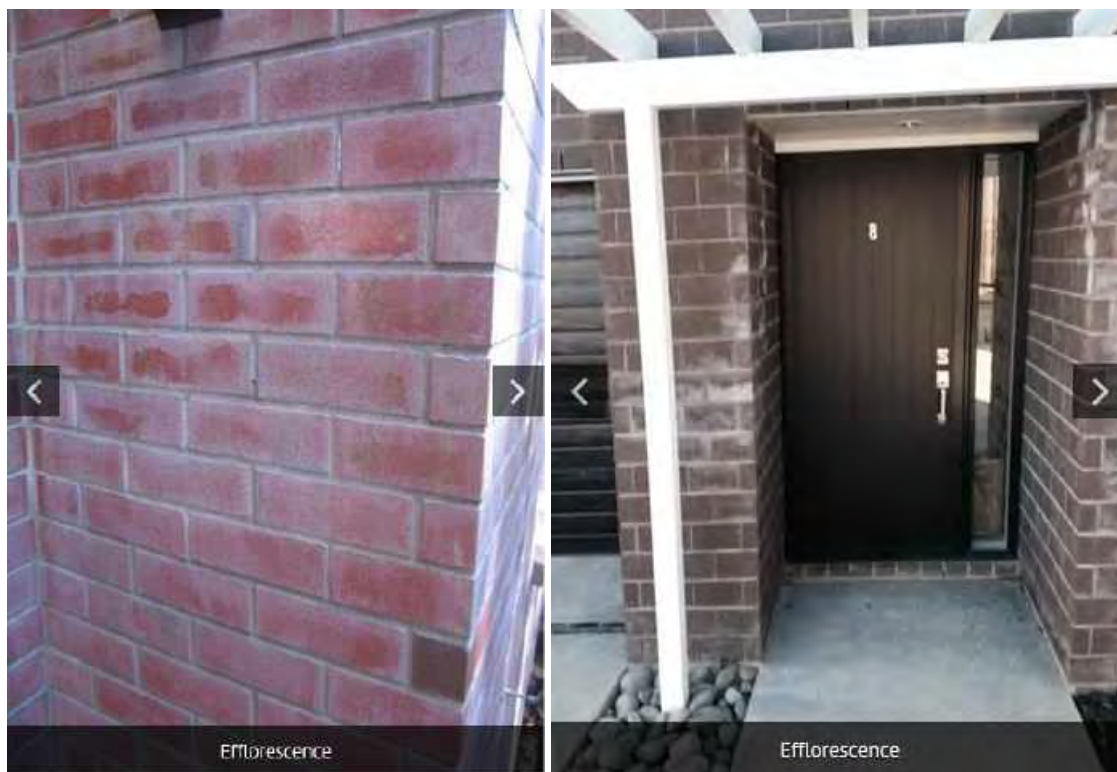
SMOKE STAINS

Common around domestic fireplaces but can also be an issue with fire damaged buildings.

Minor smoke stains can be removed with sugar soap—which is a highly alkaline mixture. Mix approximately 500g in to 2 litres of water and apply liberally by brush. After the smoke stains disappear, scrub with a mixture of detergent and household scouring powder containing Sodium Hypochlorite (Janola).

EFFLORESCENCE

Efflorescence



Efflorescence is a calcium deposit that can form on clay or concrete veneer. It appears as a white powdery and sometimes 'fluffy' deposit on the brick.

Efflorescence occurs where excessive amounts of water enters a veneer that has soluble salts present. When the water dries out, the salts are then deposited on the surface of the veneer. Soluble salts can enter the veneer from various sources:

- Mortar components, particularly cement.
- Soil or fill in contact with the wall.
- Sea spray in coastal areas.
- Masonry units (not a common source).

The Brick and Blocklayers Federation recommends that bricklayers protect new brick work with adequate coverings when rain interrupts construction.

Persistent efflorescence may act as a warning sign that water is entering the wall through faulty copings, flashings or pipes.

CLEANING EFFLORESCENCE

Most efflorescence will naturally disappear over time, however its removal can be accelerated by brushing with a stiff dry brush. The use of a dust pan or vacuum cleaner to collect the salts after

brushing is recommended as this will prevent salts from re-entering the brickwork or any porous paving materials below.

After brushing and cleaning up, an absorbent cloth (wrung out until damp only) can be used to pick up any residue. Frequent rinsing of the cloth in fresh water is advisable. Rinsing brick work with water will only cause the salt to be re-absorbed in to the bricks and reappear when dry.

BRICK TOLERANCES AND AESTHETIC APPEARANCE

Brick Tolerances and Aesthetic Appearance

It is possible for a brick veneer to be building code compliant but not have the visual look that reflects the skills of an experienced bricklayer. This is referred to as 'workmanship quality'.

It is important to discuss with your bricklayer the aesthetic look you are hoping to achieve with your brick veneer and if possible, include them in your selection process.

The Brick and Blocklayers Federation recommends that parties to a brick veneer construction enter into a clear, written contract that sets out the expectations of parties including agreed workmanship quality standards, quality checking responsibilities and an agreement on how disputes will be managed– even if it is not a compulsory requirement under legislation.

VIEWING DISTANCE

Due to the nature of bricks no two bricks are the same and no brick is perfect when examined close-up. ASTM C90 has been adopted as the industry standard for viewing brickwork – it states that 'for exposed wall construction chips and imperfections shall not be evident when viewed from a distance of not less than 6.1m in diffused light'.

DRYING CRACKS

During the manufacturing process hairline cracks can appear in a small number of clay bricks. This occurs during the drying process when excess moisture is removed from the clay prior to it entering the kiln. Bricks with these cracks conform to AS/NZS4455 and do not compromise the structural integrity or weather tightness of the brick.

From an aesthetic standpoint, the relevant American Standard Test Method (ASTM) has been adopted. ASTM C216-04 specifies that bricks must contain less than 5% visible cracking when viewed from a distance of 6.1 meters.

CHIPPING

Bricks may be transported several times before arriving onsite and occasionally chipping can occur. Chips are more noticeable on bricks that have a surface colour different from the body of the brick. A workmanship quality standard is achieved if imperfections, including chips, are not visible when viewed from a distance of not less than 6.1m under diffused light as per ASTM C90.

New Zealand does not have a standard to assist a Bricklayer to evaluate the level of chipping acceptable in a brick prior to laying however ASTM C216-15 has been adopted by BBFNZ.



- ASTM C216-15 for a general purpose face brick (FBS textured) basically has the following requirements:
- Chips from the edge should not be deeper than 8mm
- Corner chips should not be deeper than 13mm.
- When all the length of the chips are added up that the total is not exceed 10% of the perimeter of the brick face (as an example, the accumulative lengths of the chips for a 230mm X 75mm brick shall not exceed 61mm).

It is good practice for Bricklayers to set aside bricks that do not meet this standard and to assess whether to discard it or use it for cuts.

DIMENSIONAL CATEGORY

AS/NZS4455 Masonry units and segmental pavers' calls for bricks to be classified into dimensional categories based on their deviation from their work size, or the size specified in manufacture.

To test if bricks meet the standard, 20 bricks should be placed in a row and the total length should be measured. This can be done with height, width and length. Tolerances for these are:

| Category | Height | Length | Width |
|----------|--------|--------|-------|
| DW1 | ±90mm | ±50mm | ±50mm |
| DW2 | ±60mm | ±40mm | ±40mm |

RUBBING

During transportation brick may rub together on the pallet. This can sometimes cause light rubbing on the face of the bricks. Excessively rubbed bricks should be discarded or used for cuts.

COLOUR VARIATION

Clay and concrete bricks are both subject to some variation in colour between batches. This is part of the inherent beauty of brick.

Unusual discolouration patterns can be limited by blending the bricks. Should there be any concern regarding significant colour variation laying should cease and the manufacturer contacted.



BRANZ Appraised

Appraisal No. 658 [2020]

HERMPAC RUSTICATED, SPLAYCUT AND MULTI-SPLAY WEATHERBOARD CAVITY SYSTEM

Appraisal No. 658 [2020]

This Appraisal replaces BRANZ
Appraisal No. 658 [2014].



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is a cavity-based timber weatherboard external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.
- 1.2 The system consists of horizontally fixed Hermpac Rusticated, Splaycut and Multi-Splay timber weatherboards, cavity battens, flashings and accessories and is finished with a premium penetrating oil, stain or an exterior paint system to Hermpac specifications.
- 1.3 The system incorporates a primary and secondary means of weather resistance (first and second line of defence) against water penetration by separating the cladding from the external wall frame with a minimum 18 mm drained cavity.

Scope

- 2.1 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating oil or stain finished Cedar and DuraLarch weatherboards and paint finished DuraLarch and AshinDura weatherboards has been appraised as an external wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable System E2/AS1, Paragraph 1.1; and,
 - constructed with timber 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,
 - situated in NZS 3604 Wind Zones up to, and including Extra High.
- 2.2 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating oil or stain finished weatherboards has also been appraised for weathertightness and structural wind loading when used as an external wall cladding system for 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,
 - constructed with timber framing subject to specific engineering design; and,
 - situated in specific design wind pressures up to a maximum design differential ultimate limit state [ULS] of 2.5 kPa.

- 2.3 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating paint finished cedar weatherboards has been appraised as an external wall cladding system for buildings within the following scope:
- the scope limitations of NZBC Acceptable System E2/AS1, Paragraph 1.1; and,
 - constructed with timber 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,
 - situated in NZS 3604 Wind Zones up to, and including Medium when studs are at maximum 600 mm centres, and NZS 3604 Wind Zones up to, and including Very High when studs are at maximum 400 mm centres.
- 2.4 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System must only be installed horizontally on vertical, flat surfaces.
- 2.5 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity 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 Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.]*

Building Regulations

New Zealand Building Code [NZBC]

- 3.1 In the opinion of BRANZ, the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System, 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 B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4 for the relevant physical conditions of B1.3.3 being self-weight, wind, impact and creep [i.e. B1.3.3 [a], [h], [j] and [q]]. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets these requirements. See Paragraphs 9.1 - 9.5.

Clause B2 DURABILITY: Performance B2.3.1 [b], 15 years and B2.3.2. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets these requirements. See Paragraphs 10.1 and 10.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets this requirement. See Paragraphs 14.1 - 14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 System components and accessories supplied by Hermpac are as follows:

Hermpac Rusticated, Splaycut and Multi-Splay Weatherboards

- Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are manufactured from Canadian Coastal Western Red Cedar. Selected rusticated weatherboards are also manufactured from DuraLarch [Siberian Larch heartwood] and AshinDura [Western Hemlock].
- The lap and rebate profiles of Hermpac Rusticated and Splaycut weatherboards are in accordance with NZS 3617 and BRANZ Bulletin 411. The weatherboards are minimum 18.5 mm thick, and are available in a range of widths and face profiles. They are supplied in random lengths. Lengths outside of the general specification may be available by special contract.
- Hermpac Multi-Splay weatherboards are minimum 18.5 mm thick and are available in a range of widths and face profiles. They are supplied in random lengths. Lengths outside of the general specification may be available by special contract.

- Cedar and DuraLarch weatherboards are supplied unfinished for site finishing with oil, stain or paint prior to installation, or prefinished using the flood coat application method by Machinecoat NZ Limited. AshinDura weatherboards are treated to Hazard Class H3.1 and must be paint finished only. They are supplied primed, or prefinished using the flood coat application method by Machinecoat NZ Limited. Refer to the Appraisals listing on the BRANZ website for details of the Hermpac rusticated, splaycut and multi-splay weatherboard profiles covered by this Appraisal. *[Note: This Appraisal is only valid when weatherboards with profiles as listed are supplied by Hermpac.]*

Accessories

- **Hermpac external corner mouldings** - 40 x 40 mm and 42 x 42 mm profiled external corner moulds supplied in lengths 1.8 m and longer.
- **Hermpac internal corner mouldings** - 18.5 x 18.5 mm, supplied in 1.8 m and longer.
- **Hermpac cover boards** - 18 mm thick boards in widths of 69 and 90 mm. The cover boards are supplied in lengths 1.8 m and longer.
- **Hermpac eaves moulding** - 40 x 27 mm, 26 x 15 mm and 30 x 18 mm bevelled profile, supplied in 1.8 m and longer.
- **Hermpac Rusticated plugs** - 40 x 9.25 mm and 25 x 9.25 mm profiled to suit selected weatherboard profiles. The plugs are supplied in 10 m bundles.
- **Hermpac scribes** - 10 mm wide x 40 and 60 mm, 17 mm wide x 40 and 60 mm scribes with bevelled or radiused edges supplied in 1.83 to 6.1 m lengths.

[Note: All timber accessories are manufactured from Canadian Coastal Western Red Cedar or Siberian Larch heartwood.]

- **Hermpac oil or stain finished weatherboard fixings** - silicon bronze, Grade 304 or Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails. The nail shank must be minimum 3.15 mm diameter and the length must allow minimum 30 mm penetration of the wall frame.
- **Hermpac paint finished weatherboard fixings** - Grade 304 or Grade 316 stainless steel annular grooved jolt head nails. The nail shank must be minimum 3.15 mm diameter and the length must allow minimum 30 mm penetration [for DuraLarch and AshinDura] or minimum 35 mm penetration [for Cedar] of the wall frame.
- **Hermpac clinch nails** - 27 x 2.0 mm, 40 x 2.0 mm or 50 x 2.0 mm Grade 316 stainless steel annular grooved nails with an off-set flat head.
- **Hermpac cover board fixings** - 50 x 2.8 mm silicon bronze, Grade 304 or Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails.
- **Hermpac scribe fixings** - 60 x 2.8 mm stainless steel annular grooved jolt head nails.

4.2 Accessories used with the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System which are supplied by the building contractor are:

- **Flexible wall underlay** - building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlays.
- **Flexible wall underlay support** - polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible wall underlay in place and preventing bulging of the bulk insulation into the drainage cavity. *[Note: mesh and wire galvanising must comply with AS/NZS 4534.]*
- **Rigid wall underlay** - Plywood or fibre cement sheet complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid air barrier systems.
- **Flexible sill and jamb flashing tape** - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.

- **Window and door trim cavity air seal** - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal suitable for use around window, door and other wall penetration openings.
- **Cavibat cavity battens** - manufactured from extruded polypropylene. The battens are cut after extruding to a finished size of approximately 45 mm wide by 18 mm thick. The battens are coloured green and are supplied in 1,200 mm long lengths. Cavibat cavity battens are covered by BRANZ Appraisal No. 524 [2012].
- **Timber cavity battens** - nominal 50 mm wide by 25 mm thick [minimum finished size of 45 mm wide by 18 mm thick] Radiata pine timber treated to Hazard Class H3.1.
- **Cavibat fixings** - 40 x 2.5 mm flat head hot-dip galvanised nails or stainless steel finishing brads used to temporarily fix the battens in place until the cladding is installed.
- **Timber cavity batten fixings** - 40 x 2.5 mm flat head hot-dipped galvanised nails or 50 x 2.87 mm hot-dipped galvanised gun nails to temporarily fix the battens in place prior to installation of the cladding.
- **Cavity closure strip** - uPVC, aluminium or stainless steel, punched with 3-5 mm diameter holes or slots complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3.
- **Flashings** - including external corner flashing, internal corner flashing, horizontal inter-storey joint flashing, balustrade and parapet saddle flashing, and balustrade and parapet cap flashings. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table 20 and Table 21 for durability and material compatibility requirements.
- **Aluminium joinery head flashings** - as supplied by the joinery manufacturer or contractor.
- **Flexible sealant** - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.

Finishing System Specification – Oil or Stain Finish

- 4.3 Prior to the installation of oil or stain finished weatherboards, the back, face, ends and edges of the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards not supplied prefinished must be sealed with an exterior grade oil or oil-based penetrating stain. At least two coats of an exterior grade quality oil or oil-based penetrating stain must be used over the front face of the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards to protect the weatherboards and give the desired finish colour to the exterior walls. The oil or stain must be recommended for use as a wall cladding oil or stain by the manufacturer and must be applied in accordance with the manufacturer's instructions. Proprietary oil or stain systems have not been assessed, and are therefore outside the scope of this Appraisal. *[Note: Hermpac recommends the use of oil and oil based stains manufactured by Wood-X and Resene.]*

Finishing System Specification – Paint Finish

- 4.4 Prior to the installation of paint finish weatherboards that are supplied unprimed, the back, face, ends and edges of the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be primed in accordance with the Technical Literature for the relevant timber type. All exposed edges, including top edges at sills and all bottom edges of Hermpac Rusticated, Splaycut and Multi-Splay weatherboards and accessories not supplied prefinished, must be finished with at least two coats of an exterior grade acrylic latex paint complying with any of Parts 7, 8, 9 or 10 of AS 3730 to protect the weatherboards and give the desired finish colour to the exterior walls. The paint must be recommended for use as a wall cladding paint for the selected timber by the manufacturer and must be applied in accordance with the manufacturer's instructions. Proprietary paint systems have not been assessed, and are therefore outside the scope of this Appraisal. *[Note: For Hermpac Rusticated, Splaycut and Multi-Splay weatherboards, Hermpac recommends using paint with a colour that has a Light Reflectance Value (LRV) of $\geq 40\%$ for Cedar or AshinDura, or $\geq 45\%$ for DuraLarch.]*

Handling and Storage

- 5.1 Handling and storage of all materials supplied by Hermpac or the building contractor, whether on site or off site, is under the control of the building contractor. Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be stacked flat and true, clear of the ground by a minimum of 150 mm and supported on dry and clean timber bearers at maximum 900 mm centres. They must be kept dry at all times either by storing within an enclosed building or when stored externally an additional secondary cover to the plastic wrapping is required. Care must be taken to avoid damage to edges, ends and the weatherboard surfaces.
- 5.2 Accessories must be stored so they are kept clean, dry and undamaged. All accessories must be used within the maximum storage period recommended by the manufacturer.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System. 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

Framing

Timber Treatment

- 7.1 Timber wall framing behind the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

- 7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases studs must be at maximum 600 mm centres. Where interior linings compliant with NZS 3604 Section 12 are installed directly to the interior face of the wall framing, dwangs are not required. Refer to NZS 3604 Section 8.5.4 for further information.
- 7.3 Additional framing may be required at soffits, internal and external corners, and window and door openings for the support and fixing of cavity battens and the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System.
- 7.4 Timber wall framing behind where weatherboards are joined over a cavity batten must be nominal 50 mm thickness [i.e. 45 mm minimum finished thickness].
- 7.5 Timber wall framing must have a maximum moisture content of 24% at the time of the cladding application. *[Note: If Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are fixed to framing with a moisture content of greater than 24% problems may occur at a later date due to excessive timber shrinkage.]*

General

- 8.1 When the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is used for specifically designed buildings up to 2.5 kPa design differential ULS wind pressure, only the weathertightness aspects of the cladding and maximum framing centres are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.
- 8.2 Punchings in the cavity vent strip must provide a minimum ventilation opening area of 1,000 mm² per lineal metre of wall in accordance with the requirements of NZBC Acceptable System E2/AS1, Paragraph 9.1.8.3 [b]. *[Note: Cavibat cavity battens do not provide vermin proofing to the bottom of the drained cavity.]*

- 8.3 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level, paved surfaces, such as footpaths, must be kept clear of the bottom edge of the cladding system by a minimum of 100 mm, and unpaved surfaces by 175 mm in accordance with the requirements of NZBC Acceptable System E2/AS1, Table 18.
- 8.4 At balcony, deck or roof/wall junctions, the bottom edge of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System must be kept above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with NZBC Acceptable System E2/AS1, Paragraph 9.1.3.
- 8.5 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for Wind Zones up to and including Very High, and rigid underlays for buildings in the Extra High Wind Zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure. Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the weatherboard fixing lengths must be increased by a minimum of the thickness of the underlay.
- 8.6 Where the system abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Inter-storey Junctions

- 8.7 Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey drained joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 m in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4 [b].

Structure

Mass

- 9.1 The mass of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is less than 30 kg/m². The system is therefore considered a lightweight cladding in terms of NZS 3604.

Impact Resistance

- 9.2 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has good resistance to impact loads likely to be encountered in normal residential use. The likelihood of impact damage to the system when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers should be considered for vulnerable areas.

Wind Zones

- 9.3 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating oil or stain finished Cedar or DuraLarch weatherboards is suitable for use in all Wind Zones of NZS 3604, up to and including Extra High where buildings are designed to meet the requirements of NZBC Acceptable System E2/AS1, Paragraph 1.1, or up to 2.5 kPa design differential ULS wind pressure where buildings are specifically designed.
- 9.4 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating paint finished DuraLarch and AshinDura weatherboards is suitable for use in all Wind Zones of NZS 3604, up to and including Extra High where buildings are designed to meet the requirements of NZBC Acceptable System E2/AS1, Paragraph 1.1.
- 9.5 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System incorporating paint finished cedar weatherboards is suitable for use in NZS 3604 Wind Zones up to, and including Medium when studs are at maximum 600 mm centres, and NZS 3604 Wind Zones up to, and including Very High when studs are at maximum 400 mm centres.

Durability

Serviceable Life

- 10.1 Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System installations are expected to have a serviceable life of at least 20 years provided the system is maintained in accordance with this Appraisal and the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are continuously protected by a oil, stain or paint finish. *[Note: For oil or stain finished weatherboards this opinion only covers serviceability with regards to structural and weathertightness performance. It does not cover appearance, which may deteriorate significantly, especially when proper and regular maintenance is not carried out.]*
- 10.2 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of weatherboards in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

- 11.1 Regular maintenance is essential to ensure the performance requirements of the NZBC are continually met and to ensure the maximum serviceability of the system.
- 11.2 Regular cleaning [at least annually] of the oil, stain or paint coating is required to remove grime, dirt and organic growth, and to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent.
- 11.3 Recoating of the oil or stain finish will be necessary throughout the life of the cladding system. Recoating must be carried out every 2-3 years or in accordance with the oil or stain manufacturer's instructions. Recoating will be required more frequently on exposed northern and western facing walls. When recoating, care must be taken to ensure bottom edges and Hermpac Rusticated, Splaycut and Multi-Splay edges are well covered and penetrated with the oil or stain.
- 11.4 Recoating of the paint finish will be necessary throughout the life of the cladding system. Repainting must be carried out every 7-10 years or in accordance with the paint manufacturer's instructions. When repainting, care must be taken to ensure bottom edges and Hermpac Rusticated, Splaycut and Multi-Splay edges are well covered with the paint.
- 11.5 Annual inspections must be made to ensure that all aspects of the cladding system, including flashings and joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration, which would allow water ingress must be repaired immediately. Sealant, oil, stain or paint coatings, flashings or the weatherboards must be repaired in accordance with the relevant manufacturer's instructions.
- 11.6 Minimum ground clearances as set out in this Appraisal and the Technical Literature must be maintained at all times during the life of the system. *[Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System.]*

Control of External Fire Spread

Vertical Fire Spread

- 12.1 This Appraisal only covers buildings 10 m or less in height. NZBC Functional Requirement C3.2 identifies that external vertical fire spread to upper floors only needs be considered for buildings with a building height greater than 10 m. Control of external vertical fire spread is therefore outside the scope of this Appraisal.

Horizontal Fire Spread

- 12.2 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has not been assessed for a peak heat release or total heat released rating and therefore cannot be used within 1 m of the relevant boundary or Risk Group SI Buildings.
- 12.3 Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 and Verification Method C/VM2 for fire resistance rating and control of external fire spread requirements for external walls.

Prevention of Fire Occurring

- 13.1 Separation or protection must be provided to the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solution C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 14.1 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System, when installed in accordance with this Appraisal and the Technical Literature, will prevent the penetration of moisture that could cause undue dampness or damage to building elements.
- 14.2 The cavity must be sealed off from the roof and sub-floor space to meet code compliance with NZBC Clause E2.3.5.
- 14.3 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with NZBC Clause E2.3.6.
- 14.4 The details given in the Technical Literature for weather sealing are based on the principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal, and are the responsibility of the designer for compliance with the NZBC.
- 14.5 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System, where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirements for junctions, penetrations, etc. to remain weather resistant.

Internal Moisture

- 15.1 Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

Water Vapour

- 15.2 The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is not a barrier to the passage of water vapour, and when installed in accordance with this Appraisal will not create a risk of moisture damage resulting from condensation.

Installation Information

Installation Skill Level Requirements

- 16.1 All design and building work must be carried out in accordance with the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System Technical Literature and this Appraisal by competent and experienced tradespersons conversant with the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System. Where the work involves Restricted Building Work [RBW] this must be completed by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant License class.

Hempac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System Installation

Wall Underlay and Flexible Sill and Jamb Tape Installation

- 17.1 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of the Hempac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid wall underlay materials must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems must be installed in accordance with the manufacturer's instructions. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

Cavity Batten Installation

- 17.2 Cavity battens must be installed over the wall underlay to the wall framing at maximum 600 mm centres where the studs are at 600 mm centres, or at 400 mm centres when studs are at 400 mm centres. [Refer to Paragraph 9.5 for the maximum stud spacings for paint finished cedar weatherboards.] Cavibat cavity battens must be fixed in place with 40 x 2.5 mm hot-dip galvanised flat head nails or galvanised or stainless steel finishing brads at 400 mm centres. Refer to BRANZ Appraisal No. 524 [2012] for further information. Timber cavity battens must be fixed in place with 40 x 2.8 mm hot-dip galvanised flat-head nails at maximum 800 mm centres.
- 17.3 Where studs are at greater than 450 mm centres and a flexible wall underlay is being used, a wall underlay support must be installed over the underlay at maximum 300 mm centres horizontally.

Hempac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System Installation

- 17.4 Hempac Rusticated, Splaycut and Multi-Splay weatherboards may be cut on site by power or hand saw. Holes and cut-outs may be formed by using a hole saw.
- 17.5 Hempac Rusticated, Splaycut and Multi-Splay weatherboards must be dry prior to installation.
- 17.6 Before oil or stain finished Hempac Rusticated, Splaycut and Multi-Splay weatherboards are installed, the back, face and edges must be sealed with an exterior grade oil or oil-based penetrating stain. During installation, cut ends must be sealed with an exterior grade oil or oil-based penetrating stain.
- 17.7 Before paint finished Hempac Rusticated, Splaycut and Multi-Splay weatherboards are installed, the back, face and edges must be sealed with an exterior grade primer. During the installation of paint finished Hempac Rusticated, Splaycut and Multi-Splay weatherboards, cut ends must be sealed with two coats of an exterior grade alkylid timber primer.
- 17.8 Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner, external corner moulding etc. The necessary flashings must be installed before commencing weatherboard fixing and the cavity closure must be installed continuously around the bottom of the cavity.
- 17.9 The first course of weatherboards must be installed using full length boards where possible, and commence from an external corner. The first weatherboard must be installed level to assist with the installation of subsequent weatherboards. The weatherboards must overhang the bottom plate by a minimum of 50 mm.
- 17.10 Immediately prior to installing the weatherboards over the internal and external corner flashings, a continuous bead of sealant must be applied to the face of the flashing along the fixing line.
- 17.11 Hempac Rusticated, Splaycut and Multi-Splay weatherboards must be overlapped a minimum of 25 mm with an expansion gap of 2 mm at the overlap. It is recommended that the top of the weatherboard lap is restrained using the Hempac clinch nail at every cavity batten.

- 17.12 Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be pre-drilled with a hole slightly smaller than that of the nail. Fix each weatherboard with one nail per board at every cavity batten. Fixing of oil or stain finished weatherboards must be carried out using Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails. Fixing of paint finished weatherboards must be carried out using silicon bronze or Grade 304 or 316 stainless steel annular grooved jolt head nails. The nail length must allow minimum 30 mm penetration [for DuraLarch and AshinDura] or 35 mm penetration [for Cedar] of the wall frame. The fixing must be located 30-35 mm above the bottom of the weatherboard and a minimum of 32 mm from the end of the board. Crown Head, Rose Head or Flat Head nails must finish flush onto the surface of the weatherboard, not into or below the surface. The nail must be installed with a slight upslope to reduce capillary draw. Jolt head nails must be punched a maximum of 2 mm beneath the surface of the board.
- 17.13 Fix weatherboards in full lengths where possible. Where joints are unavoidable, scarf the weatherboard at 30° over a cavity batten and fix with one fixing through the overlapping board.

Aluminium Joinery Installation

- 17.14 Aluminium joinery and associated head flashings must be installed by the building contractor in accordance with the Technical Literature. A 7.5-10 mm 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.
- 17.15 After installing the window and door joinery, Hermpac Rusticated plugs or scribes must be installed in accordance with the Technical Literature to provide additional weatherproofing for the joinery/ weatherboard junction.

Finishing

- 17.16 The coating manufacturer's instructions must be followed at all times for application of the oil or stain finish.
- 17.17 To prevent swelling of the weatherboard around punched fixings, the fixing must be filled immediately, or alternatively the weatherboard and the head of the fixing must be primed with a premium alkyd timber primer.
- 17.18 The paint coating manufacturer's instructions must be followed at all times for the application of the paint finish. Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be painted as soon as practicable following fixing and must be clean and dry before commencing. If the Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are exposed to the weather for more than 2 months they must be reprimed with one coat of primer prior to the application of the finishing coats. Allow the recommended drying time between coats and follow the temperature limitations for application.

Inspection

- 17.19 The Technical Literature must be referred to during the inspection of Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System installations.

Health and Safety

- 18.1 Cutting of Hermpac Rusticated, Splaycut and Multi-Splay weatherboards must be carried out in well ventilated areas and dust masks, eye and hearing protection must be worn.
- 18.2 Safe use and handling procedures for the components that make up the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System are provided in the relevant manufacturer's Technical Literature.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

19.1 The following testing has been completed by BRANZ:

- BRANZ expert opinion on NZBC E2 code compliance for the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is based on testing and evaluation of all details within the scope and as stated within this Appraisal. The Hermpac Rusticated and Splaycut Weatherboard Cavity System was tested to NZBC E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meter box head, jamb and sill details, horizontal joints, internal and external corners and balustrade to wall junction. The Hermpac Multi-Splay Weatherboard Cavity System was tested to determine the weathertightness performance limits of the system. The testing assessed the performance of the foundation detail, horizontal lap joints, internal and external corners. In addition to the weathertightness tests, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of NZBC Acceptable Solution E2/AS1 for cavity-based weatherboard claddings.
- Fastener pull through testing. BRANZ determined design wind suction pressures, and by comparing these pressures with AS/NZS 1170 pressure coefficients, the fixing requirements were determined for timber framed walls.

Other Investigations

- 20.1 Structural and durability opinions have been provided by BRANZ technical experts.
- 20.2 The performance of timber weatherboard wall cladding products in New Zealand has been considered, including the structural and durability performance, and non-hazardous nature.
- 20.3 Site inspections have been carried out by BRANZ to assess the practicability of installation.
- 20.4 The Technical Literature for the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has been examined by BRANZ and found to be satisfactory.

Quality

- 21.1 The manufacture of Hermpac Rusticated, Splaycut and Multi-Splay weatherboards has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 21.2 The quality of materials, components and accessories supplied by Hermpac is the responsibility of Hermpac.
- 21.3 Quality of installation on site of components and accessories supplied by Hermpac and the building contractor is the responsibility of the installer.
- 21.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, wall underlay, flashing tapes, air seals, cavity battens and the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System in accordance with the instructions of Hermpac.
- 21.5 Building owners are responsible for the maintenance of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System in accordance with the instructions of Hermpac.



BRANZ Appraised
Appraisal No. 658 [2020]

BRANZ Appraisal
Appraisal No. 658 [2020]
27 May 2020

HERMPAC RUSTICATED,
SPLAYCUT AND MULTI-SPLAY
WEATHERBOARD CAVITY SYSTEM

Sources of Information

- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 4534: 2006 Zinc and zinc/aluminium-alloy coatings on steel wire.
- BRANZ Bulletin Number 411, April 2001, Recommended Timber Cladding Profiles.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3603: 1993 Timber structures standard.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 3617: 1979 Specification for profiles of weatherboards, fascia boards and flooring.
- NZS 4211: 2008 Specification for performance of windows.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



In the opinion of BRANZ, the **Hermipac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System** 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 **Herman Pacific 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. **Herman Pacific 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 **Herman Pacific 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 **Herman Pacific Limited** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

Date of Issue:

27 May 2020



PRODUCT CERTIFICATE

Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System



KEY INFORMATION

CERTIFICATE: GM-CM30037 Rev1

| 1 | SUMMARY OF DESCRIPTION OF BUILDING METHOD OR PRODUCT |
|---|---|
| | The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is a cavity-based external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used. |
| 2 | SUMMARY OF INTENDED USE OF BUILDING METHOD OR PRODUCT |
| | <ol style="list-style-type: none"> The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has been assessed as an external horizontally fixed wall cladding system for buildings within the following scope: <ul style="list-style-type: none"> the scope limitations of NZBC Acceptable Solution E2/AS1, Third Edition including amendment 9 (27/06/2019), Paragraph 1.1; and, constructed with timber framing complying with the NZBC and, with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Third Edition including amendment 9 (27/06/2019), Table 2; and, situated in NZS 3604:2011 Wind Zones up to, and including Extra High. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System has also been assessed for weathertightness and structural wind loading when used as an external horizontally fixed wall cladding system for buildings within the following scope: <ul style="list-style-type: none"> the scope limitations of NZBC Acceptable Solution E2/AS1, Third Edition including amendment 9 (27/06/2019), Paragraph 1.1; with regards to building height and floor plan area; and, constructed with timber framing subject to specific engineering design; and, situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System must only be installed horizontally on vertical, flat, surfaces. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System is assessed for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. (The assessment of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System relies on the joinery meeting the requirements of NZS 4211:2008 including Amendment 1 for the relevant Wind Zone or wind pressure.) |

| 4 | CERTIFICATE HOLDER DETAILS | ISSUED | LAST UPDATE | EXPIRY | 6 | PRODUCT CERTIFICATION BODY |
|---|---|-----------|-------------|-----------|---|--|
| | Herman Pacific Limited.
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| 5 | SIGNATURE | | | | | The complaints process for this certificate
can be found here:
https://www.global-mark.com.au/?s=complaint |
| |
Herve Michoux, Global Mark Managing Director | | | | | |



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CERTIFICATE V1.2



PRODUCT CERTIFICATE

Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System



3 BUILDING CODE PROVISIONS

The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System if designed, used, installed and maintained in accordance with the scope of this Certificate, the statements and conditions of the supporting BRANZ Appraisal No. 658 (2020), the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System Installation Specification, May 2020 will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2, B1.3.4 (b), (c), (d) and (e) for the relevant physical conditions of B1.3.3 (a), (h), (j) and (q). The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets the requirements.

Clause B2 DURABILITY: Performance B2.3.1(b) 15 years and B2.3.2(a). The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets these requirements.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets this requirement.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System meets this requirement and will not present a health hazard to people.

7 CONDITIONS AND LIMITATIONS OF USE

1. Subject to regular inspection for soil movement, earthquake or other structural impact or user damage.
 2. Maintaining the validity of BRANZ Appraisal No. 658 (2020) Hermpac Rusticated, Splaycut and Multi-splay Weatherboard Cavity System.
 3. Proprietary stain systems and proprietary paint systems have not been evaluated, and are therefore outside the scope of this certification.
- Design Conditions:
4. Product specification and incorporation of the Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System into the building design shall be carried out by a designer / architect / engineer or a building professional who:
 - a. Is qualified to design the buildings covered under the 'Scope' of use of this product.
 - b. Has ready access to the technical specifications including construction drawings and standards referenced in both the BRANZ appraisal No. 658 (2020) Hermpac Rusticated, Splaycut and Multi-splay Weatherboard Cavity System and this certificate.
- Product Installation Conditions:
5. Installation shall be carried out by a Licensed Building Practitioner (LBP), or tradespersons with experience in Rusticated, Splaycut and Multi-Splay Weatherboard external wall cladding installation who are supervised by a LBP.
 6. Installation shall be undertaken in accordance with all relevant technical information related to the selected installation method, including information contained within the BRANZ appraisal No. 658 (2020), the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System Installation Specification, May 2020, including
 - a. the construction drawings applicable (see section 9)
 - b. The finish requirements applicable to species and the stain or paint system used.
 7. As part of the application for the Code Compliance Certificate (CCC), a signed Quality Assurance Checklist Hermpac Rusticated, Multi-Splay & Splaycut Weatherboard Cavity System (dated May 2020) must be supplied by the LBP who installed or supervised installation.

8 HEALTH AND SAFETY INFORMATION



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PRODUCT CERTIFICATE

Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System



Standard industry safety practices and manufacturer safety requirement as detailed in the technical literature including the applicable SDS must be observed at all time.

9 SUPPORTING INFORMATION ABOUT DESCRIPTION

1. The system consists of horizontally fixed Rusticated, Splaycut and Multi-Splay Weatherboards installed over battens to form the cavity, flashings and accessories.
2. The Hermpac Rusticated, Splaycut and Multi-Splay weatherboards are manufactured from Western Red Cedar. Selected Weatherboards are also manufactured from DuraLarch and AshinDura. Cedar and DuraLarch weatherboards are supplied either raw, with one coat of machine applied premium penetrating exterior grade oil stain to Hermpac specifications or, with a machine applied primer coat and one machine applied undercoat of exterior grade paint to Hermpac specifications. AshinDura weatherboards are treated to H3.1 and are only available with a machine applied primer coat and one machine applied coat of exterior grade paint to Hermpac specifications.
3. The system incorporates a primary and secondary means of weather resistance (first and second line of defense) against water penetration by separating the cladding from the external wall frame with a minimal 18 mm drained cavity.
4. Hermpac Standard Profiles (HP51, HP52, HP65, HP65MS, HP66, HP66MS, HP67, HP68, HP53, HP54 and HP57) and Hermpac Custom Profiles defined in accordance with NZS3617 and BRANZ Bulletin 411 are covered by this certificate
5. The system construction details defined in:
 - Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System – Construction Drawings -Version 1.2 dated 20 May 2020; and
 - Rusticated Random Width & Depth Weatherboard Cavity System – Construction Drawings -Version 1.2 dated 20 May 2020.

10 SUPPORTING INFORMATION ABOUT INTENDED USE

Nil

11 SUPPORTING INFORMATION ABOUT CONDITIONS AND LIMITATIONS OF USE

Nil

12 BASIS FOR CERTIFICATION

The certification decision is based independent technical review(s) of engineering opinion(s) and other documented evidence(s), factory audit(s) and site review(s)

13 SUPPORTING DOCUMENTATION FOR CERTIFICATION

| Ref | Author | Title | Date and/or revision |
|-----|----------------|--|----------------------|
| 1 | BRANZ | Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System - BRANZ Appraisal No. 658 (2020) | 27/05/2020 |
| 2 * | BRANZ | BRANZ Appraisals Means of Compliance - Basis of Appraisal - Hermpac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System - BRANZ Appraisal No. 658 (2020) | TV10664-004 |
| 3 | Herman Pacific | Hermpac Weatherboard Cladding Cavity Systems – SDS Index | 20-May-2020 |

* This document was provided commercial in confidence and is not publicly available.

14 CONDITIONS RELATING TO NOTIFICATION

- (a) the certificate holder notifies the product certification body in writing of any intended change to any of the following particulars:
- (i) the name, address, or contact details of the certificate holder;
 - (ii) any address of a location where a certified product is produced or manufactured;



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PRODUCT CERTIFICATE

Hermipac Rusticated, Splaycut and Multi-Splay Weatherboard Cavity System



(b) the certificate holder notifies the product certification body in writing of any intended change, modification, or alteration to any of the following:

- (i) the certified building method or product;
- (ii) the method of its production or manufacture;
- (iii) the product quality plan prepared in respect of the certified building method or product;
- (iv) the application or installation instructions for the certified building method or product;
- (v) any documentation relating to the use and maintenance of the certified building method or product;

(c) if the certificate holder has any reason to suspect that the certified building method or product does not comply with the Building Code, the certificate holder notifies the product certification body in writing of the reason for that suspicion:

(d) if the certificate holder or the product certification body finds that a certified building method or product that has been released on the market does not comply with the Building Code, the certificate holder discloses that fact in disclosure statements published in a form that is acceptable to the product certification body and to the chief executive:

(e) if the certificate is suspended or revoked, the certificate holder—

- (i) notifies all customers to whom the building method or product is regularly supplied; and
- (ii) immediately ceases using the certificate, the mark of conformity, and any reference to the number of the certificate.

End of document



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Rusticated, Splaycut & Multi-Splay Weatherboard **Cavity System**

Installation Specifications

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PO Box 8822, Riccarton,
Christchurch 8440
p. 03 341 2163 f. 03 341 2173

Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Installation Specifications

1.0 General Information

1.1 Introduction

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System is a cavity-based external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

The cladding system consists of horizontally fixed Hermpac Rusticated, Splaycut & Multi-Splay weatherboards installed over cavity battens, flashings and accessories and is finished with a premium penetrating oil/stain or paint finish to Hermpac specifications.

The system incorporates a primary and secondary means of weather resistance (first and second line of defence) against water penetration by separating the cladding from the external wall frame with an 18/20/40-45 mm drained cavity.

1.2 BRANZ Appraisal

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System has been appraised by BRANZ. Refer to Appraisal No. 658 (2020).

1.3 CODEMARK Certification

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System has the Codemark Certificate of Conformity. Refer Certificate No. GM-CM30037.

1.4 Hermpac Rusticated, Splaycut & Multi-Splay Weatherboards

Hermpac Rusticated, Splaycut & Multi-Splay weatherboards are manufactured from Canadian Coastal Western Red Cedar. Selected weatherboard profiles are manufactured from DuraLarch (oil/stain or paint finish) or AshinDura (paint finish only).

The Rusticated and Splaycut weatherboard lap and rebate profiles are in accordance with NZS 3617 and BRANZ Bulletin 411. The weatherboards are minimum 18.5mm thick and are available in a range of widths and face profiles, supplied as a random length supply. Selected lengths are outside the general specification and are available by special contract.

Note: Multi-Splay weatherboards fall outside the scope of NZS 3617 and BRANZ Bulletin 411.

1.5 Cavity Battens

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System uses either treated timber cavity battens or Cavibat polypropylene cavity battens to separate the weatherboards from the wall frame and form the cavity. Cavity battens are installed vertically over the studs to provide support for the weatherboards at fixing points.

Refer to www.cavibat.co.nz and BRANZ Appraisal No. 524 (2012) for the full Cavibat Cavity Battens specifications.

1.6 Accessories

Accessories supplied by Hermpac for use with the Hermpac Rusticated, Splaycut & Multi-Splay Cavity System include:

- Hermpac external corner mouldings – HP40 (40 x 40mm) and HP42 (42 x 42mm) and the Hermpac 'Smart Corner' series, profiled external corner moulds.
- Hermpac internal corner moulds – HP41 (18.5 x 18.5mm) and the Hermpac 'Smart Corner' series.
- Hermpac cover battens – HP201 (69 x 18mm) and HP202 (90 x 18mm).
- Hermpac eaves moulding – HP32 (40 x 27mm), HP33 (26 x 15mm) and HP7 (30 x 18mm) bevelled profile.
- Hermpac cover batten fixings – 50 x 2.8 mm silicon bronze, Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails

for oil/stain finish or Grade 316 stainless steel annular grooved Jolt Head nails for paint finish.

- Hermpac Rustic plugs – HP44 (40 x 9.25 mm) and HP43 (25 x 9.25mm) profiled to suit selected weatherboard profiles. The plugs are supplied in 10 m bundles.
- Hermpac scribes – HP11 - HP18, with bevelled or radiused edges (cut to suit as required).
- Hermpac scribe fixings – length to suit scribe size (minimum 50 x 2.8mm) stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails for oil/stain finish or Jolt Head nails for paint finish.
- Oil/Stain finished weatherboard fixings – Silicon Bronze or Grade 316 Stainless Steel annular grooved Hermpac Crown/Rose or Flat Head nails. NB: Nail shank diameter and length as per Hermpac construction drawings. Must allow minimum 30mm embedment into framing timber or structurally fixed cavity batten.
- Paint finished weatherboard fixings – Grade 316 Stainless Steel annular grooved Hermpac Jolt Head nails. NB: Nail shank diameter and length as per Hermpac construction drawings. Must allow minimum 30mm embedment into framing timber or structurally fixed cavity batten (for AshinDura or DuraLarch) and 35mm (for Western Red Cedar). NB: If Crown/Rose or Flat Head nails are used with paint finished weatherboard, refer to fixing clause above.
- Hermpac clinch nails – Grade 316 stainless steel annular grooved nails with an off-set flat head.
- Hermpac flat and corner soakers (for selected Splaycut & Multi-Splay profiles) – 90° soakers available in copper, stainless steel, powder coated Zincalume or etch primed aluminium.
- Hermpac soaker fixings – 19 x 1.6mm silicon bronze or stainless steel Rose Head or Flat Head nails.
- Hermpac aluminium flashings – widths to suit specified corners – 2.4m or 3.0m lengths.
- Hermpac J Mould Flashing – for window jambs – 20mm or 29.5mm, 2.4m or 3.0m lengths.
- Hermpac aluminium Cavity Closure – 20/40/45mm, 2.4m or 3.0m lengths.

1.7 Handling and Storage

Hermpac Rusticated Splaycut & Multi-Splay weatherboards must be stacked flat and true, clear of the ground by a minimum of 150mm and supported on dry and clean timber bearers at maximum 900 mm centres.

The weatherboards must be kept dry at all times either by storing within an enclosed building or when stored externally an additional secondary cover to the plastic wrapping is required. Care must be taken to avoid damage to edges, ends and the weatherboard surfaces.

2.0 Design Information

2.1 Design Responsibility

The Specifier for the project must ensure that the details in this literature are suitable for the intended application and that additional detailing is provided for specific design or any areas that fall outside the scope and specifications of this literature.

2.2 Scope

This specification covers the use of the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System as an external horizontally fixed wall cladding system for buildings within the following scope:

Stain finished weatherboards with crown/rose/flat head nails. Paint finished DuraLarch and AshinDura weatherboards fixed with annular grooved jolt/crown/rose/flat head nails. Paint finished Western Red Cedar

Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

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weatherboards fixed with annular grooved crown/rose/flat head nails:

- the scope limitations of NZBC Acceptable System E2/AS1, Paragraph 1.1; and,
- constructed with timber 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,
- situated in NZS 3604 Wind Zones up to, and including 'Extra High'.

Any oil/stain or paint finished weatherboards if fixed with annular grooved flat/crown/rose head nails only for weathertightness and structural wind loading for 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,
- constructed with timber framing complying with the NZBC; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa.

CedarOne or other paint finished Western Red Cedar weatherboards if fixed with annular grooved jolt head nails:

- the scope limitations of NZBC Acceptable System E2/AS1, Paragraph 1.1; and,
- constructed with timber 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,
- situated in NZS 3604 Wind Zones up to, and including Medium when studs are at maximum 600mm centres, and NZS 3604 Wind Zones up to, and including Very High when studs are at maximum 400mm centres.

For applications which are outside the scope of this literature and details which are not in this literature the specifier must ensure that the design meets the relevant performance requirements of the NZBC.

Hermpac recommends that professional design advice is sought in these circumstances.

2.3 Building Regulations

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System if designed, used and installed in accordance with the statements and conditions of this literature and the supporting BRANZ Appraisal, will meet the following provisions of the New Zealand Building Code:

- Clause B1 Structure
- Clause B2 Durability
- Clause E2 External Moisture
- Clause F2 Hazardous Building Materials

2.4 Ground Clearances

The finished floor level must have a minimum clearance to paved or unprotected ground as required by NZS 3604:2011.

Hermpac weatherboards must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by NZBC Acceptable Solution E2/AS1, Table 18.

The bottom edge of the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System must finish a minimum of 100mm above paved surfaces or 175mm above unprotected ground.

At deck or low pitch roof/wall junctions, the bottom edge of the Hermpac weatherboards must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35mm.

2.5 Structure & Framing

Timber wall framing behind the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. Use of timber framing must be in accordance with framing manufacturer's specifications.

In all cases studs must be at maximum 600mm centres. Where interior linings compliant with NZS 3604 Section 12 are installed directly to the interior face of the wall framing, nogs/dwangs are not required. See NZS 3604 section 8.5.4 for further information.

Note: For CedarOne or painted cedar weatherboards fixed with annular grooved Grade 316 stainless steel Jolt Head nails, studs must be at a maximum 600mm centres for NZS 3604 Wind Zones up to, and including Medium, and 400mm centres maximum for NZS 3604 Wind Zones High and Very High.

2.6 Framing Tolerances

In order to achieve an acceptable wall finish, it is imperative that framing is straight and true. Framing tolerances must comply with the requirements of NZS 3604:2011.

2.7 Cavity Closure Strip

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System must incorporate a cavity closure strip to close off the bottom of the cavity and provide resistance against the penetration of vermin. The cavity closure strip must be in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3.

The cavity closure strip must be manufactured from uPVC, aluminium or stainless steel, and be punched with 3-5mm holes or slots which provide a minimum ventilation opening area of 1000 mm² per lineal metre of wall.

2.8 Wall Underlay

The Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System must be installed over wall underlay complying with NZBC Acceptable Solution E2/AS1, Table 23, or wall underlays covered by a valid BRANZ Appraisal.

All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for wind zones up to and including Very High, and rigid underlays for buildings in the Extra High wind zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure.

Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the weatherboard fixing lengths must be increased by a minimum of the thickness of the underlay.

2.9 Inter-storey Junctions

Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey drained joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 metres in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4(b).

2.10 Hermpac Rusticated, Splaycut & Multi-Splay Weatherboards

Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System

Installation Specifications

Hermpac Rusticated, Splaycut & Multi-Splay weatherboards shall be fixed with an approximate 2mm vertical expansion gap at the overlap between boards. Hermpac Rusticated and Splaycut profiles are all manufactured in accordance with BRANZ Bulletin 411 (Refer to E2/AS1 page 121, paragraph 9.4.1.1) and have a 27mm rebate for a 25mm lap.

Note: Multi-Splay weatherboards fall outside the scope of NZS 3617 and BRANZ Bulletin 411.

The weatherboards shall be pre-coated with the selected coating (prior to site delivery and installation) by Hermpac associate Machinecoat (NZ) Ltd, by the flood coat inundation method or in-line spray coat system (subject to coating type selected).

Pre-finished Rusticated, Splaycut & Multi-Splay weatherboards shall be over-coated and maintained in accordance with the coating manufacturer's specification. All cut ends and/or uncoated surfaces shall be double coated during installation to protect against the penetration of moisture, post installation.

The weatherboards shall be fixed through the cavity battens to the studs, or into the structurally fixed cavity battens, at maximum 600mm centres using Hermpac weatherboard fixings.

External corners shall be weatherproofed by the use of corrosion resistant corner flashings and corner facings, e.g. Hermpac proprietary profiles HP40, HP42, the Hermpac 'Smart Corner' series, or cover battens HP201 and HP202 with Hermpac rustic plugs or scribes.

Internal corners shall be weatherproofed by the use of corrosion resistant internal corner flashings along with internal mouldings, e.g. Hermpac profile HP41 or the Hermpac 'Smart Corner' series.

3.0 Installation Information

3.1 System Installation

The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System. Flexible building underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75mm minimum at horizontal joints and 150mm minimum over studs at vertical joints.

Generic rigid sheathing materials must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems shall be installed in accordance with the manufacturer's instructions.

Particular attention must be paid to the installation of the building underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

The selected cavity closure strip must be installed so a minimum 15mm drip edge to the bottom of the weatherboards is maintained at all times.

Cavity battens must be installed over the wall underlay to the wall framing at a maximum of 600mm centres where the studs are at 600mm centres, or at 400mm centres when studs are at 400mm centres. Cavibat cavity battens must be fixed in place with 40 x 2.8mm hot-dip galvanised flat head nails or galvanised or stainless steel finishing brads at 400mm centres. Refer to www.cavibat.co.nz and BRANZ Appraisal Number 524 (2012) for further information. Timber cavity battens must be fixed in place with 40 x 2.8mm hot-dip galvanised flat-head nails at maximum 800mm centres or as per BRANZ Bulletin BU582 Structurally Fixed Cavity Battens.

Where stud spacings are greater than 450mm and a flexible wall underlay is being used, wall underlay support

(eg. Polypropylene/Polythene tape, galvanised mesh / wire or additional battens) is required to be installed vertically at a maximum of 300mm centres. The wall underlay support is required to restrain the flexible wall underlay and insulation to prevent bulging into the drained cavity as required by E2/AS1, paragraph 9.1.8.5.

3.1.1 Aluminium Joinery Installation

Aluminium joinery and associated head flashings must be installed in accordance with the window manufacturer's instructions. 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 in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6 after the joinery has been secured in place.

3.1.2 Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Installation

Hermpac Rusticated, Splaycut & Multi-Splay weatherboards must not be wet prior to installation. Prior to installation, the back, face and edges of the Hermpac Rusticated, Splaycut & Multi-Splay weatherboards must be sealed with an exterior grade oil-based penetrating oil/stain or paint. During installation, cut ends and edges and all fresh cuts or exposed timber must be double sealed with an exterior grade oil-based penetrating oil/stain or paint.

Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner/corner moulding etc. The necessary flashings must be installed before commencing weatherboard fixing and the cavity closure must be installed continuously around the bottom of the cavity.

Immediately prior to installing the weatherboards over the internal and external corner flashings, a continuous bead of sealant must be applied to the face of the flashing along the fixing line.

The first course of weatherboards must be full length, and commence from an external corner. The first weatherboard must be installed level to assist with the installation of subsequent weatherboards. The weatherboards must overhang the bottom plate by a minimum of 50mm.

Hermpac Rusticated and Splaycut weatherboards must be overlapped a minimum of 25mm with an expansion gap of 2mm at the overlap. Multi-Splay weatherboards must be overlapped a minimum of 30mm with an expansion gap of 2mm at the overlap.

Use the Hermpac clinch nail to restrain the top of the weatherboard lap at every cavity batten.

NB: Clinch nails are a proprietary component of this cladding system. For best performance we recommend their use on all installations. The use of clinch nails is mandatory for installations in 'Extra High' wind zones and above.

Hermpac Rusticated, Splaycut & Multi-Splay weatherboards must be pre-drilled on a slight up-slope, with a hole slightly smaller than that of the nail, to reduce the risk of moisture entry. Fix each weatherboard with one nail per board at every cavity batten.

The fixing must be located 30-35mm above the bottom of the weatherboard (for Rusticated and Splaycut – ref: HC-RUST-410 and HC-SPLAY-410) and 35-40mm above the bottom of the weatherboard (for Multi-Splay – ref: HC-SPLAY410A), be located no closer than 32mm (where practical) from the end of the board, and must finish flush onto the surface of the weatherboard, not into or below the surface.

Fix weatherboards in full lengths where possible. Where joints are required, scarf the weatherboard at 30° over a cavity batten and fix as per drawn detail 'HC-RUST-413' or 'HC-SPLAY-413'.

For oil/stain finished weatherboards

Weatherboard fixings must be either Silicon Bronze or Grade 316 Stainless Steel annular grooved Hermpac

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Crown/Rose or Flat Head nails. The nail shank diameter and length as per Hermpac construction drawings. Must allow minimum 30mm embedment into framing timber or structurally fixed cavity batten. Finish flush onto the surface of the weatherboard, not into or below the surface.

For paint finished weatherboards

Weatherboard fixings must be Grade 316 Stainless Steel annular grooved Hermpac Jolt Head nails. The nail shank diameter and length as per Hermpac construction drawings. NB: Must allow minimum 30mm embedment into framing timber or structurally fixed cavity batten (for AshinDura or DuraLarch) and 35mm (for Western Red Cedar). Punch nails 2mm below the weatherboard surface, prime nail holes and fill prior to sanding and finishing. NB: If Crown/Rose or Flat Head nails are used with paint finished weatherboards, refer to fixing clause above.

3.1.3 Boxed Corners, Cover Battens and Mouldings

External and internal corners must be finished in accordance with the installation detailing.

Most Hermpac 'Smart Corners' mouldings can be fixed by applying a continuous bead of sealant to the inside surfaces of the moulding or the faces of the flashing to which the moulding is to be bonded. Excess coating should be wiped off areas of the moulding intended to contact the adhesive.

Wherever possible, the moulding should be bonded to the flashing prior to installation. If this is not possible, the moulding shall be temporarily held in place while the sealant cures.

A continuous bead of sealant should also be applied at the join between the moulding and the end-grain cross section of any butted weatherboard and direct to flashing along the line of weatherboard nail fixing (if the weatherboard fixing will pierce the flashing).

Sealant options for Wood-X, Traditional Oil/Stains or Resene Waterborne Oil/Stains include Bostik Seal N Flex FC or Sikaflex AT Façade (NB: for other coatings please check with the manufacturer to determine the most suitable sealant).

Further or sole mechanical support of the Moulding-Flashing interface can be achieved in some cases with a pre-drilled and suitably placed Hermpac nail. The requirement for a continuous bead of sealant as detailed above still applies.

3.1.4 Finishing

At least two coats of an exterior grade quality oil-based penetrating oil/stain must be used over the front face of the Hermpac Rusticated, Splaycut & Multi-Splay weatherboards to protect the weatherboards and give the desired finish colour to the exterior walls. The oil/stain must be recommended for use as a wall cladding oil/stain by the manufacturer and must be brush or Machinecoat NZ Ltd applied. Hermpac recommends the use of oil based stains manufactured by Wood-X and Resene.

Follow the oil/stain manufacturer's instructions at all times for application of the oil/stain finish.

For paint finish the paint must be recommended for use as a wall cladding paint by the manufacturer and must be brush or Machinecoat NZ Ltd applied.

To ensure a top quality paint finish:

1. Any sharp edges should be removed to provide a radius to aid in uniform paint film coverage.
2. Use a premium alkyd oil or acrylic based primer to

envelope prime all cut ends and bare timber surfaces twice.

3. Punch nail holes and prime promptly after punching.
4. Fill holes with a suitable filler and allow to dry.
5. When filler is fully dry and cured, sand area smooth.
6. Apply one coat of an alkyd oil or acrylic based primer to sanded area and allow to fully dry before sanding lightly.
7. Ensure surface is clean and free from any chalking, dirt, dust, mould or other contaminants prior to painting top coats.
8. Apply two coats of premium high quality 100% exterior grade acrylic to surface allowing adequate time for drying between coats.

Timber is a natural product and for best results use a colour with a LRV of 40-45% or above. Please consult with us for a specific recommendation minimum for your chosen timber.

Follow the paint manufacturer's instructions at all times for application of the paint finish.

Refer to Section 4.0 for maintenance requirements.

4.0 Maintenance

Building owners are responsible for the maintenance of the Hermpac Rusticated, Splaycut & Multi-Splay Weatherboard Cavity System.

Annual inspections must be made to ensure that all aspects of the cladding system, including flashings remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant, coatings, flashings or the weatherboards must be repaired in accordance with the relevant manufacturer's instructions.

Regular cleaning (at least annually) of the surface finish with water and a mild detergent is recommended to remove grime, dirt and organic growth, to maximise the life and appearance of the cladding.

Recoating of the oil/stain finish will be necessary throughout the life of the cladding system. Re-staining must be carried out every 2-3 years in accordance with the oil/stain manufacturer's instructions. Re-staining will be required more frequently on exposed northern and western facing walls. When re-staining, care must be taken to ensure bottom edges and shiplap edges are well covered and penetrated with the stain.

Recoating of the paint finish will be necessary throughout the life of the cladding system. Re-coating must be carried out every 7-10 years in accordance with the paint manufacturer's instructions. When re-coating, care must be taken to ensure bottom edges are well covered and penetrated with the paint.

5.0 Health & Safety

Cutting of Hermpac Rusticated, Splaycut & Multi-Splay weatherboards must be carried out in well ventilated areas and dust masks, eye and hearing protection must be worn.

All relevant sections of AS/NZS2311:2017 "Guide to the painting of Buildings" should be adhered to. Technical Data Sheets and Safety Data Sheets for the specified coating should be obtained from the coating supplier and consulted prior to commencing work. MBIE guidelines and regulations must be followed at all times.

BRANZ Appraised
Appraisal No. 745 [2017]

DAMPFIX GOLD INTERIOR WATERPROOFING MEMBRANE

Appraisal No. 745 [2017]

This Appraisal replaces BRANZ
Appraisal No. 745 [2011]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 Dampfix Gold Interior Waterproofing Membrane is a liquid-applied waterproofing membrane for use under ceramic or stone tile finishes in internal wet areas.

Scope

- 2.1 Dampfix Gold Interior 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 Dampfix Gold Interior Waterproofing Membrane on concrete slabs where hydrostatic or vapour pressure is present is outside the scope of this Appraisal.
- 2.3 Movement and control joints in the substrate must be carried through the membrane and tile finish. 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 ceramic or stone tile finishes are outside the scope of this Appraisal.
- 2.5 The membrane must be installed by trained applicators, approved by Bostik New Zealand Limited.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Dampfix Gold Interior 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 and B2.3.2. Dampfix Gold Interior Waterproofing Membrane meets this requirement. See Paragraph 9.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.6. Interior wet area floors and walls incorporating Dampfix Gold Interior Waterproofing Membrane meets this requirement. See Paragraphs 11.1- 11.7.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Dampfix Gold Interior Waterproofing Membrane meets this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 Materials supplied by Bostik New Zealand Limited are as follows:
- **Dampfix Gold Interior Waterproofing Membrane** - An elastomeric, one-part, water-based, fibre reinforced polyurethane waterproofing membrane. It is supplied as a gold colour in 15 litre pails.
 - **ASA Multiprime** - A synthetic latex based primer for a variety of porous substrates. It is supplied as an opaque pink liquid in 1, 5 and 20 litre containers.
 - **Bostik Ultra NP Primer 2 Part** - A two part water based epoxy primer for non-porous substrates. It is supplied in a 4 litre kit and is a uniform greenish colour when mixed.
 - **ASA Neutral Cure Silicone** - A flexible, neutral cure silicone for use as an expansion joint filler or bondbreaker. It is supplied as a white or coloured paste in 300 ml cartridges.

Handling and Storage

- 5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and 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 Dampfix Gold Interior 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 Dampfix Gold Interior 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 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.
- 7.5 Timber framing 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 along the sheet edges and 200 mm centres to all framing through the body of the sheets.

Fibre Cement Compressed Sheet/ Fibre Cement Sheet Tile Underlay

- 8.3 Fibre cement compressed sheet 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 substrate. Fibre cement sheet tile underlay must be suitable for use in internal wet areas. Installation must be in accordance with the instructions of the manufacturer.

Particleboard

- 8.4 Particleboard must be specified for the end use in accordance with NZS 3602.

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 the requirements of 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 Dampfix Gold Interior 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 serviceable 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, grout and sealant.
- 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 Dampfix Gold Interior 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 Dampfix Gold Interior Waterproofing Membrane is suitable for use to contain accidental overflow to meet NZBC Clause E3.3.2. A means of compliance for containment of overflow is given in NZBC Acceptable Solution E3/AS1, Paragraph 2.1.
- 11.3 Surfaces must be finished with ceramic or stone tile finishes. A means of 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 and drainage flanges 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.

Installation Information

Installation Skill Level Requirement

- 12.1 Installation of substrates must always be carried out in accordance with the Dampfix Gold Interior Waterproofing Membrane 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 Bostik New Zealand Ltd and its approved applicators must be completed by trained applicators, approved by Bostik New Zealand Ltd.

Preparation of Substrates

- 13.1 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.
- 13.2 The relative humidity of concrete substrates 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 a bond breaker installed as set out in the Technical Literature.
- 13.4 All substrates must be primed and the primer allowed to cure before the membrane is installed. Refer to the membrane supplier for primer specification.

Membrane Installation

- 14.1 Installation must not be undertaken where the substrate surface temperature is below 10°C or above 35°C.
- 14.2 Dampfix Gold Interior Waterproofing Membrane must be thoroughly stirred before application.
- 14.3 The membrane must be applied in a minimum of two coats to give a total dry film thickness of 1.0 mm. Subsequent coats must be applied at an opposite direction to the previous coat.
- 14.4 Application can be made by roller [medium/long nap], brush [long bristle], or a rubber or plastic float.
- 14.5 Clean up may be undertaken with water.

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 the BRANZ Good Practice Guide - Tiling. The compatibility of the tile adhesive must be confirmed with the adhesive manufacturer and Bostik New Zealand Limited.

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.
 - 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 membrane 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 Dampfix Gold Interior Waterproofing Membrane has been undertaken by BRANZ: Testing to AS/NZS 4858 Appendix A including effect of bleach, detergent and water on tensile and elongation, cyclic movement resistance and water absorption.
- 18.2 The following testing of Dampfix Gold Interior Waterproofing Membrane was undertaken by the Commonwealth Scientific Industrial Research Organisation [CSIRO] Australia: Durability testing to AS/NZS 4858 Appendix A including effect of bleach, detergent and water on tensile and elongation, water vapour transmission to ASTM E96-92, water absorption to AS 3558.1 and cyclic movement resistance.
- 18.3 Testing of Dampfix Gold Interior Waterproofing Membrane has been undertaken by Thor Specialties Pty Limited for fungi resistance to the requirements of ASTM G21.
- 18.4 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 Dampfix Gold Interior Waterproofing Membrane by BRANZ technical experts.
- 19.2 Site inspections have been carried out by BRANZ to examine the practicability of installation.
- 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.
- 20.2 The quality management system of the membrane's manufacturer has been assessed and found to be satisfactory.
- 20.3 The quality of supply of the membrane system materials to the market is the responsibility of Bostik New Zealand Limited.
- 20.4 Quality on site is the responsibility of trained applicators, approved by Bostik New Zealand Limited.
- 20.5 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, Bostik New Zealand Limited and this Appraisal.
- 20.6 Building owners are responsible for the maintenance of the tiling or stone finishing systems in accordance with the instructions of Bostik New Zealand Limited.

Sources of Information

- AS 3558.1 - 1999 Methods of testing plastics and composite materials sanitary plumbing and fixtures - Determination of water absorption characteristics.
- AS 3740 - 2010 Waterproofing of domestic wet areas.
- AS 3958.1 - 2007 Guide to the installation of ceramic tiles.
- ASTM E96-92 Standard test methods for water vapour transmission of materials.
- ASTM G21-96 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- AS/NZS 2908.2: 2000 Cellulose-cement products - flat sheet.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2269: 2012 Plywood - Structural.
- AS/NZS 4858 - 2004 Wet area membranes.
- BRANZ Bulletin Number 585. Measuring Moisture in Timber and Concrete, June 2015
- BRANZ Good Practice Guide Tiling - April 2015.
- NZS 3101: 2006 The design of concrete structures.
- 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 concrete masonry structures.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



In the opinion of BRANZ, **Dampfix Gold Interior 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 **Bostik 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. **Bostik 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 **Bostik 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 **Bostik New Zealand Ltd** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

Date of Issue:

22 August 2017



Technical Data Sheet

Dampfix Gold

Water Based Polyurethane Liquid Waterproofing Membrane

DESCRIPTION

One part, highly elastic, Class 3, water-based polyurethane waterproofing membrane system that meets the requirements of AS3740 by complying with AS/NZ 4858.

This Technical Data Sheet may be revised, as appropriate, to comply with changes to relevant Australian and New Zealand Standards, reflect changes in Industry best practice in waterproofing procedures or include improvements to current technologies.

The Applicator is advised to reference the latest Technical Data Sheet issue, before commencing application, by visiting www.bostik.co.nz and following the Technical Data sheet links or by contacting Bostik Customer Service on 0508 222 272.

The **Bostik Dampfix Gold** waterproofing membrane system is specifically formulated for application on graded substrates that provide positive falls to drainage outlets. Overlaying tiling systems must comply with Guide to the Installation of Ceramic Tiles - AS3958.1).

This is a 2-coat system applied over primed porous & non-porous substrates. It is not recommended as a membrane system in immersed applications (such as pools or spas)



FEATURES

- ✓ Class 3, high elasticity.
- ✓ Fast drying.
- ✓ Recoat in 2 hours @ 20° C & 50% RH
- ✓ Early access for following trades.
- ✓ Tile next day in most conditions.
- ✓ May be tiled directly onto with approved ASA adhesives
- ✓ Reinforced with clump free fibres.
- ✓ No mixing.
- ✓ High resistance to detergents & bleach.
- ✓ Will not re-emulsify after curing.
- ✓ Does not embrittle with age.
- ✓ Excellent adhesion to concrete; rendered masonry; wet area plasterboard; FC sheet & plywood.
- ✓ Can be applied to damp substrates, i.e. no free water
- ✓ Brush, roller or trowel applied.
- ✓ Flood Test in 72 hours.

RECOMMENDED USES

- ✓ As a waterproofing membrane to internal wet area shower, bathroom, kitchen, laundry & toilet areas to AS/NZ 3740.
- ✓ As a waterproofing membrane to external balconies, rooftops & podium levels to AS/NZ 4654.2.
- ✓ All applications to be covered by tile or other surface wearing and protective systems by following trades.
- ✓ Suitable for concrete; cement rendered masonry; FC sheeting; water resistant plasterboard; and structural plywood (Type A Stamped "PAA JAS-ANZ" to AS/NZS2269-2004) substrates.



Dampfix Gold

APPLICATION INSTRUCTIONS

IMPORTANT NOTES

- The following instruction steps as detailed in this Technical Data Sheet may not be applicable in every application. They are provided as a guide to meet the requirements of AS/NZ3740 and AS/NZ4654.2.
- It is recommended that the installation should be carried out by a Bostik ASA trained Dampfix waterproofing course applicator.
- Bostik Technical Division must approve any modification or variances to this technical data sheet in writing followed by the issuance of an amended Technical Data Sheet.
- Wherever appropriate, the application must comply with AS/NZ 3740 'Waterproofing of Internal Wet Areas in residential buildings' & AS/NZ 4654.2 "Waterproofing membrane systems for exterior use – Above ground level".
- This product is specially formulated for brush, roller or trowel application to both small and large areas.
- A wet film gauge must be used regularly to ensure that minimum wet film builds are achieved for each coat.
- All vertical terminations, including perimeter walls, hobs and penetrations etc. must be of adequate height to satisfy AS/NZ 3740 for internal applications & AS/NZ 4654.2 for external applications.
- The minimum film build requirements are identical for horizontal applications and must be applied without slump or deformation when cured.
- Apply bond breaker joint to all horizontal/vertical junctions, e.g. wall/floor, wall/wall, hob/ floor, hob/wall & shower set downs etc., prior to all membrane applications (see note on suitable sealants).
- Allow 72 hours before flood testing the installed **Dampfix Gold** system.

Suitable Sealants

ASA silicones or Bostik Industrial Silicone are suitable sealants for use as bond breakers.

Correct bond breaker selection and installation is vital to overall membrane performance. Using an unsuitable sealant can increase the risk of failure and must be avoided. **Contact Bostik for advice if unsure or if considering products not listed above.**

SUBSTRATE PREPARATION

- Read precautions prior to applying any component of the waterproofing system.
- Commencement of membrane system installation shall be taken as acceptance of the substrate suitability and preparation by the applicator.
- Check that the surface of all substrates to be coated are: structurally sound, clean, dry or damp with no free surface water, smooth and free of voids & protrusions, oils, grease, curing compounds, coatings, adhesive residues and are uncontaminated by preceding trade activities.
- Check that all composite substrates, such as wall & floor sheets are fully supported and installed to the manufacturer's instructions.
- Where platform floor sheeting, in particular particleboard, is installed check manufacturer's specification for suitability in wet area applications and ensure that protective coatings do not impair membrane adhesion.
- New concrete and render must have cured for a minimum 28 days.
- Sand & cement screeds and polymer modified renders must have cured for a minimum 7 days.
- Substrates that are not smooth or free of voids and protrusions must be ground and vacuumed clean. All remaining voids must be repaired using, **Bostik UL-Ultrafine**, making sure to follow instructions for preparation, application and curing time. Refer to **Bostik UL-Ultrafine** Technical Data Sheet
- **Bostik Multiprime** must be applied as a primer coat on all applications to porous substrates, e.g. concrete, screeds, renders. Refer **Bostik Multiprime** Technical Data Sheet.
- **Bostik N40** primer must be applied using "2 cloth method" on all applications to dry rigid plastic & metallic non-porous substrates, e.g., UPVC drainage outlets and penetrations; aluminium angle water stops, brass, copper and galvanised penetrations, stainless steel drains and gutters etc. Refer **Bostik N40** Technical Data Sheet.
- 2 coats of **Bostik Moisture Seal** must be used to seal concrete slabs subject to a hydrostatic head of pressure from the negative side. **Bostik Moisture Seal** must be clean, dry and smooth immediately prior to the application of **Bostik Dampfix Gold**. Refer **Bostik Moisture Seal** Technical Data Sheet.





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- Membranes should not be applied until all preparation steps have been completed.
- **Dampfix Gold** is not recommended for use in swimming pools, ponds or spas.

CRACKS & JOINT SEALING

CONCRETE & MASONRY SUBSTRATES

- Static cracks up to 2mm in width, i.e. cracks that do not move or continue to propagate, must be filled with **Bostik Dampfix Gold** or **Bostik UL-Ultrafine** after substrate priming and prior to the first full coat of **Bostik Dampfix Gold**.
- Static cracks greater than 2mm and less than 4 mm in width, i.e., cracks that do not move or continue to propagate, must be filled with **Bostik UL-Ultrafine** after substrate priming and prior to the first full coat of membrane.
- Cracks greater than 2mm that are subject to movement or propagation must be referred to the builder or engineer for structural assessment and method of rectification to perform as an expansion joint.
- Expansion joints must be a minimum 6mm in width and require a backer rod installed prior to the installation of a suitable sealant (see note on page 2) at a width: depth ratio of 2:1. See "Expansion Joints" below.

FLOOR & WALL SHEET JOINS

- All floor and wall sheets must be installed to sheet manufacturer's specification and primed with **Bostik Multiprime**.
- Internal or external sheet floor systems, suitable for wet area applications, require sealant application to seal sheet joints at the time of installation to comply with manufacturer's instructions. The Waterproofer must confirm that the sealant used is compatible with all **Bostik Dampfix Gold membrane** system components.
- Floor sheet joints that use Polyurethane sealants at installation must have cured for a minimum 7 days prior to the application of the membrane.
- All sheet joints must be isolated from the membrane by a min 25mm wide bond breaker tape that covers the entire width & length of the sheet join.
- As floor sheet joints are more prone to movement over joist supports, apply an extra 1000-micron (1.0 mm) wet coat of **Bostik Dampfix Gold** extending a minimum 35mm either side of the bond breaker tape. A further 2 full coats, at 1000 microns each, must be applied to the remaining area to be waterproofed.

EXPANSION JOINTS

- All expansion joints must be isolated from the membrane by a minimum 25mm wide bond breaker tape that covers the entire width & length of the joint.
- An extra 1000-micron (1.0 mm) wet coat of membrane extending a minimum 35mm either side of the bond breaker tape must be applied as an extra coat. A further 2 full coats, at 1000 microns wet coat each, is required to the remaining area to be waterproofed.

PRIMING

POROUS SUBSTRATE

- A porous or absorbent substrate will allow a bead of water to easily soak into, and wet out, the surface of the substrate.
- To avoid pin holing **Bostik Multiprime** must be stirred and not shaken if colour separation is evident. Colour separation will not affect the performance of **Bostik Multiprime**.
- **Bostik Multiprime** must be applied as a primer coat on all **Bostik Dampfix Gold** applications to porous substrates.
- Refer **Bostik Multiprime** Technical Data Sheet.

NON-POROUS SUBSTRATE

- A non-porous or impervious substrate will cause a bead of water to be retained on the surface of the substrate as a raised droplet. The droplet does not easily soak into the surface of the substrate.
- **Concrete that is overworked or burnished** at the time of placement can present, when cured, as a non-porous substrate that will not easily absorb a bead of water. Mechanical abrasion, such as captive





Dampfix Gold

shot blasting or vacuumed grinding is required to open substrate pores prior to the application of **Multiprime** primer.

- **Rigid plastic and metallic substrates** require **Bostik N40** primer applied using the “2 cloth method” e.g., uPVC drainage outlets & penetrations, aluminium angle water stops, brass, copper or galvanised penetrations, stainless steel drains & gutters etc. Refer **Bostik N40** Technical Data Sheet.
- **“Two Cloth Method”** -
 - o Dampen a clean & dry cloth with N40 primer and spread evenly over the non-porous substrate using a cleaning/rubbing action.
 - o With a second clean & dry cloth, immediately wipe all primer residues off with a buffing action.
 - o Allow the substrate to dry for a minimum of 5 minutes before installing a suitable sealant (see note on page 2) and/or **Bostik Dampfix Gold** membrane.
 - o Do not leave the primer longer than 4 hours before applying sealant/membrane.
 - o Re-prime if 4 hours has elapsed without applying sealant/membrane.
 - o Clean & Re-prime if the primed surface is contaminated with excavation spoil, water, condensation, dust or other contaminants before sealant or membrane can be applied.

NB: For pre-treated surfaces, contact Bostik Technical Division for P.A.T.S. Service.

APPLICATION

MOIST OR DAMP SURFACES

- Membrane must be applied to a primed substrate.
- **Multiprime** can be applied to damp porous substrates, i.e. with no free water on the surface.
- **N40 Primer** must **not** be applied to a damp non-porous substrate.
- **Multiprime** must be used as a primer coat to porous substrates, e.g., concrete, renders, FC sheet, water resistant plasterboard & external grade plywood.
- **Dampfix Gold** is not a vapour barrier and is not designed to stop a negative hydrostatic head of pressure. Where a substrate is subject to a hydrostatic head of pressure from the negative side **Moisture Seal** must be applied and allowed to fully cure before the application of **Dampfix Gold** system. Refer **Moisture Seal** Technical Data Sheet.

BOND BREAKER & MEMBRANE INSTALLATION

- Internal wet area installation must comply with the minimum requirements of AS/NZ3740 Section 3, “Installation”. As a guide, refer pages 12 to 33.
- External wet area installation must comply with the minimum requirements of AS/NZ4654.2, Section 2, “Design and Installation”. As a guide, refer pages 7 to 30.
- When installing bond breakers only use sealants that have been approved for use in writing by Bostik. See the note on suitable sealants on pg 2 for more details or if unsure, contact Bostik before work commences.
- Bond breaker is to be installed over the dry primer coat where a bond breaker joint is required, e.g. to internal corners and changes in direction of substrate plane, such as wall/floor; wall/wall; hob/wall junctions, pipe penetrations, tap bodies, water stops, drainage outlets or similar.
- Bond breaker joints must be a minimum 12mm x 12mm coved bead of sealant applied by caulking gun continuously into all changes of substrate plane, such as, wall/floor, hob/floor, hob/wall and wall/wall corners to the minimum termination height required by AS/NZ3740 or AS/NZ4654.2 as applicable.
- The sealant must bridge all gaps and holes with a minimum 6mm contact onto the adjacent substrates.
- All bond breaker joint sealant profiles must be a minimum 6mm in depth at the mid point of the joint.
- Substrate gaps at drainage outlets, flashings, and water stops, nail/screw holes etc must also be sealed using sealant prior to membrane application.
- Applied, sealant must be spatula tooled smooth around fittings and at all changes of substrate plane to a minimum 12mm x 12mm coved joint. The sealant must be a minimum 6mm in depth at the mid point of the bond breaker joint and extend a minimum 6mm on either side of the joint or gap.
- Apply membrane as soon as the bond breaker joint can be over coated without deformation of the coved sealant profile.



Dampfix Gold

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APPLICATION OF THE MEMBRANE

- Can be applied using a brush, roller or trowel.
- Should not be applied in excess of 2mm thick per coat.
- This is a 2-coat system.
- The 2nd coat should be applied perpendicular to the 1st coat.
- Each coat must be applied at a uniform minimum 1000 microns in thickness to achieve a total wet film thickness of 2.0mm.
- A wet film gauge should be used to regulate adequate membrane coverage during application of each coat. **(Refer table on page 5.)**
- As a further guide a 15Lt pail, applied at 1.0 litre/m² (1000 microns) will cover approx. 15m² per coat.
- A 15Lt pail will cover approx. 7.5m² in 2 coats.

MEMBRANE PROTECTION

- Membrane should be protected throughout the application process and during the initial 24-hour cure period by the placement of signs and barriers to deny access by following trades.
- Further temporary protection sheets must be installed securely, to protect the cured dry film from damage by following trades, until a protective screed or finished floor system is installed.

MEMBRANE RECOATING AND/OR REPAIR

RECOATING

- The surface must be cleaned free of all tile adhesive residue, surface dust and any form of contamination or substrate irregularity.
- The surface of membrane must be washed down with diluted **Bostik Sugar Soap**, thoroughly rinsed and allowed to dry.

REPAIRING

- The adjacent **Dampfix Gold** membrane must be sound with minimum dry film thickness of 1.2mm that is fully adhered to the substrate.
- Membrane must be thoroughly cleaned of all foreign material and left free of all cleaning agent residue, dust or contamination.
- Ensure that any exposed porous and non-porous substrates are correctly prepared, primed and sealed.
- Apply 2 coats of membrane as per "Coverage" instructions.
- Ensure that the membrane repair overlaps the existing membrane by a minimum 100mm.
- A consistent minimum 1.2mm dry film thickness is required over both previously coated and uncoated repair areas. **(Refer "Coverage" table below)**

COVERAGE

- **Bostik Dampfix Gold** is a min 2-coat system
- Each coat must be applied at 1.0 litre / m² or 1000-microns (1.0mm) thick resulting in a total wet film thickness of 2.0mm after 2 coats.
- A minimum of 2 hours should be allowed between coats.
- The 2nd coat should be applied perpendicular to the 1st coat.
- Extra coats may be applied if required at the same rate of 1000 microns (1mm thick) per coat.
- Do not thin with water or add fillers.
- The regular use of a wet film gauge during application is recommended to ensure correct wet film build per coat.
- The dry film thickness, after 2 coats should be a minimum of 1200-microns (1.2mm thick).
- Each 15Lt pail will cover depending on substrate conditions:
 - o 15m² / coat.
 - o 7.5 m² / 2 coats.

| Application | Wet Film Thickness | Dry Film Thickness |
|---|-----------------------------|-----------------------------|
| 1 st Coat | 1000 microns (1.0mm) | 600 microns (0.6mm) |
| 2 nd Coat | 1000 microns (1.0mm) | 600 microns (0.6mm) |
| Total Film Thickness after 2 coats | 2000 microns (2.0mm) | 1200 microns (1.2mm) |



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Dampfix Gold

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PRECAUTIONS

- **Must not** be installed directly on wet, contaminated, or friable substrates.
- Minimum dry film thickness after 2 coats is 1.2mm
- Regular checks with a wet film gauge during the application of each coat are advised.
- Do not apply any component of the system when air or substrate temperatures are below 5° C.
- Cold damp conditions will adversely effect application properties and slow rate of curing.
- Do not apply Bostik Dampfix Gold when air and substrate temperature is greater than 35°C or below 5°C .
- Membrane should not be used as an exposed finish or as top coating exterior membrane.
- When used in areas subject to ambient conditions below freezing special installation precautions must be taken. Contact Bostik for advice before commencing work.
- All 4654.1 **external** membrane applications covered with a reinforced tile bed or screed must be separated from the membrane by a minimum one layer of 200um plastic sheet as a separation layer in accordance with AS3958.1 - 3.3.2.3.
- The installation of protection board and ballast, such as river pebbles or similar loose laid unbound coverings, must be isolated from the membrane by a compatible drainage cell and filter fabric system.
- Must not be applied directly over lightweight concrete.
- Hobs constructed of autoclaved aerated blocks, e.g. Hebel, must be saturated with 2 coats of Multiprime to consolidate and seal the substrate. This is to prevent pin holing of the membrane and provide enough strength to support tiling of the hob.
- Autoclaved aerated block walls must be rendered prior to the application of the waterproofing system.
- Should not be used in constantly submerged applications such as swimming pools, ponds & spas.
- Not designed to withstand negative side substrate head of pressure.
- Use only suitable sealants (see note on page 2). Incorrect sealants will significantly increase the risk of failure.
- Any intended application of membrane outside of recommended installation should be referred to Bostik Technical Services for approval.
- Protect contents of pail from excessive heat, and freeze/thaw prior to use.
- Contact Bostik prior to work commencing if there is any uncertainty regarding suitability, installation or any other matters related to the system (including bond breakers).

BOSTIK CO-OPERATIVE TEST PROGRAM

Bostik offers a service in which a programme has been established to eliminate potential field problems by pre-testing Bostik membranes with samples of the building materials to which the membrane will be applied. This service is available on large projects where pre-application testing will aid in determining the proper method to achieve optimum adhesion. Consult a Bostik representative for further information

PAINTABILITY

Bostik Dampfix Gold is paintable. Refer paint supplier recommendations.

PROPERTIES

| | |
|-----------------------------------|----------------------------------|
| Colour | Gold or Grey |
| Appearance | Smooth, brush/roller grade paste |
| Shore "A" Hardness | Approx 60 |
| Elongation | >900% |
| Minimum Dry Film Thickness | 1.2mm |
| 2mm Crack Bridging | Pass |
| Volume Solids | Approx 60% |
| Packaging | 15L & 4L pails |

| | |
|--|---------------------------------------|
| Tensile Strength | 1.5 – 2.0 MPa |
| Dry Time per coat | 2 hours @ 25°C & 50% RH (min 2 coats) |
| Dry time following Trades | 24 hours @ 25°C & 50% RH |
| SG | Approx 1.3 |
| Minimum Wet Film | 1.0mm / coat |
| Membrane Rating | Class 3 |
| Moisture Vapour Transmission Rate | 1.24 grams / m2 / 24hours |
| Flammability | Non-flammable |



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Dampfix Gold

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Complies with AS3740 by meeting all requirements of AS/NZ4858
Wet Area Membranes

STORAGE & SHELF LIFE

Store between 5°C and 30°C. If stored, unopened within these temperature ranges, this product has a shelf life of **12 months**. Protect from excessive heat, moisture and freeze/thaw.

HEALTH & SAFETY

SEE THE MATERIAL SAFETY DATA SHEET FOR ADDITIONAL INFORMATION.

TECHNICAL SERVICES TOLL FREE NUMBER: 0508 222 272 (Land lines only)

MSDS can be downloaded from www.bostik.co.nz

Clean-Up

Warm soapy water will remove **Dampfix Gold** from tools and equipment prior to full cure

PACKAGING

15 Litre & 4 Litre pails

VOC – 23 g/Lt

PRODUCT DETAILS

| ITEM NO | ITEM NAME | Colour | SIZE |
|----------|--------------|--------|------|
| 30804399 | DAMPFIX GOLD | Yellow | 4L |
| 30804461 | DAMPFIX GOLD | Yellow | 15L |

This datasheet is for the general help of users. It is provided in good faith. The data is current and accurate to the best of our knowledge. Differing materials, substrates, environments, site conditions, and product storage, handling and application may affect results. Users should carry out tests to decide the product's suitability for purpose. This data sheet and the properties of the product may change without notice. Users, suppliers and retailers should check that the data sheets they have are the latest. To the maximum extent permitted by law, Bostik disclaims all warranties in relation to manufacture and use of the product. Bostik is not liable for representations made by users, suppliers or retailers about the product. Bostik is not liable for any loss or damage resulting from incorrect, careless, or negligent use or storage of the product, including use of out of date product. Any liability arising from use of the product is limited to the replacement or purchase price of the product. Bostik does not exclude rights and remedies that cannot be excluded by legislation, for example under the Consumer Guarantees Act 1993. Sale of the product by Bostik is subject to the Bostik New Zealand Limited Conditions and Terms of Sale. For more information on Bostik, products, and conditions of use and sale visit www.bostik.co.nz



Product: Dampfix Gold
Issue Date: 25/11/2014
Issue No.
Author: WK
Division: Construction
Total Pages: 7



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BRANZ Appraised
Appraisal No. 908 [2016]

DYNEX SOFFIT SYSTEM

Appraisal No. 908 [2016]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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BRANZ

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New Zealand
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Product

- 1.1 The Dynex Soffit System consists of white uPVC boards used as exterior soffit linings. The boards are extruded with an inter-locking tongue and groove profile that when fitted together, resembles the finished look of traditional tongue and groove paneling. The system is complete with uPVC jointer and end cap accessories.

Scope

- 2.1 The Dynex Soffit System has been appraised for use as an external soffit lining for buildings within the following scope:
- constructed with timber framing in accordance with the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; or,
 - constructed with steel framing subject to specific engineering design with building height and floor plan area scope limitations of NZBC Acceptable Solution E2/AS1; and,
 - situated in NZS 3604 Wind Zones up to and including Extra High.

Building Regulations

- 3.1 **In the opinion of BRANZ, the Dynex Soffit System, 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 B1 STRUCTURE: Performance B1.3.1, B1.3.2, and B1.3.4. The Dynex Soffit System meets the requirements of loads arising from self-weight and wind [i.e. B1.3.3 (a) and (h)]. See Paragraph 9.1.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years. The Dynex Soffit System meets this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Dynex Soffit System meets this requirement. See Paragraph 15.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Dynex Soffit System meets this requirement and will not present a health hazard to people.

- 3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 System components and accessories for the Dynex Soffit System, which are supplied by Dynex Extrusions Ltd are:

Dynex Soffit

- Dynex soffit is manufactured with a twin wall structure from extruded uPVC and is nominally 5.5 mm thick. The soffit boards have an effective cover of 150 mm and are supplied 3.7m long.

Accessories

- Jointers and end cap accessories are extruded from uPVC. Jointers are used at corners where the direction of the soffit changes, and for jointing lengths of soffit boards. Jointers are available with a flush finish or negative joint profile. End caps are used as a start or end point for the soffit board, or for finishing off a ripped board.
- Dynex soffit fixings [timber frame] - 32 x 3.05 mm hot-dip galvanised flat head nails with a minimum head width of 9 mm.
- Dynex soffit fixings [steel frame] - Self-drilling hot-dip galvanised Class 4 screws with a shank diameter of 3.5 mm and minimum head width of 9.25 mm. The screw length must allow a 10 mm minimum penetration through the steel framing.

Handling and Storage

5.1 Handling and storage of all materials supplied by Dynex Extrusions Ltd, whether on site or off site, is under the control of the building contractor. Dynex soffit boards and accessories are delivered to site in packs wrapped in plastic sleeves. The packs must be stacked flat, off the ground on bearers at maximum 600 mm centres and be restrained from collapse. Other materials must not be stacked on the soffit boards and accessories. Long term storage must be dry and under cover. Dynex soffit boards should always be carried on edge and care must be taken to avoid damage to edges, ends and surfaces of the boards.

Technical Literature

6.1 Refer to the Appraisals listings on the BRANZ website for details of the current Technical Literature for the Dynex Soffit System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

7.1 Timber framing behind the Dynex Soffit System must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

- 7.2 Timber framing must comply with NZS 3604. Supporting framing for the soffit must be at a maximum of 600 mm centres for NZS 3604 Wind Zones up to and including Medium, a maximum of 450 mm centres for NZS 3604 Wind Zones up to and including Very High, and a maximum of 300 mm centres for NZS 3604 Wind Zone Extra High.
- 7.3 Timber framing must have a maximum moisture content of 18% at the time of the soffit lining installation. *[Note: If Dynex soffit boards are fixed to framing with a moisture content greater than 18%, problems may occur at a later date due to excessive timber shrinkage.]*

Steel Framing

- 7.4 Steel framing must be to a specific design meeting the requirements of the NZBC.
- 7.5 The minimum framing specification is 'C' section members with an overall section size of 75 mm web and 32 mm flange. Steel thickness must be minimum 0.55 mm.
- 7.6 Supporting framing for the soffit must be at a maximum of 600 mm centres for NZS 3604 Wind Zones up to and including Medium, a maximum of 450 mm centres for NZS 3604 Wind Zones up to and including Very High, and a maximum of 300 mm centres for NZS 3604 Wind Zone Extra High.

Structure

Wind Zones

- 8.1 The Dynex Soffit System is suitable for use on buildings in NZS 3604 Wind Zones up to and including Extra High. Refer to Paragraphs 7.2 and 7.6 for soffit framing requirements.

Durability

Serviceable Life

- 9.1 The Dynex Soffit System is expected to have a serviceable life equal to that of other soffit lining systems provided it is correctly maintained in accordance with this Appraisal and the Technical Literature.
- 9.2 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of Dynex soffit boards in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

- 10.1 Regular cleaning [at least annually] of the soffit surface is recommended to remove grime, dirt and organic growth, and to maximize the life and appearance of the surface finish. Build-up of residue, mould or dirt can be removed by brushing with a soft brush, warm water and detergent. Abrasive cleaners, thinners, solvents or petrol must not be used to clean the Dynex Soffit System.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to the Dynex Soffit System from heat sources such as 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.

Control of External Fire Spread

- 12.1 Where the Dynex Soffit System is used as a soffit lining on Risk Group SH buildings, there are no control of external fire spread requirements where the soffit is more than 650 mm from a relevant boundary. Where the soffit is within 650 mm of a relevant boundary, the total eaves construction and external wall from which it projects shall have a fire resistance rating in accordance with NZBC Acceptable Solution C/AS1, Paragraph 5.2.2.
- 12.2 Where the Dynex Soffit System is used as the soffit lining to eaves, verandas, canopies or other such structures on buildings within all other Risk Groups, refer to the design requirements contained within NZBC Acceptable Solution C/AS2 to C/AS6.

External Moisture

- 13.1 The Dynex Soffit System, when installed in accordance with this Appraisal and the Technical Literature will prevent the penetration of moisture that could cause undue dampness or damage to building elements.

Installation Information

Installation Skill Level Requirements

- 14.1 The Dynex Soffit System must be installed by Licensed Building Practitioners with the relevant Licence Class, in accordance with the instructions given within the Technical Literature and this Appraisal.

System Installation

- 15.1 PVC components may be cut on site by hand saw or power saw with a fine toothed blade, jigsaw or router. Holes and cut-outs may be formed by using a hole saw or router.
- 15.2 Dynex soffit boards are designed to be installed either perpendicular or parallel to the wall. One end of the soffit board must be inserted into the fascia groove and be fixed firmly through a full fixing slot in the nailing strip closest to the fascia line. The boards must then be fixed to soffit framing [at the maximum centres detailed in Paragraphs 7.2 and 7.6] with either 32 x 3.05 mm hot-dip galvanised flat head nails with a minimum head width of 9 mm [for timber frame], or self-drilling hot-dip galvanised Class 4 screws with a shank diameter of 3.5 mm and minimum head width of 9.25 mm [for steel frame]. The fixings must be finished flush with the nailing strip and must not deform it. Subsequent boards clip over the nailing strip and conceal the nail or screw heads.
- 15.3 The change of direction at external and internal corners can be finished with a mitre or square finish. The junction between board ends must be finished with a Dynex soffit jointer.
- 15.4 At the soffit/wall junction, the end of the Dynex soffit boards must be concealed by the wall cladding, a timber bead, or the Dynex soffit end cap accessory.
- 15.5 The Dynex Soffit System should be installed when the air temperature is within the range of +10°C and +25°C. When the air temperature is outside this range, additional allowance for expansion and contraction must be considered in accordance with the Technical Literature.

Health and Safety

- 16.1 Hearing and eye protection must be worn while cutting Dynex soffit boards and accessories.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 17.1 Wind face load testing to simulate wind pressures on the Dynex Soffit System was carried out by BRANZ. BRANZ determined the design wind suction pressures, and by comparing these pressures with the NZS 3604 design wind speeds and AS/NZS 1170 pressure coefficients, the fixing requirements were determined for timber and steel framed soffits.

Other Investigations

- 18.1 Structural and durability opinions have been provided by BRANZ technical experts.
- 18.2 Site visits have been carried out by BRANZ to assess the practicability of installation and to examine completed installations.
- 18.3 Experience with single skin, double skin (twin wall), and cellular uPVC wall claddings and other fully exposed uPVC exterior building products in New Zealand and overseas for many years has been noted, including durability, and non-hazardous nature.
- 18.4 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 19.1 The manufacture of Dynex soffit boards and trim 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.
- 19.2 The quality of materials, components and accessories supplied by Dynex Extrusions Ltd is the responsibility of Dynex Extrusions Ltd. The quality control system of Dynex Extrusions Ltd has been assessed and registered as meeting the requirements of ISO 9001: 2008.
- 19.3 The environmental management system of Dynex Extrusions Ltd has been assessed and registered as meeting the requirements of ISO 14001: 2004.
- 19.4 Quality of installation on site of components and accessories supplied by Dynex Extrusions Ltd and the building contractor is the responsibility of the installer.
- 19.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and the Dynex Soffit System in accordance with the instructions of Dynex Extrusions Ltd.
- 19.6 Building owners are responsible for the maintenance of the Dynex Soffit System in accordance with the instructions of Dynex Extrusions Ltd.

Sources of Information

- 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 6, 14 February 2014).
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.



In the opinion of BRANZ, the **Dynex Soffit System** 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 **Dynex Extrusions 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. **Dynex Extrusions 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 **Dynex Extrusions 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 **Dynex Extrusions Limited** or any third party.

For BRANZ

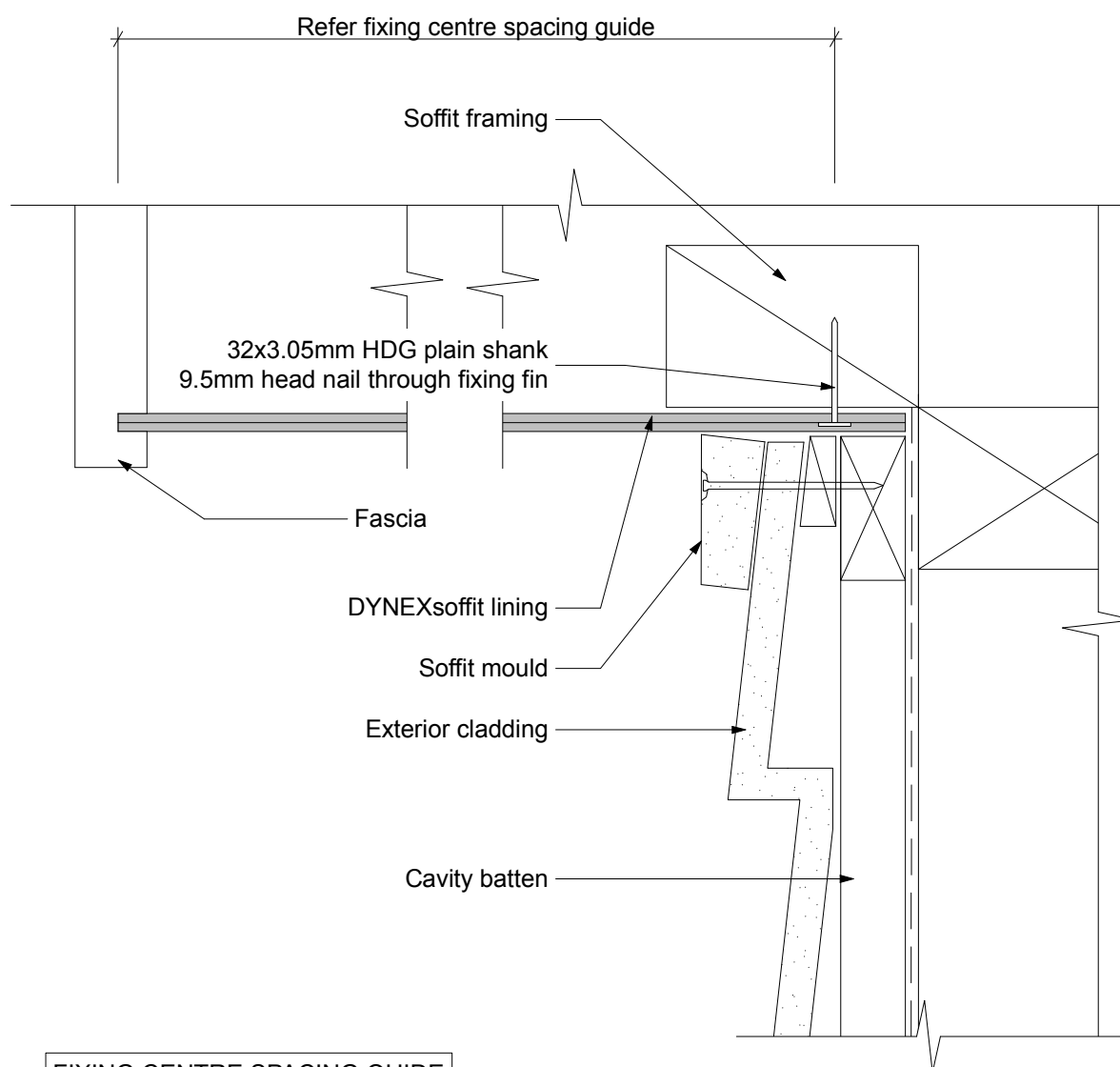


Chelydra Percy

Chief Executive

Date of Issue:

13 April 2016



FIXING CENTRE SPACING GUIDE

| Wind Zone | Fixing Centres |
|------------|----------------|
| Low | 600mm* |
| Medium | 600mm* |
| High | 450mm |
| Very High | 450mm |
| Extra High | 300mm |

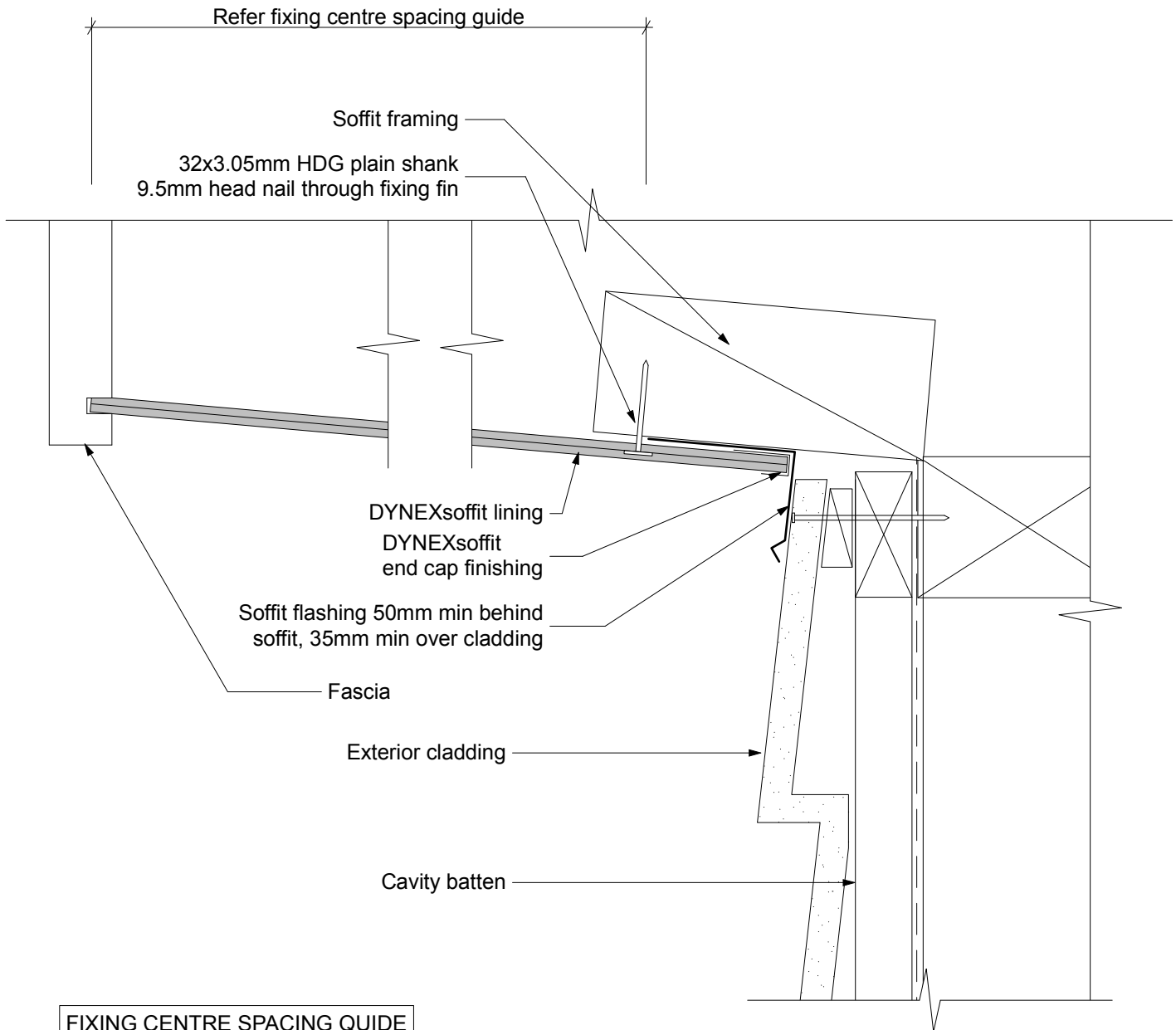
* Maximum 1200mm soffit board lengths. Lengths over 1200mm are required to be fixed at 450mm centres

DYNEXsoffit

Standard Installation

Dynex Soffit

| | |
|--|--------------|
| Scale: | 1:2 |
| Do not scale from drawings.
Contact Dynex Extrusions Ltd
for exact dimensions
www.dynex.co.nz
0800 4 DYNEX (0800 4 39639) | |
| Date: | March 2016 |
| Detail No: | SF-01 |



FIXING CENTRE SPACING GUIDE

| Wind Zone | Fixing Centres |
|------------|----------------|
| Low | 600mm* |
| Medium | 600mm* |
| High | 450mm |
| Very High | 450mm |
| Extra High | 300mm |

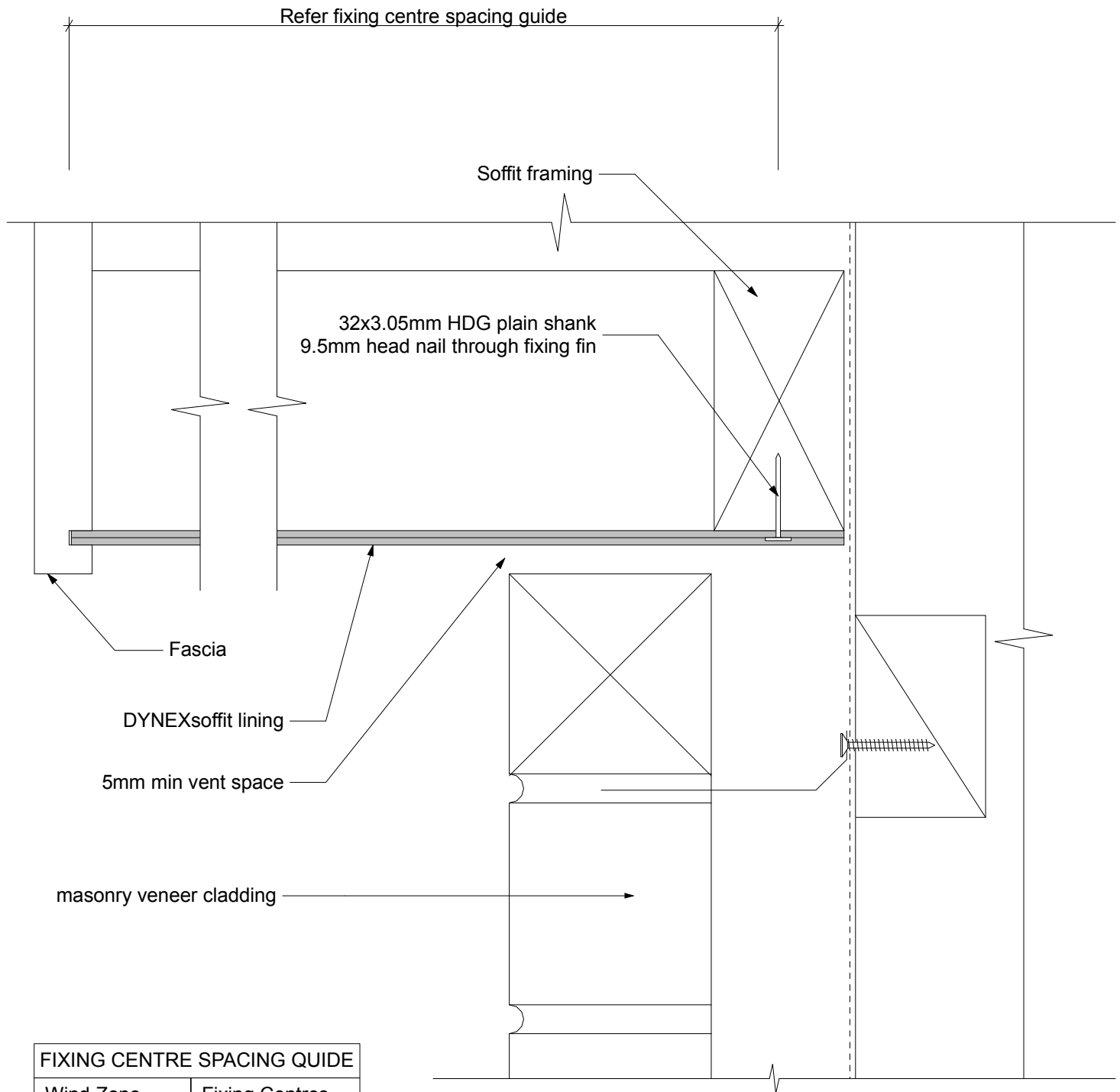
* Maximum 1200mm soffit board lengths. Lengths over 1200mm are required to be fixed at 450mm centres

DYNEXsoffit

Reverse Raking Soffit Installation

Dynex Soffit

| | |
|--|--------------|
| Scale: | 1:2 |
| Do not scale from drawings.
Contact Dynex Extrusions Ltd
for exact dimensions
www.dynex.co.nz
0800 4 DYNEX (0800 4 39639) | |
| Date: | March 2016 |
| Detail No: | SF-02 |



FIXING CENTRE SPACING GUIDE

| Wind Zone | Fixing Centres |
|------------|----------------|
| Low | 600mm* |
| Medium | 600mm* |
| High | 450mm |
| Very High | 450mm |
| Extra High | 300mm |

* Maximum 1200mm soffit board lengths. Lengths over 1200mm are required to be fixed at 450mm centres

DYNEXsoffit

Masonry Veneer Installation

Dynex Soffit

| | |
|---|--------------|
| Scale: | 1:2 |
| Do not scale from drawings. Contact Dynex Extrusions Ltd for exact dimensions
www.dynex.co.nz
0800 4 DYNEX (0800 4 39639) | |
| Date: | March 2016 |
| Detail No: | SF-03 |

Installation Guide



Looks great - A contemporary tongue and groove styled soffit, with hidden fixings, that provides a versatile and sleek lining complimenting a range of building designs and material choices.

Low maintenance - A prefinished soffit that will never need painting, no matter the conditions, allowing more time to do the things you enjoy.

Long lasting - A durable soffit that's made in New Zealand, for New Zealand conditions, and backed by a 25 year guarantee for peace of mind.

Dynex Soffit is 5.5mm in thickness, 150mm wide, comes in 3.7m lengths and is manufactured by Dynex Extrusions from durable uPVC. It is ideal for lining soffits as well as verandas, carports and other outdoor living spaces.

For that stylish finishing touch, choose Dynex Soffit. The smart choice in soffit.

For more information please visit
www.dynex.co.nz/dynexbuild/soffit

Or contact DYNEXbuild on 08004DYNEX
sales@dynex.co.nz

by **DYNEX**build

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1.0 Important information and preparation

1.1 Important information

- **Do not deform the fixing strip** (see Fixing Technique section for details)
- **Do not install on wet framing** (see 'Allowing for expansion and contraction' section for more details)
- **Do not use as exterior cladding**
- **Do not put hot objects near soffit** (see 'Care and maintenance' section for more details)

1.2 Storage and handling

Soffit boards should be kept in their protective packaging until the time they are installed. Keep boards on a flat surface in an area on site where they will not be damaged. Do not lay other materials on top of the soffit. When opening the bags, take care that the boards do not get damaged.

1.3 Temperature

Additional care should be taken when fixing the soffit at temperature extremes. Where possible, installation should be carried out in a temperature range between 10°C and 25°C. If working outside this range, additional allowances for expansion and contraction are required. See 'Allowing for Expansion and Contraction' section for more details.

1.4 Fixing specification

1.4.1 Timber Framing

Nail 32X3.05mm HDG Plain Shank 9.5mm head

1.4.2 Steel Framing

Self-drilling Screw HDG Class 4 with a shank diameter of 3.5mm and minimum head width of 9.25mm.

1.4.3 Microclimatic Conditions

The fixing of Dynex Soffit in microclimatic conditions (e.g. geothermal hot spots, corrosive atmospheres) requires special consideration. Contact Dynex for further information.

1.5 Fixing Centre Guide

Reference the chart below to determine appropriate fixing centres.

| Wind Zone | Fixing Centres |
|---|----------------|
| Low | 600mm* |
| Medium | 600mm* |
| High | 450mm |
| Very High | 450mm |
| Extra High | 300mm |
| * Maximum 1200mm soffit board lengths. Lengths over 1200mm are required to be fixed at 450mm centres. | |

1.6 Allowing for expansion and contraction

It is important to allow for the soffit boards to expand and contract in varying temperatures. In cold conditions (less than 10°C), for lengths of soffit exceeding 1m, allow 3mm for maximum movement due to temperature changes (cut 3mm undersize). On hot days (above 25°C), for lengths of soffit exceeding 1m, allow 3mm for maximum movement (cut 3mm oversize). When working between 10°C and 25°C, boards can be cut to size.

It is also important to note that the soffit should not be installed on to wet framing. When the framing dries and moves, it may cause the soffit to distort. Ensure the timber has a moisture content no greater than 18%, prior to installation.

1.7 Setting out and quantifying

| | |
|--|--------------------|
| Effective cover of board | 150mm |
| Board Length | 3.7m |
| Board thickness | 5.5mm |
| Board cover (m ² per board) | 0.56m ² |

1.8 Tools required

Dynex Soffit does not require any special tools and can be cut and nailed using a wide variety of standard building equipment including circular saws, jig saws and other power tools.

Cutting; an electric circular saw or drop saw (using a fine tooth blade with a minimum of 20 teeth). An electric jigsaw, router, angle grinder (using a continuous rim diamond blade) or a standard hand saw may also be used.

Ensure a fine tooth blade is used on saws to avoid any splintering or cracking of boards.

Hole forming; When cutting or drilling holes for lighting, venting or accessories, standard hole-forming attachments can be used. Care should be taken not to force the jigsaw or drill too hard or quickly.

1.9 Venting

When installing the soffit where there is a skillion/mono pitch roof and little or no roof cavity, ventilation must be provided to avoid excessive heat from affecting the boards in applications where the soffit is greater than 1.5m from wall to fascia.



It is recommended that equal size/area inlet

and outlet vents be used. Ensure ventilation paths are not obstructed.

1.10 Lighting

1.10.1 Surface mounted

It is important to note that Dynex Soffit is not a load bearing material. It is recommended that surface mounted lighting (or other items) be installed directly to bearers or framing. The soffit must be allowed to expand and contract in varying temperatures and not be hard fixed in place against the framing. Install lighting to the framing with an over-sized hole through the soffit, where practical, to allow the soffit to move. Holes should be 5mm oversize.

1.10.2 Recessed

Most small recessed lights that are held in place using clips can be installed directly to the soffit. It is recommended that recessed lighting be low wattage LED, IC rated. If using Halogen or CA rated recessed lights, they should be 50watt maximum output. Check lighting manufacturer's specifications for correct use and installation clearances.

1.11 Fire

Dynex Soffit is suitable for buildings in risk group SH (detached housing), where the soffit is more than 650mm from a relevant boundary, as there is no requirement for the control of external fire spread. Contact Dynex Extrusions for further information on buildings in other risk groups or where the soffit is installed closer than 650mm from a boundary.

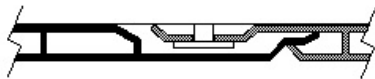
2.0 Installation procedure

Important Installation Information

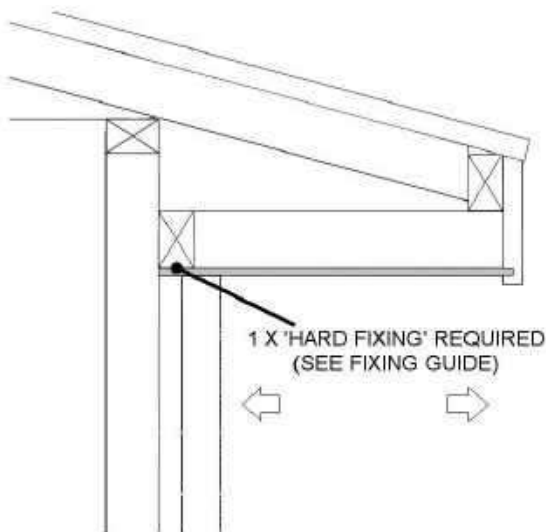
- **Reference the Fixing Technique section to determine fixing methods to be used depending on the application.**
- **Reference the Fixing Centre Guide to determine appropriate fixing spacing. Confirm if additional framing is required.**

Dynex Soffit is typically run perpendicular to the wall (for boards running parallel to the wall see Alternative Installation section). Boards are cut to length and firstly inserted into the fascia slot and then fixed in place at appropriate fixing centres.

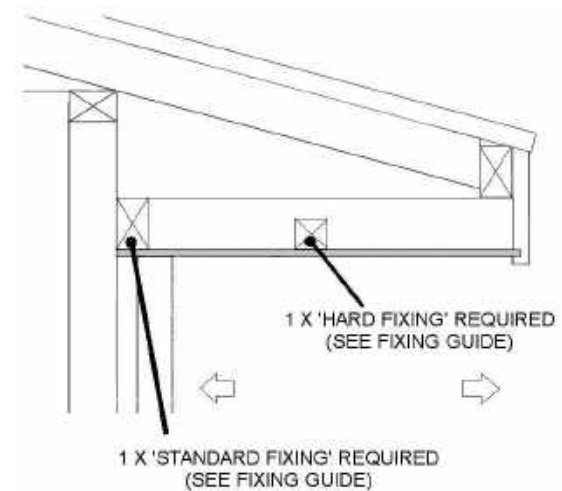
Boards are then clipped in to one another to create tongue and groove joints. Ensure the boards are pushed firmly in place. See join detail below.



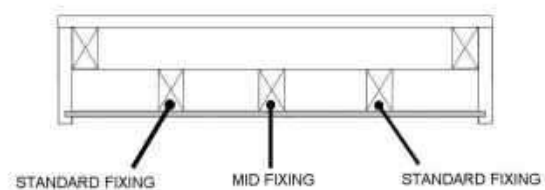
Short spanning boards that only require one fixing point (in addition to the fascia slot) should be fixed firmly in place using a 'hard fixing'.



Longer boards that require two or more fixing points (in addition to the fascia slot) should have one 'hard fixing' closest to the fascia board and then remaining fixings to be 'standard fixing'.

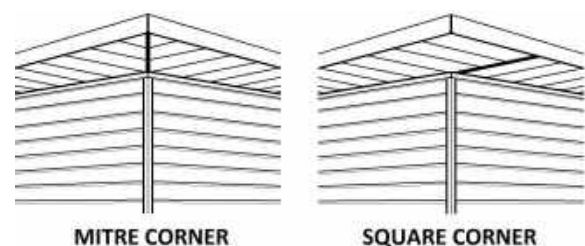


Board lengths exceeding 1500mm are to be 'mid fixed' approximately half way along the board.



Finishing of cut boards can be achieved by using an end cap or the installation of an alternatively supplied moulding.

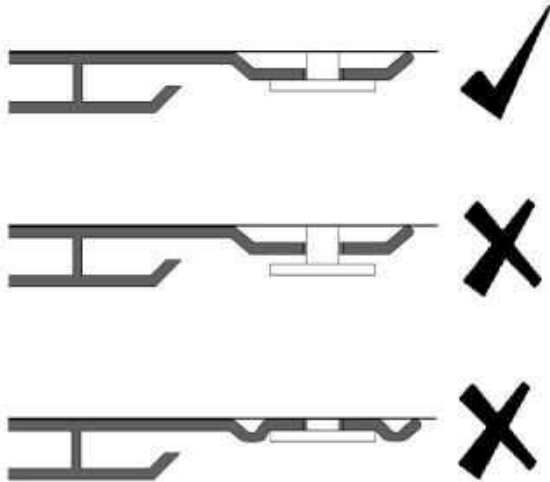
Corner junctions can either be mitred or square using the standard jointer accessories. See 'Accessories' section for more details.



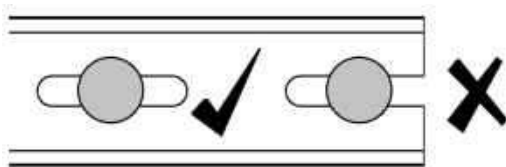
2.1 Fixing Technique

The following fixing guidelines are applicable for both timber and steel framing.

DO NOT DEFORM FIXING STRIP. The head of the fixing must sit flush with the fixing strip and not deform it. See below.



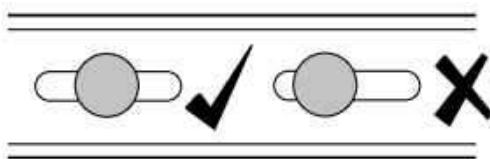
DO NOT FIX THROUGH A PARTIAL SLOT. If a slot is cut through at the end of a board, fix in the nearest full slot. See below.



DO NOT FIX THROUGH SOFFIT BOARD. Fix through the fixing slots only to allow the board to expand and contract.

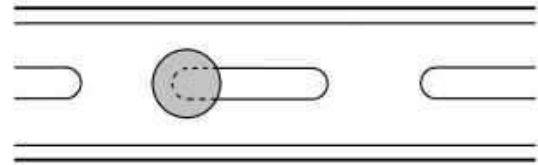
2.1.1 Standard fixing

Fixing through the centre of a slot. This fixing method holds the soffit in place but also allows the boards to move slightly through expansion and contraction. See below.



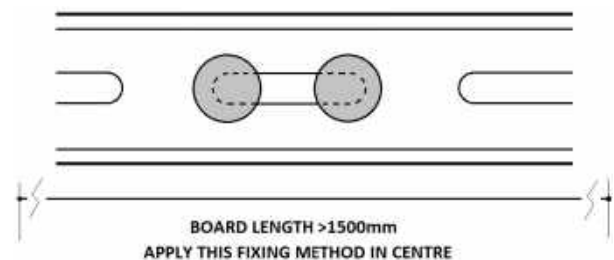
2.1.2 Hard Fixing

Fixing to the edge of a slot. This fixing method holds the soffit in place and locks it from moving in one direction. It is used to secure a short span of soffit board against the fascia board. See below.



2.1.3 Mid fixing

Fixing at both ends of one slot. This fixing method locks the soffit in place and prevents any movement. When the length of one board is longer than 1500mm. Apply two fixings to a slot approximately half way along the board length (i.e. 1800mm for a 3600mm board length). This will prevent board migration (also known as creepage) over time. See below.

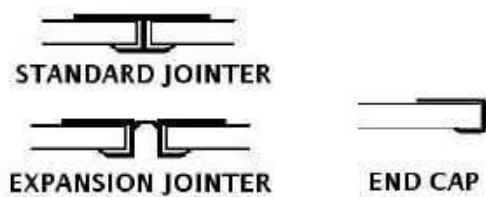


2.2 Accessories

Jointer and end cap accessories are available for use with Dynex Soffit.

Jointers: Used at corners where the direction of the soffit changes (mitre or square). Used for joining longer lengths of soffit.

End cap: Used as a starting point or ending point for boards or for finishing off a ripped board.



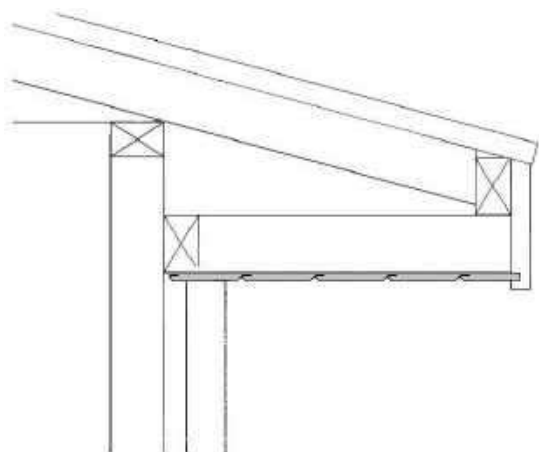
2.3 Alternative Installation (Parallel to wall)

Dynex Soffit can be installed parallel to the wall as an alternative to perpendicular to the wall.

Additional battens may be required to meet the soffit fixing spacing requirements (see fixing centre guide).

The first soffit board length will need to be ripped in order to remove the starting strip tongue before inserting into the fascia.

Full boards are then inserted in to one another to create the tongue and groove joints. Long lengths of board can be joined using the standard jointer or expansion jointer. Installation example below.



Starting and finishing of cut boards can be achieved by using the end cap accessory or the installation of an alternatively supplied moulding.

3.0 Further Information

3.1 Warranty

- Subject to the above product information, if Dynex Soffit is used and installed according to Dynex Extrusions Limited's published recommendations, we guarantee Dynex Soffit to be free from defects in material and workmanship for a period of 25-Years from the date of purchase.
- If you consider that our guarantee has not been fulfilled, do not attempt repairs or replacement but contact in the first instance the installer or alternatively Dynex Extrusions Limited P O Box 19-133, Avondale, Auckland. Dynex Extrusions Limited will then recommend appropriate course of action.
- If Dynex Soffit has been used and installed in accordance with the requirements of this guarantee (set out above) but does not comply with that guarantee, we will replace the product or refund its purchase price.
- This guarantee is given to consumers as defined in and who have the rights

under the Consumer Guarantees Act 1993 and should be read with the statutory consumer guarantees contained in that act.

3.2 Product feedback

We value your feedback. To continue to develop and produce excellent products we would value any input you have.

Sales; 0800 439 639 or sales@dynex.co.nz

3.3 Environmental policy

Dynex is committed to environmentally sound production and believes in the importance of sustainable manufacturing. The commitment to reducing the company's impact on the environment is demonstrated by adhering to the ISO 14001 environmental standard.

Dynex Soffit is a sustainable soffit product manufactured from 100% recyclable material. For more information please refer to our environmental statement found at www.dynex.co.nz.

3.4 Health & Safety

Hearing and eye protection must be worn while cutting Dynex Soffit boards and accessories.

4.0 Care and maintenance

While Dynex Soffit requires very little in the way of maintenance, follow the below guide to help keep Dynex Soffit looking its best over time.

| | |
|----------------------|---|
| Cleaning | We recommend that the product be periodically washed down to help maintain its smart look. The frequency of this is up to the home owner and the buildings location. As a guide we recommend the soffit is cleaned at least once a year. A wet cloth and warm soapy water should remove most surface marks and build up. In addition to this, Hypo-Chlorite based cleaners (such as 30 Seconds) can be used. Please follow the product instructions correctly if using such cleaners. Water blasters can also be used to clean Dynex Soffit. Be careful not to expose the soffit to extreme changes in temperatures for example hosing down the soffit with cold water on a very hot day. |
| Maintenance | All areas where sealants and penetrations occur should be checked regularly to ensure their integrity is intact. If there is any deterioration, sealants should be reapplied. |
| Scratches | In the event of any surface scratches these can be minimised by cleaning with watered down 'jif'. This may result in a slight dulling of the surface in this area. Any excess cleaner should be thoroughly cleaned off after application. |
| Repairing | Small holes or cracks caused by damaging the board or removing objects installed against the boards can be filled using a white solvent cement applied topically. Damaged boards can be removed from between other boards and replaced. |
| Fixing to the boards | Note; Dynex Soffit is not a load bearing material. If installing other products to the soffit it is important to ensure it is fixed directly to the bearers. It is also important that the soffit is allowed to expand or contract in varying temperatures and not hard fixed in place. Install to framing with an over-sized hole through the soffit to allow it to move. |
| Painting | Dynex soffit is a pre-finished product and does not require any painting. If for any reason painting was desired, contact Dynex Extrusions. |
| Do not | Do not use solvent based cleaners. If you have any doubts about the suitability of a type of cleaner please contact the manufacturer of the cleaning product with regards to its use with uPVC beforehand. It is recommended that the cleaner is tried on a small area of soffit in an unseen area before using. |
| | Do not position a heat source in close proximity to the soffit (for example a tall gas heater where the top of the heater comes close to the soffit). Ensure that heat sources are directed away from the soffit. |

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ECOPLY® SPECIFICATION & INSTALLATION GUIDE

OCTOBER 2022



ECOPLY® SPECIFICATION & INSTALLATION GUIDE

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1.0 ECOPLY® PRODUCT RANGE

Manufactured in New Zealand by Carter Holt Harvey Plywood, 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 (EWPPA) 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 and Installation Guide for Cavity Construction. For information relating to Ecoply Barrier used as a rigid air barrier refer to the current Ecoply Barrier Specification and Installation Guide. Both of these documents can be downloaded from www.chhply.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 Plywood assumes no legal liability to you in relation to this information.

1.1 TECHNICAL INFORMATION & CAD DETAILS

When specifying or installing any Ecoply plywood products visit www.chhply.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 October 2022. 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 Plywood 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 & 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 and 2B.
- Stress grade - utilises the symbol F and a suffix for both parallel and perpendicular to the grain directions, for example;
 - F8/F8 as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade in both directions.
 - For plywood 15mm thick and below all Ecoply products are F8/F8.
 - For Ecoply plywood products 17mm thick and above most products are F8/F5.
 - Ecoply 19mm Longspan Flooring is F11/F8 stress grade (See Tables 1, 4 and 5). Other Ecoply products are also available in F11/F8 upon request.

- Thickness - ranging from 7mm to 25mm. (Thicknesses above 25mm subject to availability).
- Length - being 2400mm and 2700mm with a standard nominal width of 1200mm.
- 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

| 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.chhply.co.nz or contact Carter Holt Harvey Plywood on 0800 326 759.

Table 1: Ecoply® Product Range

| Stress Grade (UNO) | | F8/F8 | | | | | | | | F8/F5 | | | | | | | |
|----------------------------------|----|-------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|
| Nominal Thickness (mm) | | 7 | | 9 | | 12 | | 15 | | 17 | | 19 | | 21 | | 25 | |
| Sheet length (x 1200mm 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 | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| Ecoply Roofing (pt) ¹ | 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, 1200mm cover.

1 Ecoply 15mm Roofing and Ecoply 19mm Longspan Flooring are supplied as standard in F11/F8 stress grade.

- 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.
- Other Ecoply products are also available in F11/F8 upon request.

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 speciality 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 75mm across the face veneer. Splits and knots allowable. |
| Possible Uses: | Possible Uses: | Possible Uses: |
| <ul style="list-style-type: none"> Furniture/Joinery/Signs Interior Linings Sheathing Engineering components where a superior visual finish is required | <ul style="list-style-type: none"> Structural gussets Stressed skin panels Bins, boxes, crates Hoardings Membrane substrate | <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: | 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 | <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 1604.3:2012. 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. Soudal® Metalex® Concentrated Timber Preservative Clear (Soudal® 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 and 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

| Section Properties per mm width | | | | | | | | |
|--|----------------------|------------------------------|--|---|---|---|---|---|
| Nominal Plywood Thickness ²
(mm) | ID Code ² | Mass
(kg/m ²) | Parallel to the Face Grain | | | Perpendicular to the Face Grain | | |
| | | | Parallel Moment of Inertia
(mm ⁴) | Section Modulus
Z (mm ³) | Shear Constant ³
I/Q (mm ²) | Perpendicular Moment of Inertia
I (mm ⁴) | Section Modulus
Z (mm ³) | Shear Constant 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 | 17-38-5 | 9.2 | 367.4 | 42.0 | 13.2 | 84.8 | 15.1 | 7.2 |
| 19 | 19-38-5 | 10.6 | 456.3 | 47.7 | 14.8 | 132.5 | 20.9 | 9.2 |
| 21 | 21-38-6 | 11.6 | 626.2 | 58.6 | 15.4 | 191.7 | 25.4 | 10.9 |
| 25 | 25-38-7 | 13.5 | 991.6 | 78.6 | 17.9 | 349.6 | 36.8 | 13.7 |

Table 4B: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design

| Nominal Strengths (Limit States) per mm width | | | | | | | | |
|--|----------------------|--------------|--|---|--|--|---|--|
| Nominal Plywood Thickness ²
(mm) | ID Code ² | Stress Grade | Parallel to the Face Grain | | | Perpendicular to the Face Grain | | |
| | | | Bending Stiffness EI
(1000 Nmm ²) | Bending Moment f _{pb} Z
(Nmm ²) | Rolling Shear f _{pr} I/Q
(N) | Bending Stiffness EI
(1000 Nmm ²) | Bending Moment f _{pb} Z
(Nmm) | Rolling Shear f _{pr} I/Q
(N) |
| 12 | 12-24-5 | F8/F8 | 1046.5 | 480.0 | 15.6 | 303.9 | 231.8 | 9.8 |
| 15 | 15-30-5 | F8/F8 | 2047.5 | 747.5 | 19.5 | 593.3 | 362.5 | 11.4 |
| 15 | 15-30-5 | F11/F8 | 2362.5 | 926.9 | 20.9 | 593.3 | 362.5 | 11.4 |
| 17 | 17-38-5 | F8/F5 | 3343.3 | 1050.0 | 22.2 | 585.1 | 211.4 | 10.7 |
| 17 | 17-38-5 | F11/F8 | 3857.7 | 1302.0 | 23.8 | 771.7 | 377.5 | 12.3 |
| 19 | 19-38-5 | F8/F5 | 4152.3 | 1192.5 | 24.9 | 914.3 | 292.6 | 12.1 |
| 19 | 19-38-5 | F11/F8 | 4791.2 | 1478.7 | 26.6 | 1205.8 | 522.5 | 14.0 |
| 21 | 21-38-6 | F8/F5 | 5698.4 | 1465.0 | 25.9 | 1322.7 | 355.6 | 16.1 |
| 25 | 25-38-7 | F8/F5 | 9023.6 | 1965.0 | 30.1 | 2412.2 | 515.2 | 20.3 |

¹ Actual thickness of Ecoply® sheets manufactured to thickness tolerances stated in AS/NZS 2269.

² Identification code: panel thickness – outermost veneer thickness x 10 – number of plies.

³ I/Q values for rolling shear are for stress at the neutral axis calculated as in NZS 3603.

Notes:

- The section properties in Tables 4A, B and C have been calculated in accordance with AS/NZS 2269.
- For section properties for other thicknesses and Shadowclad® products contact CHH Plywood on 0800 326 759.

Structural Properties of Ecoply® Plywood

The majority of Ecoply® plywood is either F8/F8 or F8/F5 grade (exceptions are identified in section 1.2: Product Description

and 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 | | |
|---|-----------------------------|------|-------|
| | F5 | F8 | F11 |
| Bending (f_{pb}) | 14 | 25.0 | 31.0 |
| Tension (f_{pt}) | 9.6 | 15.0 | 18.0 |
| Panel Shear (f_{ps}) | 3.7 | 4.2 | 4.5 |
| Rolling Shear (f_{pr}) | 1.5 | 1.7 | 1.8 |
| Compression in Plane of Sheet (f_{pc}) | 12.0 | 20.0 | 22.0 |
| Compression Normal to the Plane of the Sheet (f_{pp}) | | 9.7 | 12.0 |
| Modulus of Elasticity (E) | 6900 | 9100 | 10500 |
| Modulus of Rigidity (G) | 345 | 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 25m 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 25m 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. 15-30-5 (Thickness (mm)-Face veneer thickness (mm x 10)-Number of veneers).

Note: In some cases the Panel construction code may be replaced by the Section Properties, in which case the values of second moment of area (moment of inertia) (I) and section modulus (Z) in the grain orientations are declared: e.g. 626.2, 58.6/191.7,25.4.

- 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



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.

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



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 (EWPPAA) which is itself audited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

CHH Plywood is licensed by the EWPPAA to stamp plywood with the EWPPAA/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 1604.3:2012 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/F5 and F8/F8 stress grade. Some specialty products are available F11/F8 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 0.5mg/litre for E₀).

Actual formaldehyde emissions for Ecoply plywood have been tested and approved as having an actual formaldehyde emission level of less than 0.3mg/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 1200mm panel can be in the order of 1.5mm to 3mm 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 Plywood 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 0.13W/mK so a 12mm 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 12mm thickness and treated as required by NZS 3602) to be used for exterior cladding. For exterior cladding applications CHH Plywood 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.chhpoly.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 Plywood.

Ecoply is available Forest Stewardship Council® (FSC®) certified (FSC® C012019) upon request.

1.10 HEALTH & SAFETY

Ecoply should be handled in accordance with the Safety Data Sheets (SDS) for untreated, H3.2 CCA and H3.1 LOSP treated Ecoply, which can be downloaded from www.chhply.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.
- 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.

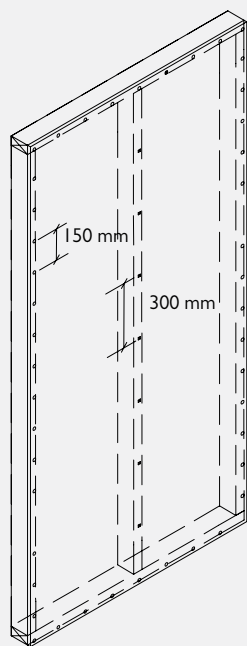
For plywood used as exterior cladding refer to the current Shadowclad® Specification and Installation Guide for Cavity Construction which can be downloaded from www.chhpoly.co.nz.

For plywood used as a rigid air barrier refer to the current Ecoply Barrier Specification and Installation Guide which can be downloaded from www.chhpoly.co.nz.

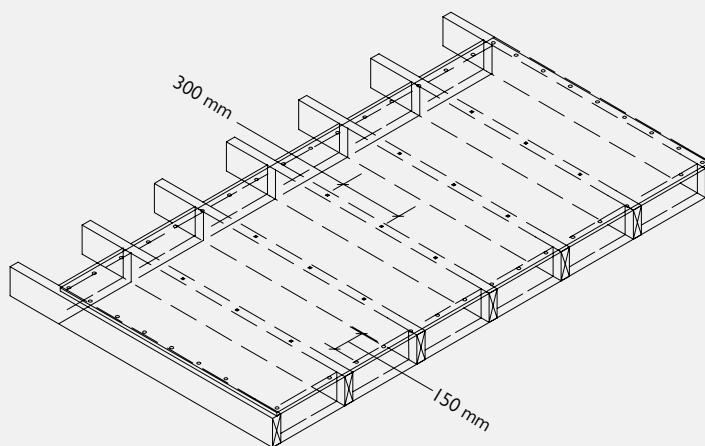
2.2 SHEET FASTENERS & FIXING

- Where there is risk of panel size change due to changes in moisture levels, allow a 2 to 3mm 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 7mm from the edge of the sheet.
- For tongue and groove products such as flooring and roofing fasten 15mm from tongue and groove edges.
- Standard fixing pattern: unless otherwise specified fasten edges and ends of sheets at 150mm centres, and within the panel at no more than 300mm 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®



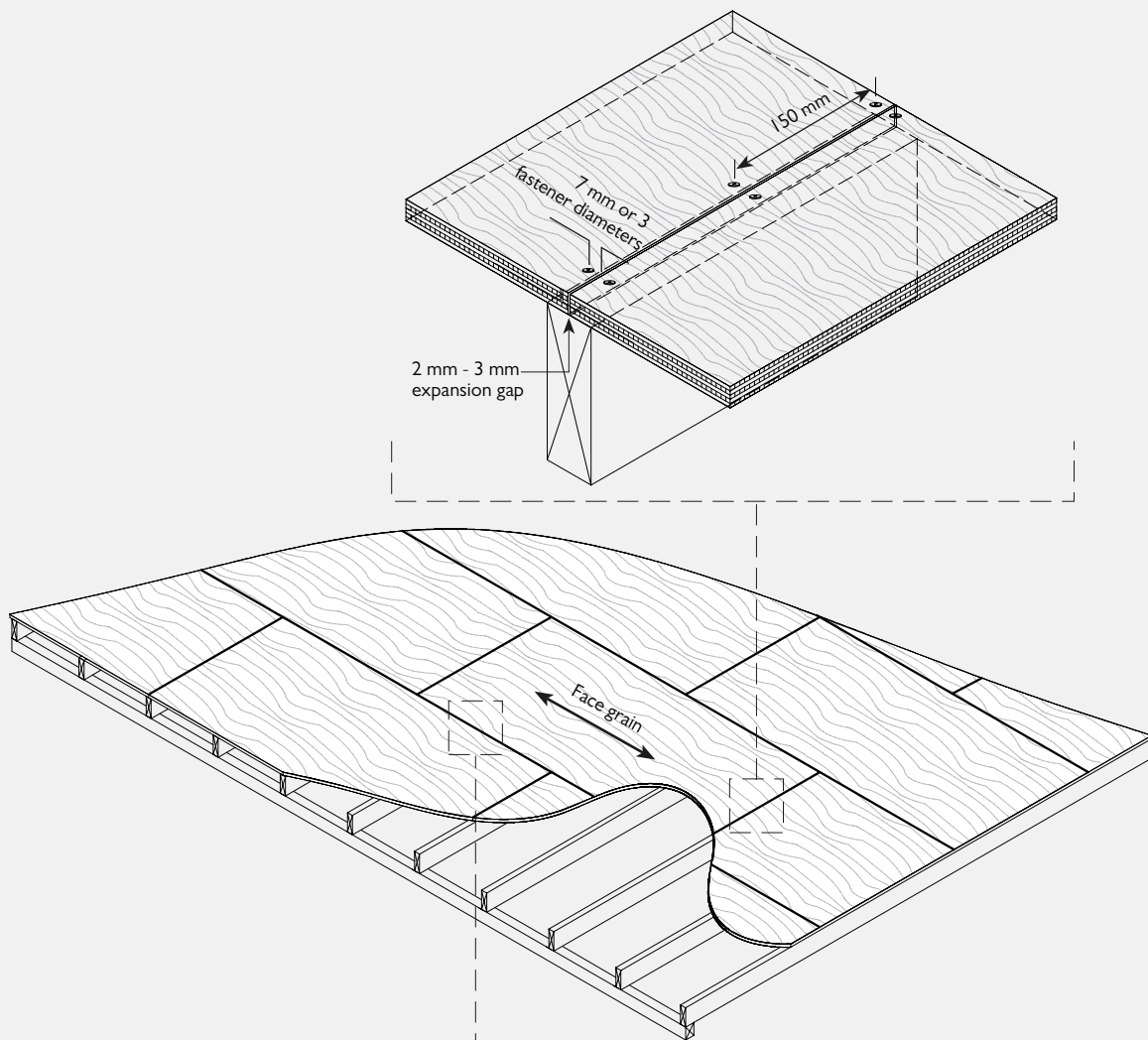
Ecoply® fastened in vertical plane



Ecoply® fastened in horizontal plane

EC002: Fastener Spacings from Edges

Ecoply® Square Edge Plywood and Butt Ends



Ecoply® Tongue and Groove Plywood

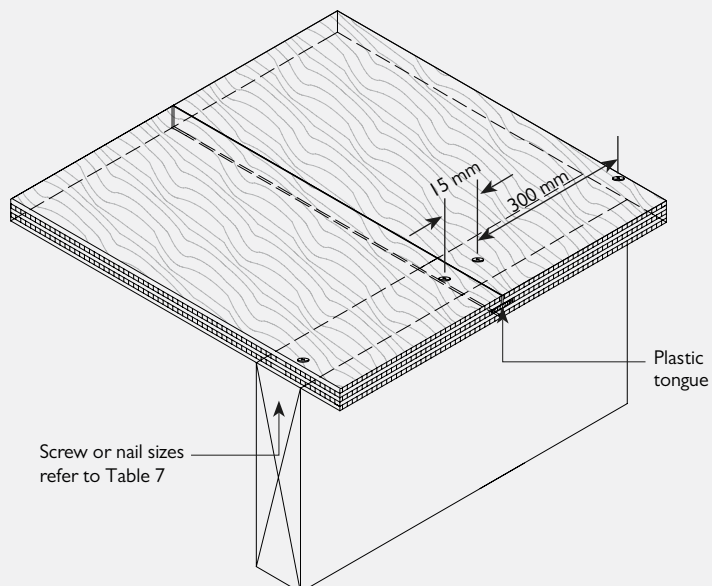


Table 7: Fasteners and Characteristic Shear Loads for EcoPLY®

| Nominal Thickness (mm) | 7mm
9mm | Load ¹ | 12mm
15mm | Load ¹ | 17mm | Load ¹ | 19mm
21mm | Load ¹ | 25mm | Load ¹ |
|--|-----------------------|-------------------|-----------------------|-------------------|-----------------------|-------------------|-----------------------|-------------------|-----------------------|-------------------|
| Minimum nail size in timber framing² | 40 x 2.5mm | 570 | 60 x 2.8mm | 736 | 60 x 2.8mm | 736 | 60 x 2.8mm | 736 | 75 x 3.15mm | 883 |
| Screw size in timber framing² | 8g x 30mm | 1230 | 8g x 40mm | 1230 | 10g x 40mm | 1650 | 10g x 45mm | 1650 | 10g x 50mm | 1650 |
| 1.15mm steel framing³ | 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 2.80mm steel framing³ | 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 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 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. Soudal® 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 Plywood 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 - BI 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 7mm, 9mm or 12mm 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.

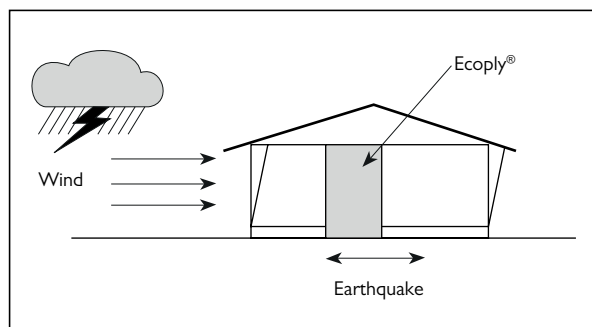
3.1 DESIGN TO COMPLY WITH THE NEW ZEALAND BUILDING CODE

Structure

Timber framed buildings to NZS 3604 Timber Framed Buildings is listed as an Acceptable Solution under Clause 3.0 Timber in Acceptable Solution BI/ASI Structure.

CHH Plywood 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 BI/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.chhply.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 120BUs/m. This does not exclude the installation of bracing elements that are rated higher than 120BUs/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 120BUs/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 Plywood 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 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):
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 and 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 and 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 I 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 2.4m, 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 2.4m high shall be rated as if they are 2.4m 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 2.4m, Ecoply and Shadowclad® is available in 2.7m 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. 2.4m x 1.2m sheet with a 0.3m x 1.2m part sheet above it to give a 2.7m x 1.2m bracing element).

Cladding as Bracing

12mm 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 Plywood 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 Plywood 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.chhply.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 100mm above decks or paved ground and a minimum of 175mm above unprotected ground.

Service Penetrations in Bracing Elements

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, or waste pipe outlets of max. 150mm diameter placed at no closer than 150mm to the edge of the braced element.

3.2 ECOPLY® BRACING SPECIFICATIONS SUMMARY

CHH Plywood 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 | 0.4m | Ecoply® one side | 80 | 95 |
| | 0.6m | | 95 | 105 |
| | 1.2m | | 120 | 135 |
| EPG | 0.4m | Ecoply one side and 10mm GIB® Standard plasterboard other side | 100 | 115 |
| | 1.2m | | 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.chhply.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.chhply.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 | 0.4m | Ecoply® one side | 80 | 95 |
| EPI_0.6 | 0.6m | Ecoply one side | 95 | 105 |
| EPI_1.2 | 1.2m | Ecoply one side | 120 | 135 |

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® or 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 7mm, 9mm or 12mm 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 2-3mm expansion gap should be left between sheets.

Fastening the Ecoply® Panels

Fasten with 50 x 2.8mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7mm 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.

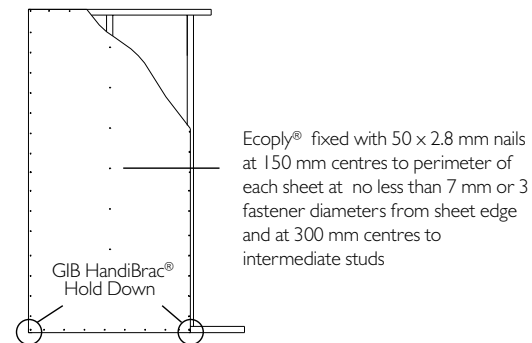
Fasteners for H3.2 CCA Treated Ecoply Panels

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 150mm centres around the perimeter of each sheet and 300mm centres to intermediate studs. Where more than one sheet forms the brace element each sheet must be nailed off independently.



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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 and 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 and Installation Guide | |
| Bracing on framing exposed to ground atmosphere in exposure zones B and 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 and 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

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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3.4 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 | 0.4m | Ecoply® one side and 10mm | 100 | 115 |
| EPG_1.2 | 1.2m | GIB® Standard plasterboard other side | 150 | 150 |

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

Side 1: One layer of 7mm, 9mm or 12mm 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 2-3mm expansion gap should be left between sheets.

Side 2: One layer of 10 or 13mm 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

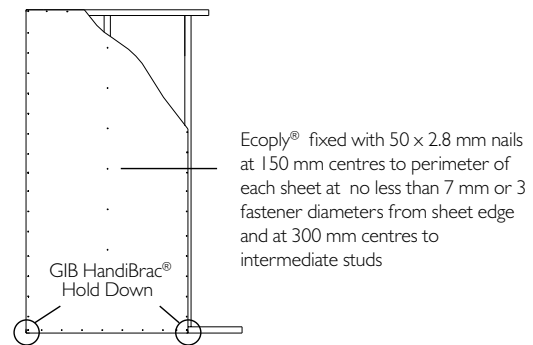
Fasten with 50 x 2.8mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7mm or 3 fastener diameters from sheet edges. Screws cannot be used. Power driven nails are suitable. Do not overdrive, nails must be full round head.

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 150mm centres around the perimeter of each sheet and 300mm 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

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

32mm x 6g GIB® Grabber® Screws or 35mm GIB® Nails.

Fastening Centres

Fasten 50, 100, 150, 225 and 300mm from each corner and 150mm thereafter around the perimeter of the bracing element. For vertical fixing place fasteners at 300mm centres at intermediate sheet joints. For horizontal fixing place single fasteners in the tapered edge where sheets cross studs.

Place fasteners 12mm from paper bound edges and 18mm from cut sheet edges. GIB® plasterboard must be treated in every respect in accordance with relevant GIB® literature.

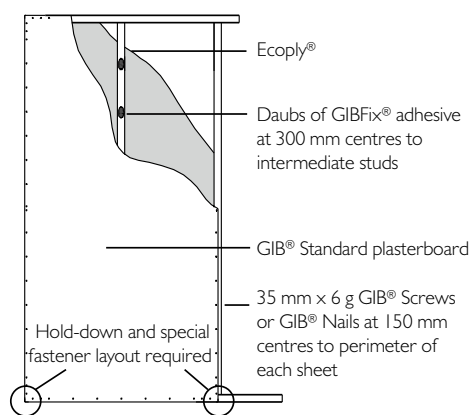


Table 13: Ecoply® Suitability for Bracing Applications Including Treatment Type and Fastener Material*

| 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 and 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 and Installation Guide | |
| Bracing on framing exposed to ground atmosphere in exposure zones B and 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 and 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.

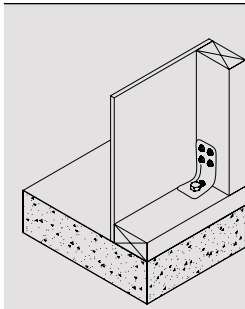
- The GIB HandiBrac® registered design provides for quick and easy installation.
- The GIB HandiBrac® provides a flush surface for the wall linings because it is fitted inside the framing. There is no need to

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.

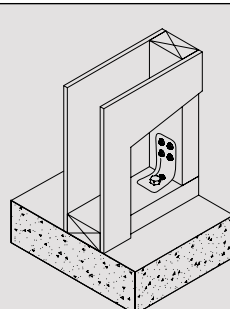
Concrete Floor

External Walls



Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.

Internal Walls



Position GIB HandiBrac® at the stud/plate junction.

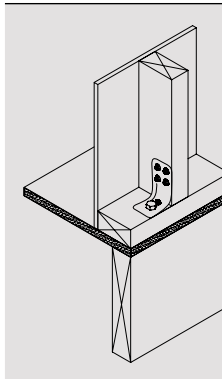
Hold-down Fastener Requirements

A mechanical fastening with a minimum characteristic uplift capacity of 15kN or screw bolt supplied with the bracket

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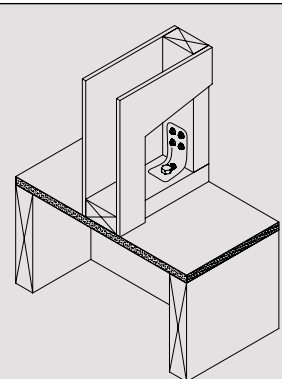
Timber Floor

External Walls



Position GIB HandiBrac® in the centre of the perimeter joist or bearer.

Internal Walls



Position GIB HandiBrac® in the centre of the floor joist or full depth solid block.

Hold-down Fastener Requirements

M12 x 150mm galvanised coach screw

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 6mm 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. 40mm x 2.5mm flat head nails for 7mm and 9mm Ecoply®.
- Fastening is at 150mm centres around the perimeter of each sheet and at 300mm centres to intermediate framing.
- Fixings are no closer than 10mm from sheet edges.
- Perimeter ceiling framing must be connected to wall framing by a perimeter 140mm x 35mm ribbon plate nailed to the top of the top plate or alternative such as a 0.55mm thick steel angle or proprietary steel channel.
- Sheets must be layed 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 & 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 and Groove of each sheet if potential movement of the plastic tongue joint is not acceptable.
- For trafficable decks use a minimum 17mm 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 Plywood. 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 Plywood' 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 3mm) 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 75mm 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 and 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 and increased moisture resistance.

Blocking not required to support tongue and groove edges (unless otherwise specified). | Specifically designed for use under shingles and tiles that have a courser finish.

Unsanded surface for extra 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, 25mm | 17, 19, 21, 25mm | 15mm |
| Sheet Sizes Available | 2400/2700 x 1200m | | |
| Stress Grades Available | F8/F8, F8/F5 ¹
(F11/F8 available upon request) | F8/F5 (F11/F8 available upon request)
19mm Longspan supplied F11/F8 as standard | F11/F8 |
| 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 Refer to Table 1 and 4B for availability of F8/F8 and F8/F5 products and thicknesses.

² Where roofing products use tongue and groove CHH Plywood recommends fastening the tongue to rafters/joists at a minimum of one point.

4.4 FRAME SPACINGS FOR ECOPLY® ROOFS & DECKS

Table 15A: Roofing - Sheathing, Non Trafficable, Above 2 Degree Pitch

| Application | Roof Pitch | Maximum Wind Zone | Maximum Frame Centres (mm) for Ecopyl® With Face Grain Across Framing | | | |
|---|------------|-------------------|---|-------|-----|-----|
| | | | Ecopyl Nominal Thickness (mm) | | | |
| | | | 15 | 19 | 21 | 25 |
| | | | Stress Grade | | | |
| | | | F11/F8 | F8/F5 | | |
| Sheathing, non trafficable roof for all roof pitches above 2 degrees.
Suitable for roof mass up to 30kg/m ² (additional to Ecopyl® weight or 40kg/m ² including Ecopyl). | >2° | Extra High | 600 | 800 | 800 | 900 |
| | | High | 900 | | | |
| | | Very High | 800 | | | |
| | | Extra High | 800 | | | |
| | >20° | Very High | 900 | | | |
| | | Extra High | 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 | 19 | 21 | 25 |
| | Stress Grade | | | | |
| | F8/F8 | F11/F8 | F8/F5 | | |
| 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 Plywood 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 Plywood 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 Plywood recommends a vent area of 1/300th of the ceiling plan area (approx. 3350mm² 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 25mm 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.

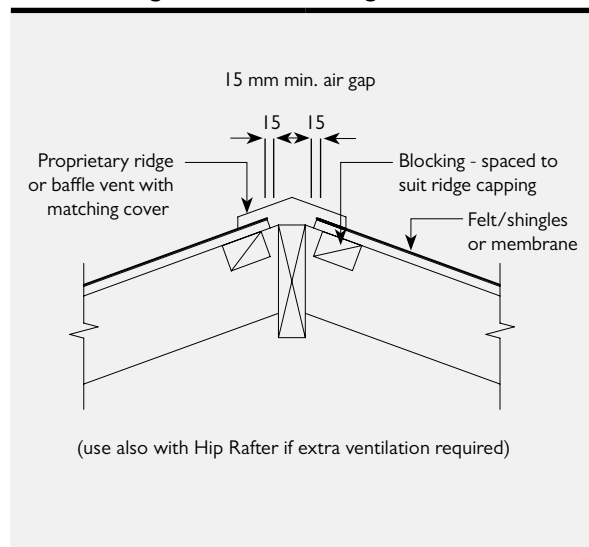
Bubbling

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.

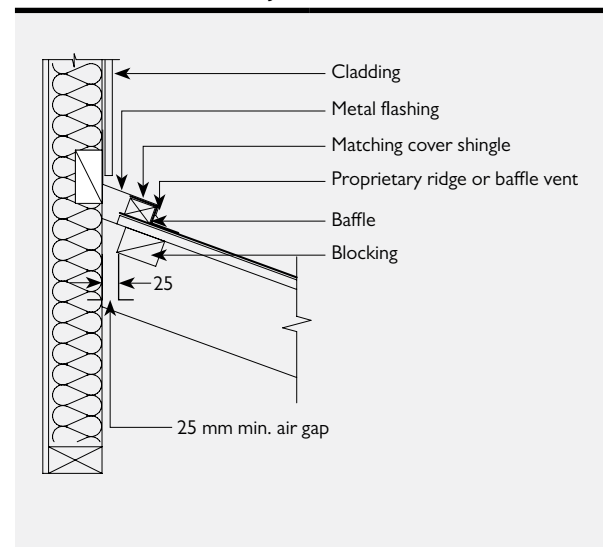
Soil

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.

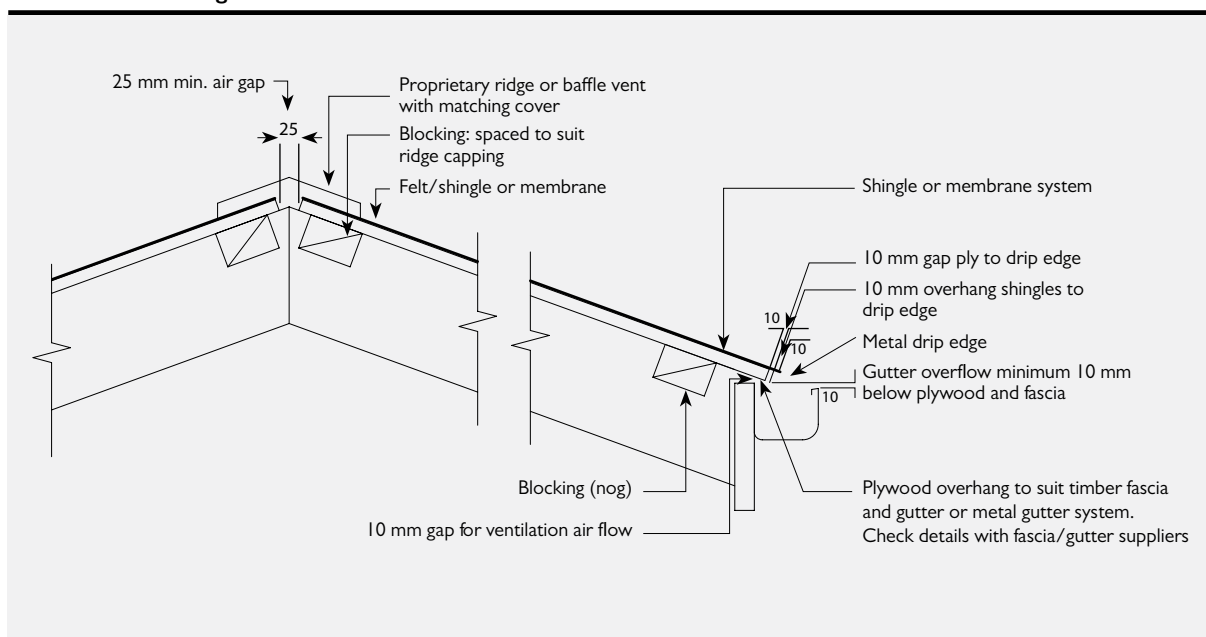
EC003: Ridge Detail With Ridgeboard



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 2.8mm nails spaced at 150mm centres on all cross framing. For very high and extra high wind zones, use 75 x 3.15mm nails spaced at 150mm 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 75mm centres with minimum 60 x 2.8mm nails for regions up to, and including high wind zones (use 75 x 3.15mm 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

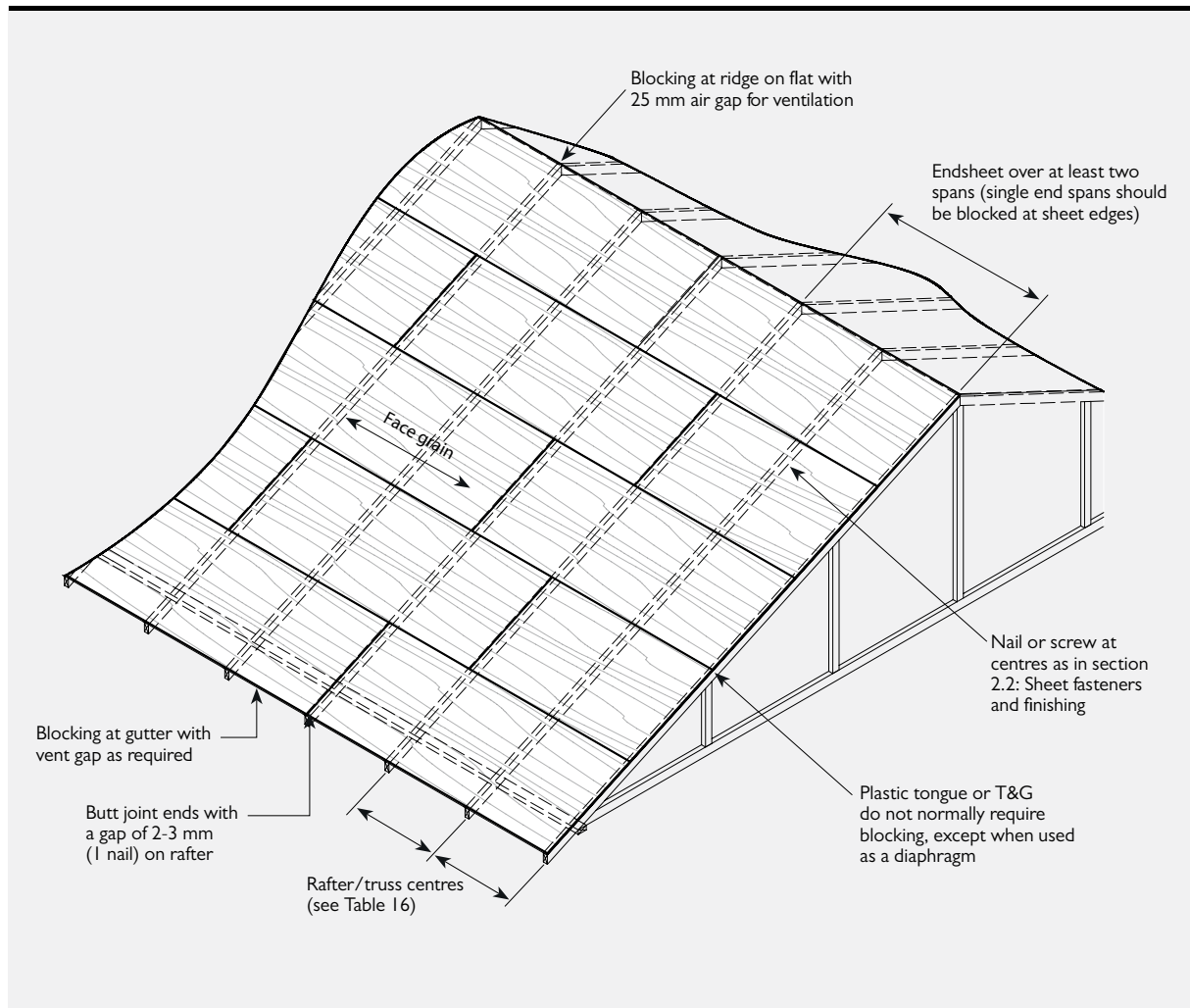
Frames should be at spacings to suit plywood thicknesses in Table 15A, page 25. Additional requirements for roof framing are:

- 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 and 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 50mm long staple with 12mm crown and legs 1.8mm 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 2mm 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/F5 stress grade (F11/F8 available upon request).
- Ecoply 19mm 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 19mm 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) | | | |
| | 17 | 19 | 21 | 25 |
| 1. Domestic flooring 2kPa - 1.8kN | 540 | 600
F11/F8 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.

Floor Loads

For domestic garage floors blocking is required under all edges to control wheel loads on the tongue. Testing with 113mm diameter load head (0.01m²) confirms commercial floor capabilities.

Refer to Table 16 to match frame set outs with 2400mm and 700mm 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.

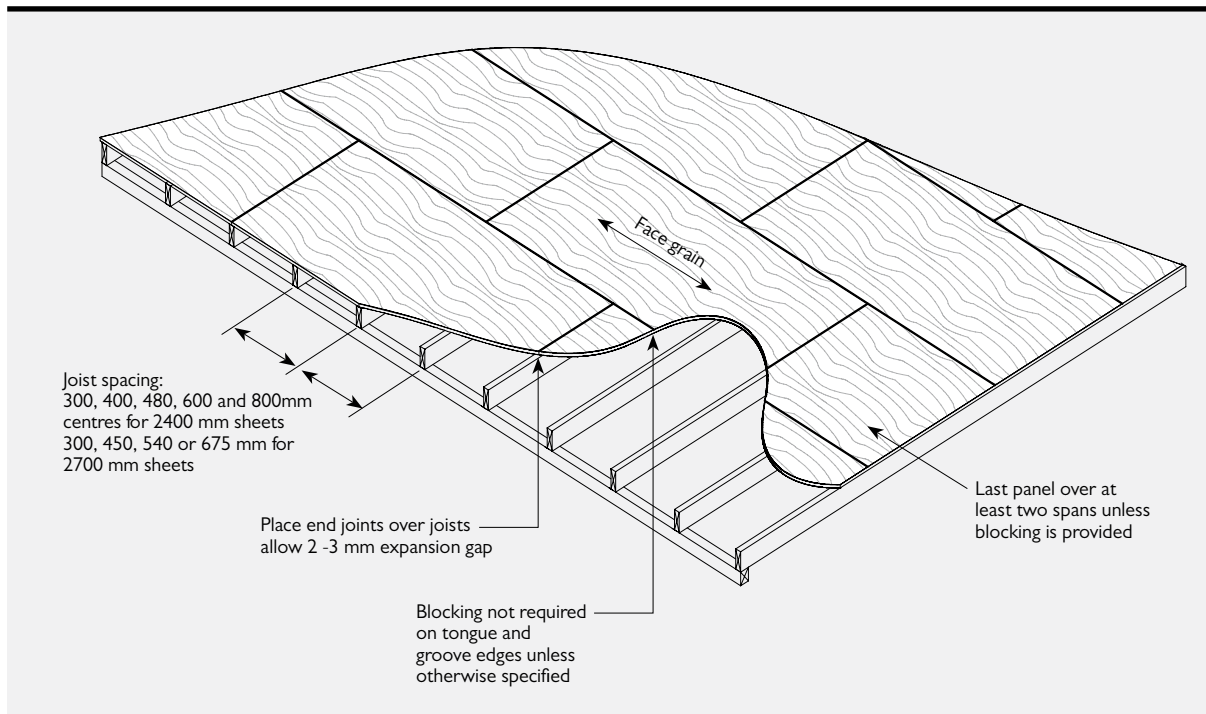
Blocking

- 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 5mm 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-Plywood.pdf>. Use the Paslode Impulse Compact Nailer 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 7mm 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 0.13W/mK so a 12mm 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 and 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 EWPAA 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 | 12mm |
| Edge finish | Square edge |
| Brand name | Ecoply® structural plywood |
| Reference to Standard | To AS/NZS 2269 |
| Stress grade ¹ /(layup) | F8/F5 (12-24-5) |
| Surface grade/bond type | CD A-Bond ² |
| Accreditation | EWPAA product certified ³ |

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/F5 is the most common structural plywood grade found in New Zealand. All Ecoply® structural products are F8 in parallel to the grain direction. Ecoply 19mm Longspan Flooring are F11/F8. Other Ecoply Flooring products are also available in F11/F8 upon request.

Q: What are surface/appearance grades (e.g. CD)?

A: Appearance grades (e.g. 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 and 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 0.5mg/litre). Actual formaldehyde emissions have been tested to be less than 0.3mg/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 & SOURCES OF INFORMATION

- New Zealand Building Code (NZBC).
- CHH Plywood technical notes - downloadable from www.chhply.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 1604.3:2012 "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 and Installation Guide for Cavity Construction.
- Ecoply® Barrier Specification and Installation Guide.
- Safety Data Sheets.
 - SDS Azole Treated Plywood, LVL and I-Joists.
 - SDS H3 CCA Treated Plywood and I-Joist.
 - SDS Untreated Plywood.
- APA (www.buildabetterhome.org).
- EWPA (www.ewp.asn.au).
- Product Technical Statement for Ecoply available online (www.chhply.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.building.govt.nz/building-code-compliance/

8.0 LIMITATIONS

The information contained in this document is current as at October 2022 and is based on data available to CHH Plywood 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 Plywood design information and literature relating to Ecoply structural plywood products. CHH Plywood 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.chhply.co.nz to obtain current information.

CHH Plywood 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 Plywood assumes no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.

9.0 HISTORICAL ECOPLY® SECTION PROPERTIES

Table 18A: Section Properties of Ecoply® Structural Plywood

| Section Properties per mm width | | | | | | | | |
|--|----------------------|------------------------------|--|---|---|---|---|---|
| Nominal Plywood Thickness ¹
(mm) | ID code ² | Mass
(kg/m ²) | Parallel to the Face Grain | | | Perpendicular to the Face Grain | | |
| | | | Parallel Moment of Inertia
(mm ⁴) | Section Modulus
Z (mm ³) | Shear Constant ³
I/Q (mm ²) | Perpendicular Moment of Inertia
I (mm ⁴) | Section Modulus
Z (mm ³) | Shear Constant 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 18B: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F8/F8 Grade

| Nominal Strengths (Limit States) per mm width | | | | | | | |
|--|----------------------|---|--|---|---|--|---|
| Nominal Plywood Thickness ¹
(mm) | ID code ² | Parallel to the Face Grain (F8) | | | Perpendicular to the Face Grain (F8) | | |
| | | Bending Stiffness
EI
(1000 Nmm ²) | Bending Moment
f _{pb} Z
(Nmm) | Rolling Shear
f _{pr} I/Q
(N) | Bending Stiffness
EI
(1000 Nmm ²) | Bending Moment
f _{pb} Z
(Nmm) | Rolling Shear
f _{pr} I/Q
(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 18C: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F11/F8 Grade (Including Longspan Flooring)

| Nominal Strengths (Limit States) per mm width | | | | | | | |
|--|----------------------|---|--|---|---|--|---|
| Nominal Plywood Thickness ¹
(mm) | ID code ² | Parallel to the Face Grain (F11) | | | Perpendicular to the Face Grain (F8) | | |
| | | Bending Stiffness
EI
(1000 Nmm ²) | Bending Moment
f _{pb} Z
(Nmm) | Rolling Shear
f _{pr} I/Q
(N) | Bending Stiffness
EI
(1000 Nmm ²) | Bending Moment
f _{pb} Z
(Nmm) | Rolling Shear
f _{pr} I/Q
(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 Actual thickness of Ecoply® sheets manufactured to thickness tolerances stated in AS/NZS 2269.

² Identification code: panel thickness – outermost veneer thickness x 10 – number of plies.

³ I/Q values for rolling shear are for stress at the neutral axis calculated as in NZS 3603.

Notes:

- Use Tables 18A and B values for all F8 stress grade Ecoply products.
- Use Tables 18A and C values for all F11/F8 stress grade Ecoply (including 19 mm Ecoply Longspan Flooring).
- The section properties in Tables 18A, B and C have been calculated in accordance with AS/NZS 2269.
- For section properties for other thicknesses and Shadowclad® products contact CHH Plywood on 0800 326 759.



Private Bag 92-106
Victoria Street West
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ECOPLY: V5. 10.1122





ELETANK

INSTALLATION INSTRUCTIONS for ELE10

Protect your investment with correct preparation & installation

Your ELE10 water tank needs a good foundation so that all the weight is distributed evenly to solid ground. When the tank is full it will weigh nearly 16,000Kg and then it is also supporting soil on top, **if the foundation is poor**, the ELETANK may move causing pipe work connections to break and cracks in your ELETANK.

The **bottom of the hole needs to be level**, we recommend 100mm compacted sand in the base of the hole to ensure it is level. **NO** large stones are allowed thus avoiding pressure spots.

Lift tank using correct lifting gear

NOTE - DO NOT SHORT CHAIN, this will pull the swiftlifts out if angle is too steep

NEVER STAND BENEATH or IN THE PATH OF A RAISED LOAD

INSTALLATION DEPTH

We recommend a square 3.2M by 3.2M hole is prepared with a flat even base so that the bottom of the ELETANK is supported evenly to ensure long serviceability. A tolerance of 25mm is permitted over the base. Dig to a depth of 2350mm so the finished base with the sand in the **bottom is at 2250mm or only dig to 2250mm if you are digging in sand.** The height of the ELE10 is 2300mm to the top of the turret but you need a lip above the ground to stop mud washing into the tank with groundwater. **Place tank into hole with inlet towards house.**

| Tank | Dimensions |
|----------|------------|
| Diameter | 2.90m |
| Height | 2.39m |
| Weight | 7,000Kgs |

Ensure pipe connections are **complete** before covering

Back-fill hole with packing sand or clean fill **COMPACTING EVERY 300mm.**

MAKE SURE TANK RISER TOP is 50mm or more above ground level and is level - USE A LEVEL

The concrete lids need to be above ground to allow air to circulate through the system.

The top of the tank has a 100mm pipe fitted for connection to the stormwater from the downpipes on the house.

On the opposite side to the turret is a soft spot - you may knock this out and **epar** the overflow in place if preferred.

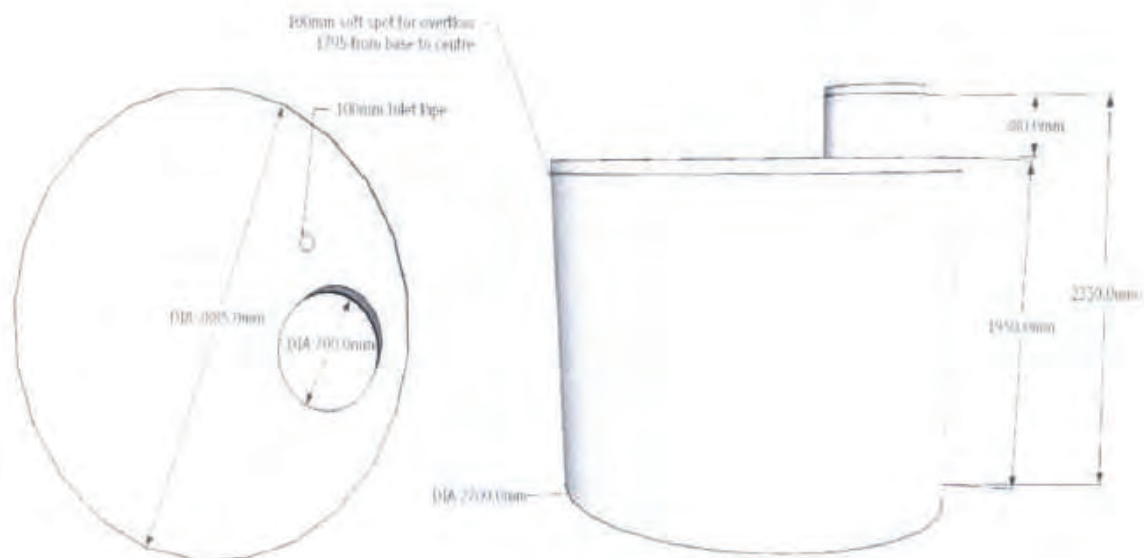
Please ensure that your site is well prepared and that you do not have other contractors (eg: plumbers, diggers) waiting on site specifically for your ELETANK delivery.

McDONALD CONCRETE GROUP Ltd will not accept responsibility for your contractor's costs should delivery be delayed.

If you are experiencing any delivery problems please contact us on 0800 353 222.

We allow 15 minutes to site an ELE10. Any extra time on site is chargeable at the delivery contractor's discretion.

FILL TANK WITH WATER TO PREVENT FLOTATION



NOT SUITABLE FOR INSTALLATION UNDER A DRIVEWAY WITHOUT EXTRA ENGINEERING WORK

PLEASE NOTE

- 1| A permit from the responsible Local Authority may be required before installing an your ELE10
- 2| In the Kapiti area this is mandatory.
- 3| Plumber|Drainlayer doesn't have to be in attendance of delivery **BUT** will have to take responsibility for installation
- 4| Tank Internal capacity to roof - maximum 11,420 Litres.

**FOR SALES & SERVICE PHONE
0800 ELE 222**

NZS3604:2011 & Specific Engineering Design in Wind Zone Environments

To Whom It May Concern

Re: Gerard Roof Tiles in NZS 3604:2011 and Specific Engineering Design – Wind Zone Environments.

NZBC B1 requires that the performance of the building elements shall have low probability of failure when exposed to conditions that the building element could be exposed to. The tiles produced by Gerard Roofing and sold in the New Zealand market under the Gerard brand are designed to be suitable for all environments including Wind Zones outlined in NZS3604:2011 and those classified as being Specific Engineered Designed when installed and maintained as specified by Gerard Roofs.

Construction of the roof includes connection of the truss/rafters to the top plate, batten to rafter fastenings and tile to batten fastenings.

Truss – Top Plate Connection

The connection of the truss/rafters to the top plate is outside the control of Gerard Roofs and is the responsibility of the builder/designer to ensure this connection is specified and installed correctly. NZS3604:2011 has data on this for wind speeds up to the Extra High Wind Zone (55 m/s); wind speeds above this require specific design by an Engineer.

Tile Batten – Rafter Connection

Connection of the tile battens to the rafter is carried out by the roof installer.

Gerard Roofs require that the installer fasten the tile battens using the fasteners that will withstand the wind loads that would occur at the periphery of a roof to all batten rafter junctions. NZS3604:2011 Table 10.12 Tile Battens for all Wind Zones outlines the fasteners required for periphery wind zones up to and including Extra High (55 m/s). This means that in the lower wind zones the fastening of Gerard Roofs exceed the requirements of NZS3604:2011.

Wind Zones above 55 m/s require specific design to ensure that the batten rafter connection will withstand the loads applied. Gerard Roofs has conducted testing establishing batten rafter connection maximum loadings based on the requirements of AS/NZS1170.2 up to wind loads of 7.5 kPa. The connection strengths of fasteners are lower than those specified in NZS3604:2011 as these reflect the limits of the testing.

The maximum connection strength of fasteners which Gerard Roofs have evaluated is shown in **Table 1 - Batten Rafter Connections**.

Tile to Tile Batten Connection

Connection of the tiles to the tile battens is carried out by the roof installer.

Gerard Roofs require that the installer fasten tiles using the fasteners specified by Gerard Roofs. Gerard Roofing has conducted testing establishing tile to tile batten connection maximum loadings based on the requirements of AS/NZS1170.2 up to wind loads of 7.5 kPa. The maximum wind load fasteners can withstand is shown in **Table 2 - Tile Fasteners**.

| Batten - Rafter Fastener | Batten spacing (mm) | Rafter span (mm) | Batten size (mm) | Fastener Load Capacity (kN) | Maximum Design Pressure of periphery load on roofing system (kPa) | Maximum Wind Speed (m/s) | Factors used in determining loads
Kl, Cpi, Cpe |
|-----------------------------|---------------------|------------------|------------------|-----------------------------|---|--------------------------|---|
| 2x 90 x3.15 mm
Gun nails | 370 | 900 | 40 x 50 | 0.9 | 2.48 | 50 | Kl = 1.5
Cpi = 0.3
Cpe - 0.9
NZS 3604:2011 |
| | 320 | 900 | 40 x 50 | 0.9 | 2.68 | 52 | |
| | 370 | 1200 | 50 x 50 | 0.8 | 1.75 | 42 | |
| | 320 | 1200 | 50 x 50 | 0.8 | 2.00 | 45 | |
| 1 x 80 mm 10 g
Screw | 370 | 900 | 40 x 50 | 1.83* | 5.58 | 61 | Kl = 2
Cpi = 0.7
Cpe - 0.9
AS/NZS 1170.2 |
| | 320 | 900 | 40 x 50 | 1.83* | 6.34 | 65 | |
| | 370 | 1200 | 50 x 50 | 1.5* | 4.06 | 52 | |
| | 320 | 1200 | 50 x 50 | 1.5* | 5.22 | 59 | |
| 1 x 100 mm 14 g
Screw | 370 | 900 | 40 x 50 | 4.0* | 7.50** | 71 | Kl = 2
Cpi = 0.7
Cpe - 0.9
AS/NZS 1170.2 |
| | 320 | 900 | 40 x 50 | 4.0* | 7.50 | 71 | |
| | 370 | 1200 | 50 x 50 | 4.0* | 7.50 | 71 | |
| | 320 | 1200 | 50 x 50 | 4.0* | 7.50 | 71 | |

Table 1 Batten Rafter Connections

* Design loads for these fasteners are higher in NZS 3604:2011, use these figures for Gerard Roofs

** Ultimate Design Pressure load to which roofing system has been tested

| Batten - Rafter Fastener | Batten spacing (mm) | Rafter span (mm) | Tile nails per tile | Maximum Design Pressure of periphery load on roofing system (kPa) | Maximum Wind Speed (m/s) | Factors used in determining loads Kl, Cpi, Cpe |
|--------------------------------------|---------------------|------------------|---------------------|---|--------------------------|---|
| 50 mm x 2.8 mm HDG Painted Tile Nail | 370 | 900 | 4 *1 | 3.8** | 62 | Kl = 1.5
Cpi = 0.3
Cpe = 0.9
NZS 3604:2011 |
| | 320 | 900 | 4 *1 | 4.4 | 66 | |
| | 370 | 1200 | 4 *1 | 2.9 | 54 | |
| | 320 | 1200 | 4 *1 | 3.4 | 58 | |
| | 370 | 900 | 5 *2 | 5.2** | 59 | Kl = 2
Cpi = 0.7
Cpe = 0.9
AS/NZS 1170.2 |
| | 320 | 900 | 5 *2 | 6.0 | 63 | |
| | 370 | 1200 | 5 *2 | 3.9 | 51 | |
| | 320 | 1200 | 5 *2 | 4.5 | 55 | |
| | 370 | 900 | 7 *3 | 7.5** | 71 | Kl = 2
Cpi = 0.7
Cpe = 0.9
AS/NZS 1170.2 |
| | 320 | 900 | 7 *3 | 7.5 | 71 | |
| | 370 | 1200 | 7 *3 | 5.6 | 61 | |
| | 320 | 1200 | 7 *3 | 6.4 | 65 | |

Table 2 Tile Fasteners

*1 Nails spaced every second module and at each lap on tiles or 320 mm spacing

*2 Nails spaced every 250 mm on Stratos, Alpine, Senator, Rockport and Oberon. For Heritage, Milano and Classic refer to *3

*3 Nails located at every module or 180 mm

** Ultimate design load to which roofing system has been tested for 4, 5 or 7 nail fastening.

The installation and maintenance requirements required to meet the needs of NZBC are also covered in the Gerard Roofs 50 year warranty.

In summary, we have confidence that roofs installed as per Gerard Roofs installation manual and maintained in accordance with our warranty will last in excess of 50 years. Should this not address your concerns, please feel free to contact me in person so I can better understand your reservations.

Regards

Dean Vincent

Peter Richards

Sales and Marketing Manager

Product Innovation Manager

New Zealand and Pacific regions



New Zealand specification manual

Roofing Designed to Endure

New Zealand's steel roofing system

2.0 Design considerations

3.0 Substrate & installation overview

4.0 Standard roof details

5.0 Components & fixing patterns

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|----------------------------------|----|
| 5.1 Gerard Roofs components | 38 |
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New Zealand's ingenious pressed steel roofing system

A Gerard roof is made up of individual lightweight pressed steel panels secured using a unique fixing system that effectively locks them together to form a single structural unit. The result is a roof that's stylish, copes with severe weather and lasts a very long time.

Invented in New Zealand ...

In 1957 New Zealand innovator Lou Fisher saw an opportunity to create a new kind of roof. Disappointed with the limitations of solid tile and the utilitarian look of long-run corrugated iron roofs, he invented the steel tile roof and established a trusted brand that would grow to become Gerard Roofs.

... proven all over the world

The company continues to lead through ongoing product development and relentless attention to quality standards. Over the years Gerard Roofs' products have been fine-tuned to endure in all living situations and are now used in over 120 countries.

The Gerard roof you put over your head has not only been proven throughout New Zealand, but in some of the most extreme climates and environments on the planet

1.1 Products

1.1.1. Gerard Roof profiles

The roof has profound effect on the look of most homes

An attractive roof is a significant architectural feature. The roof usually accounts for around a third of the overall visual appearance of a home and will have a noticeable influence on its style and street appeal.

Gerard Roofs' profiles complement a range of styles

For many people, choosing a roof is primarily about looks. Homes are a reflection of individuality and

their roofs a prominent feature. Unlike most other roofing types Gerard offers a system of choices that enables you to determine the right 'look' rather than having to accept a pre-defined one.

Applicable to traditional or contemporary architecture

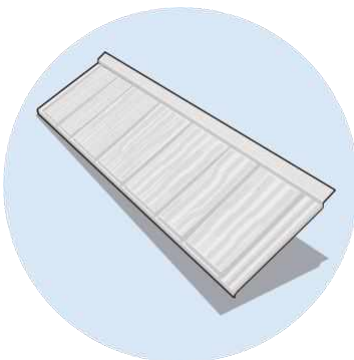
Whether you're imagining traditional style or something following the latest trends, Gerard Roofs have profiles to meet the brief. Milano, for example, is reminiscent of the enduring ridged roofs of the Mediterranean; by contrast, a profile like Rockport offers a slimmer, squarer more contemporary pattern.



Products and specifications

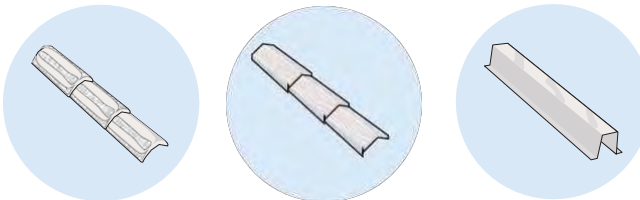
Gerard Stratos

Combining a flat plane with continuous but irregular grooves gives Gerard Stratos a recurring but slightly organic pattern that works with many styles of home.



| | |
|-----------------------|---------|
| Pitch – min./max. | 15-90° |
| Overall length | 1320 mm |
| Length of cover | 1250 mm |
| Width of cover | 370 mm |
| Upstand | 27 mm |
| Roof cover/panel | 0.46 m² |
| Panels/m² | 2.2 |
| Weight/panel Textured | 3.0 kg |
| Weight/panel Smooth | 2.1 kg |
| Weight/m² Textured | 6.6 kg |
| Weight/m² Smooth | 4.7 kg |

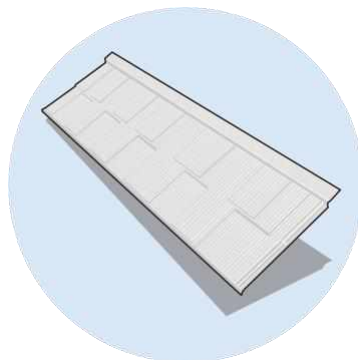
Gerard Stratos is compatible with all three Gerard trims – **Barrel**, **Angle** and **Box**.



Dimensions and weights given are nominal.

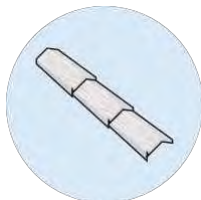
Gerard Senator

A profile with a modern look and subtle raised detailing. Senator is known for the simplicity and uniformity it brings to contemporary and traditional homes.



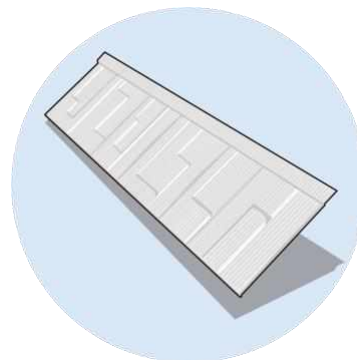
| | |
|-----------------------|---------|
| Pitch – min./max. | 15-90° |
| Overall length | 1320 mm |
| Length of cover | 1250 mm |
| Width of cover | 368 mm |
| Upstand | 16 mm |
| Roof cover/panel | 0.46 m² |
| Panels/m² | 2.2 |
| Weight/panel Textured | 3.0 kg |
| Weight/panel Smooth | NA |
| Weight/m² Textured | 6.6 kg |
| Weight/m² Smooth | NA |

Gerard Senator is compatible with **Angle** trim.



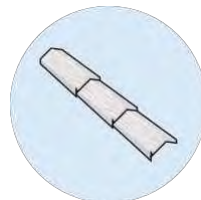
Gerard Rockport

Among Gerard’s flattest profiles, Rockport lends your roof a sleek, linear look and is often used on clean, simple architecture with a modern bias.



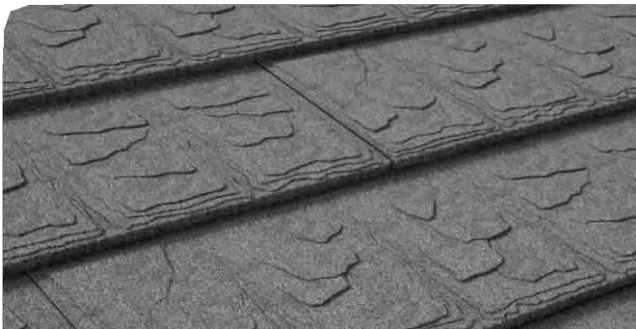
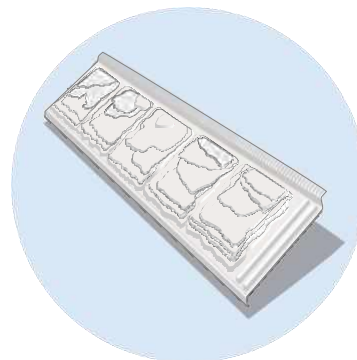
| | |
|-----------------------|---------|
| Pitch – min./max. | 15-90° |
| Overall length | 1330 mm |
| Length of cover | 1250 mm |
| Width of cover | 368 mm |
| Upstand | 20 mm |
| Roof cover/panel | 0.46 m² |
| Panels/m² | 2.2 |
| Weight/panel Textured | 3.0 kg |
| Weight/panel Smooth | NA |
| Weight/m² Textured | 6.6 kg |
| Weight/m² Smooth | NA |

Gerard Rockport is compatible with **Angle** trim.



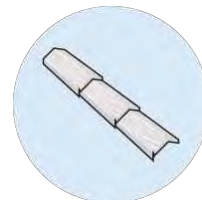
Gerard Alpine

Inspired by the look of Welsh slate the Gerard Alpine profile lends a smooth, sleek linear look while surface detailing adds a slightly rustic overtone.



| | |
|-----------------------|---------|
| Pitch – min./max. | 15-90° |
| Overall length | 1335 mm |
| Length of cover | 1260 mm |
| Width of cover | 368 mm |
| Upstand | 17 mm |
| Roof cover/panel | 0.46 m² |
| Panels/m² | 2.2 |
| Weight/panel Textured | 2.9 kg |
| Weight/panel Smooth | NA |
| Weight/m² Textured | 6.4 kg |
| Weight/m² Smooth | NA |

Gerard Alpine is compatible with **Angle** trim.



Dimensions and weights given are nominal.